

SUBMITTED TO

City of Somerville

Attn: Director of Planning

93 Highland Avenue
Somerville, MA 02143

SUBMITTED BY

74 Middlesex Ave Owner LLC
c/o EDGE

PRODUCED BY



IN ASSOCIATION WITH

Sasaki

AECOM

Boston Global Investors

Bastion Companies

Haley & Aldrich

Master Plan Special Permit

EDGE Assembly Square
Somerville, MA



February 19, 2020

Ref: 14652.00

Sarah Lewis, Director of Planning and Zoning
Somerville City Hall
93 Highland Ave.
Somerville, MA 02143

Re: EDGE Assembly Square Master Plan Special Permit

Dear Ms. Lewis,

On behalf of EDGE, through its subsidiary 74 Middlesex Ave Owner LLC, (the Proponent), VHB is pleased to submit this Master Plan Special Permit (the "MPSP") to the City of Somerville (the "City") to initiate the MPSP review process. The Proponent proposes to redevelop approximately 37,075 square feet (0.85 acres) of land in the Assembly Square area Mixed Use District (ASMD) of Somerville, Massachusetts (the "Project Site"), with an approximately 525,000 square foot (SF), pedestrian and transit oriented, mixed-use development spaces (the "Project" also known as EDGE Assembly Square). The Project consists of one building containing up to approximately 498,000 SF of office, research and development and lab enabled uses (office/R&D/lab), approximately 27,000 SF of ground floor retail and/or restaurant space, and below-grade structured parking spaces.

The Project will transform the Project Site into a hub of office/lab/R&D and retail activity, which will help knit together the fabric of Middlesex Avenue and serve as the gateway to the ASMD. Notably, the Project proposes significant improvements to existing off-site open space on the adjacent, City-owned parcel that extends from the Project Site to the northeast edge of the existing Public Storage facility on Middlesex Avenue. The proposed off-site improvements will enhance the connectivity between the ASMD and the open space, commercial uses and residential neighborhoods of Somerville to the west of Interstate 93 ("I-93"). This connection will be strengthened by new and improved public open space on and off-site improvements and an improved streetscape for new occupants, visitors and the public who will enliven the area on a consistent and daily basis.

We look forward to your review of this Project. Please contact me at (617) 607-2988 if you have any questions.

Very truly yours,



Kyle Greaves, AICP

Project Manager/ Sr. Environmental Planner

Engineers | Scientists | Planners | Designers

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EDGE Assembly Square

Somerville, Massachusetts

SUBMITTED TO **City of Somerville**
Attn: Sarah Lewis
93 Highland Avenue
Somerville, MA 02143

PROPONENT 74 Middlesex Ave Owner LLC
c/o EDGE
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New York, NY 10013

PREPARED BY **VHB**
99 High Street, 10th Floor
Boston, MA 02110

In association with:

Sasaki
AECOM
Boston Global Investors
Bastion Companies
Haley and Aldrich

February 19, 2020

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*Technical appendices are available for download at the website below:

<https://tinyurl.com/EDGE-Assembly-Appendices>

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Application Forms

1.1 Master Plan Special Permit Application

1.2 Requested Special Permits

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1.1 Master Plan Special Permit Application

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CITY OF SOMERVILLE

Office of Strategic Planning & Community Development

City Clerk Stamp

MASTER PLAN SPECIAL PERMIT (MPSP) APPLICATION • COVER SHEET

In accordance with Article 15 of the Somerville Zoning Ordinance, the undersigned submits the following Master Plan Special Permit Application for review.

Property Address: 74 Middlesex Avenue and 845 McGrath Highway		
Zoning District: ASMD	Ward: 1	MBL:
Applicant: 74 Middlesex Ave Owner LLC		
Address: 122 Hudson Street, Floor 2, New York, NY 10013		
Phone: 917.982.6091	Email: jhl@edge.tech	
Property Owner: 845 Riverview, LLC		
Address: 200 Broadway, Suite 103 Lynnfield, MA 01940		
Phone: 978.360.9558	Email: edoherty@kemsCorp.com	
Agent: Vanasse Hangen Brustlin		
Phone: 617-607-2988	Email: kgreaves@vnb.com	

As the Applicant, I make the following representations:

1. I understand that a master plan special permit application is not complete until all necessary information has been submitted and all fees have been paid and that an incomplete application will not be reviewed, will not be publicly noticed, and will not be scheduled for a public hearing.
2. The information supplied on and with this application form is accurate to the best of my knowledge.
3. I certify that the agent listed on this application form is authorized to represent me before City staff and review boards as it relates to the development of this property.

Signature: 

As the Owner, I make the following representations

1. I certify that I am the owner of the property identified on this application form.
2. I certify that the applicant named on this application form is authorized to apply for a master plan special permit for the property identified and for the purposes indicated by the submitted documentation.
3. I certify that the agent listed on this application form is authorized to represent me before City staff and review boards as it relates to the development of this property.
4. I permit City staff to conduct site visits on my property.
5. If the ownership of this property changes before the review boards have acted on this application, I will provide updated information and new copies of this form

Signature: 

CITY OF SOMERVILLE USE ONLY

	MPSP#:
	Full Fee:

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1.2 Requested Special Permits

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1.2 Requested Special Permits

In accordance with Article 15 of the City of Somerville Zoning Code (the "Ordinance"), EDGE, through its subsidiary 74 Middlesex Ave Owner LLC, (the "Proponent"), respectfully submits this Master Plan Special Permit application (the "MPSP") to the City of Somerville (the "City") to initiate the MPSP review and approval process. As a component of this MPSP application, the Proponent requests the following Special Permits:

- › The Proponent requests the following relief from the dimensional standards of Table 7.4.6 of the Ordinance through issuance of a Special Permit:
 - Relief through issuance of a Special Permit is requested for exceeding the maximum height limit for the proposed project. The Project Site is located within the Assembly Square Mixed-Use District ("ASMD") district and per Section 7.4.6 – Table of Dimensional Requirements – the Project Site is located more than 1,000 feet from an MBTA Orange Line entrance, therefore the maximum building height requirement for "all other locations" is 125 feet. Relief is sought for the Project, which currently exceeds the maximum building height requirement of 125 feet.
 - Relief through issuance of a Special Permit is requested for exceeding the maximum Floor Area Ratio (FAR) for the proposed ASMD district and per Section 7.4.6 – Table of Dimensional Requirements – the Project is greater than 50,000 gross floor area (GFA), therefore the maximum FAR is 10.0. Relief is sought for the Project, which currently exceeds the maximum FAR of 10.0.
- › In accordance with Section 7.7(c)(ii), the Proponent requests a Special Permit to authorize the occupancy of any single commercial space over 10,000 SF of leasable floor area by any permitted use.

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Project Summary

In accordance with Article 15 of the City of Somerville Zoning Code (the "Ordinance"), EDGE, through its subsidiary 74 Middlesex Ave Owner LLC, in (the "Proponent"), respectfully submits this Master Plan Special Permit application (the "MPSP") to the City of Somerville (the "City") to initiate the MPSP review and approval process.

The Proponent proposes to redevelop approximately 37,075 square feet (0.85 acres) of land in the Assembly Square Mixed Use District (ASMD) of Somerville, Massachusetts (the "Project Site," or the "Site"), with a pedestrian and transit oriented, mixed-use development that proposes one (1) building containing up to approximately 498,000 gross square feet (SF) of office, research and development (R&D) and lab enabled uses (office/R&D/lab), approximately 27,000 SF of retail and/or restaurant space, and below-grade structured parking spaces (the "Project" also known as EDGE Assembly Square). Refer to Figure 2.1 for a Site Location Map and Figure 2.2 for a Neighborhood Context Map, Figure 2.3 for an Existing Conditions Site Plan, and Figures 2.4a-b present photographs of the existing Site conditions.

Recognizing the unique opportunity to enhance the ASMD through the transformation of the Project Site and its current uses, the Proponent proposes a building driven by EDGE's four core principles: sustainability, wellbeing, design, and technology. Together, these principles have resulted in a Project that emphasizes sustainability, wellbeing, and human interaction, and has positioned the Project to raise the bar for sustainable buildings in the City of Somerville.

The Project will transform the Project Site into a hub of office/lab/R&D and retail activity, which will help knit together the fabric of Middlesex Avenue and serve as the gateway to the ASMD. Notably, the Project proposes significant improvements to existing off-site open space on the adjacent, City-owned parcel (the "Middlesex Avenue Open Space") that extends from the Project Site southeast to the edge of the existing Public Storage facility on Middlesex Avenue. The Proposed off-site improvements will enhance the connection between the ASMD and the open space, commercial uses and residential neighborhoods of Somerville to the west of the elevated Interstate 93 off-ramp (the "Off-Ramp", "I-93") below the I-93 Kensington Street Underpass (the "Kensington Underpass"). This connection will be strengthened by new and improved public open space on- and off-site, an improved streetscape, and new occupants and visitors who will enliven the area on a consistent and daily basis. The Project will also diminish the visual impact of the elevated roadway and highway ramps from the ASMD.

This chapter provides an overview of existing Project Site conditions, describes the Project and the Project Site, the Project schedule, the Project's sustainability approach, and summarizes the Project-related public benefits.

2.1 Project Vision

As a real estate developer, the Proponent aims to reinvent the workplace as a driver for health, wellbeing and sustainability. To accomplish this, the Proponent will bring their extensive knowledge and experience to the Project, which combines decades of work in real estate development with proven innovation in sustainability, smart technology and design for well-being. The Proponent is committed to making the built environment more sustainable, smarter and healthier with a user-centered approach.

The Proponent currently has 10 ongoing developments across the globe in Amsterdam, Hamburg, Berlin and London, and has recently expanded into the US market after delivering the award-winning Unilever North American Headquarters in New Jersey in 2018. EDGE Assembly is an exciting opportunity to bring the Proponent's vision of highly sustainable and intelligent commercial buildings to Somerville. Following the Proponent's proven design principles, the Project will look to set a new standard for commercial development in the Greater Boston Area.

From the beginning of the design process, the Proponent prioritizes sustainability to optimize building performance, influence material selections and to drive reductions in energy use. To enhance the health and wellbeing of building occupants, the Project incorporates outdoor areas, biophilia, improved indoor air quality, and optimal daylight in the building. The user-centered design approach proposes building features like an atrium, interconnecting staircases and breakout areas throughout the Project that create spaces for collaboration and interaction. Smart technology and the Proponent's world-leading proprietary software platform optimize building operations, monitor environmental conditions and give the opportunity for employees to have personal control over their workspaces.

With a highly visible and attractive location offering an easy commute from both Boston and suburban areas, the Project is expected to attract high profile tenants potentially looking for a new headquarters. The Project will support the City's vision of elevating Somerville as a hub for sustainable and innovative development, and will provide a work environment that attracts and retains talent in Somerville, which has grown to be part of the core Boston and Cambridge office and lab market.

2.2 Site Context and Existing Conditions

Existing Conditions

The approximately 0.85-acre Project Site is bounded by McGrath Highway to the north, Middlesex Avenue to the east, Kensington Avenue and the I-93 off-ramp to the west and an existing Public Storage building to the south. Kensington Avenue

cuts through the middle of the Project Site and creates a vehicular and pedestrian connection between Middlesex Avenue and McGrath Highway. Figure 2.3 includes the existing conditions site plan and Figures 2.4a-b present photographs of the existing Site conditions.

The portion of the Project Site to the north of Kensington Avenue includes a vacant lot consisting of deteriorated pavement, and an approximately 3,384 SF, single-story structure and parking lot supporting the existing Dunkin Donuts and the Sunrise Caribbean Restaurant. The portion of the Project Site to the south of Kensington Avenue is currently being used as passive open space directly adjacent to the Public Storage building.

The Project will replace the existing surface parking lots and retail building with new open space and public realm improvements described later in this chapter.

Site Context

The Project's location within the ASMD provides a unique opportunity to continue the dramatic revitalization of the neighborhood, and to realize the vision set forth by the City and the neighborhood of a balanced, dense and vibrant mixed-use district that emphasizes pedestrian and transit-oriented planning and design, and prioritizes the creation of new pedestrian-oriented public spaces.

One of the strengths of the Project Site is its proximity to public transit. It is located no more than a 10-minute walk from the Massachusetts Bay Transportation Authority's (MBTA) Assembly Orange Line Station (the "Assembly Station"), providing an important connection to Malden and downtown Boston.

The Project Site is a short walk from the restaurants, amenities and employment opportunities associated with Assembly Square and Assembly Row. Within a short distance from the Project Site, on-going planned development associated with Assembly Row and XMBLY will bring a diversity of new retail and restaurant offerings to the neighborhood, and will also provide new residential and office space. In addition, these developments will also introduce new open spaces, public realm improvements and pedestrian amenities that will continue the on-going transformation of a historic, largely industrial district into a vibrant, 24/7 urban community. The design of the Project is intended to integrate into the fabric of the ASMD and the context of the continued buildout of the neighborhood.

2.3 Project Summary

The Proponent is proposing a mixed-use redevelopment project consisting of one new office/R&D/lab building with ground-floor retail and restaurant space, comprising up to approximately 525,000 SF. This transformational development will deliver up to approximately:

- › 498,000 SF of commercial office/R&D use;
- › 27,000 SF of retail use;

- › Project-related parking (up to 350 below-grade spaces); and
- › Loading and service uses.

The final mix of uses will vary depending on market conditions at the time the Project is constructed, but will not exceed the maximum dimensions presented in Table 2-1, and the maximum impacts as analyzed herein this MPSP. (Note: all dimensions are approximate.)

The proposed building rises approximately 18 stories, to a height of approximately 275 feet from grade to the top of the structural roof. Depending on the final mix of uses, the floor-to-floor height and the total number of floors may change slightly; however, the Project will not exceed the maximum approved height.

Refer to Figure 2.5 for a Proposed Site Plan and Figures 2.6-2.8 for figures detailing significant views and building massing diagrams. Please also refer to Figure 2.9 for Distance Views of the Project and Figure 2.10 for a Neighborhood Massing Diagram.

Table 2-1 Program Table

Use/Element	Approximate Dimensions/Quantity¹
Office/Lab/R&D	498,000 SF
Retail	27,000 SF
Project Subtotal	525,000 SF
Floor Area Ratio (FAR)	14.2
Below-Grade Parking	Up to 350 spaces
Building Height	275 feet ²

1 Inclusive of all building space, including mechanical spaces. Zoning Gross Floor Area not yet defined

2 Measured from average finished grade to the top of the structural roof.

As described in Section 1.2 of Chapter 1, *Application Forms*, the Proponent requests relief from the dimensional standards of Table 7.4.6 of the Ordinance through issuance of a Special Permit.

2.3.1 Project Design Summary

The Proposed Project is planned to be a vibrant mixed-use development, combining human-focused sustainable architecture with a design that complements the urban fabric at multiple scales – city, district and pedestrian. The Proponent proposes a Project for the City of Somerville, driven by sustainability, wellbeing, connectivity, and technology.

The Project Site's prominent location along I-93 provides an exceptional opportunity to create a landmark building with direct visual connections to and from the ASMD and the commercial uses and residential neighborhoods of Somerville west of I-93.

The Proponent has prioritized a human-centric design approach focused on maximizing occupant well-being, which has driven the early design of the building and interior spaces. The building design and orientation propose openings at key

moments to reveal tall slots of glass on each building elevation. These vertical glass openings create unique interior views directed toward the Assembly Station, the Mystic River to the north, and the Cambridge and Boston Skylines to the south. Behind the prominent glass openings on the exterior facade, the interior design contemplates a variety of functional indoor spaces like winter gardens and an atrium, which could become gathering areas for occupants. The Proponent is exploring the potential for exterior terraces that would provide accessible outdoor space with views of the Boston and Cambridge skylines. The Proponent is also exploring the potential for a multi-story indoor atrium to maximize internal daylighting. Tall ceilings throughout the building provide generous interior spaces and help to promote distribution of daylight to workspaces throughout each floor. Refer to Figures 2.7-2.8 for building massing diagrams. Please also refer to Figure 2.9 for Distance Views of the Project and Figure 2.10 for a Neighborhood Massing Diagram.

In order to achieve the Proponent's sustainability and energy goals, the design has focused on developing a building with high energy performance. Early design work has focused on understanding and maximizing the building orientation to control daylight and reduce unwanted heat gain from solar exposure. The building floor-plate and exterior walls have been rotated toward an east-west axis, offering opportunities to regulate the amount of energy gained through the building's envelope. The exterior walls of the Project will consist of a high-performance enclosure designed as a "kit of parts", providing flexibility to adapt the window size ratio and deepen the articulated façade where beneficial on each elevation. Subsequently, the façade openings and window-to-wall ratios on each building elevation are optimized and are proportionate to the amount of solar exposure, minimizing solar gain while providing views and maximizing beneficial daylighting at workspaces, while still designing a consistent building look and feel from all directions. The high-performing exterior wall assembly will have thermal insulation properties that will retain indoor conditioning, and reduce undesired heat gain and heat loss.

2.3.2 Civic and Open Space

The Proponent is committed to developing the Project Site with as much publicly accessible open space as is feasible outside the building footprint. As described below, approximately 25 percent of the Project Site will be publicly accessible open space. Additionally, the Project proposes off-site open space improvements, which as described in Appendix F and below, will be designed to satisfy the 25 percent civic space requirement in the ASMD. The conceptual design and programming of these areas are described below. Refer to Figures 2.11 through 2.13

Public open space around the Project Site will provide animated gathering areas and permeability for community connection. Retail storefronts along Middlesex Avenue and a lively entry lobby along Kensington Avenue will activate the ground plane. The retail and lobby facades sensibly recede from the pedestrian space, providing an

enlarged sidewalk width along east and south frontages, enhancing the public realm.

To further enhance the public space, the Project is exploring the opportunity to link the on-site open space within the adjacent, city-owned Middlesex Avenue Open Space to the building's entry plaza, public sidewalks, and multi-modal transportation connections. Proposed off-site improvements to the adjacent Middlesex Avenue Open Space will help to establish both a public plaza space for the community and an active front door for the Project.

Kensington Plaza

The Project envisions the decommissioning of the adjacent Kensington Avenue and the revitalization of the existing Middlesex Avenue Open Space to create a new civic space (the "Kensington Plaza"). The existing Middlesex Avenue Open Space is not part of the Project Site, and is considered off-site improvements to City-owned land that extends from the Project Site southeast to the edge of the existing Public Storage facility on Middlesex Avenue. The Kensington Plaza will create an attractive gateway into the ASMD and the Project Site, and will provide generous pedestrian and bicycle infrastructure that connects Foley Street to the Kensington Underpass, and the Stop and Shop and Garfield Avenue neighborhood to the west. The new "gateway entrance" to the ASMD and the Project Site will include new hardscape materials, trees, plantings, seating, signage and lighting that will create an active and safe space at all times of the day. Public bicycle storage is being considered for an improved Middlesex Avenue Open Space. The proposed improvements will integrate with the adjacent hardscaped seating area north of the Public Storage building, so that the open space between the buildings works as a singular, unified civic space. Refer to Appendix F for a copy of the Civic Space Study that provide an analysis of existing open and civic space resources within walking distance of the Project Site.

The decommissioned Kensington right-of-way will be reimagined into a new plaza that will create a new civic space, and an arrival point to the ASMD from points west of I-93. The Kensington Plaza will serve as an extension of both the improved Middlesex Avenue Open Space and the Project's lobby and ground floor active uses, and could be a location for future events.

The proposed off-site improvements require the City to decommission the vehicular rights on the adjacent Kensington Avenue thoroughfare. The City of Somerville would retain ownership of the Kensington right-of-way (ROW) and the adjacent Middlesex Avenue Open Space, and the Proponent is prepared to improve and maintain the off-site improvements. The City would grant the Proponent an easement that dedicates the new civic space to the public in perpetuity, and in return, would allow the adjacent decommissioned Kensington right-of-way to be counted towards the required amount of civic space.

The Proponent will continue to coordinate closely with the City on the decommissioning of this public way, which would require a vote from the City Council and final approval from the Mayor.

2.3.3 Streetscape Design and Public Realm Improvements

The Project's Site design strategy focuses on creating pedestrian-oriented sidewalks and streets surrounding the Project Site. The following section summarizes streetscape design and public realm improvements proposed on Middlesex Avenue, McGrath Highway and Kensington Avenue. The final dimensions of the proposed sidewalks surrounding the Project Site will be advanced in collaboration with the City.

Middlesex Avenue

The streetscape along Middlesex Avenue is designed to establish the Project's identity, and to support the active uses associated with the proposed retail fronting Middlesex Avenue. The Proponent will explore the potential to extend the curb-line outward from the Project Site to match the planned dimensions associated with the City's Middlesex Avenue enhancements, which include new separated bicycle lanes traveling in both directions. The Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, and planters, and a buffer zone for benches, streetlights and bicycle racks, which will dramatically improve the pedestrian experience.

McGrath Highway

The McGrath Highway frontage will provide the vehicular access points for the service and loading areas and below-grade parking. The Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, and planters, and a buffer zone for benches, streetlights and bicycle racks, which will dramatically improve the pedestrian. The portion of McGrath Highway that fronts the Project Site will be repaved as part of this Project.

Kensington Avenue (west of Project Site)

The Project will provide a new pedestrian zone at this portion of the Project Site. The portion of Kensington Avenue (also known as Cummings Street), that fronts the Project Site will be repaved as part of this Project.

The Proponent will continue to explore the feasibility of a potential short-term vehicle drop-off area along Kensington Avenue and Middlesex Avenue.

2.3.4 Site Access/Connectivity

The Project Site has excellent vehicular access and visibility from I-93, and is well positioned along Middlesex Avenue, which serves as the major entry point to the to the ASMD. The open space, pedestrian pathways and sidewalk connections proposed as part of the Project, and as described in Sections 2.2.3 and 2.2.4, will be designed to complete and improve connections with the existing and future network of parks and pathways in the vicinity of the Project Site. Proposed site improvements will strengthen the connection between Assembly Row and the Project Site, and enhance the pedestrian and bicycle connection between Foley Street to the

residential and commercial neighborhoods of East Somerville to the west of I-93 through the Kensington Underpass.

The Project Site has convenient public transit access, including; one (1) MBTA station within a quarter mile (0.25) mile (the Assembly Station), and three (3) bus routes with stops near the Project Site along Middlesex Avenue and Mystic Avenue which provides opportunities to minimize vehicle trips and encourage alternative modes of travel.

The primary vehicular point of entry to the Project Site will be at the intersection of Middlesex Avenue and McGrath Highway. As described in Section 2.2.5, and as shown on Figures 2.14, on-site below-grade vehicle parking, and service and loading areas will all be accessible from McGrath Highway. Refer to Figure 2.15 for a neighborhood circulation and access plan.

2.3.5 Parking Summary

Vehicle Parking

Structured Vehicular Parking

The Project will provide up to 350 below-grade parking spaces that will be available only for office/R&D/lab tenant use. The below-grade parking spaces will be accessed from a ramp located adjacent to the loading bays that service the Project on McGrath Highway.

Unstructured Vehicular Parking

The Project will short-term, on-street parallel parking spaces to support the ground level retail space along Middlesex Avenue. The exact number of spaces will be determined as the design advances, and will be determined in consultation with the City.

Bicycle Parking

The Project will include short- and long-term bicycle parking storage in compliance with the City of Somerville's guidelines to encourage cycling as a strong alternative transportation mode. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of the racks will be determined during the MPSP process.

2.4 Project Site Accessibility

The Project will improve accessibility around the Project Site by creating generous, barrier-free pedestrian zones along Middlesex Avenue, McGrath Highway and Kensington Avenue.

The Project will implement the following:

- › The Proponent will continue to explore the feasibility of a potential short-term vehicle drop area along Kensington Avenue and Middlesex Avenue. Any potential drop-off area will incorporate a curb ramp to provide barrier-free access to the building;
- › The sidewalks on Middlesex Avenue and McGrath Highway will be widened, paved in concrete, free of obstructions and have a comfortable and Americans With Disabilities Act (ADA) compliant slope, where feasible; and
- › The parking ingress/egress will incorporate a flush sidewalk condition giving priority to the pedestrian over the vehicle.

Additionally, the Project will comply with accessibility regulations set forth in 521 CMR: Architectural Access Board. The Project will be served by multiple elevators and two (2) egress stairs.

2.5 Sustainability Approach

Throughout the early design process, four basic principles have driven the Proponent's decision-making process: wellbeing, sustainability, design, and technology. Combined, these principles elevate the Project team's thinking to make smart, forward-focused decisions for the future occupants of the building and the City of Somerville. Using an integrative design process, each design decision is evaluated against the overall sustainability goals of the Project. As a guide, the Project team has utilized the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED), BD+C for Core and Shell Version 4 and the International WELL Building Institute's (IWBI) WELL Building Standard into a decision-making framework to create the most impactful approach to sustainability. Together, LEED and WELL Building strategies prioritize energy efficient design and occupant wellbeing, resulting in a sustainable and healthy building that will serve as an example for future development in Somerville and the Greater Boston Area.

The Project goals comply with Ordinance, adopted on December 12, 2019, which requires that new projects over 50K SF meet the minimum requirements to achieve a LEED Platinum Certifiable level, without the need for registering or certifying the project with the USGBC.

In support of the City's energy conservation, greenhouse gas (GHG) emissions reduction goals, as well as resilience targets, the Proponent proposes to incorporate key aspects of sustainability and high-performance building design into the Project. The Project Team has prepared a draft LEED scorecard which shows a potential pathway for the Project to achieve LEEDV4 BD+C for Core and Shell Platinum certifiability. The Proponent has identified and will continue to evaluate additional potential points to improve the sustainability even further. A summary of the preliminary approach to the credit categories and a preliminary LEED scorecard are located in Appendix B.

In addition to LEED, the Proponent is also exploring WELL Building certification for Core and Shell. Many WELL criteria align strongly with the design principles including:

- › Access to daylight and views;
- › Enhanced thermal performance, controls and monitoring;
- › Light quality, including minimizing glare;
- › Incorporation of nature indoors, such as winter gardens;
- › High levels of indoor air quality, including monitoring;
- › Promotion of active commuting by bicycle and walking; and
- › Promotion of physical activity by selecting a site in close proximity to mass transit and local amenities.

Additionally, the Proponent will continue to investigate the feasibility of on-site energy generation, which is critical to reducing anticipated demand on the utility grid. The Proponent is considering and exploring incorporation of a rooftop solar Photovoltaic (PV) system, building mounted PV, as well as a ground-source heat pump system as part of the Project.

Climate Resiliency

With the Project Site's location within the Sea Level Rise floodplain for 100-year coastal storm events in 2070, flood resiliency is an important aspect of the Project's design. The planned strategies being explored include elevating critical infrastructure above the design flood elevation (DFE) where feasible, exploring flood-resistant material selection on the ground floor to minimize potential flood damage, and designing a stormwater retention system throughout the landscaped open space.

The design responds to potential extreme heat events by proposing strategies such as native drought-resistant landscaping and shade trees in the Kensington Plaza, streetscape and offsite open space improvements. Many of the proposed energy and water conservation measures aim to minimize fossil fuel use and greenhouse gas emissions, including high-efficiency MEP systems, a responsive building management system, and possible renewable energy generation with photovoltaics.

Indoor Air Quality Approach

The proposed building design will incorporate a high efficiency air quality filtration system serving outdoor air to occupied spaces and will incorporate particle filters or air-cleaning devices that are minimum efficiency reporting value (MERV) of 13 or higher, in accordance with ASHRAE Standard 52.2–2007. The resulting indoor air quality will provide a healthy and safe indoor environment for building occupants. The Proponent will be exploring additional air quality strategies that may include, but are not limited to, demand control ventilation (DCV); hybrid ventilation; phytoremediation; entryway systems, and interior cross-contamination prevention.

2.6 Project Schedule

Throughout the coming months, the Proponent expects to work diligently with the community and with the City to complete the MPSP and Site Plan Approval (SPA) review and approval processes.

The Applicant anticipates commencing Project Site preparation, demolition and utility work in Q1 of 2021. Work for the core and shell is anticipated to be complete by Q3-Q4 of 2023. Tenant fit-out work will be market dependent, but anticipated to commence around Q4 of 2023.

2.7 Summary of Project Benefits

Urban Design and Public Realm

- › The Project will provide iconic contemporary architecture that will create a memorable gateway to the Assembly Square Neighborhood, and for vehicles traveling north and south along I-93.
- › The Project will revitalize a distressed, underutilized urban site.
- › The Project will create a high-quality continuous street frontage activated by vibrant and engaging ground floor uses, such as retail and restaurant spaces. Through the use of glass facades wherever possible, the Project will provide transparency and create an inviting and safe ground-level experience for pedestrians.
- › The Project will provide a significantly upgraded streetscape, including new sidewalks, streetlighting, landscaping and other public amenities along Middlesex Avenue, McGrath Highway and Kensington Avenue.
- › New pedestrian pathways, sidewalks and bicycle connections will improve the connection between Assembly Row, the Project Site and development to the west of the I-93 Off-Ramp.
- › The Project will repave the portions of McGrath Highway and Kensington Avenue that front the Project Site.
- › The Project will create new on-site open space.
- › The Project will propose off-site improvements to the existing Middlesex Avenue Open Space. The off-site improvements will form an attractive gateway into the Assembly Square Neighborhood and will provide a generous pedestrian and bicycle connection from Foley Street across the park area to connect below I-93 to the Stop and Shop and Garfield Avenue neighborhood to the southwest.

Sustainability/Environmental

Sustainable and high-performance building strategies are at the core of the design for the Project.

- › Area Revitalization – The Project revitalizes an underutilized, distressed urban site, uses land efficiently by increasing density in immediate proximity to public transportation, and encourages the use of non-automotive modes of transportation.
- › LEED – The Project will be designed and constructed to be LEEDv4 BD+C Core and Shell Platinum Certifiable, and has developed a roadmap to achieve this goal. Preliminary LEEDv4 scorecard is provided in Appendix B.
- › Energy Conservation – The Project aims to achieve a reduction in energy use below an ASHRAE 90.1-2016 baseline, currently estimated at approximately 62 percent, by reducing overall energy consumption through the incorporation of Energy Efficiency Measures (“EEMs”) and energy-efficient design strategies.
- › Climate Resilience – The Project will be designed to reduce vulnerability given future changes in climate scenarios and natural events, such as extreme weather. Potential site and building design strategies are detailed in the Sustainable and Resilient Buildings Questionnaire in Appendix B.
- › Stormwater – The Project will implement Best Management Practices (BMPs) to improve water quality. The stormwater management system will be designed to release flows less than or equal to the existing condition. In the event the Project receives drainage easements from the City, total volumes leaving the Project Site will be reduced to meet the existing condition.
- › Sewer Mitigation / Infiltration and Inflow (I/I) – The Somerville Water and Sewer Department (SWSD) requires all new sewer connections or expansions of existing connections that exceed 2,000 gallons per day of wastewater to mitigate the impacts of the development by removing four (4) gallons of infiltration and inflow (I/I) for each new gallon of wastewater flow. The Proponent will comply with this requirement and develop an I/I mitigation plan through coordination with SWSD.

Transit and Transportation

- › Pedestrians – As described in Section 2.2.4, the Project will improve the pedestrian environment significantly through the development of the new pedestrian pathways and sidewalk connections and the creation of new publicly accessible open space.
- › Bicycle Accommodations and Parking – The Project will incorporate bicycle accommodations in compliance with the City of Somerville’s guidelines to encourage cycling as a strong alternative transportation mode.
- › Transportation Demand Management (TDM) Program – The Project will implement a robust program of TDM strategies to take full advantage of its proximity to multiple mobility options and to reduce vehicles traveling to and from the Project Site. Please refer to Section 3.8.2 for a description of specific TDM measures to be implemented for the Project.

- › Transit Accessible Employment Center – The Project will create a transit-accessible employment center, where office/lab/R&D and retail employees will have multiple options to commute to work via public transportation.

Social and Economic Benefits

- › Economic Inclusion: In recognition of the City's efforts to promote economic inclusion, the Proponent has incorporated both local and minority owned businesses onto the Project Team.
- › Youth Engagement: The Proponent will explore the potential to partner with local community groups to host periodic events during construction of the Project that engage and expose local youth to the development process, and to potential careers paths in construction and development related fields.
- › Enhanced Retail Opportunities – The Project will provide complementary new retail opportunities for neighborhood residents, visitors, and the public, consistent with those currently existing at the Property Site.
- › New Job Creation - The Project will enhance the economy by creating permanent jobs related to the retail/active use, office/lab/R&D uses, and create construction jobs in a variety of trades for the Project construction. The Project also anticipates retaining the approximately 20 jobs currently associated with the existing Dunkin Donuts.
- › Enhanced Tax Revenues – The Project will generate new real estate tax revenues for the City of Somerville.

2.8 Regulatory Context

2.8.1 Consistency with SomerVision

Somerville's Comprehensive Plan 2010-2030 (SomerVision) was developed by a steering committee in collaboration with the Mayor's Office of Strategic Planning and Community Development through a series of meetings, visioning sessions, and public workshops. At the time it was endorsed by the Somerville Board of Aldermen (now referred to as the City Council) and adopted by the Somerville Planning Board in April 2012, and aims to serve as a guide for future growth and development in the City. The primary goals of the plan are to:

- › Enhance existing squares and commercial corridors;
- › Emphasize pedestrian and transit-oriented planning and design;
- › Transform opportunity areas on the eastern and southern edges of Somerville; and
- › Focus development around new pedestrian-oriented public places.

As proposed, the Project will improve the connection between Assembly Row and the Project Site, and improve the pedestrian and bicycle connection between Foley

Street to the residential and commercial neighborhoods of East Somerville to the west of I-93 through the Kensington Underpass.

2.8.2 Consistency with Assembly Square District Plan

The Project Site is located within the ASMD, which is intended to fulfill the goals and objectives contained in the Assembly Square District Plan (the “ASD Plan”), which was originally adopted in 2000. Among other objectives, the ASD is designed to promote pedestrian and transit-oriented planning and design, and to encourage the development of a mix of uses including residential, office/lab, research and development, retail/active use, hotels, cinemas, performing arts and institutional uses around new pedestrian-oriented public places.

The Project will complement and support the surrounding land uses and adjacent residential and commercial areas by providing new commercial and retail/active use opportunities, enhanced public open spaces, and jobs for the surrounding population.

Somerville By Design

The City, in collaboration with a multi-disciplinary consultant team has recently commenced the work of developing a new Neighborhood Plan for the Assembly Square neighborhood and Transit Area. The ASMD has become one of the new regional centers, and the neighborhood plan will focus on assessing existing infrastructure, refreshing and establishing an urban design framework, and identifying ongoing pedestrian scale improvements that will help this neighborhood reach the promise first unlocked and realized in the early 2000’s when the first Assembly Square Planning Study was completed.

The public process is expected to begin with a series of meetings and presentations in early 2020, with the expectation that a draft of the new plan will be available for public comment by late 2020. The Proponent and the Project Team will continue to coordinate with City Planning Staff during development production of the neighborhood plan.

2.8.3 City of Somerville Zoning

As previously stated, on December 12, 2019, the City adopted the new Zoning Ordinance. The Project Site is located within the ASMD, and meets the criteria to establish a MPSP in accordance with the applicable provisions of Article 7, and with Article 15 of the Ordinance. The purpose of a MPSP is to provide for a greater variety, density and intensity of land uses at a site than would normally be allowed under base zoning. MPSP’s allow for more design flexibility, in return for more thoughtful, sensitive land planning that encourages additional open space on site, and can reduce the Project’s impacts on sensitive environmental resources.

2.8.4 Massachusetts Environmental Policy Act

As currently proposed, the Project is not subject to review pursuant to MEPA implementing regulations (301 CMR 11.03). While the Project does exceed a MEPA related threshold, the Project does not require a State Agency Action, and therefore MEPA review is not required.

2.9 Public Process Overview

Table 2-2 highlights the Proposed Project-related community and neighborhood outreach activities undertaken by the Proponent during the months leading up to the filing of this MPSP.

Table 2-2 Agency and Community Outreach Meetings

Date	Meeting
December 18, 2019	Somerville Dept. of Planning and Zoning
January 10, 2020	City Councilor Matthew McLaughlin
January 16, 2020	Mayor Joseph A. Curtatone
January 16, 2020	Mystic View Task Force
January 17, 2020	Somerville Mobility Division
January 22, 2020	Somerville Dept. of Planning and Zoning
January 22, 2020	Neighborhood Meeting
January 29, 2020	Somerville Engineering Dept.
February 5, 2020	Somerville Dept. of Planning and Zoning
February 5, 2020	Somerville Office of Sustainability and Environment
February 13, 2020	Public Space and Urban Forestry Dept.

These discussions have covered a broad array of topics, ranging from urban design and public realm improvements to community benefits and sustainability. The development team welcomes the input of governmental agencies, neighbors and other stakeholders, and will continue to meet with the community and others as the Project moves through the development review process.

2.10 Development Team

Table 2-3 identifies the members of the design and consulting team (the "Project Team") and provides their primary contact information. In recognition of the City's efforts to promote economic inclusion, the Proponent has incorporated both local and minority owned businesses onto the Project Team.

Table 2-3 Development Team Contact Information

DEVELOPMENT TEAM CONTACT INFORMATION	
Development Team	EDGE 122 Hudson Street, Floor 2 New York, NY, 10013 917-982-6091 <i>Contacts: Jan Hein Lakeman Ryan Sullivan</i>
	Boston Global Investors 55 Seaport Blvd 4th floor, Boston, MA 02210 617-350-7577 <i>Contact: John Hynes IV</i>
	Bastion Companies 71 Commercial Street, Suite 261 Boston, Massachusetts 02109 617-475-7255 <i>Contact: Gosder Cherilus</i>
	KEMS Development Corp. 200 Broadway, Suite 103 Lynnfield, MA 01940 978-360-9558 <i>Contact: Edward Doherty</i>
Legal Counsel	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110 617-574-6572 <i>Contact: Darren Baird</i>
Permitting	VHB 99 High Street, 10 th Floor Boston, MA 02110 617.728.7777 <i>Contact: Kyle Greaves Hugh Hahn</i>
Transportation	VHB 99 High Street, 10 th Floor Boston, MA 02110 617.728.7777 <i>Contact: Christine Trearchis Adriana Santiago</i>
Civil and Survey	VHB 99 High Street, 10 th Floor Boston, MA 02110 617.728.7777

	<i>Contact: Hugh Hahn</i> <i>Elena Vershinina</i>
Architect (Design)	Sasaki 64 Pleasant St. Watertown, MA 02472 617-926-3300 <i>Contact: Victor Vizgaitis</i> <i>Kyle Richard</i>
Architect (of Record)	AECOM 1 Federal Street Boston, MA 02210 <i>Contact: Leslie Sims</i>
Mechanical, Plumbing, Electrical Engineer and Sustainability Consultant	AECOM 125 Broad Street 15 th Floor New York, NY 10004 <i>Contact: Jason Vollen</i> <i>Amy Cannova</i>
Landscape Architecture	Sasaki 64 Pleasant St. Watertown, MA 02472 617-926-3300 <i>Contact: Caroline Braga</i> <i>Joel Smith</i>
Environmental Engineer	Haley & Aldrich 465 Medford Street, Suite 2200 Boston, MA 02129 617-886-7408 <i>Contact: Marya Gorzica</i>

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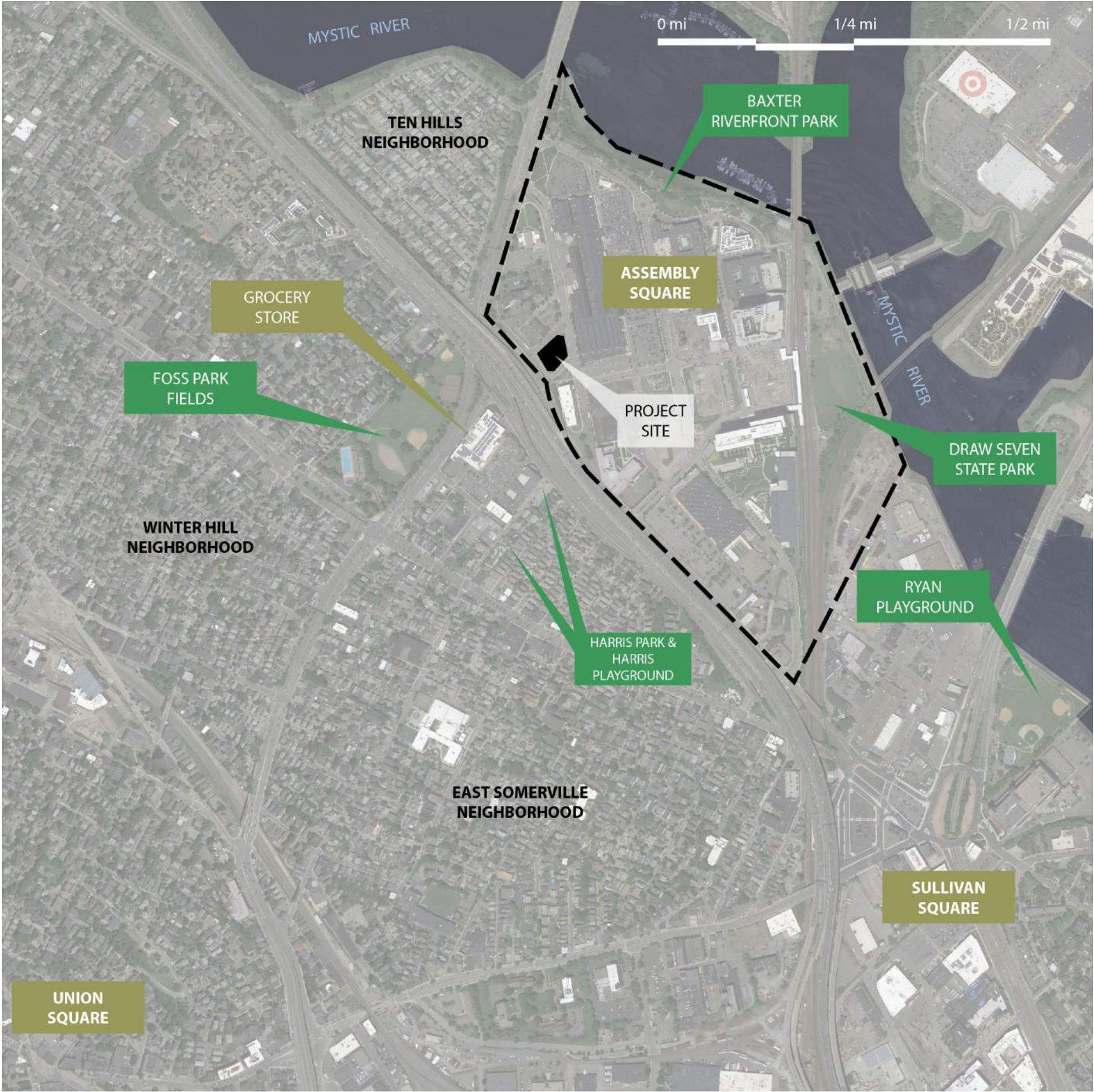
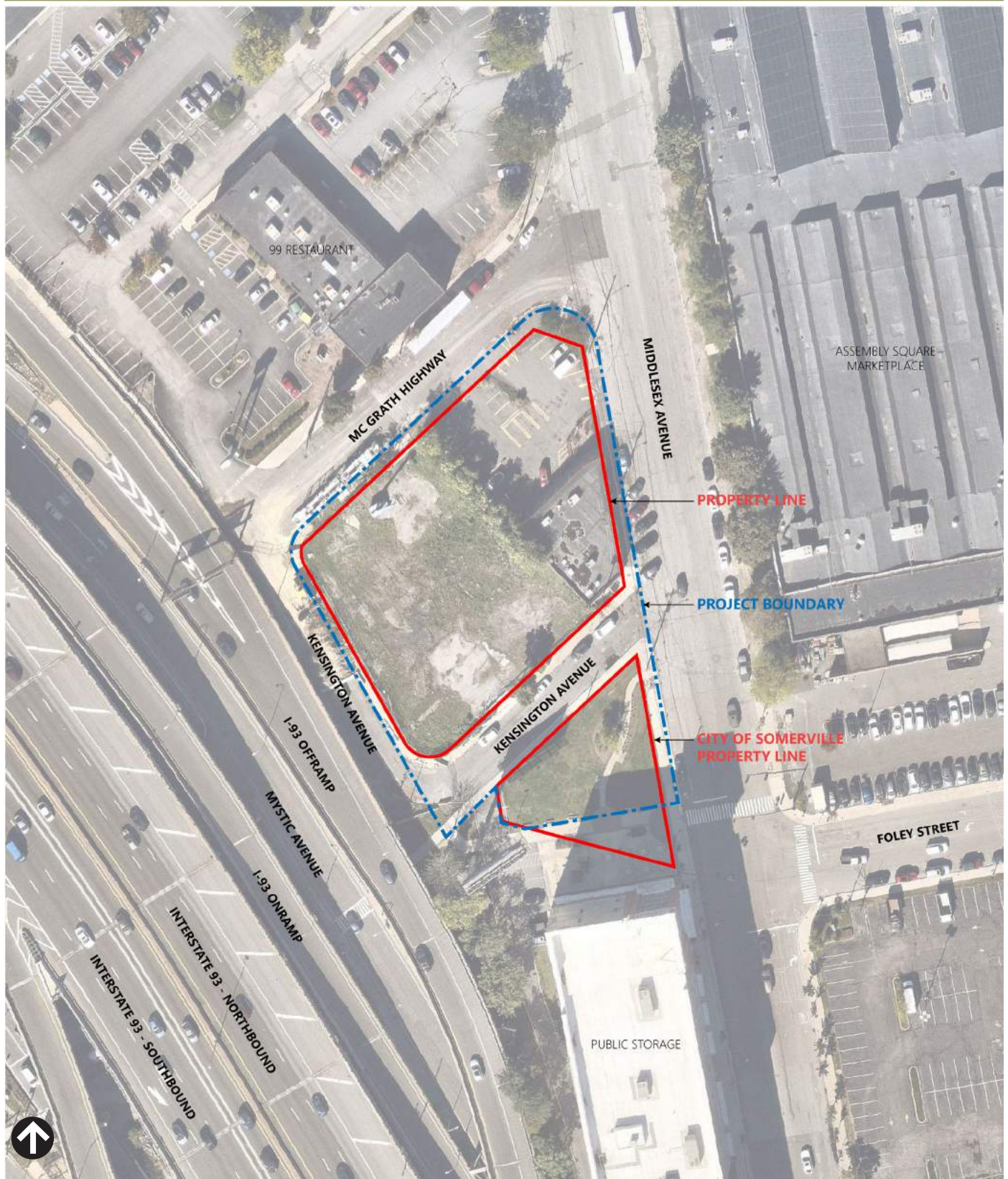


Figure 2.1
Site Location Map

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



SASAKI Figure 2.2
Neighborhood Context
Circulation Map
EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



— PROPERTY LINE
 - - - PROJECT BOUNDARY

SASAKI

Figure 2.3
 Existing Conditions Plan

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



View of the Project Site looking southwest from the intersection of Middlesex Ave. and McGrath Highway.



View of the Project Site looking northwest from the intersection of Middlesex Ave. and Kensington Ave.



Figure 2.4a

Existing Site Photos

**EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts**



View of the Project Site looking northeast from I-93.



View of the Project Site looking southeast from the intersection of McGrath Hwy and Cummings Street.



Figure 2.4b

Existing Site Photos

**EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts**



— PROPERTY LINE
- - - PROJECT BOUNDARY

SASAKI

Figure 2.5
Proposed Site Plan

**EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts**

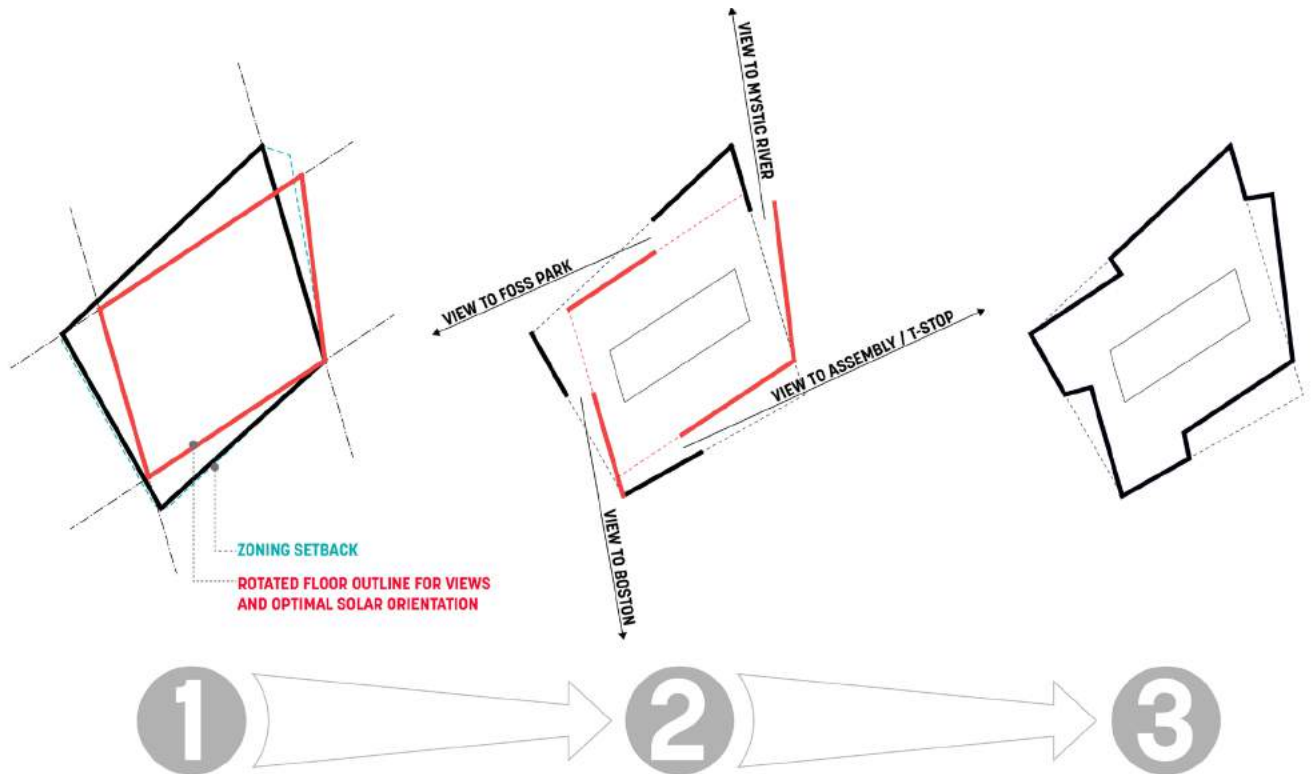
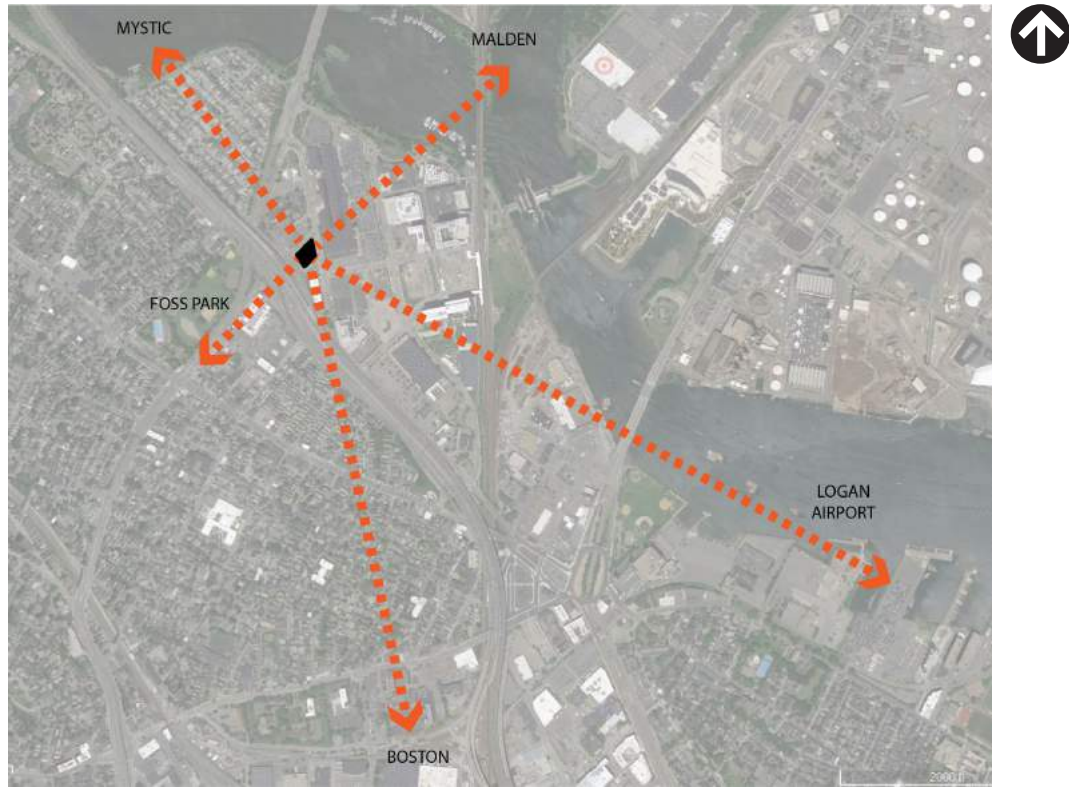


