140 KENDRICK

bxp

Pioneering Net-Zero Redevelopment of an Existing Building

PROPERTY OVERVIEW

140 Kendrick is a 440,000 sq. ft. premier workplace campus in Needham, Massachusetts, developed, owned, and managed by BXP. It features three buildings, A, B, and C, and the Exchange, an amenities center including conference facilities, a first-class desk and collaboration space, and a fitness center.

This case study will focus on Building A, a 106,000 sq. ft. office building that has undergone a retrofit focused on improving overall operational efficiency and occupant comfort. 140 Kendrick Building A is the first net-zero,[1] carbon-neutral office repositioning of this scale in Massachusetts. The project was completed in partnership with Wellington Management, which leased the building in 2021. The scope of the renovation project included full electrification, building envelope improvements, advanced energy recovery systems, mechanical system modernization, and the addition of on-site renewable energy generation.

Building A exemplifies a high-performance workplace reflected in LEED v4 Gold[2] and LEED Zero Carbon project targets. Achieving the LEED Zero Carbon target would make this building the first large-scale office to achieve this rating in Massachusetts.

"Wellington Management's commitment at 140 Kendrick is a continuation of the success we built at Atlantic Wharf through the development of Boston's First Green Skyscraper. We look forward to continuing our longstanding partnership through this extraordinary net-zero project."

Bryan Koop, Executive Vice President, Boston Region, BXP

NAME: 140 KENDRICK

SIZE: 440,000 SQ. FT.

LOCATION: NEEDHAM, MA

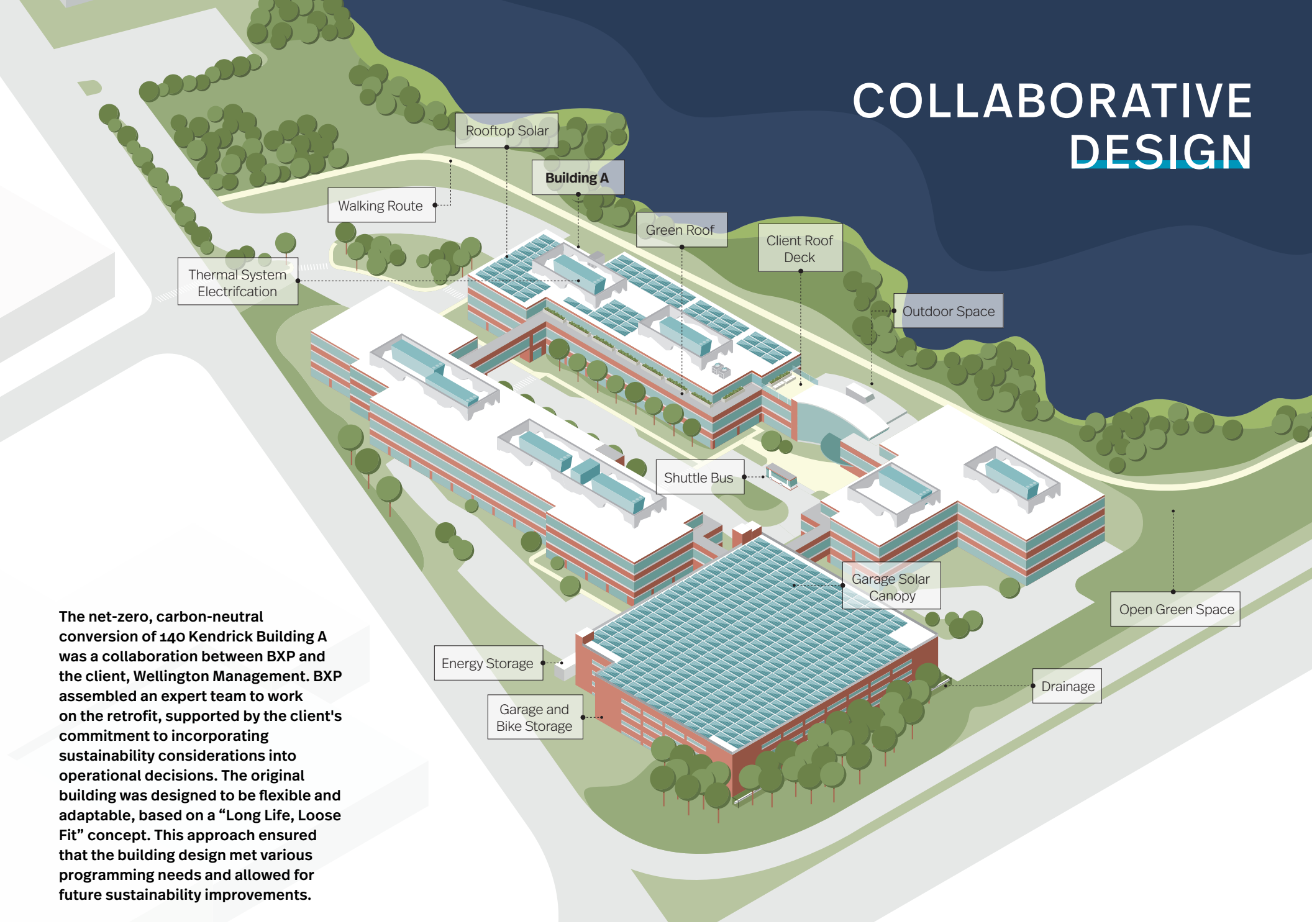
BUILDING A SIZE: 106,000 SQ. FT.

