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Green Building Report

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Cambridge Article 22: Green Building Report

Issued: November 18, 2020

Project: Ragon II

Image courtesy of Payette

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Section I. PROJECT DESCRIPTION

The proposed Ragon Institute 2.0 building will be located at 600 Main Street. The proposed project is a freestanding building in a sweeping form that takes advantage of the triangular site. It creates a gateway to the larger scale buildings of Tech Square and MIT by transitioning in a sweeping form through the interior corner of the site to address the intersection of Albany and Main Street and Tech Square beyond. The new building will be a five-story office/laboratory and research building with a two floor, below grade parking garage. The building program includes an entry lobby to support the building's daycare and education and function spaces on the ground floor. The project will also feature natural elements such as a landscaped outdoor courtyard located along Main Street, an accessible green roof area on the second level, and an atrium extending from the second level to the fifth level. The roof of the sweep mediates the scale change of the site context from West to East. The space formed between the sweeping 'arms' creates the large atrium that extends multiple levels and drives daylight through a skylight to the interior spaces and provides a large window to Main Street.

The entry area landscape and flowing gestures of expressive paving and sculpted seating intuitively lead people to the building's entries while simultaneously creating unique outdoor spaces. The paths are further defined by robust planting of trees and lower groundcovers, providing ample shade and sense of nature but not limiting views from a pedestrian perspective to the building and larger urban context. The landscape will double as storm water retention zones, contributing to the retention of water on site. A building canopy with an oculus creates a transitional indoor/outdoor space and welcoming courtyard as you enter the building.

Below the exterior oculus large trees will extend through the opening and visually connect the ground floor to a second floor roof garden. Here, the continuation of the flowing forms of the ground plane and robust planting extend up and onto the building.

The current design of the new Ragon 2.0 building includes high-efficiency HVAC systems and LED lighting. The design indicates an energy use intensity of (EUI) approximately 135, and an energy use savings of 35.7% relative to ASHRAE 90.1-2013 Baseline, which exceeds the 10% minimum requirement for Stretch Code. Additionally, three of the required additional efficiency package options listed under section C406.1 are included in the proposed design and included in both the baseline and proposed design energy models. Detailed information is included in the report within the Net Zero Energy narrative.

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Section II. AFFIDAVIT

I, Sarah Michelman, do hereby affirm that I have thoroughly reviewed the supporting documents for the LEEDv4 for New Construction rating system and confirm that the Ragon Institute 2.0 project is targeted to meet the requirement for Gold with **66** points and 6 possible ('maybe') points. The Ragon Institute 2.0 project, located in Cambridge, MA will be designed to meet the green building requirement under Article 22.20 of the Cambridge Zoning Ordinance.

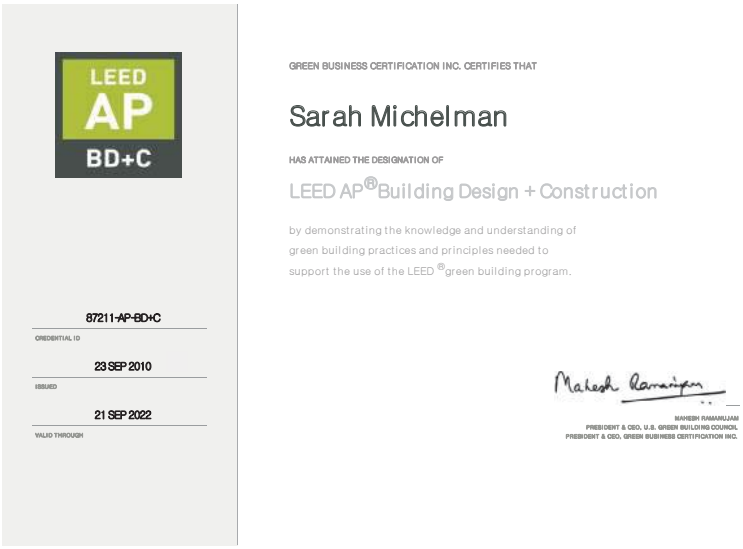
Sarah Michelman, RA, LEED AP BD+C is a Principal of The Green Engineer, Inc. Sarah has over 15 years of experience working as an architect and additional 10 years of experience as a sustainable design consultant with a focus on energy efficiency and sustainability.

A long-time promoter of sustainable design, Sarah has been a member of the US Green Building Council (USGBC) LEED since 2007. She is a registered architect in the State of Massachusetts.

To date, Sarah and The Green Engineer, Inc team have managed or been involved in over 200 LEED certified projects.

An executed Cambridge Affidavit has been provided.

Sarah Michelman, LEED BD+C, WELL AP, Fitwel Ambassador
Massachusetts Architectural Registration #10402
The Green Engineer, Inc.


LEED AP BD+C

87211-AP-BD+C
CREDENTIAL ID

23 SEP 2010
ISSUED

21 SEP 2022
VALID THROUGH

GREEN BUSINESS CERTIFICATION INC. CERTIFIES THAT

Sarah Michelman

HAS ATTAINED THE DESIGNATION OF

LEED AP® Building Design + Construction

by demonstrating the knowledge and understanding of green building practices and principles needed to support the use of the LEED ® green building program.

MAHESH RAMANUJAM
PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.

Section III. LEEDv4 SCORECARD SUMMARY

The project was reviewed for compliance using the USGBC's LEED for New Construction (LEED-NC), version 4 rating system. The project is targeting 66 out of a possible 110 credit points with an additional 6 credit points still undergoing evaluation to determine feasibility of achievement. By targeting 66 credit points, the project anticipates meeting the City of Cambridge requirement to be LEED v4 Gold 'certifiable'. In addition to the City of Cambridge requirements, the project will be registered under the LEED-NC v4 rating system and will be pursuing formal certification with the USGBC.

The team will continue to evaluate design options against LEED requirements with the goal to design and construct a building which minimize its impact on the environment, create an engaging and healthy space for occupants and reduce operating costs. Several credits remain designated as 'Maybe' due to the uncertainty of future design decisions, which is common at this phase of the Project. The team will continue to evaluate LEED credits to pursue to ensure enough of a "point cushion" to ensure the LEED Gold requirement is met.

The USGBC recently released the beta version of the LEEDv4.1 rating system which is intended to serve as an update to (and improvement upon) LEEDv4. Recent guidance issued by the USGBC allows LEEDv4 projects to substitute any prerequisite or targeted credit for the LEEDv4.1 equivalent. Credits this project intends to pursue using the LEED v4.1 criteria have been denoted with (LEEDv4.1) adjacent to the credit name within the scorecard below and ensuing credit narratives.

Y	M	N			
1	0	0	**Integrative Process**		1
1			Credit 1	Integrative Process	1

13	0	3	**Location and Transportation**		16
		N	Credit 1	LEED for Neighborhood Development Location	
1			Credit 2	Sensitive Land Protection	1
1		1	Credit 3	High Priority Site	2
5			Credit 4	Surrounding Density and Diverse Uses	5
3		2	Credit 5 (LEEDv4.1)	Access to Quality Transit	5
1			Credit 6 (LEEDv4.1)	Bicycle Facilities	1
1			Credit 7 (LEEDv4.1)	Reduced Parking Footprint	1
1			Credit 8 (LEEDv4.1)	Green Vehicles	1

7	0	3	**Sustainable Sites**		10
Y			Prereq 1	Construction Activity Pollution Prevention	Required
1			Credit 1	Site Assessment	1
		2	Credit 2 (LEEDv4.1)	Site Development - Protect or Restore Habitat	2
1			Credit 3	Open Space	1
2		1	Credit 4 (LEEDv4.1)	Rainwater Management	3
2			Credit 5	Heat Island Reduction	2
1			Credit 6	Light Pollution Reduction	1

6	0	5	**Water Efficiency**		11
Y			Prereq 1	Outdoor Water Use Reduction	Required
Y			Prereq 2	Indoor Water Use Reduction	Required
Y			Prereq 3	Building-Level Water Metering	Required
1		1	Credit 1 (LEEDv4.1)	Outdoor Water Use Reduction	2
3		3	Credit 2	Indoor Water Use Reduction	6

