The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Kathleen A. Theoharides
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
http://www.mass.gov/eea

November 8, 2021

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
THIRD NOTICE OF PROJECT CHANGE

PROJECT NAME	: Kendall Square Urban Redevelopment Plan (KSURP) - Amendment #11
PROJECT MUNICIPALITY	: Cambridge (Kendall Square)
PROJECT WATERSHED	: Charles River
EEA NUMBER	: 1891
PROJECT PROPONENT	: Cambridge Redevelopment Authority
DATE NOTICED IN MONITOR	: September 22, 2021

Pursuant to the Massachusetts Environmental Policy Act (MEPA, M.G.L. c.30, ss.61-62I) and Section 11.17 of the MEPA regulations (301 CMR 11.00), I have reviewed the Notice of Project Change (NPC) submitted for this project and hereby determine that it **does not require** an Environmental Impact Report (EIR).

In 2015, the Proponent filed an NPC and Single EIR with a detailed transportation analysis, when major new development exceeding 1 million square feet was proposed. While eight NPCs were filed prior to 2015, none proposed additional development of similar scale, and each review concluded with a finding that no further review was required in the form of an EIR. The 2015 NPC/Single EIR and subsequent 2016 Second NPC established a mitigation framework that was intended to be applied for transportation impacts associated with future projects within the KSURP planning area. This Third NPC, which is characterized as a further change to the 2015 development program, provided an updated cumulative assessment of the transportation impacts associated with the previously reviewed project and the project change described herein. The Third NPC proposes to add approximately 800,000 sf of new

building square footage, but will generate less than 3,000 adjusted adt (2,212 adt) of new vehicular traffic. In addition, the Proponent has indicated that it will continue to comply with the comprehensive mitigation program previously developed, which will fund and implement multimodal improvements in cooperation with key stakeholders, including the Massachusetts Department of Transportation (MassDOT), the Massachusetts Bay Transportation Authority (MBTA) and the City of Cambridge (City), over the buildout of the KSURP.

Based on the unique circumstances of this project, and in light of the lengthy history of review of the KSURP, I therefore find that further review of this Third NPC is not warranted in the form of an EIR. This finding shall not serve as a precedent for review of NPCs filed for any other project. In addition, any further expansion of development in the KSURP area should be viewed in the context of overall traffic projections, which now appear to have reached the maximum levels contemplated at the inception of the KSURP redevelopment effort.

Third Notice of Project Change Description

As described in the Third NPC, the project includes the following:

- Demolition of a six-story, 92,000-sf above-grade parking garage (the "Blue Garage") with 1,170 spaces;
- Demolition of a 62,576-sf manufacturing/lab building;
- Construction of Building C, a 17-story 412,000-sf building with office, lab and research and development (R&D) uses and 2,500 sf of retail use;
- Construction of Building D, a 17-story, 382,200-sf building with office and lab uses;
- Construction of a 38-story, 427,700-sf residential building with 465 units and 700 sf of retail space;
- Construction of Center Plaza, a 30,000-sf public open space between the residential building and Building C; and,
- Construction of two connected below-grade parking garages with a total of 1,584 spaces beneath Buildings C and D.

Building C will be constructed along Binney Street in the northern portion of the Blue Garage parcel, the residential building will be constructed on the southern portion of the Bluer garage parcel along Broadway and Center Plaza will be constructed in the central part of the Blue Garage parcel. Building D will be constructed to the east of Building C along Binney Street on the site of the manufacturing/lab building to be demolished. The two office buildings are new components of the KSURP and represent an increase in the overall building square footage of the KSURP from 4,427,300 sf previously reviewed to 5,227,300 sf. The residential space has been previously reviewed by MEPA in the review of the KSURP; however, the residential units are now proposed to be constructed within one building rather than two.

According to the Third NPC, the project change will accommodate the construction of an electrical substation in an underground vault 100 feet below the proposed Center Plaza to be constructed within the footprint of the Blue Garage. The substation had been previously proposed to be located on Fulkerson Street in proximity to a residential area; in response to community concerns about that location, the Proponent collaborated with the project's developer and Eversource to locate the substation

within the KSURP area. The additional 800,000 sf of lab/office space will make construction of the substation and relocation of electric distribution lines economically feasible. The electrical substation will be constructed by Eversource before the Center Plaza is completed.

The Third NPC, while characterized as a project change to the 2015 development program reviewed through a 2015 NPC/Single EIR and subsequent 2016 Second NPC described below, is itself considered a "Major Amendment" (Amendment 11) to the KSRUP and required separate approval through the Department of Housing and Community Development (DHCD). According to the Proponent, among the reasons Amendment 11 was considered a Major Amendment was because the substation is a major new public infrastructure element added to the KSURP.[1]

Original Project Description and MEPA Procedural History

The KSURP was established by the Proponent in 1965. The KSURP regulates the level of development through a cap on aggregate Gross Floor Area (GFA) of all land uses in the KSURP area. The level of development is further restricted through land use controls, including identification of Floor Area Ratios (FARs). The KSURP initially consisted of construction of up to 14 buildings totaling approximately 2.77 million gross square feet (GSF), three parking garages, open space, and other public improvements. The project was the subject of previous review under MEPA beginning with an Environmental Notification Form (ENF) in 1975, and followed by Draft and Final EIRs in 1977 and 1978 respectively, both of which were found to be adequate. Five NPCs were filed since 1978, none of which were required additional review in the form of an EIR. The NPCs adjusted the permitted mix of uses within the area, increased the maximum allowed GFA within the area, and extended the term of the KSURP. None of the NPCs required further MEPA review. Prior to Amendment 10, the KSURP allowed a maximum development of 3,302,100 sf of mixed uses, of which 200,000 sf (up to 280 units) was residential use and the remainder commercial use.

An NPC for KSURP Amendment No. 10 ("First NPC") was submitted to the MEPA Office in April 2015. Given the scale of new proposed development (addition of over 1 million GSF and over 3,000 adjusted adt), I found that the NPC warranted review in the form of an EIR. The Single EIR also applied updated review procedures to the proposed development, including analysis of GHG emissions pursuant to the 2010 May 2010 MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ("the MEPA GHG Policy"). In a Certificate issued May 29, 2015, I granted the request for a Single EIR. The Scope for the Single EIR requested further information on specific mitigation to address impacts on transit service and capacity. The Proponent filed a Single EIR for the project on October 15, 2015. On November 25, 2016 I issued a Certificate that determined the Single EIR adequately and property complied with MEPA and its implementing regulations. The Certificate on the Single EIR required that the Proponent file a Second NPC for KSURP Amendment 10 including a draft Memorandum of Understanding (MOU) between key project stakeholders that identified funding commitments offered a guide for the development of transit related mitigation measures. The Second NPC also described changes to the building program and building massing that had occurred since the Single EIR was reviewed. A Certificate on the Second NPC was issued on August 5, 2016 and did not require the filing

[1] The Third NPC included a list of over 30 public meetings conducted in 2020 and 2021 regarding Amendment 11 and does not include additional community meetings that were focused on the relocation of the proposed substation.

of an EIR. KSURP Amendment 10, as described in the First NPC, Single EIR and Second NPC, increased the total maximum development under the KSURP to 4,273,000, including 620,000 sf (up to 84 units) of residential space and 3,653,000 sf of commercial uses.

Environmental Impacts and Mitigation

According to the Third NPC, the project may result in the following environmental impacts compared to the cumulative impacts of the project as most recently reviewed under Amendment 10:

	KSURP Maximum Allowed Development (Amendment 10)	**Net Change Amendment 11**
Gross Square Footage (GSF)	4,427,300	+800,000
Housing Units	840	-95 (745 units)
Vehicle Trips Per Day (unadjusted)	37,595 adt	+6,615adt
Vehicle Trip Per Day (adjusted)	17,434	+2,212
Parking Spaces	3,545 spaces	+205 spaces
Water Use	1.4 million gpd	+58,006 gpd
Wastewater Generation	1.07 million gpd	+52,733 gpd

Permits and Jurisdiction

The original KSURP project was subject to a mandatory EIR pursuant to Sections 11.03(l)(a)(2) and 11.03(6)(a)(6) of the MEPA regulations because it required State Agency Action(s), and was expected to create more than 10 acres of new impervious surface, and generate more than 3,000 new average daily vehicle trips (adt).

The KSURP –Amendment 10 project was subject to a mandatory EIR as a stand-alone project pursuant to Section 11.03(6)(a)(6) of the MEPA regulations because it required a State Agency Action and, on its own, would generate greater than 3,000 new adt (both unadjusted and adjusted) on roadways providing access to a single location. It required approval of an Amendment to the KSURP by the Department of Housing and Community Development (DHCD). Amendment 10 required a Public Benefit Determination (PBD) and was subject to the MEPA GHG Policy.

On March 28, 2021, DHCD conditionally approved Amendment 11 subject to completion of MEPA review. The project may also require an Air Quality Permit from the Massachusetts Department

of Environmental Protection (MassDEP) and a Sewer Use Discharge Permit from the Massachusetts Water Resources Authority (MWRA). It is subject to the MEPA GHG Policy.

The KSURP Amendment 11 was approved by the Cambridge Redevelopment Authority (CRA) on September 16, 2020 and by the Cambridge City Council on February 3, 2021. It will require approval of the Infill Development Concept Plan as a Special Permit by the Cambridge Planning Board.

Because the project is not seeking Financial Assistance from the Commonwealth, MEPA jurisdiction is limited to those aspects of the project that are within the subject matter of required, or potentially required, State Agency Actions and that may cause Damage to the Environment as defined in the MEPA regulations. However, the subject matter of the Urban Renewal Plan approval and associated regulations (760 CMR 12.00) is sufficiently broad to confer the equivalent of broad scope jurisdiction over the potential environmental impacts of the project. Therefore, MEPA jurisdiction is broad in scope and extends to all aspects of a project that are likely, directly or indirectly, to cause Damage to the Environment, as defined in the MEPA regulations.

Review of the Third NPC

The Third NPC included a description of the project as previously reviewed in the NPCs and Single EIR submitted for Amendment 10 and the currently proposed project, including project plans. The Third NPC provided an update on agency coordination and public outreach, including outreach to Environmental Justice (EJ) populations in the vicinity of the site, that occurred since the Certificate on the Second NPC was issued.[2] It provided a transportation analysis that addressed trip generation by projects proposed in both Amendments 10 and 11, and included an updated GHG analysis of the proposed residential and office/lab buildings.

Traffic and Transportation

The Third NPC included a transportation study generally consistent with the EEA/MassDOT *Transportation Impact Assessment (TIA) Guidelines* issued in March 2014. It described existing and proposed roadway, pedestrian, and bicycle conditions, public transit capacity and infrastructure, roadway and intersection volumes and roadway safety issues. The TIA included in the Third NPC included the combined trips of Amendments 10 and 11; according to the Proponent, this analysis was provided at the request of MassDOT. If necessary, future filings should provide separate analyses of new trips generated by proposed development in addition to cumulative impact assessments. I recommend that the Proponent consult with the MEPA Office prior to submitting future filings if a different format for the analysis is under consideration.