Figure 2.6
Significant Views Diagram

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

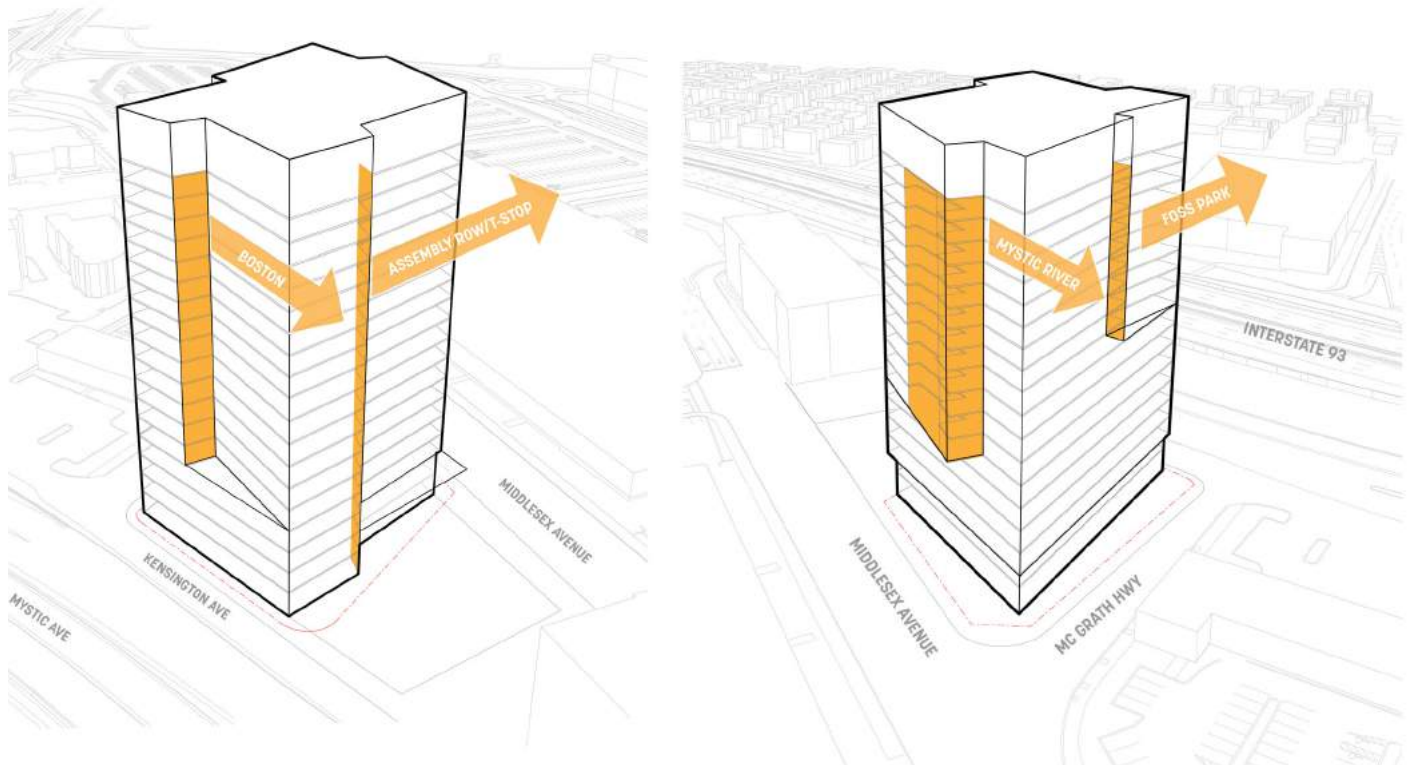


Figure 2.7

Building Massing
Significant Views

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

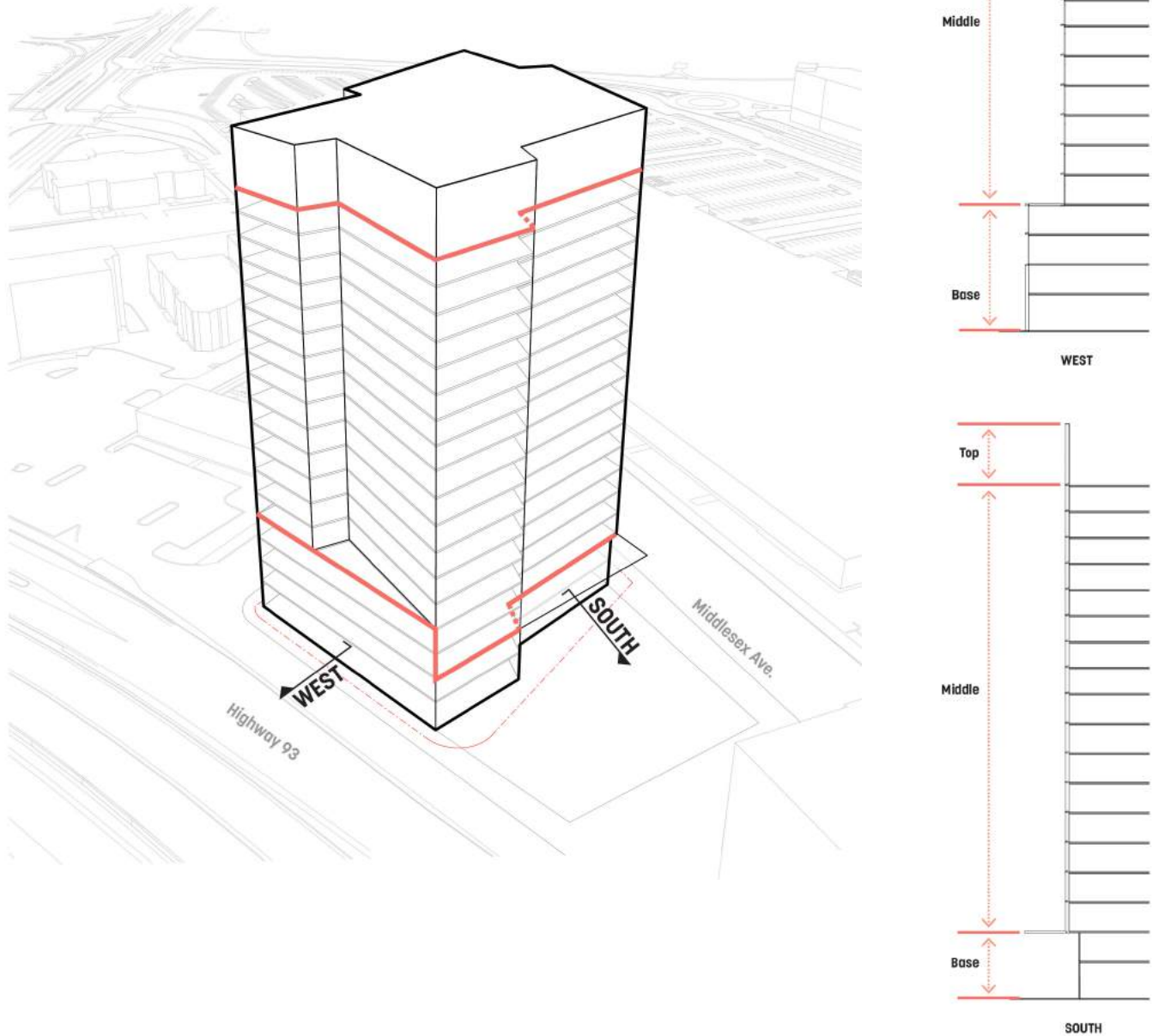


Figure 2.8

Building Massing
Volume Organization

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



From I-93 Southbound

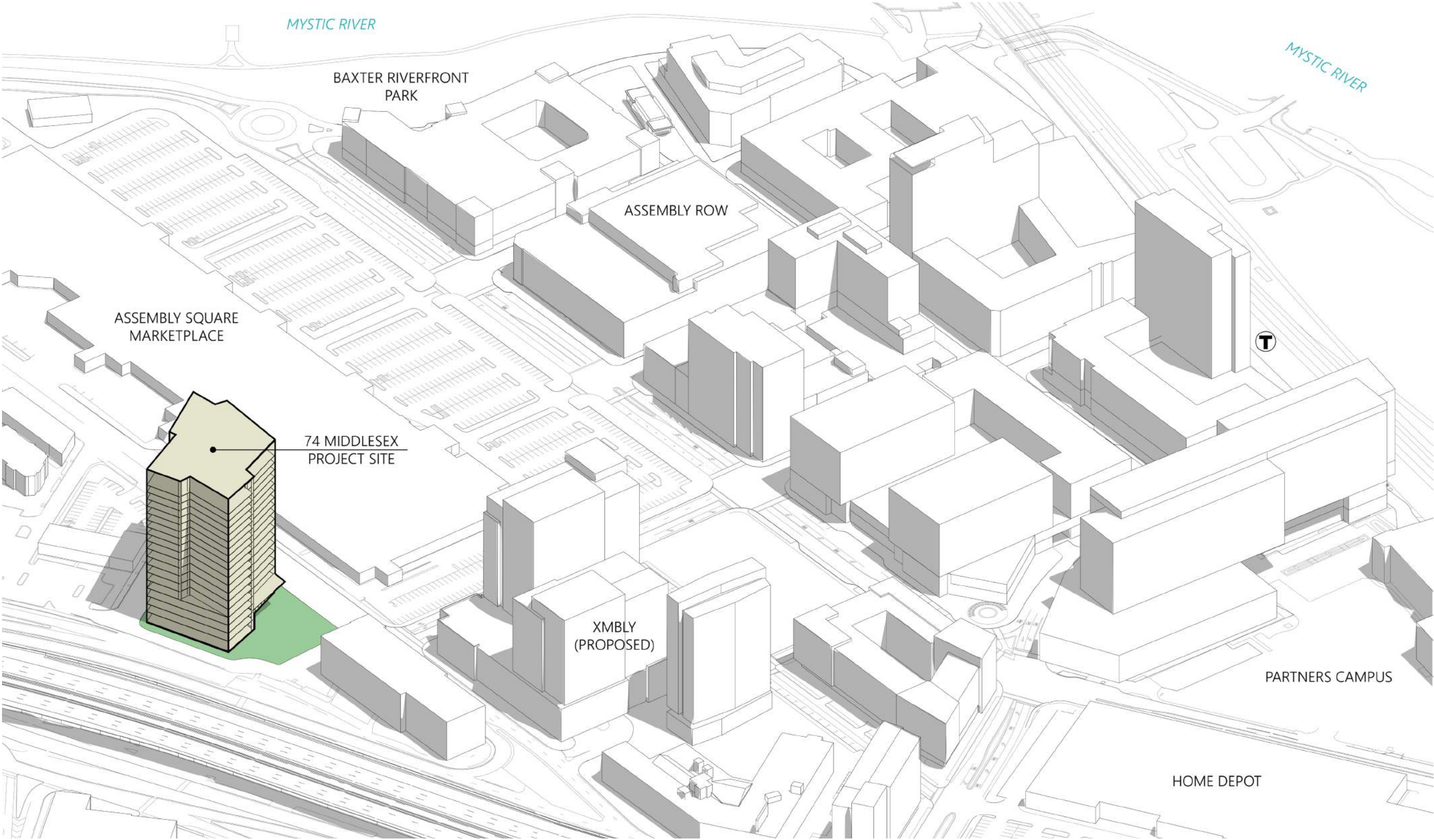


From I-93 Northbound



Figure 2.9
Distance Views

**EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts**



SASAKI Figure 2.10
Neighborhood Massing Diagram

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



LEGEND

- OPEN SPACE
- URBAN GATHERING PLAZAS



Figure 2.11
Neighborhood Open Space Plan

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

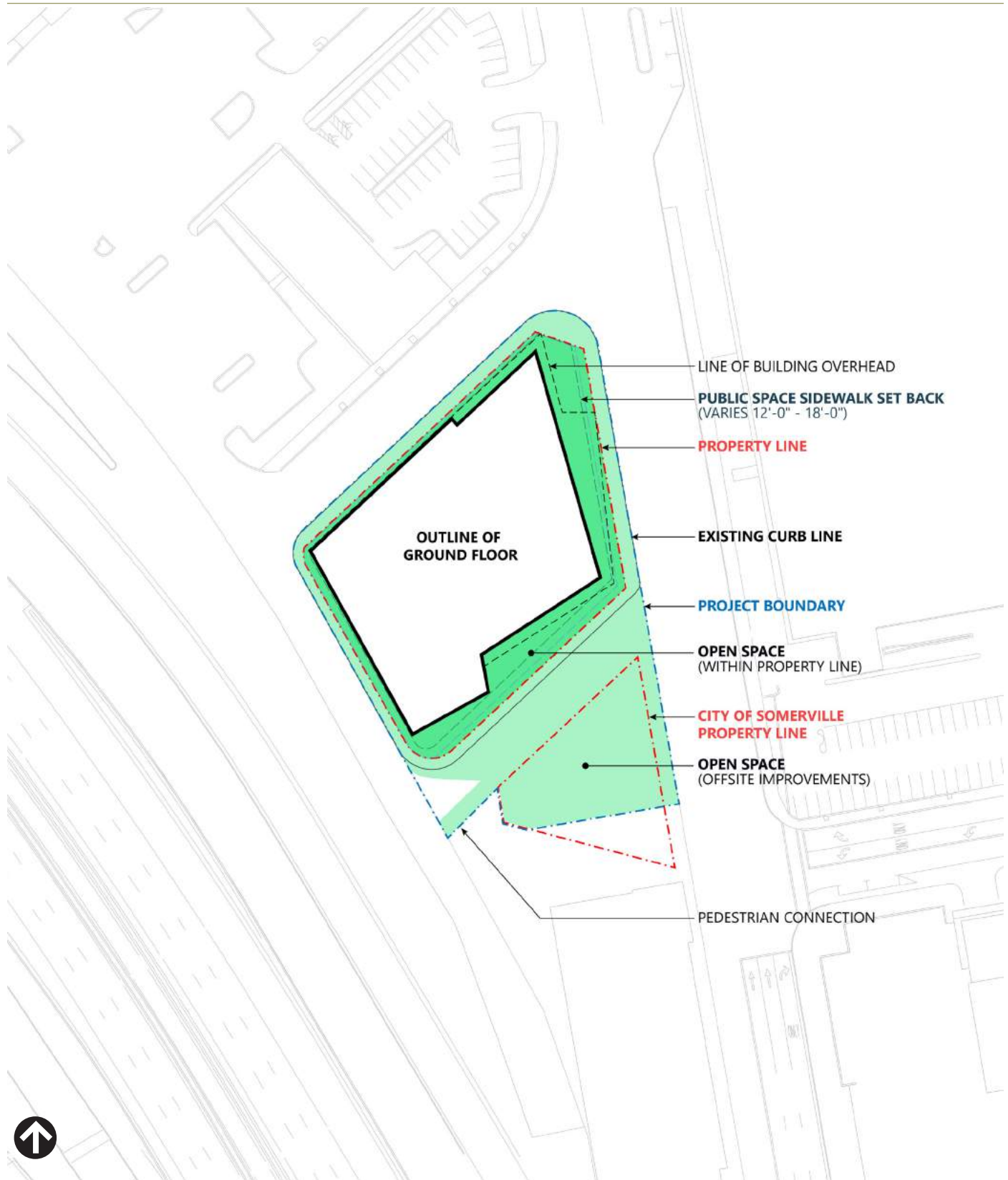


Figure 2.12

Open Space Plan
Onsite and Offsite Improvements
EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

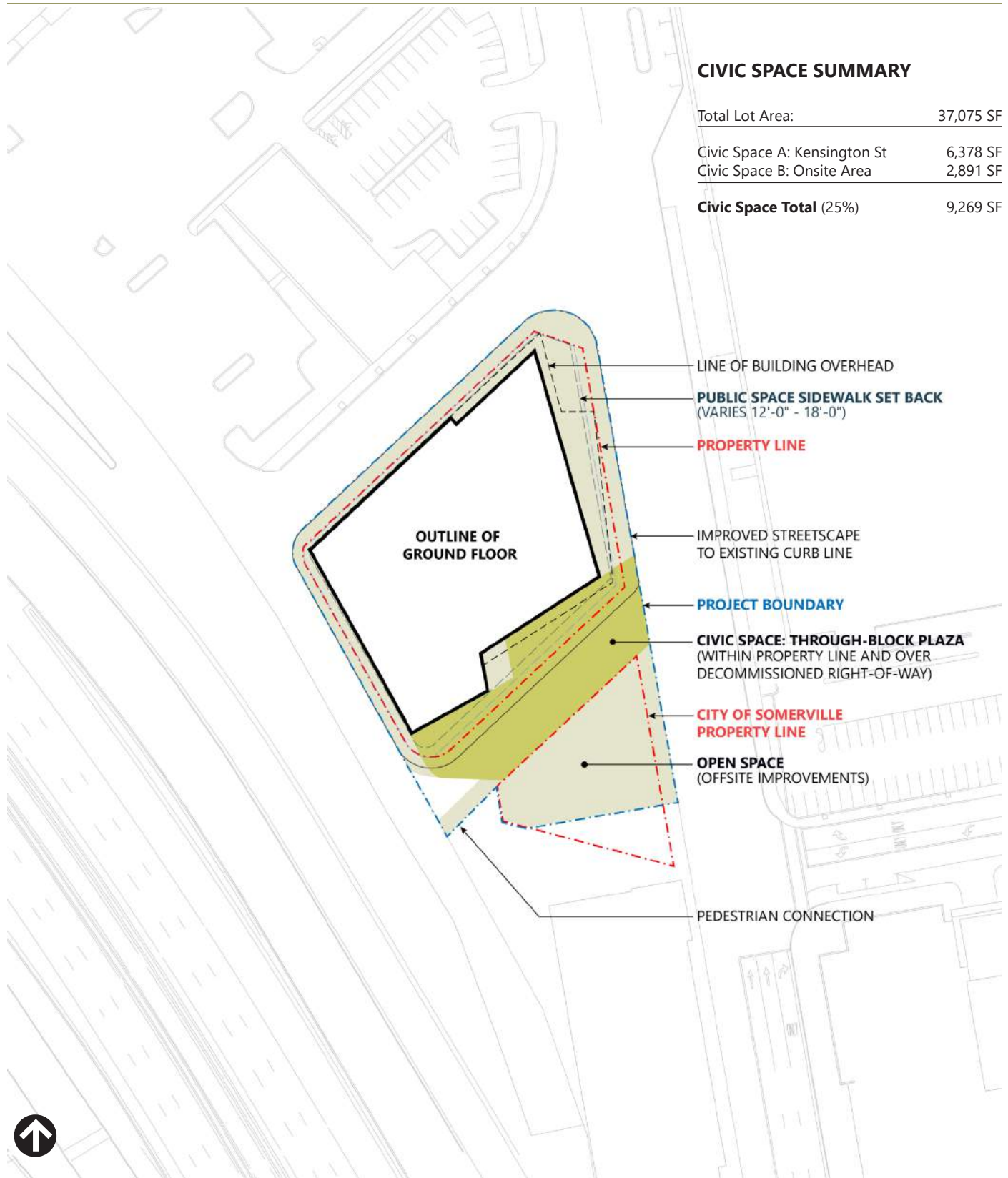
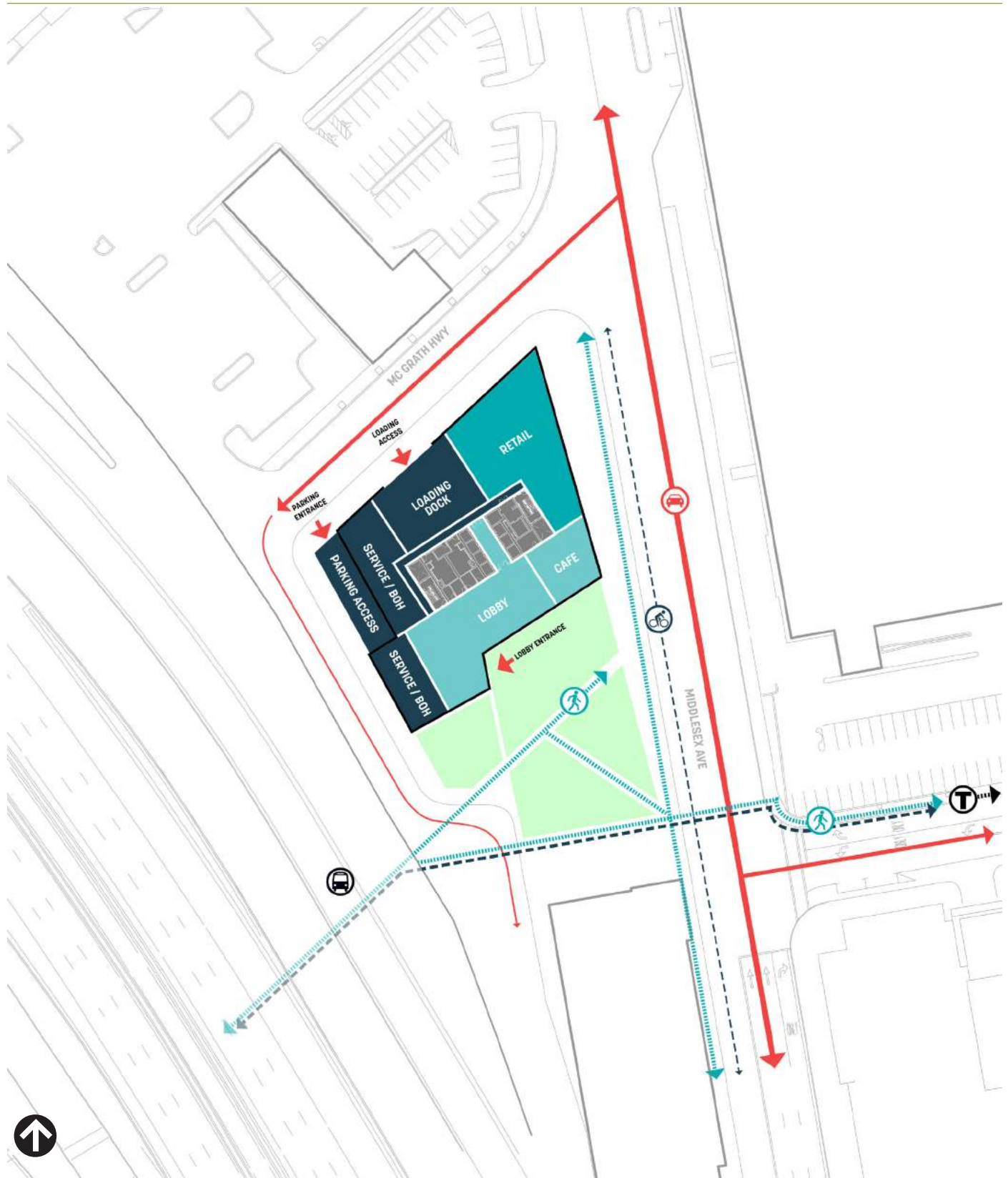


Figure 2.13

Civic Space Plan

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



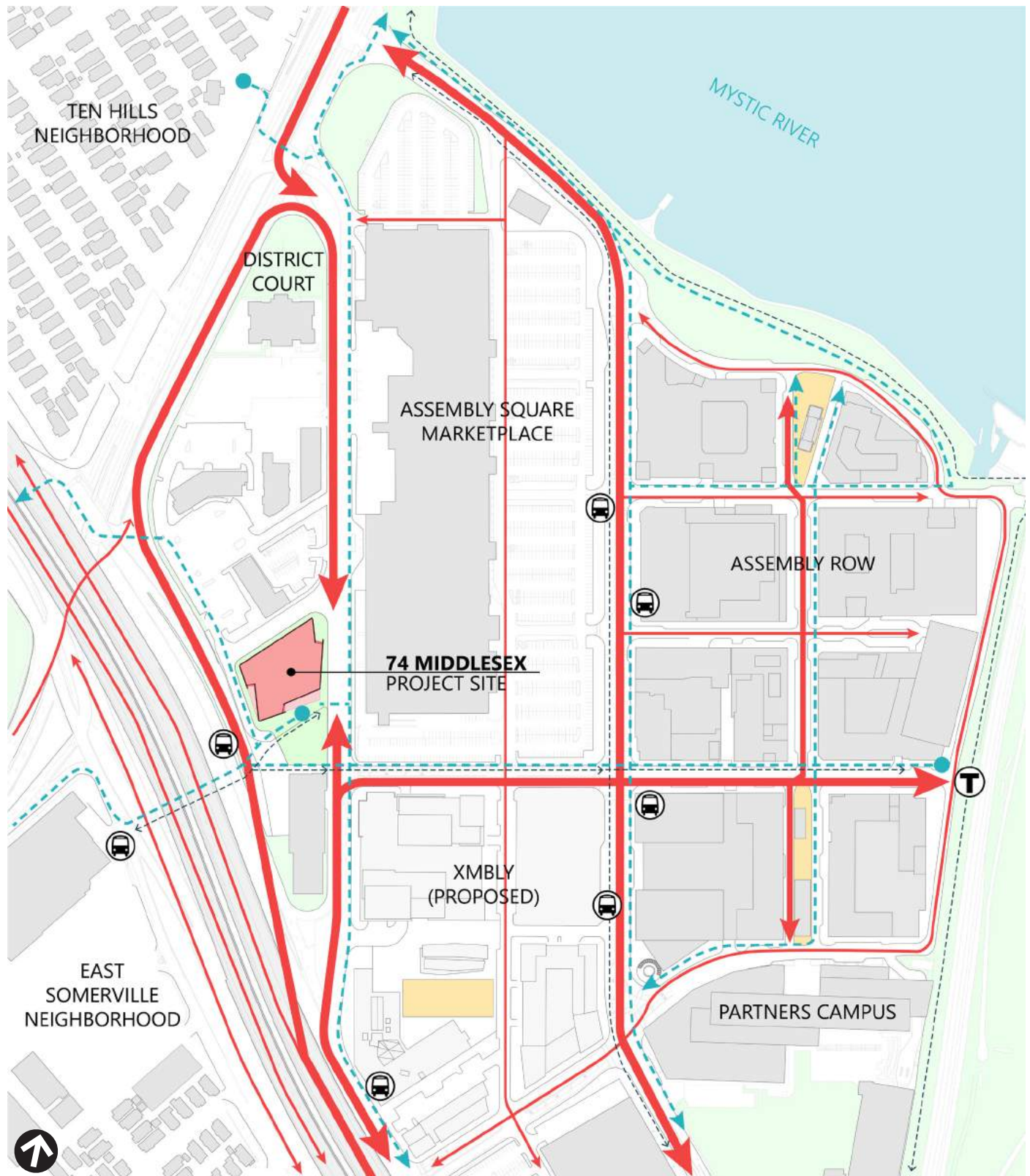
LEGEND

- PEDESTRIAN
- BICYCLE
- VEHICULAR
- T MBTA STATION
- B MBTA BUS STOP

SASAKI

Figure 2.14
Circulation and Access Plan

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



LEGEND



- VEHICULAR - PRIMARY
- VEHICULAR - SECONDARY
- - - PEDESTRIAN
- - - BICYCLE
-  MBTA STATION
-  MBTA BUS STOP



Figure 2.15

Neighborhood Circulation & Access Plan

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

3

Transportation

This Chapter provides a comprehensive Traffic Impact and Access Study (TIAS) that evaluates the existing and proposed transportation conditions in the study area and identifies the potential traffic impacts as a result of the Project (the “Study”). The approximately 0.85-acre Project Site is bounded by Mystic Avenue, McGrath Highway, Middlesex Avenue and Kensington Avenue. The Site Location Map is shown in Figure 3.1.

The Proponent proposes to redevelop the Project Site with pedestrian and transit oriented, mixed-use development including approximately 474,000 SF of office/R&D/lab uses, approximately 27,000 SF of ground floor retail and/or restaurant space, and up to 350 below-grade structured parking spaces. With the ongoing evolution of the Project design, and after completion of the TIAS, the size of the office/R&D space/lab uses have increased to approximately 498,000 SF. Refer to Appendix C for a memo that provides an update to the Project trip generation based on the revised building area.

The Study quantifies existing and projected future traffic conditions with and without the Project. Based on the analysis of the future traffic conditions, the Project is not expected to have a significant impact on the study area locations.

3.1 Study Area

Based on VHB’s knowledge of the area transportation network and the operational characteristics of the Project, the following intersections and their approach roadways were included in the assessment:

- › Middlesex Avenue at Foley Street
- › Middlesex Avenue at Mystic Avenue
- › Foley Street at Grand Union Boulevard
- › Grand Union Boulevard at Revolution Drive / Assembly Square Drive
- › Mystic Avenue at Revolution Drive
- › Fellsway (Route 28) at Grand Union Boulevard
- › Fellsway (Route 28) at Middlesex Avenue
- › Mystic Avenue at Grand Union Boulevard (Assembly Square Drive)
- › Broadway at Lombardi Street / Mount Vernon Street
- › Interstate-93 Southbound Off-Ramp at Lombardi Street
- › Interstate-93 Southbound Off-Ramp U-Turn at Mystic Avenue
- › Mystic Avenue at Wheatland Street

- › Route 28 at Mystic Avenue
- › Broadway at McGrath Highway
- › U-Turn to Interstate-93 Southbound On-Ramp
- › McGrath Highway at Middlesex Avenue
- › Grand Union Boulevard at Great River Road
- › Grand Union Boulevard at Artisan Way

The study area intersections listed above are highlighted in Figure 3.2, and the observed intersection geometry and travel-lane use area shown in Figure 3.3.

3.2 Transportation Analysis Methodology

VHB prepared the Study in three stages. The first stage involved an assessment of existing traffic conditions within the Project study area including an inventory of existing roadway geometry; observations of traffic flow, including daily and peak period traffic counts; and a review of vehicular crash data.

The second stage of the Study established the framework for evaluating the transportation impacts of the Project. Specific travel demand forecasts for the Project were assessed along with future traffic demands on the study area roadways due to projected background traffic growth and other proposed area developments that may occur independent of the proposed development. The year 2027, a seven-year time horizon, was selected as the design year for analysis for the preparation of this traffic impact and access assessment in accordance with the standard industry practices in Massachusetts.

The third and final stage of the Study discusses possible measures to improve existing and future traffic operations in the area and offsetting the traffic-related impacts associated with the development of the Project.

As part of this evaluation, VHB considered traffic conditions under the following conditions:

- › **2020 Existing conditions** – This scenario considers the existing roadway infrastructure and currently observed traffic volumes.
- › **2027 No-Build conditions** – The 2020 existing conditions volumes will be adjusted using an annual growth factor to reflect anticipated future regional traffic growth. Site-specific traffic generated by other definitively-known development projects that could impact traffic conditions within the study area also will be added. Traffic generated by these projects was obtained from available project traffic studies or estimated as part of this evaluation. The roadway infrastructure analyzed includes mitigation planned by other projects and/or municipal or state undertakings that are planned to be completed within the analysis horizon.
- › **2027 Project Build conditions** – This scenario involves adding the additional Project-Site-generated traffic being added to the 2027 No-Build volumes.

The capacity analyses will be conducted using the methodology presented in the 2010 Highway Capacity Manual or other approved procedures using Synchro™ software.

3.3 Existing Conditions Assessment

3.3.1 Roadway and Intersection Geometry

Descriptions of the study area roadways and intersections are provided below, including descriptions of the existing lane configurations, traffic control at the study intersections, the roadway jurisdiction in this area, and existing pedestrian and bicycle infrastructure.

3.3.1.1 Study Area Roadways

Middlesex Avenue

Middlesex Avenue runs between Fellsway (Route 28) and Mystic Avenue (Route 38). It is classified as an urban minor arterial roadway and is under local City of Somerville jurisdiction. Middlesex Avenue runs in a generally north/south direction and consists of two travel lanes in the northbound direction and one travel lane in the southbound direction between Mystic Avenue (Route 38) and Foley Street and one travel lane in each direction between Foley Street and Fellsway (Route 28). Exclusive turn lanes are provided at all major intersections. The posted speed limit on the roadway is 30 mph. On-street parking is provided on both sides of the roadway between Foley Street and Fellsway (Route 28), and on the southbound side of the roadway from Foley Street to Mystic Avenue (Route 38). Sidewalks are provided along both sides of the roadway and crosswalks are provided at major intersections. Sharrows are provided along the entire roadway in both directions. Land use along Middlesex Avenue is mainly commercial.

3.3.1.2 Study Area Intersections

Middlesex Avenue at Foley Street

Middlesex Avenue and Foley Street form a three-way signalized intersection. Middlesex Avenue runs north/south and Foley Street intersects from the east. The Middlesex Avenue northbound approach consists of two through lanes and an exclusive right-turn lane, while the southbound approach consists of one through lane and an exclusive left-turn lane. The Foley Street westbound approach consists of an exclusive left-turn lane and exclusive right-turn lane. Sidewalks are provided on both sides of all approaches. Crosswalks are provided across the Foley Street westbound approach and Middlesex Avenue southbound approach. On-street parking is provided on the west side of Middlesex Avenue and the south side of Foley Street. A bike lane is located on the Foley Street eastbound approach. Sharrows are provided on all approaches. Land use around the intersection is commercial.

Mystic Avenue (Route 38) at Middlesex Avenue

Mystic Avenue (Route 38) and Middlesex Avenue form a three-way unsignalized intersection. Mystic Avenue (Route 38) runs one-way northwest-bound and Middlesex Avenue intersects from the north. The approaching lanes and the departing lanes on Middlesex Avenue are divided by a center island approximately 290 feet across with southbound Middlesex Avenue traffic entering Mystic Avenue (Route 38) via a U-turn slip lane. The Mystic Avenue (Route 38) approach consists of three travel lanes. The left lane on Mystic Avenue separates approximately 150 feet past the departing lane of Middlesex Avenue to connect with I-93 Northbound On-Ramp. The Middlesex Avenue departing roadway consists of two travel lanes and the approaching roadway onto Mystic Avenue (Route 38) consists of one travel lane. Sidewalks are provided on the east side of Mystic Avenue (Route 38) and Middlesex Avenue and through the center island that separates the Middlesex Avenue approaching and departing lanes. A crosswalk is provided across the Middlesex Avenue departing lanes. A bus stop for MBTA Route 95 is located approximately 90 feet prior to the Middlesex Avenue departing roadway on Mystic Avenue (Route 38). Land use around the intersection is mostly commercial.

Grand Union Boulevard at Foley Street

Grand Union Boulevard and Foley Street form a four-way signalized intersection. Grand Union Boulevard runs north/south and Foley Street runs east/west. The Grand Union Boulevard northbound and southbound approaches consist of a shared through/right-turn lane and an exclusive left-turn lane. The Foley Street eastbound approach consists of a shared through/left-turn lane and an exclusive right-turn lane, while the westbound approach consists of two general purpose lanes. The intersection was signalized in Fall 2017. Sidewalks are provided along both sides of all approaches. Crosswalks are provided across all approaches. On-street parking is provided on both sides of Grand Union Boulevard. MBTA bus stops for route 90 is located approximately 100 feet south of Foley Street on either side of Grand Union Boulevard. Bike lanes are provided on both sides of Grand Union Boulevard and sharrows are provided on Foley Street. Land use around the intersection is mostly commercial.

Grand Union Boulevard at Revolution Drive

Grand Union Boulevard and Revolution Drive form a four-way signalized intersection. Grand Union Boulevard runs north/south and Revolution Drive runs east/west. The Grand Union Boulevard northbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane, while the southbound approach consists of an exclusive left-turn lane, a through lane, and an exclusive right-turn lane. The Revolution Drive eastbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane, while the westbound approach consists of a left-turn lane, a through lane, and a channelized right-turn lane. Sidewalks are provided along both sides of all approaches. Crosswalks are provided across all approaches. Bike lanes are provided on both sides of Grand Union Boulevard and on

the Revolution Drive eastbound approach. Sharrows are provided on all approaches. Land use around the intersection is mostly commercial.

Mystic Avenue (Route 38) at Revolution Drive

Mystic Avenue (Route 38) and Revolution Drive form a three-way signalized intersection. Mystic Avenue (Route 38) runs one-way northwest-bound and Revolution Drive intersects from the north. The Mystic Avenue northwest-bound approach consists of three through lanes and an exclusive right-turn lane. The Revolution Drive approaching and departing roadways are separated by a median approximately 50 feet wide. The Revolution Drive approaching roadway consists of two exclusive right-turn lanes and the departing roadway consists of two travel lanes. Sidewalks are provided along the northeast side of Mystic Avenue (Route 38), both sides of Revolution Drive, and across the median separating the approaching and departing roadways on Revolution Drive. Crosswalks are provided across the approaching and departing roadways of Revolution Drive. Land use around the intersection is mostly commercial.

Fellsway (Route 28) at Grand Union Boulevard

Fellsway (Route 28) and Grand Union Boulevard form a three-way signalized intersection. Fellsway (Route 28) runs north/south and Grand Union Boulevard intersects from the east. The Fellsway (Route 28) northbound approach consists of three through lanes and a channelized right-turn lane, and the southbound approach consists of three through lanes and two channelized left-turn lanes. The Grand Union Boulevard westbound approach consists of two exclusive left-turn lanes and a channelized right-turn lane. Sidewalks are provided on both sides of all approaches. Crosswalks are provided across the Grand Union Boulevard approach and the Fellsway (Route 28) southbound approach. Land use around the intersection is a mixture of commercial, residential, and recreational.

Fellsway (Route 28) at Middlesex Avenue

Fellsway (Route 28) and Middlesex Avenue form a three-way signalized intersection. Fellsway (Route 28) runs north/south and Middlesex Avenue approaches from the east. The Fellsway (Route 28) northbound approach consists of three through lanes and a channelized right-turn lane, and the southbound approach consists of three through lanes and two channelized left-turn lanes. The Middlesex Avenue westbound approach consists of two exclusive left-turn lanes and a channelized right-turn lane. Sidewalks are provided on both sides of all approaches. Crosswalks are provided across the Middlesex Avenue approach and the Fellsway (Route 28) southbound approach. Land use around the intersection is a mixture of commercial and residential.

Mystic Avenue (Route 38) at Grand Union Boulevard

Mystic Avenue (Route 38), Grand Union Boulevard, and Lombardi Way form a four-way signalized intersection. Mystic Avenue (Route 38) is one-way running northwest-bound, Grand Union Boulevard intersects from the north, and Lombardi

Way intersects from the south. The Mystic Avenue (Route 38) northwest-bound approach consists of an exclusive left-turn, two through lanes, and a shared through/right-turn lane. The Grand Union Boulevard southbound approach consists of one general purpose lane, and the Lombardi Way northbound approach consists of two through lanes and an exclusive left-turn lane. Sidewalks are provided on both sides of all approaches, except the west side of the Lombardi Way approach and the southwest side of the Mystic Avenue (Route 38) northwest-bound approach. Crosswalks are provided across the Mystic Avenue (Route 38) northwest-bound approach and the Grand Union Boulevard southbound approach. Sharrows are provided on Mystic Avenue and Lombardi Way. Land use around the intersections is mostly industrial.

Broadway at Lombardi Way / Mt. Vernon Street

Broadway, Lombardi Way, and Mt. Vernon Street form a four-way signalized intersection. Broadway runs east/west, Lombardi Way intersects from the north, and Mt. Vernon Street intersects from the south. The Broadway eastbound approach consists of an exclusive left-turn lane and a through lane, while the westbound approach is one-way departing the intersection. The Lombardi Way southbound approach consists of an exclusive left-turn lane and an exclusive right-turn lane. The Mt. Vernon Street northbound approach is one-way approaching the intersection and consists of one general purpose lane. Sidewalks are provided on both sides of all approaches, except the west side of the Lombardi Way southbound approach and the north side of Broadway east of the intersection. Crosswalks are provided across all approaches. On-street parking is provided on the west side of the Mt. Vernon Street northbound approach, both sides of the Broadway eastbound approach, and the south side of the Broadway westbound approach. An MBTA bus stop for routes 89, 90, 92, 93, and 101 is located just east of the intersection on the south side of Broadway. Bike lanes are provided on both sides of the Broadway eastbound approach and departing the intersection on the Broadway westbound approach. Sharrows are provided on Lombardi Way. Land use around the intersection is mostly commercial and residential.

Mystic Avenue (Route 38) at I-93 Southbound Off-Ramp U-Turn

Mystic Avenue (Route 38) and the I-93 Southbound Off-Ramp U-Turn form a three-way signalized intersection. Mystic Avenue (Route 38) is one-way westbound and the I-93 Southbound Off-Ramp U-Turn intersects from the south. The Mystic Avenue (Route 38) westbound approach consists of three through lanes and the U-Turn northbound approach consists of two left-turn lanes. Sidewalks are provided on both sides of all approaches and no crosswalks are provided. Land use around the intersection is mostly industrial.

Lombardi Way at I-93 Southbound Off-Ramp

Lombardi Way and the I-93 Southbound Off-Ramp form a three-way signalized intersection. Lombardi Way runs north/south and I-93 Southbound Off-Ramp intersects from the northwest. The Lombardi Way northbound and southbound approaches consist of two through lanes. The I-93 Southbound Off-Ramp consists of

an exclusive left-turn lane and an exclusive right-turn lane. A sidewalk is provided on the east side of Lombardi Way and no crosswalks are provided. Sharrows are provided on Lombardi Way in both directions. Land use around the intersection is mostly industrial.

Mystic Avenue (Route 38) at Wheatland Street / Bailey Road

Mystic Avenue (Route 38), Wheatland Street, and Bailey Road form a four-way signalized intersection. It is part of the larger Route 28 / Route 38 / I-93 interchange. Mystic Avenue (Route 38) runs northwest/southeast, Wheatland Street approaches from the southwest, and Bailey Road approaches from the northeast. The Mystic Avenue (Route 38) northwest-bound and southeast-bound approaches consist of two general purpose lanes. The Wheatland Street northeast-bound approach consists of one general purpose lane, and the Bailey Road southwest-bound approach consists of two general purpose lanes. Bailey Road and Wheatland Street are both one-way approaching the intersection. Sidewalks are provided on both sides of all approaches, except the southeast side of the Bailey Road southwest-bound approach. Crosswalks are provided across the Mystic Avenue (Route 38) southeast-bound approach and the Bailey Road southwest-bound approach. On-street parking is provided on both sides of the Wheatland street northeast-bound approach. An MBTA bus stop for route 95 is located west of Wheatland Street on the southwest corner of the Mystic Avenue (Route 38) southeast-bound approach. Land use around the intersection is a mixture of commercial and residential.

Fellsway / McGrath Highway (Route 28) Southbound at Mystic Avenue (Route 38)

Mystic Avenue (Route 38) and Fellsway / McGrath Highway (Route 28) Southbound form a four-way signalized intersection. It is part of the larger Route 28 / Route 38 / I-93 interchange. Fellsway (Route 28) Southbound is one-way approaching the intersection from the north and McGrath Highway (Route 28) Southbound is one-way departing the intersection to the south. Northbound traffic on Fellsway / McGrath Highway (Route 28) travels through a tunnel below the intersection. Mystic Avenue (Route 38) runs east/west with an approximately 20-foot-wide median. The Fellsway (Route 28) southbound approach consists of three general purpose lanes. The Mystic Avenue (Route 38) eastbound approach consists of a through lane, a shared through-right-turn lane, and an exclusive right-turn lane. The Mystic Avenue (Route 38) westbound approach consists of two through lanes and right-turns are prohibited. Sidewalks are provided on the east side of Fellsway (Route 28) southbound approach, west side of the McGrath Highway southern departing lanes, the south side of Mystic Avenue (Route 38) west of the intersection, and in the median of Mystic Avenue (Route 38) east of the intersection. Crosswalks are provided across the Mystic Avenue (Route 38) westbound approach, the approaching lanes of the Mystic Avenue westbound approach, and across Fellsway / McGrath Highway (Route 28) through the center of the intersection connecting to sidewalks in the median of Mystic Avenue (Route 38). Land use around the intersection is a mixture of commercial and recreational.

McGrath Highway (Route 28) at Broadway

McGrath Highway (Route 28) and Broadway form a four-way signalized intersection. McGrath Highway (Route 28) runs north/south and Broadway runs east/west. All approaches have medians separating the approaching and departing traffic. The McGrath Highway (Route 28) northbound and southbound approaches each consist of an exclusive left-turn lane, two through lanes, and a shared through/right-turn lane. The Broadway eastbound approach consists of an exclusive left-turn lane, a shared through/left-turn lane, two through lanes, and an exclusive right-turn lane. The Broadway westbound approach consists of an exclusive left-turn lane, a shared through/left-turn lane, a through lane, and a channelized right-turn lane. Sidewalks are provided on both sides of all approaches. Crosswalks are provided across all approaches. An MBTA bus stop for routes 89, 89/93, and 101 is located to the west of the intersection on the Broadway eastbound approach. Land use around the intersection is a mixture of commercial, residential, and recreational.

I-93 Southbound On-Ramp at Mystic Avenue U-Turn

The Mystic Avenue U-Turn intersects the I-93 Southbound On-Ramp from the north to form a three-way signalized intersection. It is part of the larger Route 28 / Route 38 / I-93 interchange. The I-93 Southbound On-Ramp is one-way running southeast-bound and the Mystic Avenue U-Turn is one-way running southbound. The I-93 Southbound On-Ramp southeast-bound approach consists of two through lanes and the Mystic Avenue U-Turn southbound approach consists of two left-turn lanes. There are no pedestrian facilities provided at this intersection.

McGrath Highway at Middlesex Avenue

McGrath Highway intersects Middlesex Avenue from the west to form a three-way unsignalized intersection. The Middlesex Avenue northbound and southbound approaches each consist of one general purpose lane. The McGrath Highway eastbound approach consists of one general purpose lane under STOP control. Sidewalks are provided on both sides of Middlesex Avenue and along the north side of McGrath Highway. There are no marked crosswalks provided at the intersection. On-street parking is provided along both sides of Middlesex Avenue and the south side of McGrath Highway. Land use around the intersection is commercial.

Grand Union Boulevard at Great River Road

Great River Road intersects Grand Union Boulevard from the east to form a three-legged roundabout. All three approaches to the roundabout consist of a single general-purpose lane under YIELD control. Sidewalks are provided on both sides of Grand Union Boulevard northbound, Great River Road westbound and along the west side of Grand Union Boulevard southbound. Crosswalks are provided along all three approaches to the roundabout. Land use around the roundabout is primarily commercial.

Grand Union Boulevard at Artisan Way

Artisan Way intersects Grand Union Boulevard from the east and the Assembly Marketplace Driveway intersects from the west to form a four-legged unsignalized intersection. The Assembly Marketplace Driveway eastbound approach consists of single general-purpose lane under STOP control. The Artisan Way westbound approach consists of a shared left-turn/through lane and a right-turn lane under STOP control. The northbound and southbound Grand Union Boulevard approaches each consist of a left-turn lane, shared through/right-turn lane and a bicycle lane. There is on-street parking along both sides of Grand Union Boulevard and along the south side of Artisan Way. Sidewalks are provided on both sides of Grand Union Boulevard and Artisan Way and along the north side of the Assembly Marketplace Driveway. Crosswalks are provided along all four approaches to the intersection. Land use around the roundabout is primarily commercial.

3.3.2 Study Area Traffic Volumes

Traffic volumes the study area roadways and intersections were collected by VHB primarily in November 2019. Peak-period turning movement and classification (TMC) counts were collected at the study area intersections on a typical weekday from 7:00 to 9:00 AM and 4:00 to 6:00 PM, and on a typical Saturday from 11:00 AM to 2:00 PM. These time periods were selected so that the combined peak periods for the roadway and Project Site activity would be evaluated. Additional TMC counts were collected in January and February 2020 for the intersections of Grand Union Boulevard at Great River Road and Artisan Way.

The weekday morning peak period was observed to generally occur from 7:15 AM to 8:15 AM, with the weekday evening peak period generally occurring from 4:30 PM to 5:30 PM, and the Saturday midday peak period observed to occur from 12:00 PM to 1:00 PM.

In addition, VHB conducted automatic traffic (ATR) counts for a continuous 72-hour period, including a typical weekday and Saturday in November 2019. These counts were conducted on Middlesex Avenue, south of the Site. The ATR tubes were ripped up after 24-hours; subsequently an additional 72-hour count was conducted in December 2019. The observed traffic volumes are summarized in Table 3-1.

Table 3-1 Observed Traffic Volume Summary

Location	Weekday							Saturday			
	<u>Daily</u> ^a	<u>Morning Peak Hour</u>			<u>Evening Peak Hour</u>			<u>Daily</u>	<u>Midday Peak Hour</u>		
	Vol.	Vol. ^b	K Factor ^c	Dir. Dist. ^d	Vol.	K Factor	Dir. Dist.	Vol.	Vol.	K Factor	Dir. Dist.
Middlesex Avenue North of Foley Street	10,100	625	6.2%	81% SB	860	8.5%	78% NB	9,300	825	8.9%	51% NB

a average daily traffic volume expressed in vehicles per day.

b peak hour volume expressed in vehicles per hour.

c percent of traffic occurs during the peak hour.

d directional distribution of peak hour traffic.

e Source: VHB; based on automatic recorder counts conducted in December 2019. The December counts were found to be higher and thus, were not seasonally adjusted.

Note: Peak hours do not necessarily coincide with the peak hours of turning movement counts.

As shown in Table 3-1, Middlesex Avenue north of Foley Street carries approximately 10,100 vehicles on a typical weekday with the peak hours accounting for 6.2 percent (morning peak hour) and 8.5 percent (evening peak hour) of the weekday daily traffic flow. On a typical Saturday, Middlesex Avenue north of Mystic Avenue carries approximately 9,300 vehicles with the midday peak hour accounting for 8.9 percent of the Saturday daily traffic flow. Traffic flow along Middlesex Avenue is heavier in the southbound direction during the weekday morning peak hour and heavier in the northbound direction during the weekday evening peak hour and Saturday midday peak hours.

The daily ATR data and peak-period TMC data are included in Appendix C.

Seasonality of Count Data

The traffic data collected for the study area was obtained during November 2019. To quantify the seasonal variation of traffic volumes in the area, historic traffic data available from MassDOT were reviewed. Monthly hourly traffic volumes for 2015¹ were reviewed at MassDOT permanent counting station 8098 located on I-93 in Somerville. Based on the review, traffic volumes in November are slightly higher than average month conditions, while traffic volumes in January and February are lower than average month conditions. To present a conservative analysis, the observed November traffic volumes have not been adjusted downward, and the January/February counts were increased to reflect average month conditions. The seasonal adjustment factors are included in Appendix C.

¹ The most recent year of complete data available.

Traffic Growth

Historic traffic data in the vicinity of the Project Site was reviewed to determine an appropriate growth rate. Previous traffic studies conducted in the City of Somerville and historic count data was reviewed. Based on this research, a growth rate of 1.0-percent was determined to be appropriate for this study. Accordingly, the observed 2019 traffic counts were increased by 1.0-percent to reflect 2020 existing conditions.

The resulting 2020 Existing Conditions weekday morning, weekday evening, and Saturday midday peak hour traffic volumes are shown in Figures 3.4, 3.5, and 3.6, respectively. The observed peak hour pedestrian and bicycle volumes are provided in Appendix C.

3.3.3 Public Transportation

The study area is currently served by two MBTA bus routes within 0.5 miles of the Project Site. The area is serviced by MBTA Bus Routes 90 and 95. There are eighteen additional MBTA bus routes with stops within 0.75 miles of the Site. In addition, the Site is served by the Orange Line of the MBTA with Assembly Station located approximately less than 2,000 feet from the Site. Descriptions of each transit service are provided below and a public transit map is shown in Figure 3.7.

- › Bus Route 90 travels between Wellington Station and Davis Square via Assembly Square Mall, Sullivan Square, and Highland Avenue. The nearest stop to the Site is on Grand Union Boulevard adjacent to the Site, at Foley Street. During peak periods, Bus Route 90 has a frequency of approximately 30-50 minutes.
- › Bus Route 95 travels between Sullivan Square and West Medford via Mystic Avenue and Medford Square. The nearest stop to the Site is on Mystic Avenue (Route 38) adjacent to the Site, at Kensington Avenue. During peak periods, Bus Route 95 has a frequency of approximately 10-40 minutes.
- › Assembly Station on the Orange Line of the MBTA is approximately 800 feet east of the Site via Revolution Drive or Foley Street. The Orange Line travels from Oak Grove in the north to Forest Hills in the south and serves the cities of Malden, Medford, and Somerville, as well as the Boston neighborhoods of Charlestown, Downtown, Chinatown, Back Bay, South End, Roxbury, and Jamaica Plain. The Orange Line runs approximately every six minutes during peak periods. Assembly Station opened in 2014.

Additional transit service is available within the study area beyond the 0.5 miles range discussed above. Additional stops on the Orange Line are located at Sullivan Square Station (located approximately 0.6 miles south of the Site) and Wellington (located approximately one mile north of the Site). Both Sullivan Square Station and Wellington Station are local transit hubs and provide connections to several additional MBTA bus routes.

3.3.4 Vehicle Crash Analysis

A detailed crash analysis was conducted to identify potential vehicle accident trends and/or roadway deficiencies in the traffic study area. The most current vehicle accident data for the traffic study area intersections were obtained from MassDOT for the years 2013 to 2017. The MassDOT database is comprised of crash data from the Massachusetts Registry of Motor Vehicles (RMV) Division primarily for use in traffic studies and safety evaluations. Data files are provided for an entire city or town for an entire year, though it is possible that some crash records may be omitted either due to individual crashes not being reported, or the city crash records not being provided in a compatible format for the RMV use. A summary of the study intersections vehicle accident history based on the available RMV data is presented in Table 3-2 and the detailed crash data is provided in Appendix C.

Crash rates are calculated based on the number of accidents at an intersection and the volume of traffic traveling through that intersection on a daily basis. Rates that exceed MassDOT's average for accidents at intersections in the district in which the town or city is located could indicate safety or geometric issues for a particular intersection. For our study area, the calculated crash rates were compared to MassDOT's District 4 average, as Somerville and Medford are located in District 4. In District 4, the average crash rate is 0.73 for signalized intersections and 0.57 for unsignalized intersections. These rates imply that, on average, 0.73 accidents occurred per million vehicles entering signalized intersections throughout District 4, and 0.57 accidents occurred per million vehicles entering unsignalized intersections in District 4. It should be noted that the location for some accidents cannot be precisely determined from the database. These locations typically involve interchange intersections. Additionally, some accidents may have occurred but were either not reported or not included in the database, and therefore not considered.

The following tables present the number of crashes, crash characteristics, as well as the crash rate for each of the study area intersections. Table 3-2 presents the crash data for the study area intersections. It should be noted that the intersection of I-93 Southbound On-Ramp at Mystic Avenue U-Turn was constructed in Fall 2017 and therefore is not included in the vehicular crash summary. Detailed crash data is provided in Appendix C.

Table 3-2 Vehicular Crash Summary (2013-2017)

	Middlesex Avenue at Foley Street	Mystic Avenue at Middlesex Avenue	Mystic Avenue at Revolution Drive	Grand Union Boulevard at Foley Street	Grand Union Boulevard at Revolution Drive	Fellsway at Grand Union Boulevard	Fellsway at Middlesex Avenue	Mystic Avenue at Grand Union Boulevard	Broadway at Lombardi / Mount Vernon	I-93 SB Off-Ramp at Lombardi
Signalized?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MassDOT Average Crash Rate	0.73	0.57	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Calculated Crash Rate	0.36	0.15	0.10	0.46	0.19	0.10	0.19	0.48	0.49	0.04
Exceeds Average?	No	No	No	No	No	No	No	No	No	No
Year										
2013	1	2	2	0	1	0	3	4	5	1
2014	3	0	0	2	2	3	5	3	3	0
2015	3	0	0	3	1	0	1	4	2	0
2016	0	2	3	4	1	3	3	5	3	0
2017	0	3	0	2	1	2	2	8	1	0
Total	7	7	5	11	6	8	14	24	14	1
Collision Type										
Angle	4	3	0	8	3	3	5	11	7	0
Head-on	1	0	1	0	0	0	1	1	0	0
Rear-end	1	2	4	1	2	3	4	7	1	0
Rear-to-rear	0	0	0	0	0	0	0	0	0	0
Sideswipe, same direction	0	0	0	0	0	0	1	3	1	0
Sideswipe, opposite direction	0	0	0	0	0	0	0	0	0	0
Single Vehicle Crash	1	1	0	1	1	2	3	2	3	0
Not reported	0	1	0	1	0	0	0	0	2	1
Severity										
Fatal Injury	0	0	0	0	0	0	0	0	0	0
Non-Fatal Injury	1	1	2	3	1	4	5	4	6	0
Property Damage Only	3	6	2	8	4	3	7	19	7	1
Not Reported	3	0	1	0	1	1	2	1	1	0
Time of day										
Weekday ,7:00 AM - 9:00 AM	0	1	0	0	0	0	0	4	2	0
Weekday, 4:00 – 6:00 PM	0	0	1	1	0	1	4	3	0	0
Saturday 11:00 AM – 2:00 PM	2	1	0	1	0	0	0	0	0	0
Weekday, other time	3	1	2	4	6	5	8	12	11	1
Weekend, other time	2	4	2	5	0	2	2	5	1	0
Pavement Conditions										
Dry	6	6	3	7	6	7	11	18	10	0
Wet	1	1	2	2	0	0	3	5	3	0
Snow/Ice	0	0	0	0	0	1	0	0	1	1
Slush	0	0	0	1	0	0	0	0	0	0
Not reported	0	0	0	1	0	0	0	1	0	0
Non-Motorist (Bike, Pedestrian)	0	0	0	1	0	0	1	1	3	0

Source: Crash data was obtained from MassDOT Crash Portal, accessed January 2020.

Table 3-2 Vehicular Crash Summary (2013-2017)

	Mystic Avenue at Wheatland Street	Fellsway / McGrath Hwy (Rt. 28) SB at Bailey Road (Rt. 38) / I-93 SB On-Ramp	Fellsway / McGrath Hwy (Rt. 28) SB at Mystic Avenue (Rt. 38)	Mystic Avenue (Rt. 38) at McGrath Hwy (Rt. 28) NB Off-Ramp	Broadway at McGrath Highway	Middlesex Avenue at McGrath Highway	Grand Union Boulevard at Great River Road	Grand Union Boulevard at Artisan Way
Signalized?	Yes	Yes	Yes	Yes	Yes	Yes	No	No
MassDOT Average Crash Rate	0.73	0.73	0.73	0.73	0.73	0.73	0.57	0.57
Calculated Crash Rate	0.45	0.70	1.44	0.43	0.66	0.38	0.43	0.20
Exceeds Average?	No	No	Yes	No	No	No	No	No
Year								
2013	4	3	15	1	16	0	0	0
2014	3	7	7	2	12	1	1	0
2015	3	4	7	4	14	2	2	1
2016	4	19	18	4	9	2	3	2
2017	<u>2</u>	<u>5</u>	<u>31</u>	<u>4</u>	<u>8</u>	<u>1</u>	<u>3</u>	<u>1</u>
Total	16	38	78	15	59	6	9	4
Collision Type								
Angle	4	17	38	1	12	1	1	2
Head-on	0	0	0	0	0	1	0	0
Rear-end	6	11	24	9	31	2	4	1
Rear-to-rear	0	0	0	1	0	0	0	0
Sideswipe, same direction	5	5	14	1	5	0	0	0
Sideswipe, opposite direction	0	0	1	1	1	1	0	0
Single Vehicle Crash	1	5	1	2	9	1	3	1
Not reported	0	0	0	0	1	0	1	0
Severity								
Fatal Injury	0	1	0	0	0	0	0	0
Non-Fatal Injury	3	11	21	7	21	2	2	2
Property Damage Only	12	26	56	8	37	4	6	1
Not Reported	1	0	1	0	1	0	1	1
Time of day								
Weekday ,7:00 AM - 9:00 AM	1	4	4	0	5	0	1	0
Weekday, 4:00 – 6:00 PM	0	3	5	1	5	1	1	0
Saturday 11:00 AM – 2:00 PM	1	0	1	0	0	1	1	0
Weekday, other time	9	21	51	10	40	3	2	2
Weekend, other time	5	10	18	4	9	1	4	2
Pavement Conditions								
Dry	14	30	66	13	44	5	8	2
Wet	2	7	12	2	13	1	0	1
Snow	0	0	0	0	2	0	0	1
Ice	0	0	0	0	0	0	0	0
Slush	0	1	0	0	0	0	0	0
Not reported	0	0	0	0	0	0	1	0
Non-Motorist (Bike, Pedestrian)	0	3	2	0	7	0	1	1

Source: Crash data was obtained from MassDOT Crash Portal, accessed January 2020.

As shown in Table 3-2, review of the accident data indicates that one of the Somerville study area intersections is above the district crash rate averages: the intersection of Fellsway / McGrath Highway (Route 28) SB at Mystic Avenue (Route 38), which had 78 reported crashes over the five-year period.

The majority of crashes throughout the study area were angle crashes and rear-end crashes occurring on dry pavement resulting in property damage only. It should be noted that one fatal accident was indicated in the study area at the intersection of Fellsway / McGrath Highway (Route 28) SB at Baily Road. In addition, nine of the study area intersections had at least one crash occur during the five-year period that involved a bicyclist or a pedestrian. The intersection of McGrath Highway (Route 28) at Broadway had over five reported crashes that involved a bicyclist or a pedestrian over the five-year period.

Highway Safety Improvement Program

In addition to calculating the crash rate, study area intersections should also be reviewed in the MassDOT's Highway Safety Improvement Program (HSIP) database. An HSIP-eligible cluster is one in which the total number of "equivalent property damage only"² crashes in the area is within the top five percent of all clusters in that region. Being HSIP-eligible makes the location eligible for FHWA and MassDOT funds to address the identified safety issues at these locations.