1		1	Credit 3 (LEEDv4.1)	Cooling Tower Water Use	2
1			Credit 4	Water Metering	1

14	6	13	Energy and Atmosphere		33
Y			Prereq 1	Fundamental Commissioning and Verification	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Building-Level Energy Metering	Required
Y			Prereq 4	Fundamental Refrigerant Management	Required
5	1		Credit 1	Enhanced Commissioning	6
9	3	6	Credit 2	Optimize Energy Performance	18
		1	Credit 3	Advanced Energy Metering	1
		2	Credit 4 (LEEDv4.1)	Grid Harmonization	2
		3	Credit 5	Renewable Energy Production	3
		1	Credit 6	Enhanced Refrigerant Management	1
		2	Credit 7	Green Power and Carbon Offsets	2

6	0	7	Materials and Resources		13
Y			Prereq 1	Storage and Collection of Recyclables	Required
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required
		5	Credit 1 (LEEDv4.1)	Building Life-Cycle Impact Reduction	5
1		1	Credit 2 (LEEDv4.1)	BPDO – EPD	2
1		1	Credit 3 (LEEDv4.1)	BPDO - Sourcing of Raw Materials	2
2			Credit 4 (LEEDv4.1)	BPDO – Material Ingredients	2
2			Credit 5 (LEEDv4.1)	Construction and Demolition Waste Management	2

12	0	4	Indoor Environmental Quality		16
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke Control	Required
2			Credit 1	Enhanced Indoor Air Quality Strategies	2
3			Credit 2 (LEEDv4.1)	Low-Emitting Materials	3
1			Credit 3	Construction Indoor Air Quality Management Plan	1
2			Credit 4	Indoor Air Quality Assessment	2
1			Credit 5	Thermal Comfort	1
1		1	Credit 6	Interior Lighting	2
1		2	Credit 7 (LEEDv4.1)	Daylight	3
1			Credit 8	Quality Views	1
		1	Credit 9 (LEEDv4.1)	Acoustic Performance	1

6	0	0	Innovation		6
1			Credit 1	Exemplary Performance: Heat Island Reduction	1
1			Credit 2	Innovation: Purchasing - Lamps	1
1			Credit 3	Exemplary Performance: Reduced Parking Footprint	1
1			Credit 4	Innovation in Design: TBD	1
1			Credit 5	Pilot Credit: Integrative Analysis of Building Materials	1
1			Credit 6	LEED Accredited Professional	1

1	2	1	Regional Priority (earn up to 4 points)	4

1			Credit 1	Regional Priority Credit: SSc4	1
		1	Credit 2	Regional Priority Credit: LTc3 (2 points)	1
	1		Credit 3	Regional Priority Credit: EAc2 20% (8 points)	1
	1		Credit 4	Regional Priority Credit: MRc1 (2 points)	1

66	6	38	TOTALS	Possible Points: 110

Section IV. LEED Credit Narrative

As detailed below, the Project meets the LEEDv4 New Construction Minimum Program Requirements and each of the required Prerequisites. Additionally, the following credits are being targeted.

A. Integrative Process (IP)

IP Credit 1 Integrative Process — 1 credit point

The Project has met the intent of this credit through identification of cross discipline opportunities to design a sustainable building project. Sustainable design focused meetings have been conducted in early design to assist the team in establishing shared sustainable design and energy / water efficiency goals for the project. Early design phase energy modeling will be conducted to review systems synergies and assess areas where energy loads may be significantly reduced. A water use analysis will be conducted to aid in establishing water use reduction targets.

The Project has conducted interdisciplinary early meetings focusing on sustainability. These meetings have included the ownership group, architect, MEP engineer, energy analyst, and sustainability expert. An initial charrette was conducted in Fall 2020. Early energy modeling will be performed to provide real feedback on decision-making. Additionally, the Project will be linked into the MassSave energy-efficiency incentive program. This early work will push the design to optimize the performance of the envelope and HVAC systems and explore additional opportunities for decreasing water use within the project.

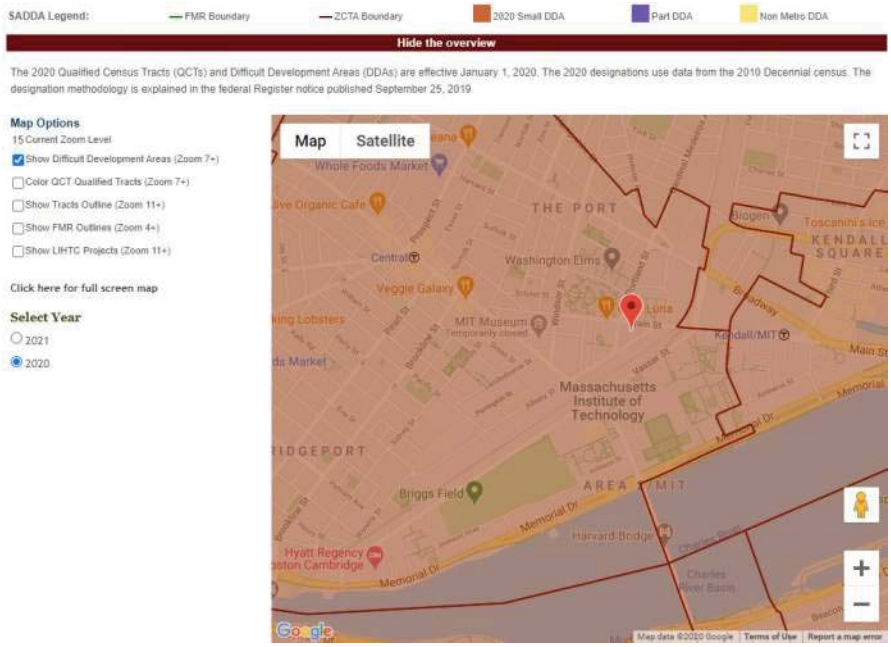
B. Location and Transportation (LT)

LT Credit 2 Sensitive Land Protection — 1 credit points

The Project will meet the credit requirements by being located on land that has been previously developed.

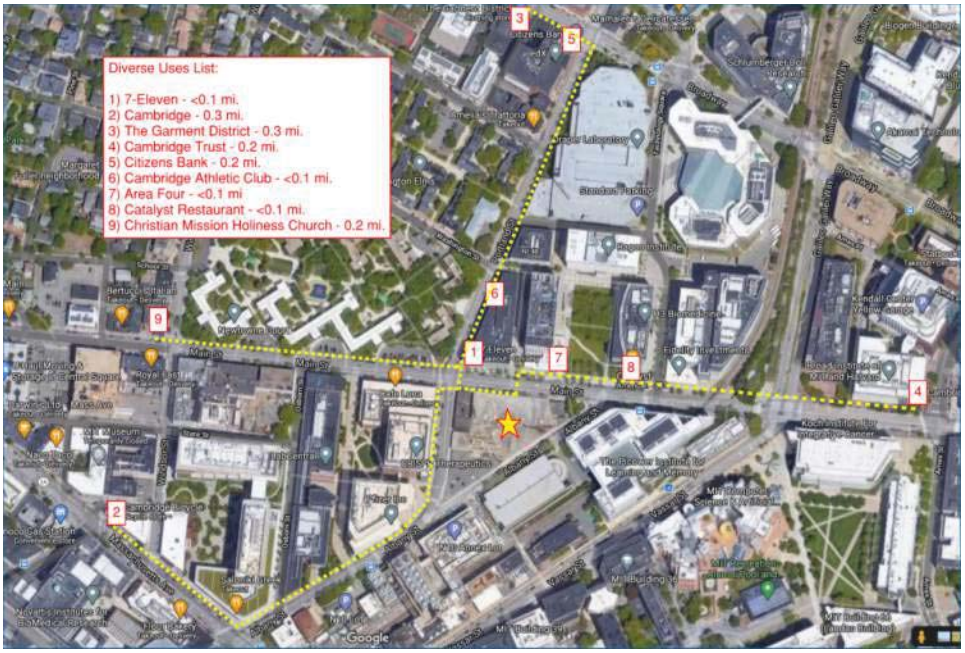
LT Credit 3 High Priority Site — 1 credit point

The Project will meet the credit requirements by being located on a site in a U.S. Department of Housing and Urban Development's Difficult Development Area as shown in the map below.