Transportation Analysis

[2] According to the Third NPC, the public outreach effort has included meetings with community groups, social media and open houses. The Proponent has provided translation services at meetings and distributed project-related information in languages other than English. According to the Third NPA, the Proponent will continue its outreach efforts to nearby EJ populations.

Analyses of transit and vehicular operations were provided for the weekday morning and evening peak hours for Existing 2021, No Build 2028 and Build 2028 scenarios. The TIA identified potential pedestrian and bicycle accommodations, roadway improvements and TDM measures which will be implemented to minimize impacts to the transportation network. It analyzed the impacts of the project in a study area including the following 24 intersections:

- O'Brien Highway/Third Street;
- Cambridge Street/Third Street;
- Cambridge Street/First Street;
- O'Brien Highway/Cambridge Street/East Street;
- O'Brien Highway/Land Boulevard/Charlestown Avenue;
- Binney Street/Galileo Galilei Way/Fulkerson Street;
- Binney Street/North Garage West Driveway;
- Binney Street/North Garage East Driveway;
- Binney Street/Third Street;
- Binney Street/First Street;
- Binney Street/Land Boulkevard;
- Broadway/Galileo Galilei Way;
- Broadway/North Garage West Driveway;
- Broadway/North Garage East Driveway;
- Broadway/Ames Street;
- Broadway/Third Street;
- Broadway/Main Street;
- Broadway/Main street/Memorial Drive;
- Main Street/Ames Street;
- Main Street/Galileo Galilei Way/Vassar Street;
- Massachusetts Avenue/Vassar Street;
- Memorial Drive/Route 3/Ames Street;
- Massachusetts Avenue/Memorial Drive Westbound On/Off Ramps; and,
- Massachusetts Avenue/Memorial Drive Eastbound On/Off Ramps.

Existing 2021 transportation conditions were established with counts of vehicles, pedestrians and bicyclists in 2019. Existing transit ridership was based on 2019 data available from the Massachusetts Bay Transportation Authority (MBTA).

Trip Generation

The project's trip generation was estimated using trip rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Handbook* for Land Use Codes (LUC) 222 (High-Rise Residential), 760 (Research & Development Center) and 710 (General Office Building). Based on these trip rates, the project will generate 17,365 adt, including 1,290 trips in the AM peak period and 1,307 trips in the PM peak period. As noted above, the analysis included trips generated by the development

proposed in Amendment 10 in addition to Amendment 11; according to the Third NPC, the project will generate 6,615 adt (unadjusted) associated with the 800,000 sf of new office/lab development.[3]

The trip generation was adjusted to account for the travel mode shares identified in Table 1 and the number of new trips for each mode are shown in Table 2. According to the Third NPC, the Amendment 11 development will generate 2,212 daily vehicle trips (adjusted), including 31 vehicle trips in the AM peak hour and 11 vehicle trips in the PM peak period.

Table 1. Travel Mode Shares (percent) for each land use.

Land Use	Walking	Bicycling	Transit	Auto	Other
Residential	25	10	30	32	3
Office/R&D	6	9	37	34	14
Retail	6	9	37	34	14

The project's trip generation for each mode is shown in Table 2.

Table 2. New trips by mode (# trips).

	Walking	Bicycling	Transit	Auto	Other
Daily	1,740	1,910	7,568	5,932	2,650
AM Peak	126	141	554	432	195
PM Peak	136	144	572	450	199

The No Build 2028 scenario incorporated a 0.5 percent annual growth rate in vehicle trips on all area roadways in the study area and included additional trips to be generated by 12 planned development projects in the vicinity of the site. The No Build 2028 scenario also incorporated planned roadway improvements, including MassDOT's O'Brien Highway (Route 28) Reconstruction Project, the CRA's redesign of Binney Street and Broadway, and signalization of the Ames Street/Memorial Drive intersection. The Build 2028 condition includes the addition of project-generated trips to the No Build 2028 scenario.

Traffic Operations

The TIA provided an evaluation of the combined impact of vehicular traffic generated by the Amendments 10 and 11 development programs on roadways in the study area, including an intersection capacity analysis of peak hour traffic operations at study area intersections. The analysis designated intersections with a Level-of-Service (LOS), which reflects the overall operations of an intersection, including traffic speed, delay, and capacity. For urban intersections, LOS D reflects an acceptable level of operations; LOS E or F reflect significantly congested conditions and long delays.

[3] As of 2016, total adjusted adt associated with the 2015-16 development program, when added to the expected future traffic as projected in 2010 when the project was reviewed under MEPA (Amendment No.8), was estimated at 17,434 adt. With the addition of 2,212 adt associated with this Third NPC, total traffic generation is now estimated at 19,646 adt, which is slightly above the originally projected 19,300 vehicle trips for the KSURP as a whole. Future filings should provide an updated cumulative traffic generation estimate for the KSURP.

Three signalized intersections operate at LOS E or LOS F during the AM peak period and five intersections operate at those levels in the PM peak period under Existing 2021 conditions and will continue to do so under No Build 2028 and Build 2028 conditions. In addition, eight signalized intersections will operate at LOS E or LOS F in both the AM and PM peak periods under No Build 2028 and Build 2028 conditions, indicating that those intersections will operate under degraded conditions without the addition of project-generated traffic. Vehicular trips generated by the development programs proposed in Amendments 10 and 11 will generally cause increased congestion and delays at intersections throughout the study area compared to No Build 2028 conditions; however, only the LOS in the AM peak period at the Broadway/Ames Street intersection will degrade from LOS D to LOS E. The Third NPC did not separately describe the impacts of the project change; however, its impacts are not likely to be significant since trips generated by Amendment 11 are less than those associated with Amendment 10. According to MassDOT, there are few state roadway intersections in the study area and the impacts at these intersections are minor. I encourage the Proponent to review comment letters received on the Third NPC and consider potential traffic impacts beyond the transportation study area.

Pedestrian and Bicycle Facilities

According to the Third NPC, the KSURP area has excellent pedestrian and bicycle facilities, including sidewalks and crosswalks on all roadways and intersections, pedestrian countdown timers with leading pedestrian interval (LPI) programming, bike lanes, cycle tracks and multi-use pathways. The Third NPC identified the following mitigation measures to encourage pedestrian bicycle access:

- Provide additional pedestrian countdown timers at study area intersections;
- Implement LPI programming at study area intersections;
- Incorporate a new mid-block pedestrian crossing on Broadway between the proposed Cambridge Center North Garage Office Buildings and Danny Lewin Park on the south side of Broadway;
- Review all pedestrian crossings within the KSURP boundaries to assess their potential for bulb-outs, raised crossings, pedestrian refuge islands, Rectangular Rapid Flashing Beacons (RRFB's), re-aligned non-apex ramps and/or other treatments to enhance the comfort and visibility of crosswalks;
- Enhance the Main Street streetscape between Ames Street and Galileo Galilei Way to encourage its use by pedestrians;
- Improve pedestrian safety by enhancing lighting along sidewalks and pathways for safer pedestrian accommodations;
- Enhance open spaces with multiple outdoor connection to buildings within the KSURP area;
- Provide three bicycle sharing stations a full-service bike station within the KSURP area; and,
- Provide 780 long-term bicycle parking spaces and 142 short-term bicycle parking spaces.

Public Transportation

The site is well-served by public transportation, including the MBTA's Red Line subway and Bus Routes 64, 85 and CT2 and the EZRide Shuttle managed by the Charles River Transportation Management Association (TMA). The Third NPC provided a comprehensive analysis of MBTA transit services consistent with the MBTA's recommended approach for bus service, which includes an analysis

of the bus passenger comfort metric under existing and proposed conditions. According to the Third NPC, project-generated bus trips will cause exceedance of the passenger comfort metric on 14 bus trips.

With respect to Red Line subway service, the Third NPC included an analysis of the passenger crowding condition during 30-minute increments at the peak load point for that period. The analysis assumed that future Red Line operations and capacity improvements will produce reduce headways in the peak periods from 4.5 minutes to three minutes, with each branch running at six-minute headways. Based on these assumptions, the Third NPC documented that the Red Line will have sufficient capacity to accommodate the additional transit ridership associated with the project change. The Third NPC also included an analysis based on current Red Line capacity, without the proposed capacity improvements; assuming that the Redline will operate in the future under existing capacity conditions, project-generated trips would cause crowing exceedances for a few 30-minute increments during the shoulder peak-hours. According to MassDOT, the NPC did not include a platform loading capacity of the Kendall Square/MIT Station for future conditions as provided in the SEIR for Amendment No. 10.

Parking

The Certificate on the Second NPC indicated that the KSURP would include a total of 3,517 parking spaces, including those proposed in Amendment 10, and noted the total number of spaces would fall below the 3,545 spaces previously approved under Amendment 3. The project includes the demolition of the 1,170-space Blue Garage and its replacement with two underground garages below Buildings C and D, which together will provide 1,584 spaces; this would appear to represent a net increase of 414 spaces over the previously-proposed 3,517 spaces for a total of 3,931 spaces. The Third NPC, however, asserted that 3,882 parking spaces were previously reviewed in the Second NPC, instead of the 3,517 spaces referred to in the Certificate on the Second NPC, and that the Third NPC would reduce the number of parking spaces by 132 for a total of 3,750 spaces.

The Third NPC included a shared parking analysis that estimated that 3,878 spaces would be required for the entire KSURP. This estimate was based on an analysis of existing parking demand of 2,344 spaces, and additional 1,334 spaces for development proposed in Amendments 10 and 11 plus 200 spaces that the Proponent is obligated to provide at 105 Broadway and the Cambridge Innovation Center. The proposed parking supply of 3,750 spaces 115 spaces less than the parking supply demand of 3,878 spaces. I encourage the Proponent to further reduce the parking supply, which would discourage the use of single occupancy vehicle (SOV) trips to the site.

Transportation Mitigation

As previously detailed in the Certificate on the Second NPC, the Proponent has developed a framework for mitigating the project's transportation impacts through the Kendall Square Transit Enhancement Program (KSTEP), which is intended to identify and coordinate the construction of mitigation measures over the next 15 years. The KSTEP is administered by a working group comprised of MassDOT, MBTA, the City and other stakeholders, using mitigation funds contributed in connection with development of the KSURP. The developer of the KSURP area and the CRA contributed approximately $6 million in connection with Amendment 10 and will provide an additional $1.1 million upon issuance of the building permit for the second office/lab building.

According to the Proponent, the KSTEP has funded the construction of a bus shelter at 500 Main Street and potential designs for improvements to the intersection of Broadway and Ames Street, including a study of bus priority design concepts and implementation of additional recommendations for enhancing transit service, including conversion of an eastbound right turn lane to a right turn/transit queue jump lane. The Proponent also works with the City to optimize signal timings and make other adjustments at intersections to improve safety for pedestrians and bicyclists and improve traffic operations.