As part of this effort, VHB reviewed this database and found that the following intersections are listed under the following HSIP-eligible clusters:

2014-2016 HSIP Cluster

- › Fellsway / McGrath Highway (Route 28) Southbound at Mystic Avenue (Route 38)
- › McGrath Highway (Route 28) at Broadway

2007-2016 HSIP Pedestrian Cluster

- › McGrath Highway (Route 28) at Broadway

While multiple locations have been identified as being HSIP locations, all of these study area intersections have been subject to recent Roadway Safety Audits (RSA) conducted by MassDOT. Specifically, an RSA was conducted (dated February 1, 2017) to evaluate conditions at the Route 28/Mystic Avenue interchange, and Route 28 at Broadway in Somerville. Prior to that effort, the Route 28/Mystic Avenue interchange also was studied as part of a September 30, 2015 RSA.

2 Equivalent property damage only" is a method of combining the number of crashes with the severity of the crashes based on a weighted scale. Crashes involving property damage only are reported at a minimal level of importance, while collisions involving personal injury (or fatalities) are weighted more heavily.

Additionally, MassDOT is now undertaking the design of planned improvements at the Route 28/Mystic Avenue interchange. These measures are currently in the planning/early design stage but are expected to focus primarily on signal improvements and pedestrian and bicycle enhancements.

3.4 Future Conditions Analysis

Traffic volumes in the study area were projected to a seven-year traffic-planning horizon. Independent of the Project, volumes on the roadway network under the future No-Build conditions were assumed to include existing traffic and new traffic resulting from background traffic growth. Under the Build condition, Project generated traffic volumes were added to the No-Build volumes to reflect the Build conditions within the Project study area.

3.4.1 2027 No-Build Conditions

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in local and regional demographics. A frequently used procedure is to estimate the historical annual percentage increase in traffic volumes and apply that increase to the study-area traffic volumes. An alternative procedure involves the estimation of traffic generated by specific planned major developments that would be expected to affect traffic volumes on the study area roadways. For the purpose of this assessment, *both* methods were utilized to present a conservative assessment.

Historic Traffic Growth

Historic traffic data in the vicinity of the Project Site was reviewed to determine an appropriate growth rate. Previous traffic studies conducted in the City of Somerville and historic count data was reviewed. Based on this research, a growth rate of 1.0-percent was determined to be appropriate for this study.

Site Specific Growth

In addition to accounting for background growth, the traffic associated with other planned/approved developments near the Site was considered. Based on a review of recent traffic studies conducted in the area and discussions with the City of Somerville, there are two planned/approved developments within the vicinity of the study area that were considered as part of the background development.

- › **XMBLY** – The project includes a phased construction over an extended period, located between Middlesex Avenue, Foley Street, Grand Union Boulevard and Revolution Drive. The full build-out includes approximately 489 residential units, 612,500 sf of office space, 335,500 sf of research & development/lab space, 27,140 sf of retail/restaurant space, and a new 16,000 SF fire station for the City of Somerville.

Assembly Row (Full Build Out) – To the east of the Project Site is Assembly Row, a large, multi-phased, mixed-use development owned by Federal Realty Investment Trust. Once fully built-out, Assembly Row will consist of approximately 1,843 residential units, 170 hotel rooms, 2,801,333 SF of office, 527,024 SF of retail, a 12-screen cinema, and a 50,000 SF health club. Full build-out of the project site is expected to take 10-15 years total with several phases already completed or under construction. Currently, approximately 1,017 residential units, 875,807 SF of office, 397,582 SF of retail, a 12-screen cinema, a 158-room hotel, and a 50,000 SF health club has been completed and tenanted in Blocks 1-4, 5A, 6, 10 and 11 (Partners Healthcare). The entirety of Assembly Row is expected to be opened and operational by 2024. The traffic expected to be generated by the phases that were not yet completed and operational at the time of the existing traffic counts in 2019 have been identified and included in the No-Build and Build condition analyses.

Projected traffic volumes expected to be generated by these projects were obtained from the published traffic studies submitted as part of the permitting processes. The projected Site-generated traffic tracings are included in Appendix C.

Roadway Improvements

In assessing future traffic conditions, proposed roadway improvements within the study area were considered. Based on research by VHB and discussions with the City of Somerville, the following projects may affect traffic volumes within the seven-year horizon:

- › **Route I-93/Route 28/Mystic Avenue interchange** – Following recent roadway safety audits at this location, MassDOT is now undertaking the design of planned improvements at this location. These measures are currently in the planning / early design stage but are expected to focus primarily on signal improvements and pedestrian and bicycle enhancements. As there currently are no known changes planned to the overall operation of the interchange for automobile traffic, the future conditions analysis did not incorporate any planned operational changes.
- › **Mystic River Footbridge** – In the initial design stage is a 780-foot bridge across the Mystic River to link the Encore Casino with Assembly Square and the Orange Line. The footbridge will be open to pedestrians and bicyclists only and will connect recreational paths on both sides of the Mystic River. A second bridge will be required over the Orange Line train tracks to complete the connection between Assembly Square and the Encore Casino. It should be noted that this project is currently securing funding sources and therefore is mentioned for reference purpose only. No credit was taken for potential vehicle trip reductions.
- › **Xmbly Signal Improvements** – As part of the Xmbly project, the Proponent has proposed to install an adaptive traffic signal system at the following ten intersections. Transit Signal Priority (TSP) will be installed at the first four locations:

- Mystic Avenue (Route 38) at I-93 Southbound Off-Ramp U-Turn;
- Mystic Avenue (Route 38) at Grand Union Boulevard / Lombardi Way;
- Lombardi Way at I-93 Southbound Off-Ramp;
- Broadway at Lombardi Way / Mt. Vernon Street;
- Fellsway (Route 28) at Grand Union Boulevard;
- Fellsway (Route 28) at Middlesex Avenue;
- Middlesex Avenue at Foley Street;
- Grand Union Boulevard at Foley Street;
- Grand Union Boulevard at Revolution Drive; and
- Mystic Avenue (Route 38) at Revolution Drive.

Each of these locations is already signalized under existing conditions. However, installing the updated adaptive signal equipment will allow these signals to operate in a more flexible, adaptive manner responding to actual traffic conditions continuously on a cycle-by-cycle basis. The benefits of this improvement are difficult to quantify, as the Synchro© software used for the signalized capacity analysis is not capable of modeling adaptive control. The software considers a fixed signal cycle length within a standard coordinated system, but an adaptive system will have variable cycle lengths throughout any given hour. Because of that, it is not possible to accurately model these improvements. Previous comparisons of an existing operating adaptive signal system indicate delays can be roughly 10-percent less than that which would be expected with a standard coordinated signal system. .

The roadway improvement projects listed above were incorporated into the No-Build and Build conditions traffic analyses as stated.

Public Transportation Improvements

In addition to planned roadway improvement projects in the vicinity of the project Site, planned public transportation improvement projects were reviewed as well. Based on research by VHB, it was determined that one public transportation project is planned in the area; the extension of the MBTA's Green Line.

- › **Green Line Extension** – In early 2017, the Federal Transit Administration granted final approvals for the 4.3-mile extension of the MBTA's Green Line light rail from its current terminus at Lechmere Station in Cambridge into Somerville and Medford. The extension will have two branches: a 0.9-mile southerly branch that will terminate near Somerville's Union Square, and a 3.4-mile northerly branch that will parallel the Lowell Line of the commuter rail through Somerville and will terminate at College Avenue in Medford. The Green Line extension is expected to be completed in 2021 and will include seven new stations (including a rebuilt Lechmere Station). The nearest stations to the project Site will be East

Somerville Station and Gilman Square Station, both approximately one-mile south/southwest of the Project Site.

It should be noted that the Green Line extension project is mentioned for reference purposes only and is not factored into the future traffic analyses.

- › **Orange Line Capacity Improvements** – The MBTA has indicated that the Orange Line fleet will be entirely replaced with modern, more efficient vehicles by the year 2022. This will increase capacity during peak periods due to increased frequencies, from 6 minutes to 4.5 minutes, associated with the entry of the new vehicles into service.³

No-Build Traffic Volumes

The 2027 No-Build traffic volumes were developed by applying the 1.0 percent annual growth rate over the seven-year study horizon to the 2020 Existing Conditions traffic volumes and adding the traffic volumes associated with the site-specific background projects noted previously. Figures 3.8, 3.9, and 3.10 show the respective 2027 No-Build peak hour traffic volumes.

3.4.2 Trip Generation

The Project is comprised of office/R&D/lab, and retail/restaurant use, as described previously. The rate at which any development generates traffic is dependent upon a number of factors such as size, location, and concentration of surrounding developments. The Trip Generation Manual⁴ published by the Institute of Transportation Engineers (ITE) categorizes these land uses and provides weekday daily, weekday morning, weekday evening, Saturday daily and midday peak hour unadjusted vehicle trip generation estimates for each use. For the Project, the trip generation estimates for the planned uses were projected using LUC 710 (General Office Building) and LUC 820 (Shopping Center). The resulting overall Project trip generation was compared to that associated with the existing uses on the Site, with the additional traffic compared that to condition being added to the study area roadway network.

Table 3-3 summarizes the Project-related trips generated by the existing uses within the Project Site, as previously presented in the Assembly's Edge PUD-PMP Transportation Chapter.

³ MBTA, "Integrated Fleet and Facilities Plan (IFFP), Part Two: Heavy Rail – Red, Orange, and Blue Lines," November 20, 2017. The MBTA IFFP estimates that the new cars and infrastructure investments will provide an opportunity for an increase in capacity up to 40%.

⁴ Trip Generation Manual (10th Edition), Institute of Transportation Engineers, Washington D.C., 2017.

Table 3-3 Existing Site Trip Generation

	Existing Coffee Shop Trips	Existing Restaurant Trips	Total Existing Observed Site Generated Trips
Weekday Morning			
Enter	86	0	86
Exit	<u>84</u>	<u>0</u>	<u>84</u>
Total	170	0	170
Weekday Evening			
Enter	17	7	24
Exit	<u>18</u>	<u>8</u>	<u>26</u>
Total	35	15	50
Saturday Midday			
Enter	23	6	29
Exit	<u>23</u>	<u>5</u>	<u>28</u>
Total	46	11	57

Source: Assembly's Edge PUD-PMP Transportation Chapter and Appendix; October 20, 2017.

As shown in Table 3-3, the existing trip generation for the Project Site is approximately 170 vehicles trips (86 entering / 84 exiting) during the weekday morning peak hour, 50 vehicle trips (24 entering / 26 exiting) during the weekday evening peak hour, and 57 trips (29 entering / 28 exiting) during the Saturday midday peak period.

Since the existing Dunkin Donuts coffee shop will remain as part of the Project, only credit for the existing Sunrise restaurant will be taken from the future trip generation.

Following the documentation of the existing trip generation as shown in Table 3-3, trip generation was estimated for the full redevelopment of the Project Site. The methodology used and results of this analysis are discussed in detail in the following sections.

Proposed Project-Generated Traffic

The proposed transit-oriented development will consist of a mixture of office/R&D/lab and supporting ground floor retail/restaurant/active uses. As noted above, traffic associated with the office/lab space was estimated using ITE LUC 710 (General Office Building) trip generation data. The retail uses are expected to be small, service-oriented businesses. While exact tenants have not yet been secured, these are not expected to be large destination-retail uses. Instead, potential uses will include small eating establishments, coffee shops, or gallery uses. While these do not fit the description of a transitional ITE "Shopping Center," retail traffic was estimated using this land use code (LUC 820), which results in an overly

conservative analysis. Given that the existing Dunkin Donuts (Coffee Shop) is remaining on the proposed Project Site, the proposed retail square footage has the existing Dunkin Donuts removed. The overall unadjusted vehicle trip estimates for the Project are presented in Table 3-4.

Table 3-4 Project Trip Generation – Unadjusted Vehicle Trips

	Office ^a	Retail/ Restaurant ^b	Total Unadjusted Vehicle Trips
Weekday Daily			
Enter	2,400	474	2,874
<u>Exit</u>	<u>2,400</u>	<u>474</u>	<u>2,874</u>
Total	4,800	948	5,748
Weekday Morning			
Enter	406	15	421
<u>Exit</u>	<u>66</u>	<u>9</u>	<u>75</u>
Total	472	24	496
Weekday Evening			
Enter	80	46	126
<u>Exit</u>	<u>419</u>	<u>50</u>	<u>469</u>
Total	499	96	595
Saturday Daily			
Enter	524	579	1,103
<u>Exit</u>	<u>524</u>	<u>579</u>	<u>1,103</u>
Total	1,048	1,158	2,206
Saturday Midday			
Enter	136	59	195
<u>Exit</u>	<u>116</u>	<u>54</u>	<u>170</u>
Total	252	113	365

a Based on ITE LUC 710 (General Office Building), assumes 474,000 sf of office space.

d Based on ITE LUC 820 (Shopping Center), assumes 27,000 sf of retail/restaurant space.

The values shown in Table 3-4 are the base unadjusted vehicle-trip estimates prior to the necessary adjustments for internal trip sharing, mode-splits, and other factors. The details of how these subsequent adjustments were made by each step are discussed in the following sections.

Person Trips

The unadjusted vehicle trips calculated using the ITE data were subsequently converted into person trips by applying national data⁵ for vehicle-occupancy rates

5 [Summary of Travel Trends – National Household Travel Survey](#); USDOT Federal Highway Administration (Washington, DC) 2017.

for a variety of uses. This was done so that the national ITE-based data also would be converted to person trips using national data for consistency.

Internal Capture Trips

As described in the ITE Trip Generation Handbook "because of the complementary nature of these land uses, some trips are made among the on-site uses. This capture of trips internal to the site has the net effect of reducing vehicle trip generation between the overall development site and the external street system (compared to the total number of trips generated by comparable land uses developed individually on stand-alone sites)...an internal capture rate can generally be defined as the percentage of total person trips generated by a site that are made entirely within the site. The trip origin, destination, and travel path are all within the site."

Based on the methodology outlined in the ITE Trip Generation Handbook, internal capture rates were applied to the gross person trips. The resulting peak-hour person trip estimates for the Project and are presented in Table 3-5.

Table 3-5 Project Peak-Hour Person Trips

	Office ^a	Retail ^a	Total Person Trips
Weekday Morning			
Enter	454	18	472
<u>Exit</u>	<u>66</u>	<u>11</u>	<u>77</u>
Total	520	29	549
Weekday Evening			
Enter	88	75	163
<u>Exit</u>	<u>466</u>	<u>87</u>	<u>553</u>
Total	554	162	716
Saturday Midday			
Enter	152	97	249
<u>Exit</u>	<u>123</u>	<u>94</u>	<u>217</u>
Total	275	191	466

^a Person trip generation estimate with internal capture credits applied.

Mode Share

The mode shares used for this evaluated were developed considering multiple sources. These include a traffic study⁶ for a prior development proposal on the

⁶ The Office and Research Center + The Residences at Assembly (Chapter 3 – Transportation) Design Consultants, Inc. (Somerville, Massachusetts), September 30, 2016.

Project Site, and data from the Notice of Project Change (NPC)⁷ prepared for the Partner's office development within Assembly Square. Mode shares presented as part of the nearby North Point development also were considered due to the similarities in some components of that project. The resulting anticipated mode splits are presented in Table 3-6.

Table 3-6 Mode Share

Use	Vehicle	Transit	Bike/Walk
Office/Research & Development	65%	30%	5%
Retail/Restaurant	71.7%	20%	8.3%

Source: Based on hybrid of mode shares used in Partners Health Care Study PNF (2014), Certified NorthPoint TIS (with data from Kendall Square K2 City of Cambridge, "Hotel Parking and Transportation Demand Management Reports – City of Cambridge", Assembly Edge PUD-PMP (2017), and US Census data.

The mode shares presented in Table 3-6 are based on the current condition within the study area. As described in detail in the Mobility Management Plan (MMP), the Site is expected to attain vehicle mode shares under 50 percent through Transportation Demand Management (TDM) measures.

The mode shares discussed above were applied to the net-new person trips to generate the adjusted Project trips by mode. The local average vehicle occupancy based on US Census data for each primary use then was applied to the vehicle mode to reflect the number of vehicle trips generated by the Site.

Pass-By Trips

While the ITE rates provide estimates for all the traffic associated with each land use, not all of the traffic generated by the Project will be new to the area roadways. For example, a portion of the vehicle-trips generated by the retail land use will likely be drawn from the traffic volume roadways adjacent to the Project Site. For example, someone traveling on Middlesex Avenue may choose to deviate from their original travel path to visit the site retail, before heading back to continue to their final destination. For this evaluation, ITE pass-by rates for LUC 820 (Shopping Center) were utilized for the retail trip generation and applied to existing trips on Middlesex Avenue. Specifically, 34- and 26-percent of the Site trip generation was assumed to be drawn from the surrounding roadway network during the weekday evening and Saturday midday peak hours, respectively. For all other time periods studied, a 25-percent pass-by rate was assumed.

⁷ Assembly Row Revised Program for Partners Healthcare Site – Notice of Project Change; VHB, Watertown, Massachusetts (May 15, 2014).

Project-Generated Trips

The mode share and local average vehicle occupancy were applied to the person trips to estimate net new trips by mode, and then the pass-by adjustments noted above were applied to the vehicle trips generated by the retail portion of the Site. Tables 3-7 and 3-8 summarize the net new trips by mode and net new vehicle trips by use, respectively.

Table 3-7 Project-Generated Peak-Hour Trips by Mode

	Bike/Walk	Transit	Vehicle ^a
Weekday Morning			
Enter	24	140	256
<u>Exit</u>	<u>4</u>	<u>22</u>	<u>39</u>
Total	28	162	295
Weekday Evening			
Enter	10	41	67
<u>Exit</u>	<u>30</u>	<u>157</u>	<u>281</u>
Total	40	198	348
Saturday Midday			
Enter	16	65	113
<u>Exit</u>	<u>14</u>	<u>56</u>	<u>96</u>
Total	30	121	209

a Total development vehicle trips (including pass-by trips associated with the retail portion). No credit taken for existing Site trips.

As shown in Table 3-7, the Project is expected to generate between 209 and 348 total vehicle trips during the peak hours studied (including trips generated by the existing Site uses). The breakdown of these trips by use are summarized below in Table 3-8.

Table 3-8 Project-Generated Peak-Hour Vehicle Trips by Use ^a

	Office	Retail	-Pass-By ^b	Total Trips	-Existing Trips	=Total Net Vehicle Trips
Weekday Morning						
Enter	250	7	1	256	0	256
<u>Exit</u>	<u>36</u>	<u>4</u>	<u>1</u>	<u>39</u>	<u>0</u>	<u>39</u>
Total	386	11	2	295	0	295
Weekday Evening						
Enter	48	30	11	67	7	60
<u>Exit</u>	<u>257</u>	<u>35</u>	<u>11</u>	<u>281</u>	<u>8</u>	<u>273</u>
Total	305	65	22	348	15	333
Saturday Midday						
Enter	84	39	10	113	6	107
<u>Exit</u>	<u>68</u>	<u>38</u>	<u>10</u>	<u>96</u>	<u>5</u>	<u>91</u>
Total	152	77	20	209	11	198

a New vehicle trips with internal capture credits applied.

b Pass-by credits of 25%, 34%, and 26% applied to weekday morning, weekday evening, and Saturday midday peak hour retail trip generation, respectively.

As shown in Table 3-8, the Project is expected to generate a total 295, 348, and 209 vehicle trips during the respective weekday morning, weekday evening, and Saturday midday peak hours. However, these totals include traffic already being generated by the existing Sunrise restaurant under existing conditions (as shown in Table 3-4). After considering this existing traffic generation, the Project will result in an additional 295, 333, and 144 vehicle trips compared to existing conditions during the weekday morning, weekday evening, and Saturday midday peak hours, respectively. This additional traffic was assigned to the study area roadways and intersections based on trip distribution patterns developed as discussed in the following section.

3.4.3 Trip Distribution and Assignment

The directional distribution of traffic approaching and departing the Project is a function of several variables. These include the population densities, shopping opportunities, competing uses, existing travel patterns, and the efficiency of the roadways leading to the Site.

As the project is primarily comprised of office/research & development/lab space, the trip distribution patterns were determined using journey-to-work census data for the City of Somerville. The assignment of site-generated traffic to specific travel routes was based on observed traffic flow conditions on available routes, and the assumption that most motorists will seek the fastest and most direct routes to and from the site.

Table 3-9 summarizes the resulting trip distribution patterns for the Project. The trip distribution patterns for proposed project are shown in Figure 3.11.

Table 3-9 Vehicle Trip Distribution Summary

Route	Direction	Commercial Trip Distribution
I-93	north	18%
I-93	south	15%
Route 28	north	11%
Route 28	south	21%
Broadway	north	17%
Mystic Avenue	north	6%
<u>Mystic Avenue</u>	<u>south</u>	<u>12%</u>
Total	--	100%

The future 2027 Build traffic volumes were developed by adding the additional Project-generated traffic volumes (as compared to existing conditions) to the 2027 No-Build conditions peak-hour traffic volumes. Figures 3.12, 3.13, and 3.14 show the resulting 2027 Build Conditions weekday morning, weekday evening, and Saturday midday peak hour traffic volumes, respectively.

3.5 Parking Demand and Supply

Evaluating the adequacy of a development's parking supply normally involves comparing the expected demand to the proposed supply. Estimating the parking demand associated with each individual use within a transit-oriented mixed-use development also requires the evaluation of transit, walking, biking, and internal trip sharing. The resulting parking demand then can be compared to the proposed parking supply. With this approach there is an underlying assumption that there are no limitations to parking availability and that anyone wishing to park can freely do so. If the availability of parking is not restricted to some degree, then a site will not truly function as a transit-oriented development. Instead, it only will be a project that happens to have nearby public transportation available as one possible travel option.

As part of the proposed Site design, the amount and specific location of parking supply was carefully evaluated. This was done to help ensure that sufficient parking would be available for the normal operation of the Site, while not providing excessive parking which might reduce incentive for using other means of travel.

The following section summarizes the parking supply proposed for the Project Site.

3.5.1 Proposed Parking Supply

Parking for the Site will be accommodated through structured below-grade parking and on-street parking. The street parking is likely to be used primarily by visitors to retail/restaurant uses within the Site. Currently, along the Site frontage, on-street parking is angled parking along the west side of Middlesex Avenue and parallel parking along the east side Middlesex Avenue. The parking spaces along Middlesex Avenue along the Project Site frontage are free along the west side of the roadway and metered along the east side of the roadway. The cost for the metered spaces currently is \$1.25 per hour/\$0.25 per twelve minutes, with a two-hour time limit during the Monday-Saturday (8:00 AM-8:00 PM) metered operation of these spaces. The City of Somerville is currently redesigning Middlesex Avenue, with plans for implementation of the redesign in 2021. The proposed conceptual design for Middlesex Avenue provides bicycle lanes along both sides of the roadway and replaces the angled parking along the west side with parallel parking.

As noted above, the overwhelming majority of parking provided will be in a structured, multi-level garage below the building, with up to 350 spaces being provided. A full-access driveway to this garage will be provided on McGrath Highway.

The parking facility will be controlled through gating, ticketing, reader cards or other means. This will help ensure that the parking is strictly used by the Project, and not for parking for the MBTA or other nearby developments. The ability of this proposed parking supply to accommodate the anticipated Project parking demand is discussed in the following section.

3.5.2 Parking Demand

The potential parking demand for the Project was estimated based on standard ITE⁸ parking generation data for office and retail uses. Even considering the varying peak periods, shared parking, and other factors, the average calculated parking demand for the Project exceeds the proposed supply. This proposed parking supply is appropriately limited to help promote travel to the Site other means besides automobile. The following sections discuss how the office/research & development, residential, and retail/restaurant demand effectively will be managed to help reduce the Project parking needs.

Time-of-Day Considerations

As with any office-oriented development, the peak period for the parking demand will occur midday on a weekday. While the Project includes a retail/restaurant

8 Parking Generation, 4th Edition, Institute of Transportation Engineers, Washington, D.C., 2010.

component, only 27,000 SF of building space is proposed for those uses, which are likely to be heavily oriented to shared business with Site workers.

Public Transportation/Biking/Walking

The parking needs for the Project will be lessened due to the nearby availability of public bus service and the MBTA Assembly Orange Line Station. Amenities associated with the Project also will promote bicycle and pedestrian travel. The ongoing trend of less reliance on private automobile ownership is the result of increased transit usage, and recently improved accommodations for bicycle and pedestrian travel throughout the Assembly Square District. Alternate means of travel, such as taxi, private ride services (Uber, Lyft, and others) should continue to reduce the parking needs for this area. There also will be internal trip-sharing between the uses within the Project Site. As an example, some employees of the office components of the Project Site may choose to walk to the various on-site retail uses that will be available. Accordingly, there would not be any additional parking activity associated with that type of activity.

3.6 Access and Circulation

The Project Site has excellent vehicular access and visibility from I-93, and is well positioned along Middlesex Avenue, which serves as the major entry point to the to the ASMD. To avoid traffic conflicts on Middlesex Avenue, the primary point of vehicular access will be along McGrath Highway, providing access to on-site below-grade vehicle parking, and service and loading areas. Additionally, the Proponent will continue to explore the feasibility of a potential short-term vehicle drop area in the greater Kensington Avenue design.

3.6.1 Pedestrian and Bicycle Facilities

The open space, pedestrian pathways and sidewalk connections proposed as part of the Project, and as described in detail in Chapter 2, *Project Summary*, will be designed to complete and improve connections with the existing and future network of parks and pathways in the vicinity of the Project Site. The Project proposes significant improvements to existing off-site open space on the adjacent, City-owned Middlesex Avenue Open Space that extends from the Project Site southeast to the edge of the existing Public Storage facility on Middlesex Avenue. The Proposed off-site improvements, as presented in section 3.8.1, will enhance the connection between the ASMD and the open space, commercial uses and residential neighborhoods of Somerville to the west of the elevated Interstate 93 Off-Ramp below the Kensington Underpass. This connection will be strengthened by new and improved public open space on- and off-site, an improved streetscape, and new occupants and visitors who will enliven the area on a consistent and daily basis. The Project will also diminish the visual impact of the elevated roadway and highway ramps from the ASMD.

The Project will include short- and long-term bicycle parking storage in compliance with the City of Somerville's guidelines to encourage cycling as a strong alternative transportation mode. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of the racks will be determined during the MPSP process.

3.6.2 Loading

The service and loading area for the Project Site can be accessed via McGrath Highway, off of Middlesex Avenue. The Transportation Access Plan (TAP), included in Appendix C, provides vehicle tracking figures demonstrating the ability of various vehicles sizes to maneuver into and out of the loading area safely.

3.7 Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess quality flow, roadway capacity analyses were conducted with respect to Existing and projected No-Build and Build traffic volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Roadway operating conditions are classified by calculated levels of service.

3.7.1 Level-of-Service Criteria

The evaluation criteria used to analyze area intersections in this traffic study are based on the 2010 Highway Capacity Manual (HCM)⁹. The term 'Level of Service' (LOS) is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that considers a number of factors including roadway geometry, speed, travel delay and freedom to maneuver. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

In addition to LOS, two other measures of effectiveness (MOEs) are typically used to quantify the traffic operations at intersections: volume-to-capacity ratio (v/c) and delay (expressed in seconds per vehicle). For example, an existing v/c ratio of 0.9 for an intersection indicates that the intersection is operating at 90 percent of its available capacity. A delay of 15 seconds for a particular vehicular movement or approach indicates that vehicles on the movement or approach will experience an average additional travel time of 15 seconds. For a given LOS letter designation

9 Highway Capacity Manual; Transportation Research Board (Washington, D.C.), 2010.

there may be a wide range of values for both v/c ratios and delay. Comparison of intersection capacity results therefore requires that, in addition to the LOS, the other MOEs should also be considered.

The LOS designations, which are based on delay, are reported differently for signalized and unsignalized intersections. For signalized intersections, the analysis considers the operation of all traffic entering the intersection and the LOS designation is for overall conditions at the intersection. For unsignalized intersections, however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. Thus, the LOS designation is for the critical movement exiting the side street, which is generally the left turn out of the side street or site driveway. Table 3-10 shows the LOS criteria for both signalized intersections and unsignalized intersections.

It should be noted that the analytical methodologies typically used for the analysis of unsignalized intersections use conservative analysis parameters, such as long critical gaps. Actual field observations indicate that drivers on minor streets generally accept shorter gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. The analysis methodologies also do not fully take into account the beneficial grouping effects caused by nearby signalized intersections. The net effect of these analysis procedures is the over-estimation of calculated delays at unsignalized intersections in the study area. Cautious judgment should therefore be exercised when interpreting the capacity analysis results at unsignalized intersections. The level-of-service criteria for signalized and unsignalized intersections are summarized in Table 3-10.

Table 3-10 Level of Service Criteria

Level of Service	Delay – Signalized Intersection	Delay – Unsignalized Intersection
A	0 to 10 seconds	0 to 10 seconds
B	10 to 20 seconds	10 to 15 seconds
C	20 to 35 seconds	15 to 25 seconds
D	35 to 55 seconds	25 to 35 seconds
E	55 to 80 seconds	35 to 50 seconds
F	Greater than 80 seconds	Greater than 50 seconds

Source: 2010 Highway Capacity Manual.

Signalized Intersection Capacity Analysis

Capacity analyses conducted by VHB for the signalized intersections are summarized in Table 3-11. The capacity analyses were conducted for the 2019 Existing, 2027 No-Build, and 2027 Build conditions.

Unsignalized Intersection Capacity Analysis

Capacity analyses conducted by VHB for the signalized intersections are summarized in Table 3-12. The capacity analyses were conducted for the 2019 Existing, 2027 No-Build, and 2027 Build conditions.

Table 3-11 Signalized Intersection Capacity Analysis

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Middlesex Avenue at Foley Street															
<i>Weekday Morning</i>															
WB L	0.49	48	D	46	87	0.62	45	D	87	145	0.62	45	D	87	145
WB R	0.10	4	A	0	18	0.11	3	A	0	23	0.11	4	A	0	25
NB T	0.12	31	C	27	53	0.26	41	D	41	70	0.45	40	D	68	98
NB R	0.06	4	A	1	3	0.13	3	A	1	8	0.13	3	A	1	8
SB L	0.62	18	B	149	258	0.90	42	D	261	#469	0.95	51	D	~274	#519
SB T	0.10	12	B	26	56	0.12	15	B	31	65	0.14	15	B	36	74
Overall	-	21	C	-	-	-	34	C	-	-	-	39	D	-	-
<i>Weekday Evening</i>															
WB L	0.59	55	D	69	119	0.87	54	D	~378	#574	0.87	54	D	~378	#574
WB R	0.28	5	A	0	39	0.30	3	A	0	46	0.29	3	A	0	46
NB T	0.37	21	C	165	189	0.76	36	D	208	m241	0.88	43	D	218	m244
NB R	0.12	3	A	10	m10	0.13	3	A	3	m12	0.14	3	A	3	m12
SB L	0.43	14	B	61	104	0.84	47	D	98	#220	0.92	60	E	136	#302
SB T	0.02	11	B	7	19	0.03	17	B	8	23	0.18	18	B	48	86
Overall	-	19	B	-	-	-	35	C	-	-	-	38	D	-	-
<i>Saturday Midday</i>															
WB L	0.64	49	D	83	138	0.78	50	D	144	214	0.78	50	D	144	214
WB R	0.21	3	A	0	27	0.23	3	A	0	32	0.23	2	A	0	32
NB T	0.20	32	C	57	114	0.40	35	C	97	#159	0.49	37	D	11	#191
NB R	0.09	4	A	10	11	0.14	2	A	4	8	0.14	3	A	2	m12
SB L	0.53	17	B	115	208	0.72	29	C	175	#346	0.73	31	C	184	#392
SB T	0.03	13	B	8	24	0.03	17	B	9	27	0.08	17	B	22	52
Overall	-	23	C	-	-	-	28	C	-	-	-	29	C	-	-
Grand Union Boulevard at Foley Street															
<i>Weekday Morning</i>															
EB L/T	0.28	46	D	27	59	0.48	49	D	60	106	0.48	49	D	60	106
EB R	0.64	10	A	0	69	0.64	9	A	0	68	0.65	9	A	0	68
WB L/T/R	0.48	43	D	35	54	0.67	40	D	58	95	0.67	40	D	58	95
NB L	0.13	9	A	7	13	0.12	23	C	10	m21	0.12	23	C	10	m21
NB T/R	0.15	9	A	26	29	0.60	31	C	84	#272	0.60	31	C	84	#272
SB L	0.02	11	B	5	15	0.64	20	B	137	229	0.64	20	B	137	229
SB T/R	0.74	31	C	301	#516	0.82	38	D	349	#630	0.82	38	D	349	#630
Overall	-	24	C	-	-	-	29	C	-	-	-	29	C	-	-
<i>Weekday Evening</i>															
EB L/T	0.55	49	D	53	90	0.90	92	F	~86	#199	0.90	92	F	~86	#199
EB R	0.24	6	A	0	29	0.20	4	A	0	39	0.27	4	A	0	44
WB L/T/R	0.25	28	C	18	34	0.77	31	C	166	#277	0.77	31	C	166	#277
NB L	0.31	8	A	21	m36	0.55	11	B	30	m23	0.55	11	B	30	m23
NB T/R	0.67	19	B	116	m#543	1.67	>120	F	~544	m#304	1.67	>120	F	~544	m#304
SB L	0.08	15	B	8	19	0.76	45	D	60	#133	0.76	45	D	60	#133
SB T/R	0.59	31	C	185	222	0.79	46	D	164	#296	0.79	46	D	164	#296
Overall	-	23	C	-	-	-	120	F	-	-	-	117	F	-	-
<i>Saturday Midday</i>															
EB L/T	0.67	50	D	86	172	0.97	96	F	~150	#296	0.97	96	F	~150	#296
EB R	0.28	5	A	0	47	0.32	5	A	0	49	0.33	5	A	0	50
WB L/T/R	0.27	24	C	22	47	0.54	25	C	63	111	0.54	25	C	63	111
NB L	0.41	20	C	57	107	0.43	21	C	69	116	0.43	21	C	69	116
NB T/R	0.65	30	C	170	#381	1.03	83	F	~389	#597	1.03	83	F	~389	#597
SB L	0.07	17	B	8	22	0.71	36	D	67	#153	0.71	36	D	67	#153
SB T/R	0.74	41	D	145	224	0.58	33	C	155	248	0.58	33	C	155	248
Overall	-	29	C	-	-	-	48	D	-	-	-	48	D	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Grand Union Boulevard at Revolution Drive															
<i>Weekday Morning</i>															
EB L	0.42	59	E	22	51	0.30	51	D	19	52	0.30	51	D	19	54
EB T/R	0.61	34	C	22	66	0.50	27	C	19	#82	0.50	27	C	19	#82
WB L	0.38	58	E	20	52	0.38	54	D	25	#70	0.38	54	D	25	#70
WB T	0.48	58	E	37	79	0.69	68	E	69	#177	0.69	68	E	69	#177
WB R	0.01	0	A	0	0	0.01	0	A	0	0	0.01	0	A	0	0
NB L	0.06	11	B	8	17	0.06	12	B	7	18	0.06	12	B	7	18
NB T/R	0.18	19	B	65	88	0.72	33	C	~406	#498	0.72	33	C	~406	#498
SB L	0.32	9	A	70	m76	0.59	18	B	66	m99	0.59	18	B	66	m99
SB T	0.54	15	B	202	292	0.57	15	B	187	m283	0.57	15	B	187	m286
SB R	0.14	11	B	44	m57	0.16	11	B	42	m57	0.16	11	B	44	m60
Overall	-	19	A	-	-	-	26	C	-	-	-	26	C	-	-
<i>Weekday Evening</i>															
EB L	0.87	81	F	82	#188	2.07	>120	F	~172	#298	2.07	>120	F	~172	#298
EB T/R	0.51	37	D	67	127	0.34	30	C	82	148	0.34	30	C	82	148
WB L	0.17	35	C	17	44	0.28	34	C	51	102	0.28	34	C	51	102
WB T	0.59	44	D	92	156	0.97	70	E	~441	#634	0.97	70	E	~441	#634
WB R	0.06	0	A	0	0	0.06	0	A	0	0	0.06	0	A	0	0
NB L	0.30	18	B	63	110	0.53	25	C	68	117	0.53	25	C	68	117
NB T/R	0.78	40	D	~413	#613	1.52	>120	F	~629	#847	1.52	>120	F	~629	#847
SB L	0.35	35	C	44	68	0.38	33	C	36	m48	0.38	32	C	35	m47
SB T	0.29	43	D	107	147	0.62	50	D	147	m203	0.62	49	D	146	m203
SB R	0.29	43	D	103	143	0.42	45	D	92	m131	0.55	47	D	125	m177
Overall	-	39	D	-	-	-	>120	F	-	-	-	>120	F	-	-
<i>Saturday Midday</i>															
EB L	0.66	49	D	144	#325	0.98	99	F	~200	#370	0.98	99	F	~200	#370
EB T/R	0.24	31	C	48	110	0.33	36	D	61	121	0.33	36	D	61	121
WB L	0.08	37	D	14	44	0.19	43	D	31	70	0.19	43	D	31	70
WB T	0.12	36	D	31	76	0.36	45	D	89	155	0.36	45	D	89	155
WB R	0.04	0	A	0	0	0.04	0	A	0	0	0.04	0	A	0	0
NB L	0.07	17	B	12	30	0.06	17	B	13	30	0.06	17	B	13	30
NB T/R	0.76	41	D	228	345	0.88	50	D	406	#653	0.88	50	D	406	#653
SB L	0.28	19	B	35	61	0.36	21	C	34	64	0.36	21	C	34	64
SB T	0.27	26	C	84	129	0.25	25	C	97	157	0.25	25	C	97	157
SB R	0.37	27	C	115	169	0.30	25	C	114	180	0.32	26	C	124	194
Overall	-	33	C	-	-	-	45	D	-	-	-	45	D	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Mystic Avenue (Route 38) at Revolution Drive															
<i>Weekday Morning</i>															
WB R	0.43	4	A	0	5	0.69	29	C	47	88	0.70	32	C	56	97
NB T	0.24	3	A	41	42	0.35	5	A	90	131	0.38	5	A	124	127
NB R	0.09	1	A	0	0	0.12	1	A	0	0	0.12	1	A	0	0
Overall	-	3	A	-	-	-	9	A	-	-	-	9	A	-	-
<i>Weekday Evening</i>															
WB R	0.79	43	D	142	190	1.25	>120	F	~443	#657	1.36	>120	F	~495	#705
NB T	0.51	8	A	193	m200	0.67	7	A	126	m117	0.67	7	A	120	m115
NB R	0.20	1	A	0	m0	0.24	1	A	0	m0	0.24	1	A	0	0
Overall	-	13	B	-	-	-	49	D	-	-	-	63	E	-	-
<i>Saturday Midday</i>															
WB R	0.68	31	C	50	88	0.75	39	D	105	148	0.76	39	D	111	155
NB T	0.34	5	A	119	132	0.45	7	A	167	131	0.47	7	A	158	125
NB R	0.19	1	A	0	0	0.24	1	A	0	0	0.24	1	A	0	0
Overall	-	8	A	-	-	-	12	B	-	-	-	12	B	-	-
Fellsway (Route 28) at Grand Union Boulevard															
<i>Weekday Morning</i>															
WB L	0.14	38	D	30	35	0.27	40	D	63	70	0.27	40	D	63	70
WB R	0.09	0	A	0	0	0.11	0	A	0	0	0.11	0	A	0	0
NB T	0.60	7	A	49	54	0.64	9	A	46	m95	0.65	9	A	46	m95
NB R	0.09	0	A	0	0	0.47	4	A	62	m78	0.47	4	A	60	m77
SB L	0.74	50	D	194	#544	1.21	>120	F	315	#760	1.21	>120	F	315	#760
SB T	0.69	15	B	196	#763	0.83	19	B	312	#998	0.84	19	B	321	#1017
Overall	-	17	B	-	-	-	33	C	-	-	-	33	C	-	-
<i>Weekday Evening</i>															
WB L	0.91	52	D	358	422	1.21	>120	F	~671	#807	1.21	>120	F	~671	#807
WB R	0.14	0	A	0	0	0.29	1	A	0	0	0.29	1	A	0	0
NB T	0.86	15	B	133	146	0.92	17	B	132	150	0.94	19	B	138	#168
NB R	0.04	0	A	0	0	0.18	0	A	0	m0	0.18	0	A	0	0
SB L	1.49	>120	F	~250	#350	2.45	>120	F	~315	#423	2.45	>120	F	~315	#423
SB T	0.35	14	B	146	172	0.36	16	B	152	183	0.37	16	B	153	184
Overall	-	46	D	-	-	-	102	F	-	-	-	102	F	-	-
<i>Saturday Midday</i>															
WB L	0.56	51	D	111	155	0.76	57	E	186	244	0.76	57	E	186	244
WB R	0.35	1	A	0	0	0.44	1	A	0	0	0.44	1	A	0	0
NB T	0.80	12	B	79	147	0.94	23	C	146	m165	0.94	24	C	148	m167
NB R	0.15	0	A	0	m0	0.32	0	A	0	m0	0.32	0	A	0	m0
SB L	0.71	48	D	208	317	0.89	60	E	290	#440	0.89	60	E	290	#440
SB T	0.42	7	A	121	239	0.48	9	A	186	278	0.49	9	A	187	280
Overall	-	16	B	-	-	-	22	C	-	-	-	22	C	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Fellsway (Route 28) at Middlesex Avenue															
<i>Weekday Morning</i>															
WB L	0.09	36	D	18	25	0.20	39	D	43	52	0.23	39	D	50	58
WB R	0.08	0	A	0	0	0.08	0	A	0	0	0.09	0	A	0	0
NB T	0.60	26	C	280	329	0.90	37	D	513	587	0.90	37	D	513	587
NB R	0.21	0	A	0	0	0.29	1	A	0	0	0.39	1	A	0	0
SB L	0.22	52	D	46	m#153	0.30	52	D	57	m#148	0.34	51	D	67	m#180
SB T	0.67	6	A	83	145	0.80	10	A	110	#932	0.80	10	A	110	#932
Overall	-	14	B	-	-	-	21	C	-	-	-	20	C	-	-
<i>Weekday Evening</i>															
WB L	0.14	29	C	40	58	0.30	30	C	101	140	0.40	31	C	138	185
WB R	0.40	1	A	0	0	0.39	1	A	0	0	0.41	1	A	0	0
NB T	0.66	28	C	328	369	0.77	32	C	413	475	0.78	32	C	416	478
NB R	0.10	0	A	0	0	0.13	0	A	0	0	0.15	0	A	0	0
SB L	0.23	56	E	28	m41	0.35	52	D	27	m35	0.38	53	D	29	m38
SB T	0.63	23	C	479	521	0.82	43	D	649	m593	0.82	43	D	648	m593
Overall	-	22	C	-	-	-	32	C	-	-	-	32	C	-	-
<i>Saturday Midday</i>															
WB L	0.32	46	D	60	92	0.44	48	D	102	144	0.51	49	D	117	162
WB R	0.20	0	A	0	0	0.23	0	A	0	0	0.23	0	A	0	0
NB T	0.76	33	C	373	537	1.00	69	E	612	#833	1.00	69	E	612	#833
NB R	0.22	0	A	0	0	0.28	0	A	0	0	0.32	1	A	0	0
SB L	0.09	32	C	19	40	0.11	33	C	25	50	0.12	33	C	28	54
SB T	0.46	6	A	118	140	0.57	9	A	179	226	0.57	9	A	178	220
Overall	-	18	B	-	-	-	34	C	-	-	-	34	C	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Mystic Avenue (Route 38) at Grand Union Boulevard / Lombardi Way															
<i>Weekday Morning</i>															
WB L	0.31	22	C	78	148	0.40	27	C	96	161	0.40	27	C	96	161
WB T/R	0.49	22	C	134	193	0.68	27	C	182	232	0.70	28	C	190	242
NB L	0.53	45	D	87	158	0.50	30	C	76	135	0.50	30	C	76	135
NB T	0.07	14	B	21	27	0.24	9	A	54	53	0.24	8	A	54	53
SB L/T/R	0.76	41	D	195	282	0.79	41	D	228	#348	0.79	41	D	228	#348
Overall	-	28	C	-	-	-	26	C	-	-	-	27	C	-	-
<i>Weekday Evening</i>															
WB L	0.32	25	C	90	149	0.37	26	C	104	167	0.37	26	C	104	167
WB T/R	0.86	35	C	319	385	1.01	55	E	~395	#515	1.01	57	E	~404	#520
NB L	0.57	42	D	151	264	0.59	48	D	179	262	0.59	48	D	179	262
NB T	0.18	11	B	31	83	0.25	13	B	84	103	0.25	13	B	84	103
SB L/T/R	0.78	51	D	195	#324	1.19	> 120	F	~387	#590	1.19	> 120	F	~387	#590
Overall	-	34	C	-	-	-	60	E	-	-	-	61	E	-	-
<i>Saturday Midday</i>															
WB L	0.43	28	C	117	198	0.53	32	C	133	215	0.54	32	C	133	215
WB T/R	0.72	29	C	220	#311	0.92	41	D	266	#373	0.93	43	D	~272	#380
NB L	0.46	33	C	80	173	0.59	41	D	94	#237	0.61	43	D	100	#237
NB T	0.10	8	A	23	33	0.16	8	A	34	36	0.16	8	A	34	36
SB L/T/R	0.48	29	C	124	166	0.49	24	C	150	193	0.48	24	C	147	193
Overall	-	27	C	-	-	-	33	C	-	-	-	34	C	-	-
Broadway at Lombardi Way / Mt. Vernon Street															
<i>Weekday Morning</i>															
EB L	0.18	26	C	41	64	0.25	28	C	57	115	0.25	28	C	57	115
EB T	0.36	28	C	82	165	0.43	31	C	96	180	0.43	31	C	96	180
NB L/T/R	0.76	52	D	101	149	0.77	52	D	104	173	0.77	52	D	104	173
SB L	0.84	64	E	136	162	0.88	98	F	152	#287	0.88	98	F	152	#287
SB R	0.38	3	A	25	27	0.41	3	A	14	25	0.41	3	A	14	25
Overall	-	34	C	-	-	-	45	D	-	-	-	45	D	-	-
<i>Weekday Evening</i>															
EB L	0.38	27	C	104	175	0.51	36	D	129	219	0.51	36	D	129	219
EB T	0.26	25	C	65	117	0.35	33	C	78	143	0.35	33	C	78	143
NB L/T/R	0.88	110	F	234	#402	0.91	64	E	229	#449	0.91	64	E	229	#449
SB L	0.75	41	D	84	201	0.83	106	F	215	334	0.83	106	F	215	334
SB R	0.48	5	A	87	79	0.54	5	A	64	70	0.54	5	A	64	70
Overall	-	42	D	-	-	-	46	D	-	-	-	46	D	-	-
<i>Saturday Midday</i>															
EB L	0.23	21	C	59	127	0.31	25	C	80	162	0.31	25	C	80	162
EB T	0.28	22	C	70	148	0.36	26	C	88	177	0.36	26	C	88	177
NB L/T/R	0.78	52	D	101	17	0.81	54	D	113	#207	0.81	54	D	113	#207
SB L	0.76	45	D	107	158	0.79	89	F	136	291	0.79	89	F	136	291
SB R	0.39	2	A	7	20	0.44	3	A	21	62	0.44	3	A	21	62
Overall	-	24	C	-	-	-	36	D	-	-	-	36	D	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Lombardi Way at I-93 Southbound Off-Ramp															
<i>Weekday Morning</i>															
EB L	0.24	30	C	37	61	0.76	37	D	197	249	0.76	37	D	197	249
EB R	0.59	28	C	141	168	0.44	18	B	113	139	0.44	18	B	113	139
NB T	0.09	10	B	35	56	0.13	14	B	39	61	0.13	14	B	39	61
SB T	0.32	21	C	124	161	0.46	30	C	146	243	0.46	30	C	146	243
Overall	-	22	C	-	-	-	27	C	-	-	-	27	D	-	-
<i>Weekday Evening</i>															
EB L	0.60	55	E	67	116	0.74	54	D	136	199	0.74	54	D	136	199
EB R	0.53	13	B	56	108	0.54	19	B	117	192	0.54	19	B	117	192
NB T	0.18	8	A	85	m34	0.22	4	A	24	m21	0.22	4	A	24	m21
SB T	0.24	14	B	56	m170	0.42	22	C	192	m178	0.42	22	C	192	m178
Overall	-	15	B	-	-	-	20	C	-	-	-	20	C	-	-
<i>Saturday Midday</i>															
EB L	0.54	48	D	55	93	0.71	48	D	115	174	0.71	48	D	115	174
EB R	0.47	10	B	36	70	0.41	11	B	52	90	0.41	11	B	52	90
NB T	0.10	5	A	32	21	0.13	4	A	24	7	0.13	4	A	24	7
SB T	0.25	15	B	86	110	0.35	19	B	111	126	0.35	19	B	111	126
Overall	-	14	B	-	-	-	19	B	-	-	-	19	B	-	-
Mystic Avenue U-Turn at Mystic Avenue															
<i>Weekday Morning</i>															
WB T	0.3	2	A	10	12	0.37	2	A	13	18	0.39	3	A	13	24
NB L	0.25	27	C	48	73	0.45	28	C	98	141	0.52	29	C	117	163
Overall	-	7	A	-	-	-	10	A	-	-	-	11	B	-	-
<i>Weekday Evening</i>															
WB T	0.47	3	A	23	53	0.52	4	A	53	m53	0.53	4	A	52	m53
NB L	0.91	58	E	209	#m299	1.01	77	E	~240	#362	1.03	82	F	~260	#375
Overall	-	19	B	-	-	-	25	C	-	-	-	27	C	-	-
<i>Saturday Midday</i>															
WB T	0.41	5	A	22	60	0.47	6	A	44	m53	0.48	7	A	47	m52
NB L	0.61	31	C	139	161	0.60	26	C	162	184	0.61	25	C	167	192
Overall	-	13	B	-	-	-	13	B	-	-	-	13	B	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Mystic Avenue (Route 38) at Wheatland Street / Bailey Road															
<i>Weekday Morning</i>															
EB T	0.46	19	B	201	225	0.49	20	B	217	273	0.50	20	C	223	280
WB T	0.28	1	A	0	0	0.29	0	A	0	0	0.29	0	A	0	0
NB L/R	0.24	8	A	19	43	0.23	8	A	16	60	0.23	8	A	16	60
SB L/R	0.40	39	D	100	m124	0.45	39	D	109	m129	0.45	40	D	109	m129
Overall	-	17	B	-	-	-	17	B	-	-	-	17	B	-	-
<i>Weekday Evening</i>															
EB T	0.47	20	B	220	228	0.46	19	B	208	260	0.46	19	B	210	262
WB T	0.44	1	A	0	0	0.46	1	A	0	0	0.46	1	A	0	0
NB L/R	0.11	2	A	0	2	0.11	2	A	0	10	0.11	2	A	0	12
SB L/R	0.33	39	D	106	m147	0.39	41	D	126	m160	0.39	41	D	127	m160
Overall	-	15	B	-	-	-	15	B	-	-	-	15	B	-	-
<i>Saturday Midday</i>															
EB T	0.39	21	C	194	242	0.47	23	C	245	301	0.48	23	C	248	304
WB T	0.24	0.4	A	0	0	0.27	0	A	0	0	0.27	0	A	0	0
NB L/R	0.11	2	A	0	11	0.11	2	A	0	15	0.11	2	A	0	15
SB L/R	0.34	44	D	125	171	0.36	43	D	132	178	0.36	44	D	132	m180
Overall	-	19	B	-	-	-	20	B	-	-	-	20	B	-	-
Fellsway (Route 28) SB at Bailey Road (Route 38) / I-93 Southbound On-Ramp															
<i>Weekday Morning</i>															
WB T	0.28	17	B	105	125	0.29	17	B	108	135	0.29	17	B	110	138
SB L	0.76	34	C	360	449	0.81	35	C	382	469	0.81	35	D	378	465
SB T/R	1.00	59	E	~518	#618	1.15	106	F	~663	#764	1.16	111	F	~670	#775
Overall	-	43	D	-	-	-	70	E	-	-	-	73	E	-	-
<i>Weekday Evening</i>															
WB T	0.40	18	B	170	205	0.46	19	B	203	242	0.49	20	B	217	257
SB L	0.57	27	C	259	314	0.59	25	C	278	317	0.59	27	C	280	319
SB T/R	0.75	30	C	360	403	1.09	81	F	~608	#713	1.15	105	F	~675	#356
Overall	-	25	C	-	-	-	52	D	-	-	-	65	E	-	-
<i>Saturday Midday</i>															
WB T	0.35	20	C	163	196	0.39	21	C	187	223	0.40	21	C	193	228
SB L	0.65	38	D	303	374	0.73	40	D	357	436	0.73	40	D	357	436
SB T/R	0.58	33	C	257	305	0.76	38	D	376	437	0.78	39	D	392	453
Overall	-	30	C	-	-	-	34	C	-	-	-	34	C	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
Fellsway / McGrath Highway (Route 28) SB at Mystic Avenue (Route 38)															
<i>Weekday Morning</i>															
EB T/R	0.49	25	C	130	159	0.56	68	E	152	183	0.57	68	E	153	183
EB R	0.49	14	B	98	142	0.55	15	B	116	162	0.55	16	B	116	163
WB T	0.28	1	A	2	2	0.29	1	A	0	0	0.29	1	A	0	0
SB L/T	0.85	20	B	104	m102	0.91	36	D	92	m79	0.92	39	D	92	m80
Overall	-	18	B	-	-	-	36	D	-	-	-	38	D	-	-
<i>Weekday Evening</i>															
EB T/R	0.51	24	C	124	137	0.53	67	E	147	174	0.53	61	E	146	174
EB R	0.50	14	B	93	119	0.51	15	B	109	152	0.52	15	B	110	153
WB T	0.45	1	A	0	0	0.46	1	A	0	0	0.46	1	A	0	0
SB L/T	0.68	9	A	41	48	0.91	25	C	91	m83	0.97	45	D	96	m83
Overall	-	11	B	-	-	-	28	C	-	-	-	36	D	-	-
<i>Saturday Midday</i>															
EB T/R	0.46	19	B	138	167	0.54	21	C	154	182	0.54	21	C	154	182
EB R	0.46	16	B	95	137	0.55	18	B	118	162	0.55	18	B	120	163
WB T	0.24	1	A	2	2	0.27	1	A	0	0	0.27	1	A	0	0
SB L/T	0.44	7	A	24	27	0.58	7	A	29	31	0.60	7	A	29	37
Overall	-	11	B	-	-	-	12	B	-	-	-	12	B	-	-
Mystic Avenue (Route 38) at McGrath Highway (Route 28) NB Off-Ramp															
<i>Weekday Morning</i>															
EB T	0.47	30	C	244	294	0.56	74	E	326	m376	0.57	75	E	335	m383
NB T	0.48	36	D	158	209	0.50	36	D	168	222	0.50	36	D	168	222
NB R	0.2	0	A	0	0	0.25	0	A	0	0	0.25	0	A	0	0
Overall	-	26	C	-	-	-	49	D	-	-	-	49	D	-	-
<i>Weekday Evening</i>															
EB T	0.37	38	D	248	288	0.38	72	E	276	m337	0.39	69	E	272	m324
NB T	0.77	44	D	294	364	0.80	45	D	307	385	0.80	45	D	307	385
NB R	0.26	0	A	0	0	0.28	0	A	0	0	0.28	0	A	0	0
Overall	-	31	C	-	-	-	44	D	-	-	-	43	D	-	-
<i>Saturday Midday</i>															
EB T	0.30	22	C	261	321	0.35	24	C	318	390	0.36	24	C	322	393
NB T	0.55	49	D	169	223	0.63	51	D	197	257	0.63	51	D	197	257
NB R	0.25	0	A	0	0	0.31	0	A	0	0	0.31	0	A	0	0
Overall	-	23	C	-	-	-	24	C	-	-	-	24	C	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
McGrath Highway (Route 28) at Broadway															
<i>Weekday Morning</i>															
EB L	0.71	55	D	228	#417	0.86	67	E	287	#550	0.90	72	E	309	#586
EB L/T	0.70	48	D	231	342	0.86	57	E	297	#479	0.90	61	E	314	#513
EB R	1.15	>120	F	~374	#657	1.22	>120	F	~413	#705	1.22	>120	F	~413	#705
WB L	0.68	60	E	160	263	0.71	62	E	169	276	0.71	62	E	169	276
WB L/T	0.69	53	D	167	237	0.72	54	D	177	250	0.72	54	D	177	250
WB R	0.12	0	A	0	0	0.12	0	A	0	0	0.12	0	A	0	0
NB L	0.65	72	E	87	155	0.66	72	E	88	160	0.66	72	E	88	160
NB T/R	0.69	45	D	222	305	0.95	61	E	337	#509	0.99	70	E	360	#550
SB L	0.61	72	E	74	129	0.61	72	E	71	136	0.61	72	E	71	136
SB T/R	1.33	>120	F	~609	#742	1.42	>120	F	~675	#895	1.43	>120	F	~681	#902
Overall	-	104	F	-	-	-	120	F	-	-	-	>120	F	-	-
<i>Weekday Evening</i>															
EB L	0.75	62	E	186	313	0.83	68	E	241	#415	0.84	69	E	248	#429
EB L/T	0.74	53	D	188	273	0.77	55	D	228	319	0.77	55	D	230	322
EB R	0.54	52	D	101	185	0.53	52	D	115	202	0.53	52	D	115	202
WB L	0.72	63	E	161	267	0.75	67	E	183	281	0.75	67	E	184	281
WB L/T	0.71	55	D	167	238	0.74	57	E	189	250	0.74	58	E	190	250
WB R	0.09	0	A	0	0	0.09	0	A	0	0	0.09	1	A	0	0
NB L	0.81	74	E	158	#314	0.86	81	F	191	#364	0.86	81	F	192	#364
NB T/R	1.15	117	F	~517	#752	1.43	>120	F	~765	#947	1.45	>120	F	~781	#958
SB L	0.82	74	E	162	#333	0.86	82	F	186	#357	0.86	82	F	188	#357
SB T/R	1.01	70	E	~396	#623	1.56	>120	F	~834	#1019	1.62	>120	F	~885	#1067
Overall	-	79	E	-	-	-	>120	F	-	-	-	>120	F	-	-
<i>Saturday Midday</i>															
EB L	0.82	62	E	242	#421	0.87	68	E	293	#535	0.89	69	E	304	#560
EB L/T	0.68	46	D	197	284	0.70	48	D	228	326	0.85	48	D	232	333
EB R	0.54	47	D	116	206	0.51	47	D	123	218	0.51	47	D	123	218
WB L	0.68	64	E	124	209	0.70	67	E	137	223	0.70	67	E	137	223
WB L/T	0.68	56	E	129	186	0.70	58	E	142	119	0.70	58	E	142	199
WB R	0.11	0	A	0	0	0.11	0	A	0	0	0.11	0	A	0	0
NB L	0.63	67	E	87	158	0.67	70	E	101	173	0.67	70	E	101	173
NB T/R	0.92	55	D	339	#520	1.19	>120	F	~529	#705	1.21	>120	F	~542	#719
SB L	0.75	70	E	127	217	0.80	75	E	150	#269	0.81	76	E	150	#269
SB T/R	0.72	41	D	254	359	0.97	60	E	373	#591	0.99	66	E	384	#609
Overall	-	50	D	-	-	-	79	E	-	-	-	84	F	-	-

Table 3-11 Signalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	v/c ^a	Del ^b	LOS ^c	50 Q ^d	95 Q ^e	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
I-93 Southbound On-Ramp at Mystic Avenue U-Turn															
<i>Weekday Morning</i>															
EB T	0.34	18	B	291	284	0.36	19	B	298	280	0.36	19	B	297	278
SB L	0.53	26	C	23	54	0.63	37	D	57	97	0.64	38	D	59	100
Overall	-	19	B	-	-	-	23	C	-	-	-	23	C	-	-
<i>Weekday Evening</i>															
EB T	0.23	14	B	192	228	0.28	19	B	188	177	0.28	20	B	185	170
SB L	0.56	10	A	0	28	0.79	37	D	143	193	0.80	37	D	161	210
Overall	-	13	B	-	-	-	27	C	-	-	-	28	C	-	-
<i>Saturday Midday</i>															
EB T	0.39	7	A	54	93	0.54	9	A	70	123	0.55	9	A	71	125
SB L	0.26	4	A	0	15	0.38	10	A	12	42	0.40	10	B	14	45
Overall	-	6	A	-	-	-	9	A	-	-	-	10	A	-	-

a Volume to capacity ratio.

b Average total delay, in seconds per vehicle.

c Level-of-service.

d 50th percentile queue, in feet.

e 95th percentile queue, in feet.