LT Credit 4 Surrounding Density and Diverse Uses 5 credit points

The Project will meet Option 1 for Surrounding Density by being located in an area with an average density greater than 35,000 sf/acre. The Project will meet Option 2 for Diverse Uses by being located within ½ mile walking distance of at least 9 publicly available diverse uses in at least three separate use categories.



The Project are located within ½ mile of the following 9 diverse uses:

Category	Use Type	Number	Business Name	Distance
Community-serving retail	Convenience Store	1	7-Eleven	<0.1 mi
	Other Retail	2	Cambridge Bicycle	0.3 mi
	Other Retail	3	The Garment District	0.3 mi
Services	Bank	4	Cambridge Trust	0.2 mi
	Bank	5	Citizens Bank	0.2 mi
	Gym	6	Cambridge Athletic Club	<0.1 mi
	Restaurant	7	Area Four	<0.1 mi
	Restaurant	8	Catalyst Restaurant	<0.1 mi
Civic and community facilities	Place of Worship	9	Christian Mission Holiness Church	0.2 mi

LT Credit 5 Access to Quality Transit (LEEDv4.1) 3 credit points
LEEDv4.1: The Project is located within ½ mile walking distance of the Kendall/MIT station and within ¼ mile walking distance of the Massachusetts Ave @ Albany St Bus Stop. The Kendall/MIT transit station provides occupants with access to 106 weekday rides and 85 weekend rides via the MBTA Red Line and the Massachusetts Ave @ Albany Bus Stop provides 108 weekday rides and 113 weekend rides.

	Total Rides Per Day		Percent of Total Rides Per Line		Walking Distance to Closes Stop (mi.)
Red Line - Alewife, Ashmont	106	85	50%	43%	0.30
Bus # 1	108	113	50%	57%	0.25
Total:	214	198			

LT Credit 6 Bicycle Facilities (LEEDv4.1) 1 credit point
A minimum of 12 exterior short-term and 41 covered long-term bicycle storage is planned for visitors and regular occupants of the Project. Additionally, shower and changing facilities will be provided for use by building occupants. The immediate neighborhood provides a direct connection to a local bicycle network that links to a variety of services with pedestrian and cyclist access. The Project will meet City of Cambridge requirements for bike storage.

LT Credit 7 Reduced Parking Footprint (LEEDv4.1) 1 credit point
A new, one or two-level parking garage is proposed to provide on-site parking for employees and visitors. The new parking garage will provide 120-122 parking spaces depending on scheme, which is an 87% reduction to the baseline number of parking spaces calculated from the ratios set forth in the LEED reference guide.

LT Credit 8 Green Vehicles (LEEDv4.1) 1 credit point
The Building Owner has committed to provide EV charging stations to satisfy the LEED credit by providing EV charging stations for 2% of the total parking capacity. There are 120-122 parking spaces that will be provide. Of those spaces, 2% will be outfitted as electric vehicle charging stations, which will require a total of 3 EV charging stations.

C. Sustainable Sites (SS)

SS Prerequisite 1: Construction Activity Pollution Prevention Required
The construction manager will be required to submit and implement an appropriate SWPPP/Erosion and Sedimentation Control (ESC) Plan for construction activities related to the construction of the Project. The ESC Plan will conform to the erosion and sedimentation

requirements of the applicable NPDES regulations and specific municipal requirements for the City of Cambridge. Additionally, the ESC Plan will address management and containment of dust and particulate matter generated by on site demolition and construction activities. Civil design drawings will include measures for the implementation of the ESC plan.

SS Credit 1: Site Assessment — 1 credit point
A comprehensive site assessment will be completed as part of the Project. The site assessment will include topography, hydrology, climate, vegetation, soils, human use, and human health effects and was used to inform the design.

SS Credit 3: Open Space (LEEDv4.1) — 1 credit point
The project design will provide outdoor space that is physically accessible and will be equal to or greater than 30% of the total site area. A minimum of 25% of the physically accessible site area will be planted with two or more types of vegetation or have overhead vegetated canopy.

SS Credit 4: Rainwater Management (LEEDv4.1) — 2 credit points, *1 maybe point*
The project design will replicate natural site hydrology processes to retain the 85th percentile of regional or local rainfall events using low-impact development (LID) and green infrastructure (GI) practices. The project is planning to use the planting areas as storm water retention zones and infiltration tanks to contain all water on-site.

SS Credit 5 Heat Island Reduction — 2 credit points
The roof and non-roof hardscape materials of the Project will include light-colored surfaces to reduce the overall heat island effect impact on the Project site. The roof membrane will be high albedo roof product with an initial SRI value of 82 minimum. All parking associated with the Project will be located undercover, qualifying the Project for an exemplary performance point.

SS Credit 6 Light Pollution Reduction — 1 credit point
The Project will meet uplight and light trespass requirements by complying with the LEED v4 BUG Rating method. To meet credit requirements, the site lighting will not exceed the LEEDv4 allowable luminaire backlight, uplight and glare ratings for Lighting Zone 3.

D. Water Efficiency (WE)

WE Prerequisite 1 Outdoor Water Use Reduction, 30% — Required
Through the use of native/adaptive plant species selection the Project's landscape water requirement (as calculated by the EPA WaterSense Water Budget Tool) will be reduced by at least 30% from the calculated baseline for the site's peak watering month. The landscape design will include softscape areas which will be planted with a diverse palette of materials which are native, adaptive, low-maintenance, and no irrigation requirements beyond establishment and have year-round aesthetic appeal. At a minimum the Project will meet the Cambridge DPW water management standards.

WE Prerequisite 2 Indoor Water Use Reduction, 20% Reduction — Required
Through the specification of low flush and flow and high efficiency plumbing fixtures, The Project will reduce potable water consumption by at least 20% over the baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. The proposed plumbing fixtures within the base building scope of work are as follows:

Fixture Type	Flush / Flow Rate
Water Closet	1.28 gpf
Urinal	0.125 gpf
Lavatory Faucet	0.35 gpm
Showerhead	1.5 gpm

WE Prerequisite 3 Building Level Water Metering — Required

The Project will meet the requirements of this prerequisite by installing permanent water meters that measure the total potable water use the building and associated grounds. In addition to installing the meters, the Project will commit to sharing water usage data with the USGBC for a five-year period beginning on the date the Project accepts LEED certification or typical occupancy, whichever comes first. It is understood that the building will be subject to the Building Energy Use Disclosure Ordinance and will annually report and disclose energy performance in terms of energy usage.

WE Credit 1 Outdoor Water Use Reduction - No Irrigation (LEEDv4.1) — 1 credit point

The project will be able to achieve a 50% reduction in landscaping water demand through plant selection, and if permanent irrigation is provided, water efficient irrigation delivery and weather sensors. The project will also explore the ability to not need permanent irrigation.

WE Credit 2 Indoor Water Use Reduction — 3 credit points

Through the specification of low flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that at a minimum result in a 30% reduction in potable water use annually when compared to EPA baseline fixtures for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

Group Name	Baseline Case (gallons/year)			Design Case (gallons/year)		
	Annual Flush Volume	Annual Flow Volume	Annual Consumption	Annual Flush Volume	Annual Flow Volume	Annual Consumption
Visitors	4,964.00	912.50	5,876.50	2,985.70	456.25	3,441.95
FTEs	1,177,344.00	560,640.00	1,737,984.00	752,659.20	315,360.00	1,068,019.20

Annual baseline water consumption (gallons/year)	1,743,860.50
Annual design water consumption (gallons/year)	1,071,461.15
Percent water use reduction (%)	**38.56%**

WE Credit 3 Cooling Tower Water Use (LEEDv4.1) — 1 credit point

The Project will conduct a one-time potable water analysis for the cooling tower water and calculate the cycles of concentration. Through increasing the level of treatment in the make-up and/or condenser water, the Project will achieve the calculated maximum number of cycles before any of the parameters analyzed exceed their maximum allowable levels of concentration. The control parameters that are required to be assessed are: Ca, total alkalinity, SiO_2, Ci, and conductivity.