Wastewater and Water Supply

According to the Third NPC, the project will generate a total new wastewater flow of 52,733 gpd (196,152 gpd total for Amendments 10 and 11). The Proponent will be responsible for mitigating Infiltration and Inflow (I/I) at a ratio of four gallons of I/I removal for every gallon of wastewater generated by the project; based on that formula, the Proponent will be required to remove 784,608 gpd of I/I, an increase of 210,932 gpd since the Second NPC. According to the Third NPC, the Proponent has completed an I/I removal project in East Cambridge that removed 269,969 gpd of I/I and is currently constructing a culvert in Broadway that will provide additional I/I mitigation in the future.

The project will use 58,006 gpd of water (215,767 gpd total for Amendments 10 and 11). According to the Third NPC, the project includes water conservation measures, such as low flow plumbing fixtures, efficient air conditioning systems, use of native vegetation in landscaping, and minimal/efficient irrigation systems, that will reduce water use below the estimate. In addition, the Proponent will continue to explore the viability of alternate water sources such as water reuse systems, rainwater harvesting, and xeriscaping.

Stormwater

According to the Third NPC, the project includes the construction of a stormwater management system that will meet the Massachusetts Stormwater Management Standards and the City's requirement that the 25-year post-development peak runoff rates and volumes not exceed the two-year run off patterns under existing conditions. The stormwater management system will include green roofs, rainwater reuse tanks, increased pervious area and infiltration systems. In addition, the Proponent will construct permeable pavement over the previously impervious roadway and pedestrian areas that service the project site. As required by the City, infiltration systems and rainwater reuse tanks will be designed to drain within 72 hours of each precipitation event. According to the Third NPC, the capacity of the infiltration systems and rainwater reuse tanks will be equal to approximately two inches of runoff over the entire project site, which will remove phosphorous to a greater extent than the 65 percent removal rate established in the Charles River Total Maximum Daily Load (TMDL) requirements. I refer the Proponent to comments from the Charles River Watershed Association, which provides additional recommendations improving the water quality of runoff from the site.

Climate Change

According to the Third NPC, the project includes the following resiliency design features:

- Backflow preventers will be installed on all sanitary system connections to minimize surcharging into the building;
- The stormwater management system will be designed to accommodate high-intensity storm events;
- Green roofs, increased pervious surfaces, high-efficiency irrigation systems and landscaping with native plant species will minimize urban heat island effect and increase resiliency to both drought and stormwater flooding;
- Use of portable flood protection systems or similar measures to protect ground-level uses and below-grade parking areas;
- Minimize flooding in the buildings by limiting basement areas, watertight wall construction and elevating ground floor elevations; and,
- Protection of critical infrastructure and emergency generator fuel supplies from effects of extreme weather.

According to the Third NPC, the project will comply with a recently-approved city zoning provisions that will require the installation of green roofs or Biosolar roofs on all buildings that are 20,000 sf or larger.

Greenhouse Gas (GHG)Emissions

The Third NPC included an analysis of the project's stationary- and mobile source GHG emissions. The GHG Policy requires projects to quantify carbon dioxide (CO_2) emissions and identify measures to avoid, minimize or mitigate such emissions. The analysis quantified the direct and indirect CO_2 emissions associated with the project's energy use (stationary sources) and transportation-related emissions (mobile sources). The Third NPC outlined and committed to mitigation measures to reduce GHG emissions. The stationary source GHG analysis evaluated CO_2 emissions for each building under a Base Case and a Design Case. The Base Case was designed to meet the minimum energy requirements of the 9th Edition of the Massachusetts Building Code. In addition, because the City has adopted the Massachusetts Stretch Energy Code (SC), the Base Case reflects the additional 10 percent energy savings required by the SC. The Design Case included additional energy-efficiency measures proposed in the Preferred Alternative.

The analysis used the eQUEST modeling software to quantify energy use of each alternative. The estimates of GHG emissions were calculated using the CO_2 emission factors of 633 pounds per megawatt-hour for grid electricity published by the Independent System Operator- New England (ISO-NE) in the *2019 ISO New England Electric Generator Air Emissions Report* and 117 pounds per million British Thermal Units (MMBtu) for natural gas estimated by the U.S. Energy Information Administration. The project's overall stationary source CO_2 emissions were estimated at 18,749 tons per year (tpy) under the Base Case scenario. According to the Third NPC, the mitigation measures included in the Design Case will reduce GHG emissions to 13,442 tpy, a reduction of 5,307 tpy (28.3 percent).

The project design as modelled in the Design Case includes significant measures that will minimize GHG emissions from the proposed buildings, including:

- Electrification of space heating using water source heat pumps served by a condensing loop connected to one or more air source heat pumps (ASHP) in the

residential building;
- Use of ASHP for service water heating in all buildings;
- High-efficiency windows and roof insulation and that exceed Building Code requirements in the residential building;
- Energy recovery and space heating in the lab/office buildings with air source heat pumps (ASHP) sized to 20-25 percent of peak heating load as primary heat source with natural gas boilers as secondary heat source; and,
- Electric vehicle (EV) charging stations at 5 percent (79) of all parking spaces and 10 percent (159) will be EV-ready.

According to the Department of Energy Resources (DOER), the project includes significant GHG mitigation measures, including full electrification of the residential building and partial electrification of the lab/office space. I encourage the Proponent to consider construction of the residential building to Passivehouse design standards. As noted by DOER, this measure would significantly reduce the project's GHG emissions and would be eligible for $1.2 million in MassSave incentives.

Construction of rooftop solar photovoltaic (PV) generating systems could generate up to 124,901 kilowatt-hours per year (kWh/year), which would offset 40 tpy of GHG emissions. I encourage the Proponent to construct rooftops to be solar-ready and to maximize installation of PV systems.

Mobile Source GHG Emissions

The Third NPC analyzed the project's mobile-source CO_2 emissions using the EPA's MOVES3 emissions model and data from the traffic study. The MOVES3 model calculates estimates of emissions for vehicles expressed in a volume per distance travelled. The analysis calculated GHG emissions under the Existing 2020, No Build 2028 and Build 2028 scenarios. The GHG emissions from mobile sources in the transportation study area are expected to increase from 28,140 tpy under Existing 2020 conditions to 49,194 tpy under No Build 2028 conditions. Study area GHG emissions in the 2028 Build condition were estimated as 52,269 tpy, representing an increase of 3,075 tpy with the addition of project-generated vehicle trips. The project will implement roadway improvements and TDM measures that will minimize vehicle trips to and from the site. Implementation of these mitigation measures will reduce the project's mobile source GHG emissions under Build 2028 conditions from 3,075 tpy to 3,014 tpy, a reduction of 61 tpy (two percent). The minimal reduction in mobile-source GHG emissions modeled for the Proponent's roadway and TDM measures is not consistent with the Proponent's assertion that transportation mitigation measures implemented through the KSTEP will effectively promote multimodal transportation to and from the project site. I expect that future filings will include a more detailed assessment of the success of the KSTEP mitigation program in reducing trips and minimizing mobile-source GHG emissions.

Construction Period Impacts

According to the Third NPC, a Construction Management Plan (CMP) will be prepared for each project component to identify temporary construction period impacts, mitigation measures, road closures, detours, and staging. Mitigation measures to be included in the CMP include: erosion and sedimentation control, identification of designated truck routes, maintenance and protection of

pedestrian and bicycle accommodations, dust suppression, covering trucks used for transportation of construction debris, daily cleaning of streets and sidewalks, and construction noise mitigation measures. All construction activities must comply with the Massachusetts Contingency Plan (MCP).

Mitigation/Draft Section 61 Findings

The Third NPC included an updated summary of potential mitigation measures to avoid, minimize, and/or mitigate environmental impacts. The Proponent will provide a GHG self-certification to the MEPA Office that is signed by an appropriate professional (e.g., engineer, architect, transportation planner, general contractor) indicating that all of the GHG mitigation measures, or equivalent measures that are designed to collectively achieve identified reductions in stationary source GHG emission and transportation-related measures, have been incorporated into the project. To the extent the project will take equivalent measures to achieve the identified reductions, I encourage the Proponent to commit to achieving the same level of GHG emissions identified in the mitigated (design) case expressed in volumetric terms (e.g., tpy). The GHG self-certification should provide a final updated table showing the total estimated GHG emissions from all stationary and mobile sources, based on the final design of the project. The Proponent has committed to implement the following measures to avoid, minimize, and mitigate environmental impacts:

Traffic/Transportation

- The KSURP developer will contribute $1.1 million to KSTEP (upon issuance of the building permit for the second lab/office building) to be used for multimodal improvements to mitigate KSURP impacts;
- Analyze and propose adjustments to signal timing and phasing for study area local intersections, as appropriate, in coordination with the City;
- Provide additional pedestrian countdown timers at study area intersections;
- Implement LPI programming at study area intersections;
- Incorporate a new mid-block pedestrian crossing on Broadway between the proposed Cambridge Center North Garage Office Buildings and Danny Lewin Park on the south side of Broadway;
- Review all pedestrian crossings within the KSURP boundaries to assess their potential for bulb-outs, raised crossings, pedestrian refuge islands, Rectangular Rapid Flashing Beacons (RRFB's), re-aligned non-apex ramps and/or other treatments to enhance the comfort and visibility of crosswalks;
- Enhance the Main Street streetscape between Ames Street and Galileo Galilei Way to encourage its use by pedestrians;
- Improve pedestrian safety by enhancing lighting along sidewalks and pathways for safer pedestrian accommodations;
- Provide three bicycle sharing stations a full-service bike station within the KSURP area;
- Provide 780 long-term and 142 short-term bicycle parking spaces;
- Explore opportunities to create a full-service bike station within the area; and,
- Implement TDM Program, including a car sharing program, MBTA transit pass subsidy, free rides on some existing shuttle routes, parking pricing, Hubway pass subsidy, provision of parking spaces care share parking, preferential parking for carpool and vanpool

participants and alternative fuel vehicles, transportation coordinator, and provision of "real-time" transportation information in all new and renovated lobbies and at select public plazas on the project site. The Proponent will continue to participate in the Charles River TMA.

GHG Emissions

- Electrification of space heating using water source heat pumps served by a condensing loop connected to one or more air source heat pumps (ASHP) in the residential building;
- Use of ASHP for service water heating in all buildings;
- High-efficiency windows and roof insulation and that exceed Building Code requirements in the residential building;
- Energy recovery and space heating in the lab/office buildings with air source heat pumps (ASHP) sized to 20-25 percent of peak heating load as primary heat source with natural gas boilers as secondary heat source; and,
- Electric vehicle (EV) charging stations at 5 percent (79) of all parking spaces and 10 percent (159) will be EV-ready; and,
- PV- ready building roofs.

