EA PREREQUISITE 2: MINIMUM ENERGY PERFORMANCE

Project # 1000018096 OUS/OHSU CLSB and OHSU Skourtes Tower

All fields and uploads are required unless otherwise noted.

THRESHOLD ATTEMPTED

Points Attempted: 0

ALL PROJECTS

TARGET FINDER

The following fields are required, but the values have no bearing on EA Prerequisite 2 compliance. Use the Target Energy Performance Results calculator on the ENERGY STAR website to generate the values. If using prescriptive compliance paths (Options 2 or 3), leave the Design energy consumption and cost values blank in the Target Finder website, and set the Design values equal to the Target values in this form.

	Design		Target	
Energy performance rating (1-100):				
CO_2-eq emissions:		metric tons/year		metric tons/year
CO_2-eq emissions reduction:		%		%

Upload EAp2-1. Provide the Target Finder Energy Performance Results for the project building (a screen capture or other documentation containing the same information). (Optional)

Upload *Files: 0*

☒ The building is not able to get a Target Finder score because the tool does not support the primary building type of the project building and/or the project is not located in the United States. (Optional)

PREREQUISITE COMPLIANCE

Total gross square footage: 504,504 sf

The content highlighted in yellow above is linked to PIf2, PIf3, SSc2, EAp1, EAc1, EAc2, EAc6, MRc1.1 & MRc1.2.

Principal project building activity: Core Learning Space: College/University

The content highlighted in yellow above is linked to PIf3 & EAc1.

Select a compliance path:

- (●) **Option 1. Whole Building Energy Simulation.** The project team will document improvement in the proposed building performance rating as compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2007 or California Title 24-2005 Part 6.
- ( ) **Option 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide.** The project team will document compliance with the ASHRAE Advanced Energy Design Guide.
- ( ) **Option 3. Prescriptive Compliance Path: Advanced Buildings Core Performance Guide.** The project team will document compliance with the Advanced Buildings™ Core Performance™ Guide.

The content highlighted in yellow above is linked to EAc1, EAc2 & EAc6.

OPTION 1. WHOLE BUILDING ENERGY SIMULATION

Complete the following sections:

Section 1.1A - General Information
Section 1.1B - Mandatory Requirements
Section 1.2 - Space Summary
Section 1.3 - Advisory Messages
Section 1.4 - Comparison of Proposed Design Versus Baseline Design Energy Model Inputs
Section 1.5 - Energy Type Summary
Section 1.6 - Performance Rating Method Compliance Report
Section 1.7 - Exceptional Calculation Measure Summary
Section 1.8 - On-Site Renewable Energy
Section 1.9A - Total Building Performance Summary
Section 1.9B - Reports & Metrics

SECTION 1.1A - GENERAL INFORMATION

☒ **Compliant energy simulation software:** The energy simulation software used for this project has all capabilities described in EITHER section "G2 Simulation General Requirements" in Appendix G of ASHRAE 90.1-2007 OR the analogous section of the alternative qualifying energy code used.

☒ **Compliant energy modeling methodology:** Energy simulation runs for both the baseline and proposed building use the assumptions and modeling methodology described in EITHER ASHRAE 90.1-2007 Appendix G OR the analogous section of the alternative qualifying energy code used.

Simulation program:	eQuest
Principal heating source:	Fossil Fuel
Energy code used:	ASHRAE 90.1-2007

List the ASHRAE addenda used in the modeling assumptions, if any. (Optional)

N/A

Zip/Postal Code:	97239

The content highlighted in yellow above is linked to SSc1 & SSc2.

Weather file:	Porltaor.bin (TMY2 dataset Port Intl Airport)
Climate zone:	4c

List the climatic data from ASHRAE Standard 90.1-2007 Table D-1. Specify if another source is referenced for HDD & CDD data.

Heating Degree Days:	4,522
Cooling Degree Days:	2,517
HDD and CDD data source, if other than ASHRAE: (Optional)	

New construction gross square footage:	504,504	
Existing, renovated gross square footage:	0	
Existing, unrenovated gross square footage:	0	
Total gross square footage:	504,504	
New construction percent:	100	%
Existing renovation percent:	0	%
Existing unrenovated percent:	0	%

The content highlighted in yellow above is linked to PIf2, PIf3, SSc2, EAp1, EAc1, EAc2, EAc6, MRc1.1 & MRc1.2.

Gross square footage used in the energy model, if different than gross square footage above: (Optional) 504,504

SECTION 1.1B - MANDATORY REQUIREMENTS

Signatory EAp2-1.

For all elements included in the Architect's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: PP

Priya Premchandran; N/A; September 11, 2012

OR

( ) **Upload EAp2-S1.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Signatory EAp2-2.

For all elements included in the Mechanical Engineer's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: NG

Ned Greene; MEP Engineer; September 11, 2012

OR

( ) **Upload EAp2-S2.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Signatory EAp2-3.