~ Volume exceeds capacity, queue is theoretically infinite.

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

dl Defacto Left Lane. Recode with 1 through lane as a left lane

Table 3-12 Unsignalized Intersection Capacity Analysis

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	D ^a	v/c ^b	Del ^c	LOS ^d	95 Q ^e	D	v/c	Del	LOS	95 Q	D	v/c	Del	LOS	95 Q
Mystic Avenue (Route 38) at Middlesex Avenue															
<i>Weekday Morning</i>															
SB R	160	0.24	11	B	23	240	0.38	14	B	45	255	0.44	15	C	55
<i>Weekday Evening</i>															
SB R	120	0.33	16	C	35	465	>1.20	>120	F	565	560	>1.20	>120	F	863
<i>Saturday Midday</i>															
SB R	170	0.29	13	B	25	270	0.53	19	C	78	305	0.62	22	C	105
Middlesex Avenue at McGrath Highway															
<i>Weekday Morning</i>															
EB L/R	55	0.17	13	B	15	60	0.15	15	C	13	100	0.38	25	C	43
NB L	20	0.02	9	A	3	20	0.02	9	A	3	115	0.16	11	B	15
<i>Weekday Evening</i>															
EB L/R	10	0.03	12	B	3	10	0.02	12	A	3	295	0.70	29	D	133
NB L	Neg	0.00	8	A	0	Neg	0.00	8	B	0	30	0.03	8	A	3
<i>Saturday Midday</i>															
EB L/R	15	0.03	13	B	3	15	0.04	14	B	3	120	0.34	19	C	38
NB L	Neg	0.00	8	A	0	Neg	0.00	8	A	0	45	0.05	9	A	3
Grand Union Boulevard at Great River Road															
<i>Weekday Morning</i>															
WB LR	75	0.08	5	A	0	130	0.16	6	A	25	130	0.16	6	A	25
NB TR	105	0.14	5	A	0	170	0.30	10	A	25	170	0.30	10	A	25
SB LT	715	0.70	14	B	150	1,435	>1.20	>120	F	1,675	1,435	>1.20	>120	F	1,675
<i>Weekday Evening</i>															
WB LR	245	0.43	12	B	50	260	0.67	27	D	125	260	0.67	27	D	125
NB TR	625	0.64	13	B	125	960	1.01	50	F	500	960	1.01	50	F	500
SB LT	230	0.22	5	A	25	375	0.37	7	A	50	375	0.37	7	A	50
<i>Saturday Midday</i>															
WB LR	145	0.24	8	A	25	235	0.40	11	B	50	235	0.40	11	B	50
NB TR	420	0.48	10	A	75	540	0.72	18	C	150	540	0.72	18	C	150
SB LT	390	0.41	8	A	50	705	0.70	14	B	150	705	0.70	14	B	150

Table 3-12 Unsignalized Intersection Capacity Analysis (continued)

Location / Movement	2020 Existing Conditions					2027 No-Build Conditions					2027 Build Conditions				
	D ^a	v/c ^b	Del ^c	LOS ^d	95 Q ^e	D	v/c	Del	LOS	95 Q	D	v/c	Del	LOS	95 Q
Grand Union Boulevard at Artisan Way															
<i>Weekday Morning</i>															
EB LTR	45	0.15	17	C	13	45	0.26	31	D	25	45	0.26	31	D	25
WB L/T	45	0.29	29	D	30	50	0.63	99	F	73	50	0.63	99	F	73
WB R	20	0.03	9	A	3	20	0.03	10	A	3	20	0.03	10	A	3
NB L	20	0.03	9	A	3	20	0.03	11	B	3	20	0.03	11	B	3
SB L	70	0.05	8	A	5	75	0.06	8	A	5	75	0.06	8	A	5
<i>Weekday Evening</i>															
EB LTR	120	1.05	>120	F	185	130	>1.20	>120	F	403	130	>1.20	>120	F	403
WB L/T	60	0.55	66	F	68	65	>1.20	>120	F	170	65	>1.20	>120	F	170
WB R	75	0.29	23	C	30	80	0.49	43	E	60	80	0.49	43	E	60
NB L	70	0.06	8	A	5	75	0.07	9	A	5	75	0.07	9	A	5
SB L	25	0.03	9	A	3	25	0.04	11	B	3	25	0.04	11	B	3
<i>Saturday Midday</i>															
EB LTR	185	>1.20	>120	F	623	200	>1.20	>120	F	*	200	>1.20	>120	F	*
WB L/T	85	>1.20	>120	F	295	95	>1.20	>120	F	260	95	>1.20	>120	F	260
WB R	105	>1.20	>120	F	125	115	>1.20	>120	F	170	115	>1.20	>120	F	170
NB L	90	0.10	9	A	5	95	0.11	9	A	10	95	0.11	9	A	10
SB L	85	0.15	11	B	13	90	0.15	12	B	13	90	0.15	12	B	13

a Demand, in vehicles

b Volume to capacity ratio.

c Average total delay, in seconds per vehicle.

d Level-of-service.

e 95th percentile queue, in feet.

f Northbound approach becomes Block 21 Driveway in 2027 Build conditions.

g Northbound approach becomes Road K in 2027 Build conditions.

* Unable to calculate queue

3.8 Traffic Mitigation Overview

This section provides an overview of the proposed mitigation for the proposed Project.

3.8.1 On- and Off-Site Mitigation

Streetscape Design and Public Realm Improvements

The Project's Site design strategy focuses on creating pedestrian-oriented sidewalks and streets surrounding the Project Site. The following section summarizes streetscape design and public realm improvements proposed on Middlesex Avenue, McGrath Highway and Kensington Avenue. The final dimensions of the proposed sidewalks surrounding the Project Site will be advanced in collaboration with the City.

Middlesex Avenue

The streetscape along Middlesex Avenue is designed to establish the Project's identity, and to support the active uses associated with the proposed retail fronting Middlesex Avenue. The Proponent will explore the potential to extend the curb-line outward from the Project Site to match the planned dimensions associated with the City's Middlesex Avenue enhancements, which include new separated bicycle lanes traveling in both directions. The Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, and planters, and a buffer zone for benches, street lights and bicycle racks, which will dramatically improve the pedestrian experience.

McGrath Highway

The McGrath Highway frontage will provide the vehicular access points for the service and loading areas and below-grade parking. The Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, and planters, and a buffer zone for benches, streetlights and bicycle racks, which will dramatically improve the pedestrian. The portion of McGrath Highway that fronts the Project Site will be repaved as part of this Project.

Kensington Avenue (west of Project Site)

The Project will provide a new pedestrian zone at this portion of the Project Site. The portion of Kensington Avenue (also known as Cummings Street), that fronts the Project Site will be repaved as part of this Project.

The Proponent will continue to explore the feasibility of a potential short-term vehicle drop-off area along Kensington Avenue and Middlesex Avenue.

3.8.2 Transportation Demand Management (TDM) Plan

TDM measures are most often directed at commuter travel and implemented at office sites. However, due to the mixed-use and transit-orientated nature of the Proposed Project, there also are opportunities to bring TDM programs to the Proposed Project's retail uses.

A MMP is required for any development within the ASMD. As a matter of departmental policy for the City of Somerville, the Director of Transportation and Infrastructure requires an MMP for the following types of development:

- › Property owners of buildings with 50,000 SF or more of commercial space OR multi-tenant buildings that in combination have fifty (50) or more employees are required to provide the following for their tenants:
 - An on-site transportation coordinator;
 - Posted mobility management information;
 - Distributed mobility management information;
 - Un-bundled parking;
 - Preferential parking for carpool/vanpool vehicles; and
 - An annual mobility management education meeting for tenants and their employees.
- › These same property owners must require future tenants to provide the following through lease agreements:
 - Qualified transportation fringe benefits for employees; and
 - A guaranteed ride home program for employees.
- › Employers with 50 or more employees are required to provide the following for their employees:
 - An on-site transportation coordinator;
 - Posted mobility management information;
 - Distributed mobility management information;
 - Qualified transportation fringe benefits for employees;
 - A guaranteed ride home program for employees; and
 - An annual mobility management education meeting for tenants and their employees.
- › The property owner of a parking facility is required to provide the following:
 - Preferential parking locations for carpool/vanpool; and
 - Posted mobility management information.

The following sections discuss the land use types for which MMP programs will be implemented for the Project. A description of the MMP elements is presented in this section along with information on how those elements aid employees, visitors, and retail patrons getting to and from the Project Site. As there may be multiple

tenants located within the Site, MMP obligations will need to be included as part of the lease language between tenants and the property owner. Verification of the ongoing conformance with this condition will be provided to the City of Somerville by the property owner either as a copy of the leases (with financial aspects and other non-MMP elements redacted) or via an affidavit signed by the owner and tenant(s) verifying that this language was included and agreed to in the lease. This documentation will be provided to the City prior to the issuance of the Certificate of Occupancy of a space by a tenant with fifty (50) or more employees.

General MMP measures to be implemented as part of this Project will involve promoting transit use and facilitating bicycle and pedestrian travel both through Site amenities and ongoing practices and programs. These will include providing bicycle racks and amenities within the Project Site. The mixed-use nature of the Site by itself also effectively will function as a transportation demand management measure. Specifically, with the variety of uses proposed both within the Project Site and already in place in the surrounding area, the need to travel off-site by automobile for dining or shopping opportunities will be minimized.

The following plan first addresses general MMP measures that apply to the whole Project Site, then special programs for the office/laboratory uses and retail shops and restaurants.

General Measures

TMA involvement

The Proponent will become a member of Assembly Connect, Assembly Square's Transportation Management Association. The Proponent currently is taking the internal steps needed to initiate becoming a member of the TMA, and this requirement will be satisfied within the timeframe noted above.

Transportation Coordinator

As required by the submittal requirement for MMPs, an on-site TDM coordinator will be designated for the proposed building. Alternatively, a representative from an approved Mobility Management Association may be appointed in place of an on-site TDM coordinator. The work location and contact information for the TDM Coordinator will be provided to the Director of Transportation & Infrastructure (the "Director") prior to the issuance of a Certificate of Occupancy. This person may be the office manager, human resources employee, or other individual serving a dual-role in another job on the Site. Also, the specific office location for the TDM Coordinator will be shown on plans to be submitted to the Director prior to the submittal of the Building Permit application.

The person(s) in this role will coordinate with other organizations within Assembly Square to help promote a reduced reliance on single-occupant motor-vehicle travel to the Project Site. To that end, the TDM measures identified in the following sections will be implemented under the direction and supervision of this person. The final job description for this role will be determined over time, but the duties of the on-site TDM coordinator will include, but not be limited to:

- › Assisting site employees with ride matching and transportation planning;
- › Developing and implementing appropriate TDM measures;
- › Disseminating information on alternate modes of transportation and developing transportation related marketing and education materials;
- › Hosting an annual mobility management educational meeting for tenants and their employees (both the content of this meeting and associated posted material also shall be provided to the Director for review and approval prior to the issuance of a Certificate of Occupancy);
- › Developing and maintaining information pertaining to pedestrian and cycling access to and from the Project Site;
- › Distributing transit maps and passes;
- › In tenants' lease agreements the Proponent will require that tenants provide an Emergency Ride Home, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy; and
- › Tenants will make efforts to seek qualified candidates located within one-quarter mile (i.e., walking distance) of the Site.

Any tenants with more than fifty (50) employees also will be required to submit their own MMP, along with a copy of the leases (with financial aspects and other non-MMP elements redacted) or an affidavit signed by the owner and tenant(s) verifying that this language was included and agreed to in the lease. This documentation will be provided to the City prior to the issuance of the Certificate of Occupancy of a space by these tenants.

Ride-Sharing Services

The parking needs for the Project will be lessened due to the nearby availability of public transit currently provided in the area. Furthermore, alternate means of travel, such as taxi, private ride services (Uber, Lyft, and others) should continue to reduce the parking needs for this area. The exact level of usage by these private ride-sharing services can be quantified through post-opening monitoring studies to be conducted as discussed later in this document.

Use-Specific Measures

In addition to the general TDM measures outlined above, the following use-specific programs for the office/laboratory uses and retail shops and restaurants also will be provided.

Office/Laboratory Uses

Office/lab employers within the Project Site will be required to implement appropriate TDM measures in their leases and to be overseen by the on-site building TDM coordinator. As not every TDM program will be suitable for every type of employer, such as telecommuting or flexible work hours, the on-site TDM coordinator will offer technical assistance to employers to evaluate potential programs and implement them when appropriate. Employer-based TDM measures may include the following programs:

- › Preferential carpool and vanpool parking within the parking garage and spaces near office building entrances within the parking garage as a convenience to commuters and to promote ride-sharing;
- › Ride matching assistance managed by the on-site TDM coordinator so that employees find appropriate carpool and vanpool partners;
- › Sponsored vanpools and subsidized expenses;
- › Tenants will provide employees with Qualified Transportation Fringe benefits per current U.S. Internal Revenue Service Code, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy;
- › Provide telecommuting and flexible work hour options for employees in appropriate jobs;
- › Provide incentives for bicycle and pedestrian commutes, like covered bicycle storage, changing rooms, and shower facilities;
- › Hold promotional events for transit-riders, cyclists, and pedestrians;
- › Offer direct deposit to employees; and
- › The Proponent will consider providing preferred parking for low-emitting fuel-efficient vehicles and/or electric vehicle charging stations within the Project garages.

Retail/Restaurants

The Proponent will seek to attract a variety of retail shops, restaurants, and service tenants as ground-floor supporting uses. As most of these businesses will be small shops, there will not be the same levels of TDM opportunities internal to each individual business as will be available with larger employers, but employees who work on the Project Site will be able to take advantage of the transportation guidance and programs coordinated by the transportation coordinator.

The suite of TDM measures to be implemented in association with the retail shops are fewer than for traditional offices, but will still have an impact in reducing single-occupant vehicle travel. The retail/restaurant MMP measures for those tenants with more than fifty (50) employees may include the following:

- › Ride matching services and transit information provided by the on-site TDM coordinator;

- › Tenants will provide employees with Qualified Transportation Fringe benefits per current U.S. Internal Revenue Service Code, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy;
- › Offer direct deposit to employees; and
- › As noted earlier, the Proponent will consider providing preferred parking for low-emitting fuel-efficient vehicles and/or electric vehicle charging stations within each of the garages serving the buildings comprising the Proposed Project.

Monitoring and Annual Reporting

The Proponent will conduct annual travel surveys as required. These surveys will be developed through consultation with the City to determine the number of Site employees utilizing public transportation, those traveling to the Site by private automobile, and those using car-sharing services. Employees also will be surveyed to identify those that bike or walk to and from work. The Proponent is committed to making reasonable efforts to achieve the City's goal to control the percentage of trips made by automobile at 50 percent or less, consistent with SomerVision. If annual monitoring and reporting identifies a shortfall in meeting this goal, additional mobility management programs and services must be implemented.

The annual update to the Mobility Management Plan, to be submitted to the City, will include the following the components:

- › Annual travel survey of employees;
- › Annual reporting of parking utilization for each parking garage and parking lot. This will be done through an inventory to be conducted for a representative weekday midday period when it can reasonably be assumed that the combined peak parking demand for employees and visitors would occur;
- › Biennial (every other year) counts of entering and exiting automobile trips for the parking garage proposed as part of the Project; and
- › A status summary of the MMP in place at the Project Site will be provided.

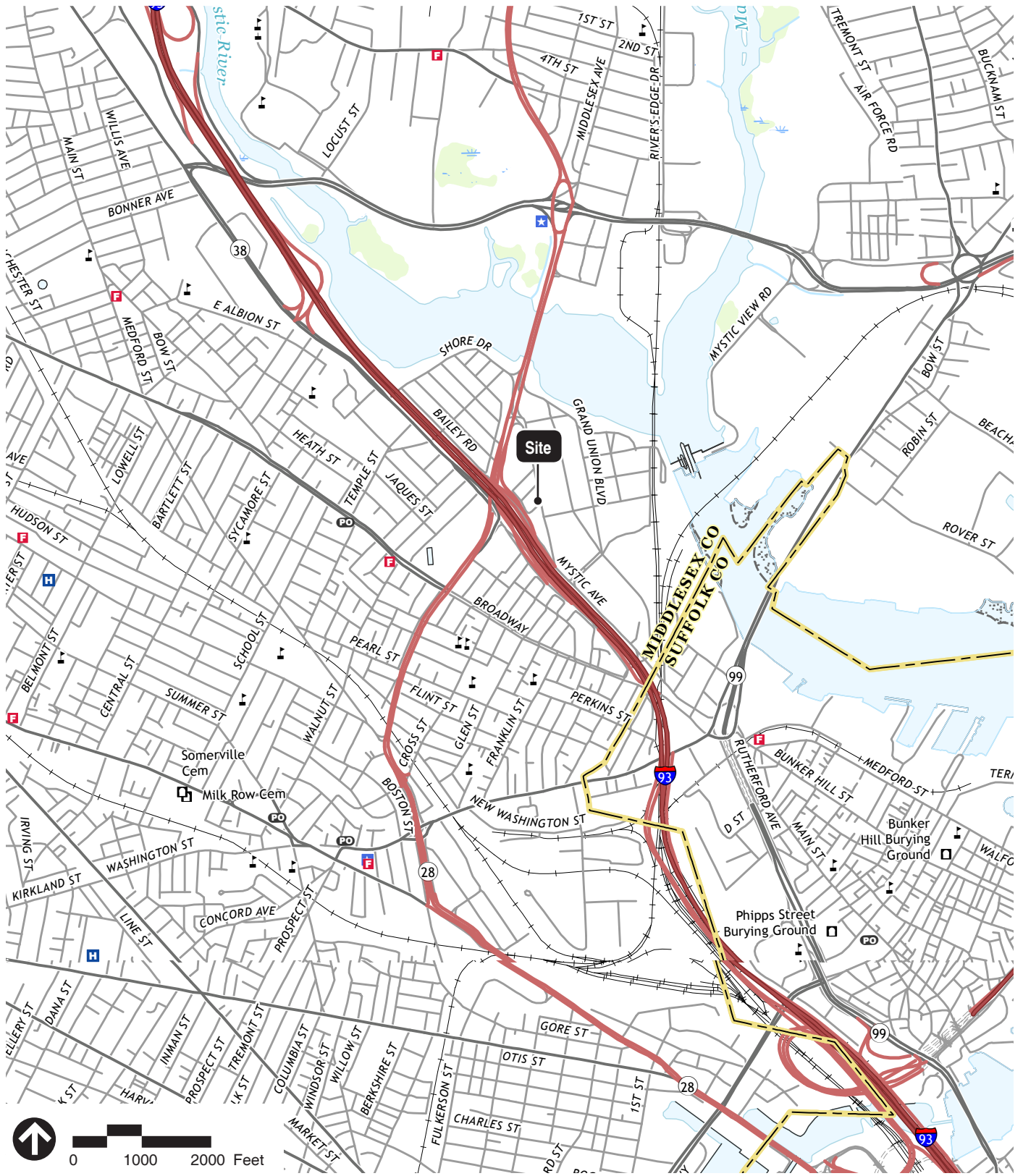
In keeping with standard practices for the City of Somerville, all the monitoring outlined above will occur during the months of April/May or September/October, unless other time periods are pre-approved by the City.

3.9 Conclusion

The Project is consistent with the City of Somerville's transportation-related goals for the Assembly Square district, and the Project is highly consistent and complementary to the surrounding developments in this area. The Project Site has been designed to accommodate Project-generated traffic, as well as traffic other nearby planned or potential developments. In summary, the Project will provide the following transportation-related benefits:

- › The Project will be a mixed-use, transit-oriented development consistent with the City's goals for this area. With the mixed-use environment, there should be considerable internal trip-sharing between the various uses proposed within the site. For example, the retail and restaurant space provided should be largely oriented to workers already on-site as opposed to traditional shopping center.
- › The proposed on-site parking supply will be kept to the minimum levels needed to satisfy tenant needs, while being low enough to help promote travel by biking, walking, or using MBTA transit service, including the nearby MBTA Orange Line Assembly station.
- › Ample secured bicycle parking will be provided within the Project building, with supplemental outdoor bicycle racks provided near the building entrance.
- › The transportation analysis for the Project was conducted in a highly conservative manner. The underlying mode shares used assume higher automobile use than is anticipated for this area based on prior studies. However, the conservatively high auto use was assumed so that the maximum potential vehicular traffic on the Study area roadways would be evaluated.¹⁰
- › New and improved sidewalks surrounding the Project Site will help to build upon recently implemented pedestrian improvements in the area, providing an overall cohesive pedestrian-friendly environment within the ASMD.
- › Streetscape improvements along Middlesex Avenue include extending the curb-line outward from the Project Site to match the planned dimensions associated with the City's Middlesex Avenue enhancements, which include new separated bicycle lanes traveling in both directions.

¹⁰ Refer to Appendix C for a memo that provides an update to the Project trip generation based on the revised building area.



Source: USGS Topo Quad, Boston South & Boston North



Figure 3.1
Site Location Map

**EDGE Assembly Square
Somerville, Massachusetts**



Source: NearMap Aerial, City of Somerville GIS

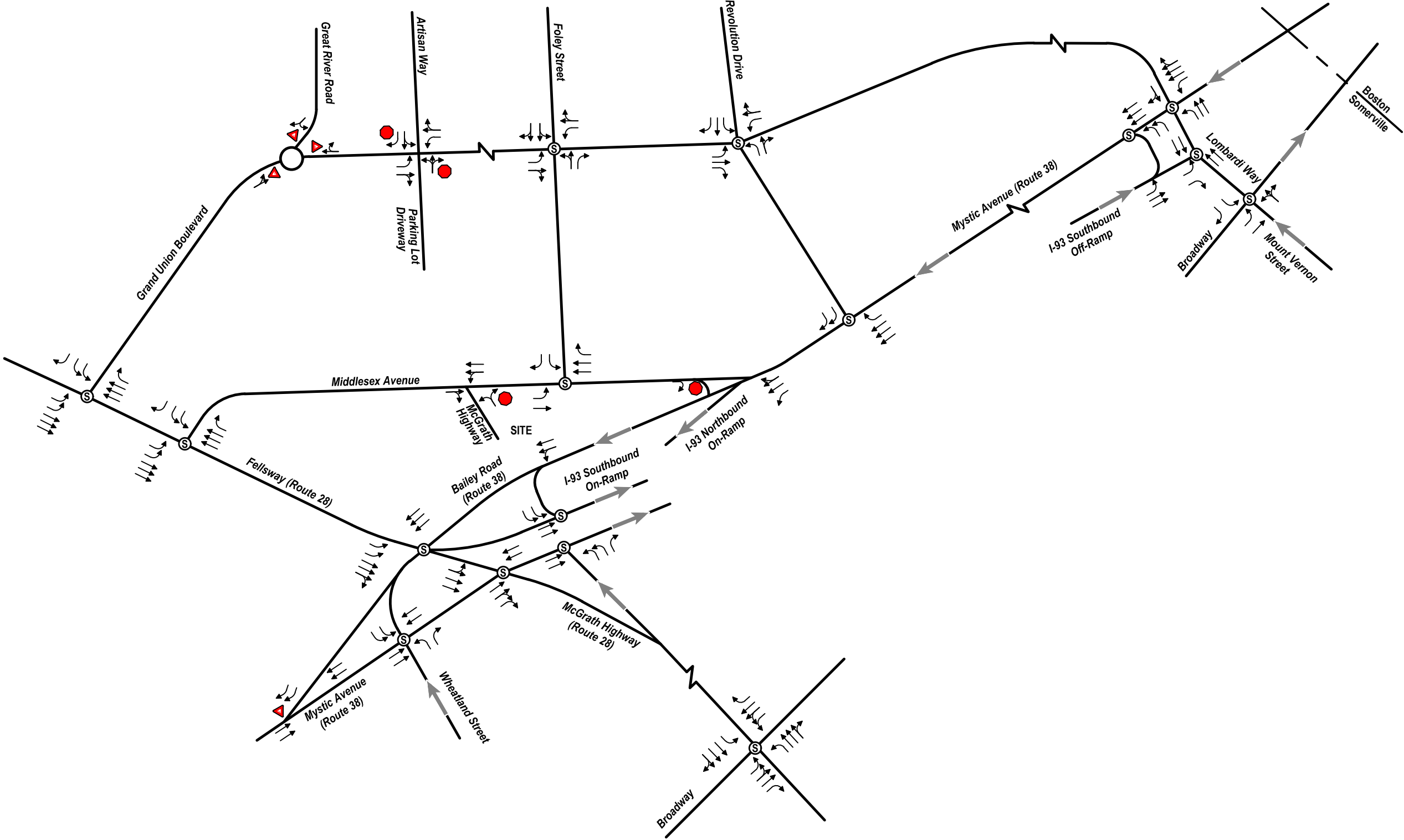


Figure 3.2
Study Area Intersections

- #** Signalized Intersection
- #** Unsignalized Intersection

**EDGE Assembly Square
Somerville, Massachusetts**

- Ⓢ Signalized Intersection
- Stop Controlled Approach
- ▼ Yield Controlled Approach



Not to Scale

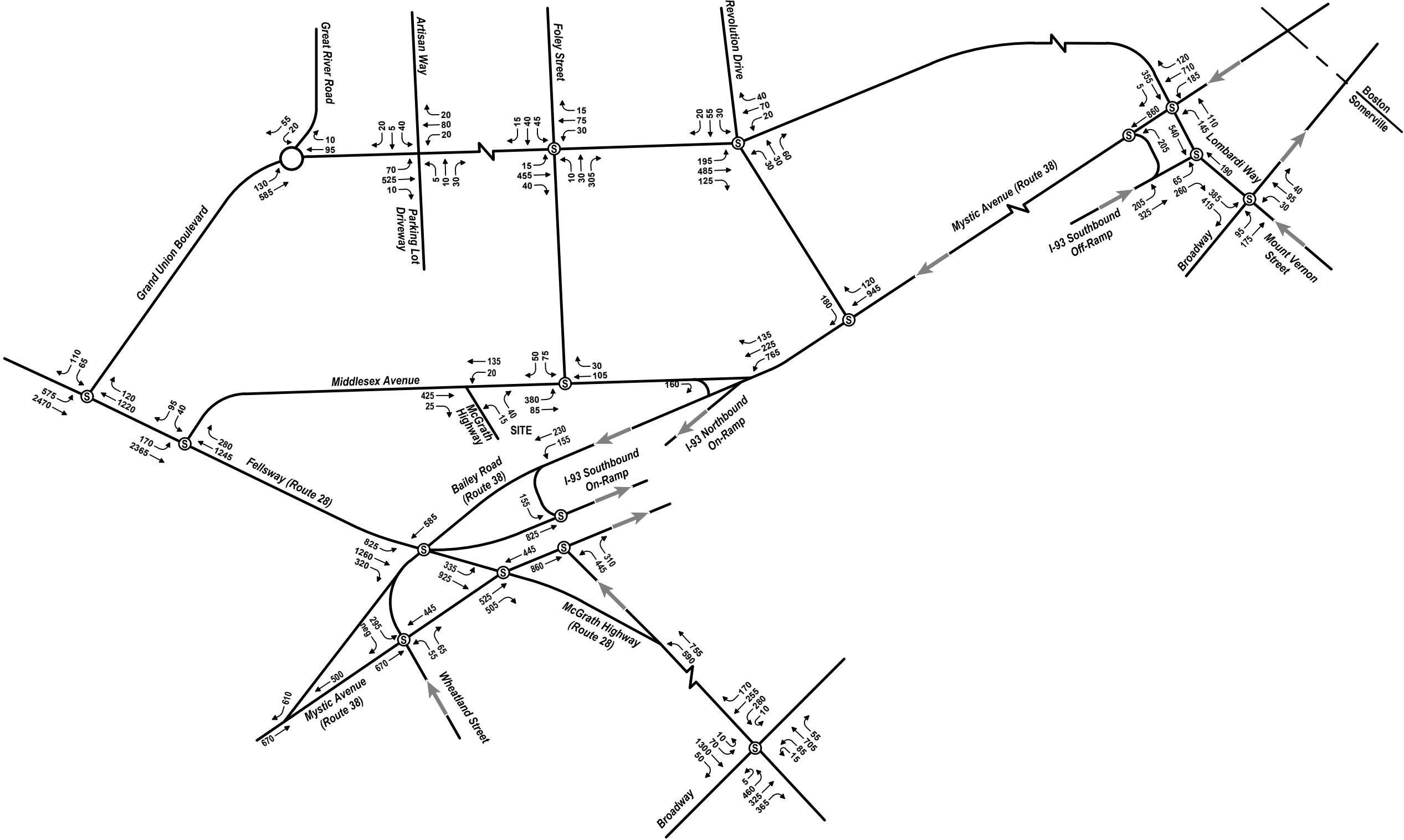


Lane Geometry and Traffic Control

EDGE Assembly Square
Somerville, Massachusetts

Figure 3.3

Ⓢ Signalized Intersection
neg = Negligible



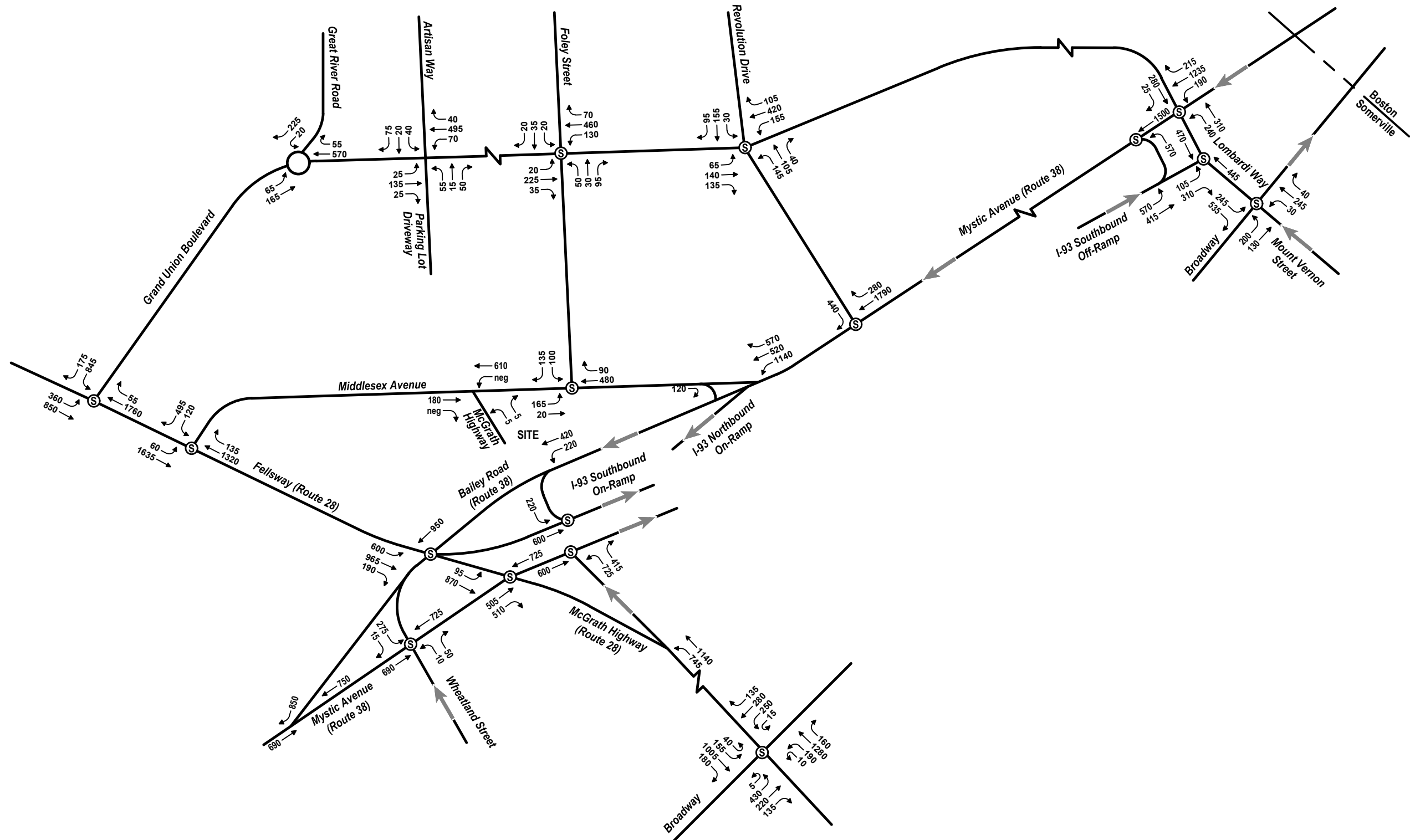
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Existing Conditions Vehicle Volumes
Morning Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

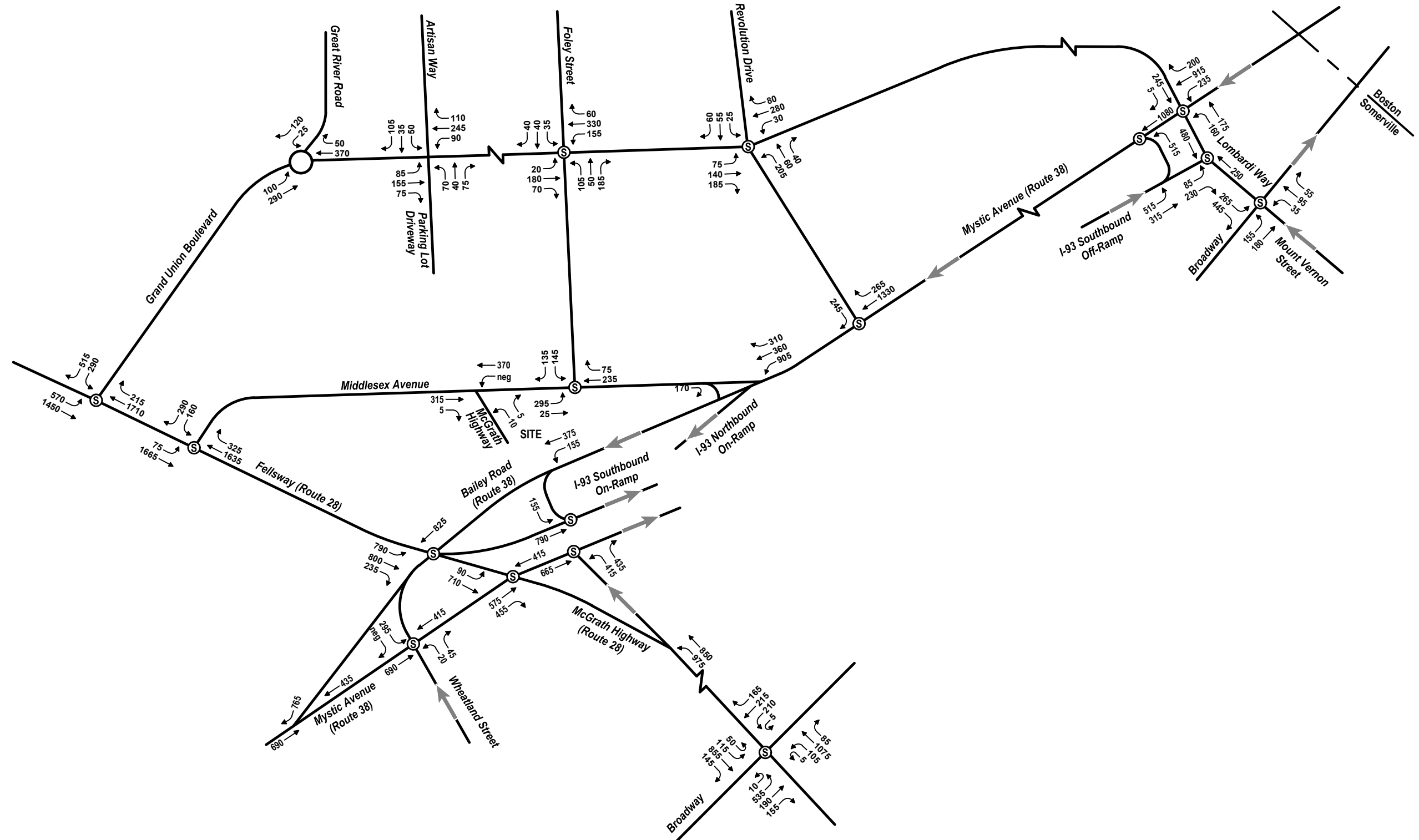
Figure 3.4

neg = Negligible

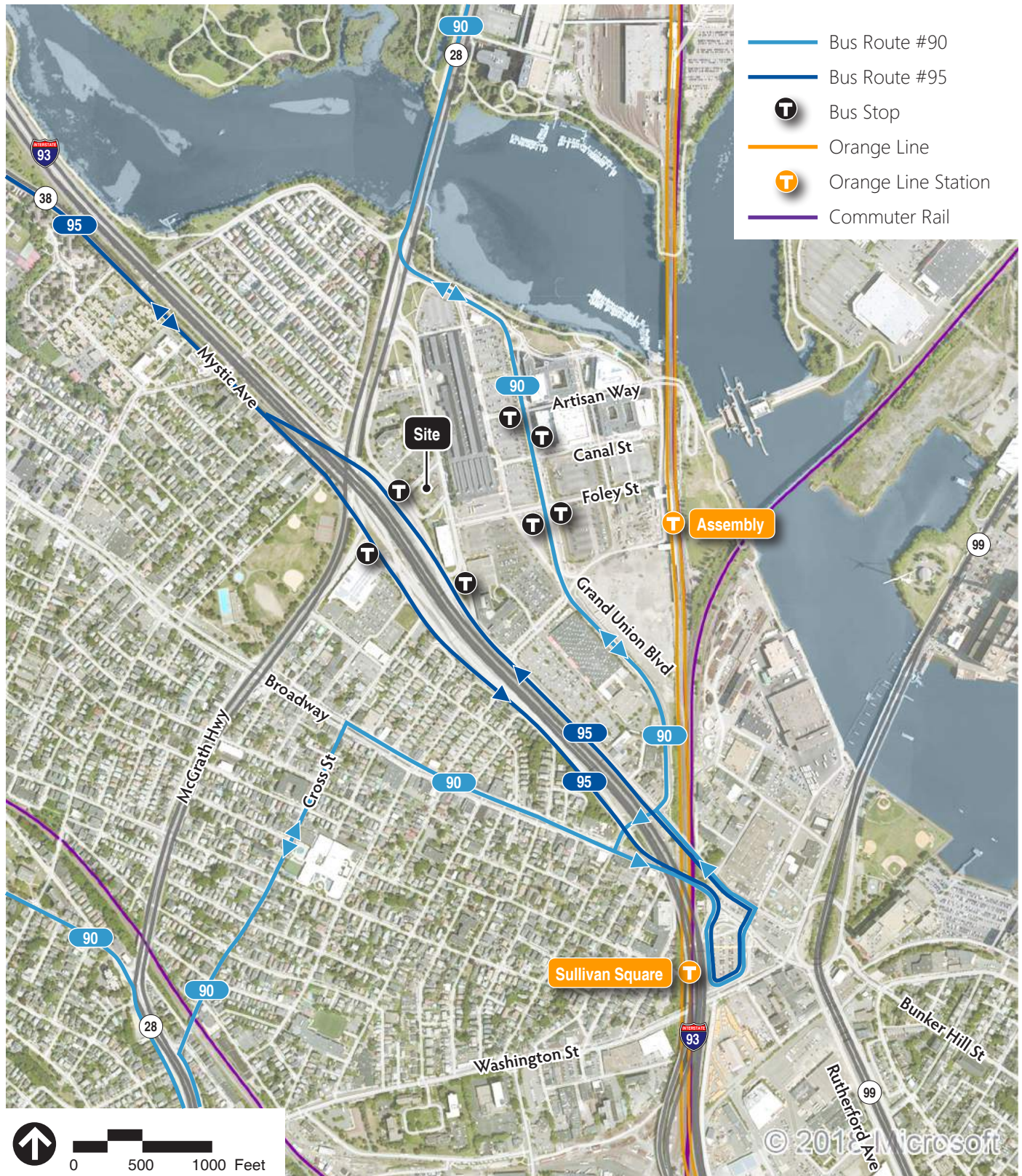


Ⓢ Signalized Intersection

neg = Negligible



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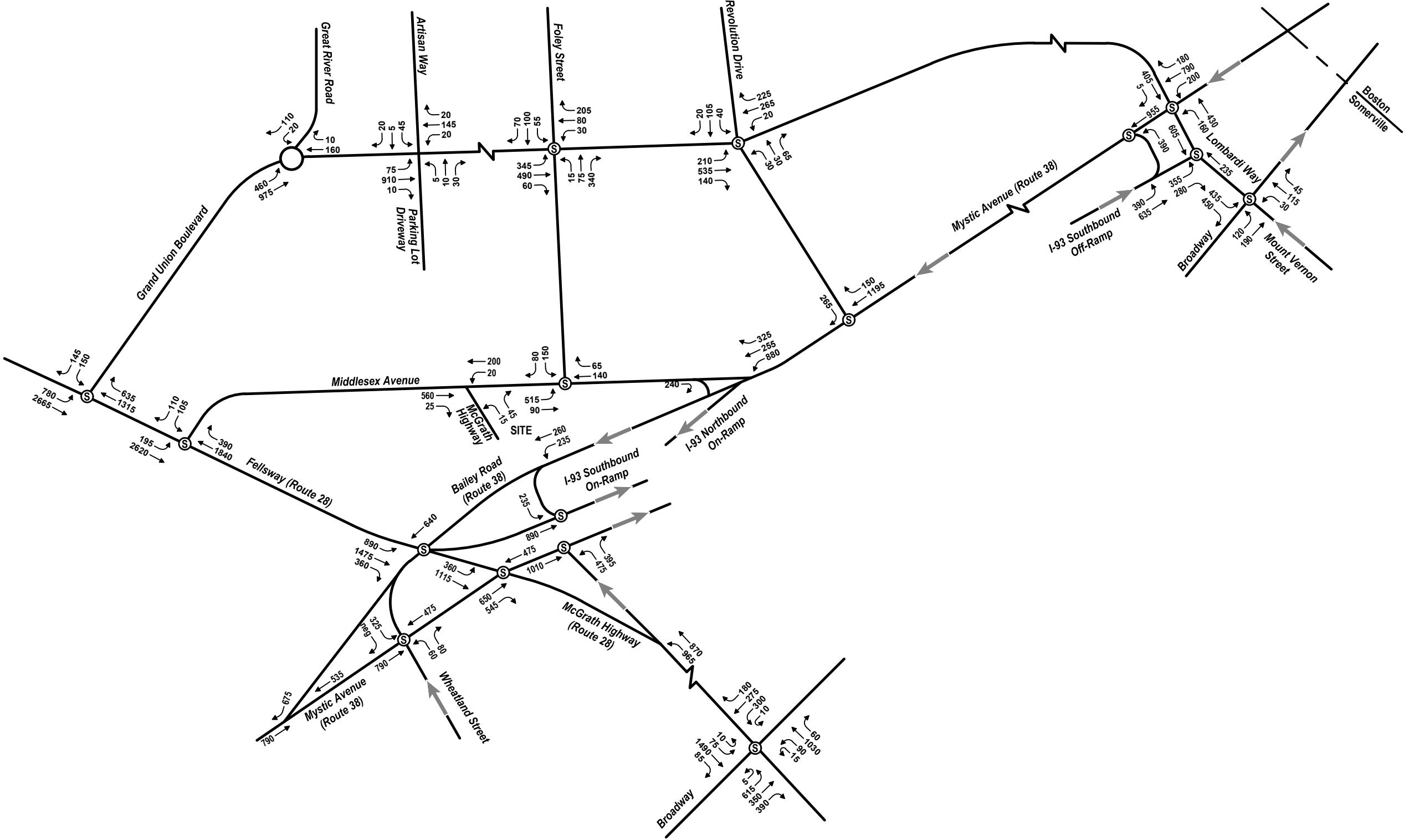
Source: Bing Aerial, MassGIS



Figure 3.7
Existing Transit Service Map

**EDGE Assembly Square
Somerville, Massachusetts**

Ⓢ Signalized Intersection
neg = Negligible



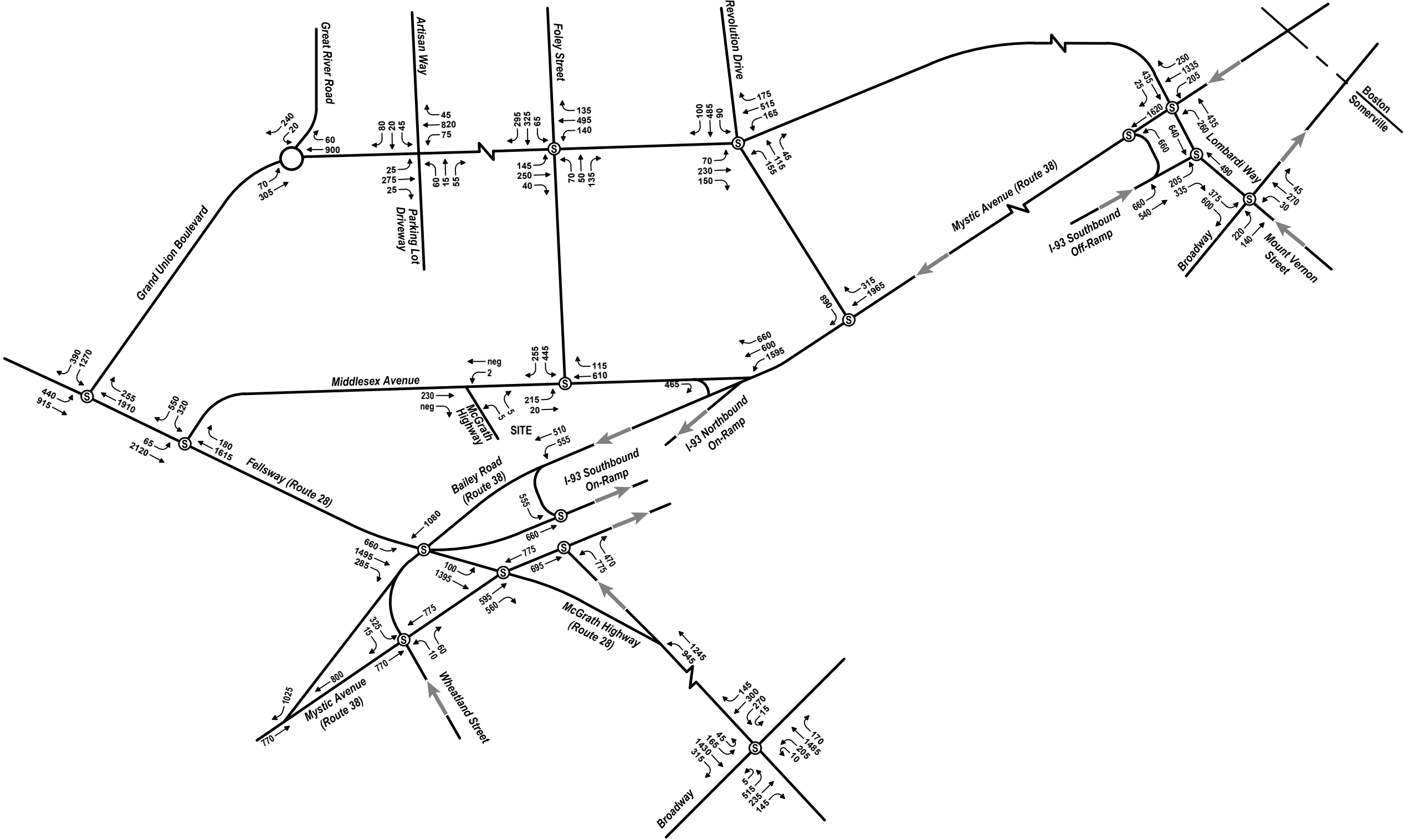
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No Build Conditions Vehicle Volumes
Morning Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

Figure 3.8

Ⓢ Signalized Intersection
neg = Negligible



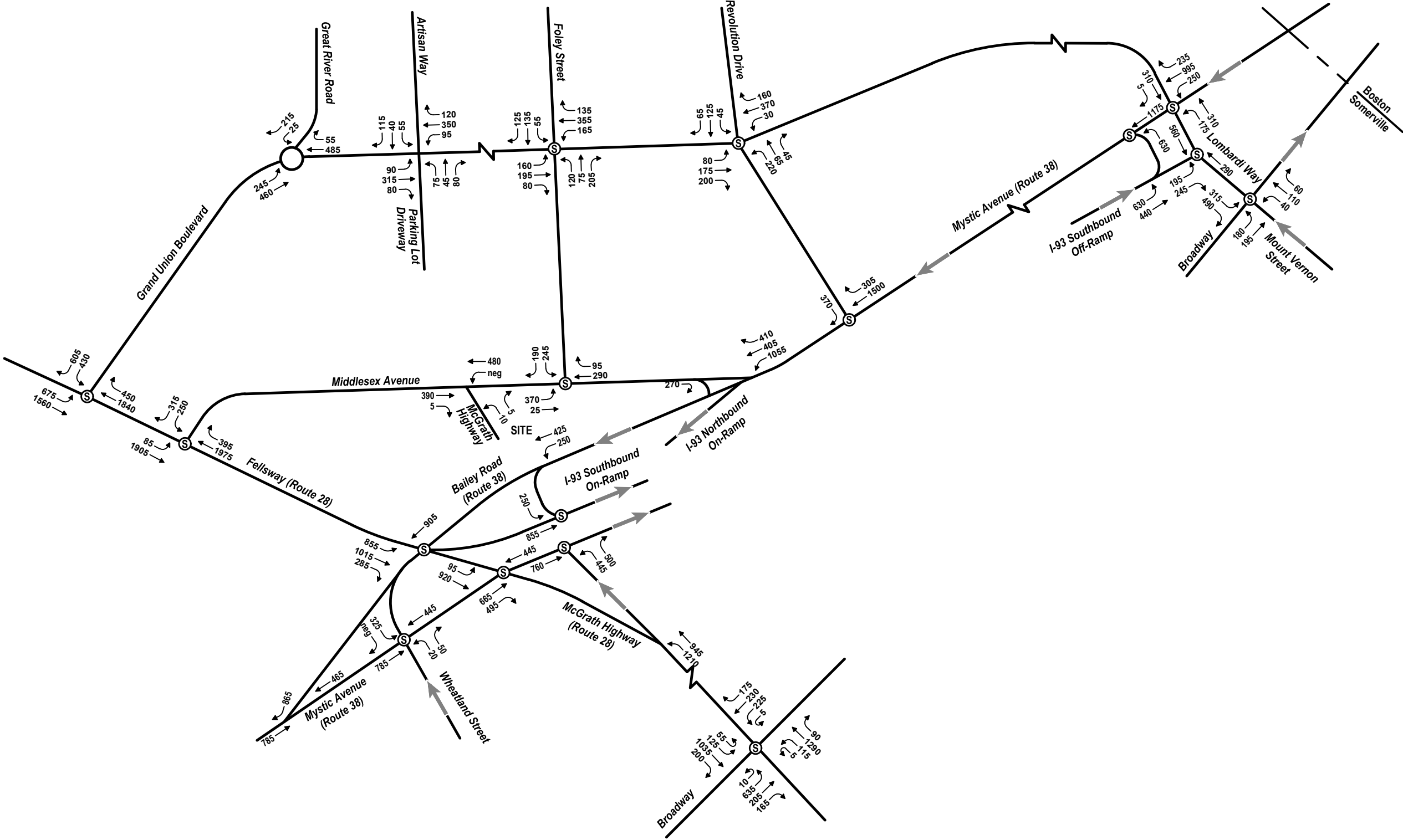
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No Build Conditions Vehicle Volumes
Evening Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

Figure 3.9

Ⓢ Signalized Intersection
neg = Negligible



Not to Scale



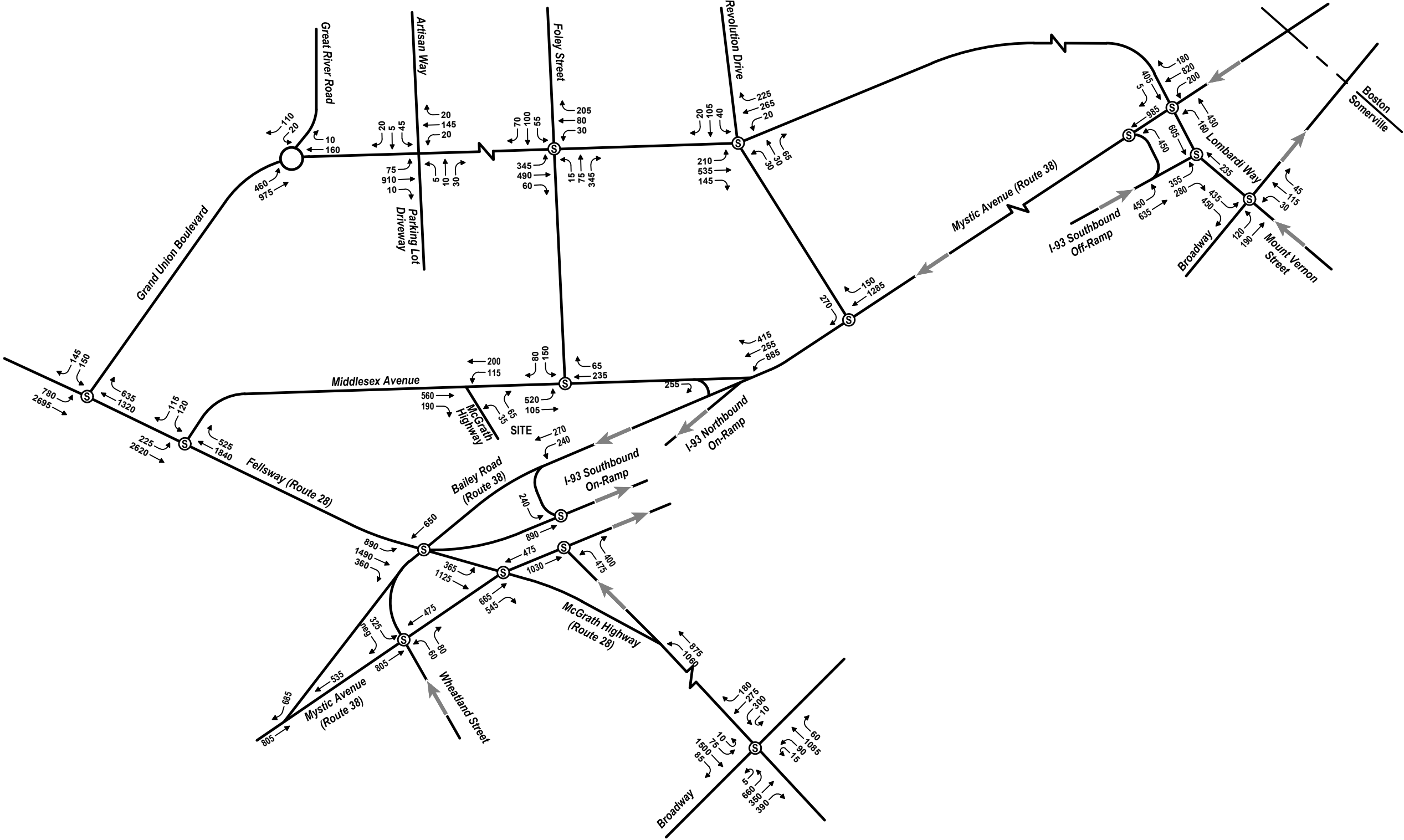
No Build Conditions Vehicle Volumes
Saturday Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