Climate Adaptation and Resiliency Measures

- Backflow preventers will be installed on all sanitary system connections to minimize surcharging into the building;
- The stormwater management system will be designed to accommodate high-intensity storm events;
- Green roofs, increased pervious surfaces, high-efficiency irrigation systems and landscaping with native plant species will minimize urban heat island effect and increase resiliency to both drought and stormwater flooding;
- Use of portable flood protection systems or similar measures to protect ground-level uses and below-grade parking areas;
- Minimize flooding in the buildings by limiting basement areas, watertight wall construction and elevating ground floor elevations; and,
- Protection of critical infrastructure and emergency generator fuel supplies from effects of extreme weather.

Water and Wastewater

- Coordinate with the City to correct I/I issues in the vicinity of the Project or providing funding for projects that the City is performing to reduce I/I; and,
- Incorporate water use reduction strategies to achieve a 20% reduction in water use. The reduction in water use will also reduce wastewater generation.

Stormwater

- The project will mitigate stormwater effluent from the post-development, 25-year design storm to the rates of the pre-development, 2-year design storm and reduce TSS by 80% from the pre-development condition;
- The stormwater management system will treat runoff to meet the Charles River phosphorous removal TMDL (65%) and will maximize infiltration to the local groundwater;
- Proponent will work with the City to evaluate a district-wide stormwater management solution to treat stormwater runoff beyond the scope of individual project components; and,
- Use of green roofs and permeable pavement in project design.

Construction Period

- Development of a CMP for each project component including: erosion and sedimentation control, identification of designated truck routes, maintenance and protection of pedestrian and bicycle accommodations, dust suppression, covering trucks used for transportation of construction debris, daily cleaning of streets and sidewalks, and noise mitigation measures.

Conclusion

The Third NPC has sufficiently defined the nature and general elements of the project for the purposes of MEPA review and demonstrated that the project's environmental impacts will be avoided, minimized and/or mitigated to the extent practicable. Based on the information presented in the Third NPC and after consultation with State Agencies, I find that no further MEPA review is required at this time. Remaining issues can be addressed through the local, state and federal permitting and review processes. The Proponent and State Agencies should forward copies of the final Section 61 Findings to the MEPA Office for publication in accordance with 301 CMR 11.12.

K. Theoharides

November 8, 2021
Date

Kathleen A. Theoharides

Comments received:

10/20/2021 Stephen H. Kaiser
10/28/2021 Massachusetts Water Resources Authority (MWRA)
10/28/2021 Charles River Watershed Association (CRWA)
11/05/2021 Massachusetts Department of Transportation (MassDOT)
11/08/2021 Massachusetts Department of Energy Resources (DOER)

KAT/AJS/ajs

Stephen H. Kaiser
191 Hamilton St.
Cambridge Mass. 02139

To : Kathleen Theoharides, Secretary of Energy and Environmental Affairs,
attention : Alex Strysky, Environmental Analyst, MEPA Unit
Members of the Cambridge Redevelopment Authority
Members of the Cambridge Planning Board

From : Stephen H. Kaiser

Comment on the Notice of Project Change, Kendall Square, EEA #1891

The NPC for Kendall Square MXD District proposes an additional 800,000 s.f. of office development in combination with other sites previously reviewed. The stimulus for these changes has been the addition of an underground electrical transformer station to be built by EverSource in coordination with Boston Properties. The energy objective is to handle increased electrical demand due to development ..... conversions from gas to electric heating .... and anticipated conversions of vehicles from gas to electric.

BACKGROUND

This notice of project change and rezoning proposal has come from a lengthy and contentious process in Cambridge involving issues of electrical transformer capacity, energy supply, housing, and public safety. The trouble began when the City of Cambridge initiated a "master planning" process spread over several years and costing $3 million. In preparing its final report, City officials decided it was possible to prepare an Energy Plan for the city, but they decided not to.

Potentials for a local energy crisis were identified by EverSource, a private company yet a "public utility" serving the Cambridge area. Extensive new development was approaching occupancy with insufficient local transformer capacity to service the new loads. The prospect of brownouts or city refusal to grant occupancy permits triggered intense political discussions about the near future. EverSource has demonstrated the

ability to produce an Energy Plan and a forecast for ten years into the future. When EverSource investigated local sites for the new transformers, the parcel selected had been programmed for community housing and was located close to a school. Issues of public safety were raised about a new transformer site close to a school. Community residents and the City Council became engaged in searching for a better site for transformers. The vital question was : could a site be found within the development area at Kendall Square to locate a new transformer station?

It is fair to say that there was no rush of developers offering land to build a new electrical station. One developer, Boston Properties, did seek a solution, involving demolition of a brutalist parking garage, adding 800,000 s.f. of new office space and an underground parking garage, while EverSource would construct an underground transformer station. The disputed parcel originally planned for housing would remain for housing use. Public safety concerns at the school appeared resolved.

The current NPC for the Kendall Square MXD district is a compilation of all these various goals and changes. The Planning Board and Redevelopment Authority are considering zoning changes to allow the 800,000 additional office space, although it is not evident how either Board will deal with energy, traffic and transit issues.

In addition to the NPC and zoning changes, EverSource is actively moving forward with a plan to increase electrical capacity, redundancy, and reliability for surrounding areas of Cambridge, Somerville and Allston. This Eversource project is directly related to distribution of power to and from the Kendall Square transformer site. Both projects are being considered for construction in the same 2024 to 2028 period, with simultaneous completion dates.

ALTERNATIVES

Because of the lengthy negotiations to resolve transformer sites, garage replacement, and an agreement to increase zoning to permit 800,000 s.f. additional room for office development, it would be wise <u>not</u> to introduce considerations of alternatives to the NPC, such as increased housing rather than office space. In effect a package has been agreed upon which appears acceptable, and if major changes were made the agreement could fall

apart and the transformer crisis could start up again. Provisions for emergencies can be considered by MEPA, without provision for a full discussion of alternatives. The current Kendall Square situation is one of those. Therefore it would be wise to continue with the single package plan proposed in the NPC, with no other alternatives.

The primary issues before MEPA relate to adequacy of the present scope for the NPC, scope of the study area, transportation (vehicles, transit, bikes and pedestrians), and energy use. Do these issues warrant further environmental review, such as a Single Environmental Impact Report (SEIR)?

TRAFFIC ISSUES

The bulk of the NPC is 1,000 pages of traffic counts and capacity calculations. Comparisons can be made between

..... traffic flows for existing 2021 AM and PM peak hours ...
..... traffic generated by approved but not yet occupied new buildings that are "in the pipeline," and will be in operation during 2028 "No-Build" condtions
..... traffic generated by the new 800,000 s.f. Office building in 2028. .

This approach appears to follow sound methodology for estimating future vehicle trips, except for three missing locations described below. From this 2028 No-Build case we can get a sense for what the traffic conditions will be like and how many intersections will or will not be able to take added traffic without creating more congestion. This assessment should also identify key traffic bottleneck conditions that appear incapable of tolerating significant additional traffic without long delays and queues.

The summary of traffic results is displayed concisely at pages C-9 through C-17. Both Volume-to-Capacity ratios (V/C) and delays are presented fully, without cutoffs such as greater-than-1.20 or greater-than-80 seconds. This exemplary approach should become standard practice for Cambridge and MEPA review, except any listing of delays to the nearest tenth of a second is false precision. Unfortunately, in Chapter 2, "Assessment of Project Change Impacts," no information on Volume/Capacity ratios and delay is summarized. This information should have been included within Table 2-5. The use of

Level of Service ratings are severely limited under congested conditions. Level-of-Service F remains the same whether V/C is 1.01 or 1.86, as was demonstrated in Appendix C. Table 2-5 fails to indicate the notable increase in congestion in the Kendall Square area, with or without the new NPC development.

Congested locations by 2028 increase both in number and severity by 2028, and Chapter 2 on "Assessment" says nothing about this important change. In the entirety of Chapter 2 the words "congestion" and "queue" do not appear once. Thus, the calculations may have been done for capacity but there is no summary, assessment or evaluation about congestion and queues.

Historically, traffic engineers have had difficulties measuring queues for the better part of a century, so finding a way to express accurate queue length results in an NPC is almost impossible. Calculation sheets in Appendix C have numerous notations to the effect that queue lengths cannot be accurately calculated and they may be "theoretically infinite." These difficulties can be traced to failures in computer programs and the *Highway Capacity Manual* : they cannot be addressed and resolved in a Notice of Project Change. At a minimum, there should be an explanation in Chapter 2 why reporting on queue lengths in a coherent way is so difficult. Intersections of primary concern for queue impacts are busy locations close to each other, such as O'Brien Highway/First Street and Cambridge Street/First Street, as well as Binney Street/First Street and Binney/Land Boulevard.

INTERSECTIONS WHERE TRAFFIC VOLUMES EXCEED CAPACITY IN 2021 AND 2028

Existing year 2021 intersections show volumes of traffic exceeding capacity only twice, with V/C ratios of 1.03 and 1.27. No-Build growth over the next seven years to 2028 will result in 13 locations with volumes exceeding capacity. The No-Build condition for 2028 shows many intersections in the Kendall Square area will become significantly overloaded – even before adding in the increment of traffic from new NPC development. For the 2028 condition with 800,000 s.f. of new office space, 14 locations have volumes exceeding capacity, with V/C ratios as high as 1.86 in the morning peak.

NEED FOR TRAFFIC MITIGATION

The proponent has offered no specific traffic mitigation, even signal retiming, in the NPC, and proposes instead to negotiate any mitigation with the City of Cambridge, outside the formal MEPA process. Mitigation is an inherent part of the MEPA review process and should not be delegated at the decision of any proponent. Further MEPA review is needed.

TRANSIT ANALYSIS

The 2015 SEIR was notable because it was the first EIR analysis I have ever seen of Red Line Capacity submitted as part of a MEPA EIR. The results were most worthwhile. In 2015, a concluding assessment of transit service noted measurements of 8,600 riders per hour in one direction at the peak load point (Kendall Station) – a figure that contrasted with the calculated capacity of 4 ½ minute headway trains of 13,000 riders an hour -- if the trains are evenly spaced. By implication, running trains on-time would achieve a 50% improvement in service capacity. The common reference to unevenly-spaced transit operations is "bunching," with some trains overloaded and other trains lightly loaded.

The current NPC made no reference to actual measurements of peak ridership, nor to common references to maximum capacity of a rapid transit track of 40,000 riders per hour. At the top of page C-30, a half-hour estimate of 10,860 passenger capacity translates into 21,720 riders per hour, assuming new Red Line cars operating at 3-minute headways with even spacing. The NPC failure to reference any measurements of existing ridership suggests that the NPC was unduly optimistic in estimated future ridership. The issue of MBTA train bunching should have been addressed directly. To my knowledge, the MBTA does not measure train or bus bunching and does not estimate the effects of uneven transit spacing. Any transit knowledge gained in the 2015 SEIR appears to have been lost. .