BUILDING A CERTIFICATION TARGETS:
LEED V4 BD+C: CS GOLD, LEED ZERO CARBON

[1]Net-zero for this project is aligned with the LEED Zero Carbon standard. LEED Zero Carbon recognizes net-zero carbon emissions from energy consumption and transportation through carbon emissions avoided or offset over a period of 12 months.

[2]LEED V4 raises the bar on building standards to address energy efficiency, water conservation, site selection, material selection, daylight, and waste reduction. Please follow this link for more information: https://www.usgbc.org/leed

COLLABORATIVE DESIGN



The net-zero, carbon-neutral conversion of 140 Kendrick Building A was a collaboration between BXP and the client, Wellington Management. BXP assembled an expert team to work on the retrofit, supported by the client's commitment to incorporating sustainability considerations into operational decisions. The original building was designed to be flexible and adaptable, based on a "Long Life, Loose Fit" concept. This approach ensured that the building design met various programming needs and allowed for future sustainability improvements.

When redesigning the building, BXP presented the client with three retrofit scenarios with differing levels of sustainability ambition. Given Wellington's commitment to considering sustainability within its operational decision-making, the most ambitious option was chosen, in line with LEED v4 Gold certification and LEED Zero Carbon project targets.

The collaboration ensured environmental and social excellence continued at all subsequent design and retrofit stages. In addition, both parties discussed the sustainability features of the fit-out in a synergistic manner to provide the best possible space for Wellington Management's employees.

"Wellington Management is delighted to be partnering with BXP on the redevelopment of 140 Kendrick. We hope it inspires others to consider the benefits of aligning their own retrofit projects with LEED Zero Carbon targets in the future."