For all elements included in the Electrical Engineer's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: JRS

Jim Sattem; Electrical Engineer; September 11, 2012

OR

( ) **Upload EAp2-S3.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Provide the following Interactive Compliance Forms:

Upload EAp2-2. Building Envelope Compliance Documentation (Optional) Upload *Files:* 0

Upload EAp2-3. HVAC Compliance Documentation (Optional) Upload *Files:* 0

Upload EAp2-4. Lighting Compliance Documentation (Optional) Upload *Files:* 0

Upload EAp2-5. Service Water Heating Compliance (Optional) Upload *Files:* 0

SECTION 1.2 - SPACE SUMMARY

Table EAp2-1. Space Usage Type

Space Name / Description	Space Usage Type	Space Area (sf)	Regularly Occupied Area (sf)	Unconditioned Area (sf)	Typical Hours in Operation (per week)		
Atrium	Atrium	18,173.5	0	0	65	+	-
Corridor/ Lobby	Corridor/Lobby	59,807.9	0	0	65	+	-
Stair	Stair	18,725.7	0	0	93	+	-
Elevator/ Shaft	Elevator/ Shaft	16,921.2	0	16,921.2	93	+	-
Laboratory	Laboratory	95,452	95,452	0	93	+	-
Classroom/ Lecture	Classroom/ Lecture	52,890.5	52,890.5	0	65	+	-
Mech/ Elec	Mech/ Elec	28,848.8	0	28,848.8	93	+	-
Office/ Conference	Office/ Conference	95,682.2	95,682.2	0	65	+	-
Clinical	Clinical	73,617	73,617	0	65	+	-
Retail	Retail	6,682	6,682	0	65	+	-
Building Support	Building Support	37,703.2	21,332.6	16,370.6	93	+	-
Total		504,504	345,656.3	62,140.6			
Percentage of total (%)			68.51	12.32			

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SECTION 1.3 - ADVISORY MESSAGES

Complete the table below based on information from the energy simulation output files.

Table EAp2-2. Advisory Messages

	Baseline Design (0° Rotation)	Proposed Design
Number of hours heating loads not met[1]	216	197
Number of hours cooling loads not met[1]	73	38
Total	289	235
Difference [2] (Proposed minus baseline)		-54
Number of warning messages	0	0
Number of error messages	0	0
Number of defaults overridden	0	0
Unmet load hours compliance	Y	

1 Baseline design and proposed design unmet load hours each may not exceed 300
2 Unmet load hours for the proposed design may not exceed the baseline design by more than 50 hours.

SECTION 1.4 - COMPARISON OF PROPOSED DESIGN VERSUS BASELINE DESIGN ENERGY MODEL INPUTS

Download, complete, and upload "EAp2 Section 1.4 table.xls" (found under "Credit Resources") to document the baseline and proposed design energy model inputs for the project. Documentation should be sufficient to justify the energy and cost savings numbers reported in the Performance Rating tables below.

Upload EAp2-7. Provide the completed EAp2 Section 1.4 tables available under "Credit Resources."

Upload *Files: 6*

SECTION 1.5 - ENERGY TYPE SUMMARY

List the energy types used by the project (i.e. electricity, natural gas, purchased chilled water or steam, etc.), and provide the the virtual energy rate from the baseline and proposed design energy model results or from manual calculations. *If revising the values in Table EAp2-3, reselect energy type in all affected rows in Table EAp2-4 and Table EAp2-5 to ensure that the revised values are propagated and that Table EAp2-4 and Table EAp2-5 calculations are refreshed.*

Table EAp2-3. Energy Type Summary

Energy Type	Utility Company Name	Utility Rate and Description of Rate Structure [1]	Baseline Virtual Rate[2] ($ per unit energy)	Proposed Virtual Rate[2] ($ per unit energy)	Units of Energy	Units of Demand
Electricity	PGE	PGE-89P	0.0708	0.0711	kWh	kW
Natural Gas	NW Natural	Sch 32 Volumetric	0.7335	0.7986	therms	therms/hr

Energy Type	Utility Company Name	Utility Rate and Description of Rate Structure [1]	Baseline Virtual Rate[2] ($ per unit energy)	Proposed Virtual Rate[2] ($ per unit energy)	Units of Energy	Units of Demand

+ -

Notes:

1 *Per ASHRAE 90.1-2007 G2.4, project teams are allowed to use the state average energy prices published by DOE's EIA for commercial building customers, available on EIA's website (www.eia.gov). If project uses backup energy for on-site renewable energy, please specify the rate of backup source energy.*

2 *Rate is defined as the total annual charge divided by the metered energy from the plant for each resource.*

If the proposed and baseline rates vary significantly, describe the building input parameters (e.g. demand reduction measures) leading to the variation in energy rates, and provide detailed information regarding the utility rate structure including all demand and energy charges, and the seasonal and time-of-use structure of the utility tariff. (Required when proposed and baseline rates vary by more than 10%)

Natural Gas rate schedule varies by 7%. The rate schedule is subject to fixed volumetric charges, and service charges. As the volumetric charge increases, the overall cost per therm goes down.

Upload EAp2-8. Provide any documentation to support the proposed/ baseline rate variance narrative. (Optional)

Upload *Files: 0*

SECTION 1.6 - PERFORMANCE RATING METHOD COMPLIANCE REPORT

In the table below, list each energy end use for the project (including all end uses reflected in the baseline and proposed designs). Then check whether the end-use is a process load, select the energy type, and list the energy consumption and peak demand for each end-use for all four baseline design orientations.

Table EAp2-4. Baseline Performance - Performance Rating Method Compliance

End Use	Process	Baseline Design Energy Type	Units of Annual Energy & Peak Demand		Baseline (0° rotation)	Baseline (90° rotation)	Baseline (180° rotation)	Baseline (270° rotation)	Baseline Building Results
Interior Lighting		Electricity	Energy Use	kWh	3,042,725	3,042,725	3,042,725	3,042,725	3,042,725
			Demand	kW	627.93	627.93	627.93	627.93	627.93
Exterior Lighting		Electricity	Energy Use	kWh	54,789	54,789	54,789	54,789	54,789
			Demand	kW	10.72	10.72	10.72	10.72	10.72
Space Heating		Natural Gas	Energy Use	therms	403,754	405,825	396,913	403,754	402,561.5
			Demand	therms/h	226	226.5	222.3	226	225.2
Space Cooling		Electricity	Energy Use	kWh	1,736,368	1,758,011	1,724,370	1,736,368	1,738,779.25
			Demand	kW	984.94	1,015.21	978.05	984.94	990.79