In addition to meeting the requirements of the WEc3 Cooling Tower Water Use credit, the Project will prioritize implementing as many best practices as possible for water use reduction in labs as per the International Institute for Sustainable Laboratories.

WE Credit 4 Water Metering 1 credit point

To support water management and identify opportunities for additional water savings, the Project will include permanent water meters for, condenser water, chilled water, and domestic hot water.

E. Energy and Atmosphere (EA)

EA Prerequisite 1 Fundamental Commissioning and Verification Required

A commissioning agent will be engaged by the Building Owner for purposes of providing fundamental commissioning services for the building energy related systems by the end of Design Development. The commissioning agent will perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems.

The commissioning agent (CxA) will be independent of the project's design and construction management teams. The commissioning agent will report findings to the Building Owner. The Owner's Project Requirements and the Basis of Design documents will be provided to the CxA for review.

The following systems will be included in the Commissioning scope of work:

- Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems
- HVAC controls
- Lighting controls
- Electrical systems
- Domestic hot water systems
- Plumbing and pumps
- Building Automation System

EA Prerequisite 2 Minimum Energy Performance Required

To meet the prerequisite, the Project's building performance will demonstrate a minimum of 5% improvement in energy use by cost when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2010. The Project is also required to meet the MA Stretch Energy Code requirements.

This project will achieve these savings through inclusion of the following ECMs:

1. Improved envelope assemblies with triple-pane glazing
2. Reduced LPD
3. Reduced ACH rate capability during unoccupied hours
4. SAT Reset to minimize reheat loads
5. High-efficiency heat recovery chilled water plant and hot water plants
6. Low-flow domestic hot water fixtures

Comprehensive, iterative energy modeling will be used to explore design options to meet all Code requirements and to provide substantiation for the LEED application. Energy performance goals were established during the Schematic Design for the Project phase. The Project utilized the International Institute for Sustainable Laboratories Benchmarking Tool to establish an energy performance benchmark. The Project also graphed the project site energy performance against the Cambridge operating laboratory buildings which reported their site EUI from 2016 through 2019 as required by the City of Cambridge Building Energy Use Disclosure Ordinance (BEUDO).

EA Prerequisite 3 Building Level Energy Metering Required

To meet the requirements of this prerequisite, the Project will install whole building energy meters for gas and electricity. In addition to installing the meters, the Project will commit to sharing energy usage data with the USGBC for a five-year period beginning on the date each accepts LEED certification or typical occupancy, whichever comes first. It is understood that at a minimum, the Project will be subject to the Building Energy Use Disclosure Ordinance and will annually report and disclose energy performance in terms of energy usage.

EA Prerequisite 4 Fundamental Refrigerant Management Required

CFC based refrigerants will not be used in the Project's HVAC & R systems.

EA Credit 1 Enhanced Commissioning 5 credit points, 1 *maybe points*

In addition to EApr1 Fundamental Commissioning and Verification requirements, Option 1 Path 1 Enhanced Commissioning and Option 2 Building Envelope Commissioning will be pursued by the Project. The Building Owner will engage a commissioning agent to review the proposed design and verify the building systems meet the Owner's expectations and requirements.

The following commissioning process activities in addition to those required under EA Prerequisite Fundamental Commissioning and Verification will be completed by the commissioning agent, in accordance with ASHRAE Guideline 0–2005 and ASHRAE Guideline 1.1–2007 for HVAC&R systems, as they relate to energy, water, indoor environmental quality, and durability:

- Review contractor submittals.
- Verify inclusion of systems manual requirements in construction documents.
- Verify inclusion of operator and occupant training requirements in construction documents.
- Verify systems manual updates and delivery.
- Verify operator and occupant training delivery and effectiveness.
- Verify seasonal testing.
- Review building operations 10 months after substantial completion.
- Develop an on-going commissioning plan.

In addition to the commissioning of mechanical and electrical systems, the Building Owner is considering engaging the commissioning agent to perform monitoring-based commissioning activities as they relate to the operations and maintenance of the building once it has been occupied.

Requirements for enhanced and monitoring-based commissioning will be included in the OPR and BOD.

EA Credit 2 Optimize Energy Performance 9 credit points, *3 maybe points*

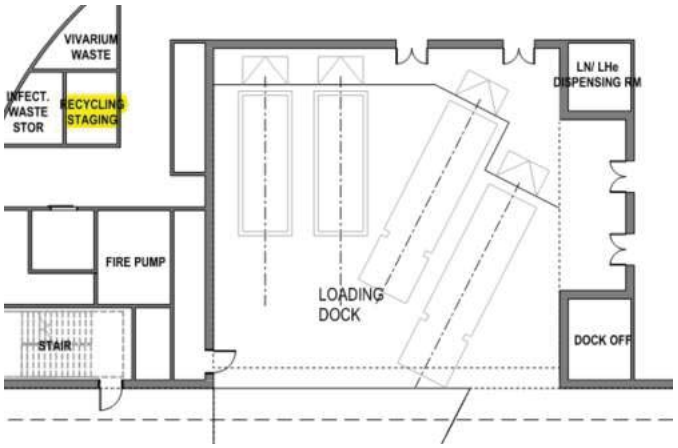
The project is designed to meet IECC 2015/ASHRAE 90.1-2013 energy efficiency requirements to comply with the requirements of the Massachusetts Stretch Energy Code. Based on preliminary modeling, it is expected that the project will achieve at least a 22% annual energy cost savings when compared to the ASHRAE 90.1-2010 baseline.

The team recognizes the importance of energy efficiency and will continue to evaluate opportunities reduce energy use and increase points within the Energy & Atmosphere category, specifically within the Optimize Energy Performance credit.

F. Materials and Resources (MR)

MR Prerequisite 1 Storage and Collection of Recyclables — Required

Storage of collected recyclables will be accommodated in a designated recycling area within the loading dock area. Recyclable materials collected will include mixed paper, corrugated cardboard, glass, plastics, and metals, and the disposal of batteries and electronic waste. A contracted waste management company will collect the recyclables on a regular basis.



MR Prerequisite 2 Construction and Demolition Waste Management Planning — Required

The Project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the construction manager to submit and implement a compliant waste management plan for the duration of construction. Waste diversion goals for the project will include at least five materials targeted for diversion.

MR Credit 2 Building Product Disclosure & Optimization (BPDO): EPDs (LEEDv4.1)

1 credit point, 1 Exemplary Performance point

The Project will achieve this credit via Option 1. The technical specifications will include direction for the construction manager and their sub-contractors to provide and submit materials and products Environmental Product Declarations that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. The team will work to provide documentation for 20 different permanently installed products sourced from at least 3 different manufacturers.

MR Credit 3 BPDO: Sourcing of Raw Materials (LEEDv4.1) — 1 credit point

The Project will pursue this credit. The technical specification will include information for applicable products and materials to meet one of the following extraction criteria (as applicable): Extended producer responsibility, Bio-Based materials, FSC wood, Materials reuse, Recycled Content, and/or regionally extracted and manufactured (within 100 miles of the project site). Credit achievement cannot be determined until construction phase.

MR Credit 4 BPDO: Material Ingredients (LEEDv4.1) — 2 credit points

The Project will pursue Option 1 and Option 2 for product and material disclosure, and by selecting products and materials with third party confirmation of reduced hazardous substances. The project manual will include the information and direction for the construction manager and their sub-contractors to provide and submit materials and products documentation identifying the chemical make-up. The documentation may be Health Product Declarations, Cradle-to-Cradle or Declare certification. The team will provide documentation

for 20 different permanently installed products sourced from at least 3 different manufacturers.

MR Credit 5 Construction & Demolition Waste Management (LEEDv4.1) 2 credit points
The Project will meet the requirements of this credit by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the construction manager to attempt to divert a minimum of 75% of the demolition and construction waste generated on site from area landfills. The construction waste management plan will include tracking five waste streams. Diverted material reported will include at least three different material streams. Demolition waste will be separated on site as part of the strategy to meet this credit.