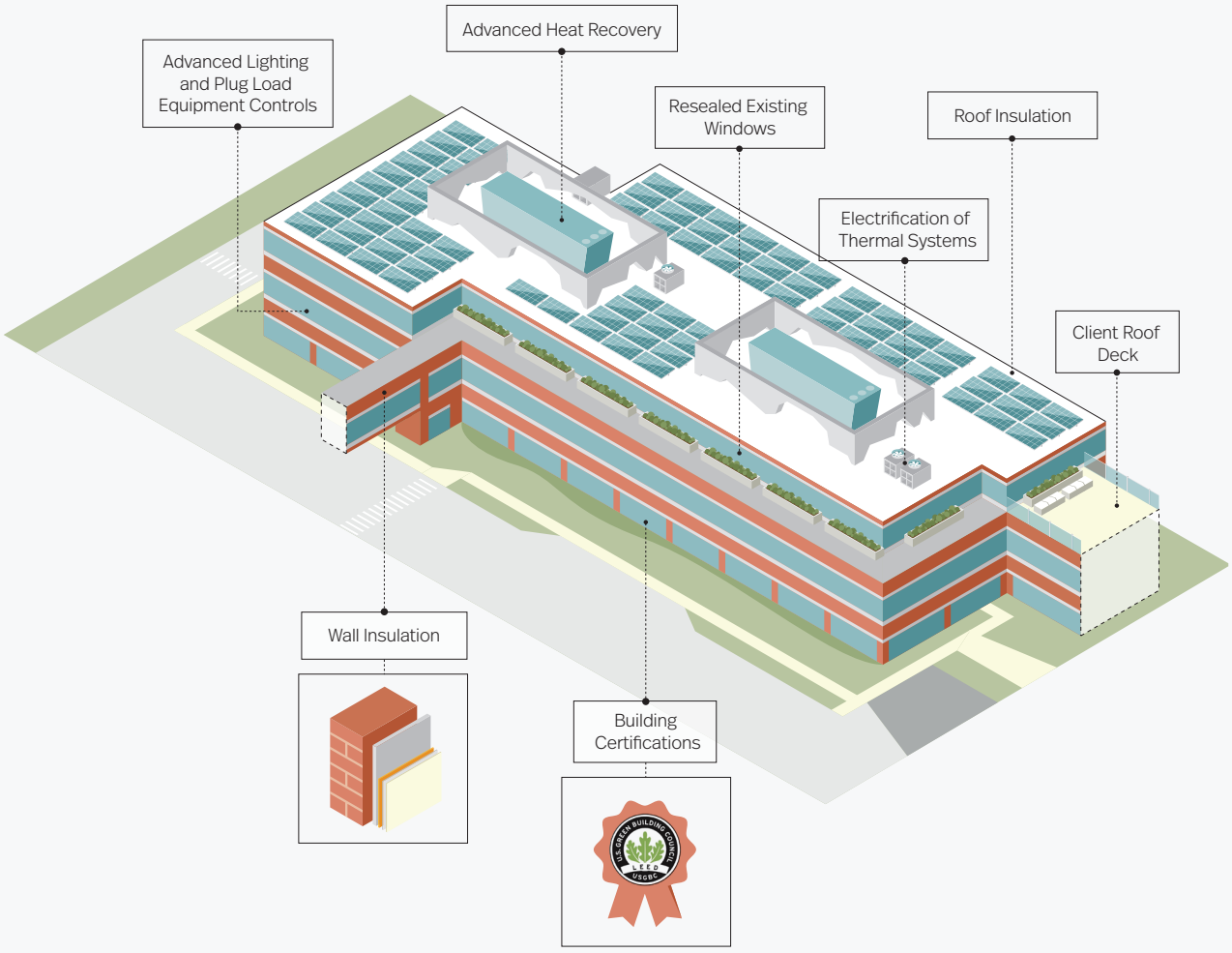
Karen Pritchard, Director, Finance and Administration, Wellington Management

UPGRADES TO THE BUILDING

The key driver for the Building A retrofit was the alignment of ESG ambitions of both BXP and Wellington Management. The aim was to create a state-of-the-art, efficient, LEED Zero Carbon building that provides its clients with a safe, comfortable, and productive environment.

40%	Reduction in energy use intensity
1.4 MW	On-site solar and storage
1.4m kWh	Annual production of renewable energy
23.4 $kgCO_2e/SF$	Embodied carbon saving
90%	Building heat recovered
38%	Reduction in indoor water use