Pumps		Electricity	Energy Use	kWh	613,581	632,941	653,597	613,581	628,425
			Demand	kW	198.48	199.03	199.15	198.48	198.79
Heat Rejection		Electricity	Energy Use	kWh	35,321	35,573	35,019	35,321	35,308.5
			Demand	kW	65.49	67.55	67.23	65.49	66.44
Fans-Interior		Electricity	Energy Use	kWh	3,266,240	3,280,502	3,208,211	3,266,240	3,255,298.25
			Demand	kW	563.91	592.02	553.12	563.91	568.24
Fans - Parking Garage	X	Electricity	Energy Use	kWh	15,550	15,550	15,550	15,550	15,550
			Demand	kW	1.78	1.78	1.78	1.78	1.78
Service Water Heating		Natural Gas	Energy Use	therms	8,387	8,387	8,387	8,387	8,387
			Demand	therms/h	1.5	1.5	1.5	1.5	1.5
Receptacle Equipment	X	Electricity	Energy Use	kWh	5,317,190	5,317,190	5,317,190	5,317,190	5,317,190
			Demand	kW	972.46	972.46	972.46	972.46	972.46
Interior Lighting - Process	X	Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
Refrigeration Equipment	X	Electricity	Energy Use	kWh	46,837	46,837	46,837	46,837	46,837
			Demand	kW	8.68	8.68	8.68	8.68	8.68
Cooking	X	Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
Industrial Process	X	Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
Elevators and Escalators	X	Electricity	Energy Use	kWh	468,041	468,041	468,041	468,041	468,041
			Demand	kW	53.43	53.43	53.43	53.43	53.43
Process Steam	X	Natural Gas	Energy Use	therms	34,806	34,806	34,806	34,806	34,806
			Demand	therms/h	6.3	6.3	6.3	6.3	6.3
Process Steam Acc	X	Electricity	Energy Use	kWh	1,848	1,848	1,848	1,848	1,848
			Demand	kW	0.21	0.21	0.21	0.21	0.21
Heating Acc		Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
Boiler Misc equip(space heating)		Natural Gas	Energy Use	therms	0	0	0	0	0
			Demand	therms/h	0	0	0	0	0
Boiler misc equip		Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
CH misc equip (space cooling)		Electricity	Energy Use	kWh	19,448	20,018	19,866	19,480	19,703
			Demand	kW	10.82	10.94	10.69	10.82	10.82
Heat pump supple		Electricity	Energy Use	kWh	144,668	144,668	144,668	144,668	144,668
			Demand	kW	31.82	31.82	31.82	31.82	31.82

End Use	Process	Baseline Design Energy Type	Units of Annual Energy & Peak Demand		Baseline (0° rotation)	Baseline (90° rotation)	Baseline (180° rotation)	Baseline (270° rotation)	Baseline Building Results
HRC misc equip (space cooling)		Electricity	Energy Use	kWh	0	0	0	0	0
			Demand	kW	0	0	0	0	0
BaselineTotal Energy Use (MMBtu/yr)					95,064.71	95,463.18	94,278.61	95,064.82	94,967.83
Baseline Annual Process Energy (MMBtu/yr)						23,438.98			
Process Energy Modeling Compliance [1]						Y			

1 Determined using Section 1.9 cost calculations after Section 1.9A is complete. Annual process energy costs must be at least 25% of the total energy costs for the proposed design. Process energy costs should be modeled to accurately reflect the proposed building.

Complete the table below. List the proposed design energy consumption and peak demand for each end use.

Table EAp2-5. Performance Rating - Performance Rating Method Compliance

End Use	Process	Baseline Building Units		Baseline Building Results	Proposed Design Energy Type	Units of Annual Energy & Peak Demand		Proposed Building Results	% Sav
Interior Lighting		Energy Use	kWh	3042725	Electricity	Energy Use	kWh	1,388,519	54.37
		Demand	kW	627.93		Demand	kW	348.52	
Exterior Lighting		Energy Use	kWh	54789	Electricity	Energy Use	kWh	16,301	70.25
		Demand	kW	10.72		Demand	kW	3.19	
Space Heating		Energy Use	therms	402561.5	Natural Gas	Energy Use	therms	92,002	77.15
		Demand	therms/hr	225.2		Demand	therms/hr	94.8	
Space Cooling		Energy Use	kWh	1738779.25	Electricity	Energy Use	kWh	1,746,718	-0.46
		Demand	kW	990.79		Demand	kW	773.07	
Pumps		Energy Use	kWh	628425	Electricity	Energy Use	kWh	138,877	77.9
		Demand	kW	198.79		Demand	kW	55.18	
Heat Rejection		Energy Use	kWh	35308.5	Electricity	Energy Use	kWh	50,083	-41.84
		Demand	kW	66.44		Demand	kW	40.77	
Fans-Interior		Energy Use	kWh	3255298.25	Electricity	Energy Use	kWh	2,364,465	27.37
		Demand	kW	568.24		Demand	kW	472.98	
Fans - Parking Garage	X	Energy Use	kWh	15550	Electricity	Energy Use	kWh	15,550	0
		Demand	kW	1.78		Demand	kW	1.78	
Service Water Heating		Energy Use	therms	8387	Natural Gas	Energy Use	therms		
		Demand	therms/hr	1.5		Demand	therms/hr	0	
Receptacle Equipment	X	Energy Use	kWh	5317190	Electricity	Energy Use	kWh	5,317,190	0
		Demand	kW	972.46		Demand	kW	972.46	
Interior Lighting - Process	X	Energy Use	kWh	0	Electricity	Energy Use	kWh	0	0
		Demand	kW	0		Demand	kW	0	