PEDESTRIANS AND BIKES : ALL SITUATIONS

Each Synchro calculation with full disclosure can produce eight sheets of paper, while the NPC reduces the output to only two pages. Unfortunately, pedestrian information is lost by this selectivity. The NPC offers no information on pedestrian volumes and delays, and as

with vehicle traffic, there is no evaluation. By contrast, at the September 28 joint CRA and Planning Board hearing, bicycle valet parking was the topic that dominated discussion by the Boards about transportation issues.

NEED FOR A SINGLE EIR : TRAFFIC, TRANSIT, AND ENERGY

Because of the major traffic problems forecast for the Kendall Square area, it should now be evident that the City of Cambridge and its development community must try to take action to mitigate this situation, it is evident that now is the time to act and to improve the quality of traffic results by using succinct summaries. MEPA should approve all submissions as demonstrably “adequate”only if accurate and useful in all vital respects. The 1,100-page NPC submission for Kendall Square does not meet such standards of quality in its present form – while failing to evaluate the results – and does not enhance planning needs for the area, except as a stimulus for improvements in documentation.

The proponent and the consultant team deserve appreciation for their effort to assemble a thorough document of information, even if there are missing aspects in the presentation. However, three locations stand out as omissions from an NPC assessment of traffic to and from Kendall Square. In recent years traffic backups from Leverett Circle have extended into the intersections of two locations along O'Brien Highway – at Museum Street and Land Boulevard. Thus Leverett Circle and Museum way should have been studied in the NPC analysis.

The traffic results for Memorial Drive at Mass Avenue show congestion and LOS F delays for right-turn movements. Please review the accuracy of these results compared to field observations. Instead, consider a key bottleneck location that affects Memorial Drive and Granite Street in Cambridgeport. Three years ago the Cambridgeport neighborhood was afflicted with near gridlock conditions because of traffic trying to get through the Reid Overpass rotary at Memorial Drive and onto the B.U. Bridge. The actual bottleneck is at Commonwealth Avenue on the Boston side, but heavy flows of traffic came from Memorial Drive, as well as Sydney, Waverly, and Granite Streets. Unfortunately, if the queues extend back into Cambridge, Granite Street can become blocked. When that happens, 300 families can become "traffic-quarantined" -- meaning citizens are prevented from getting out. The problem occurs only in the afternoon peak.

The relevance of the B.U. Bridge problem is that Memorial Drive and Sidney Street are primary corridors for traffic to depart from the Kendall Square area. The B.U. Bridge traffic problem became a major crisis in 2018, with state highway officials, Cambridge and state house legislators involved looking for a solution. Since 2020, neighbors have been relieved of traffic blocking because of work-at-home and other COVID factors. However, Kendall traffic growth could bring back periods of Granite Street blocking, and once again 300 families could suffer being blocked in, with no access from emergency vehicles.

Therefore, I recommend that the scope for the traffic study should be expanded to include BU Bridge, Museum Way and Leverett Circle, while any locations with LOS A or B need not be considered further.

The Proponent has indicated a preference for the current NPC as sufficient to comply with the requirements of MEPA. The Notice does contain extensive traffic analysis and forecasts, with and without the proposed 800,000 s.f. of development. It has also considered innovative methods to reduce energy use by new buildings on-site, with significant energy savings. However, the traffic analysis is incomplete in its assessment of numerous future intersections that are likely to be severely congested in both the No-Build and Build situations by the year 2028.

Similarly, EverSource has prepared an energy plan for Kendall Square as well as a twenty-year projection of energy demands including new development. Unfortunately, this energy plan and related forecasts have not been made available to the public, so that for the purposes of MEPA review it becomes impossible to comment on the adequacy of current plans to meet future needs. There is nothing in the NPC to indicate how the transition from gas heating to electric heat will be accomplished in the coming years, or how future adoption of electric cars will affect electricity demand. A special priority for increased electric power is raising the capacity of transformers and related energy services. This planning should be available for public review and to meet the requirements of the MEPA process. Review and approval by EFSB will also benefit from better planning information, including goals similar to MEPA for reducing environmental impacts.

In addition to traffic and energy, more analysis and mitigation needs to be included in the transit capacity analysis.

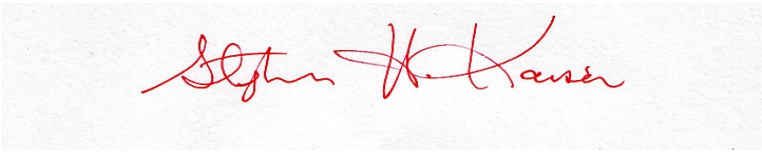
Given the need for additional assessment of future traffic and energy demand, the solution may be found in following the 2015 solution of requiring a Single EIR -- to give the public and government agencies needed knowledge on the severity of future traffic congestion and on the ability of the energy plan to accommodate numerous changes in the energy market.

The NPC does identify important energy savings for NPC development, but offers no comprehensive plan for energy savings if applied as well to new No-Build development or to energy savings plans applicable to existing buildings in the Kendall Square area. It would be unfortunate to see the NPC as solely an energy generation and expansion project, when for reasons of climate change the inclusion of an energy saving program generally would represent a more positive and balanced consequence.

Consideration of a Single EIR should take guidance from the basic purposes of MEPA review :

> "MEPA review is intended to facilitate (d) environmental planning for Projects requiring Agency Action, including an Agency's programs, regulations, or policies. It enables the Proponent and each Participating Agency to consider the positive and negative, short-term and long-term potential environmental impacts for all phases of a Project, and the cumulative impacts of the Project and any other Project or other work or activity in the immediate surroundings and region."
>
> 301 CMR 11.01 (a) and (d) MEPA and Environmental Planning.

Sincerely,



Stephen H. Kaiser, PhD

Charles River Watershed Association

October 28, 2021

Via Email

Alexander Strysky
MEPA Office Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
alexander.strysky@mass.gov

Re: Notice of Project Change for Kendall Square Urban Redevelopment Project, Cambridge Center, EEA 1891

Dear Alexander:

Charles River Watershed Association ("CRWA") submits the following comments on the Notice of Project Change ("NPC") for the Kendall Square Urban Redevelopment Project ("KSURP"), Cambridge Center. The NPC is an update from the previous NPC filed on June 30, 2016. The proposed project change consists of "infill development program modifications to conform to the final rezoning approved by Cambridge City Council on February 3, 2021." The summary of project change parameters and impacts includes a net increase of 800,000 gross square footage (GSF), 50 feet in maximum height, 5,932 vehicle trips per day (adjusted), 132 parking spaces, 58,006 gallons per day (gpd) of water use, and 52,733 gpd of wastewater generation/treatment. The project change also summarizes a net decrease of 95 housing units. The proposed project changes do not result in any new MEPA Review thresholds that were submitted in the June 30, 2016, NPC

Stormwater Management

CRWA is encouraged that the project:

- proposes to manage almost two inches of runoff over the entirety of the Project Site through infiltration and rainwater reuse
- reduces the stormwater runoff peak rate and volume such that the 25-year post-development hydrologic condition meets that of the two-year pre-development
- anticipates the project change will further increase the phosphorus removal rates in the Previously Reviewed Project (which approached 100 percent with less capacity for removal in the infiltration systems) and exceed the required 65 percent threshold set by the Total Maximum Daily Load for Nutrients In the Lower Charles River Basin, Massachusetts, June 2007 (EPA TMDL No. 33826)
- Is planning stormwater infrastructure to handle short-duration, high intensity precipitation events through increased inlet and conveyance capacity in coordination with the City

There is no discussion in the NPC about how the project will address the Final Pathogen TMDL for the Charles River Watershed January 2007 (EPA TMDL No. 32371). Inflow and Infiltration (I&I) mitigation work to address aging sewer infrastructure is one important way to limit the migration of bacteria into our local waterbodies; illicit discharge detection and elimination (IDDE) is another. Under Stormwater Handbook Standard 10 – Prohibition of Illicit Discharges, for any sewer and storm drain infrastructure remaining on site, we would expect the Project Proponent to confirm the condition and separation of stormwater utilities, and that there are no illicit connections. Bacteria in waterbodies does not only come from sewers, but also non-point source pollution—in particular, animal and pet waste that is improperly disposed of. The project should provide pet waste stations or trash cans that are emptied on a sufficiently frequent schedule, catch basin grates cast with the term "Do not Dump – Drains to River," and signs about the importance of picking up after your pet. Bacteria can also come from soils and decomposition of natural materials. Catch basins and water quality units collect much of this material, and some of it may enter the infiltration systems. Frequent cleaning as part of a long-term operation and maintenance program is a critical way to keep these materials from entering the piped network and subsurface systems.

We expect the Project Proponent to provide complete documentation of how the project is designed to address the TMDLs, including calculations of pre- and post-construction pollutant loading (including TSS and phosphorus). The Project Proponent should address these questions if a response to comments on the NPC is prepared, and resolve these questions during subsequent permitting processes.

In addition, there is no documentation in the NPC related to construction period stormwater management. Have the plans proposed in previous filings changed? If so, further detail on construction period dewatering, including volumes, flow rates, anticipated water quality concerns, including any posed by documented contamination, and potential impacts on the drainage system and river should be provided.

Climate Change Adaptation and Resilience

CRWA is encouraged to see the project proponent discuss the following in the NPC:

- the City of Cambridge's Climate Change Vulnerability Assessment that has been finalized since the submission of the Previously Reviewed Project and therefor will be using information to guide finished floor elevations.
- Storage of wastewater on site to protect the newly constructed building and avoid further exacerbation of the City's system
- store stormwater on site
- consider drought, which is often not discussed in MEPA filings
- discuss the use of portable flood protection systems

We note that Section 3.4.1 describes these opportunities but the language is non-committal. When and in what filing or permitting process will the Project Proponent confirm the usage and extent of green roofs, rainwater harvesting, Xeriscaping, need for portable food protection, etc.?

Chapter 91 Resources & Open Space and Public Realm

CRWA is pleased to see the Project Change will result in a net increase in public benefits as compared to the previously proposed public benefits. The language and the math provided in Section 2.5.1 is a little confusing (The Project proposes the construction of approximately 34,000 square feet of new open space, an increase of more than 8,000 SF compared to the Concept Plan Amendment #1. The new open space and pedestrian realm improvements will include a new approximately 30,000-SF central open space known as "Center Plaza", which will serve to consolidate and expand upon the open space currently contained within Broadway and Binney Parks contribute to a vibrant public realm, foster new cross-block connections and promote pedestrian connectivity through the North Parcel, and to the Volpe development to the east. The new open space and public realm improvements will serve residents, workers, and the general public alike.") Where is the remaining 4,000 square feet of new open space? This question applies to Section 2.10 as well.

Landscaping and Trees

The figures included in Chapter 1 do not make it clear what areas will be impervious or pervious, what trees will be removed, and where trees will be replaced. The NPC does not explicitly state the number of trees to be removed and the number of trees that will be installed as part of this project. In addition, there are other vegetation options besides trees that provide many co-benefits including evapotranspiration (natural air conditioning), mental health improvements, habitat, carbon storage and cleaner air, etc. Can more plantings be incorporated into the design where trees are not feasible? If not, document why. The Project Proponent should provide planting plans that document existing and proposed trees (and vegetation) and indicate species and size (diameter at breast height).