G. Indoor Environmental Quality (IEQ)

IEQ Prerequisite 1 Minimum IAQ Performance Required
The Project's mechanical systems are designed to exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7. The mechanical engineer will complete a ventilation rate procedure (VRP) calculator to verify compliance for the Project. Outdoor airflow monitors are included in the project.

IEQ Prerequisite 2 Environmental Tobacco Smoke Control (LEEDv4.1) Required
Smoking will be prohibited in The Project and within 25' of the building. Signage will be posted within 10' of all building entrances to indicate the interior and exterior no-smoking policy.

IEQ Credit 1 Enhanced Indoor Air Quality Strategies 2 credit points
The Project is being designed to incorporate permanent entryway systems, properly enclosed and ventilated chemical use/storage areas, and compliant filtration media (MERV 13+).

Additionally, the project will meet the requirements of Option 2 by providing a CO2 sensor in all densely occupied spaces.

IEQ Credit 2 Low Emitting Materials (LEEDv4.1) 3 credit points
The Project will achieve this credit through meeting the compliance criteria for the following compliant categories: interior paints and coatings, adhesives and sealants, flooring, ceilings, insulation, and composite wood. Intending to achieve at least 4 categories for 3 points.

IEQ Credit 3 Construction Indoor Air Quality Management Plan 1 credit point
The project manuals for the Project will include direction for the construction manager to develop and implement an Indoor Air Quality Management plan in compliance with applicable control measures as stated in the SMACNA IAQ Guidelines for Occupied Buildings under construction 2nd Edition, 2007 ANSI/SMACNA 008-2008 Chapter 3. Additional measures will be implemented to ensure absorptive materials will be protected from moisture damage.

IEQ Credit 4 IAQ Assessment 2 credit points
To meet the requirements of Option 2, after construction ends and before occupancy, but under ventilation conditions typical for occupancy, the project will conduct baseline IAQ testing for all occupied spaces

IEQ Credit 5 Thermal Comfort 1 credit points
The project will design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55–2010, Thermal Comfort Conditions for Human Occupancy.

Additionally, the project will provide individual thermal comfort controls for at least 50% of individual occupant spaces and group thermal comfort controls for all shared multi-occupant spaces. The thermal comfort controls will allow occupants to adjust air temperature, air speed, and/or humidity.

IEQ Credit 6 Interior Lighting 1 credit point
At least 90% of individual occupant spaces, provide individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, of, midlevel). Midlevel is 30% to 70% of the maximum illumination level (not including daylight contributions.
All shared multi-occupant spaces will have multizone control systems that enables occupants to adjust the lighting to meet group needs and preferences, with at least three lighting levels or scenes (on, of, midlevel), lighting for any presentation or projection wall will be separately controlled, and switches or manual controls will be located in the same space as the controlled luminaires.

IEQ Credit 7 Daylight (LEEDv4.1) 1 credit point
The project will demonstrate through computer modeling that spatial daylight autonomy for each regularly occupied meets levels of a minimum of $sDA_{300/50\%}$ for at least 40% of the regularly occupied floor area.

IEQ Credit 8 Quality Views 1 credit point
A direct line of sight to the outdoors and/or atrium will be provided for 75% of the regularly occupied floor area of the Project. 75% of the regularly occupied floor area will also have quality views to the outdoors which will include multiple lines of sight; unobstructed views; views to landscaped areas, sky, pedestrian walkways, and streetscapes.

H. Innovation (IN)

INc1 Exemplary Performance: SSc5 Heat Island Reduction 1 credit point
The Project will achieve Exemplary Performance for Heat Island Reduction by meeting both Option 1: Roof and Nonroof and Option 2: Parking Under Cover.

INc2 Innovation: Purchasing - Lamps 1 credit point
The Project will achieve one innovation point by complying with LEED Innovation Credit: Purchasing – Lamps, which requires that the calculated average mercury content for the Project be below 35 picograms of Hg per lumen hour. The project will be 100% LED.

INc3 Exemplary Performance: LTc7 Reduced Parking Footprint 1 credit point
The Project will achieve Exemplary Performance for Reduced Parking Footprint by reducing parking from the baseline by more than 60%.

INc4 Innovation, Pilot Credit, Exemplary Performance: To be Determined 1 credit point
The Project is exploring options to achieve this Innovation credit and is confident that a path will be found to earn all innovation credits. Options include, but are not limited to, exemplary performance in an existing credit, Green Building Education, Occupant Comfort Survey, Social Equity within the Project team, or Beauty and Design WELL feature compliance.

INc5 Pilot: Integrative Analysis of Building Materials 1 credit point
The Project will specify, purchase and install three different permanently installed products that have a documented qualitative analysis of potential health, safety, and environmental impacts of the product over its life cycle.

INc6 LEED Accredited Professional 1 credit point
Many members of the team are LEED Accredited Professionals (APs).

I. Regional Priority (RP)

Regional Priority Credits (RPCs) are established by the USGBC to have priority for a particular area of the country. When a project team achieves one of the designated RPCs, an additional credit is awarded to the project. LEEDv4 RPCs applicable to the Cambridge area include: LTc3 High Priority Site (2 points), SSc4 Rainwater Management (2 points), WEc2 Indoor Water Use Reduction (4 points), EAc2 Optimize Energy Performance (17%/8 points), EAc5 Renewable Energy Production (3%/2 points), and MRc1 Building Life-Cycle Impact Reduction (2 points).

The Project is currently tracking the following RPCs:

RPc1 SSc4 Rainwater Management (2 points)	1 credit point
RPc2 WEc2 Indoor Water Use Reduction (4 points)	*1 maybe point*
RPc3 EAc2 Optimize Energy Performance (17%/8 points)	*1 maybe point*

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The Green Engineer
Sustainable Design Consulting

www.greenengineer.com

Net Zero Energy Narrative

23 Bradford St., Concord, MA 01742

T: 978.369.8978

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Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Project Profile

Development Characteristics

Proposed Land Use(s) and Gross Floor Area (sq.ft.), by Use:	Laboratory/Office 185,842 GFA
Proposed Building Height(s) (ft. and stories):	120 feet 6 Floors above grade (including Penthouse).
Proposed Dwelling Units:	N/A
Proposed Open Space (sq.ft.):	32,956sf
Proposed Parking Spaces:	120 - 122
Proposed Bicycle Parking Spaces (Long-Term and Short-Term):	Minimum of 41 spaces long term and 12 spaces short term

Green Building Rating System

Choose the Rating System selected for this project:

LEED-Leadership in Energy & Environmental Design (U.S. Green Building Council)			
Rating System & Version:	LEED v4 New Construction	**Seeking Certification?**	Yes
Rating Level:	LEED Gold	**# of Points:**	66

Enterprise Green Communities			
Rating System & Version:	n/a	**Seeking Certification?**	No
Rating Level:	n/a	**# of Points:**	n/a

Passive House Institute US (PHIUS) or Passivhaus Institut (PHI)			
Rating System & Version:	n/a	**Seeking Certification?**	No

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Proposed Project Design Characteristics

Building Envelope

The building is a laboratory building typology (60/40 laboratory/office split). The Project is incorporating ea

Assembly Descriptions:

Roof:	The primary Building Roof will be a white (high-albedo) EPDM roof over rigid insulaton designed to achieve a minimum R-40. Higher insulation values are being explored. Tapered insulation will be used to create minimum 1/4" per foot slopes to direct water to paired primary and overfow roof drains. Sloped roof areas may have an extensive (tray-based) green roof system to aid in the retenton of storm water. Additonal study is required to determine whether generally flat roof areas will be designed as a green roof, blue roof (for storm water retenton), both or neither.
Foundation:	Foundation walls will be insulated concrete walls designed with a maximum C-value of 0.119.
Exterior Walls:	Opaque exterior walls will be a rainscreen system using a panelized material designed to achieve a u-value between 0.0275 and 0.033. Assembly materials will be selected and detailed to minimize thermal bridging.
Windows:	Exterior glazing will be a high-performance triple-glazed IGUs with a Basis of Design U-value between 0.18 and 0.22
Window-to-Wall Ratio:	The window-to-wall ratio will be approximately 47%. A more detailed ratio will be finalized as the design progresses.
Slab-on-Grade:	The building is designed with a 4-foot thick mat slab foundation below the lowest level of the parking garage. Due to its thickness, this slab is uninsulated. All at-grade spaces exist above the sub-terranean parking garage, and therefore there are no slabs on grade in the building. Slabs at cantilevered portions of the building will be designed to achieve a minimum R-19, with higher insulation values being evaluated.
Underground Walls:	See description of foundation walls.
Other Components:	
Building Infiltration	