Refrigeration Equipment	X	Energy Use	kWh	46837	Electricity	Energy Use	kWh	46,837	0
		Demand	kW	8.68		Demand	kW	8.68	
Cooking	X	Energy Use	kWh	0	Electricity	Energy Use	kWh	0	0
		Demand	kW	0		Demand	kW	0	
Industrial Process	X	Energy Use	kWh	0	Electricity	Energy Use	kWh	0	0
		Demand	kW	0		Demand	kW	0	
Elevators and Escalators	X	Energy Use	kWh	468041	Electricity	Energy Use	kWh	468,041	0
		Demand	kW	53.43		Demand	kW	53.43	
Process Steam	X	Energy Use	therms	34806	Natural Gas	Energy Use	therms	34806	0
		Demand	therms/hr	6.3		Demand	therms/hr	6.3	
Process Steam Acc	X	Energy Use	kWh	1848	Electricity	Energy Use	kWh	1848	0
		Demand	kW	0.21		Demand	kW	0.21	
Heating Acc		Energy Use	kWh	0	Electricity	Energy Use	kWh	10596	0
		Demand	kW	0		Demand	kW	10.72	
Boiler Misc equip(space heating)		Energy Use	therms	0	Natural Gas	Energy Use	therms	3087	0
		Demand	therms/hr	0		Demand	therms/hr	1.8	
Boiler misc equip		Energy Use	kWh	0	Electricity	Energy Use	kWh	332	0
		Demand	kW	0		Demand	kW	0.18	
CH misc equip (space cooling)		Energy Use	kWh	19703	Electricity	Energy Use	kWh	10415	47.14
		Demand	kW	10.82		Demand	kW	24.74	
Heat pump supple		Energy Use	kWh	144668	Electricity	Energy Use	kWh	144,668	0
		Demand	kW	31.82		Demand	kW	31.82	
HRC misc equip(space cooling)		Energy Use	kWh	0	Electricity	Energy Use	kWh	79605	0
		Demand	kW	0		Demand	kW	72.77	
Total Energy Use (MMBtu/yr)				94,967.83				53251.25	
Process Energy (MMBtu/yr				23,438.98				23438.98	

Table EAp2-6. Section 1.6 Energy Use Summary

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Use	Proposed Energy Use
Electricity	kWh	5,849,466	14,769,162	11,800,045
Natural Gas	therms	34,806	445,754.5	129,895
		0	0	0
Totals	MMBtu	23,438.98	94,967.83	53,251.25

Table EAp2-7. Section 1.6 Energy Cost Summary (Automatic)

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Cost	Proposed Energy Cost
Electricity	$	414,142.19	1,045,656.67	838,983.2
Natural Gas	$	25,530.2	326,960.93	103,734.15
	$	0	0	0
Total	$	439,672.39	1,372,617.6	942,717.35

Select one of the following:

- (●) **Section 1.6 Automatic Cost Calculation:** Total building energy costs will be based on the "virtual" energy rate defined in Section 1.5.
- ( ) **Section 1.6 Manual Cost Input:** The project team will analyze the total building energy costs based on local utility rate structures. Costs will be input separately from the energy model.

Note: Energy cost savings are summarized in Section 1.9A Total Building Performance Summary.

SECTION 1.7 - EXCEPTIONAL CALCULATION MEASURE SUMMARY

Select one of the following:

- (●) The energy analysis includes exceptional calculation method(s) (ASHRAE 90.1-2007, G2.5).
- ( ) The energy analysis does not include exceptional calculation methods.

For each exceptional calculation method employed, document the predicted energy savings by energy type. If an end-use has an energy loss rather than an energy savings, enter it as a negative number.

Table EAp2-10. Exceptional Calculations

End Use	Exceptional Calculation Method Description	Energy Type(s)	Unit	Annual Energy Savings
Miscellaneous	Regenerative VVRF elevator	Electricity	kWh	359,429
Electricity			kWh	359,429
Natural Gas				0
				0
Total			MMBtu	1,226.37

Upload EAp2-10. Provide a narrative explaining the exceptional calculation method(s) performed, and theoretical or empirical information supporting the accuracy of the method(s). Reference any applicable Credit Interpretation Rulings.

Upload *Files: 1*

Table EAp2-11. Section 1.7 Energy Cost Savings Summary (Automatic)

Energy Type	Units	Proposed Energy Savings
Electricity	$	25,555.4
Natural Gas	$	0
	$	0
Total	$	25,555.4

Select one of the following:

- (•) **Automatic Cost Calculation:** Exceptional calculation measure cost savings will be based on the "virtual" energy rate defined in Section 1.5.
- ( ) **Manual Cost Input:** The project team will analyze exceptional calculation measure costs for each exceptional calculation measure based on local utility rate structures. Costs will be input separately from the energy model

Note: The same method has to be used for all the measures in this section. Energy cost savings are summarized in Section 1.9A Total Building Performance Summary. Calculated cost savings will be automatically subtracted from the proposed design energy model results when determining the Proposed Building Performance Rating.

SECTION 1.8 - ON-SITE RENEWABLE ENERGY

Select one of the following

- ( ) The project uses on-site renewable energy produced on-site.
- (•) The project does not use on-site renewable energy.