Estimates as of July 2023



Energy Efficiency

Energy Performance

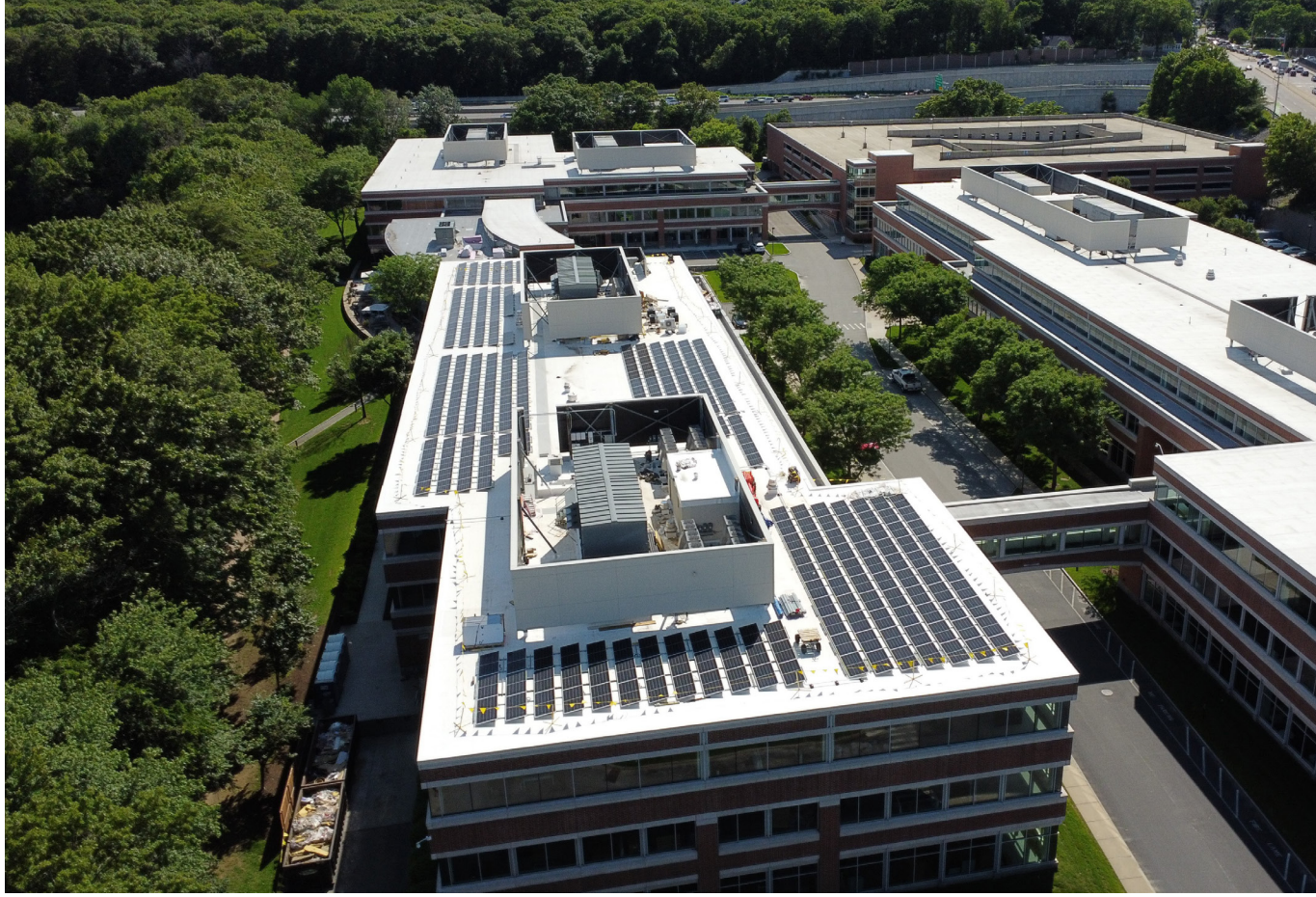
A core focus of the Building A retrofit was improving the original building's energy performance, which is aligned with BXP's energy and environmental goals. Improvements were made by insulating the building envelope (roof and walls), improving air-tightness by replacing and adding window seals, incorporating advanced energy recovery at rooftop air handling units, cutting the gas (eliminating all on-site gas combustion), and electrifying the building's Heating, Ventilation, and Air Conditioning (HVAC) with a Variable Refrigerant Flow (VRF) Heat Pump system. Once the building is in full operation, the team will pursue LEED Zero Carbon and ENERGY STAR certifications.

On-site Renewable Energy Generation

More than 1.4 MW of on-site solar and storage were installed as part of the project. The on-site solar is expected to generate more energy than the building's annual consumption, estimated to produce over 1.4 million kWh of renewable energy annually. As a result, less energy would be lost in transmission through the grid, energy costs would be reduced and the building would be energy positive.

Embodied Carbon

Embodied carbon refers to the amount of CO_2 emissions released throughout the whole lifecycle of a building, from source material production and construction through to operation. An estimated 23.4 $kgCO_2e/SF$ of embodied carbon was saved due to repositioning the existing building structure, aligned with BXP's overall target to reduce the embodied carbon of new development projects by 14% by 2024, from a 2018 baseline.



Building Services Efficiency

Energy consumed by HVAC equipment and lighting can amount to the majority of usage in a building. Measures have been designed and implemented to improve efficiency and reduce energy usage. The team targeted a 40% reduction in energy use intensity, resource conservation, and improved efficiency. Automatic light and plug load control features have been designed in alignment with the net-zero goal.