Envelope Performance:

	Proposed		Baseline	
	Area (sf)	*U-value*	*Area (sf)*	*U-value*
Window	51,228 sf	0.18 - 0.22		0.42
Wall	57,297 sf	.0275 - .033		0.0452
Roof	44,870 sf	0.025		0.0255

Envelope Commissioning Process:

Building envelope commissioning will be pursued for this project in accordance with ASHRAE Guidelines 0-2005 and National Institute of Building Sciences Guideline 3-2012, Exterior Enclosure Technical Requirements for the Commissioning Process, as they relate to energy, water, indoor environmental quality, and durability. Services by qualified Building Enclosure Commissioning Agents will be sought with previous experience on projects of similar characteristics to review design and submittals, verify inclusion of operator and occupant training, verify seasonal testing of the envelope, to develop and provide an on-going commissioning plan, and to review building operations 10 months after substantial completion.

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Building Energy Systems

Systems Descriptions:

The building is a laboratory building typology (60/40 laboratory/office split). The Project is incorporating ea

HVAC System	High equipment efficiencies are targeted for main plant equipment, i.e. condensing boilers, premium efficiency motors, variable frequency drives
Space Heating:	Heating Hot Water (HHW) will be provided by natural gas fired condensing boilers supplying 140°F water to the AHU glycol energy recovery system, fan coil units (FCU), VAV reheat coils, and other HVAC related heating devices. A heat recovery chiller will provide additional heating when there is a simultaneous heating and cooling demand in the building. Energy recovery will be used to provide preheating of outside air to the building via a closed loop, glycol piping system, pumps, heat exchangers, expansion tanks, etc. Energy will be recovered from the laboratory exhaust air stream.
Space Cooling:	Cooling will be through two water-cooled chillers and cooling towers each sized for 700 tons (70% of peak load). Hydronic cooling, predominantly active chilled beams (ACBs) and limited quantity of fan coil units, will be employed.
Heat Rejection:	The building shall be provided with two main forms of energy recovery: enthalpy wheels on non-lab units and run-around coil systems for lab spaces.
Pumps & Auxiliary:	Ducts and pipes will be sized for low pressure drops to reduce fan and pumping power
Ventilation:	Minimum space ventilation rates will meet the requirements of ASHRAE 62.1-2016, with additional ventilation provided as required for laboratory spaces.
Domestic Hot Water:	Gas-fired condensing water heaters located in penthouse - separate heaters for domestic and laboratory usage.
Interior Lighting:	High-efficiency lighting with occupant controls. Lighting will utilize LED and low lighting power densities by space type.
Exterior Lighting:	Exterior lighting will comply with all City and LEED requirements regarding safe nighttime lighting environments and light spillage.
Other Equipment:	Air-cooled diesel generator for emergency and legally required standby and optional loads.

Systems Commissioning Process:

66

The commissioning agent will perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems. Enhanced commissioning scope will include reviewing the owner's project requirements, and the basis of design, creating, distributing and implementing a commissioning plan, performing a design review of the project documents, witnessing on-site installations and testing and performing commissioning of installed HVAC, lighting, lighting controls and domestic hot water systems.

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Anticipated Energy Loads and Greenhouse Gas Emissions

Assumptions

The building is a laboratory building typology (60/40 laboratory/office split). The Project is incorporating early energy modeling via IES software for whole building analysis at multiple stages of design to explore opportunities for energy reduction on mechanical systems, improve energy efficiency, and reduce greenhouse gas emissions. ASHRAE code minimums were used for all baseline equipment sizes.

Annual Projected Energy Consumption and Greenhouse Gas (GHG) Emissions

	Baseline Building (ASHRAE 90.1-2013)		Proposed Design		NZE Option (Future Scenario)	
	MMBTU	% of Total	MMBTU	% of Total	MMBTU	% of Total
Space Heating	32,930	62%	17,628	51%	9,389	35%
Space Cooling	2,027	4%	1,235	4%	1,923	7%
Heat Rejection	623	1%	252	1%	192	1%
Pumps & Aux	321	1%	148	0%	53	0%
Ventilation/Fans	9,463	18%	7,690	22%	7,997	30%
Domestic Hot Water	382	1%	382	1%	382	1%
Interior Lighting	3,329	6%	2,525	7%	2,525	9%
Exterior Lighting	-	0%	-	0%	-	0%
Misc. Equipment	4,417	8%	4,425	6600%	4,425	16%
On Site PV (future)	-	0%	-	0%	*1,505*	6%
	$US, kBtu, Kbtu/sf		$US, kBtu, Kbtu/sf, kWh, therm	% Reduction from Baseline	$US, kBtu, Kbtu/sf, kWh, therm	% Reduction from Baseline
Total Energy Cost ($US)	$1,725,829		$1,330,806	23%	$1,301,058	25%
Total Energy Use (kWh)	7,712,375		6,651,237	13.8%	7,326,282	5.0%
Total Energy Use (therms)	271,812		115,942	57.3%	3,821.0	98.6%
Site EUI (kBTU/SF)	210.0		135	35.7%	99.1	52.8%
Source EUI (kBTU/SF)						
	MMBTU	% of Total	MMBTU	% of total	MMBTU	% of total
On-Site Renewable Energy Generation	-	-	-	-	1,505	5.6%
Off-Site Renewable Energy Generation	-	-	-	-	-	0%
	MTons CO2 [/sf]		MTCO2e [/sf]	% Reduction from Baseline	MTCO2e [/sf]	% Reduction from Baseline
GHG Emissions	3293		2211	32.9%	1778	46.0%
GHG Emissions per sf	0.013		0.009	32.9%	0.007	46.0%