SECTION 1.9A - TOTAL BUILDING PERFORMANCE SUMMARY

Table EAp2-15. Total Building Energy Use Performance

		Baseline		Proposed			
Energy Type	Units	Process Subtotal	Section 1.6 Total Energy Use	Section 1.6 Energy Use	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	Total Energy Use
Electricity	kWh	5,849,466	14,769,162	11,800,045	359,429	0	11,440,616
Natural Gas	therms	34,806	445,754.5	129,895	0	0	129,895
		0	0	0	0	0	0
Totals	MMBtu	23,438.98	94,967.83	53,251.25	1,226.37	0	52,024.88
						Energy use savings (%)	45.22

The values below are automatically calculated using the virtual energy rate from Section 1.5 unless the project team has opted to manually input costs in Section 1.6, 1.7, and/or 1.8. To modify these values and/or to see automatically calculated results for reference see Sections 1.6, 1.7 or 1.8.

Table EAp2-16. Total Building Energy Cost Performance

Baseline	Proposed

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Energy Type	Units	Process Subtotal	Section 1.6 Total Energy Cost	Section 1.6 Energy Cost	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	Total Energy Cost
Electricity	$	414,142.19	1,045,656.67	838,983.2	25,555.4	0	813,427.8
Natural Gas	$	25,530.2	326,960.93	103,734.15	0	0	103,734.15
	$	0	0	0	0	0	0
Totals	$	439,672.39	1,372,617.6	942,717.35	25,555.4	0	917,161.94
Baseline process energy costs as percent of total energy costs (%)		32.03				Energy cost savings (%)	33.18
						EA Credit 1 points documented	11

The content highlighted in yellow above is linked to EAc1.

Section 1.9B - REPORTS AND METRICS

Table EAp2-17. Energy Use Intensity

	Baseline EUI	Proposed EUI
Electricity (kWh/sf)		
Interior Lighting	6.031	2.752
Space Heating	0	0
Space Cooling	3.447	3.462
Fans - Interior	6.452	4.687
Service Water Heating	0	0
Receptacle Equipment	10.539	10.539
Miscellaneous	2.806	1.237
Subtotal	29.275	22.677
Natural Gas (kBtu/sf)		
Space Heating	79.794	18.236
Service Water Heating	1.662	0
Miscellaneous	6.899	7.511
Subtotal	88.355	25.747
Other (kBtu/sf)		
Miscellaneous	0	0
Subtotal	0	0
Total Energy Use Intensity (kBtu/sf)		
Total	188.24	103.121

Table EAp2-18. End Use Energy Percentage

	Baseline Case (%)	Proposed Case (%)	End Use Energy Savings (%)
Interior Lighting	10.93	9.11	13.14
Space Heating	42.39	17.68	72.32
Space Cooling	6.25	11.45	-0.06
Fans - Interior	11.69	15.51	7.08
Service Water Heating	0.88	0	1.95
Receptacle Equipment	19.1	34.87	0
Miscellaneous	8.75	11.38	5.57

Select one of the following:

- (•) The project used DOE2, eQuest or Visual DOE.
- ( ) The project used EnergyPlus.
- ( ) The project team used EnergyPro.
- ( ) The project team used HAP.
- ( ) The project team used Trace.
- ( ) The project team used other modeling software.

Upload EAp2-11. Provide the input summary and the BEPS, BEPU, and ES-D reports.

Upload *Files: 1*

ADDITIONAL DETAILS

☐ Special circumstances preclude documentation of prerequisite compliance with the submittal requirements outlined in this form.

☒ The project team is using an alternative compliance approach in lieu of standard submittal paths.

ALTERNATIVE COMPLIANCE PATH

Describe the alternative compliance path used by the project team. Include justification that this path meets the prerequisite intent and requirements. Be sure to reference what additional documentation has been provided, if any. Non-standard documentation will be considered upon its merits.

The team has completed the entire template with information wherever applicable and have also attached supporting documentation. However, when clicking to check compliance, it does not turn into Y. The team is unsure if there is a template glitch or not.

Upload EAp2-ACP. Provide any additional documents that support the alternative compliance path approach. (Optional)

Upload *Files: 1*

SUMMARY

EA Prerequisite 2: Minimum Energy Performance Compliance Documented: Y Check Compliance

1.4.1A -ASHRAE 90.1 Section 5: Building Envelope (Construction Assemblies)