Environmental Justice

Figure 1.8 shows the location of the project site and the environmental justice (EJ) communities within a 1- and 5-mile proximity of the site. We were encouraged to see details in Section 1.5.4 of the NPC on enhanced public outreach to these communities. Ultimately, the project proponent should document how outreach to Environmental Justice population was conducted (e.g., what languages and how many languages were used in advertising and then while holding an event? Were any accommodations provided? How many people attended each event? What organizations were contacted and did they become engaged? What feedback did these populations provide and how were responses this feedback conveyed? Etc.)

Thank you for considering these comments, and please do not hesitate to reach out with any questions.

Sincerely,

Janet Moonan, PE
Stormwater Program Director

MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
Fax: (617) 788-4899
TTY: (617) 788-4971

October 28, 2021

Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Attn: MEPA Office, Alex Strysky
Boston, MA 02114

Subject: EOEEA #1891 – Notice of Project Change
Kendall Square Urban Redevelopment Project
Amendment No. 11
Cambridge MA

Dear Secretary Theoharides,

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the Notice of Project Change (NPC) submitted by Cambridge Redevelopment Authority (the "Proponent") for Kendall Square Urban Redevelopment Project (the "Project") in Boston, Massachusetts. This NPC is Amendment No.11 of the Project and reflects modifications to the previously proposed development program. Modifications include, construction of approximately 800,000 gross square feet (GSF) of new commercial building space, consolidation of the previously reviewed 420,000 GSF of residential uses into a single building, creation of additional public open space and relocation of existing above-grade parking spaces with the construction of two new below-grade garages.

MWRA has previously commented on the Project, most recently another NPC for Amendment No. 10 on July 26, 2016. MWRA's comments on this NPC for Amendment No. 11 continue to relate to stormwater and wastewater issues including the need for Infiltration/Inflow (I/I) Removal as well as Discharge Permitting from the Toxic Reduction and Control (TRAC) Department.

Wastewater

This NPC reports that wastewater generation associated with Amendment No.11 will be 1.12 million gallons per day (gpd). The Proponent reports this as an increase of 52,733 million gpd, over the previously reviewed project flow of 1.07 million gpd associated with Amendment No. 10. In this NPC, the Proponent reiterates that the Project is responsible for removing Infiltration/Inflow (I/I) to sanitary sewer infrastructure in the Project area. I/I must be removed at a ratio of 4:1 relative to the updated wastewater generation estimates. Based on the Project's updated wastewater generation, the Proponent

will be responsible for mitigating approximately 784,608 gallons of I/I based on the current program of uses, which is approximately 210,932 GPD more than the previously reviewed value. The Proponent has previously completed an I/I removal project for the Cambridge Department of Public Works (CDPW) in 2019 called the East Cambridge Sewer Separation Project, which removed 269,969 GPD of I/I mitigation. The Proponent is currently constructing a culvert in Broadway for future I/I mitigation called the Kendall Culvert. The Proponent will continue to coordinate with the CDPW on the mitigation of the required I/I as the Project progresses and is committed to mitigating the required I/I before building occupation.

TRAC Discharge Permitting

MWRA prohibits the discharge of groundwater and stormwater into the sanitary sewer system, pursuant to 360 C.M.R. 10.023(1) except in a combined sewer area when permitted by the Authority and the local community. The Project site has access to a storm drain and is not located in a combined sewer area. Therefore, the discharge of groundwater or stormwater to the sanitary sewer system associated with this Project is prohibited.

A Sewer Use Discharge Permit is required prior to discharging industrial process and/or laboratory wastewater associated with the Project into the MWRA sanitary sewer system. For assistance in obtaining this permit, a representative from the proposed commercial space or laboratory should contact Emily Johnson, Industrial Coordinator, in the TRAC Department at Emily.Johnson@mwra.com.

Any gas/oil separators in parking garages associated with the project must comply with 360 C.M.R. 10.016 and State Plumbing Code. The installation of the proposed gas/oil separators may not be back filled until inspected and approved by the MWRA and the Local Plumbing Inspector. For assistance in obtaining an inspection the Proponent should contact Alix Pierre Louis, Regional Manager, in the TRAC Department at (617) 305-5660.

On behalf of the MWRA, thank you for the opportunity to provide comments on this Project. Please do not hesitate to contact Katie Ronan of my staff at (857) 289-1742 or Katherine.Ronan@mwra.com with any questions or concerns.

Sincerely,

Rebecca Weidman
Director
Environmental and Regulatory Affairs

cc: John Viola, MassDEP
Adam Horst, BWSC

Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO

massDOT
Massachusetts Department of Transportation

November 5, 2021

Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2150

RE: Cambridge – Kendall Square Urban Renewal Plan Amendment – NPC
(EEA #1891)

ATTN: MEPA Unit
Alex Strysky

Dear Secretary Theoharides:

On behalf of the Massachusetts Department of Transportation, I am submitting comments regarding the Environmental Notification Form for the Kendall Square Urban Renewal Plan Amendment No. 11 Project in Cambridge as prepared by the Office of Transportation Planning. If you have any questions regarding these comments, please contact J. Lionel Lucien, P.E., Manager of the Public/Private Development Unit, at (857) 368-8862.

Sincerely,

David J. Mohler
Executive Director
Office of Transportation Planning

DJM/jll

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 857-368-4636, TTY: 857-368-0655
www.mass.gov/massdot

cc: Jonathan Gulliver, Administrator, Highway Division
Carrie Lavallee, P.E., Acting Chief Engineer, Highway Division
John McInerney, P.E., District 6 Highway Director
Neil Boudreau, Assistant Administrator of Traffic and Highway Safety
Boston Metropolitan Planning Organization
Planning Department, City of Cambridge

Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO

massDOT
Massachusetts Department of Transportation

MEMORANDUM

TO: David J. Mohler, Executive Director
Office of Transportation Planning

FROM: J. Lionel Lucien, P.E, Manager
Public/Private Development Unit

DATE: November 5, 2021

RE: Cambridge: Kendall Square Urban Renewal Plan Amendment – NPC

The Public/Private Development Unit has reviewed the Notice of Project Change (NPC) submitted by the Cambridge Redevelopment Authority ("CRA" or the "Proponent") and Boston Properties (the "Redeveloper") for another amendment of the Kendall Square Urban Redevelopment (formerly, Renewal) Plan (the "KSURP Amendment No. 11") within the Kendall Square neighborhood of the City of Cambridge (the "Project"). The Project Change reflects modifications to the previously proposed development program and building massing scheme under Amendment No. 10, as well as an amended approach to accommodating parking requirements previously presented in an NPC filed on June 30, 2016. These modifications accommodate the relocation of an Eversource electrical substation to improve energy efficiency and delivery in the City of Cambridge. As a result, the following key program changes are proposed:

- Construction of approximately 800,000 square feet (sf) of new commercial space,
- Consolidation of the previously reviewed 420,000 sf of residential uses into a single building and elimination of condominium units,
- Creation of additional public open space, and
- Relocation of existing above-grade parking spaces and the construction of new parking spaces.

The project is located in the Kendall Square area, and is bounded by Main Street, the Boston and Albany Branch Railroad, Binney Street, and Third Street. The project triggers the mandatory filing of an Environmental Impact Report because it will generate in excess of 3,000 new unadjusted daily vehicle trips. The Project does not require any transportation-related permits; however, the Proponent has previously committed to put aside funding to support transit improvements within the KSURP. MassDOT and the MBTA acknowledge the establishment of a Memorandum of Understanding with the CRA and Boston Properties to guide the implementation of the mitigation program.

The NPC includes a transportation study prepared in conformance with the latest *MassDOT/EOEEA Guidelines for Transportation Impact Assessments* (TIA). The study includes a comprehensive assessment of the transportation conditions in the KSURP study

Ten Park Plaza, Suite 4160, Boston, MA 02116
Tel: 857-368-4636, TTY: 857-368-0655
www.mass.gov/massdot

area based on a thorough analysis of existing and future conditions. The NPC includes a transit analysis to incorporate appropriate MBTA data and statistics to evaluate the project's transit impacts. This evaluation provides an understanding of the potential impacts of this amendment of the KSURP on the transportation system over the next seven years, more specifically on the Red Line. MassDOT and the MBTA provide the following comments.

Traffic Operations

The TIA presents capacity analyses and a summary of average and 95th percentile vehicle queues for the intersections within the study area. According to the traffic analysis, most intersections are expected to operate with constrained conditions and in several instances levels of service (LOS) F with excessive delays and queues that extend beyond available storage length in both the No-Build and Build conditions. The NPC analysis confirms that the additional trips associated with the NPC only slightly worsen Future Build conditions.

The Proponent has not provided in the NPC any specific traffic mitigation but indicates that they will work with the City of Cambridge as part of the local permitting process to implement a comprehensive multimodal mitigation program to address transportation issues more effectively within the KSURP. We note that most of the intersections are under the City of Cambridge jurisdiction. The study area only includes a few intersections under MassDOT jurisdiction along Monsignor O'Brien Highway that are expected to be slightly impacted by trips associated with the Project. These intersections are currently being improved by a MassDOT corridor project or by other developments along Route 28 being permitted by MassDOT.

Public Transportation

The area of the project site is well served by public transportation. Kendall Square Station on the MBTA Red Line is located within the KSURP. Several MBTA bus routes stop with walking distance of the project site including routes 64, 85, and CT2. In addition, EZ Rides provides transit services to facilitate access in and around the City of Cambridge.

The NPC includes a comprehensive transit analysis of these different transit services that surround the site. The analysis presented is consistent with the Office of Performance Management and Innovation's recommended approach, which both reports the existing metric of bus passenger comfort and assesses projected future trips that exceed the recommended passenger crowding threshold.

The TIA includes a detailed presentation of the impact to the transit system with summary tables for the anticipated demand in terms of MBTA Service Standards for bus services. According to the analysis, the bus routes surrounding the site are expected to have limited capacity in the future to accommodate the additional transit trips generated by the Project. The analysis projects that 22 bus trips will exceed crowding thresholds in the Future

No-Build conditions and transit trips associated with the Project would cause 14 new bus trips to exceed crowding thresholds in the Future Build conditions.

For the Red Line, the passenger crowding analysis is based on the average passenger loads, representing a typical weekday activity, as reflected in the MBTA's Rail Flow data representing typical Fall 2019 activity. Per the MBTA's method, the passenger crowding condition is evaluated in 30-minute increments at the peak load point for that period. The TIA has based the Future Red Line operations and capacity improvements on the expectation that the trunk section of the Red Line will have headways in the peak periods reduced from four-and-a-half (4.5) minutes to three (3.0) minutes, with each branch running at six-minute headway.