Figure 3.10



Figure 3.11

Ⓢ Signalized Intersection
neg = Negligible



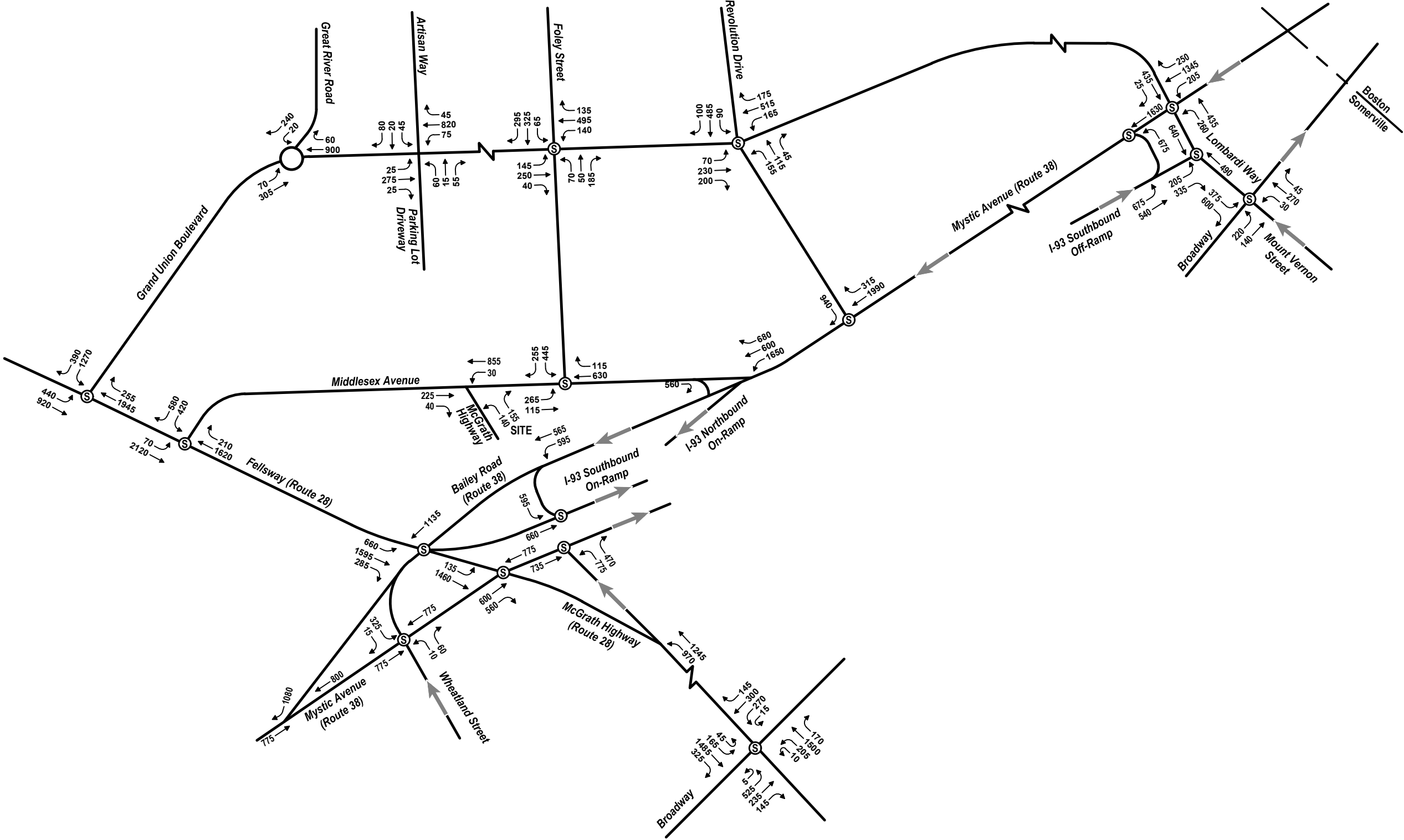
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Build Conditions Vehicle Volumes
Morning Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

Figure 3.12

Ⓢ Signalized Intersection
neg = Negligible



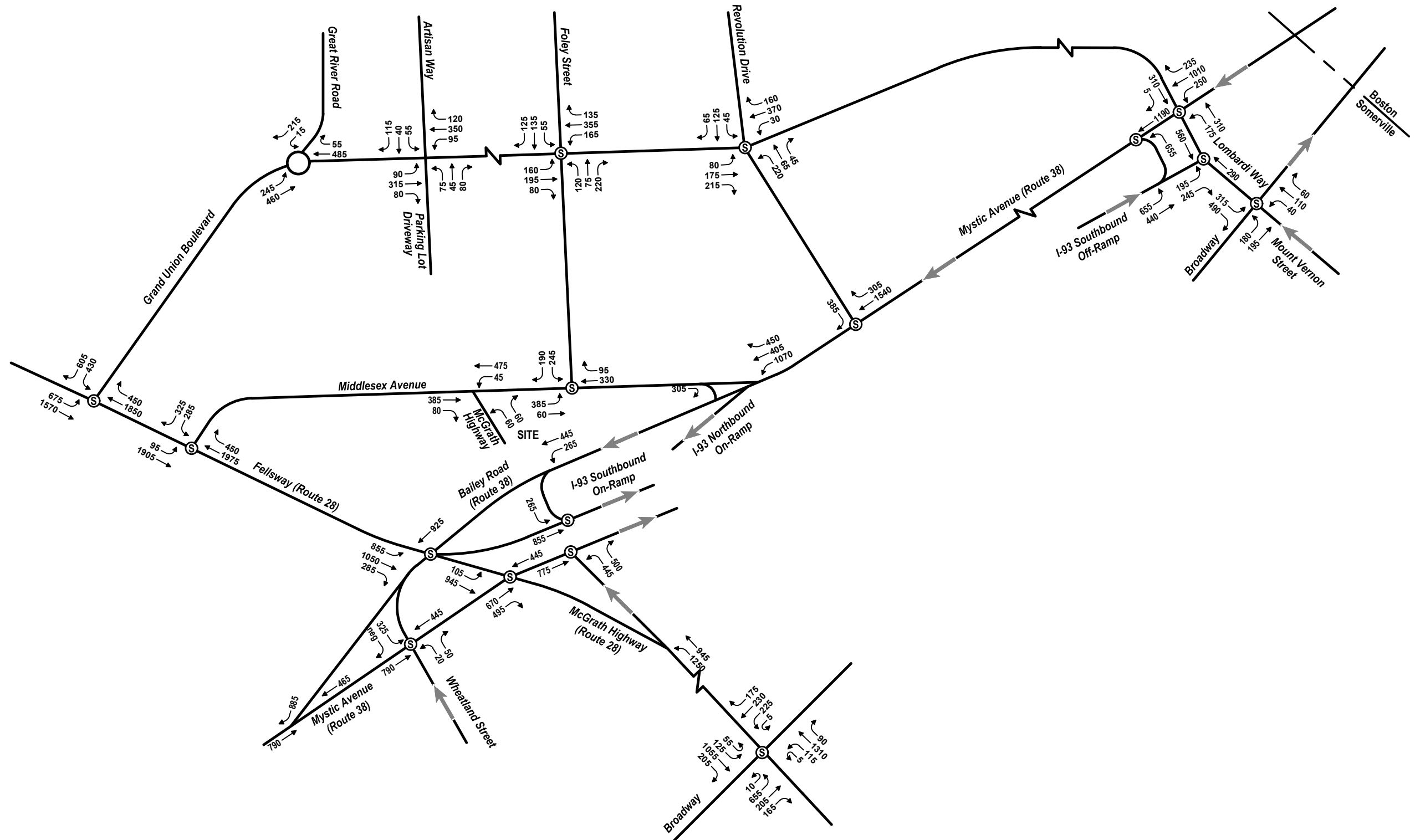
Build Conditions Vehicle Volumes
Evening Peak Hour
EDGE Assembly Square
Somerville, Massachusetts

Figure 3.13



Not to Scale

neg = Negligible



4

Utility Analysis

This chapter presents an analysis of the infrastructure aspects of the Project, as described in detail in Chapter 2, *Project Summary*. Specifically, this evaluation includes the following elements:

- › Existing and proposed water distribution system;
- › Existing and proposed sanitary sewer system;
- › Existing and proposed stormwater management system; and
- › Utilities analysis.

Please refer to Figure 4.1 for an Existing Conditions Plan, Figure 4.2 for a Layout and Materials Plan, and Figure 4.3 for a Grading, Drainage and Utilities Plan.

The City Engineering Department has confirmed that in the vicinity of the Project, the City owned existing infrastructure has adequate capacity, including water, sanitary sewer and storm drain. There are several private utility companies that had previously served the Project Site; therefore, it is anticipated that any other required utility company would be ready to serve the Project as well.

The Project proposes one new domestic water service connections as well as two new fire protection water services from existing 16-inch water main that runs along McGrath Highway and Cummings Street. There are two proposed sewer connections to the City's system as depicted on Figure 4.3. Refer to Appendix D for wastewater generation calculations as well as the pipe capacity analysis.

4.1 Study Description

This evaluation was developed following review of available information provided by the City of Somerville and other resources obtained from the private utility companies. During an initial meeting with City Engineer on January 29, 2020 the existing infrastructure and the Project's water and sewer needs were reviewed to determine existing conditions at the Project Site and parameters for design. No issues relative to existing water, sewer and drain capacity are anticipated for the Project.

4.2 Summary of Key Findings and Benefits

The key impact assessment findings related to infrastructure systems include:

- › The existing utility infrastructure systems are expected to be adequately sized to accept the demand associated with the development and operation of the Project.

- › The Project will comply with the City's Policy for New Connections and Modifications to Existing Connections to the Municipal Sewer and Drain System, Stormwater Management, and Infiltration/Inflow Mitigation, last updated 14 May 2018.
- › The Project is estimated to generate approximately 38,700 gallons per day ("GPD") of sanitary sewage and will require approximately 42,570 GPD of water.
- › The design team will analyze feasibility of reusing stormwater for the Project's irrigation system in the next design phase. Reusing stormwater is not required by the City, however, the application is credited towards the I/I fee.

4.3 Water Supply and Distribution

4.3.1 Existing Water Supply and Distribution System

The City's Water and Sewer Department (SWSD) owns, operates and maintains the public water supply distribution system in the Project area. This public water supply distribution system will provide both the domestic and fire protection flows for the Project. The City purchases all of its water from the Massachusetts Water Resources Authority (MWRA). The water is delivered through seven MWRA master meters into the City's distribution system.

A 12-inch main is currently located on the Project side of Kensington Avenue which supplies water to the existing building on the Project Site.

Existing Water System Demands

The current on-site user consists of two restaurants (Dunkin Donuts and the Sunrise Caribbean Restaurant). The current usage at the Project Site is estimated to be approximately 3,630 GPD.

Existing Water System Analysis

There is a looped water distribution system built around the property. The pipe sizes vary from twelve to twenty inches. The existing building is served from 12-inch water main in Kensington Avenue. There are two hydrants for fire protection in the vicinity of the Project Site.

Based on discussions with the City's Engineering Department, the system should have adequate capacity to serve the Project.

4.3.2 Proposed Water System

Proposed Water System Demands

The Project, as currently proposed is estimated to use approximately 42,570 GPD. This is a net increase of 38,940 GPD at the Project Site.

Proposed Water System Analysis

Based on a preliminary meeting with the City Engineering Department, at this design phase of the Project, it was recommended to use available data for pressure and flow information. As the design progresses, a flow test will be completed to verify that adequate flow and pressure are available.

During final design phase a detailed analysis will be performed to determine the pipe sizing of the domestic supply to the building in accordance with the Plumbing Code. Currently, one domestic and two fire protection services are proposed for redundancy. The locations of proposed connections will be confirmed with the City Engineer.

4.4 Sanitary Sewer

4.4.1 Existing Sewer System

The existing sanitary sewer system consists of an eight-inch sewer pipe in Kensington Avenue flowing into an eight-inch vitrified clay sewer in Cummings Street, ultimately flowing west to the MWRA sewer located on the west side of the ROW.

Existing Sewer System Analysis

During a recent meeting with the City of Somerville, the engineering department did not express any concerns in regard to sewer capacity.

A sewer system analysis was performed by analyzing existing wastewater flows into an eight-inch pipe. The pipe, essentially, carries the flow from the project area to the Marginal Facility. The City has provided tributary sewer flow data from the associated accounts for annual water usage. It was determined that total existing flow equals to 0.025 CFS, refer to Appendix D for details. The analysis has also determined available pipe capacity for future flows, which will be able to accommodate the project.

Assuming that the eight inch pipe has a minimum slope of 0.004 ft/ft required by the engineering standards, Manning roughness coefficient for clay pipes is 0.011, using the nomograph provided in Appendix D, the pipe capacity will be equal to 1.0 CFS.

4.4.2 Proposed Sewer System

The Project is expected to generate design flow of approximately 38,700 GPD of sanitary sewer discharge from the Project Site. Recognizing the existing sewer flows from the existing uses on the Project Site, the Project will generate additional new design flows to the municipal sewer system of 35,400 GPD.

The sanitary sewer peak flow rates have been calculated by multiplying the average daily flow by a peaking factor of 5.6, resulting in a peak flow of approximately 108,360 GPD. The determination of flows was completed in accordance with the New England Interstate Water Pollution Controls Guide, "Guides for the Design of Wastewater Treatment Works, TR-16, Revised 2016."

Proposed Sewer System Analysis

Based upon the proposed flows, the peak flow from the Project is estimated to be 0.17 CFS. The total proposed flows from the Project is 0.06 CFS, which is substantially less than the existing capacity of the system, refer to Appendix D for the calculations.

Proposed Sewer System Improvements

The Project proposes two sewer services from the Project to the City's system located along Cummings Street and McGrath Highway, refer to Figure 4.3.

Sewer Mitigation / Infiltration and Inflow (I/I)

The Project will comply with the City's Policy for New Connections and Modifications to Existing Connections to the Municipal Sewer and Drain System, Stormwater Management, and Infiltration/Inflow Mitigation, last updated 14 May 2018. Payments will be made to the City based on design flows calculated based on the mix of office and Lab/Research & Development uses identified at building and sewer connection permits.

4.5 Stormwater Drainage System

4.5.1 Existing Drainage Conditions

The existing storm drainage system consists of several catch basins on the abutting streets that collect stormwater and ultimately discharge to a 7.5-foot high by 10-foot wide MWRA storm drain that outfalls to the Mystic River. This MWRA drain also passes wet weather sewage and combined stormwater overflow from the MWRA's sewer collection system.

Two catch basins on McGrath Highway collect stormwater, which discharges directly into the culvert. One catch basin on Kensington Ave to the west of the Project Site, (also known as Cummings Street), collects stormwater, which flows through a 12-inch reinforced concrete pipe into the culvert. Two catch basins on Kensington Avenue collect stormwater, which flows through a 10-inch drain (located above the sewer line) to a 36-inch drain under I-93. The on-site drainage consists of two catch basins that tie into the 12-inch RCP drain line on Middlesex Avenue.

4.5.2 Proposed Stormwater Management System

The proposed stormwater management plan consists of reducing peak runoff, capture and recharge of 0.8-inch of stormwater runoff from the building roof top, the sidewalks and other on-site impervious areas. A new drainage system will collect stormwater and discharge it to a ground water recharge system.

Reduction of runoff to the City of Somerville's drainage collection system is anticipated as well by diverting the drainage pattern to the new system. The concept will also consist of:

1. **Water Quality Control** – The Project Team will continue to evaluate stormwater best management practices (BMPs) to improve run-off quality, and reduce peak flows to the City system. Several options are continuing to be explored for retention and/or reuse, which include a combination permeable pavements and infiltration system.

The Project will replace existing catch basins that do not have four-foot deep sumps and an outlet hood. The sump captures coarse grained sediment and the hood prevents floatables from being transported to the receiving water. The catch basins with deep sumps and hoods receive a 25 percent total suspended solids (TSS) removal credit.

Rooftop runoff will be collected by the site drainage system, divert the flow to a recharge system and infiltrate underneath the portion of streetscape along Middlesex Avenue adjacent to the Project Site. Rooftop runoff does not require treatment, therefore can be potentially discharged directly to the City's drainage system or as an overflow from the proposed infiltration system. The Project will evaluate the potential of recharge for roof runoff for feasibility given the possibility for migration of contaminants into the soil under the Project Site.

The infiltration system will be designed to infiltrate the runoff thereby reducing total runoff volume. Runoff from paved surfaces will be pretreated by a deep sump catch basin before being discharged to the infiltration system.

Porous/permeable paving is being proposed for on-site hardscape surfaces outside of the garage footprint. Porous pavers would infiltrate stormwater in-place, and reduce the flow and volume of run-off from these paved surfaces.

2. **Operations and Maintenance** – A Long-Term Operations and Maintenance (O&M) Plan will be prepared which provides detailed procedures and a schedule for maintaining each of the BMPs. It is anticipated that the O&M plan will be formalized in an agreement with the City to maintain the proposed BMPs.

4.5.3 Stormwater Reuse

The design team will analyze feasibility of reusing stormwater for the Project's irrigation system in the next design phase. Reusing stormwater is not required by the City, however, the application is credited towards the I/I fee. Furthermore, harvesting requires storage space and challenging operational conditions. Since the

Project Site has limited space, it's feasibility will be analyzed in detail during the next design phase.

4.6 Utilities

4.6.1 Gas Distribution System

National Grid provides natural gas in Somerville. The nearest gas source to the Project is a six-inch gas main in Middlesex Avenue with a stub of six-inches down McGrath Highway to serve the LaQuinta. A six-inch stub down Kensington Avenue services the existing building.

Although Proponent is researching a possibility of the building to potentially be serviced by electrical power only, a gas connection will be accounted for.

4.6.2 Electrical Distribution System

NSTAR supplies electricity to the area. The Project team will work with NSTAR and the Project's Electrical Engineer to determine the size and source for the Project's electrical system. The Electrical Engineer will design the electrical infrastructure for the Project.

There are utility poles with overhead wires along Middlesex Avenue. Some of the poles are bent to certain degree and their appearance is not esthetically pleasing. Therefore, the project will explore a possibility of relocating the wires underground.

4.6.3 Telephone Distribution System

Verizon supplies telephone services to the Project area. The system consists of above and below ground infrastructure. The Project team will work with Verizon and the Project's Electrical Engineer to determine the size and source for the Project's electrical system. The Electrical Engineer will design the telephone infrastructure for the Project.

4.6.4 Fire Alarm System

The City's Department of Public Works (DPW) Electric Lights and Lines Division manage fire alarms in the City. The Project team will work with the City and the Project's Electrical Engineer to determine the size and source for the Project's fire alarm system. The Electrical Engineer will design the fire alarm infrastructure for the Project.

In order to provide sufficient coverage for the Project, the Project team and the electrical engineer will coordinate with the City's Fire Chief to meet the City's requirements.

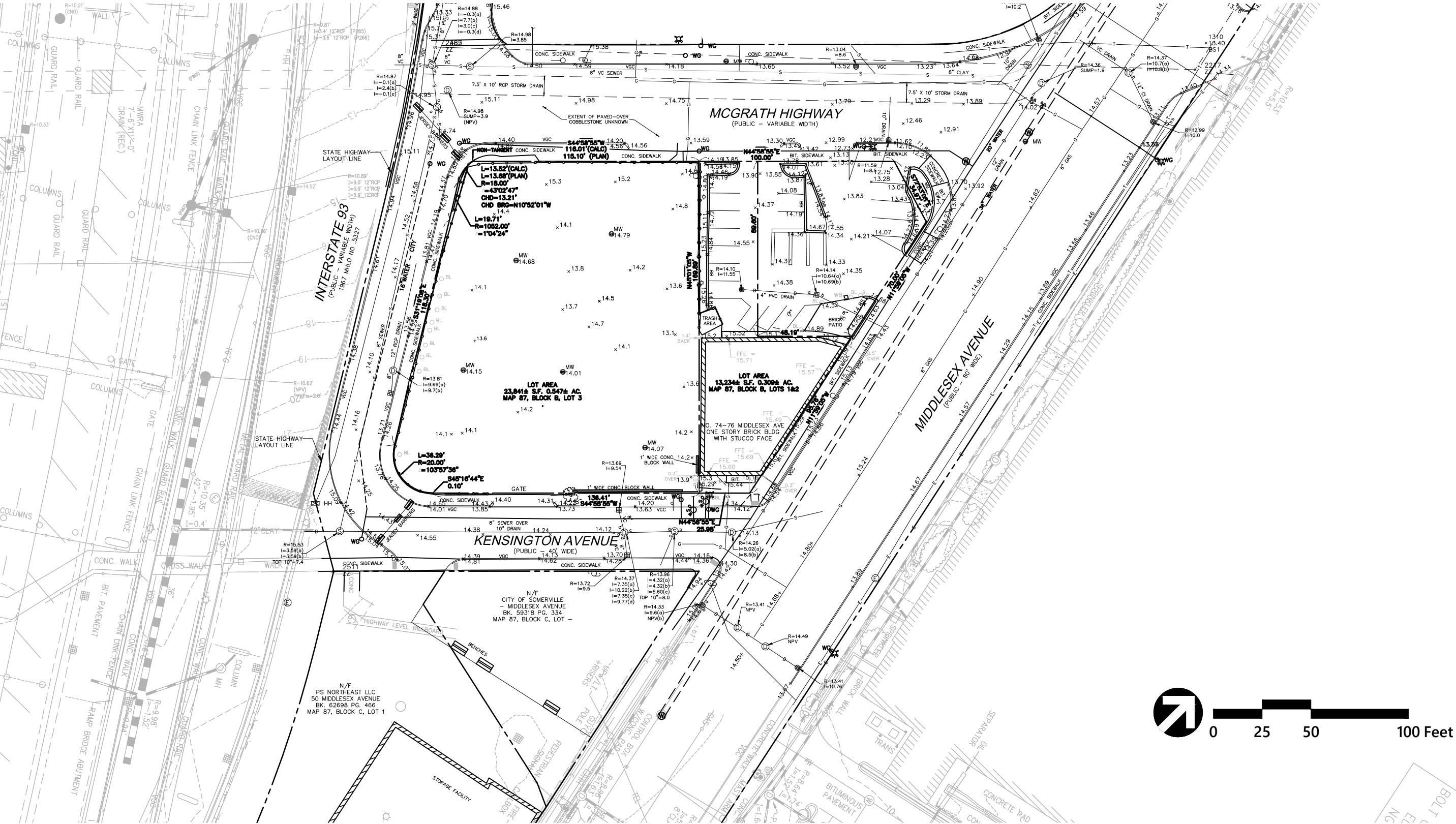
4.6.5 Cable Television System

Verizon/RCN/Comcast provides cable TV/Internet Service to the Project area. The Project team will work with the providers and the Project's Electrical Engineer to determine the size and source for the Project's Cable TV/Internet Service. The Electrical Engineer will design the cable TV/Internet infrastructure for the Project.

4.7 Summary

The construction of the utility infrastructure is planned to begin in 2021. It's our understanding that existing utilities in the vicinity of the Project are adequate and have the capacity to serve the project. The water system will be designed adequately to provide water during the average day demand and peak fire flow conditions. The sewer system will be sized to carry all flows from the proposed development to the City's sewer system. The sewer flows generated will be mitigated at a 4:1 ratio. The stormwater management system will be designed to reduce runoff from the site and provide groundwater recharge. Coordination with private utilities is ongoing and will continue throughout the design and construction of the Project. As the design advances, the Project will be reviewed by the City as part of the Site Plan approval process.

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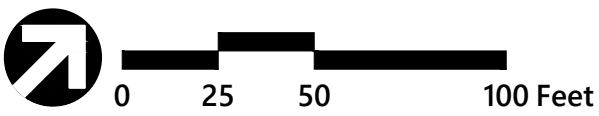
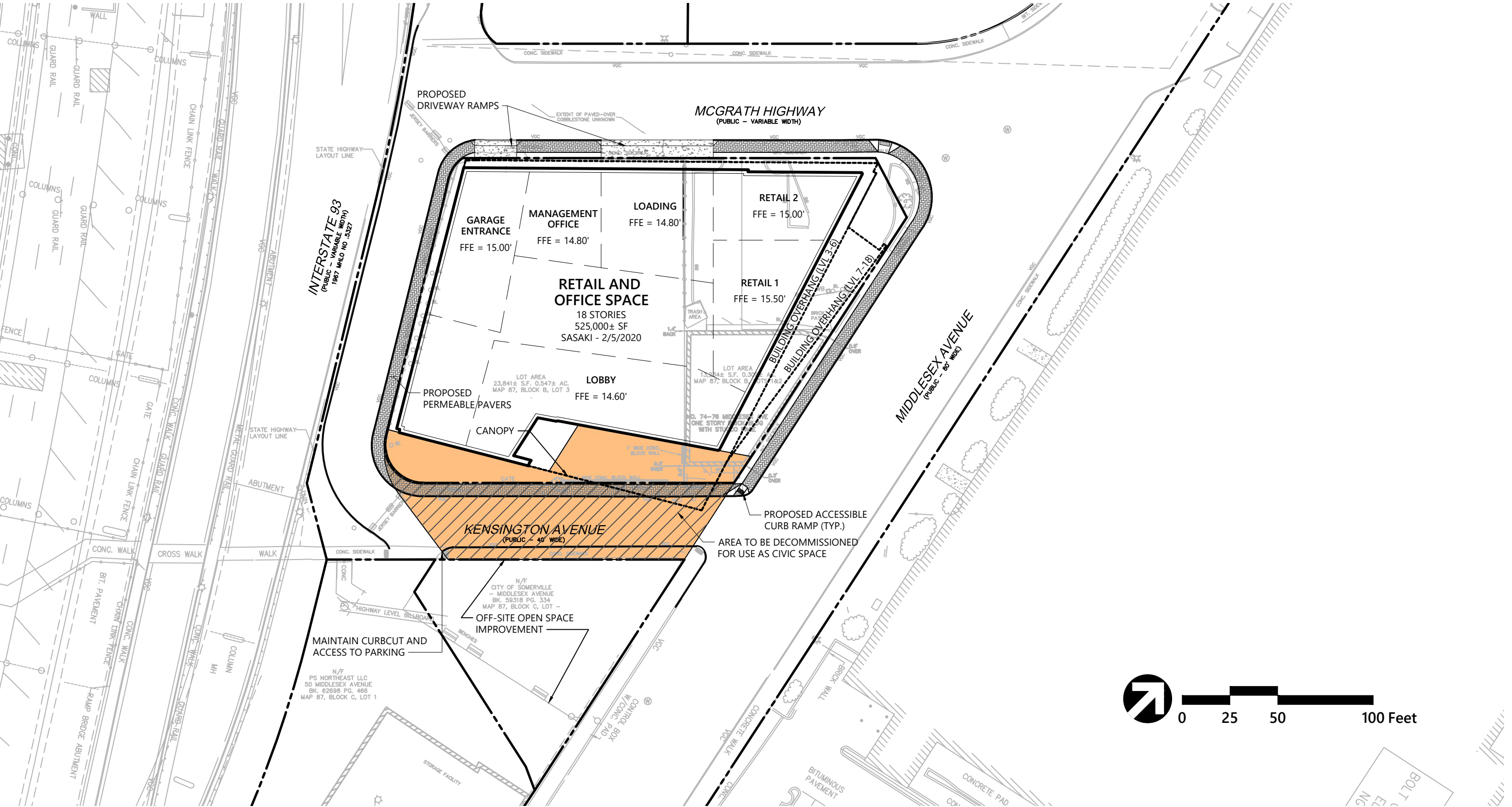
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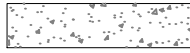
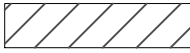
1. THE PROPERTY LINES SHOWN WERE DETERMINED BY AN ACTUAL FIELD SURVEY CONDUCTED BY DESIGN CONSULTANTS, INC. (DCI) AS WELL AS SUPPLEMENTED WITH THE CITY OF SOMERVILLE AND VHB RECORD INFORMATION.
2. THE TOPOGRAPHY AND PHYSICAL FEATURES ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED ON THE GROUND BY DCI DURING SEPTEMBER 16, 2016 AND OCTOBER 3, 2016.




Figure 4.1
Existing Conditions Plan

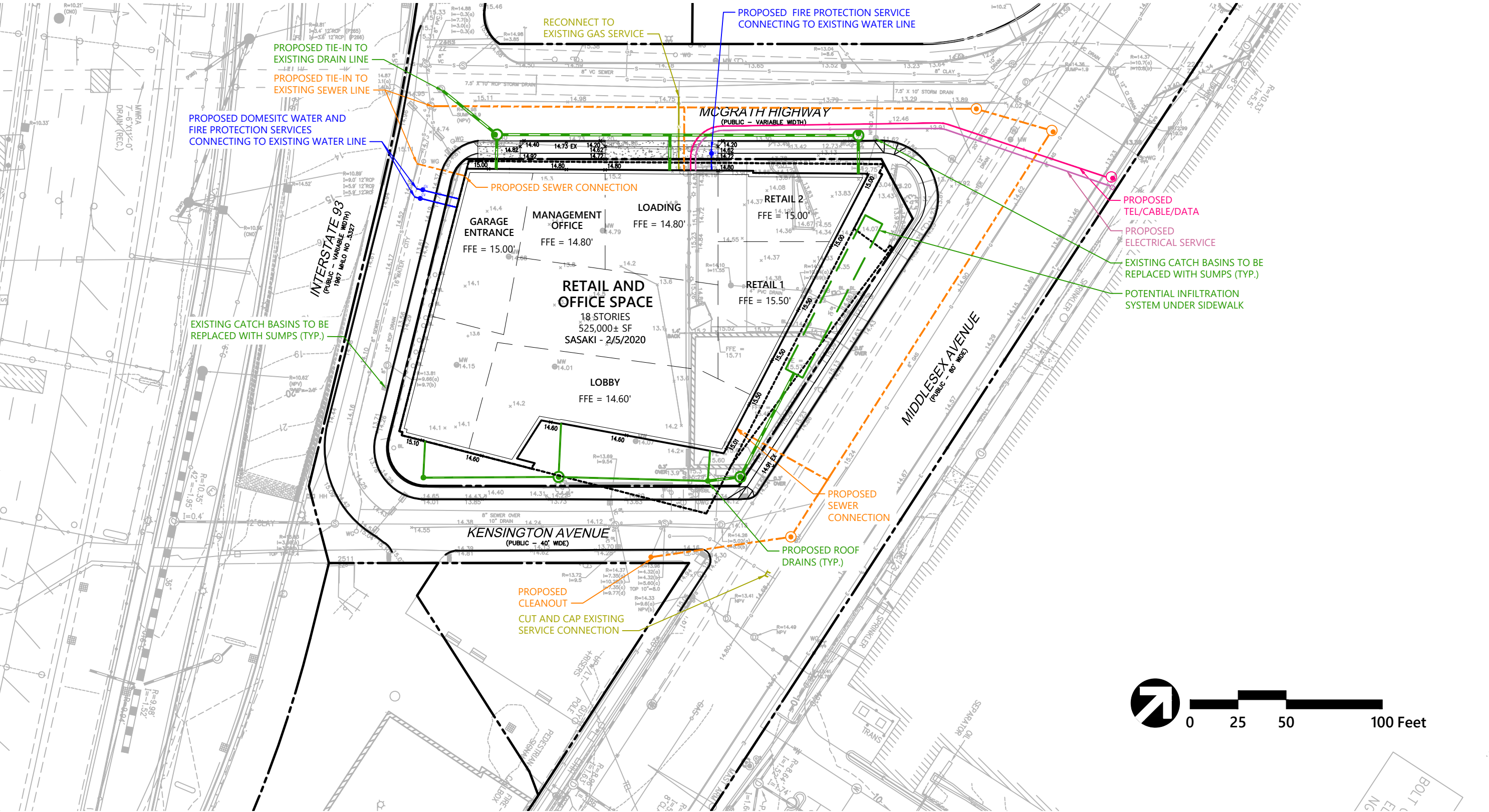
EDGE Assembly Square
Somerville, Massachusetts



- | | |
|---|---|
|  Proposed Permeable Pavers |  Proposed Civic Space |
|  Proposed Driveway Aprons |  Area to be Decommissioned For Use as Civic Space |

 **Figure 4.2**
Layout and Materials Plan

EDGE Assembly Square
Somerville, Massachusetts



- | | |
|----------------|--------------|
| Sanitary Sewer | Electric |
| Storm Drain | Telecom/CATV |
| Water | Natural Gas |



Figure 4.3
Grading, Drainage, and
Utilities Plan
**EDGE Assembly Square
Somerville, Massachusetts**

5

Zoning Compliance Narrative

This chapter briefly describes how the Proponent has fulfilled the various submission requirements and zoning obligations as described in the Ordinance adopted on December 12, 2019. Following each provision listed below is a statement describing compliance by the Project. The numbering used throughout this chapter follows the section numbering of the applicable Ordinance.

The summary Table 5-1 below outlines conformance to the requirements that have been provided for reference. As described in Section 1.2 of Chapter 1, *Application Forms*, the Proponent requests the following relief from the dimensional standards of Table 7.4.6 of the Ordinance through issuance of a Special Permit:

- › Relief is sought for the Project, which currently exceeds the maximum building height requirement of 125 feet.
- › Relief is sought for the Project, which currently exceeds the maximum FAR of 10.0.

Additionally, in accordance with Section 7.7(c)(ii), the Proponent requests a Special Permit to authorize the occupancy of any single commercial space over 10,000 SF of leasable floor area by any permitted use. Refer to Section 1.2 of Chapter 1, *Application Forms*, for a list of requested Special Permits.

Table 5-1 Zoning Compliance Program Table

Requirement	Allowed within ASMD (>50K SF)	Proposed	Status
Lot Standards			
Minimum Lot Area (min)	N/A	37,075 (0.85 acre)	Complies
Open Space (min)	--	25%	N/A
Civic Space (min)	25%	25%	Complies
Building Standards			
Floor Area Ratio, (sf)	10.0	14.2	<i>Does Not Comply</i>
Building Height (ft) ¹	125'	275'	<i>Does Not Comply</i>
Density			
Lot Area/Dwelling Unit (min)	No Minimum	N/A	N/A

The following dimensional table provides a summary of the average lot and building dimensions for the Project.

Table 5-2 Dimensional Summary Table

	Approx. Dimension
Lot Dimensions	
Lot Width (ft)	170
Lot Depth (ft)	214
Lot Development	
Lot Coverage (%)	100%
Open Space (%)	25%
Building Setbacks	
Primary Front Setback (ft.)	Varies, Min. 5
Secondary Front Setback (ft.)	Varies, Min. 5
Side Setback	--
Building Massing	
Building Width (ft.)	218 ¹
Max. Floor Plate (SF)	<30,000
Min. Ground Story Height (ft.)	18
Min. Upper Story Height (ft.)	12'8"
Min./Max. Building Height (Stories)	18
Max. Building Height (ft.)	275

¹ Measured along north elevation

5.1 ARTICLE 7: SPECIAL DISTRICTS

7.4 Assembly Square Mixed-Use District (ASMD)

7.4.5 Master Plan Standards

a. Thoroughfare Network

(i). The alignment and connectivity of thoroughfares must be consistent with the ASQ Plan.

A primary gateway to the ASMD is adjacent to the Project Site. The continuation of Foley Street north of the Public Storage building connects to the East Somerville neighborhood to the west via the Kensington Underpass, a pedestrian and bicycle underpass connection below I-93 and over Mystic Avenue. The Project proposes to enhance this connection by improving pathway materials and lighting within the area of proposed off-site civic space improvements. The "gateway entrance" will be framed by trees and plantings and identified with signage. A revitalized Kensington Plaza will offer an urban space as an arrival point to the west edge of the ASMD neighborhood.

The north-south thoroughfare, Middlesex Avenue, is preserved as the main vehicular access to the Project Site from I-93, Sullivan Square, and

from other points north, south, and west. Foley Street, running east-west through the heart of the ASMD, does not directly abut the Project Site, but its western end has a direct visual connection to the Project Site. Foley Street is recognized as the key connector from the Project Site and neighboring buildings to the MBTA Assembly Station to the east.

b. Civic Space

(i). At least twenty percent (25%) of a development site, excluding thoroughfares, must be provided as one or more civic spaces.

The Project complies with this requirement.

The Project envisions the decommissioning of the adjacent Kensington Avenue and the revitalization of the existing Middlesex Avenue Open Space to create the new Kensington Plaza. Refer to Section 2.3.2 of Chapter 2, *Project Summary*, for a summary of the proposed civic and open space improvements proposed by the Proponent.

Refer also to Appendix F for a copy of the Civic Space Study that provide an analysis of existing open and civic space resources within walking distance of the Project Site

(ii). Civic spaces are subject to the provisions of Article 13: Public Realm of this Ordinance.

The application is for a MPSP approval and at this time specific details for the landscaping and materials selection associated with the proposed Kensington Plaza have not been designed. Design of the proposed civic space will be addressed during the Site Plan approval process. Refer to Appendix F for a copy of the Civic Space Study that provide an analysis of existing civic space resources within walking distance of the Project Site.

Materials and plant selection will comply with the provisions of Sections 10.3, *Landscaping*, and 13.1, *Civic Space*. Circulation is a critical component of the proposed civic space, and the proposed improvements will aim to enhance existing connections and provide a welcoming thoroughfare for the public to traverse the Project Site. Open space will be accessible to the public at all times of the year, 24 hours a day, and will be designed as accessible per ADA and MAAB regulations. Hardscape materials, trees, plantings, seating, and lighting within the Kensington Plaza will designed to allow for small group gatherings and for passive recreation. The Project is exploring on-site locations for bicycle parking as well.

(iii). Civic spaces must be dedicated to the public in perpetuity by a covenant or other deed restriction.

The proposed off-site improvements require the City to decommission the vehicular rights on the adjacent Kensington Avenue thoroughfare.

The City of Somerville would retain ownership of the Kensington ROW and the adjacent Middlesex Avenue Open Space, and the Proponent is prepared to improve and maintain the off-site improvements. The City would grant the Proponent an easement that dedicates the new civic space to the public in perpetuity, and in return, would allow the adjacent decommissioned Kensington right-of-way to be counted towards the required amount of civic space.

(iv). Civic space created through easement or decommissioning of an existing thoroughfare or other abutting right-of-way may be counted toward the required amount of civic space.

The proposed off-site improvements require the City to decommission the vehicular rights on the adjacent Kensington Avenue thoroughfare. The City of Somerville would retain ownership of the Kensington ROW and the adjacent Middlesex Avenue Open Space, and the Proponent is prepared to improve and maintain the off-site improvements. The City would grant the Proponent an easement that dedicates the new civic space to the public in perpetuity, and in return, would allow the adjacent decommissioned Kensington right-of-way to be counted towards the required amount of civic space.

(v). Any development site abutting the Mystic River Bank must provide at least two hundred and thirty-five thousand (235,000) square feet of Civic Space abutting the Mystic River.

This section is not applicable to the Project.

(vi). Civic spaces abutting the Mystic River must be designed to reduce the level of storm water runoff into the river and with special attention to the provision of wildlife habitat.

This section is not applicable to the Project.

7.4.5(c) Mixed Uses

(i). Proposed development with any single commercial space over fifty thousand (50,000) square feet of leasable floor area dedicated to any principal use from the Retail Sales use category must dedicate at least sixty percent (60%) of any additional leasable floor area to principal uses that are not from the Retail Sales use category.

This section is not applicable to the Project. The Project does not contain a Large Retail Project.

7.4.6 Building Standards

a. General

(i). - One (1) principal building is permitted on each lot as specified on Table 7.4.7.

The Proponent proposes to construct only one principal building type on the Project Site. The Project is most consistent with the "Lab Building" type as described in Section 5.1.9 of the Ordinance.

(c). - Buildings over fifty thousand (50,000) square feet of gross floor area are permitted by Site Plan Approval subject to an approved Master Plan Special Permit.

This application is for MPSP approval.

(ii). Principal buildings are prohibited within one hundred and fifty (150) feet of the Mystic River Bank.

This section is not applicable to the Project.

(iii). Structured parking, whether above grade or below grade, is excluded for purposes of calculating Gross Floor Area, Net Floor Area and Floor Area Ratio in the ASMD.

The Project's vehicular parking will be located entirely below-grade.

(iv). Accessory structures in any civic space located within one-hundred and fifty (150) feet of the Mystic River Bank may be up to thirty (30) feet in height.

This section is not applicable to the Project. There are no accessory structures proposed on the Project Site.

(v). The Planning Board may waive the provisions of 7.4.6 Building Standards or the dimensional standards of Table 7.4.6 by Special Permit.

The Proponent requests relief from the dimensional standards of Table 7.4.6 of the Ordinance through issuance of a Special Permit. Refer to Section 1.2 of Chapter 1, *Application Forms*, for a list of requested Special Permits.

a). In addition to the review criteria for all Special Permits specified in §15.2.1.e. Review Criteria, the review board shall make findings considering the following in its discretion to approve or deny a special permit authorizing a waiver from the provisions of §7.4.6 Building Standards or the dimensional standards of Table 7.4.6:

i). Consistency with the ASQ Plan.

This section is not applicable to the Project. As referenced in Section 2.8.2 of Chapter 2, *Project Summary*, the City, in collaboration with a multi-disciplinary consultant team has recently commenced the work of developing a new Neighborhood Plan for the ASMD. The Proponent and the Project Team will continue to coordinate with City Planning Staff during development production of the Neighborhood Plan.

b. Building Setbacks

(i). Buildings may be set back from the front lot line up to five (5) feet except in special circumstances, where greater setbacks would enhance the pedestrian friendly experience of the frontage.

Setbacks greater than five (5) feet are proposed along the Project Site's Middlesex Avenue frontage, and along the Kensington Avenue frontage south of the Project Site.

Along Middlesex Avenue, the Proponent will explore the potential to extend the curb-line outward from the Project Site to match the planned dimensions associated with the City's Middlesex Avenue enhancements, which include new separated bicycle lanes traveling in both directions. Along both Middlesex Avenue and Kensington Avenue south of the Project Site, the Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, planters, and a buffer zone for benches, streetlights and bicycle racks, which will dramatically improve the pedestrian experience. The final dimensions of proposed sidewalks will be advanced in collaboration with the City.

c. Building Design Standards

(i). Building facades must provide solid material framing each storefront and lobby entrance as follows:

- a). pilasters or columns supporting a horizontal lintel and cornice;**
- b). a spandrel positioned between pilasters or columns that extend from upper stories of the building to the ground; or**
- c). flat wall above and to either side of a void or punched opening.**

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(ii). Storefronts and lobby entrances must be set within the resulting frame provided for each by the building facade.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(iii). Materials framing each storefront or lobby entrance may be integrated into the design of the building or customized for individual storefronts and lobby entrances.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(iv). Facades must be articulated to create surface relief and shadow lines that add depth to the façade through the use of architectural elements such as balconies, Bays, cladding, columns, corner boards, cornices, door surrounds, moldings, piers, pilasters, seat walls, sills, wall depth, and windows that either recess or project from the average plane of the facade by at least four (4) inches.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(v). Principal entrances must be clearly defined, through the use of building elements such as canopies, porticos, overhangs, peaked roof forms, and/or arches. Outdoor patios, tile work, moldings, integral planters or wing walls with landscaped areas, or places for sitting are required for entries set back from the front lot line.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(vi). Ground story building facades and accompanying principal entrances must provide extensive areas of window glass to provide visual access to interior uses.

Exterior materials used at the ground story floor will be transparent to encourage visual connection. The interior of the lobby and retail spaces will be visible from the adjacent sidewalks and streets, and the Project occupants will have a view out to the enhanced civic space.

(vii). Building facades must include windows providing visual access to the interior of a space, arcades, display windows, entry areas, awnings, or other such features for at least seventy (70) percent of the horizontal length of all ground story facades that face public thoroughfares or the Mystic River.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(viii). Forty percent (40%) of this activated facade area on the Ground story of Building walls along primary and secondary streets must consist of window or doors meant for public entry and exit.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(ix). Uninterrupted or unfenestrated lengths of façade exceeding thirty-five (35) horizontal feet are prohibited.

d. Building Design Guidelines**(i). Facades should be vertically articulated into a series of Architectural Bays no wider than thirty (30) feet.**

The exterior walls of the Project will consist of a high-performance enclosure designed as a “kit of parts,” providing a flexible system of components that establishes an architectural bay approximately 5-10 feet wide. Subsequently, the façade openings and window-to wall ratios on each building elevation are optimized and are proportionate to the amount of solar exposure, minimizing solar gain while providing views and maximizing beneficial daylighting at workspaces.

(ii). Architectural bays should be derived, in general, from the building’s structural bay spacing.

The façade bay sizing will correspond with the structural bay spacing. The architectural bay width is intended to be a multiple of the structural bay, with columns concealed behind opaque portions of the façade.

(iii). Architectural bays should have piers (flat wall), pilasters, or columns that either extend all the way to the ground or to the cornice and sign band of ground level storefronts frames.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(iv). Architectural bays should align, in general, with individual or groups of storefronts and lobby entrances.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(v). The location, alignment, and massing of residential towers should limit the obstruction of desirable views from inside dwelling units and increase the actual or perceived distance between towers.

This section is not applicable to the Project. The Project does not propose any residential uses.

(vi). Ground story commercial spaces should be dedicated to uses from the Retail Sales, Food & Beverage, or Commercial Services use categories to encourage pedestrian activity.

The Proponent anticipates that ground floor uses fronting Middlesex Avenue will include commercial, retail and food & beverage.

(vii) Multiple and frequent entrances oriented toward front lot lines are encouraged.

The ground floor retail and commercial uses will be directly accessible from the pedestrian corridor located along the Project's primary frontage of Middlesex Avenue, or within 30 feet of a building corner facing the intersection of Middlesex and a perpendicular street. The Project's commercial lobby entrance will be located along the secondary frontage of Kensington Avenue. The existing, paved vehicular street is proposed to be decommissioned and transformed into the Kensington Plaza.

(viii). Ground story commercial spaces should take advantage of views of the waterfront and other open spaces, and add a street front presence to public thoroughfares and sidewalks.

Exterior materials used at the ground story floor will be transparent to encourage visual connection. The interior of the lobby and retail spaces will be visible from the adjacent sidewalks and streets, and the Project occupants will have a view out to the enhanced civic space.

The Mystic River waterfront is not visible from the Project Site at ground level.

(ix). Development surrounding open space should result in a net benefit to the space in terms of activation, enhanced quality and attractiveness, expanded use, and public access.

Publicly accessible open space around the Project Site will provide a new gathering space that will be animated by the Project entrance and ground floor retail uses. To enhance the public realm, the retail and commercial lobby facades are set back from the sidewalk, expanding the pedestrian zone and urban corridor.

Together, the Kensington Plaza and improved Middlesex Avenue Open Space will create an attractive gateway into the ASMD and the Project Site, and will provide generous pedestrian and bicycle infrastructure that connects Foley Street to the Kensington Underpass, and the Stop and Shop and Garfield Avenue neighborhood to the west. The off-site improvements will include new hardscape materials, trees, plantings, seating, and lighting that will create an active and safe space at all times of the day.

(x). The selection of materials, fenestration, and ornamentation should result in a consistent and harmonious composition that appears as a unified whole rather than a collection of unrelated parts.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

(xi) The type and color of materials used for a building should be kept to a minimum, preferably three (3) or fewer.

This application is for MPSP approval. Additional details demonstrating compliance with Building Design Standards will be provided during the Site Plan approval process.

7.4.7 Use Provisions

a. General

(i) The use of real property is subject to the provisions of Article 9: Use Provisions of this Ordinance. Where the provisions of this section conflict with those of Article 9, the provisions of Article 9 apply.

(ii) Use categories are permitted as specified on Table 7.4.7. Use categories not identified on Table 7.4.7 are prohibited.

(iii). All uses must comply with any use-specific standards applicable for each use in §9.2 Use Definitions & Limitations and this Section.

(iv). Uses permitted by Special Permit require additional development review

The Project proposes uses that are “Permitted Uses” in the ASMD as defined by Table 7.4.7 of the Ordinance.

b. Use Limitations

(i). Occupancy of any single ground story commercial space over fifty thousand (50,000) square feet in leasable floor area by any use from the Retail Sales use category is prohibited.

This section is not applicable to the Project. The Project does not contain a Large Retail Project.

(ii) Occupancy of any single commercial space greater than ten-thousand (10,000) square feet in leasable floor area by any permitted use requires a Special Permit.

The Proponent requests a Special Permit to authorize the occupancy of any single commercial space over 10,000 SF of leasable floor area by any permitted use. Refer to Section 1.2 of Chapter 1, *Application Forms*, for a list of requested Special Permits.

(iii). In addition to the review criteria for all Special Permits specified in §15.2.1.e. Review Criteria, the review board shall make findings considering the following in its discretion to approve or deny a special permit authorizing occupancy of any single commercial space over ten-thousand (10,000) square feet in leasable floor area by any permitted use:

a). Compatibility with the intensity of activity associated with the surrounding land uses.

Among other objectives, the ASD is designed to promote pedestrian and transit-oriented planning and design, and to encourage the development of a mix of uses including residential, office/lab, research and development, retail/active use, hotels, cinemas, performing arts and institutional uses around new pedestrian-oriented public spaces.

The Project will complement and support the surrounding land uses and adjacent residential and commercial areas by providing new commercial and retail/active use opportunities, enhanced public open spaces, and jobs for the surrounding population.

b). Capacity of the local thoroughfare network providing access to the site and the impact on pedestrian, bicycle, and vehicular traffic and circulation patterns in the neighborhood.

Refer to Chapter 4, *Transportation*, for the results of the Transportation Access and Impact Study (TIAS), which has been prepared and submitted as part of this MPSP application.

Please also refer to Section 2.3.4 of Chapter 2, *Project Summary*, for a description of proposed streetscape design and public realm improvements.

7.4.8 Development Standards

a. General

(i) Development is subject to the provisions of Article 10: Development Standards of this Ordinance. Where the provisions of this section conflict with those of Article 10, the provisions of Article 10 apply.

b. Signs

(i). Off-premises signs are prohibited.

This section is not applicable to the Project.

(ii). All signs must comply with standards set forth in Section 10.8. Signs except as follows:

a). The top of a wall sign attached parallel to a building may be no higher than 35 feet above finished grade.

Location and approximate dimensions of proposed signage will be provided during the Site Plan approval process.

(iii). Nonconforming freestanding, directional, or wall signs may be approved by Special Permit.

a). In addition to the review criteria for all Special Permits specified in §15.2.1.e. Review Criteria, the review board shall make findings considering the following in its discretion to approve or deny a special permit authorizing a nonconforming freestanding, directional, or wall signs:

i). The creation of legible urban environment free from the over use of signs.

ii). Aesthetics, proportion, scale of the proposed sign in relation to the building or storefront.

iii). Design, location, and context of other signage on the building and on surrounding properties.

Location and approximate dimensions of proposed signage will be provided during the Site Plan approval process.

c. Stormwater Management

(i). Storm water should be removed from all roofs, canopies, and paved areas, and routed through well-engineered systems designed with appropriate storm water management techniques.

The proposed stormwater management plan consists of reducing peak flow runoff, capture and recharge 0.8 of an inch of stormwater runoff from the building roof top, the sidewalks and other on-site impervious areas. A new drainage system will collect stormwater and discharge it to a bioretention basin, which will subsequently promote infiltration to the ground.

(ii). Skimming devices, oil and grease traps, and similar facilities at the collection or discharge points for paved surface must be maintained regularly.

The proposed closed drainage system will incorporate the use of deep sump catch basins at the collection points from paved surfaces. These drainage structures are inspected and maintained regularly.

(iii). Where practical, the routing of runoff through sheet flow, swales, or other means that increases filtration and percolation is strongly encouraged.

The design team will continue to evaluate best practices and incorporate them into the Project as feasible.

(iv). The Planning Board may require independent peer review of a storm water management plan by an accredited independent engineering firm.

The design team is willing to meet with an independent peer reviewer to discuss the proposed stormwater management system.

7.4.9 Parking & Mobility

a. General

(i). Development is subject to the provisions of Article 11: Parking & Mobility of this Ordinance. Where the provisions of this section conflict with those of Article 11, the provisions of Article 11 apply.

This application is for MPSP approval. Additional details demonstrating compliance with Article 11 of the Ordinance will be provided during the Site Plan approval process.

b. Type

(i). Motor vehicle parking may be provided as above ground structured parking or underground structured parking.

The Project proposes up to 350 below-grade vehicular parking spaces. The below-grade parking spaces will be accessed from a ramp located adjacent to the loading bays that service the Project on McGrath Highway (refer to Figure 2.14).

(ii). Surface parking lots may be permitted on an interim basis by Special Permit.

This section is not applicable to the Project. The Project does not propose any surface parking on the Project Site.

c. Parking Design

(i) The design of all parking is subject to §11.1 Bicycle Parking and §11.2 Motor Vehicle Parking of this Ordinance.

This application is for MPSP approval. Additional details demonstrating compliance with Section 11.1 and 11.2 of the Ordinance will be provided during the Site Plan approval process.

d. Parking Location

(i). No surface parking is permitted within two-hundred (200) feet of the Mystic River Bank as defined by 310 CMR 10.54.2.c.

This section is not applicable to the Project. The Project does not propose any surface parking on the Project Site.

e. Unbundled Parking

(i). Motor vehicle parking spaces must be rented or leased as an option rather than a requirement of the rental, lease, or purchase of a dwelling unit or non-residential floor space.

In compliance with Section 7.4.9 of the Ordinance, motor vehicle parking will be unbundled from the lease of non-residential floor-space.

(ii). Bicycle parking must be provided at no cost or fee to customers, visitors, employees, tenants, and residents.

The Project will include short- and long-term bicycle parking storage in compliance with the City of Somerville's guidelines to encourage cycling as a strong alternative transportation mode. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of the racks will be determined during the MPSP process.

f. Loading Facilities

(i). Loading facilities must be located away from major public thoroughfares, the Mystic River, and other highly visible locations. The visual impact of exposed loading facilities should be reduced through creative design solutions.

Loading needs for the Project will be accommodated by a clearly defined loading area on the north side of the building, along McGrath Highway. Deliveries will arrive on Middlesex Avenue leading to its intersection with McGrath Highway to access the loading area. The loading areas will not be visible from the improved Middlesex Avenue Open Space of the Kensington Plaza to the south of the Project.

Additional information, including detailed plans and dimensions of the loading and service area will be provided during the Site Plan approval application process.

(ii). Modifications to, relocations of, or creation of new loading facilities for an existing building requires a Special Permit.

This section is not applicable to the Project.

7.4.10 Development Benefits

b. Development must provide affordable dwelling units as specified on Table 7.2.11 (a)

This section is not applicable to the Project. The Project does not propose any residential uses.

c. Development of a general building must provide linkage payments as specified on Table 7.2.11. (b).

The Proponent will work with the City to finalize the appropriate contribution agreements and package of public benefits and improvements, including the above-referenced linkage payments as documented in Table 7.2.11 of the Ordinance, that will be provided as a

result of this Project. Additional details will be provided during the Site Plan approval application process.

7.4.11 Public Realm

a. General

(i). Development is subject to the provisions of Article 13: Public Realm of this Ordinance. Unless otherwise specified, where the provisions of this section conflict with those of Article 13, the provisions of Article 13 apply.

This application is for MPSP approval, and at this time specific details for the landscaping and materials selection associated with the proposed Kensington Plaza have not been designed. Design of the proposed Kensington Plaza will be addressed during the Site Plan approval process. Materials and plant selection will comply with the provisions of Sections 10.3, *Landscaping*, and 13.1, *Civic Space*.

b. Thoroughfares

(i) Thoroughfare design should be consistent with the ASQ Plan, specifically the 2002 Assembly Square: Design Guidelines for the Public Realm.

The north-south thoroughfare, Middlesex Avenue, provides primary vehicular access to the Project Site from I-93, Sullivan Square, and from other points north, south, and west. Foley Street, running east-west through the heart of the ASMD, does not directly abut the Project Site, but its western end has a direct visual connection to the Project Site. Foley Street is recognized as the key connector from the Project Site and the neighboring buildings to the MBTA Assembly Station to the east.

(ii). Development sites abutting Mystic Avenue or Fellsway must contribute toward the improvement pedestrian access to the Ten Hills and East Somerville neighborhoods by means of sidewalk connections, crosswalks, streetscape landscaping, traffic signalization, and traffic calming, as deemed necessary by the Planning Board.

This section is not applicable to the Project. The Project Site does not abut Mystic Avenue or the Fellsway.

(iii). Continuous pedestrian connections must be provided between all major points of pedestrian activity on a Development Site, including, but not limited to, connections to the Mystic River waterfront, connections to all public and private ways abutting a Development Site, and any transit stations.