Results are based on energy model report dated November 16, 2020 issued by Arup

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

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Anticipated Energy Usage

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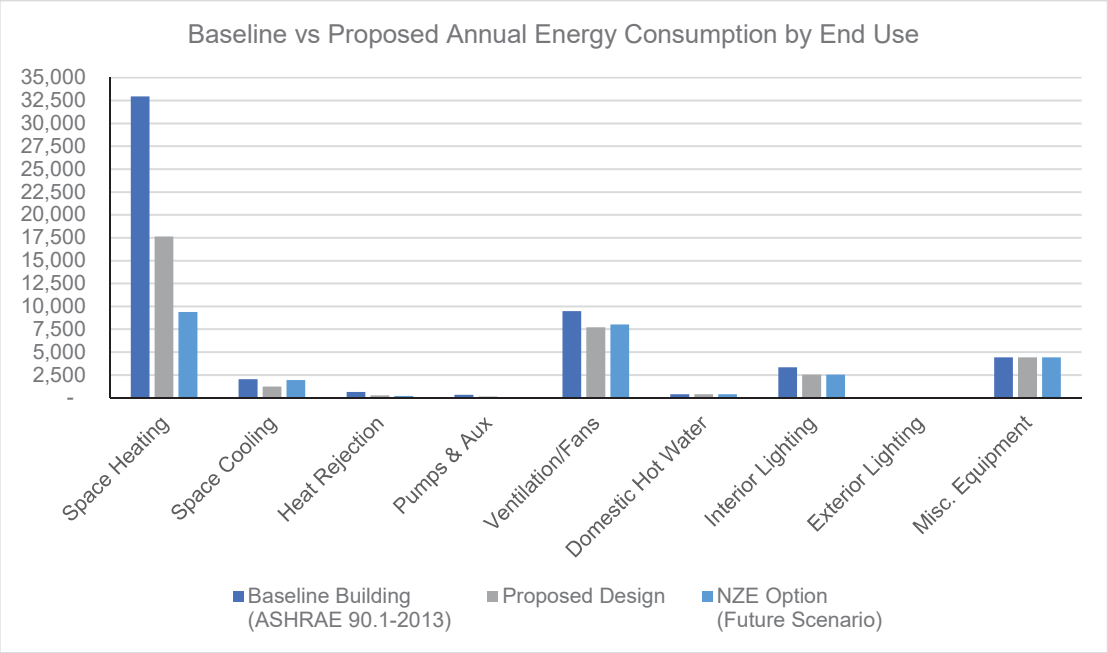
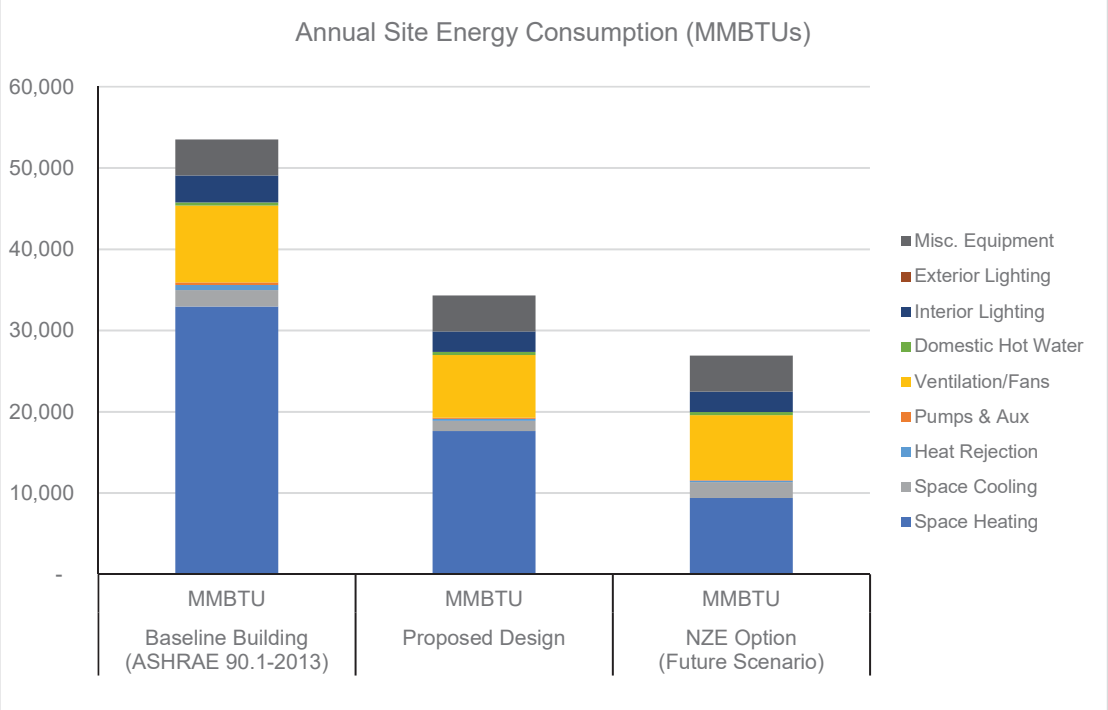




Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Building Energy Performance Measures

Overview:

The building is a laboratory building typology (60/40 laboratory/office split). The Project is incorporating early energy modeling via IES software for whole building analysis at multiple stages of design to explore opportunities for energy reduction on mechanical systems, improve energy efficiency, and reduce greenhouse gas emissions. ASHRAE code minimums were used for all baseline equipment sizes.

Land Uses:	Sited on previously developed land, which is also classified as U.S. Department of Housing and Urban Development's Difficult Development Area
Building Orientation and Massing:	The Project is on a previously developed urban site with limited potential of massing and orientation changes. Fenestration area is optimized for the project to minimize thermal losses and unwanted gains, and to bring in sufficient daylight into the spaces.
Envelope Systems:	High performing envelope which meets the new code envelope backstop criteria has been designed for the project. It includes continous insulation on walls and roofs, high performaing glazing assemblies and optimized window wall ratio.
Mechanical Systems:	High efficiency equipment and energy/heat recovery equipment, and high efficiency chiller and boiler plants.
Renewable Energy Systems:	The Project's roof is being designed as solar ready and the team is continuing to evaluate economics for solar. Due to the nature of the Project, part of the roof will be occupied by large mechanical systems. On areas of the roof free of mechanical systems and with good solar availability, the potential of installing photovoltaic panels is under evaluation.
District-Wide Energy Systems	The Project evaluated the feasibility of the district steam. Energy and emissions impacts are difficult to quantify because steam production data is unavailable at the current time. Additionally, steam is produced via a non-renewable source fuel, which will not assist with the City NZE goals.
Other Systems:	EV charging stations to be provided for 2% of the total parking capacity for the project.

Integrative Design Process:

The development team has conducted numerous interdisciplinary early meetings focusing on sustainability. These meetings have included the ownership groups, architects, MEP engineers, civil engineers, landscape architects, energy analysts, and sustainability experts. An initial sustainability kick-off meeting for the Project was conducted in November 2020 focusing on sustainability and energy goals. Energy modeling is occurring and providing real feedback on decision-making; and the Project will link into the MassSave energy-efficiency incentive program. Early energy studies were used to estimate site Energy Use Intensities (EUI) and greenhouse gas (GHG) emissions and identify energy conservation measures for Building Envelope, Lighting Power Density, Equipment Efficiencies, etc. This early work has pushed the design to increase the performance of the envelope and HVAC systems and explore additional opportunities for decreasing water use. As the building design progresses, integrative analysis remains part of the design strategy to validate that Project's energy performance and GHG emissions reduction goals are being met.

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

The Green Engineer
Sustainable Design Consulting

Solar Ready Roof Assesment

The purpose of this assessment is to determine the technical feasibility of solar energy system installation, either as part of the proposed project or in the future. It is helpful to supplement this narrative with a plan depicting the information provided.

The building is a laboratory building typology (60/40 laboratory/office split). The Project is incorporating early energy mod

Total Roof Area (sf)	39,040 sf at the top of the building.
Unshaded Roof Area (sf)	27,400sf (excludes areas with big mechanical equipment, shaded area, 15% additional deductions for setbacks, fire code, spaces for vent-pipes, shafts, etc.)
Structural Support:	The roofs will be PV/Solar ready for the areas identified with good solar access. The team is continuing to evaluate economics for solar/PV.
Electrical Infrastructure:	The design team will take electrical infrastructure into account while evaluating the economics for solar/PV on the roofs.
Other Roof Appurtenances:	Certain mechanical equipment, namely exhuast, will occupy and further shade roof area. Consideration will be given as to impacts of this equiment on future PV placements.
Solar Ready Roof Area (SF)	The roofs will be PV/Solar ready and the team is continuing to evaluate economics for solar/PV. The final amount of total square footage provided as solar-ready may change as the building design process progresses
Capacity of Solar Array (kW):	The project has capacity for a 341 kW PV system with an installed cost of about $1.2M. Anticipatd annual production is 441,150 kWh at a 20 degree tilt. The simple payback is calcualted to be 17 years. On-site photovoltaic system is likely not to be economically feasible due to the limited size of the roof space that would allow for solar power generation. Off-site PV, or other means of off-site renewable energy system may be considered by the Ragon Institute by purchasing electricity from renewable energy sources.
Financial Incentives ($):	There are federal and state (SMART) incentives available for eligible PV generation systems. These incentives programs are continously changing. Therefore, this analysis will be performed at the time of PV system design.
Cost Feasibility:	As noted in the capacity assessment, on-site generation does not initially appear to be an economically feasible source of renewable energy for the project.

Green Building Incentive Program Assistance

The project will involve utility rate incentives through a Memorandum of Understanding (MOU) with Eversource. The Integrated Design Path for Large Buildings is provided by the Mass Save Program Administrators (Eversource) for projects greater than 100,000 square feet. Eversource and Ragon will engage a third-party Engineer to evaluate potential energy saving measures through energy modeling compared to the state energy code baseline. Eversource will be part of the integrative design process through design development. The results of the energy model and pricing exercise will be used to determine utility incentives as well as aid in system decision making.