Based on these assumptions, the analysis indicates that in the Future Build, the Red Line will have sufficient capacity to accommodate the additional transit ridership associated with the project change. An analysis is also provided for Future Build conditions based on the current passenger capacity level of the Red Line. The analysis also indicates that crowding conditions will still be below the MBTA standards, except for a few 30-minute increments during the shoulder peak-hours. We note however that the NPC did not include a platform loading capacity of the Kendall Square/MIT Station for future conditions as provided in the SEIR for amendment No. 10.

Project Mitigation

The NPC indicates that the KSURP will contribute a fair amount of vehicular, transit, pedestrian, and bicycle trips to an already constrained transportation network. The Proponent has committed to work with the City of Cambridge to identify, implement, and contribute funding toward the existing multimodal mitigation program to offset the resulting impacts to the transportation system. This mitigation program generally would generally consist of highway, transit, bicycle, and pedestrian improvements and will be primarily implemented by the City of Cambridge. The CRA has established the Kendall Square Transit Enhancement Program to support the implementation of transportation improvements within the KSURP. The Proponent has also committed to a transportation demand management (TDM) program to reduce automobile trips and will expand the existing monitoring program to include the current project.

The Proponent has committed to a monetary contribution of approximately $1.1 million adding to the $6.6 million previously provided to the KSTEP towards the implementation of the mitigation program. The contribution amount was determined based on a formula established by the CRA for the KSURP. The CRA has consulted with MassDOT regarding the methodology to require contribution to the KSTEP fund. As stated, the mitigation will be implemented in collaboration with the CRA and the City of Cambridge. The Proponent is encouraged to continue coordination with the CRA, the City of Cambridge and the MBTA as the Project is built and occupied. If you have any questions regarding these comments, please contact me at *Lionel.Lucien@dot.state.ma.us.*

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF
ENERGY AND ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENERGY RESOURCES
100 CAMBRIDGE ST., SUITE 1020
BOSTON, MA 02114
Telephone: 617-626-7300
Facsimile: 617-727-0030

Charles D. Baker
Governor

Karyn E. Polito
Lt. Governor

Kathleen A. Theoharides
Secretary

Patrick Woodcock
Commissioner

8 November 2021

Kathleen Theoharides, Secretary
Executive Office of Energy & Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02114
Attn: MEPA Unit

RE: Kendall Square Urban Redevelopment Project (KSURP), Amendment 11, Cambridge, MA, EEA #1891

cc: Maggie McCarey, Director of Energy Efficiency, Department of Energy Resource
Patrick Woodcock, Commissioner, Department of Energy Resources

Dear Secretary Theoharides:

We've reviewed the Notice of Project Change (NPC) for the proposed project. The project includes two lab/office building (973,000-sf, total) and a 420,000-sf residential building (560 units).

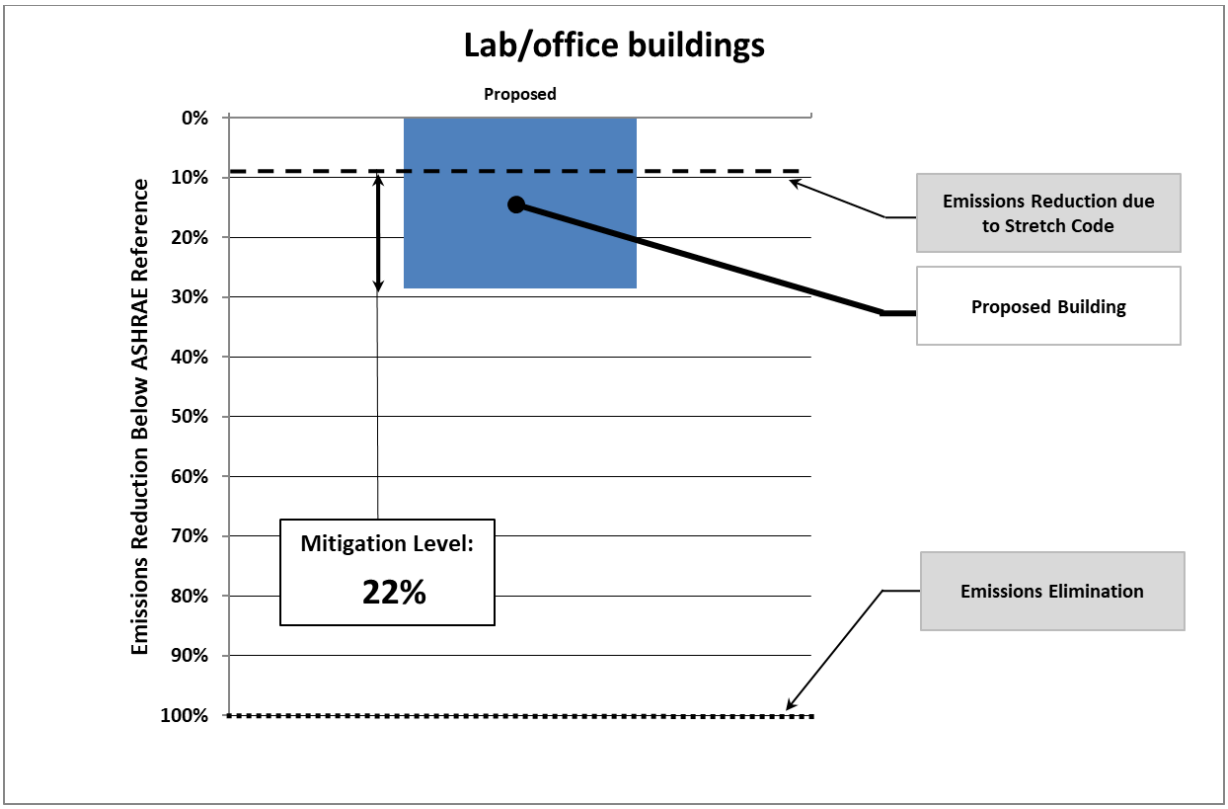
Executive Summary

The project was very responsive to recommendations in our ENF, including evaluating and committing to hybrid electrification in the lab/office, full electrification of the residential, and other significant emissions reduction measures. In addition, the project is making significant progress to reduce gas emissions, including an 89% reduction in gas emissions in the lab/office and elimination of gas emissions in the residential building.

The project also evaluated, but has not yet committed to, Passivehouse for the residential.

Mitigation level – Lab/office

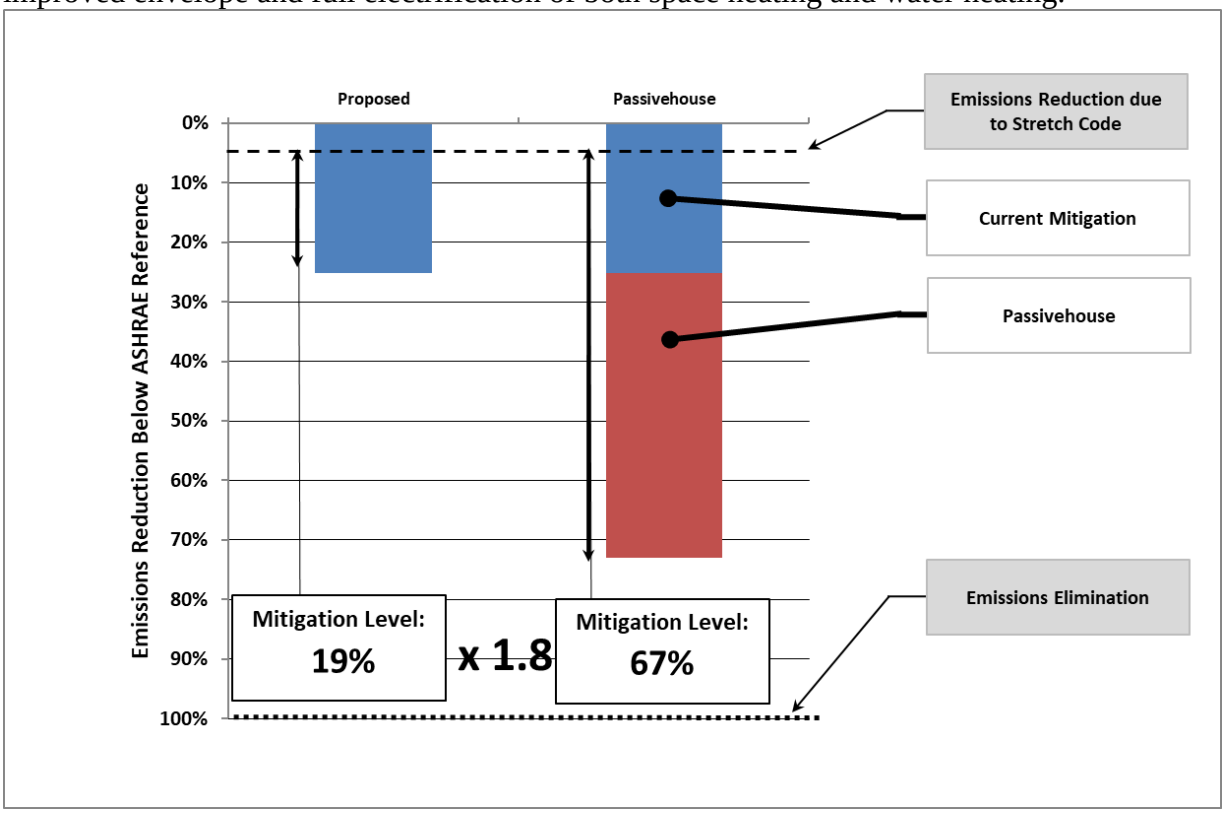
Mitigation Level[1] for the lab/office is 22%. The project is achieving this ML largely with ventilation energy recovery and hybrid electrification consisting of air source heat pumps for primary space heating and gas for secondary space heating.



[1] Mitigation Level is the GHG reduction in percent above and beyond what is required by building code, including Stretch Code if applicable. A Mitigation Level of 0% means the project has no mitigation.

Mitigation level – Residential

Mitigation Level for the residential building is 19%. This ML is largely achieved through improved envelope and full electrification of both space heating and water heating.



ML could be improved by x1.8 to 67% with Passivehouse design. Passivehouse ~~would~~ could also enable the project to access $1.12M in MassSave incentives.

Mitigation Level – Gas Emissions

The project is committing to significant measures which will reduce gas emissions. The lab/office buildings are reducing gas emissions by 89% while the residential building is eliminating gas emissions (100% reduction). The project should be commended for these significant commitments.

Envelope, Heat Recovery, and Solar Gains

The combination of quality envelope, heat recovery, and management of solar gains can result in significant reduction in heating (and cooling) thermal energy demand intensity (TEDI, units of kBtu/sf-yr). In addition to reduced utility costs and emissions, the value of a targeted focus on heating and cooling TEDI results in:

- Simplified space heating electrification;
- Reduction, and possible elimination, of perimeter heating and other systems;
- Improved resiliency;

- Reduced peak demands;
- Improved occupant comfort;
- Reduced maintenance.