Model Input Parameter / Energy Efficiency Measure	Baseline Case			Proposed Case		
	Description	Insulation R-value	Assembly U-factor/ C-factor / F-factor	Description	Insulation R-value	Assembly U-factor/ C-factor / F-factor
Roofs	90.1 (2007) Table 5.5-4 roof	R-20 ci	U-0.048	**1. SBS Utility roof** SBS Roof Membrane Cover Board Tapered 6" AVG Polyiso (R-6 per in) Roof Sheathing 4" Slab + Roof deck **2. PVC Roof** Roof Membrane Cover Board Tapered 6" AVG Polyiso (R-6 per in) Roof Sheathing Roof deck **3. Eco Paver** Paver/ Pedestal System or Green roof 7.5" AVG tapered XPS (R-5 per inch) 4" min slab + Roof Deck	1. R-37.5 (EFF R-30) 2. R-36 (EFF R-30) 3. R-36 (EFF R-30)	1. U - 0.033 2. U - 0.033 3. U - 0.033
Roof SRI				No products rated for SRI in spec		
Roof Reflectivity			Refl = 0.3			All Refl = 0.45
Walls - Above Grade	90.1 (2007) Table 5.5-4 Steel Framed Walls	R-13 + R-7.5 c.i.	U - 0.064	**1. Metal Framed Wall** Metal panel 4" Mineral Wool ci (R-4.2 per inch) Z-Girts/ Furring derated to R-12 EFF Membrane/ Ext Sheating 6" Metal Stud Interior 5/8" Gyp **2. Parking Int Wall** Perlite grouted 6" CMU base (varying height) 4" Stud R-13 top 5/8" Gyp **3. Lab CIP Concrete** 6" Concrete 2" Interior Spray foam (R-7.4 per inch) 4" Stud wall 5/8" Gyp **4. Curtain Wall** Metal Panel 4" Mineral Wool Outboard (R-4.2 per inch) R-2.85 glazing + spandrel 2" spray foam Inboard 5/8" Gyp	1. R - 17.2 (Derated to R-12) 2. R - 1.54 CMU + R R-13 Stud. Overall (Derate to R-2.9 Assy) 3. R - 15 c.i. (Overall R-16.4 ASHRAE Table A3.1A) 4. R - 5	1. U - 0.0833 2. U - 0.343 3. U - 0.061 4. U - 0.20
Walls - Below Grade	90.1 (2007) Table 5.5-4 Below Grade Mass Wall	NR	C - 1.140	**1. Below Grade Exterior Wall** 2" XPS Rigid Insulation Concrete (Varies)	1. R-10 (Derated to R-8)	1. U - 0.103
Semiheated Exterior Envelope						
Floors	90.1 (2007) Table 5.5-4 Mass Floors	R-8.3 c.i.	U - 0.087	**1. Floor between P1/L1** 6" Slab 4" Pinned Mineral Wool (R-4.2 Per inch)	1. R - 17.2 (Derate to R-12)	1. U - 0.072
Slab-On-Grade Floors	90.1 (2007) Table 5.5-4 SOG	None	F - 0.72	**1. Slab insulation** 2" XPS fully insulated (R-5 per inch)	1. R-10	1. F - 0.36
Opaque doors						

Other						

1.4.1B - ASHRAE 90.1 Section 5: Fenestration and Shading

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
Vertical fenestration Area (% of Wall area)	40%	50%
Vertical Glazing Description	Metal Frame	Dbl Paned Low-E, thermally broken Aluminum framed 1. S/W = Viracon VNE 1-63 w/ 5/8" air gap 2. E/N = Viracon VE1-2M w/ 5/8" air gap
Vertical Glazing U-factor	U - 0.50	U - 0.41 exc L-1 (0.43) overall. COG = 0.28.
Vertical Glazing SHGC - North	SHGC - 0.40	2. SHGC = 0.38
Vertical Glazing SHGC Non-North	SHGC - 0.40	1.. SHGC = 0.29 2. SHGC = 0.38
Shading Devices	None	Shading at L-2 South tower/ Perf shading various north tower
Fenestration Visual Light Transmittance	0.63	1. VLT = 0.622 2. VLT = 0.703
Skylight Fenestration Area (percent of roof area)	5%	8%
Skylight Description	W/O Curb	W/O Curb - Guardian SNX 62/27 with 50% screen on #3
Skylight U-factor	U - 0.69	U - 0.433
Skylight SHGC	SHGC - 0.39	SHGC - 0.21
Building Self-Shading Description	None	None
Building Orientation & Shape[1]	N/S glazing orientation	N/S glazing orientation
Other		

Notes:

1 If energy cost by Baseline Rotation (0, 90, 180, 270) varies by more than 5%, describe the factors contributing towards this variation (e.g. fenestration percentage by orientation, building form, etc.)

1.4.2 - ASHRAE 90.1 Section 6: HVAC (Air-Side)

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
Primary HVAC Type[1]	System 7 - VAV with HW Reheat	ALL systems VAV with reheat. Laboratory systems 100% exhausted through Laboratory exhaust fans.
Other HVAC Type[2]	System 3 - PSZ -AC w/ furnace including economizer (IDF closets/ Stairwells as simulated with cooling. Retail space not designed.)	2-pipe fan coil with ventilation air from laboratory system (Equipment rooms). 2-pipe fan coil (IDF rooms). All units simulated as 4-pipe with HW heating. Stairwell HW Cabinet Unit Heater simulated with cooling to match baseline (PSZ-AC with HW heating). Retail spaces (not designed) simulated as PSZ-AC with furnace (same as baseline).
Semi-conditioned Space HVAC Type	NONE	NONE
Semi-conditioned Area (Gross SF)	N/A	N/A
Semi-conditioned Heating Capacity (Btuh)	N/A	N/A