Project Name: Ragon 2
Submitted By: The Green Engineer, Inc.
Date of Submission: 12/02/2020

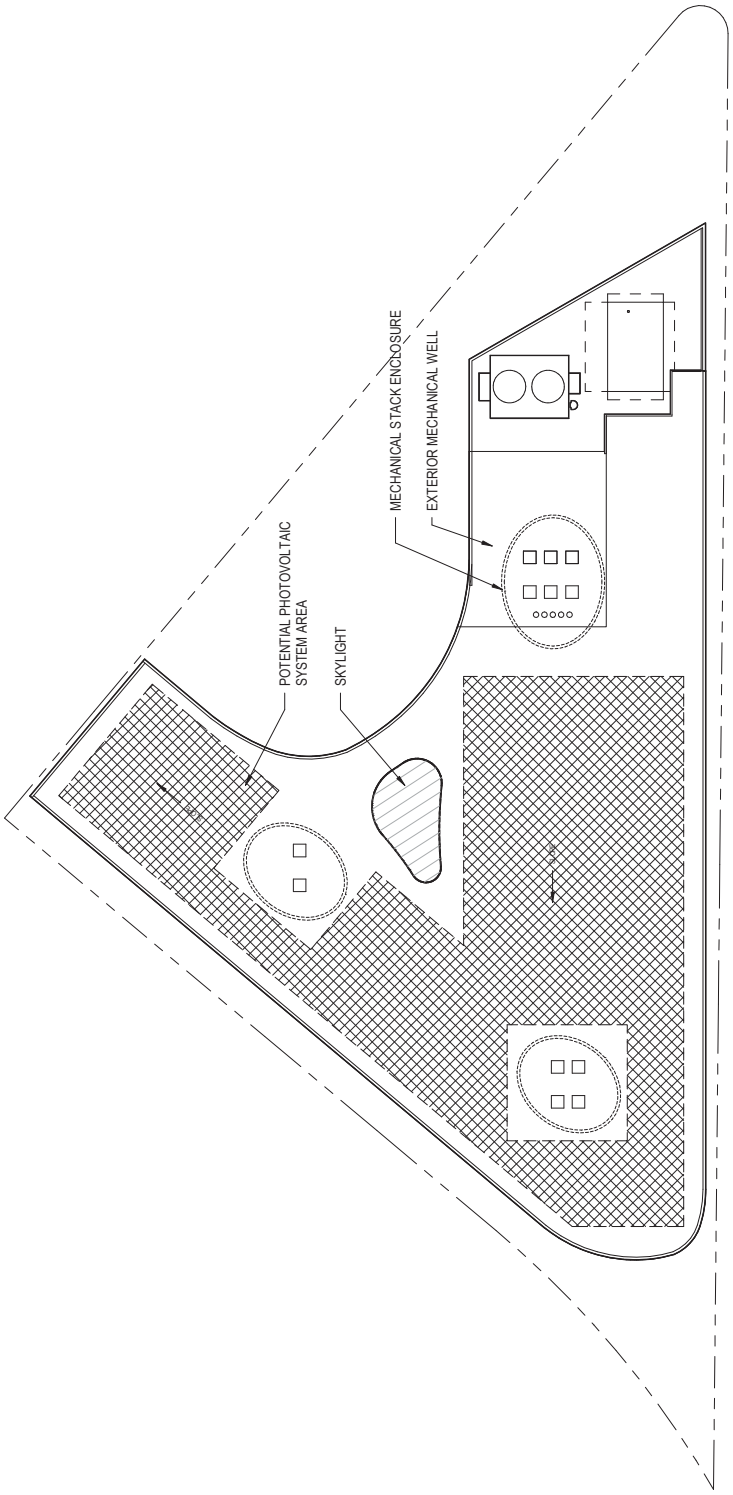
The Green Engineer
Sustainable Design Consulting

Net Zero Scenario Transistion

Several opportunities for future improvement of the Project have been identified that may be implemented for a Net Zero Option scenario.

The building is a

	Net Zero Condition	Transistion Process
Lighting Design	High-efficiency lighting with occupant controls. Lighting will utilize LED and low lighting power densities by space type. It is not anticipated that significant additional energy savings will be realized through lighting. As lighting relies on electricity, the transition to Net Zero relies on off-site renewable electricity supply.	It is important to acknowlege that the new Massachusetts Building Energy Code has stringent LPD thresholds and the Applicant will designing to go beyond the code thresholds where possible.
Future Lighting Upgrades	We anticipate that overtime, the future lighting improvements will reduce both interior and exterior lighting by 50%. This will also have the effect of reducing cooling loads while increasing heating loads.	Lighting technology continues to improve, as LED technology and automatic lighting controls become commonplace. Lighting upgrades may be implemented to take advantage of a future enhanced technology.
Domestic Hot Water:	To lower energy use in the future, domestic hot water heating source can be a heat pump type water heater.	At the end of life of the original equipment it is possible to easily convert the existing system to a high efficienct heat pump system for domestic hot water system.
Receptacle Loads	In Net Zero Option, plug loads are assumed to be 25% lower than the current design scenario. This would also have the effect of reducing cooling loads while increasing heating loads	Receptacle loads represent a significant energy end use in the Project, due to the high numbers of lab equipment, computers, etc. Currently plug loads are growing and continure to grow, as phones, tablets, etc proliferate, along with phanton loads their chargers create. We anticipate that this trend will reverse with improvement in technology.
Fossil Fuel Free HVAC Systems	Future NZE scenario assumes some sort of air source heat pump technology would be used. In this option the boilers and chillers would be replaced with modular air-cooled heat pumps that could provide chilled and hot water as needed.	While not currently economically feasible, the Project could eventually be converted to all electric service. We would expect this to occur at the end of life of the original HVAC systems. There are a few options available. The actual methodology will depend on innovations in technology over the next several decades. Potenital difficulties include the hot water temperatures the heat pumps can generate. Current technology struggles to heat beyond the 130F. It is possible that future heat pump technology can generate higher temperatures, but it should also be noted that the proposed HVAC systems will use lower temperatures to maximize boiler efficiency.


MECHANICAL STACK ENCLOSURE
EXTERIOR MECHANICAL WELL
POTENTIAL PHOTOVOLTAIC SYSTEM AREA
SKYLIGHT

The Green Engineer
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www.greenengineer.com

Green Building Professional Affidavit

23 Bradford St., Concord, MA 01742

T: 978.369.8978

GREEN BUILDING PROJECT CHECKLIST • ARTICLE 22.000 • GREEN BUILDING REQUIREMENTS

Affidavit Form for Green Building Professional
Special Permit

Green Building
Project Location: 600 - 624 Main Street, Cambridge, MA

Green Building Professional

Name: Sarah Michelman

☒ Architect

☐ Engineer

License Number: MA Lic No. 10402

Company: The Green Engineer, Inc.

Address: 23 Bradford Street, First Floor, Concord, MA 01742

Contact Information

Email Address: Sarah@greenengineer.com

Telephone Number: 978-341-5462

I, Sarah Michelman, as the Green Building Professional for this Green Building Project, have reviewed all relevant documents for this project and confirm to the best of my knowledge that those documents indicate that the project is being designed to achieve the requirements of Section 22.24 under Article 22.20 of the Cambridge Zoning Ordinance.

X _____ 11/11/2020
(Signature) *(Date)*

Attach either:

☒ Credential from the applicable Green Building Rating Program indicating advanced knowledge and experience in environmentally sustainable development in general as well as the applicable Green Building Rating System for this Green Building Project.

☐ If the Green Building Rating Program does not offer such a credential, evidence of experience as a project architect or engineer, or as a consultant providing third-party review, on at least three (3) projects that have been certified using the applicable Green Building Rating Program.

LEED AP BD+C

87211-AP-BD+C

CREDENTIAL ID

23 SEP 2010

ISSUED

21 SEP 2022

VALID THROUGH

GREEN BUSINESS CERTIFICATION INC. CERTIFIES THAT

Sarah Michelman

HAS ATTAINED THE DESIGNATION OF

LEED AP® Building Design + Construction

by demonstrating the knowledge and understanding of green building practices and principles needed to support the use of the LEED® green building program.

Mahesh Ramanujam

MAHESH RAMANUJAM
PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.