The whole building electrification at Building A was a core element of improving efficiency and reducing energy use. The new HVAC system relies on a high-efficiency (VRF) system controlled by a new building management system.

Updates included the installation of two new roof-top units with advanced Superblock heat recovery, estimated to recover 90% of the building's heat. In addition, the existing heating and cooling systems were modernized, and gas heating was replaced, reducing the project's overall carbon footprint.

The new roof-top units also increased the outdoor air supplied to the client space by 50%. Outdoor air has been shown to have multiple benefits for occupant comfort, health, productivity, and well-being.

Waste

BXP pursues best-practice waste management in all its properties, incorporated into the BXP Waste Management Plan, which outlines recycling and composting guidance for its building. Building life-cycle impact reduction was fundamental to the retrofit approach. Building A targeted maximum points for this section of the LEED certification by reusing and optimizing the existing building structure, envelope, and interior to limit waste to landfill. For example, existing windows were resealed rather than replaced after modeling energy performance and embodied carbon. Resealing existing high-performing windows increased energy efficiency and improved thermal comfort without the need to replace them with new material, supporting circular economy principles. In addition to reusing existing structural and envelope-building elements, the team achieved a 50% construction waste diversion rate.

Water

BXP's water-use reduction goal is to reduce water-use intensity by 30% by 2025. New low-flow water closets, urinals, and faucets reduce indoor water use by 38%. As part of the Garage Solar canopy system, a stormwater infiltration system has been designed and installed to help infiltrate stormwater runoff from the garage solar panels into the ground recharge. The garage solar project will not have any adverse impacts on the existing sewage system and will aid in preventing combined sewer overflow regionally.

Upgrades to the Building's Exterior

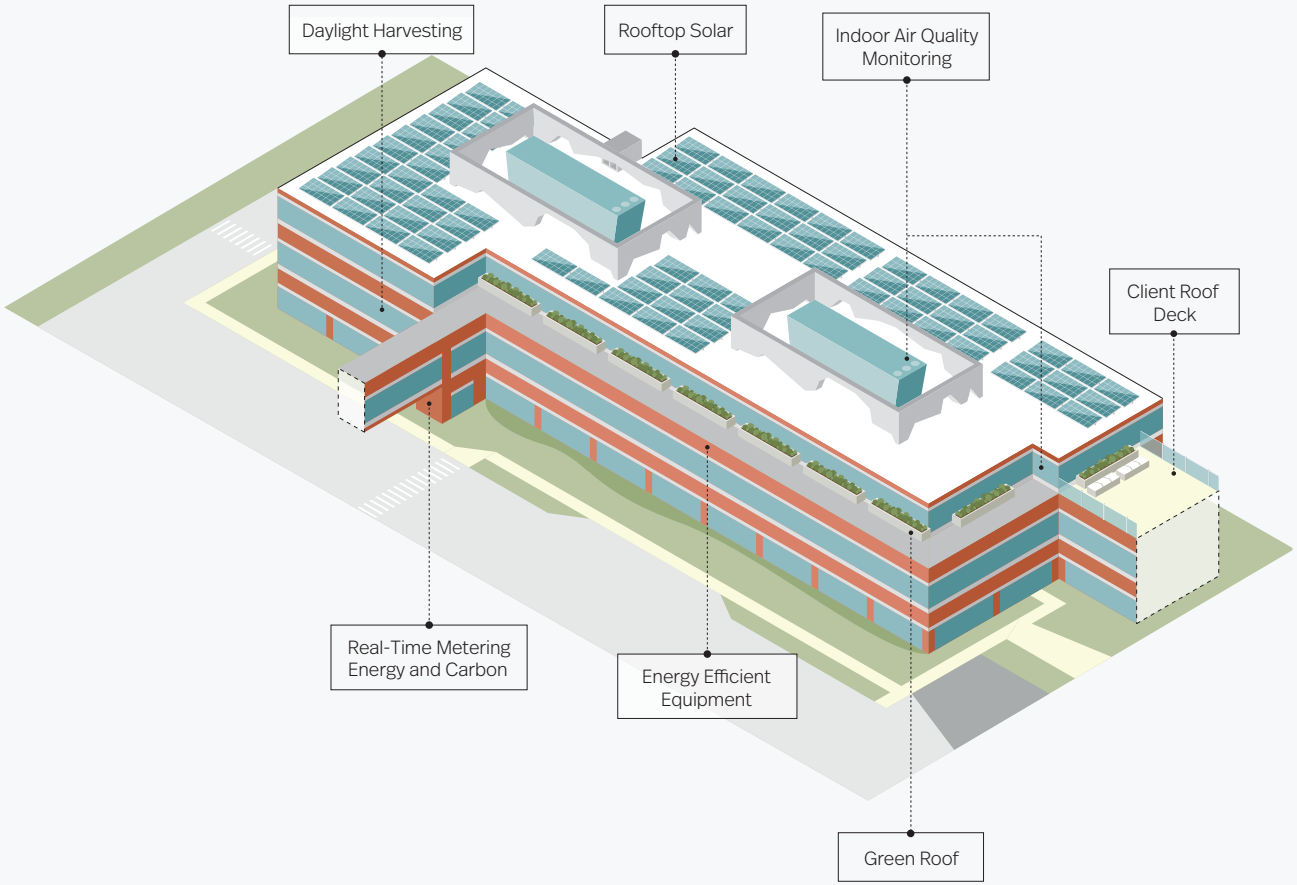
The exterior envelope was upgraded to improve thermal insulation and tightness. Both the roof and walls' thermal performance were enhanced with spray foam insulation, which provides performance and acoustical benefits to the building. Insulation and sealing reduced heat loss and air infiltration. The environmental impact of spray foam insulation was also considered, and a UL GREENGUARD Gold Certified product with ultra-low global warming potential, Heatlok HFO Pro, was specified.