Specific TEDI reduction strategies are:

- High-performance window and walls;
- Thermally broken windows and components to eliminate thermal bridges;
- Low air-infiltration;
- Ventilation heat recovery;
- Solar gain management via external shading and/or low solar heat gain coefficient (SHGC)

Building with curtain wall envelope requires high performing windows and high performing opaque spandrels to achieve heating TEDI reductions. High performing windows and high performing opaque spandrels should be carefully evaluated if curtain-wall construction is considered.

Key TEDI reduction strategies in the lab/office includes:

- improved ventilation energy recovery
- reduced air infiltration

Key TEDI reduction strategies for the residential include:

- improved vertical envelope “UA” performance
- improved roof envelope performance
- reduced air infiltration
- improved ventilation energy recovery

The project should be commended for these strategies.

Envelope Performance – lab/office

Below is a summary of the vertical envelope performance of the lab/office. The proposed vertical UA is essentially equal to prescriptive vertical UA in the Code (0.9% improvement).

PROPOSED				
	sf	**% of vertical**	**IECC U**	**UA**
window and wall	245,062			
window	100,475	41%	0.240	0.098
wall	144,587	59%	0.100	0.059
		R equiv	Improvement over Code UA	
vertical UA	0.157	6.35	0.9%	

Roof insulation is proposed to be equal to the Code. The project is choosing C406.8 as one of the three C406 measures. This measure mandates air infiltration of 0.25 cfm/sf at 75 Pa.

Envelope Performance – residential

Below is a summary of the vertical envelope performance of the residential building. The project is choosing C406.8 as one of the three required C406 measures. (This section mandates a 15% improvement over code prescriptive envelope performance.) The proposed envelope exceeds this mandate, providing a UA that is 12.3% improved beyond C406.8 requirements.

PROPOSED				
	sf	**% of vertical**	**IECC U**	**UA**
window and wall				
window		45%	0.230	0.104
wall		55%	0.027	0.015
		R equiv		
vertical UA	0.118	8.45		
				R equiv
		code UA	0.159	6.30
code UA with 15% improvement per C406.8			0.135	7.41
		proposed UA	0.118	8.45
improvement of proposed over C406.8			12.3%	

Roof insulation is also significantly improved over Code. Proposed roof insulation is about double the Code required roof insulation.

In terms of air infiltration, the project is proposing Code air infiltration (0.4 cfm/sf at 75 Pa). We recommend the project evaluate reduced air infiltration for the residential building.

Energy Recovery

Energy recovery is a key strategy to reduce heating and cooling TEDI and emissions.

- *Ventilation energy recovery:* Ventilation energy recovery includes systems that recover energy in a buildings ventilation system.

  The lab/office buildings and the residential building are proposing highly effective ventilation energy recovery.

- *Concurrent heating and cooling energy recovery:* Sometimes buildings experience a need for concurrent space heating and space cooling (heating and cooling at the same time, usually in different parts of the building or building systems). If a building has an appreciable amount of concurrent heating and cooling, an effective TEDI and emission reduction strategy is utilizing energy recovery which uses heat generated from space cooling and compression processes to be usefully reused for space heating.

  The residential building is using water source heat pumps. This approach inherently takes advantage of concurrent heating and cooling.

  The lab/office building did not appear to evaluate a common current heating/cooling energy recovery strategy for these building types: heat recovery chillers (HRCs). We recommend the project evaluate heat recovery chillers for these buildings.

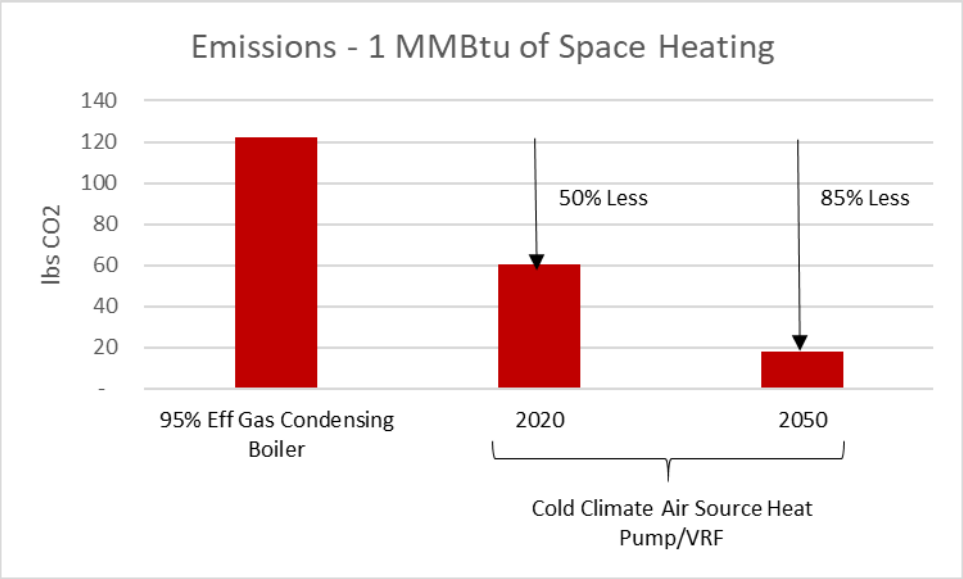
Efficient Electric Space Heating

Efficient electrification and renewable thermal space and water heating entails the swapping of fossil fuels (natural gas, oil, and propane) or electric resistance systems with one or more of the following:

- Cold-climate air source heat pumps and variable refrigerant flow (VRF) for space heating;
- Air source heat pumps for water heating;
- Ground source heat pumps;
- Solar thermal.

Electrification of space and water heating is a key mitigation strategy with significant short- and long-term implications on GHG emissions. Massachusetts grid emissions rates continue to decline with the implementation of clean energy policies that increase renewable electricity sources. The implication is that efficient electric space and water heating with cold climate air source heat pump and VRF equipment have lower emissions than other fossil-fuel based heating options, including best-in-class (95% efficient) condensing natural gas equipment.

Currently, efficient electric heating has approximately **50% lower emissions** in Massachusetts than condensing natural gas heating. By 2050, efficient electric heating is expected to have approximately **85% lower emissions** in Massachusetts than condensing natural gas heating. See illustration below.



Efficient Electric Space Heating – Lab/office

Lab/office buildings have traditionally been difficult to efficiently electrify due to their very high ventilation needs and have typically used entirely gas for space heating. However, the DOER has seen numerous lab/office buildings in recent years include a *hybrid* of electric and gas space heating. This approach typically uses air source heat pumps, sized for 20 to 25% of the peak load, for primary heating and gas heating as secondary for times when the load exceeds the heat pump capacity. It's often that case that a hybrid system sized to 20 to 25% of the peak heating manages to still provide 80 to 90% of the total annual space heating with air source and only 10 to 20% of the total annual space heating with gas.

The project evaluated and committed to this approach for the two lab/office buildings. The project will be using air source heat pumps sized to 20 to 25% of peak heating. Using this approach, gas emissions will be reduced by 89%. We commend this project for adopting this approach.

Efficient Electric Space Heating – Residential

The residential building space heating is proposed to be fully efficiently electrified using a system of water source heat pumps served by a condensing loop connected to an air source heat pump (or air source heat pumps) for heating the loop. We commend the project for using this approach.

Efficient Electrification – Service Water Heating

Similar to above, due to Massachusetts electric grid emissions, even swapping from best in class condensing gas to air source heat pump service water heating results in significant emissions reduction.

For the lab/office building, water heating approach is not clear. The submission simply states "electric heating". We recommend the building use air source heat pump water heating, rather than electric resistance water heating, if possible.

The residential building is proposing air source water heating for all service water. We commend the project for this approach.

Solar PV

The project evaluated rooftop solar PV, identifying a total of 7,300 sf of space (total, for all three buildings) potentially available for solar. City of Cambridge requires 80% of the rooftop, with some allowance for equipment, to be either solar or vegetative. The developer is still determining the proportion of each at this time.

Electric Vehicle (EV) Ready Parking Spaces

EV charging stations are critical for the continual transition towards electric mobility. Even if EV charging stations are not installed during construction, it is critical to maximize EV-ready spaces as it is significantly cheaper and easier to size electrical service and install wiring or wiring conduit during construction, rather than retrofitting a project later.

The project is committing to install EV charging at 79 parking spaces and making 159 other spaces EV ready. DOER commends the project for this effort.

Incentives

Buildings which incorporate the above strategies can qualify for significant incentives:

- MassSave® performance-based incentives[2] offer incentives for every kWh or therm saved compared to a program-provided energy model. The above energy efficiency strategies offer opportunities for large kWh and therm savings.

- Alternative Energy Credits (AECs)[3] offer incentives to electrify building space heating using heat pumps and/or VRF. This program also includes multipliers which increase value if the building meets Passivehouse standards or buildings built to HERs 50 or less. These credits may be distributed on a quarterly basis over time; or, may be distributed in a lump sum to the developer if certain conditions are met.

[2] https://www.masssave.com/en/saving/business-rebates/new-buildings-and-major-renovations/
[3] https://www.mass.gov/guides/aps-renewable-thermal-statement-of-qualification-application

- Massachusetts SMART program[4] provides significant incentives for solar development on top of federal and state tax incentives. SMART includes pathways which allow solar production to be sold without off-takers. This may be of potential interest to building developers as this allows them to develop rooftop solar without necessarily engaging with building tenants. For this reason, setting aside rooftop solar PV areas helps ensure that building owners' ability to monetize the roof is not impacted.

Codes and Baseline

Massachusetts Stretch Code applies to the proposed buildings. Stretch Code requires a 10% energy performance improvement over ASHRAE 90.1-2013-Appendix G plus Massachusetts amendments including C402.1.5 (envelope), C405.3 and C405.4 (lighting), C405.10 (EV charging), and C406 (three additional efficiency measures).

Projects should include the three C406 additional efficiency measures in their Baseline. The project is incorporating the following for the lab/office:

- C406.2 - More efficient HVAC performance
- C406.3 - Reduced lighting power density
- C406.9 – Reduced air infiltration

The project is incorporating the following for the residential:

- C406.2 - More efficient HVAC performance
- C406.3 - Reduced lighting power density
- C406.8 - Enhanced envelope UA performance

Recommendations

Recommendations are as follows:

Residential:

1. Consider using Passivehouse. Passivehouse would almost double Mitigation Level and enable access to $1.12M in MassSave incentives.

2. If Passivehouse is not pursued, we recommend lowering the air infiltration from 0.4 cfm/sf at 75 Pa to 0.25 cfm/sf at 75 Pa, confirmed with field testing.

Lab/office:

3. For the lab/office, evaluate an alternative scenario that uses heat recovery chillers as well as the proposed hybrid.

[4] https://www.mass.gov/solar-massachusetts-renewable-target-smart

4. Commit to air source heat pump water heating.

General

5. Commit to some level of PV readiness (expressed as rooftop area).

Sincerely,

Paul F. Ormond, P.E.
Energy Efficiency Engineer
Massachusetts Department of Energy Resources

Brendan Place
Clean Energy Engineer
Massachusetts Department of Energy Resources