The Project's civic space and open space design strategy focuses on enhancing pedestrian circulation, permeability and creating new

pedestrian connections. It is anticipated that designated hardscape pathways and proposed planting schemes will enhance existing connections and new gateway for visitors to traverse the Project Site. In particular, the new Kensington Plaza and the improved Middlesex Avenue Open Space will enhance east-west circulation and will provide a gateway connection to the I-93 pedestrian underpass and reinforce the connection to Foley Street for access to the MBTA Assembly Station. The enhanced public realm along Middlesex Avenue will strengthen north-south pedestrian circulation. Refer to Section 2.3.4 of Chapter 2, *Project Summary*, for a description of streetscape design and public realm improvements.

c. Sidewalk Curb Cuts

(i) A curb cut requires a permit from the City Engineer and must be compliant with all City Ordinances.

The Project will comply with all City requirements as necessary.

(ii) Unless otherwise specified, the City Engineer may not permit more than one (1) curb cut per front lot line of a lot.

This section is not applicable to the Project. The Project Site does not propose any curb cuts at the front lot line.

(iii). Curb cuts are prohibited along all thoroughfares designated as a pedestrian street.

This section is not applicable to the Project. The Project Site does not abut Mystic Avenue or the Fellsway.

(iv) Curb cuts must be located to minimize conflicts with pedestrians and bicyclists and must have a clear distance from fire hydrants, street trees, utility poles, and other furnishings as deemed necessary by the City Engineer.

The proposed curb cut to accommodate the below-grade parking and loading needs for the Project will be accommodated by a clearly defined curb cut on the north side of the building, along McGrath Highway. The loading areas will not be visible from the Kensington Plaza on the south side of the Project, and will be located away from the primary pedestrian public realm along Middlesex Avenue.

Additional information, including detailed plans and dimensions of the public realm improvements, including curb cuts, will be provided during the Site Plan approval application process.

a). Curb cuts for commercial or high-volume driveways should be at least one-hundred (100) feet from an unsignalized or signalized intersection.

The proposed curb cut along McGrath Highway is located greater than 100 feet away from the closest signalized intersection at the intersection of Middlesex Avenue and Foley Street.

b). Curb cuts for residential driveways should be at least twenty (20) feet from an unsignalized intersection and at least forty (40) feet from a signalized intersection.

This section is not applicable to the Project. The Project Site does not propose residential uses.

(v) The interior width of a curb cut (between curb stones) may be no wider than the driveway, vehicular entrance, or loading facility it serves.

The Proposed curb cut along McGrath Highway will adhere to this standard. Additional information, including detailed plans and dimensions of the public realm improvements, including curb cuts, will be provided during the Site Plan approval application process.

(vi) A driveway apron may be installed only within the furnishing zone of a sidewalk and must be constructed in accordance with all standards established by relevant City Departments.

Driveway aprons will be constructed in accordance with all standards established by relevant City Departments.

(vii) The grade, cross slope, and clear width of the walkway of a sidewalk must be maintained between the driveway apron and the abutting driveway. The appearance of the walkway (ie. scoring pattern or paving material) must indicate that, although a vehicle may cross, the area traversed by a vehicle remains part of the sidewalk.

The grading plan will be developed in accordance with the City Standards and regulations.

7.4.11 Land Platting

a. The following standards supersede the provisions of Article 13: Public Realm Standards:

(i). Block Size

a). Blocks may have individual block faces up to five-hundred (500) feet in width and a total perimeter up to eighteen-hundred (1,800) feet.

This section is not applicable to the Project. The Project does not propose to subdivide the Project Site.

(ii). Lots Width

a). Lots may be platted to have up to a maximum lot width of five hundred (500) feet.

This section is not applicable to the Project. The Project does not propose to subdivide the Project Site.

5.2 ARTICLE 10: DEVELOPMENT STANDARDS

10.3 Landscaping

10.3.5 Site Landscaping

The application is for a MPSP approval and at this time specific details for the landscaping and materials selection associated with the proposed Kensington Plaza and improved Middlesex Avenue Open Space have not been designed. Please refer to Section 2.3.3 of Chapter 2, *Project Summary*, for a general discussion of open space and landscaping improvements. Design of the Kensington Plaza will be addressed during the Site Plan approval process. Materials and plant selection will comply with the provisions of Sections 10.3, *Landscaping*, and 13.1, *Civic Space*.

10.4 Green Score

10.4.3 Applicability

a. This section is applicable to the construction of any new principal building and any substantial renovation of a principal building.

The application is for MPSP approval, and at this time specific details for the landscaping, materials selection and the Project's Green Score have not been designed and calculated. Details on the Project Site's Green Score, including proposed landscaping materials will be provided during the Site Plan Approval process. Materials and plant selection will comply with the provisions of Sections 10.4, *Landscaping*, and 13.1.

10.4.4 Compliance & Enforcement

a. Real property must comply with the Green Score indicated for each building type. See the standards for each building type in each zoning district for more information.

The application is for MPSP approval, and at this time specific details for the landscaping, materials selection and the Project's Green Score have not been designed and calculated. Details on the Project Site's Green Score, including proposed landscaping materials will be provided during the Site Plan Approval process. Materials and plant selection will comply with the provisions of Sections 10.4, *Landscaping*, and 13.1.

10.11 Sustainable Development**10.11.1 Green Buildings**

b. New construction or modification of any principal building type greater than fifty thousand (50,000) square feet in gross floor area must be LEED Platinum certifiable.

The Project Team has prepared a draft LEED scorecard which shows one potential path for the Project to achieve LEEDV4.1 BD+C for Core and Shell Platinum certifiability. The Proponent has identified and will continue to evaluate additional potential points to improve the sustainability even further. A summary of the preliminary approach to the credit categories and a preliminary LEED scorecard are located in Appendix B.

c. Development subject to the provisions of this Section must meet the standards of the most current LEED building rating system. During the twelve (12) month time period after the adoption of a new version of LEED, permit applications may be submitted demonstrating compliance to either the immediately previous or newly adopted version of the LEED building rating system.

The Project Team has prepared a draft LEED scorecard which shows one potential path for the Project to achieve LEEDV4.1 BD+C for Core and Shell Platinum certifiability. The Proponent has identified and will continue to evaluate additional potential points to improve the sustainability even further. A summary of the preliminary approach to the credit categories and a preliminary LEED scorecard are located in Appendix B.

d. Development review applications for development subject to the provisions of this Section must include:

(i). A completed LEED checklist for the appropriate LEED building standard to demonstrate how the proposed development is anticipated to meet the standards of this Section.

Refer to Appendix B a preliminary LEED scorecard.

(ii). A narrative indicating the mechanisms proposed to achieve each of the credits and prerequisites of the appropriate LEED building standard and demonstrating the anticipated methods by which compliance with the requirements of this Section will be achieved at the time of construction.

Refer to Appendix B for a summary of the preliminary approach to the LEED credit categories.

(iii). An affidavit by a LEED-Accredited Professional (LEED-AP) Project Manager or by appropriate consultants stating that to the best of their knowledge, the project has been designed to achieve the stated LEED building standard.

Refer to Appendix B for an affidavit signed by a LEED-Accredited Professional (LEED-AP) Project Manager.

e. Prior to the issuance of the first Building Permit and prior to the issuance of the first Certificate of Occupancy, the LEED checklist and narrative description outlining compliance with the certification level required by this Section must be updated to identify any design changes made subsequent to Site Plan Approval and submitted to the Building Official accompanied by an affidavit by a LEED-AP Project Manager or appropriate consultants stating that, to the best of their knowledge, the project has been designed to achieve the stated LEED building standard.

In compliance with the Ordinance, the Proponent will submit an updated LEED scorecard and narrative description outlining compliance at the prior to the issuance of the Building Permit, and prior to issuance of the Certificate of Occupancy.

10.11.2 Green Roofs & Storm Water Management

a. To every extent practicable, storm water should be reused on-site for irrigation or other purposes.

The design team will analyze the feasibility of stormwater reuse for the Project irrigation system.

b. The review boards may authorize the City Engineer to grant a credit to properties, against which any storm water impact fees are imposed, equivalent to the quantity of storm water that is removed from entering the system through the use of green roofs or other onsite storm water management practices.

The Proponent's intent is to capture stormwater runoff from on-site impervious areas, discharge it to a bioretention basin and recharge stormwater to the ground.

10.11.3 Heat Island Reduction

a. Roofs and parking covers must have a Solar Reflectance Index as specified on Table 10.11.1 for a minimum of seventy five percent (75%) of the roof area or parking spaces.

Roofing materials will comply by having an SRI at or above the requirement. The Proponent is considering and exploring incorporation of a rooftop solar PV system, building mounted PV, as well as a ground-source heat pump system as part of the Project.

(i) Roof area and parking spaces covered by solar collectors and green roofs compliant with the provisions of this Ordinance are exempt.

The Proponent is considering and exploring incorporation of a rooftop solar PV system, on a portion of the roof. Additional details will be provided during the Site Plan approval process.

b. Uncovered surface parking spaces must have an initial solar reflectance of at least 0.33 or a three (3) year aged solar reflectance of at least 0.28.

This section is not applicable to the Project. The Project Site does not propose uncovered surface parking spaces.

10.11.4 Environmental Performance

a. The review boards shall establish submittal requirements for development review applications to ensure the following:

(i) That shadows cast by high-rise buildings do not substantially and adversely limit ground level access to sunlight on sidewalks and Civic Spaces.

Please refer to Appendix A for the Project's shadow studies, and a summary of the net new shadows created by the Project.

(ii) That by high-rise buildings pedestrian level wind velocities do not exceed acceptable levels for various activities existing or proposed at particular locations.

The application is for a MPSP approval. An analysis demonstrating acceptable pedestrian wind comfort will be prepared and submitted during the Site Plan approval process.

(iii) That buildings do not cause visual impairment or discomfort due to reflective spot glare and solar heat buildup in any nearby buildings.

The application is for a MPSP approval. An analysis demonstrating that the Project does not result in any visual impairment or unacceptable solar glare will be prepared and submitted during the Site Plan approval process.

5.3 ARTICLE 11: PARKING AND MOBILITY

11.1 Bicycle Parking

This application is for MPSP approval. Additional details demonstrating compliance with Section 11.1 and 11.2 of the Ordinance will be provided during the Site Plan approval process.

11.2 Motor Vehicle Parking

This application is for MPSP approval. Additional details demonstrating compliance with Section 11.1 and 11.2 of the Ordinance will be provided during the Site Plan approval process.

11.3 Shared Parking

The below-grade parking facility will be available only for office/R&D/lab tenant use, and access will be controlled through gating, ticketing, reader cards or other means.

The Project will short-term, on-street parallel parking spaces to support the ground level retail space along Middlesex Avenue. The exact number of spaces will be determined as the design advances, and in consultation with the City.

11.4 Mobility Management Plan

a. A mobility management plan (MMP) is required for all development and for Master Plan Special Permits.

Please refer to Appendix C for the Project's draft MMP.

5.4 ARTICLE 15: ADMINISTRATION**15.2.2 Master Plan Special Permit****d. Procedure**

(ii). The review procedures required for a Master Plan Special Permit may, at the discretion of the designated review board, be conducted simultaneously with the review procedures required for other discretionary or administrative permits, as indicated elsewhere in this Ordinance.

This application is for MPSP approval. At the conclusion of the MPSP approval process the Proponent will submit an application for Site Plan approval.

e. Review Criteria

(i). In its discretion to approve or deny a development review application requiring a Master Plan Special Permit, the Planning Board shall make findings considering, at least, each of the following:

a). The comprehensive plan and existing policy plans and standards established by the City.

As referenced in Section 2.8.2 of Chapter 2, *Project Summary*, the City, in collaboration with a multi-disciplinary consultant team, has recently commenced the work of developing a new Neighborhood Plan for the Assembly Square neighborhood and Transit Area. The Proponent and the Project Team will continue to coordinate with City Planning Staff during development production of the Neighborhood Plan.

The Project is consistent with the existing ASD plan adopted in 2000, including the follow objectives: the ASD is designed to promote pedestrian and transit-oriented planning and design, and to encourage the development of a mix of uses including residential, office/lab, research and development, retail/active use, hotels, cinemas, performing arts and institutional uses around new pedestrian-oriented public places.

b). The intent of the zoning district where the property is located.

The Project is located within the ASMD, which is characterized by a mix of mid-rise and high-rise buildings, as well as a thoroughfare and open space network that emphasizes walkability and pedestrian connectivity.

c). The proposed alignment and connectivity of the thoroughfare network.

A primary gateway to the ASMD is adjacent to the Project Site. The continuation of Foley Street north of the Public Storage building connects to the East Somerville neighborhood to the west via the Kensington Underpass, a pedestrian and bicycle underpass connection below I-93 and over Mystic Avenue. The Project proposes to enhance this connection by improving pathway materials and lighting within the area of proposed off-site civic space improvements. The “gateway entrance” will be framed by trees and plantings and identified with signage. A revitalized Kensington Plaza will offer an urban space as an arrival point to the west edge of the ASMD neighborhood.

The north-south thoroughfare, Middlesex Avenue, is preserved as the main vehicular access to the Project Site from I-93, Sullivan Square, and from other points north, south, and west. Foley Street, running east-west through the heart of the ASMD, does not directly abut the Project Site, but its western end has a direct visual connection to the Project Site. Foley Street is recognized as the key connector from the Project Site and neighboring buildings to the MBTA Assembly Station to the east.

d). The gross floor area allocated to different use categories.

Please refer to Table 2-1 of Chapter 2, *Project Summary*, for a program summary table.

e). Mitigation proposed to alleviate any adverse impacts on utility infrastructure.

Please refer to Chapter 3, *Utility Analysis*, for an analysis of existing and proposed utilities. The utility design and any proposed mitigation will be refined during building design and elaborated during review of the Site Plan approval application.

f). Proposed development phasing.

The Project will be constructed in one phase. Please refer to Section 2.6 of Chapter 2, *Project Summary*, for a summary of the Project Schedule.

g). Proposed on-street parking to address demand by customers of Retail Sales, Food & Beverage, or Commercial Services principal uses.

The Project will short-term, on-street parallel parking spaces to support the ground level retail space along Middlesex Avenue. The exact number of spaces will be determined as the design advances, and in consultation with the City.

APPENDIX A: Shadow Studies

Contents

- Shadow Study Narrative
- Shadow Study Graphics

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APPENDIX A: SHADOW STUDIES

1.1 Shadow Analysis

1.1.1 Regulatory Context

An analysis of the shading impact is a requirement of Article 10 of the Ordinance. Specifically, section 10.4.a states the following:

The review boards shall establish submittal requirements for development review applications to ensure the following: That shadows cast by high-rise buildings do not substantially and adversely limit ground level access to sunlight on sidewalks and Civic Spaces

1.1.2 Key Findings/Conclusions

The net new shadows produced by the Project are not expected to have any material effect on residential areas or public open space in the vicinity of the Project Site. The majority of net new shadows will be cast to the north and east, towards existing commercial development and paved areas.

1.1.3 Methodology

The following shadow impact analysis has been prepared using methodologies generally consistent with accepted practices for such studies.

A shadow analysis conducted in an urban area typically compares the shadows cast by existing buildings with those estimated to result from the Project when considering proposed buildings and topography.

The study was accomplished by using a three-dimensional model of the Project area using survey and design data for the Project Site and proposed building massing prepared by Project designers.

The study used sun altitude and azimuth data is consistent with the standards established by the City of Somerville for each study date estimated to occur at the Project; times were adjusted for daylight savings time as appropriate. The proposed shadows cast by the Project were estimated for the spring and fall equinoxes and the summer and winter solstices. Shadows were estimated for each study date at 9:00 AM, 12:00 PM, 3:00 PM and 6:00 PM. Additionally, a diagram was prepared for that shows the cumulative shadow impact for each required date.

The impact of net new shadow cast by the Project is shown in blue in Figures A.1-A.4, while existing shadows are shown in gray.

1.1.4 Results

The following section describes the estimated shadows under the proposed conditions and anticipated impacts these shadows may have on the nearby open spaces and major pedestrian ways.

March 21 and September 21

March 21 is the vernal equinox, when the length of day and night are equal. Daylight Savings Time is in effect. The sun rises at 6:46 AM in the south-southeast. September 21 is the autumnal equinox and the daytime and nighttime hours are equal. The sun rises at 6:31 AM EDT in the southeastern sky and sets at 6:42 PM EDT. The shadows cast on this date are almost identical to those on March 21, the vernal equinox.

At 9:00 AM, the Project will cast net new shadow to the northwest over McGrath Highway, I-93 and a small portion of the Fellway, as well as a portion of the adjacent property located to the north of the Project.

At 12:00 PM, the Project will cast net new shadow to the north over McGrath Highway and over the property located to the north of the Project.

At 3:00 PM, the Project will cast net new shadow to the northeast over Middlesex Avenue and an incremental portion of the big box stores on the adjacent property.

At 6:00 PM, the Project will cast net new shadow to the east towards Middlesex Avenue and the big box stores on the neighboring property and extending to Grand Union Boulevard.

June 21

June 21 is the summer solstice, the first day of summer and has the longest day of the year. The sun rises at 5:08 AM and sets at 8:25 PM; Daylight Savings Time is in effect.

At 9:00 AM on the summer solstice, net new shadow from the Project will extend northwest over McGrath Highway and I-93.

At 12:00 PM, the Project will cast net new shadow to the north towards McGrath Highway. The Project will also cast net new shadow over a small portion of the adjacent property to the north.

At 3:00 PM, the Project will cast net new shadow to the east towards Middlesex Avenue and a small portion of the big box stores on the adjacent property.

At 6:00 PM, the Project will cast net new shadow to the east towards Middlesex Avenue as well as a portion of the big box stores on the neighboring property and Foley Street.

December 21

December 21 is the winter solstice and the shortest day of the year. The sun is at its lowest inclination above the horizon at each hour of the day. Even low buildings cast long shadows in northerly latitudes such as Somerville's. The sun rises at 7:10 AM EST and sets at 4:15 PM EST.

Winter shadows due to the low sun angle extend to the northwest across the existing heavily shaded urban landscape. As the day progresses, the shadow moves to the north and northeast over the existing buildings north of the Project Site. Although new shadow is greatest at this period, the days during this time of year are less bright and there is much less contrast between shaded and unshaded areas. Given these environmental conditions, net new shadow is minimal and falls primarily on existing building rooftops.

At 9:00 AM, the Project will cast net new shadow to the northwest towards McGrath Highway, the adjacent property, a portion of the Fellsway, and a portion Ten Hills residential neighborhood. It is worth noting that the shadow analysis does not include the existing shadow created by residential properties north of the Fellsway, which create significant self-shading during this time of the year.

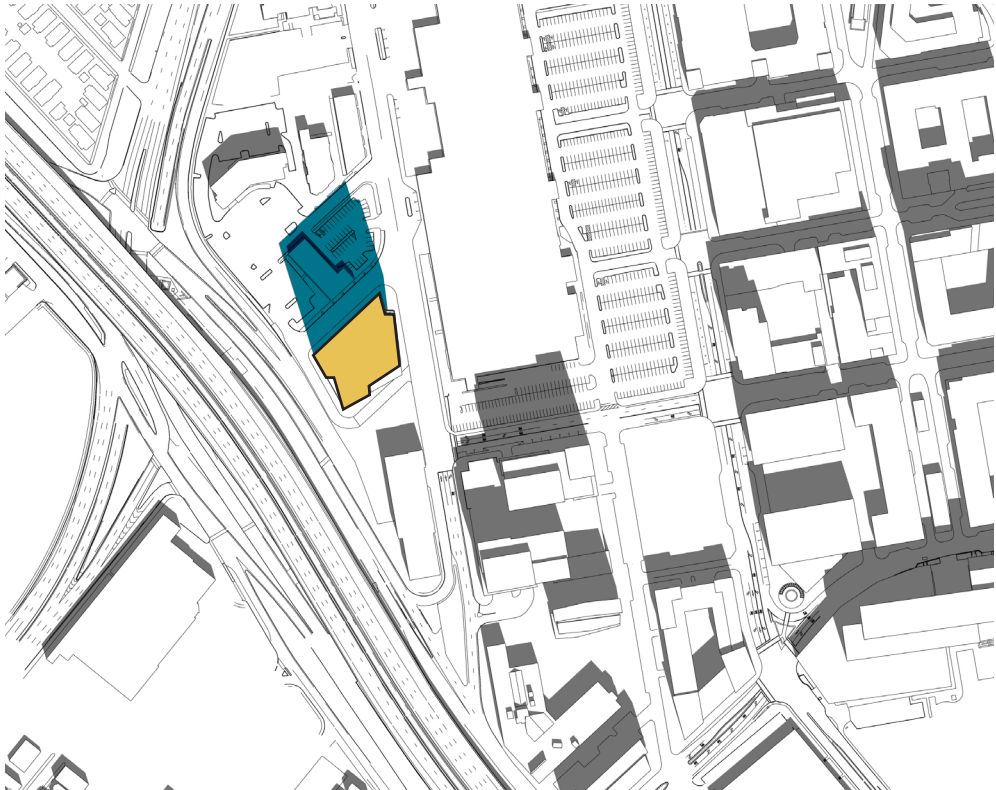
At 12:00 PM, the Project will cast net new shadow to the north towards McGrath Highway and the buildings on the adjacent property. Limited net new shadow will also be cast onto Middlesex Avenue and the rear of the big box stores on the adjacent property.

At 3:00 PM, the Project will cast net new shadow to the northeast over Middlesex Avenue and the big box stores on the neighboring property. Net new shadows will also be cast onto a portion of Grand Union Boulevard and a limited portion of an existing parking garage.

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9AM



12PM



3PM

MARCH 21
(Vernal Equinox)

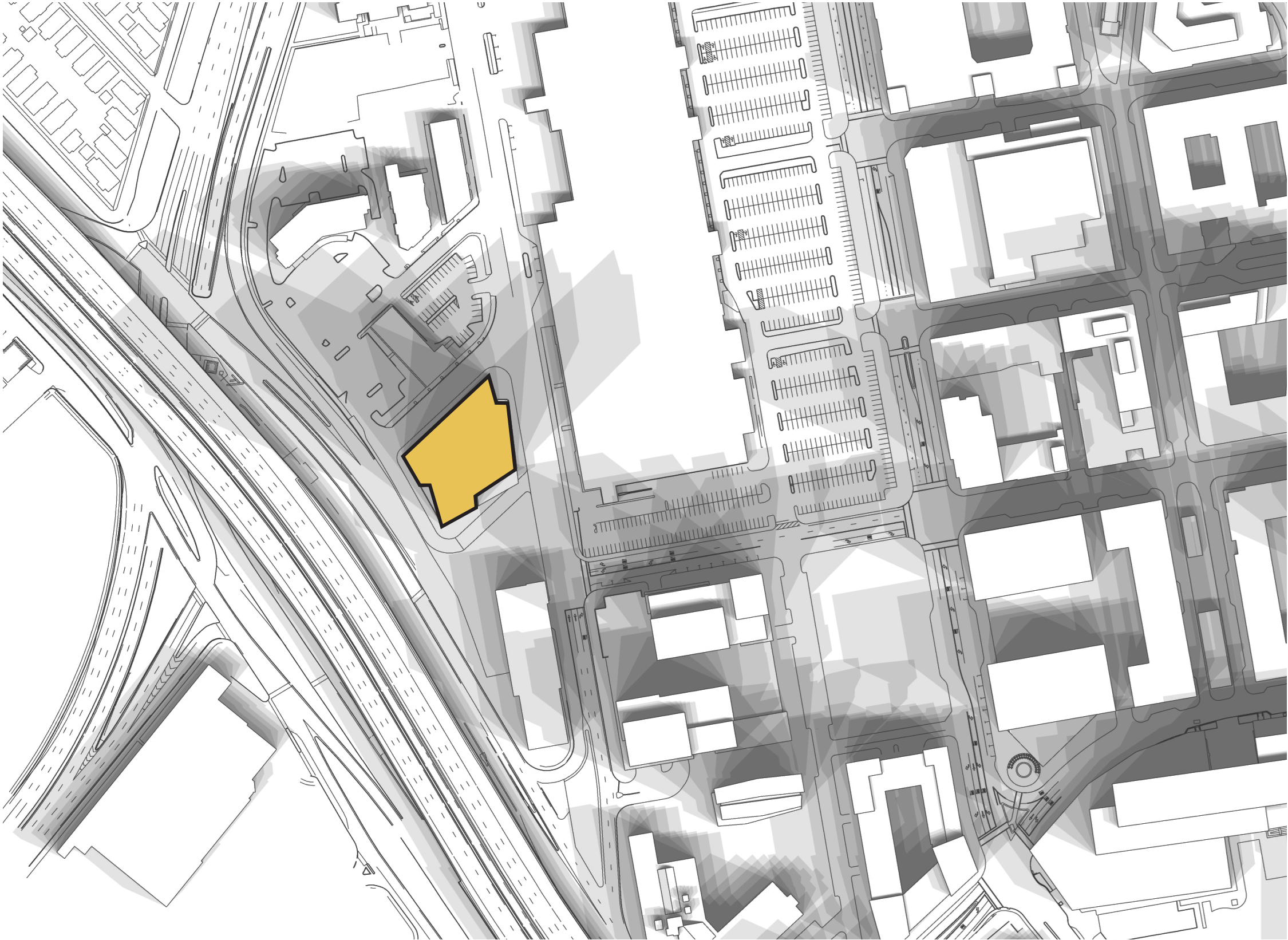
Existing and Net New Shadows

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.1a
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



MARCH 21
(Vernal Equinox)

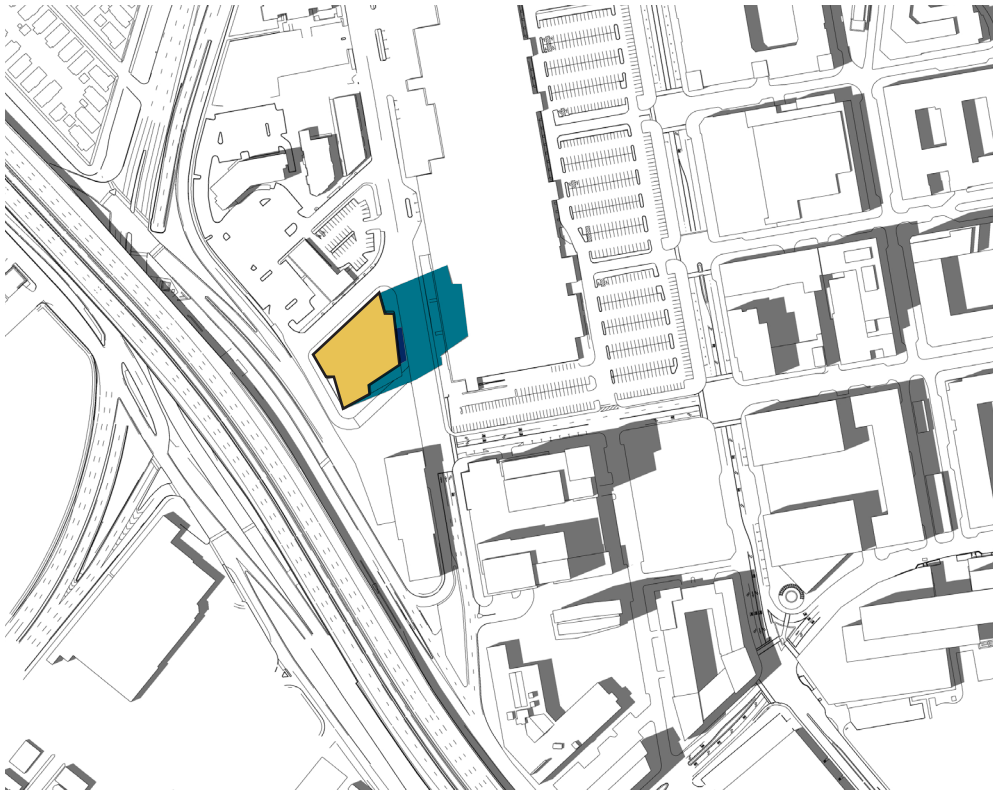
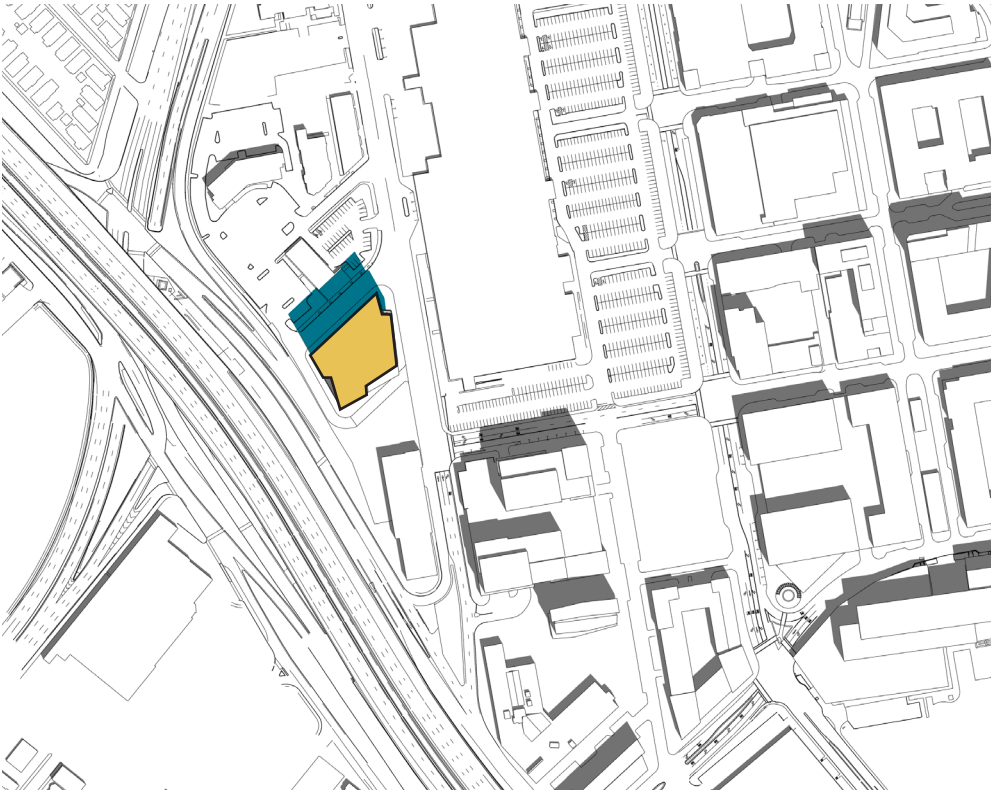
Cumulative shadow

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.1b
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



JUNE 21
(Summer Solstice)

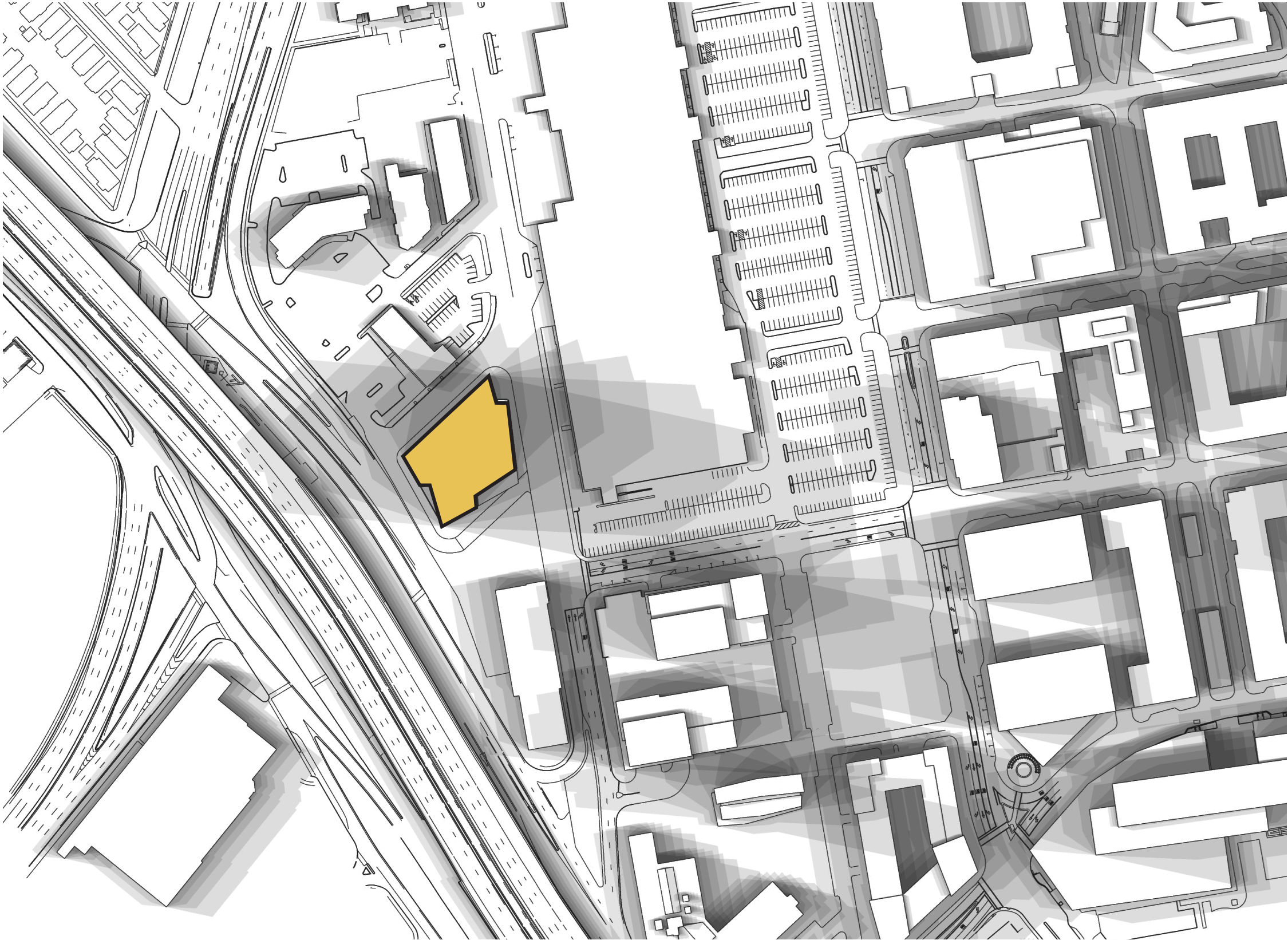
Existing and Net New Shadows

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.2a
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



JUNE 21
(Summer Solstice)

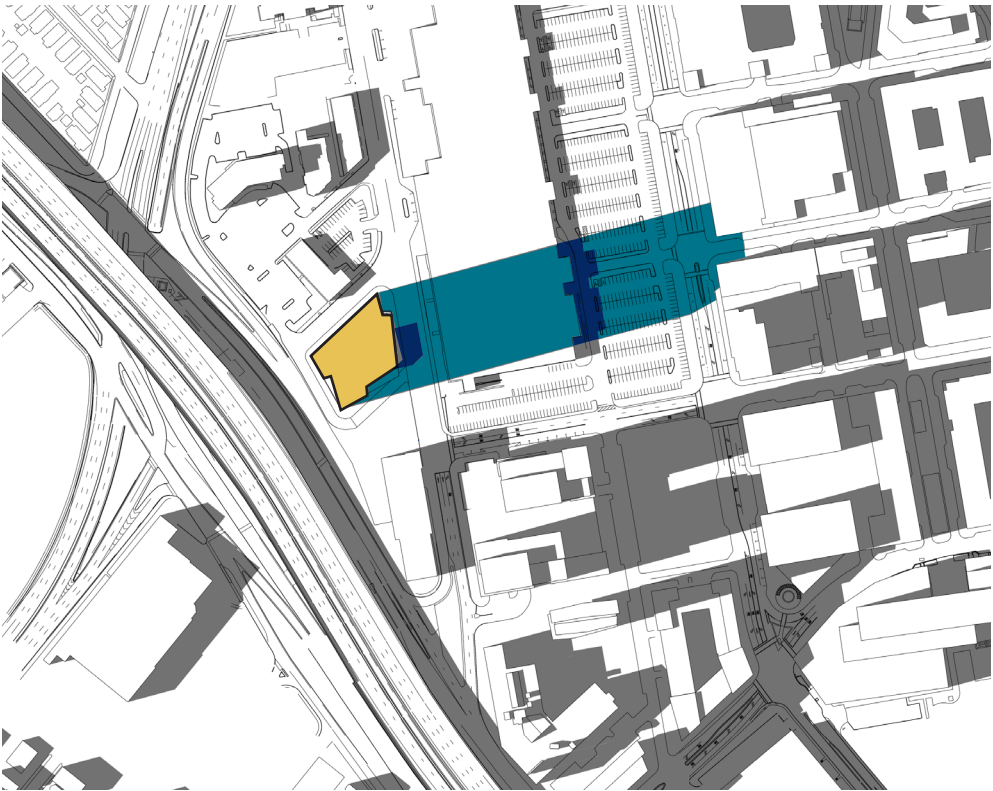
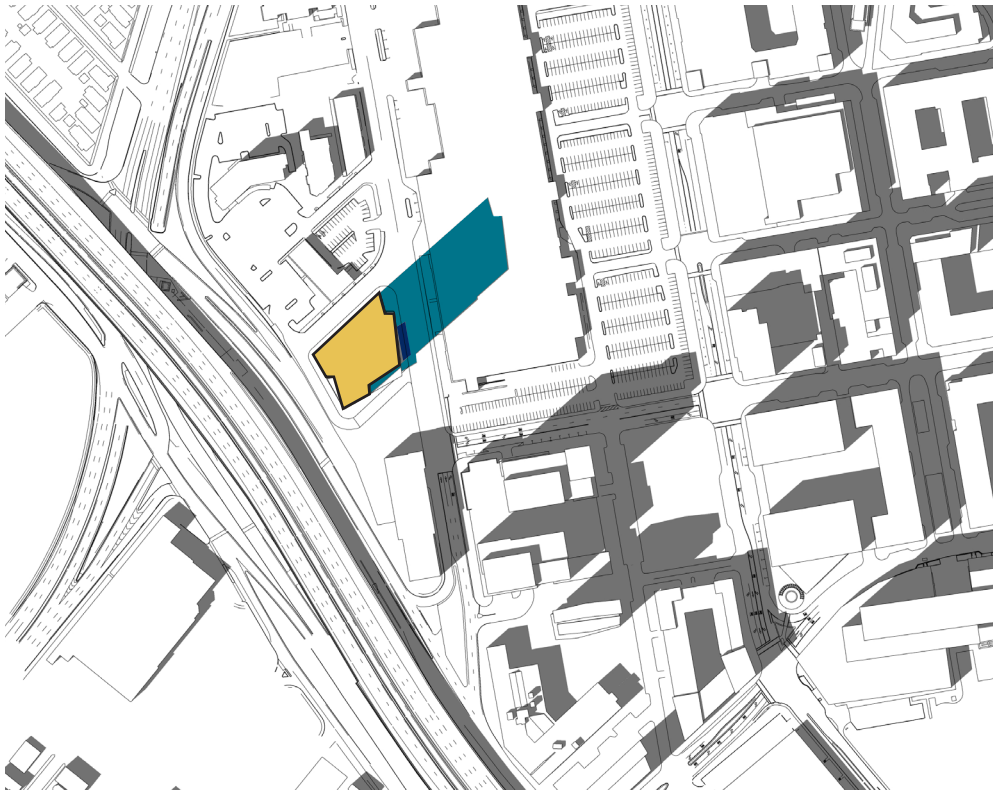
Cumulative shadow

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.2b
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



SEPTEMBER 21
(Autumnal Equinox)

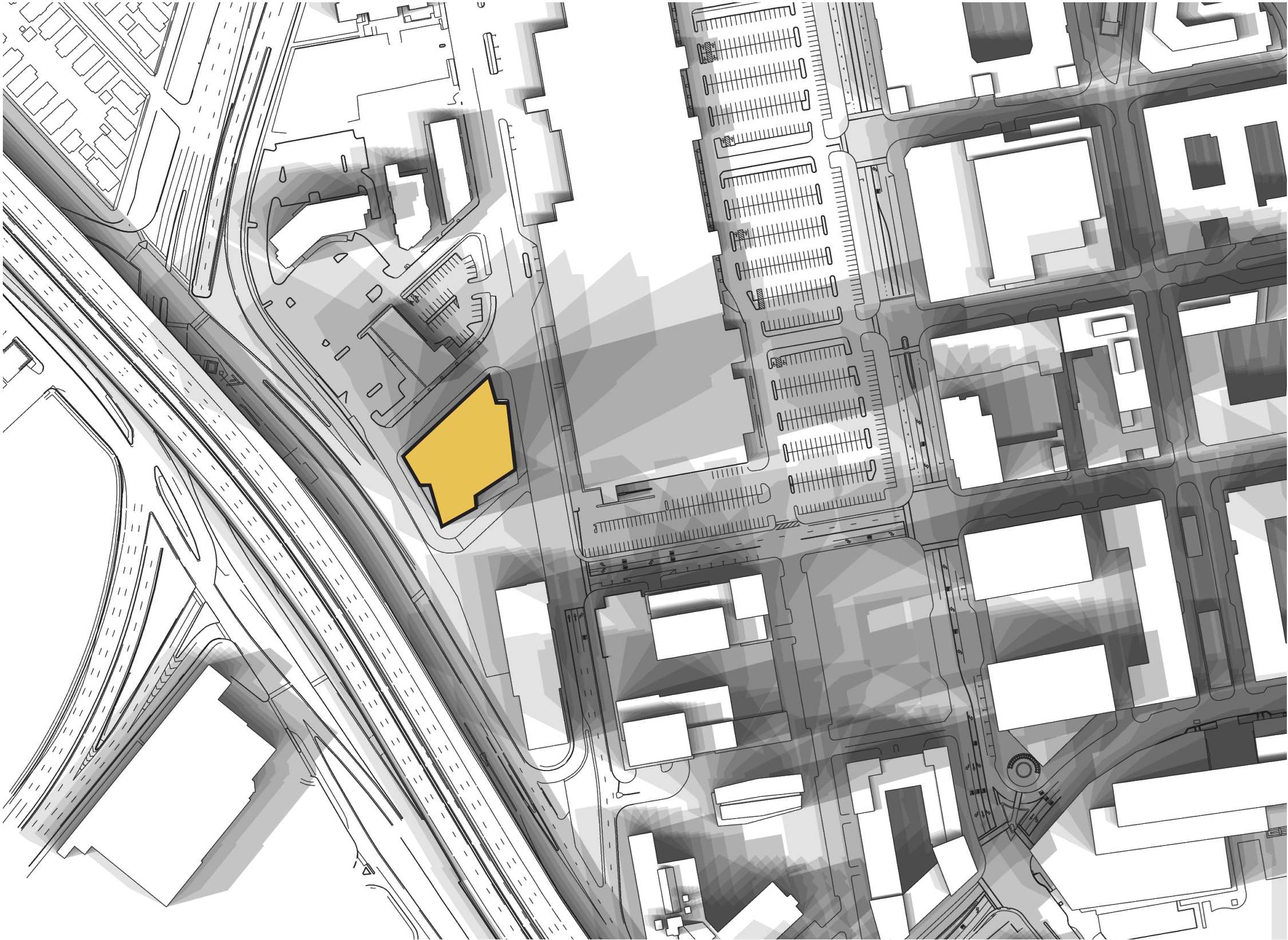
Existing and Net New Shadows

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.3a
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



SEPTEMBER 21
(Autumnal Equinox)

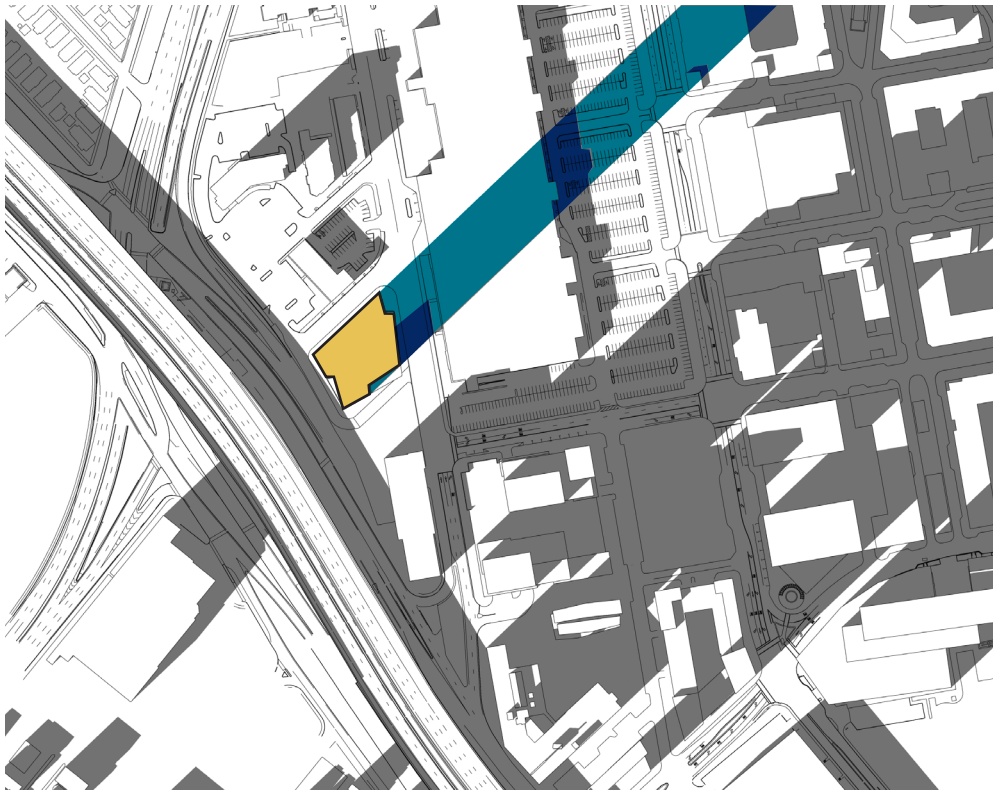
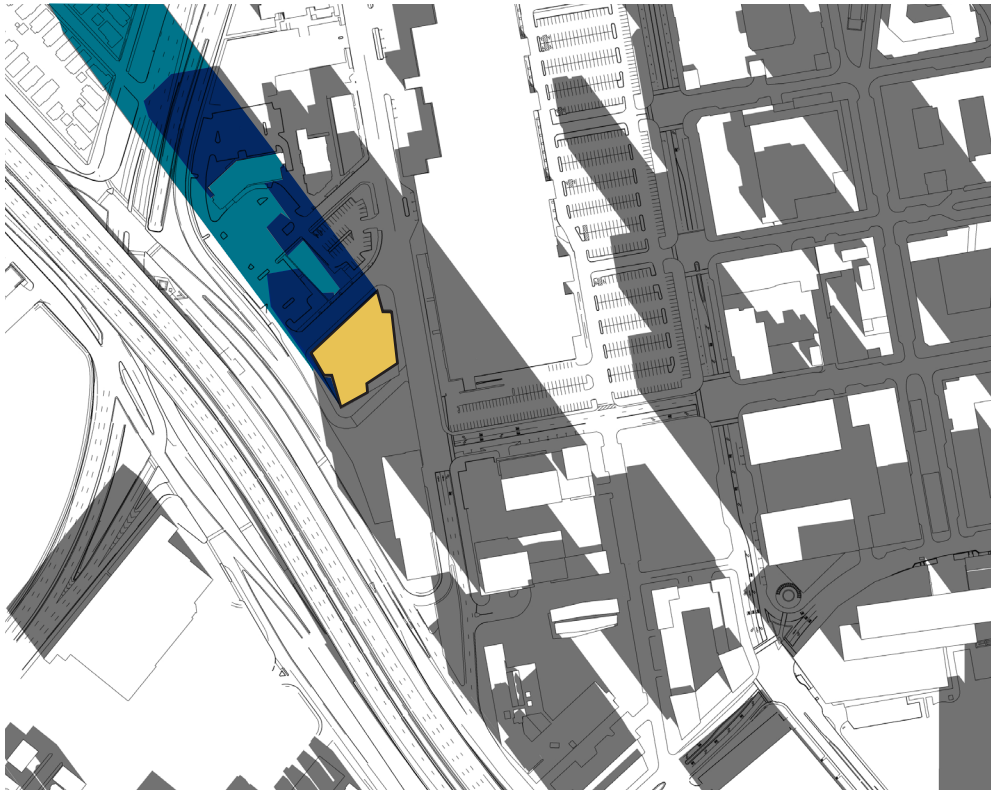
Cumulative shadow

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.3b
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



DECEMBER 21
(Winter Solstice)

Existing and Net New Shadows

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.4a
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts



DECEMBER 21
(Winter Solstice)

Cumulative shadow

- LEGEND
- EXISTING SHADOW
 - NET NEW SHADOW
 - PROPOSED BUILDING



Appendix A.4b
Shadow Studies

EDGE Assembly Square
74 Middlesex Avenue
Somerville, Massachusetts

APPENDIX B: Sustainability

Contents

- LEED v4 C+S Draft Scorecard
- LEED Credit Narrative
- Sustainability and Resilient Buildings Questionnaire
- LEED Affidavit

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LEED v4 DRAFT SCORECARD

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LEED v4 for BD+C: Core and Shell

Project Checklist

Y ? N

1			Credit	Integrative Process	1
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13 4 3 Location and Transportation 20

		0	Credit	LEED for Neighborhood Development Location	20
2			Credit	Sensitive Land Protection	2
		3	Credit	High Priority Site	3
6			Credit	Surrounding Density and Diverse Uses	6
3	3		Credit	Access to Quality Transit	6
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

6 5 0 Sustainable Sites 11

Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
	2		Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
	3		Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
1			Credit	Tenant Design and Construction Guidelines	1

9 2 0 Water Efficiency 11

Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
4	2		Credit	Indoor Water Use Reduction	6
2			Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

29 4 0 Energy and Atmosphere 33

Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
6			Credit	Enhanced Commissioning	6
15	3		Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
1	1		Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2

Project Name: EDGE Assembly Square, Somerville, MA

Date: February 19, 2020

8 1 5 Materials and Resources 14

Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
3		3	Credit	Building Life-Cycle Impact Reduction	6
1		1	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1		1	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

8 2 0 Indoor Environmental Quality 10

Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2	1		Credit	Daylight	3
1			Credit	Quality Views	1

3 3 0 Innovation 6

2	3		Credit	Innovation: Climate Resilience; green cleaning; others TBD	5
1			Credit	LEED Accredited Professional	1

3 1 0 Regional Priority 4

1			Credit	Regional Priority: Renewable Energy Production (threshold: 2 points)	1
1			Credit	Regional Priority: Optimize Energy Performance (threshold: 8 points)	1
1			Credit	Regional Priority: Indoor Water Use Reduction (threshold: 4 points)	1
	1		Credit	Regional Priority: Specific Credit TBD	1

80 22 8 TOTALS Possible Points: 110

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

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LEED CREDIT NARRATIVE

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LEED Credit Narrative

Project Overview and Summary

The Project incorporates a sustainability approach that promotes livability and economic development, while also mitigating the external impacts related to energy, emissions and water consumption and, waste production.

Using the nine US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) categories, the following design strategies will be implemented. Where LEED requirements cannot be met, these have been noted. The basis of this assessment is LEED BD+C for Core and Shell version 4, with LEED v4.1 criteria being substituted where beneficial to the Project (as allowed by USGBC).

A LEED scorecard has been prepared that currently indicates 80 points that are deemed achievable at this conceptual stage of design, which equates to LEED Platinum. The Project Team has identified an additional 22 points that will need to be further evaluated to achieve at least five extra points to provide a buffer should some credits not be achievable.

Integrative Process

- › *Integrative Process:* The Proponent recognizes that the most successful buildings are ones where the design and operational elements are considered from the very beginning and formed as the result of an integrated, collaborative and multi-disciplinary team. This integrative process, albeit at a reduced level, has already been exercised at this stage of the Project and will continue to be a priority as the project progresses. While energy has been a dominant design driver from the beginning, water will also be considered to fulfil the requirements of this LEED credit.

Location and Transportation

- › *Sensitive Land Protection:* The Project Site is developed and currently in use.
- › *High Priority Site:* Businesses are currently operating at the Project Site and therefore this credit will not be achieved.
- › *Surrounding Density and Diverse Uses:* The Project is located in an urban area and takes advantage of existing infrastructure, from utilities to roadway networks. There are a number of local amenities and services in the nearby neighborhood within walking distance of the Project Site. The density and diversity criteria for LEED are expected to be achieved.
- › *Access to Quality Transit:* There are a number of public transit options available to the Project within ¼ mile of the building entrance, including subway and buses.

- › *Bicycle Facilities:* Sufficient sheltered and secure bicycles parking will be provided in the lower level parking area to achieve this credit. Showers will be provided for tenants.
- › *Reduced Parking Footprint:* Vehicular parking is proposed on two, below-grade levels of parking. Further investigation into how the proposed parking compares to the base ratios established for the purposes of LEED will need to be undertaken.
- › *Green Vehicles:* At least five percent of total parking spaces will be designated a preferred parking for green vehicles. At least two percent of total parking spaces will be installed with electric charging stations.

Sustainable Sites

- › *Construction Activity Pollution Prevention:* An Erosion and Sedimentation Control Plan will be developed during the design phase by the Civil Engineer and implemented by the Contractor during construction to minimize pollution from construction activities.
- › *Site Assessment:* The Project Site has been extensively studied for all the aspects required by LEED, and has been actively used to inform the design.
- › *Site Development: Protect or Restore Habitat:* This credit requires further consideration, but the revitalization of the adjacent City owned park (the "Kensington Park Improvements"), provides an important opportunity to promote habitats. The green roof terraces will also contribute to this credit.
- › *Open Space:* The Kensington Park Improvements and exterior spaces surrounding the Project on-site provide considerable open space through the incorporation of accessible green terraces and new civic open space.
- › *Rainwater Management:* Calculations to determine compliance with this LEED credit have yet to be undertaken. A detention tank will serve to collect stormwater.
- › *Heat Island Reduction:* A combination of Solar Roof Index (SRI) compliant roofing and SR compliant exterior hardscapes, together with the green terraces and Kensington Park Improvements should ensure this credit is achieved.
- › *Light Pollution Reduction:* The LEED criteria will be followed to meet this credit. Since the location of the Project is adjacent to I-93, the Proponent will continue to study interior and exterior lighting design alternatives that do not impact adjacent vehicular traffic on I-93.
- › *Tenant Design and Construction Guidelines:* The Proponent is committed to developing a high performance and sustainability-focused handbook for tenants.

Water Efficiency

- › *Outdoor Water Use Reduction:* Native and adapted plantings that can survive on rainfall alone will be specified. If irrigation is installed, it will be high efficiency to achieve the 50 percent baseline reduction requirement.

- › *Indoor Water Use Reduction:* Restroom fixtures and fittings will be selected to achieved at least 40 percent water use reduction savings from the LEED baseline. Water using laboratory equipment will be compliant with LEED criteria.
- › *Water Metering:* A building-level water meter will be installed as well as water sub-metering of at least two uses.
- › *Cooling Tower Water Use:* No cooling towers will be installed in the Project, but this credit is likely to be achieved since LEED allows an alternative modeling route to demonstrate compliance.

Energy and Atmosphere

- › *Commissioning:* The Proponent is committed to third-party commissioning for both fundamental and enhanced commissioning, as well as building envelope commissioning and monitoring-based commissioning.
- › *Energy Performance:* Extensive energy modeling has been performed using IES Virtual Environment (VE) software to help optimize building systems and the façade to reduce energy demand. For the purposes of LEED the Project is targeting 15 points out of the possible 18 points for Optimize Energy Performance.
- › *Energy Metering:* The Proponent is a strong advocate for building data. In addition to a main building-level energy meter, all the systems that comprise more than 10 percent of total building demand will be sub-metered.
- › *Refrigerant Management:* The Project is new construction and all new systems will be installed; therefore no CFCs will be used. The calculation to determine if the Enhanced Refrigerant Management criteria is achieved has yet to be undertaken.
- › *Demand Response:* The Project will investigate the inclusion of Demand Response technology to tie-in to a future demand response program should one be available.
- › *Renewable Energy Production:* Solar photovoltaic (PV) is considered the most viable renewable energy technology for this Project with roof and façade mounted panels being considered. This requires further evaluation but is an important consideration of the Proponent and it is the intention to serve at least five percent of total building electricity by PV to meet the LEED requirement.
- › *Green Power and Carbon Offsets:* The Proponent is committed to purchasing green power for 100 percent of the Project's energy consumption.

Materials and Resources

- › *Storage and Collection of Recyclables:* A dedicated storage area for recyclables will be provided for tenants.
- › *Construction and Demolition Waste:* A requirement will be included in the construction and demolition waste specifications to achieve a diversion rate of at least 75 percent across four different waste streams to meet this LEED credit. The Contractor will also be required to develop and Construction Waste Management Plan.

- › *Building Life-Cycle Impact Reduction*: A whole-building life-cycle assessment will be undertaken to evaluate different construction options and used to inform the project team of the building's environmental impacts.
- › *Environmental Product Declarations (EPD)*: Health and wellbeing is a key consideration for the Project and materials and products that have been verified by a third-party source will be evaluated as part of the design process.
- › *Sourcing of Raw Materials*: The environmental attributes that contribute to this credit will be evaluated as part of the design process.
- › *Materials Ingredients*: As with EPD's, materials and products that have Health Product Declarations (HPD) or equivalent will be evaluated and selected as part of the design process.