Total Cooling Capacity	System 7 - Chilled water 20,576MBH System 3 - Retail - 245MBH System 3 - Stairwells - 596 MBH System 3 - IDF closets - 1757 MBH **TOTAL 23,174 MBH**	Per design: Chilled water system - 22,200 MBH DX Retail systems - 287MBH DX Stairwell systems - 547 MBH **TOTAL 23,034 MBH**
Unitary Cooling Capacity Ranges[3]	Multiple (see attached)	Multiple (see attached)
Unitary Cooling Efficiency[4]	Multiple (see attached)	Multiple (see attached)
Total Heating Capacity	System 7 - HW Boiler 21,981MBH System 3 - Retail 333.5 MBH System 3 - Stairwell 1,149 MBH System 3 - IDF 2362 MBH **TOTAL 25,826 MBH**	HW Boiler - 16,800 MBH Heat Recovery Chiller - 6,399 MBH Stairwell (Furnace) - 1216 MBH Retail System (Furnace) - 389 MBH **TOTAL - 24,804MBH**
Unitary Heating Capacity Ranges[5]	Warm Air furnace <225 MBH	Warm Air furnace <225 MBH
Unitary Heating Efficiency[6]	80% Thermal Efficiency	80% Thermal Efficiency
Fan System Operation	System 7 - VAV, System 3 CV	System 7 - VAV, System 3 CV
Outdoor Air Design Min Ventilation[7]	Laboratory System Non-Laboratory Systems	Per design:
HVAC Air-side Economizer Cycle	All systems have 100% economizer	All VAV systems have economizer, IDF/ EQUIPMENT FCU no economizer
Economizer High-Limit Shutoff	75F	65F
Design Airflow Rates (Conditioned Space)	Multiple (See attached) **TOTAL AIRFLOW : 656,091 CFM**	Multiple (See attached) **TOTAL AIRFLOW : 746,836CFM**
Total System Fan Power (Conditioned)[8]	681.6 kW	1099 kW
Total Supply Fan Power	558 kW	595 kW
Total Return / Relief Fan Power		172 kW
Total Exhaust Fan Power (tied to AHUs)	106 kW (Fume Hood Exh)	331 kW
6.5.3.1.1B Pressure Drop Adjusmtents[9]	Various (see attached)	Various (see attached)
Zone Terminal Boxes Fan Power	N/A	15.2 kW
Unconditioned Total Fan Power[10]	17.8 kW	17.8 kW
Unconditioned Total Fan Flow[10]	100000 cfm	100000 cfm
Semi-conditioned Total Fan Power[10]	N/A	N/A
Semi-conditioned Total Fan Flow[10]	N/A	N/A
Exhaust Air Energy Recovery[11]	None	Yes - chilled water coil in exhaust
Demand Control Ventilation[12]	None	1.All space with DCV control required by code, both baseline and propose model did not model DCV, same amount outside air cfm for both model as designed. 2. All spaces with DCV control in design, not not required by code, model DCV control in proposed model, outside air CFM same as design, baseline model outside air using ASHARE 90.1-2007 minimum ventilation air
Supply Air Temperature Reset Parameters	5F reset based on Load	10F reset based on Load ex Lab system
Thermal Energy Storage	None	None
Other		

Notes:

1 Indicate the ASHRAE Baseline HVAC System Type Number From Table G3.1.1B (#1 - #8).

2 Indicate ASHRAE Baseline HVAC System Type Number From Table G3.1.1B (#1 - #8), and applicable exception to G3.1.1 that applies (indicate how the exception applies).

3 Unitary cooling capacity ranges should match tables 6.8.1A, 6.8.1B, or 6.8.1D.

4 Efficiency should be reported per capacity range, and should match the units used for each capacity range in tables 6.8.1A, 6.8.1B, or 6.8.1D.

5 Unitary heating capacity ranges should match tables 6.8.1B, 6.8.1D, or 6.8.1E.

6 Efficiency should be reported per capacity range, and should match the units used for each capacity range in tables 6.8.1B, 6.8.1D, or 6.8.1E.

7 Enter ventilation flow rate (in CFM, not %). Baseline & Proposed ventilation rate must be equal unless Demand Control Ventilation is modeled for credit, in which case Baseline should reflect ASHRAE 62.1-2007 or local code minimum volumes.
8 Indicate Total System Fan Power (in kW) including supply, return, exhaust and relief fan power.
9 Indicate all pressure drop adjustments including devices for which credit is taken and the related adjustment.
10 Fan flow & power must be identical (except standard motor efficiencies from chapter 10 may be used in the Baseline). The exceptional calculation method may be used to show savings.
11 Indicate energy recovery efficiency, percentage of building served by ERV, and ERV bypass Mechanism, and verify that outside air is modeled with zero flow in both cases during unoccupied periods.
12 Indicate spaces with DCV, method of control used, and verify that outside air is modeled with zero flow in both cases during unoccupied periods.

1.4.3 - ASHRAE 90.1 Appendix G: HVAC (Water-side)

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
The Project Has District Heating (Y/N)	N	N
The Project Has District Cooling (Y/N)	N	N
Number of Chillers	(3) Autosized 596-ton Centrifugal Chillers	CH-1/2 700-ton centrifugal, HRC 1-3 (1) 450-ton modular heat recovery chiller.
Chiller Part-Load Controls[1]	Constant Speed Staged	Variable speed Centrifugal, constant speed staged modular
Chiller Capacity (Per Chiller)	596-tons	CH-1/2: 700-ton HRC 1-3: 450-ton (cooling)
Chiller Efficiency[2]	6.10 COP/ 6.40 IPLV	CH-1/2: COP 7.32 (0.48 kW/ton) at rated condition HRC-1,2,3: Heat recovery mode COP 2.0 (1.76 kW/ton) Cooling Mode COP 5.0 (0.7 kW/ton)
Chilled Water Loop Supply Temperature	44F	45F
Chilled Water (CHW) Loop Delta-T	12F	15F
CHW Loop Temp Reset Parameters	90.1 Reset: 44@80F; 54@60F	Fixed
CHW Loop Configuration[3]	Constant staged Primary/ Variable Secondary	Variable Primary
Number of Primary CHW Pumps	3	3
Primary CHW Pump Power	179.6 kW	102 kW
Primary CHW Pump Flow	8,167 GPM	4200 gpm
Primary CHW Pump Speed Control	Constant	Variable Speed Drive/ Staged
Secondary CHW Pump Power	124 kW	N/A
Secondary CHW Pump Flow	5669 GPM	N/A
Secondary CHW Pump Speed Control	Variable Speed Drive	N/A
Number of Cooling Towers / Fluid Coolers	2 (Staged on with chiller)	3
Cooling Tower Fan Power	38HP/ GPM = 164 kW	76.5 kW each/ 229 kW total
Cooling Tower Fan Control	2-SPD	Variable Speed Drive/ Staged
Condenser Water Leaving Temperature	85F	75F
Condenser Water (CW) Loop Delta-T	10F	15F
CW Loop Temp Reset Parameters	Reset based on Load to 70F	Reset based on load to 55F
CW Loop Configuration[3]	Constant Staged Primary	Variable Primary
Number of CW Pumps	3	4
CW Pump Power	93.461 kW	70 kW
CW Pump Flow	4919 GPM	5100 GPM
CW Pump Speed Control	Constant Speed Staged	Variable Speed Drive/ Staged
Number of Boilers	2	6
Boiler Part-Load Controls	4:1 modulating burner	20:1 modulating burner
Boiler Capacity (Per Boiler)	10,800 MBH Each	2,800 MBH Each
Boiler Efficiency[2]	82% Combustion Efficiency/ 80% Estimated Thermal Efficiency	92% Thermal Efficiency at 120F EWT
Boiler Water Loop Supply Temperature	180	140
Hot Water or Steam (HHW) Loop Delta-T	50F	30F