Upgrades to the building exterior using the existing infrastructure were a crucial feature of the retrofit, moving BXP closer to its goal of being carbon-neutral in its operations by 2025.

"We are proud of our position and consistent recognition as an industry leader in sustainability. We will continue to demonstrate our commitment and capacity to conduct our business in a manner that contributes to positive economic, social, and environmental outcomes for our clients, shareholders, employees, and the communities we serve."

Owen D. Thomas, CEO, BXP and Douglas T. Linde, President, BXP

ENHANCING THE CLIENT EXPERIENCE



15	Plant species options for the green roof
600 acre	Nature reserve and public recreation area
1.5 mile	Walking trail looping Kendrick Pond in Cutler Park

“Each design element was considered from a sustainability perspective and with our colleagues' well-being and best interests in mind. Flexible seating design will decrease waste over the life of the lease and provide our employees with options to work in environments best suited for the work they are doing. Access to outside spaces, fitness facilities, wellness, and multi-faith spaces will enable employees to thrive in this new office environment.”

Karen Pritchard, Director, Finance and Administration, Wellington Management

Enhancing Client Well-being

In addition to striving for optimal energy performance, BXP aims to maintain a healthy and comfortable indoor environment for occupants. As part of the smart building strategy, a continuous indoor air quality (IAQ) monitoring system was installed in Building A. The IAQ sensors will monitor outside air, supply air, and return air streams for temperature, humidity, CO_2, and total volatile organic compounds (VOCs). Threshold monitoring alerts property management if the ideal readings are not met.

Building A prioritizes client well-being by providing first-class amenities. ‘The Exchange’ is available to all clients and includes collaboration space, outdoor access, two Sheffield bike stands for storage, outdoor seating, and access to nature and views.

In addition, biophilic elements are provided by a roof deck and green roof. For the roof deck, sustainably harvested wood pavers were chosen as an alternative to concrete pedestal pavers as they are Forest Stewardship Council (FSC) certified. Plant species selected for the green roof have low water needs and are drought resistant. The plants also benefit local wildlife, with the sedum acre, or Goldmoss Stonecrop, particularly appealing to bees.

The site is located next to Cutler Park, a 600-acre nature preserve and public recreation area with a 1.5-mile trail looping Kendrick Pond. Nature and health and well-being are intrinsically linked as research has proven that access to nature benefits occupants’ mental and physical health and well-being at work.

Transportation

Transportation systems surrounding 140 Kendrick promote sustainable transport and mobility. On weekdays, a shuttle service operates hourly between the corner of Lincoln and Walnut Streets (Newton Highlands) and 140 Kendrick, giving clients access to shared transport.

BXP and Wellington will survey transportation and bike lane connectivity and will offset commuting emissions as part of the LEED Zero certification process.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