Indoor Environmental Quality

- › *Minimum Indoor Air Quality Performance*: The requirements of ASHRAE 62.1-2010 will be met as well as the LEED requirements for ventilation and monitoring.
- › *Environmental Tobacco Smoke Control*: The Project will be no smoking. Exterior areas within 25 feet of the building will be designated no smoking with clear signage.
- › *Enhanced Indoor Air Quality Strategies*: Walk-off mats (10-foot minimum) at all regularly used entrances to the Project will be included. High level filters will be specified and rooms that contain potential contaminants will be addressed as the design progresses.
- › *Low-Emitting Materials*: Low and zero VOC materials will be specified.
- › *Construction Indoor Air Quality (IAQ) Management Plan*: The specifications will include the requirement for the contractor to develop and implement a construction IAQ Plan to maintain a high-quality indoor environment.
- › *Daylight*: Daylight has been optimized to reduce glare, improved views and balance color rendition while meeting critical lux thresholds.
- › *Views*: The design of the Project is built around providing access to high quality views.

Innovation

- › LEED provides the opportunity to capture up to six points for innovative strategies employed by the Project Team. These still require further consideration, but at least two of the six points are targeted at this time.

Regional Priority

The following regional priority credits are available for this Project Site. These are considered to be the most important LEED issues for this location and are awarded as bonus points:

- › Renewable Energy Production (achieve two-point threshold) – targeted
- › Optimize Energy Performance (achieved eight-point threshold) – targeted

- › High Priority Site (achieve two-point threshold) – not achieved
- › Rainwater Management (achieve two-point threshold) – to be evaluated
- › Indoor Water Use Reduction (achieve-four-point threshold) – targeted

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SUSTAINABLE AND RESILIENT BUILDING QUESTIONNAIRE

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This document outlines development review application requirements in relation to the long-term environmental sustainability and climate resilience of buildings within Somerville. Development proposals that require Site Plan Approval by the Somerville Zoning Ordinance must include a completed Sustainable & Resilient Buildings Questionnaire with the required Development Review Application. A Development Review Application is considered incomplete unless a completed questionnaire is submitted with the application.

The purpose of this questionnaire is to ensure that the impacts of future climate conditions are carefully evaluated and to encourage reasonable efforts to reduce or eliminate greenhouse gas emissions and mitigate the impacts related to climate change in the design, construction, and occupancy of buildings. Completion of this questionnaire raises awareness of site specific vulnerability, ensures that future climate conditions are considered throughout the stages of development.

Please review the following documents before completing the questionnaire:

- [Somerville Climate Change Vulnerability Assessment](#)
- [Carbon Neutrality Pathway Assessment](#)

RESOURCES:

For information on net-zero and resilient building and site design, please review the following resources:

- [Architecture 2030 Palette \(Net-zero design tools\)](#)
- [Building Resilience in Boston](#)
- [Enhancing Resilience in Boston](#)
- [A Better City's Resiliency Toolkit](#)
- [Ready to Respond: Strategies for Multifamily Building Resilience](#)

For additional information visit www.somervillema.gov/sustainaville

PROCEDURE:

A completed Sustainable & Resilient Buildings Questionnaire must be submitted with a Development Review Application for all development proposals that require Site Plan Approval. New construction or alterations to existing structures of 25,000 square feet or more must also submit an updated questionnaire prior to the issuance of the first Building Permit and prior to the issuance of the first Certificate of Occupancy to identify any design changes made subsequent to Site Plan Approval or additional information determined as the development process unfolds.

BACKGROUND: CARBON NEUTRALITY

Understanding the global imperative to reduce greenhouse gas emissions in order to prevent extreme changes to the climate, Mayor Joseph A. Curtatone set a goal for Somerville to become carbon neutral by the year 2050. In 2017, the Somerville Board of Aldermen passed a resolution re-affirming the city's carbon neutrality goal. Carbon neutrality is defined as the net-zero release of carbon dioxide and other greenhouse gases (GHG) within Somerville's municipal boundary.

To achieve carbon neutrality by 2050, Somerville will need to drastically reduce greenhouse gas emissions from electricity, buildings, transportation, and waste disposal. Development within the city will need to be high performing and progressively improve its energy performance to become carbon neutral. Buildings should be designed to maximize energy efficiency, produce or procure renewable energy, and phase out fossil fuel use.

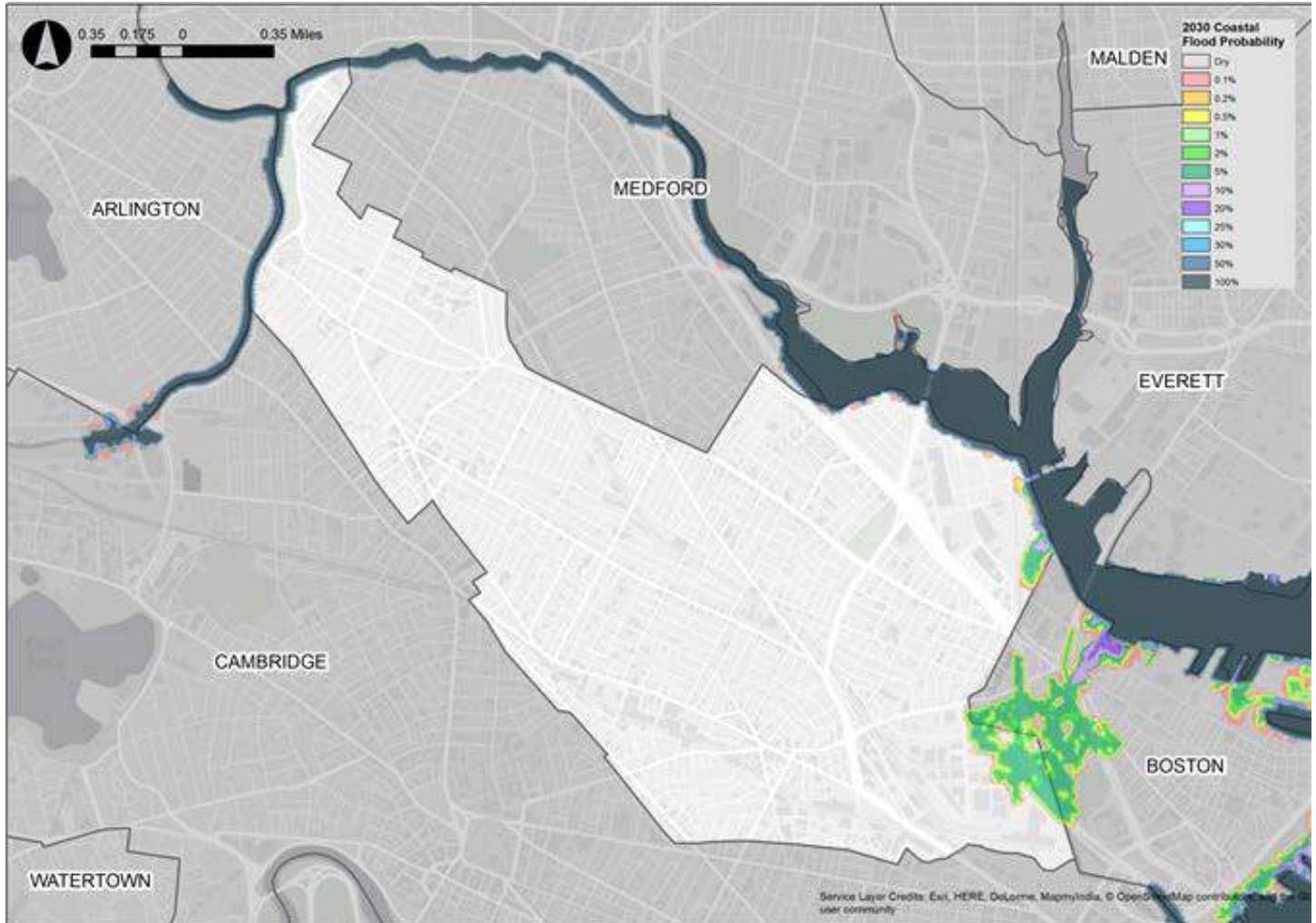
BACKGROUND: CLIMATE CHANGE VULNERABILITY

Despite efforts to minimize greenhouse gas emissions, climate change is already impacting the City of Somerville and changes to the climate will continue to intensify unless global emissions are swiftly and significantly reduced. The City of Somerville's Climate Change Vulnerability Assessment analyses vulnerabilities associated with Somerville's key climate stressors: increased precipitation, sea level rise and storm surge, and higher temperatures. The analysis recommends that new development consider these climate impacts and take appropriate measures to address the projected climatic conditions described in the assessment.

Sea level rise and storm surge are already potential concerns for areas of East Somerville. By 2035-2040, the Amelia Earhart Dam could be regularly flanked by strong storms resulting in flooding for areas of Assembly Square, Ten Hills, and Winter Hill. Additionally, future 100-year (1% annual chance of occurrence) 24-hour storm events are projected to have a more than 30% increase in rainfall. This increased storm water will put additional stress on Somerville's water infrastructure and is likely to worsen precipitation-based flooding across many areas of the city. As the climate continues to change, average seasonal temperatures are expected to increase and the number of days above 90 degrees Fahrenheit (currently about 10 a year) could rise to 40 days by 2030, a third of the summer, and 90 days by 2070, nearly the entire summer.

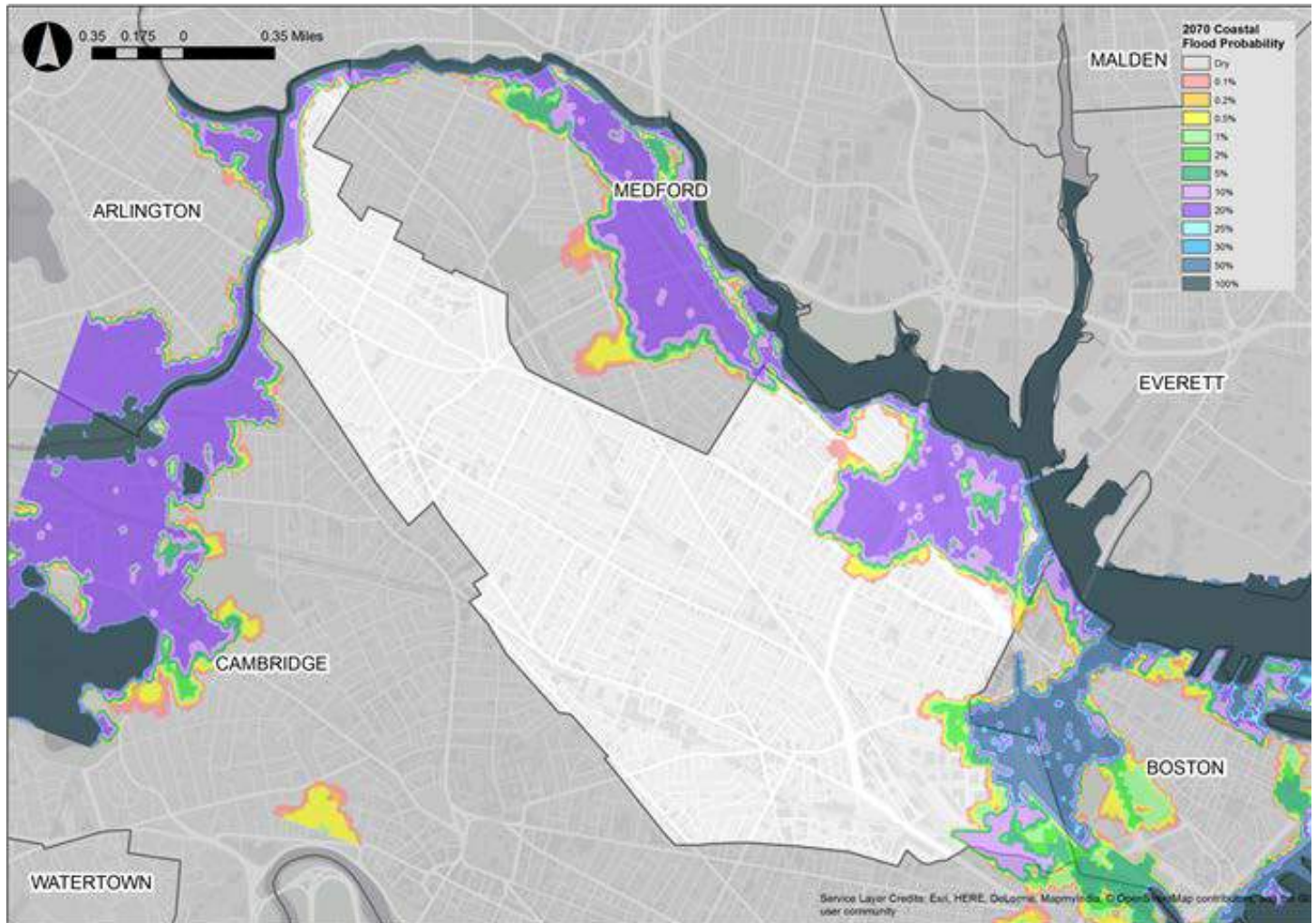
The following maps and figures provide an overview of projected climate exposure. Please review the Climate Change Vulnerability Assessment for more detailed analysis on Somerville's exposure, vulnerability, and risk to climate change.

2030 Coastal Flood Probability



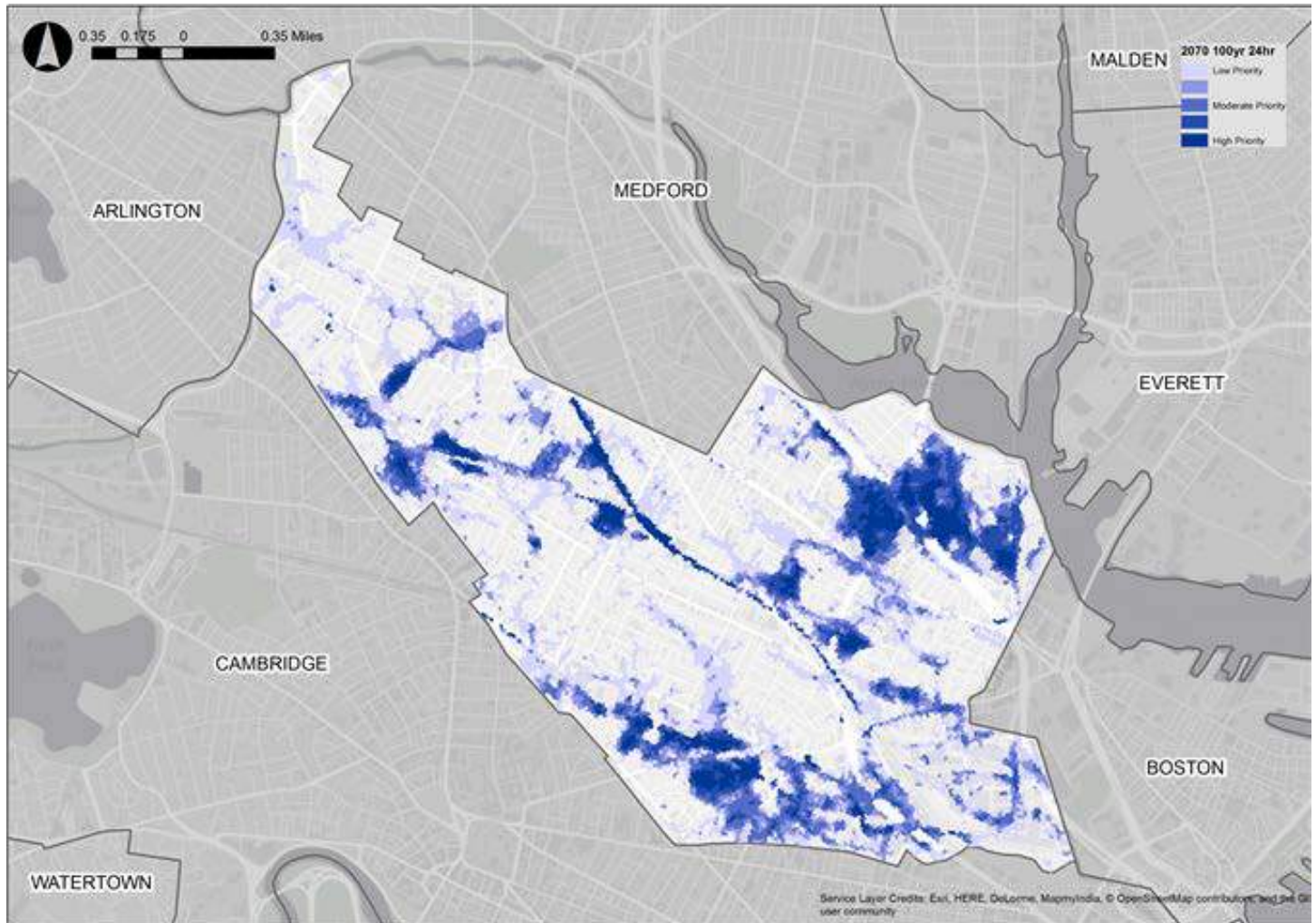
This map shows the annual chance of flooding from coastal storm events and sea level rise in 2030. A 100% chance of flooding means that area is very likely to flood that year, while a 50% chance means that there is an equal chance that it may or may not flood in a given year. A 1% chance of flooding corresponds with a '100-year event'. A 0.1% chance corresponds with a '1000-year event'.
(Somerville Climate Change Vulnerability Assessment, 2017)

2070 Coastal Flood Probability



This map shows the annual chance of flooding from coastal storm events and sea level rise in 2070. A 100% chance of flooding means that area is very likely to flood that year, while a 50% chance means that there is an equal chance that it may or may not flood in a given year. A 1% chance of flooding corresponds with a 100-year event. A 0.1% chance corresponds with a 1000-year event. (Somerville Climate Change Vulnerability Assessment, 2017)

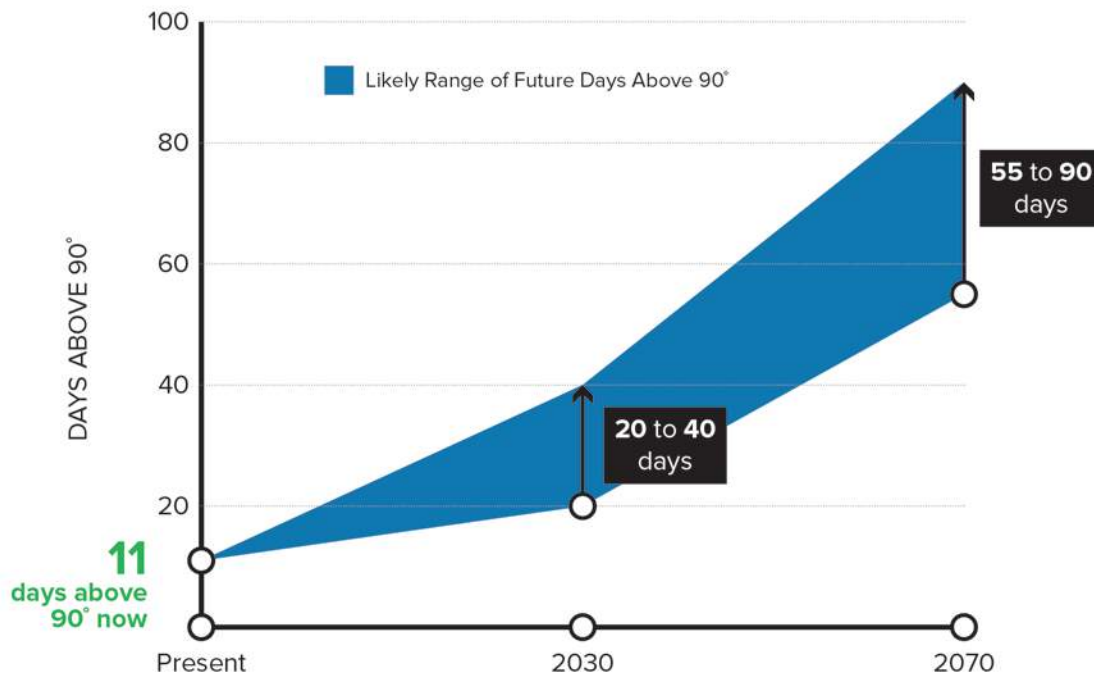
Precipitation Projections



2070 100-year, 24-hour Design Storm Priority Areas of Flood Concern
(Somerville Climate Change Vulnerability Assessment, 2017)

Storm Type	Present-day Rainfall	2030 Rainfall	2070 Rainfall
10-year (10%), 24-hour	4.9 in	5.6 in	6.4 in
100-year (01%), 24-hour	8.9 in	10.2 in	11.7 in

Temperature Projections



(Somerville Climate Change Vulnerability Assessment 2017)

Temperature	1971-2000 (average)	2030		2070	
		(low)	(high)	(low)	(high)
Annual	50.0° F	53.3° F	53.5° F	55.8° F	58.7° F
Summer	70.6° F	74.5° F	74.8° F	77.4° F	80.6° F
Winter	29.8° F	32.2° F	33.0° F	34.6° F	38.0° F

SUSTAINABLE & RESILIENT BUILDINGS QUESTIONNAIRE

Proposal Information

Proposal Name	EDGE Assembly Square
Address	74 Middlesex Avenue and 845 McGrath Highway
Owner/Developer	74 Middlesex Ave. Owner LLC c/o EDGE
Business Address	122 Hudson Street, Floor 2, New York, NY 10013
Designated Contact	Ryan Sullivan
Telephone Number	917-982-6091
Email Address	Rsu@edge.tech

Design Team

Design Architect	Sasaki
Architect of Record	AECOM
Engineer	Civil - VHB MEP - TBD
Landscape Architect	Sasaki
Sustainability/LEED	AECOM/Sasaki
Permitting	VHB
Construction Management	TBD

State Review

Is MEPA Approval Required?	No, the Project does exceed one MEPA threshold; however there is no state financial assistance, land transfer by a state agency, or corresponding state agency action or permit.
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Building & Site Details

Building Type	Office/Research & Development / Lab
Gross Floor Area	Approx. 525,000 gross square feet (SF)
Principal Uses	Office/Research & Development / Lab
Ground Floor Uses	Commercial lobby, ground-floor retail/active uses
Site Elevation	Avg. 14.5 feet (SSB)
Ground Story Elevation	Approx. 15.0 feet (SSB)
Building Height	18 # of Stories (275 feet)
Below Grade Levels	The exact number of below grade parking levels will be determined as the design advances.
Ground Water Elevation	Between 7' and 10' below grade
Parking Spaces	Up to 350 below-grade vehicle parking spaces
EV Ready Spaces	To be determined as the design advances.

EV Charging Spaces
Climate Vulnerability
Exposure
(check all that apply)

To be determined as the design advances.	
X	Sea Level Rise & Storm Surge
X	Precipitation Induced Flooding
X	Heat
<input type="checkbox"/>	Other(s):

Green Building
LEED Version
LEED Certifiable
LEED Rating
LEED Point Score

LEED BD+C version 4 for Core and Shell
Yes
Platinum
80

Building Systems
Expected Life of Building
Critical Site Infrastructure
Expected Life of Key Systems
Type of Heating System(s)
Type of Cooling System(s)

60+ years
Pumps - 20 years, all other site Infrastructure - 75 years
30 years
Investigating full electrification and Ground Source Heat Pump
Investigating Ground Source Heat Pump + air source heat pump/ Auxiliary Chiller

Building Energy Use & Continuity

Reducing greenhouse gas emissions is critical to avoiding the worst impacts of climate change. To achieve Somerville's 2050 carbon neutrality goal, new construction must be designed to maximize energy efficiency, produce or procure renewable energy, and phase out fossil fuel use. At the same time, new development should make efforts to improve resiliency to disruptions in utility services, which could become more frequent with more powerful storm events and heat waves.

1. Explain how building energy loads & performance were determined:

AECOM used the computer software IES Virtual Environment (VE) 2019 (version 2019.1.0.0) to model both the proposed design and the baselines and evaluate energy efficiency measures. IES VE is a computer program for detailed energy use analysis. It calculates the hour-by-hour energy use of a building based on information on the building's location, construction, HVAC systems, occupancy, internal loads, and operation.

Annual Electric Load	5,325,289 (kWh)
Annual Heating Load	15,580 (MMbtu/hr)
Annual Cooling Load	1,197,000 (Tons/hr)

Peak Electric Load	3,614 (kW)
Peak Heating Load	14.99 (MMbtu)
Peak Cooling Load	2,194 (tons)

Energy Use Intensity

34.74 (kBtu/SF)

*Note: These results are based on a 50 percent office / 50 percent lab split scenario, which assumes 50 percent of the lab space will consist of office space. This results in approximately 75 percent of the overall building square footage dedicated to office space, and approximately 25 of the building square footage solely dedicated to lab space.

2. Describe any strategies that will be implemented to support continued building operations during potential utility outages.

Interruptions of power will be mitigated by an emergency generator. Spatial allocations will be provided for tenant generators.

Back-Up/Emergency Power Systems

Electric Output

750 kVA

System Type

Emergency

Number of Power Units

1

Fuel Source

Diesel

Emergency and Critical System Loads (in the event of service disruption)

Electric

750 (kWh)

Heating

1.5 (MMbtu/hr)

Cooling

300 (Tons/hr)

2. How is the building designed to reduce energy usage? Please describe the key design features of the building including any active (equipment, controls, features, etc.) or passive (orientation, massing, systems, etc.) energy efficiency measures.

The massing orientation has been optimized to balance energy performance, daylight quality, and solar capacity.

The overall Window to Wall Ratio (WWR) of 40 percent aligns with ASHRAE guidelines. Actual WWR at different façades based on orientation and building program has been optimized to balance energy performance and daylight quality. The building envelope components must meet the ASHRAE and EDGE Blueprint requirements set forth by the standard for the corresponding climate zone. Permanent exterior shades in various types will be considered. Both green roof and rooftop solar photovoltaic (PV) applications are currently being considered.

The proposed heating and cooling generating systems to be considered include on-site Ground Source Heat Pump (GSHP) and Air Source Heat Pump (ASHP) systems. The building is designed to be net zero capable. Minimizing the use of and the removal of gas boilers are being explored in the systems design. The building has an ambition to be all-electric ready.

Ventilation energy constitutes a large portion of the building's annual energy use due to high demand of fan load which ensures indoor air quality. Variable Frequency Drive (VFD) and low pressure drop fan systems, high efficiency air handling unit (AHU) heat recovery and air side economizers are to be considered to offset the fan load.

Reduced lighting power density is proposed with optimized lighting layout and high efficiency LED fixtures. Daylight and occupancy controls of lighting fixtures beyond the code minimum are considered.

Energy Use below Mass
Code (2013)

Approx. 58.38 %

Energy Use below
ASHRAE 90.1
(current edition 2016)

Approx. 62.16 %

3. Will the building use air or ground source heat pumps or solar thermal systems? Please describe any such system. If no, please explain the building's heating and cooling systems and whether high efficiency electric or renewable powered systems were considered.

GSHP systems are being considered to generate heating and cooling. The predicted on-site GSHP capacity can only meet partial portions of the Project's heating and cooling energy. Therefore, supplementary heating and cooling need to be provided by additional ASHP or auxiliary chillers. On-site renewable rooftop and building mounted solar PV is being considered to provide electricity.

4. Describe any existing or planned connections to distributed energy or district energy systems.

No current plans.

5. Is on-site renewable energy generation feasible? Please describe your analysis and findings. If yes, will any renewable energy be produced onsite? If so, please describe (system type and capacity).

An annual solar radiation study and PV feasibility assessment has been completed. The roof is shown as the best location for solar PV with highest annual solar radiation and better PV output. The Project will provide conduits and structural upgrades to provide a 'solar ready' roof for the future installation of solar PV panels.

In addition to the roof, other high potential for PV is located on the southern façades due to the exposure with only afternoon sun being blocked. Building Integrated PV on the south façade, with holistic considerations of programmatic constraints and natural daylight requirements, are to be investigated.

6. Describe any on-site energy storage systems.

The building does not include any on-site energy storage.

7. Describe any other measures intended to reduce energy use and greenhouse gas emissions.

Energy efficient and low flow plumbing fixtures are proposed to reduce the Domestic Hot Water (DHW) heating demand.

Smart plug load control system are proposed to reduce the process load.

8. Does the electric utility's infrastructure have enough capacity to support the addition of your building's energy load? Please confirm that you have consulted with the local utility.

Due to existence of electrical conduits in the vicinity of the Project, it was assumed that the electric utility's infrastructure has enough capacity to support the Project. The design team will coordinate with the local utility company during the next phase of the design.

9. Describe measures that will be implemented to reduce building energy demands on utilities and infrastructure, such as a demand response program.

Fundamental Commissioning and Enhanced Commissioning, including building envelope commissioning, is proposed per LEED requirements to ensure the building systems are running optimally and as efficiently as designed.

The property manager will utilize a Building Management System (BMS) to track and control the building systems. The BMS is proposed to connect to environmental sensors and can be overridden by the automatic controls. The property manager can adjust the controls according to the utility demand.

The Project will be designed to include the infrastructure to connect to a future Demand Response Program, which is currently being investigated. The goal will be to enable the building to shed at least 10 percent of building peak electricity demand (determined by the energy modeling and in line with LEED requirements) thereby reducing pressure on the utility grid.

The building is designed to be fully electric ready in the future as part of the long-term strategy to encourage the use of renewable and non GHG emitting resources.

The City of Somerville recognizes that as technology advances, incorporating design elements to mitigate carbon emissions and increase resilience may become more feasible. Applicants are encouraged to devise strategies that permit building systems to adapt and evolve over time to further reduce GHG emissions and

to avoid path dependency that perpetuates reliance on fossil fuels. With this in mind, please answer the following questions:

10. Will the building be a net zero carbon building? A net zero carbon building is a highly energy efficient building that either produces or procures enough carbon-free renewable energy to meet building operations or offsets any remaining carbon emissions. If the building will not be a net zero carbon building, describe how the building's systems will be adapted over time to achieve net zero energy emissions. Changes could include, but are not limited to, additional renewable energy generation, energy storage, additional energy efficiency measures, or other measures that would further reduce greenhouse gas emissions.

The Project is proposed to be Net Zero Carbon Capable. This approach allows for the feasible implementation of sustainable features today with the built-in ability to transform to fully carbon neutral in the future. This includes the capacity to deploy and upgrade an all-electric building systems infrastructure to take advantage of renewable resources on and off-site, as well as utilize techniques such as ice storage to accommodate the projected future cooling needs due to climate change.

11. Will the building's roof include any sustainability features? These may include, but are not limited to, high albedo roof materials, solar panels, or vegetation. If no features are included in the design, please describe why and if any features could be added in the future.

The Proponent is exploring the potential to install rooftop PV on shadow-free areas on the roof where the efficiency of the panels is higher. For the rest of the area on the roof, accessible green roof or recreational space will be considered. Where applicable, high albedo material will be utilized for the pavement and any remaining roof area. The potential to reuse stormwater collected from the roof will be investigated.

12. Has the building been planned and designed to accommodate any additional future resiliency enhancements? Please describe if designs could accommodate future additions of any of the following:

- Solar PV (roof or site is solar ready)
 - Solar Thermal
 - Connection to district energy system
 - Potable water storage
 - Wastewater storage
 - Back up energy systems & fuel
 - Electric Vehicle Charging
 - Green roof
-

Both green roof and rooftop solar photovoltaic (PV) applications are currently being considered. The building will incorporate emergency power generation for all life safety systems. As the Project design advances, the exact location and number of electric vehicle and bicycle charging stations will be advanced.

Climate Change Risk and Vulnerability

13. How did you use climate change projections from Somerville's Climate Change Vulnerability Assessment (CCVA) to inform the building and site design of your project?

There is no risk posed in the near term as evidenced in the 2030 flood map. According to Figure 38 and Figure 40 of CCVA, the Project Site has minimal risk of flooding (approximately 20 percent) during the 100-year coastal storm event in 2070 with 2.5' ~ 3' flood height.

Refer to Figures B.1-B.4 (attached), which depict the location of the Project Site on the CCVA flood maps.

14. Based on the information in the Climate Exposure section of the CCVA, what are the projected climate change impacts that your site might be vulnerable to? Please list and describe all relevant impacts from the CCVA.

Regardless of the minimal risk flood, the project is planning to locate critical building systems above grade, unless they are designed, constructed, and installed to prevent floodwaters, including any backflow through the system, from entering or accumulating within the component. Additionally, at the appropriate time in the future, the project would consider implementing temporary flood barriers as necessary.

The next two sections ask specific questions about how the project is designed to manage climate-related risks from heat, coastal and inland flooding.

Managing Heat Risks

As temperatures increase, Somerville will become more susceptible to the urban heat island effect which causes hotter temperatures due to paved surfaces and waste heat generated by energy use when compared to less developed areas. Open space, trees coverage, and impervious surfaces can help reduce heat exposure and the intensity of the urban heat island effect.

Increasing average temperatures can have wide-ranging impacts on human life, the built environment, and natural ecosystems. Rising temperatures and more intense heat waves present significant public health

concerns and can contribute toward kidney, lung, and heart problems. Vulnerable populations are particularly susceptible to heat-induced illness and mortality. Buildings also demand greater electricity for cooling. Even small changes in average temperatures can significantly impact the natural environment.

15. Describe how the building and its energy systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heat waves, and longer lasting heat waves.

Projected future weather models have been used to evaluate the impact that climate change may have on the heating and cooling demands of the building and to inform the design process.

A mechanical system designed to meet only current loads translates to an oversized system for the future, which may result in higher energy consumption. Therefore, the more that heating demand can be met via passive and adaptive design, the more efficient the building will be during its life. The cooling demands increase significantly in all future weather probabilities. The data indicate that increased capacities will be required to accommodate future demands, unless alternative passive design solutions offset cooling loads and therefore maximize the lifespan of the systems. Techniques such as night cooling will help mitigate future temperature increases and can be implemented as a retrofit in the future.

The Outdoor Air Temperature (OAT) within the building set points (21RC-26RC) increases from 349 hours (h), to 789h, 1059h and 1255h for the 10 percent, 50 percent and 90 percent probabilities, respectively. The results show the high potential to meet the building design conditions and thermal comfort passively, through operable windows and natural ventilation.

Temperature Design Conditions

Low Temperature	8.1°F
Annual Cooling Days	224

High Temperature	90.6°F
Annual Heating Days	234
Days Above 90°	10

16. What design features will be implemented on site to minimize the site's contribution to the urban heat island effect? Please describe any and all design elements. Strategies could include, but are not be limited to, the following:

- High albedo pavement or roof materials
- Passive cooling or increased ventilation capacity
- Green roofs or walls
- Heat resistant trees and plants
- Additional landscaped areas

The Project will Incorporate the following strategies:

- High albedo pavement to achieve the solar reflectance value of LEED;
- High albedo roof materials to achieve the solar reflectance index values of LEED; and
- Increased landscaped and vegetated areas in the off-site Kensington Park Improvements to promote a more natural environment and reduce the amount of non-reflective surfaces.

The Project will continue to evaluate the potential for green roofs and exterior terraces to help minimize the effects of local heat island impacts.

17. What additional design and operations strategies will be implemented to protect building occupants during extreme heat events?

The façade design will incorporate measures to prevent high solar heat gain.

Emergency generators will provide backup power for life safety systems.

Managing Flood Risks

Several areas of Somerville are already prone to flooding from intense precipitation. As part of a wet region, Somerville is projected to experience more than a 30% increase in rainfall during a 100-year 24-hour event. With climate change, precipitation events will become more intense—meaning that a greater volume of rain will fall in a shorter period of time. This can lead to flooding in areas where the drainage system does not have sufficient capacity. It will be further exacerbated by the presence of impervious surfaces, such as roads and parking lots, where the water cannot be absorbed into the ground, but rather is funneled into storm drains, nearby water bodies or other low-lying areas.

In addition to flooding from precipitation, sea level rise and storm surge are already potential concerns for areas of East Somerville and by 2035-2040 the Amelia Earhart Dam could be regularly flanked by storms. More information can be found in the complete Vulnerability Assessment.

18. How has the site and building been designed to manage storm water from rain event?

The Project's intent is to capture stormwater runoff from on-site impervious areas, by connecting roof drains to a new drainage system, then discharge stormwater to a bioretention basin and infiltrate stormwater to the ground. Pervious concrete is being explored for a portion of the new sidewalks surrounding the Project Site.

19. Is the site susceptible to flooding from sea level rise and storm surge or rain events now or during its expected lifetime? Please refer to the Somerville Climate Change Vulnerability Assessment and restate your potential flood risks based on the CCVA.

According to Figure 15 of CCVA, the Project Site is not susceptible to flooding from coastal flooding events and sea level rise in 2030. However, according to Figure 16 of CCVA, the Project Site is found to be susceptible to flooding from coastal flooding events and sea level rise in 2070 with a 20 percent annual chance of flooding.

If you answered YES to the previous question, please complete the next section. Otherwise, you have completed the questionnaire. Thank you.

Flooding Design Considerations

Site Elevation - Low	13 (SSB) (ft)	Site Elevation - High	15 (SSB) (ft)
Site Elevation - Avg.	Approx. 14.5 (SSB) (ft)	Ground Level Elevation	15 (SSB) (ft)
Is any portion of the site in a FEMA SFHA? (1% chance floodplain)	No	What FEMA zone(s)	n/a
Base Flood Elevation	n/a	Design Flood Elevation	n/a
2030 Flood Risk	0 (%)	2070 Flood Risk	20 (%)
BFE of 2070	13 (NAVD88)/19 (SSB) (ft)	DFE of 2070	14 (NAVD88) 20 (SSB) (ft)

20. What are the ground floor uses of the building? Are there any below ground stories of the building? If so, what uses are located below ground?

Ground floor uses include the commercial lobby, retail/active uses and back of house uses. Below ground there will be utility space and vehicle parking.

21. Are there any flood-sensitive assets, utilities, mechanical equipment, or critical site infrastructure located in areas of the building that are at risk of flooding? What measures will protect building systems during a flood or severe storm? These might include, but may not be limited to, the following:

- Elevation of utilities and mechanical systems
- Water tight utility conduits
- Waste water back flow prevention
- Storm water back flow prevention

- Systems located above the ground floor
- Securing objects at risk of becoming dislodged

Utilities, equipment, or critical site infrastructure will be located above the 2070 DFE unless they are (1) specifically allowed below the 2070 DFE, and (2) designed, constructed, and installed to prevent floodwaters, including any backflow through the system, from entering or accumulating within the components.

Any utilities, equipment, or critical site infrastructure located below the 2070 DFE will be permitted in areas that are dry floodproofed in accordance with ASCE 24-14 Section 6.2.

22. Will any flood-damage resistant materials be used in design and construction in flood risk areas?

Construction below the 2070 DFE will be constructed with flood damage-resistant materials. Flood damage-resistant materials will have sufficient strength, rigidity, and durability to adequately resist all flood-related and other loads unless designed to break away or as permitted elsewhere. Flood damage-resistant materials will follow the requirements in accordance with ASCE 24-14 Section 5.2.

23. What flood control design elements will be used to mitigate a 2070 coastal flood event with a 10% chance to occur in any given year (a '10-year' event)? These might include, but may not be limited to, the following:

- Elevation of the site
- Structural elevation of the building
- Non-structural elevation of the ground floor
- Wet flood-proofing (allowing water to flow through building envelope)
- Dry flood-proofing (preventing water from entering building)

The portion of the building below the 2070 DFE consists of part of the commercial lobby and two below-grade parking floors. Because the portion of the building below the 2070 DFE is solely for parking for vehicles and building access, according to ASCE 24-14 Section 6.3.1, wet floodproofing these areas is available. Therefore, wet floodproofing will be utilized as a flood resiliency strategy for the area below the 2070 DFE.

24. What is the recovery plan for a 2070 coastal flood event with a 1% chance to occur in any given year (a '100-year' event)? Summarize anticipated pre- and post-event policies, strategies, and actions necessary to facilitate post-flood recovery. These might include, but may not be limited to, the following:

- Flood mitigation design (see #23)
- Recovery management team
- Annual training & exercises
- Hazard evaluation & mitigation

- Damage assessment
- Demolition & debris removal
- Repair permitting
- Business resumption

The portion of the building below the 2070 DFE consists of part of the commercial lobby and two below-grade parking floors. Because the portion of the building below the 2070 DFE is solely for parking for vehicles and building access, according to ASCE 24-14 Section 6.3.1, wet floodproofing these areas is available. Therefore, wet floodproofing will be utilized as a flood resiliency strategy for the area below the 2070 DFE.

25. Will hazardous or toxic material be stored on site? Where will it be stored? How will you protect hazardous or toxic material from flooding?

No landlord related hazardous materials will be stored on the Project Site. If a tenant request comes along in the future the appropriate procedures and approval process will be taken.

26. Will the building employ any temporary measures to prevent flooding on site? These could include barricades, flood gates, and other measures. Please describe any temporary measures and include the elevation the measures are designed for.

At the appropriate time in the future, the Project would consider implementing temporary flood barriers, as necessary.

27. Will the site be accessible during a flood inundation? If yes, to what flood elevation?

A portion of the ground floor will remain accessible, where equipment and critical building infrastructure will be elevated on areas of the floor raised above the 2070 DFE.

28. Will any additional measures be employed to protect the building from storms and flooding?

The base of the building will be designed to provide ample head height so that the ground floor elevation may be raised to meet an elevated grade, if the street elevation is raised in the future.

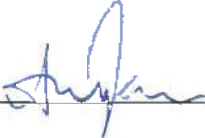
LEED AFFIDAVIT

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AFFIDAVIT OF

I, Amabel Canova, being duly sworn according to law, deposes and say:

1. My name is Amabel Canova (also known as Amy Canova). I am of sound mind, capable of making this affidavit, and personally acquainted with the facts herein stated.
2. I am a LEED Accredited Professional with BD+C specialty, credential ID 100014839-AP-BD+C, currently employed by AECOM.
3. I confirm that I am the LEED Accredited Professional for the EDGE Assembly project located in Somerville, MA.
4. I have been actively involved in the project and have coordinated with the other project partners of EDGE Technologies, Sasaki, and VHB to develop the LEED v4 Core and Shell scorecard and to the best of my knowledge, the project has been planned and is designed with the goal of being LEED Platinum certifiable.
5. I declare that I have read the foregoing statements and that the facts stated therein are true and correct to the best of my knowledge, information, and belief.

 2/17/2020

Amabel Canova

Technical Leader – Sustainability

SWORN TO AND SUBSCRIBED before me

This 17th day of February 2020.


NOTARY PUBLIC FOR THE STATE OF New Jersey

MY COMMISSION EXPIRES: 04-02-2024

AMANDA L. BOCHKO
NOTARY PUBLIC OF NEW JERSEY
Commission # 50102252
My Commission Expires 4/2/2024



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APPENDIX C: Mobility and Transportation

Contents

- Building Program Memo
- Mobility Management Plan
- Transportation Access Plan
- Transportation Supporting Documentation*

*Materials are available for download at the website below:

<https://tinyurl.com/EDGE-Assembly-Appendices>

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BUILDING PROGRAM MEMO

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February 13, 2020

Ref: 14652.00

Sarah Lewis
Director
City Hall 3rd Floor
Office of Strategic Planning and Community Development
93 Highland Avenue
Somerville, MA 02143

Re: EDGE Assembly Square – Building program change
74 Middlesex Avenue
Somerville, Massachusetts

Dear Ms. Lewis:

VHB is providing this letter regarding a minor change in the building program for the proposed EDGE Assembly development (the "Project") which occurred following the completion of the Traffic Impact and Access Study.

The February 2020 Traffic Impact and Access Study included as part of this Master Plan Special Permit submittal evaluated a development program consisting of approximately 474,000 square feet (SF) of office, research & development and lab enabled uses (office/R&D/lab), with approximately 27,000 SF of ground-floor retail and/or restaurant space. This includes the existing Dunkin' Donuts use which still will be provided within the new building. With the ongoing evolution of the Project design, the size of the office/R&D space/lab has increased to approximately 498,000 SF. The overall increase primarily is due to an increase in internal foyer/amenity space and other elements. Regardless, VHB has recalculated the project trip generation based on this new total building size.

Based on the updated development program described above, the Project is expected to generate 14, 16, and 7 additional vehicle trips during the respective weekday morning, weekday evening, and Saturday midday peak hours. As noted in the traffic study, Project traffic will be arriving and departing from both the north and south on Middlesex Avenue. Distributing the maximum additional traffic noted above (16 trips during the weekday evening peak hour) onto Middlesex Avenue only results in 8 additional trips per hour at any one point on this roadway. That increase (which translates into one additional vehicle trip every 7.5 minutes) will not have a perceptible impact on traffic operations along this roadway or other study area intersections.

Based on the information provided above, the Traffic Impact and Access Study should not need to be updated to reflect this minor change. Furthermore, trip generation for the office/R&D space/lab space

Engineers | Scientists | Planners | Designers

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Sarah Lewis
Ref: 14652.00
February 13, 2020
Page 2



was estimated considering a "worst-case" scenario with all of this space being devoted to office. In fact, the proponent is targeting both office and R&D/labs users within the building. Because of this, the trip generation estimates presented in the study likely already will be overstated compared to what will occur with the actual tenants occupying the site.

Please call at 617-607-6175 if you have any questions or if you need any additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Patrick Dunford".

Patrick Dunford, P.E.
Senior Project Manager
pdunford@vhb.com

MOBILITY MANAGEMENT PLAN

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EDGE Assembly Square: 74 Middlesex Avenue

Somerville, Massachusetts

PREPARED FOR

74 Middlesex Ave. Owner LLC c/o EDGE

Contact:
EDGE
Ryan Sullivan
122 Hudson Street, Floor 2
New York, NY 10013

PREPARED BY



101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

February 2020

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1

Project Information

Contact Information

The Project development site address and contact information is as follows:

74 Middlesex Avenue and 84 McGrath Highway

Contact:

EDGE

Ryan Sullivan

122 Hudson Street, Floor 2

New York, NY 10013

Project Description

74 Middlesex Ave. Owner LLC c/o EDGE (the "Proponent") intends to develop a dynamic, mixed-use, transit-oriented development (the "Project") within the Assembly Square District of Somerville, Massachusetts. The Project will be developed within a combined 0.85-acre site bounded by McGrath Highway to the north, Middlesex Avenue to the east, and Kensington Avenue to the west and south (the "Project Site"). The development program will include a mixture of office, research and development (R&D) and lab enabled uses (office/R&D/lab), ground floor retail/restaurant uses, and associated parking facilities and infrastructure improvements.

Build Out/Program Estimates

At its full build-out, the Project will include approximately 474,000 square feet (sf)¹ of office/R&D/lab space and approximately 27,000² sf of retail/restaurant space. The final mix of uses will vary depending on market conditions at the time the Project is constructed, but will not exceed the approximate maximum dimensions presented above.

Parking Plan

The following section summarizes the proposed Project parking supply.

Proposed Parking Supply

With the proposed Project, a new underground parking garage providing up to 350 spaces will be constructed underneath the proposed building. This parking supply will serve the approximately 474,000 sf of office/research and development space, and 27,000 sf of combined retail/restaurant space to be provided within this parcel.

The below-grade parking facility will be available only for Project use, and access will be controlled through gating, ticketing, reader cards or other means. This will help avoid this parking being used for the MBTA or other nearby developments.

The Project will include short- and long-term bicycle parking storage in compliance with the City of Somerville's guidelines to encourage cycling as a strong alternative transportation mode. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of the racks will be determined during the MPSP process.

In addition to the parking facilities discussed above, there is an abundance of on-street parking spaces along Middlesex Avenue in close proximity to the Project Site. Currently, along the Site frontage, on-street parking is angled parking along the west side of Middlesex Avenue and parallel parking along the east side Middlesex Avenue. The parking spaces along Middlesex Avenue along the Project Site frontage are free along the west side of the roadway and metered along the east side of the roadway. The cost for the metered spaces currently is \$1.25 per hour/\$0.25 per twelve minutes, with a two-hour time limit during the Monday-Saturday (8 AM-8PM) metered operation of these spaces.

The City of Somerville is currently redesigning Middlesex Avenue, with plans for implementation in 2021. The proposed conceptual design for Middlesex Avenue provides bicycle lanes along both sides of the roadway and replaces the angled parking along the west side with parallel parking. The Proponent plans to extend the curb-line outward from the Project Site to match the planned dimensions associated with the City's Middlesex Avenue enhancements, which include new separated bicycle lanes traveling in both directions. The final dimensions of the proposed curb-line extension will be

¹ Inclusive of all building space, including mechanical spaces. Zoning Gross Floor Area not yet defined

² The 27,000 sf retail/restaurant includes the approximately 1,917 sf existing Dunkin Donuts that is remaining as part of the proposed Project.

advanced in collaboration with the City. The Project will provide a generous pedestrian zone, a furnishing zone that includes new street trees, and planters, and a buffer zone for benches, streetlights and bicycle racks, which will dramatically improve the pedestrian experience.

Nearby Transit Services

There are ample public transportation services provided by the Massachusetts Bay Transportation Authority (MBTA) currently in the immediate vicinity of the Project Site as summarized in the following section.

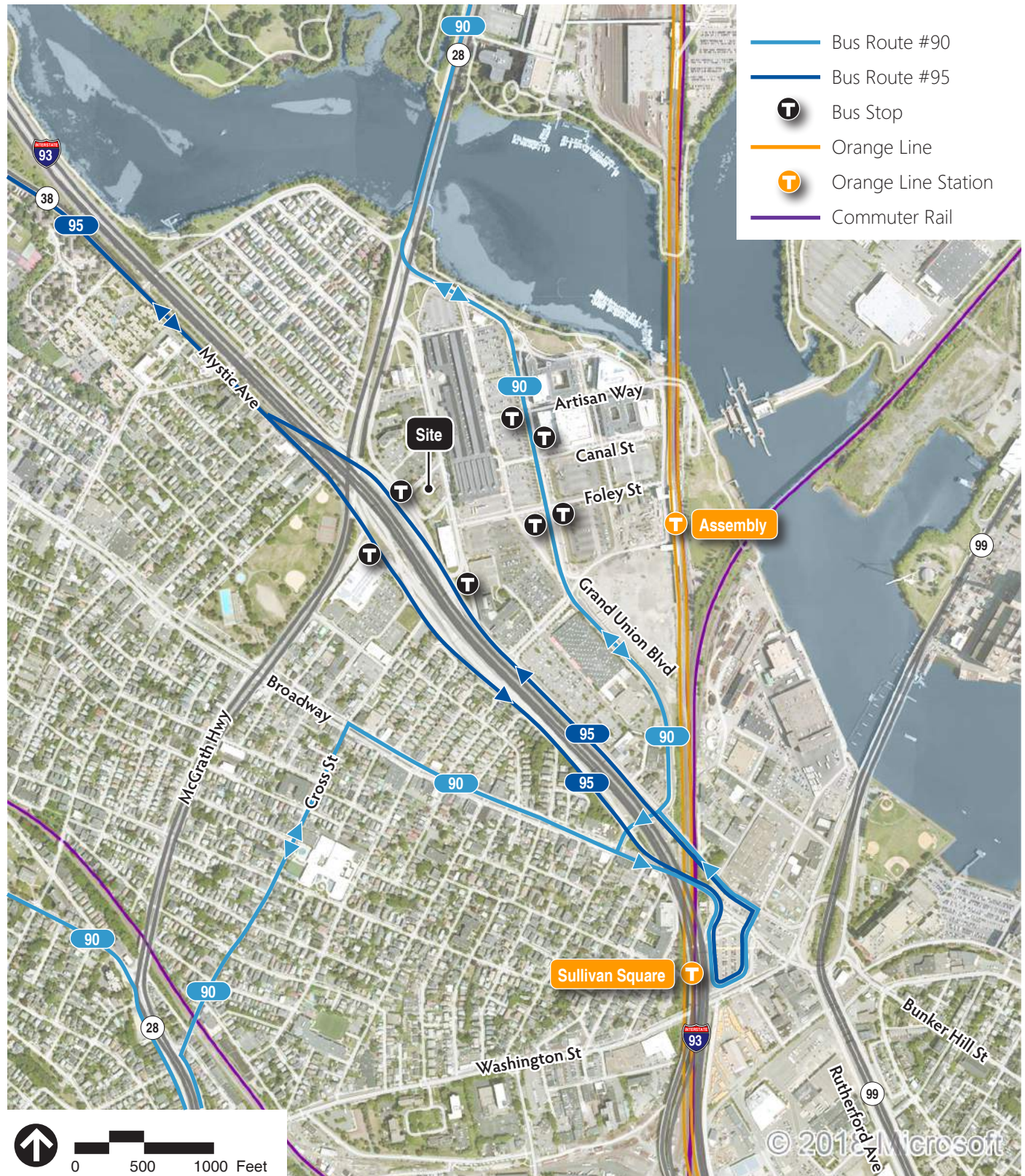
Existing Conditions

The study area is currently served by two MBTA bus routes within 0.5 miles of the Project Site. The area is serviced by MBTA Bus Routes 90 and 95. There are eighteen additional MBTA bus routes with stops within 0.75 miles of the Site. In addition, the Project Site is served by the MBTA Orange Line with Assembly Station located approximately less than 2,000 feet (approx. 0.38 miles), or an 8-minute walk, from the Project Site. A description of each transit service is provided below:

- › Bus Route 90 travels between Wellington Station and Davis Square via Assembly Square Mall, Sullivan Square, and Highland Avenue. The nearest stop to the Project Site is on Grand Union Boulevard at Foley Street, located approximately 1,100 feet (or a 4-minute walk) from the Site. During peak periods, Bus Route 90 has a frequency of approximately 30-50 minutes.
- › Bus Route 95 travels between Sullivan Square and West Medford via Mystic Avenue and Medford Square. The nearest stop to the Project Site is on Mystic Avenue (Route 38) at Kensington Avenue, located approximately 500 feet (or a 2-minute walk) from the Site. During peak periods, Bus Route 95 has a frequency of approximately 10-40 minutes.

Peak period frequencies/headways for MBTA bus services are shown graphically in Figure 1 and are summarized in Table 1.

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Source: Bing Aerial, MassGIS



Figure 1
Existing Transit Service Map

**EDGE Assembly Square
Somerville, Massachusetts**

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Table 1 Project Area MBTA Service

Bus Route	Origin / Destination	Peak-Hour Frequency (minutes)	Direction	Weekday	Saturday	Sunday
90	Charlestown; Davis Square – Wellington Station	30-50	Inbound	588	334	230
			<u>Outbound</u>	<u>593</u>	<u>350</u>	<u>163</u>
			Total	1,182	684	393
95	Fellsway; West Medford – Sullivan Square	10-40	Inbound	896	445	206
			<u>Outbound</u>	<u>986</u>	<u>491</u>	<u>236</u>
			Total	1,881	936	442

a Based on MBTA's Ridership and Service Statistics – Fourteenth Edition, 2014.

Assembly Square Orange Line Station

Assembly Station on the Orange Line of the MBTA is approximately 2,000 feet (approx. 0.38 miles) east of the Project Site via Foley Street. The Orange Line travels from Oak Grove in the north, to Forest Hills in the south, and serves the cities of Malden, Medford, and Somerville, as well as the Boston neighborhoods of Charlestown, Downtown, Chinatown, Back Bay, South End, Roxbury, and Jamaica Plain. The Orange Line runs approximately every six minutes during peak periods. The Assembly Station on the Orange Line opened in 2014.

Additional transit services are available within the study area beyond the 0.5 miles range discussed above. Additional stops on the Orange Line are located at Sullivan Square Station (located approximately 0.6 miles south of the Project Site) and Wellington Station (located approximately one mile north of the Site). Both Sullivan Square Station and Wellington Station are local transit hubs and provide connections to several additional MBTA bus routes.

Bicycle Network

As part of the traffic data collection, current biking activity was recorded for the study area intersections. The area surrounding the Project Site has ample bicycle accommodations which were implemented as part of the adjacent Assembly Row development. These include new bicycle lanes, a multi-use path, and other amenities. Grand Union Boulevard currently features striped bicycle lanes on both sides of the roadway; however, the City has plans to restripe Grand Union to provide a parking-protected cycle track, providing further protection for bicyclist.

The nearest Blue Bikes bicycle-sharing station to the Project Site is located near the northerly headhouse at Assembly Station, approximately 1/3 mile to the east of the Project Site. Additionally, the approved XMBLY project has committed to installing an additional bicycle-sharing station, providing another Blue Bike alternative closer to the Project Site. Figure 2 provides an overview of the bicycle accommodations throughout the study area.