HHW Loop Temp Reset Parameters	90.1 OSA Reset: 180F@20F/ 150@50F	Fixed
HHW Loop Configuration[3]	Variable Primary	Constant Staged Primary/ Variable Secondary/ Tertiary Circ Pumps
Number of Primary HHW Pumps	1	6
Primary HHW Pump Power	24.34 kW	9.3 kW
Primary HHW Pump Flow	1281 GPM	1,116 GPM
Primary HHW Pump Speed Control	Variable Speed Drive	Constant Speed
Secondary HHW Pump Power	N/A	45 kW
Secondary HHW Pump Flow	N/A	1650 GPM
Secondary HHW Pump Speed Control	N/A	Variable Speed Drive/ Staged
Thermal Energy Storage Capacity	N/A	N/A
Thermal Energy Storage Control Sequence	N/A	N/A
Thermal Energy Storage Charge Temp	N/A	N/A
Thermal Energy Storage Chiller Efficiency[4]	N/A	N/A
Water-side Economizer	N/A	N/A
Water-side Energy Recovery	N/A	N/A
Other		

Notes:
1 Example - variable speed drive, dual compressors, etc.
2 Units of efficiency must match the units listed for the relevant equipment type in Tables 6.8.1F through 6.8.1J.
3 Constant Primary / Variable Secondary, Variable Primary, etc.
4 The full-load efficiency of the chillers while charging the thermal energy storage tanks.

1.4.4 - ASHRAE 90.1 Section 7: Service Water Heating

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
SHW Equipment Type	Gas- Fired	Heating Water Heat Exchanger
SHW Storage Tank Capacity	400 Gal	(3) * 200 Gallon tank
SHW Heating Input Capacity[1]	1700 MBH	1700 MBH
Equipment Efficiency[1]	80% Thermal Efficiency	From HW system
Temperature Controls	Aquastat	Return Aquastat at 118F
SHW Energy Recovery	Preheat to 85F from Chiller system	Heating water from heat recovery chiller
Other		

Notes:
1 Units must match the relevant SWH Equipment Type in Table 7.8.

1.4.5 - ASHRAE 90.1 Section 9: Lighting

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
Automatic Lighting Shutoff Method	Programmable Timing and Occ Sensor	Programmable Timing and Occ Sensor
Gross Lighted Floor Area	505,858 sf	505,858 sf
Interior Lighting Power Calc Method[1]	Space-by-Space	Space-by-Space
Interior Lighting Power Density (Average)	1.09 w/sf	0.709 w/sf
Interior LPD per space (Space-by-Space)[2]	See attached schedule for details	See attached schedule for details
Additional Lighting Power Allowance[3]	No Additional Allowances taken	

Automatic Interior Space Shutoff Control in Required Spaces (Section 9.4.1.2)[4]	Occupancy controlled in Classrooms, conference rooms, and break rooms	All zones indicated in attached schedule
Interior Lighting Power Adjustments (Table G3.2) [5]	Adjustments not included for code required occupancy sensors.	10% reduction in spaces with occ sensor beyond what is required by code
Daylight Dimming Controls[6]	Not modeled in baseline simulation	See attached schedule for dimmable daylighting controls.
Automatic Exterior Lighting Control	Celestial Clock	Celestial Clock
Total Exterior Lighting Power	10,722 Watts	3,190 Watts
Tradable Surface Exterior Lighting Power	10,480 Watts	2,948 Watts
Non-Tradable Surface Exterior Lighting Power[7]	242 Watts	242 Watts
Other		

Notes:

1 Indicate whether Building Area Method or Space-by-Space Method was used. If Building Area Method was used, indicate the Building Area Function (e.g. Office). If the Building includes a parking garage or Tenant Spaces that differ from the main Building Area Function, indicate these separately.

2 If the Space-by-Space Method was used, indicate each space function, and the lighting power density per space function. Alternatively, upload the lighting compliance documentation in Section 1.1B, and reference it in this table.

3 Indicate the total additional lighting power modeled, and the exceptions applied that allow additional lighting (total additional lighting power modeled should be identical in the

4 No credit may be taken for spaces where automated controls are required.

5 Indicate the percentage credit taken, and the spaces for which the credit was applied.

6 Indicate the spaces where automated daylighting controls are included, and verify these were modeled in the simulation program.

7 Values should be identical in the Baseline and Proposed Case.

1.4.6 - Miscellaneous

Include units for all relevant inputs

Model Input Parameter / Energy Efficiency Measure	Baseline Case	Proposed Case
Receptacle equipment	5,317,200 kWh	5,317,200 kWh
Escalators and Elevators	468,044 kWh	108,615 kWh
Refrigeration equipment	46,837 kWh	46,837 kWh
Cooking		
Data Center & Server Room Loads	Included in plugs	Included in plugs
Process loads	34,806 therms Process steam	34,806 therms Process steam
Other		