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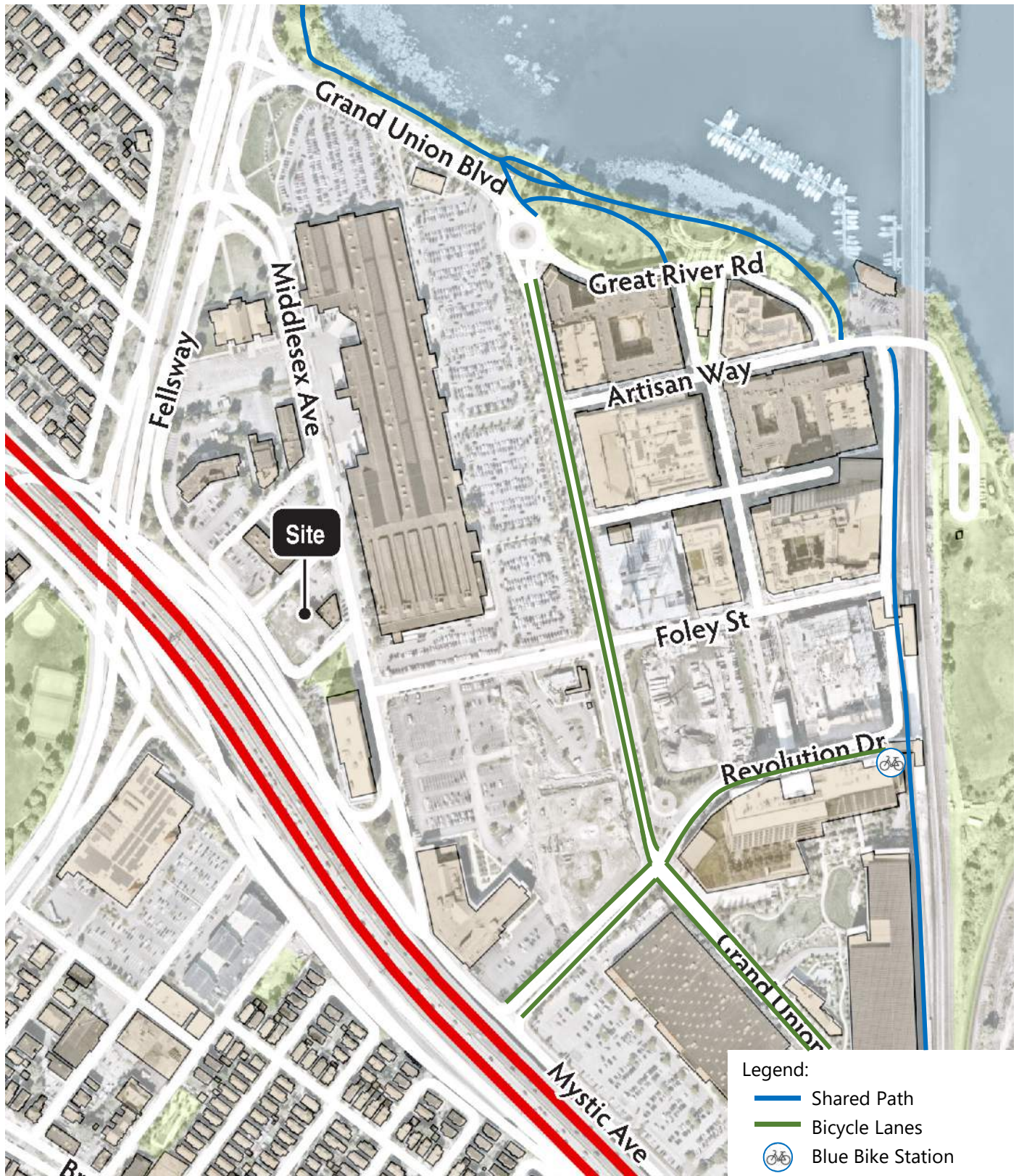


Figure 2
Bicycle Infrastructure Plan

**EDGE Assembly Square
Somerville, Massachusetts**

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Sidewalks

There is a sidewalk along each side of Middlesex Avenue within the vicinity of the Project Site. Each of the existing roadways adjacent to the overall Project Site have sidewalks located along both sides of the roadway. There is a crosswalk on Middlesex Avenue approximately 160 feet to the south of the Project Site. The crosswalk connects to the sidewalk along the east side of Middlesex and Foley Street.

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2

Mode Split / Trip Generation

The Project is comprised of office/R&D/lab, and retail/restaurant use, as described previously. The rate at which any development generates traffic is dependent upon a number of factors such as size, location, and concentration of surrounding developments. The Trip Generation Manual³ published by the Institute of Transportation Engineers (ITE) categorizes these land uses and provides weekday daily, weekday morning, weekday evening, Saturday daily and midday peak hour unadjusted vehicle trip generation estimates for each use. For the proposed development, the trip generation estimates for the planned uses were projected using LUC 710 (General Office Building) and LUC 820 (Shopping Center). The resulting overall Project trip generation was compared to that associated with the existing uses on the Project Site, with the additional traffic compared that to condition being added to the study area roadway network.

Table 2 summarizes the Project-related trips generated by the existing uses within the Project Site, as previously presented in the former Assembly's Edge PUD-PMP Transportation Chapter.

³ Trip Generation Manual (10th Edition), Institute of Transportation Engineers, Washington D.C., 2017.

Table 2 Existing Site Trip Generation

	Existing Coffee Shop Trips	Existing Restaurant Trips	Total Existing Observed Site Generated Trips
Weekday Morning			
Enter	86	0	86
Exit	<u>84</u>	<u>0</u>	<u>84</u>
Total	170	0	170
Weekday Evening			
Enter	17	7	24
Exit	<u>18</u>	<u>8</u>	<u>26</u>
Total	35	15	50
Saturday Midday			
Enter	23	6	29
Exit	<u>23</u>	<u>5</u>	<u>28</u>
Total	46	11	57

Source: Assembly's Edge PUD-PMP Transportation Chapter and Appendix; October 20, 2017.

As shown in Table 2, the existing trip generation for the Project Site is approximately 170 vehicle trips (86 entering / 84 exiting) during the weekday morning peak hour, 50 vehicle trips (24 entering / 26 exiting) during the weekday evening peak hour, and 57 trips (29 entering / 28 exiting) during the Saturday midday peak period.

Since the existing Dunkin Donuts coffee shop will remain as part of the proposed Project, only credit for the existing Sunrise restaurant will be taken from the future trip generation.

Following the documentation of the existing trip generation as shown in Table 2, trip generation was estimated for the full redevelopment of the Project Site. The methodology used and results of this analysis are discussed in detail in the following sections.

Proposed Project-Generated Traffic

The proposed transit-oriented development will consist of a mixture of office/R&D/lab and supporting ground floor retail/restaurant/active uses. As noted above, traffic associated with the office/lab space was estimated using ITE LUC 710 (General Office Building) trip generation data. The retail uses are expected to be small, service-oriented businesses. While exact tenants have not yet been secured, these are not expected to be large destination-retail uses. Instead, potential uses will include small eating establishments, coffee shops, or gallery uses. While these do not fit the description of a transitional ITE "Shopping Center", retail traffic was estimated using this land use code (LUC 820), which results in an overly conservative analysis. Given that the existing Dunkin Donuts (Coffee Shop) is remaining on the proposed Project Site, the proposed retail

square footage has the existing Dunkin Donuts removed. The overall unadjusted vehicle trip estimates for the Project are presented in Table 3.

Table 3 Project Trip Generation – Unadjusted Vehicle Trips

	Office ^a	Retail/ Restaurant ^b	Total Unadjusted Vehicle Trips
Weekday Daily			
Enter	2,400	474	2,874
<u>Exit</u>	<u>2,400</u>	<u>474</u>	<u>2,874</u>
Total	4,800	948	5,748
Weekday Morning			
Enter	406	15	421
<u>Exit</u>	<u>66</u>	<u>9</u>	<u>75</u>
Total	472	24	496
Weekday Evening			
Enter	80	46	126
<u>Exit</u>	<u>419</u>	<u>50</u>	<u>469</u>
Total	499	96	595
Saturday Daily			
Enter	524	579	1,103
<u>Exit</u>	<u>524</u>	<u>579</u>	<u>1,103</u>
Total	1,048	1,158	2,206
Saturday Midday			
Enter	136	59	195
<u>Exit</u>	<u>116</u>	<u>54</u>	<u>170</u>
Total	252	113	365

a Based on ITE LUC 710 (General Office Building), assumes 474,000 sf of office space.

b Based on ITE LUC 820 (Shopping Center), assumes 25,100 sf of retail/restaurant space.

The values shown in Table 3 are the base unadjusted vehicle-trip estimates prior to the necessary adjustments for internal trip sharing, mode-splits, and other factors. The details of how these subsequent adjustments were made by each step are discussed in the following sections.

Person Trips

The unadjusted vehicle trips calculated using the ITE data were subsequently converted into person trips by applying national data⁴ for vehicle-occupancy rates for a variety of uses. This was done so that the national ITE-based data also would be converted to person trips using national data for consistency.

⁴ Summary of Travel Trends – National Household Travel Survey; USDOT Federal Highway Administration (Washington, DC), 2017.

Internal Capture Trips

As described in the ITE Trip Generation Handbook, “because of the complementary nature of these land uses, some trips are made among the on-site uses. This capture of trips internal to the site has the net effect of reducing vehicle trip generation between the overall development site and the external street system (compared to the total number of trips generated by comparable land uses developed individually on stand-alone sites)...an internal capture rate can generally be defined as the percentage of total person trips generated by a site that are made entirely within the site. The trip origin, destination, and travel path are all within the site.”

Based on the methodology outlined in the ITE Trip Generation Handbook, internal capture rates were applied to the gross person trips. The resulting peak-hour person trip estimates for the Project are presented in Table 4.

Table 4 Project Peak-Hour Person Trips

	Office ^a	Retail ^a	Total Person Trips
Weekday Morning			
Enter	454	18	472
<u>Exit</u>	<u>66</u>	<u>11</u>	<u>77</u>
Total	520	29	549
Weekday Evening			
Enter	88	75	163
<u>Exit</u>	<u>466</u>	<u>87</u>	<u>553</u>
Total	554	162	716
Saturday Midday			
Enter	152	97	249
<u>Exit</u>	<u>123</u>	<u>94</u>	<u>217</u>
Total	275	191	466

^a Person trip generation estimate with internal capture credits applied.

Mode Share

The mode shares to be used for this Project were developed considering multiple sources. These include U.S. Census data⁵, a traffic study⁶ for a prior development proposal on the Project Site, the Mobility Management Plan (MMPG) for an adjacent parcel⁷, and data from the Notice of Project Change (NPC)⁸ prepared for the Partner’s office development within the Assembly Square Mixed-Use District (ASMD).

⁵ U.S. Census Bureau, American Community Survey 2012-2016 5-year estimates. Census Tract 3501.03.

⁶ Assembly’s Edge, Special Permit with Site Plan Review (Chapter 4 – Transportation); Design Consultants, Inc. (Somerville, Massachusetts); April 19, 2018.

⁷ XMBLY – 5 Middlesex Avenue (Appendix F - Mobility Management Plan); VHB (Watertown, Massachusetts); May 2018.

⁸ Assembly Row Revised Program for Partners Healthcare Site – Notice of Project Change; VHB (Watertown, Massachusetts); May 15, 2014.

The following sections discuss aspects of the Project which also should help promote a shifting from single-occupant vehicles as the predominant mode of travel near the Project Site.

Promotion of Transit Use

Access to public transportation will significantly reduce demand for vehicular travel and parking spaces. This should be particularly effective in relation to the MBTA Orange Line Assembly Station already being in operation within a short walking distance to the Project Site.

As noted earlier, the on-site TDM coordinator will provide a central commuter information center within the Project Site in a prominent location such as in a building foyer, or near garage elevators. This will provide employees and visitors with transit maps and schedules and route information for pedestrians and cyclists.

Facilitating Bicycle and Pedestrian Travel

The open space, pedestrian pathways and sidewalk connections proposed as part of the Project will be designed to complete and improve connections with the existing and future network of parks and pathways in the vicinity of the Project Site. The Project proposes significant improvements to existing off-site open space on the adjacent, City-owned Middlesex Avenue Open Space that extends from the Project Site southeast to the edge of the existing Public Storage facility on Middlesex Avenue. The Proposed off-site improvements, as presented in section 3.8.1, will enhance the connection between the ASMD and the open space, commercial uses and residential neighborhoods of Somerville to the west of the elevated Interstate 93 Off-Ramp below the Kensington Underpass. This connection will be strengthened by new and improved public open space on- and off-site, an improved streetscape, and new occupants and visitors who will enliven the area on a consistent and daily basis. The Project will also diminish the visual impact of the elevated roadway and highway ramps from the ASMD.

The nearest Blue Bikes bicycle-sharing station to the Project Site is located near the northerly headhouse at Assembly Station approximately 1/3 mile to the east of the Project Site. Additionally, the approved XMBLY project has committed to installing an additional bicycle-sharing station, providing another Blue Bike alternative closer to the Project Site.

The Proponent is committed to discussing the option of providing an additional Blue Bikes station within the Project Site with the City of Somerville and Blue Bikes.

Secured bicycle parking spaces will be provided to meet the City of Somerville requirements. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage, satisfying the Somerville Zoning Ordinance requirements. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of each rack will be determined during the Special Permit process, but the bicycle parking provided will comply with City requirements.

Parking Management

The parking ratios proposed for the Project are considerably lower than those found in a suburban setting, and are low even for sites that are well-served by public transportation. With the limited supply, parking spaces will be allocated to a select number of employees.

Office parking spaces either will be allocated only to certain employees through a process to be determined by individual tenants, or parking use will be managed through pricing strategies. Given that the Project Site is located within 2,000 feet (approx. 0.38 miles) of the Assembly Station, not having access to parking on site should not be a hardship to employees.

Most of the Project retail space will consist of small shops, restaurants, or cafes within the ground-level of the buildings. Even without any formal shared parking program, there will likely be shared activity. The majority of customer traffic to the retail/restaurant uses on site will likely be in the form of office/lab workers already on-site as opposed to destination retail traffic.

The Proponent will consider the following additional TDM measures:

- › Charge for on-site employee parking and provide subsidies for off-site parking;
- › Demand-responsive pricing: adjust hourly rates for employee and customer parking to manage parking availability;
- › Preferential carpool/vanpool parking spaces; and
- › Shared parking.

Project Mode Share

The resulting anticipated mode splits are presented in Table 5. More conservative mode-splits, with higher automobile use, will be utilized in the Traffic Impact and Access Study (TIAS) accompanying this submittal. However, through the implementation of this MMP, it is the hope and expectation of the Proponent that the percentage of trips made by automobile can be reduced to under 50-percent. Accordingly, while the Master Plan Special Permit transportation analysis will assume 65- and 72-percent automobile usage for the respective office and retail components, the estimates shown in Table 5 for these uses are based on the desired 50-percent maximum, which should be attainable in the overall multi-modal environment and limited parking supply.

Table 5 Mode Share

Use	Vehicle	Transit	Bike/Walk
Office/Research & Development	50%	38%	12%
<u>Retail/Restaurant</u>	<u>50%</u>	<u>25%</u>	<u>25%</u>
Overall Project	50%	32%	18%

Source: Based on hybrid of mode shares used in Partners Health Care Study PNF (2014), Certified NorthPoint TIS (with data from Kendall Square K2 City of Cambridge, "Hotel Parking and Transportation Demand Management Reports – City of Cambridge", Assembly Edge PUD-PMP (2017), US Census data, and Boston Transportation Department data for Zone 11 (Sullivan Square).

The mode shares discussed above were applied to the net-new person trips to generate the adjusted Project trips by mode. The local average vehicle occupancy, based on US Census data for each primary use then was applied to the vehicle mode to reflect the number of vehicle trips generated by the Project Site.

Pass-By Trips

While the ITE rates provide estimates for all the traffic associated with each land use, not all of the traffic generated by the Project will be new to the area roadways. For example, a portion of the vehicle-trips generated by the retail land use will likely be drawn from the traffic volume roadways adjacent to the Project Site. Someone traveling on Middlesex Avenue may choose to deviate from their original travel path to visit the Project Site retail, before heading back to continue to their final destination. For this evaluation, ITE pass-by rates for LUC 820 (Shopping Center) were utilized for the retail trip generation, and applied to existing trips on South Street. Specifically, 34- and 26-percent of the Project Site trip generation was assumed to be drawn from the surrounding roadway network during the weekday evening and Saturday midday peak hours, respectively. For all other time periods studied, a 25-percent pass-by rate was assumed.

Project-Generated Trips

The mode share and local average vehicle occupancy were applied to the person trips to estimate net new trips by mode, and then the pass-by adjustments noted above were applied to the vehicle trips generated by the retail portion of the Project. Tables 6 and 7 summarize the net new trips by mode and net new vehicle trips by use, respectively.

Table 6 Project-Generated Peak-Hour Trips by Mode

	Bike/Walk	Transit	Vehicle ^a
Weekday Morning			
Enter	59	178	197
<u>Exit</u>	<u>11</u>	<u>28</u>	<u>31</u>
Total	70	206	228
Weekday Evening			
Enter	30	52	58
<u>Exit</u>	<u>78</u>	<u>199</u>	<u>221</u>
Total	108	251	279
Saturday Midday			
Enter	42	82	91
<u>Exit</u>	<u>39</u>	<u>71</u>	<u>78</u>
Total	81	153	169

a Total development vehicle trips (including pass-by trips associated with the retail portion).

As shown in Table 6, the Project is expected to generate between 169 and 279 total vehicle trips during the peak hours studied (including trips generated by the existing Project Site uses). The breakdown of these trips by use is provided below in Table 7.

Table 7 Project-Generated Peak-Hour Vehicle Trips by Use ^a

	Office	Retail	Pass-By ^b	Total Trips	-Existing Trips ^c	=Total Net Vehicle Trips
Weekday Morning						
Enter	192	4	1	197	0	196
<u>Exit</u>	<u>28</u>	<u>2</u>	<u>1</u>	<u>31</u>	<u>0</u>	<u>30</u>
Total	220	6	2	228	0	226
Weekday Evening						
Enter	37	13	8	58	7	43
<u>Exit</u>	<u>197</u>	<u>16</u>	<u>8</u>	<u>221</u>	<u>8</u>	<u>205</u>
Total	234	29	16	279	15	248
Saturday Midday						
Enter	64	20	7	91	6	78
<u>Exit</u>	<u>52</u>	<u>19</u>	<u>7</u>	<u>78</u>	<u>5</u>	<u>66</u>
Total	116	39	14	169	11	144

a New vehicle trips with internal capture credits applied.

b Pass-by credits of 25%, 34%, and 26% applied to weekday morning, weekday evening, and Saturday midday peak hour retail trip generation, respectively.

c Existing observed trips associated with the Sunrise Restaurant.

As shown in Table 7, the Project is expected to generate a total 228; 279; and 169 new vehicle trips during the respective weekday morning, weekday evening, and Saturday midday peak hours. However, these totals do not account for any credit for traffic already being generated by the Project Site under existing conditions (as shown in Table 2). After

considering this existing traffic generation, the Project will result in an additional 226; 248; and 144 vehicle trips compared to existing conditions during the weekday morning, weekday evening, and Saturday midday peak hours, respectively.

The anticipated vehicle trip generation presented above is based on the targeted maximum of 50-percent automobile usage. As noted earlier, the existing auto usage for this area currently is estimated at 65-percent. Table 8 compares the expected vehicle trip generation for the Project (based on the desired 50-percent auto use maximum) to that which would occur if the current mode splits were not improved.

Table 8 Project Trip Generation Comparison – Proposed vs. Existing Mode Splits

	Project Trip Generation		Reduction in Vehicle Trips	
	With Existing Mode Splits ^a	With Targeted Mode Splits ^a	Vehicle Trips	Percent Decrease
Weekday Morning				
Enter	256	196	60	
<u>Exit</u>	<u>39</u>	<u>30</u>	<u>9</u>	
Total	295	226	69	23%
Weekday Evening				
Enter	60	43	17	
<u>Exit</u>	<u>273</u>	<u>205</u>	<u>68</u>	
Total	333	248	85	26%
Saturday Midday				
Enter	107	78	29	
<u>Exit</u>	<u>91</u>	<u>66</u>	<u>25</u>	
Total	198	144	54	27%

^a Existing conditions mode share and Project mode share based on Table 5.

As shown in Table 8, it is expected that Project vehicle trip generation can be reduced by between 54- and 85 peak-hour vehicle trips through the implementation of the MMP, proximity to public transit, and the availability of bicycle/pedestrian accommodations.

Trip Distribution

The directional distribution of traffic approaching and departing the Project is a function of several variables. These include the population densities, shopping opportunities, competing uses, existing travel patterns, and the efficiency of the roadways leading to the Site.

Since the project is primarily comprised of office/research & development/lab space, the trip distribution patterns were determined using journey-to-work census data for the City of Somerville. The assignment of site-generated traffic to specific travel routes was based on observed traffic flow conditions on available routes, and the assumption that most motorists will seek the fastest and most direct routes to and from the site.

All vehicular traffic approaching the Site will enter and exit via the entrances along McGrath Highway, as shown in Figure 3A. The anticipated pedestrian and bicycle Site access pathways are presented in Figures 3B and 3C.

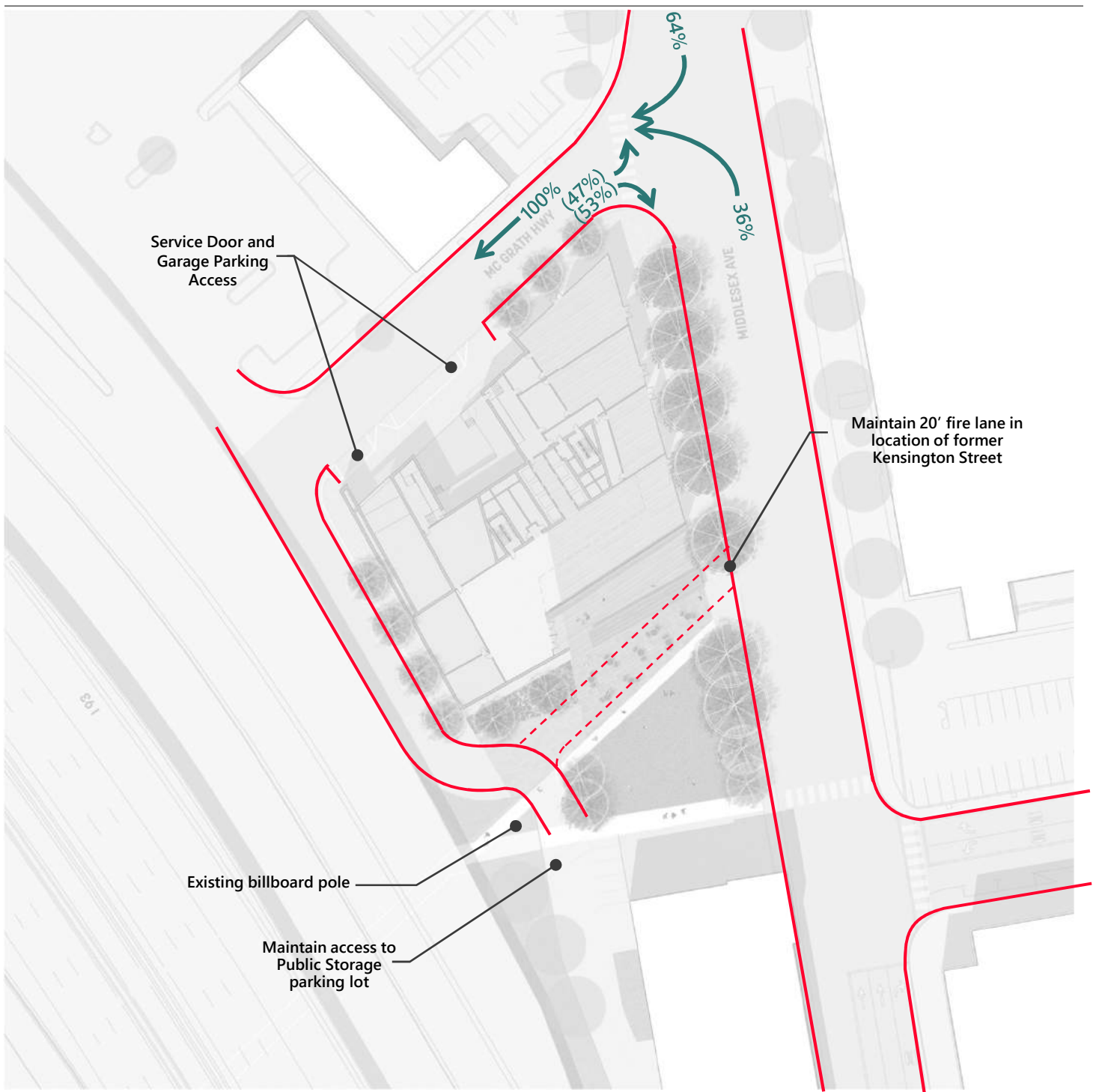
Table 9 summarizes the resulting trip distribution patterns for the Project. The trip distribution patterns for proposed project are shown in Figure 3.7, as presented in Chapter 3 of the Master Plan Special Permit application.

Table 9 Vehicle Trip Distribution Summary

Route	Direction	Commercial Trip Distribution
I-93	North	18%
I-93	south	15%
Route 28	north	11%
Route 28	south	21%
Broadway	north	17%
Mystic Avenue	north	6%
<u>Mystic Avenue</u>	<u>south</u>	<u>12%</u>
Total	--	100%

Mode Share Commitment

The Proponent is committed to making reasonable efforts to achieve the City's goal to control the percentage of trips by automobile at 50 percent or less, consistent with the updated Somerville Zoning Ordinance adopted on December 12, 2019. In combination with proposed pedestrian and bicycle improvements, close proximity to public transit services, and inherent walkable characteristics of the Assembly Square neighborhood, implementation of this MMP is anticipated to help decrease the percentage of trips made by automobile to 50 percent, a 15 percent reduction below estimated existing conditions of 65 percent of trips made by automobile. If annual monitoring and reporting identifies a shortfall in meeting this goal, additional mobility management programs and services will be implemented. The nature and details of the additional reasonable efforts to be undertaken by the Proponent (if required) will be determined through consultation with the City of Somerville Director, Mobility Division. The measures could involve amplifying existing programs or introducing new measures.



Legend:

XX% Entering Vehicles

(XX%) Existing Vehicles

— Vehicular Access

— Curb line

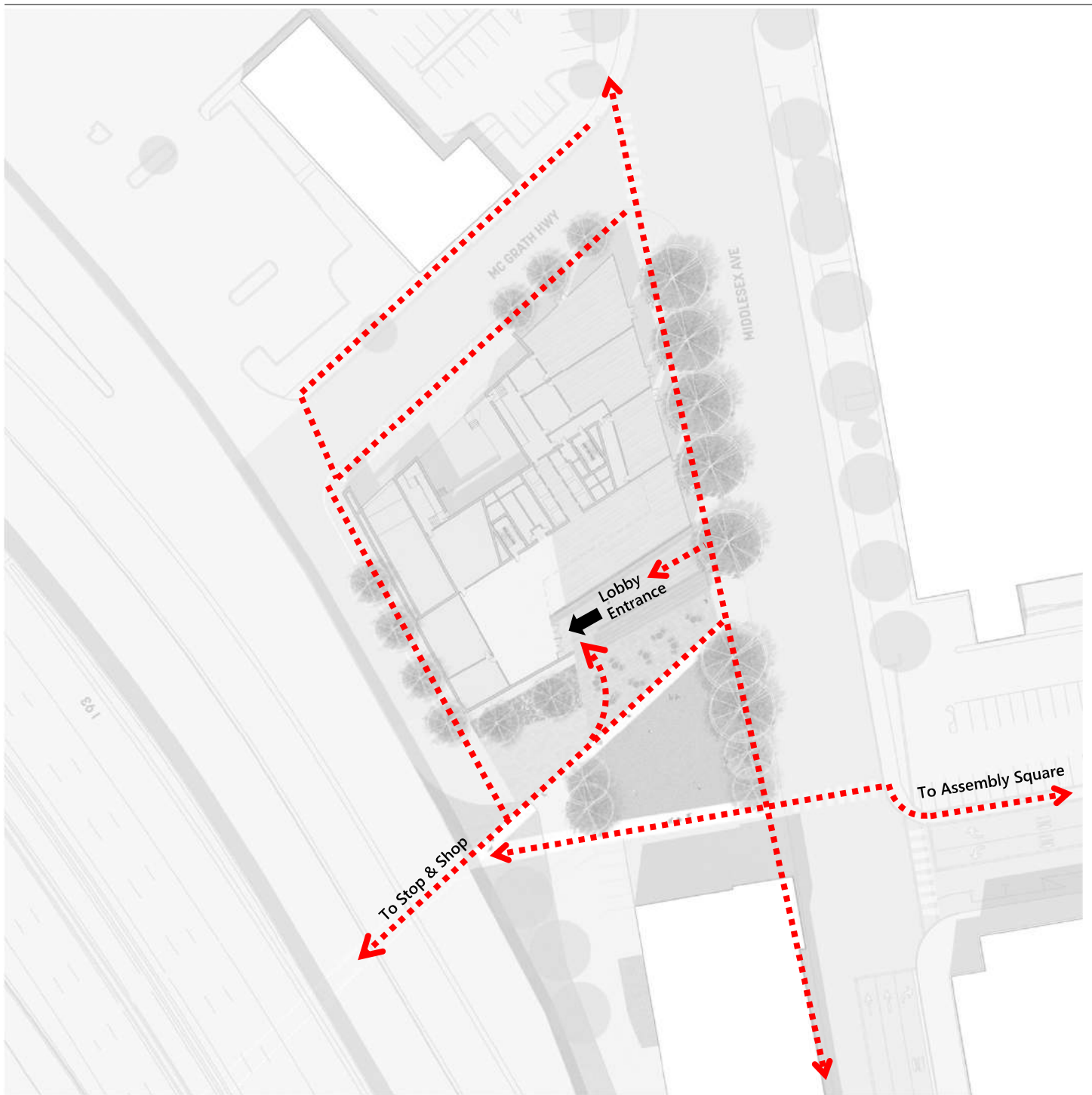


Figure 3A

Vehicle Access & Parking Plan

**EDGE Assembly Square
Somerville, Massachusetts**

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Legend:

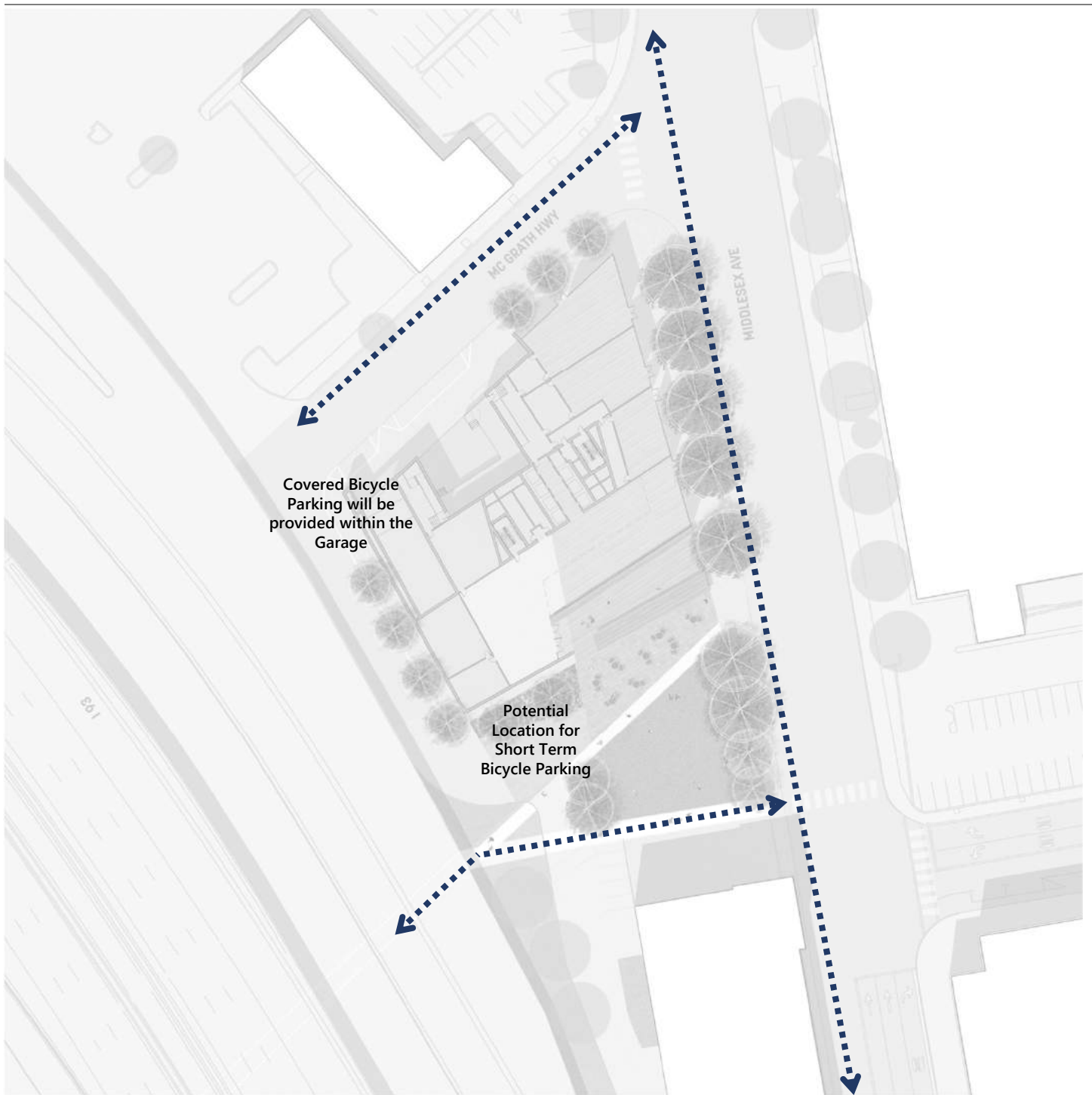
- Pedestrian Pathways
- ← Primary Entrance



Figure 3B
Pedestrian Access Plan

**EDGE Assembly Square
Somerville, Massachusetts**

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Legend:

■ ■ ■ ■ Bicycle Pathways



Figure 3C
Bicycle Access & Parking Plan

**EDGE Assembly Square
Somerville, Massachusetts**

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3

Proposed Programs and Services

A MMP is required for any development within the ASMD. As a matter of departmental policy for the City of Somerville, the Director of Mobility Division requires an MMP for the following types of development:

- › Property owners of buildings with 50,000 sf or more of commercial space OR multi-tenant buildings that in combination have fifty (50) or more employees are required to provide the following for their tenants:
 - An on-site transportation coordinator;
 - Posted mobility management information;
 - Distributed mobility management information;
 - Un-bundled parking;
 - Preferential parking for carpool/vanpool vehicles; and
 - An annual mobility management education meeting for tenants and their employees.
- › These same property owners must require future tenants to provide the following through lease agreements:
 - Qualified transportation fringe benefits for employees; and
 - A guaranteed ride home program for employees.
- › Employers with 50 or more employees are required to provide the following for their employees:
 - An on-site transportation coordinator;
 - Posted mobility management information;

- Distributed mobility management information;
 - Qualified transportation fringe benefits for employees;
 - A guaranteed ride home program for employees; and
 - An annual mobility management education meeting for tenants and their employees.
- › The property owner of a parking facility is required to provide the following:
- Preferential parking locations for carpool/vanpool; and
 - Posted mobility management information.

The following sections discuss the land use types for which MMP programs will be implemented for the Project. A description of the MMP elements is presented in this section along with information on how those elements aid employees, visitors, and retail patrons getting to and from the Project Site. As there may be multiple tenants located within the Site, MMP obligations will need to be included as part of the lease language between tenants and the property owner. Verification of the ongoing conformance with this condition will be provided to the City of Somerville by the property owner either as a copy of the leases (with financial aspects and other non-MMP elements redacted) or via an affidavit signed by the owner and tenant(s) verifying that this language was included and agreed to in the lease. This documentation will be provided to the City prior to the issuance of the Certificate of Occupancy of a space by a tenant with fifty (50) or more employees.

General MMP measures to be implemented as part of this Project will involve promoting transit use and facilitating bicycle and pedestrian travel both through Project Site amenities and ongoing practices and programs. These will include providing bicycle racks, pedestrian friendly connections, and other amenities within the Project Site. The mixed-use nature of the Project will also effectively function as a TDM measure. Specifically, with the variety of uses proposed both within the Project Site and already in place in the surrounding area, the need to travel off-site by automobile for dining or shopping opportunities will be minimized.

The following plan first addresses general MMP measures that apply to the whole Project Site, then special programs for the office/R&D/lab uses and retail shops/restaurants.

General Measures

Transportation Management Association (TMA) Involvement

The Proponent will become a member of Assembly Connect, Assembly Square's Transportation Management Association. The Proponent currently is taking the internal steps needed to initiate becoming a member of the TMA, and this requirement will be satisfied within the timeframe noted above.

Transportation Coordinator

As required by the submittal requirement for MMP's, an on-site TDM coordinator will be designated for the Project. Alternatively, a representative from an approved Mobility Management Association may be appointed in place of an on-site TDM coordinator. The work location and contact information for the TDM Coordinator will be provided to the Director of Mobility Division (the "Director") prior to the issuance of a Certificate of Occupancy. This person may be the office manager, human resources employee, or other individual serving a dual-role in another job on the Project Site. Also, the specific office location for the TDM Coordinator will be shown on plans to be submitted to the Director prior to the submittal of the Building Permit application.

The person(s) in this role will coordinate with other organizations within Assembly Square to help promote a reduced reliance on single-occupant motor-vehicle travel to the Project Site. To that end, the TDM measures identified in the following sections will be implemented under the direction and supervision of this person. The final job description for this role will be determined over time, but the duties of the on-site TDM coordinator will include, but not be limited to:

- › Assisting site employees with ride matching and transportation planning;
- › Developing and implementing appropriate TDM measures;
- › Disseminating information on alternate modes of transportation and developing transportation related marketing and education materials;
- › Hosting an annual mobility management educational meeting for tenants and their employees (both the content of this meeting and associated posted material shall be provided to the Director for review and approval prior to the issuance of a Certificate of Occupancy);
- › Developing and maintaining information pertaining to pedestrian and cycling access to and from the Project Site;
- › Distributing transit maps and passes;
- › In tenants' lease agreements the Proponent will require that tenants provide an Emergency Ride Home, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy; and
- › Tenants will make efforts to seek qualified candidates located within one-quarter mile (i.e., walking distance) of the Project Site.

Any tenants with more than fifty (50) employees also will be required to submit their own MMP, along with a copy of the leases (with financial aspects and other non-MMP elements redacted) or an affidavit signed by the owner and tenant(s) verifying that this language was included and agreed to in the lease. This documentation will be provided to the City prior to the issuance of the Certificate of Occupancy of a space by these tenants.

Ride-Sharing Services

The parking needs for the Project will be lessened due to the nearby availability of public transit currently provided in the area. Furthermore, alternate means of travel, such as taxi, private ride services (Uber, Lyft, and others) should continue to reduce the parking needs for this area. The exact level of usage by these private ride-sharing services can be quantified through post-opening monitoring studies to be conducted as discussed later in this document.

Use-Specific Measures

In addition to the general TDM measures outlined above, the following use-specific programs for the office/laboratory uses and retail shops and restaurants also will be provided.

Office/Laboratory Uses

Office/lab employers within the Project Site will be required to implement appropriate TDM measures in their leases and to be overseen by the on-site building TDM coordinator. As not every TDM program will be suitable for every type of employer, such as telecommuting or flexible work hours, the on-site TDM coordinator will offer technical assistance to employers to evaluate potential programs and implement them when appropriate. Employer-based TDM measures may include the following programs:

- › Preferential carpool and vanpool parking within the parking garage and spaces near office building entrances within the parking garage as a convenience to commuters and to promote ride-sharing;
- › Ride matching assistance managed by the on-site TDM coordinator so that employees find appropriate carpool and vanpool partners;
- › Sponsored vanpools and subsidized expenses;
- › Tenants will provide employees with Qualified Transportation Fringe benefits per current U.S. Internal Revenue Service Code, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy;
- › Provide telecommuting and flexible work hour options for employees in appropriate jobs;
- › Provide incentives for bicycle and pedestrian commutes, like covered bicycle storage, changing rooms, and shower facilities;
- › Hold promotional events for transit-riders, cyclists, and pedestrians;
- › Offer direct deposit to employees; and
- › The Proponent will consider providing preferred parking for low-emitting fuel-efficient vehicles and/or electric vehicle charging stations within the Project garages.

Retail/Restaurants

The Proponent will seek to attract a variety of retail shops, restaurants, and service tenants as ground-floor supporting uses. Ground floor retail/active uses will potentially include restaurant or café use, general merchandise, and/or service uses like banks and office supplies. As most of these businesses will be small shops, there will not be the same levels of TDM opportunities internal to each individual business as will be available with larger employers, but employees who work on the Project Site will be able to take advantage of the transportation guidance and programs coordinated by the transportation coordinator.

The suite of TDM measures to be implemented in association with the retail shops are fewer than for traditional offices, but will still have an impact in reducing single-occupant vehicle travel. The retail/restaurant MMP measures for those tenants with more than fifty (50) employees may include the following:

- › Ride matching services and transit information provided by the on-site TDM coordinator;
- › Tenants will provide employees with Qualified Transportation Fringe benefits per current U.S. Internal Revenue Service Code, with a copy of the lease agreement language specifying that being provided to the Director for review prior to the issuance of the building's Certificate of Occupancy;
- › Offer direct deposit to employees; and
- › As noted earlier, the Proponent will consider providing preferred parking for low-emitting fuel-efficient vehicles and/or electric vehicle charging stations within each of the garages serving the buildings comprising the Proposed Project.

Monitoring and Annual Reporting

The Proponent will conduct annual travel surveys as required. These surveys will be developed through consultation with the City to determine the number of Project Site employees utilizing public transportation, those traveling to the Project Site by private automobile, and those using car-sharing services. Employees also will be surveyed to identify those that bike or walk to and from work. The Proponent is committed to making reasonable efforts to achieve the City's goal to control the percentage of trips made by automobile at 50 percent or less, consistent with SomerVision. If annual monitoring and reporting identifies a shortfall in meeting this goal, additional mobility management programs and services must be implemented.

The annual update to the MMP, to be submitted to the City, will include the following the components.

- › Annual travel survey of employees;
- › Annual reporting of parking utilization for each parking garage and parking lot. This will be done through an inventory to be conducted for a representative weekday midday period when it can reasonably be assumed that the combined peak parking demand for employees and visitors would occur;
- › Biennial (every other year) counts of entering and exiting automobile trips for the parking garage proposed as part of the Project; and
- › A status summary of the MMP in place at the Site will be provided.

In keeping with standard practices for the City of Somerville, all the monitoring outlined above will occur during the months of April/May or September/October, unless other time periods are pre-approved by the City.

TRANSPORTATION ACCESS PLAN

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Memorandum

To: Mayor's Office of Strategic Planning
and Community Development
City of Somerville
93 Highland Avenue
Somerville, MA 02143

Date: February 14, 2020

Project #: 14562.00

From: Christine Trearchis, P.E., PTOE
Senior Project Engineer

Re: Transportation Access Plan
EDGE Assembly Square – 74 Middlesex Avenue
Somerville, Massachusetts

The following information is being provided to document the draft Transportation Access Plan (TAP) for the Edge Assembly Square development (the "Project") to be located at 74 Middlesex Avenue in Somerville, Massachusetts (the "Site"). The TAP will be issued as a final document upon review and approval by the City of Somerville (the "City"), following any required edits or additional from that review. This document and accompanying information depicts the proposed Project access for automobile, bicycle, and pedestrian traffic. Information regarding truck deliveries and service vehicles (trash, recycling, etc.) also is provided for review.

The Project involves redeveloping the Project Site with pedestrian and transit oriented, mixed-use development including approximately 474,000 SF of office, research and development (R&D) and lab enabled uses (office/R&D/lab), approximately 27,000 SF of ground floor retail and/or restaurant space, and up to 350 below-grade structured parking spaces (the "Project"). With the ongoing evolution of the Project design, and after completion of the TAP and TIAS, the size of the office/R&D space/lab has increased to approximately 498,000 SF. Refer to Appendix C for a memorandum that provides an update to the Project trip generation based on the revised building area.

Site Access

The Project Site has excellent vehicular access and visibility from I-93, and is well positioned along Middlesex Avenue, which serves as the major entry point to the to the Assembly Square Mixed-Use District (ASMD). To avoid traffic conflicts on Middlesex Avenue, the primary point of vehicular access will be along McGrath Highway, providing access to on-site below-grade vehicle parking, and service and loading areas.

On-Street Parking

The regulation of on-street parking will be coordinated through consultation with the City. The Proponent plans to extend the curb-line slightly outward from the Project Site to match the planned configuration of the City's desired Middlesex Avenue enhancements and will replace the existing angled parking along the Project Site frontage with parallel parking spaces. These spaces currently have two-hour time limits but are free parking spaces with no parking meters. It is expected that the new parallel parking spaces will follow a similar structure, but the final regulation of this on-street parking will be determined by the City of Somerville.

Site Plans and Supporting Graphics

The conceptual ground floor Project Site plans accompanying this application have been attached for reference (Figures A-1 and A-2). To supplement the Site plans, graphics highlighting the planned vehicular and pedestrian accommodations have been provided for general reference.



Ground Floor Plan and Illustrative Plan

Figures A-1 and A-2 for plan depicting the combined ground floor level and site landscaping have been included.

Pedestrian Access Plan

Refer to Figure A-3 for a plan depicting the Project sidewalk network and general building entrance locations is provided attached to this document. The building entrances shown are general locations; more detail and information will be provided as plans are developed.

Bicycle Parking Plan

Refer to Figure A-4 for a conceptual bicycle parking plan. The exact locations and configurations of the internal building bicycle parking have not yet been finalized. Based on the current design, the Project proposes a minimum of 60 interior secured bicycle parking spaces located in the below-grade garage. The Project also will be providing short-term bicycle racks within 50 feet of each building entrance. The exact capacity and location of the racks will be determined during the in consultation with the City.

Motor Vehicle Parking Plan

Refer to Figure A-5 for a plan showing the vehicle access to the Project Site, and to the loading dock and below-grade parking accessed from McGrath Highway. Up to 350 below-grade structured parking spaces will be provided within the building.

Vehicle Movement Plans

Refer to Figures A-6 through A-8 for Vehicle tracking diagrams that demonstrate the ability of large vehicles to navigate in and out of the Project Site from the various loading facilities and/or driveways. The width of the loading zone curb along McGrath Highway will continue to be refined to accommodate a WB-50 maneuvering into and out of the loading dock.



Memorandum

ATTACHMENTS

- Ground Floor Plan
- Illustrative Plan
- Pedestrian Access Plan
- Bicycle Parking Plan
- Vehicle Parking Plan
- Vehicle Tracking Diagrams

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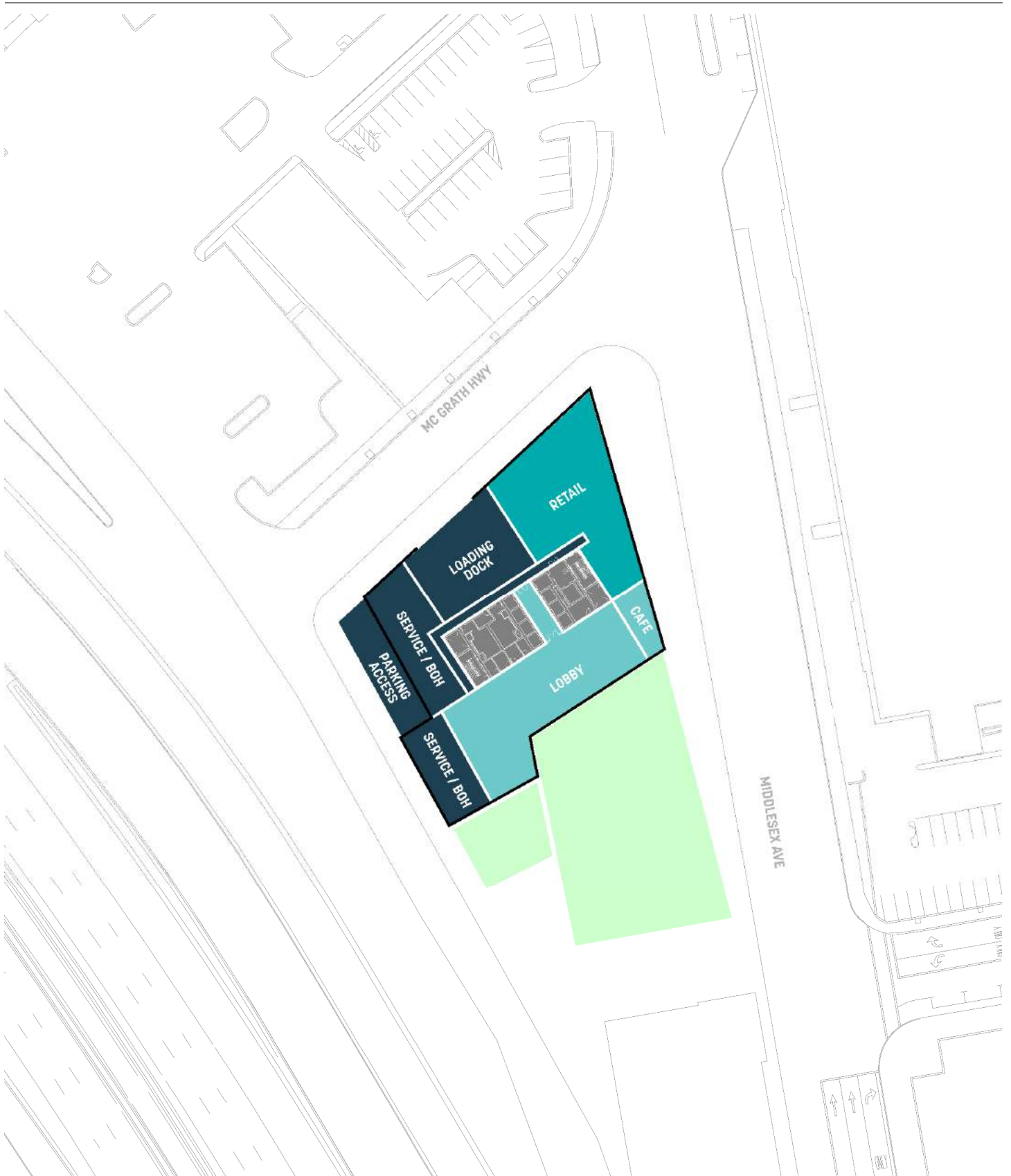
Ref: 14652.00
February 13, 2020



Memorandum

➤ **Ground Floor Plan**

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Ground Floor Plan

Figure A-1

**EDGE Assembly Square
Somerville, Massachusetts**

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Ref: 14652.00
February 13, 2020



Memorandum

➤ **Illustrative Plan**

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— PROPERTY LINE
 - - - PROJECT BOUNDARY



Illustrative Site Plan

Figure A-2

**EDGE Assembly Square
 Somerville, Massachusetts**

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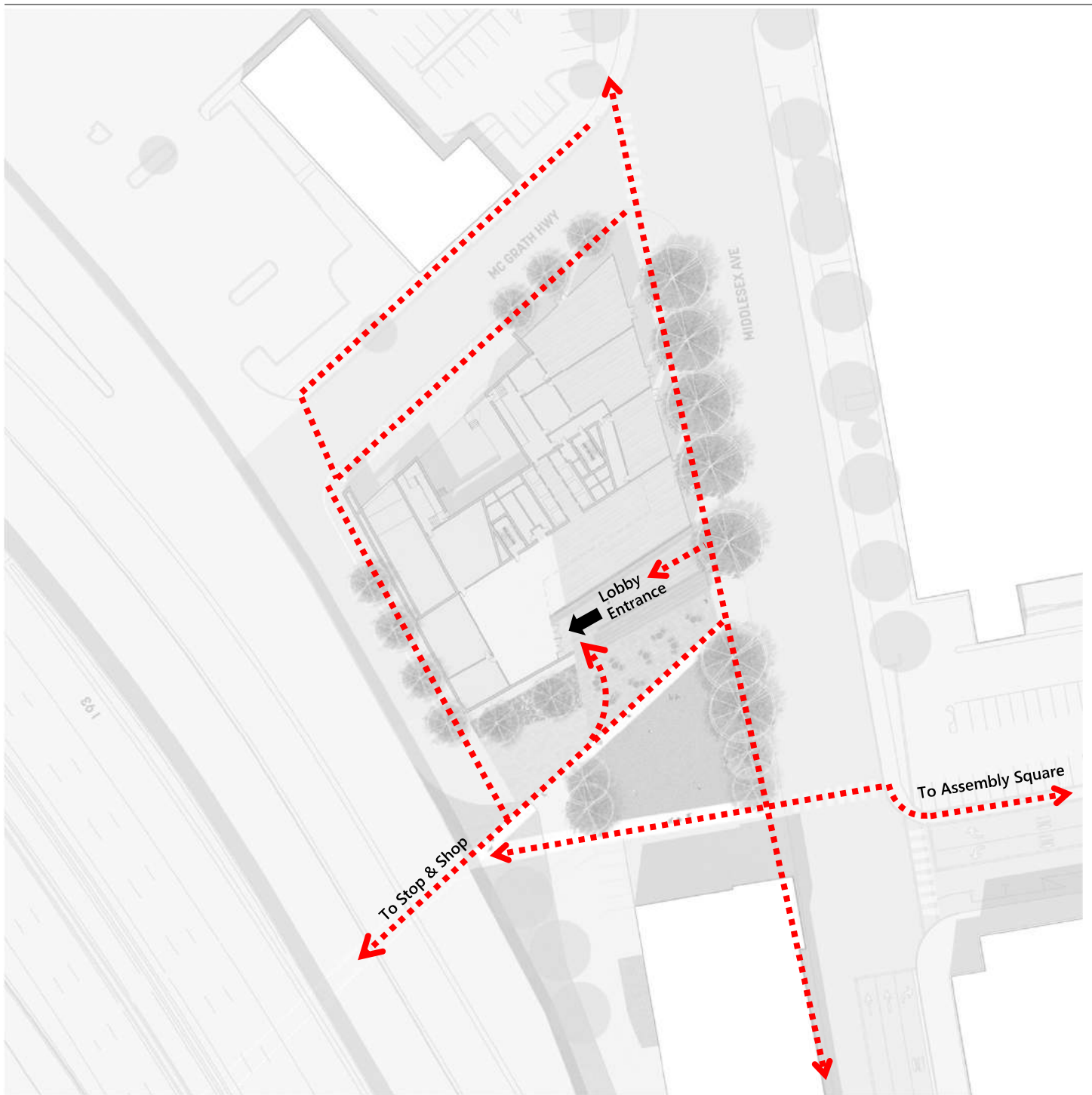
Ref: 14652.00
February 13, 2020



Memorandum

➤ **Pedestrian Access Plan**

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Legend:

- Pedestrian Pathways
- ← Primary Entrance



Pedestrian Access Plan

Figure A-3

EDGE Assembly Square
Somerville, Massachusetts

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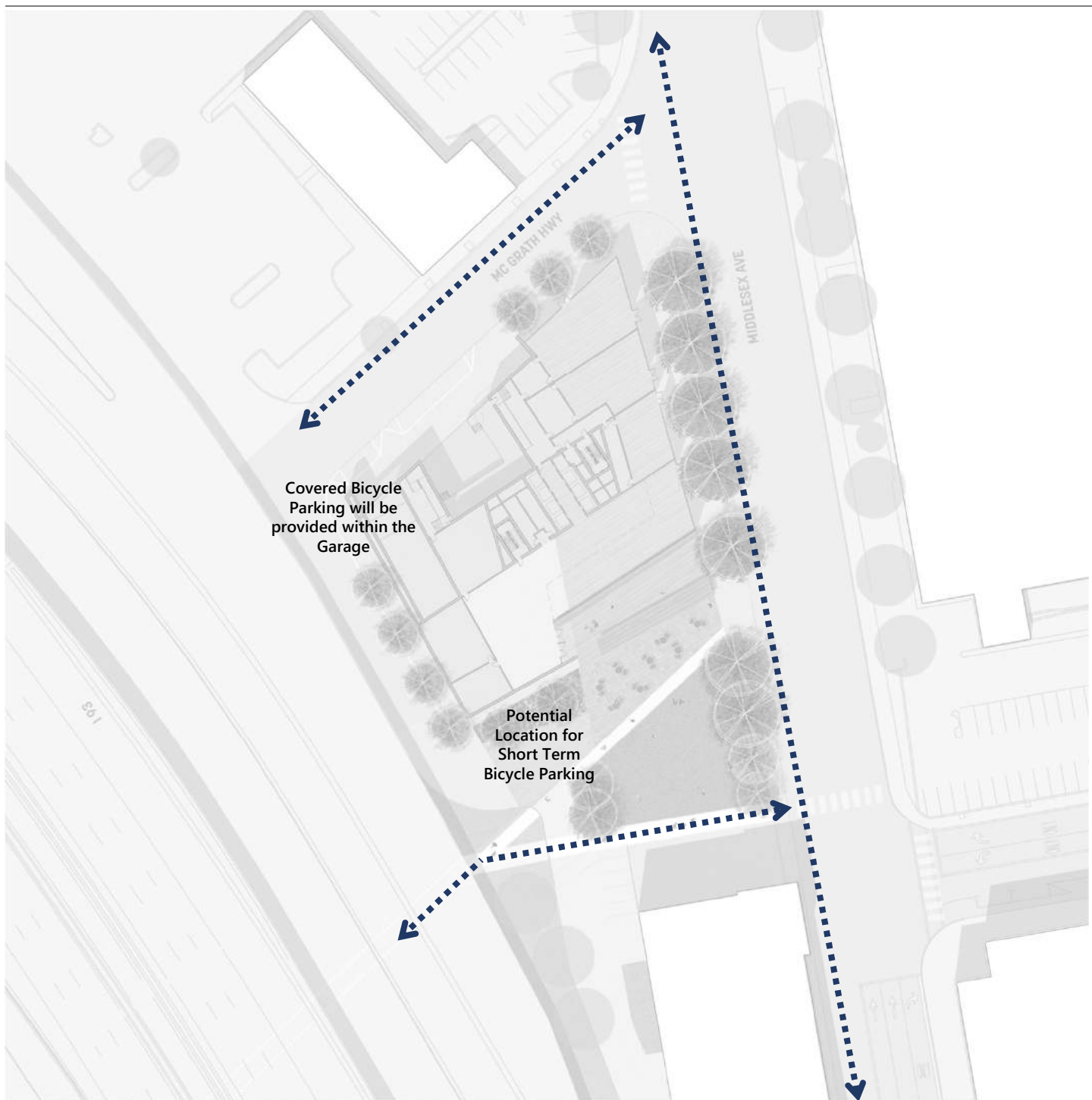
Ref: 14652.00
February 13, 2020



Memorandum

➤ **Bicycle Parking Plan**

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Legend:

■ ■ ■ ■ Bicycle Pathways



Bicycle Access & Parking Plan

Figure A-4

EDGE Assembly Square
Somerville, Massachusetts

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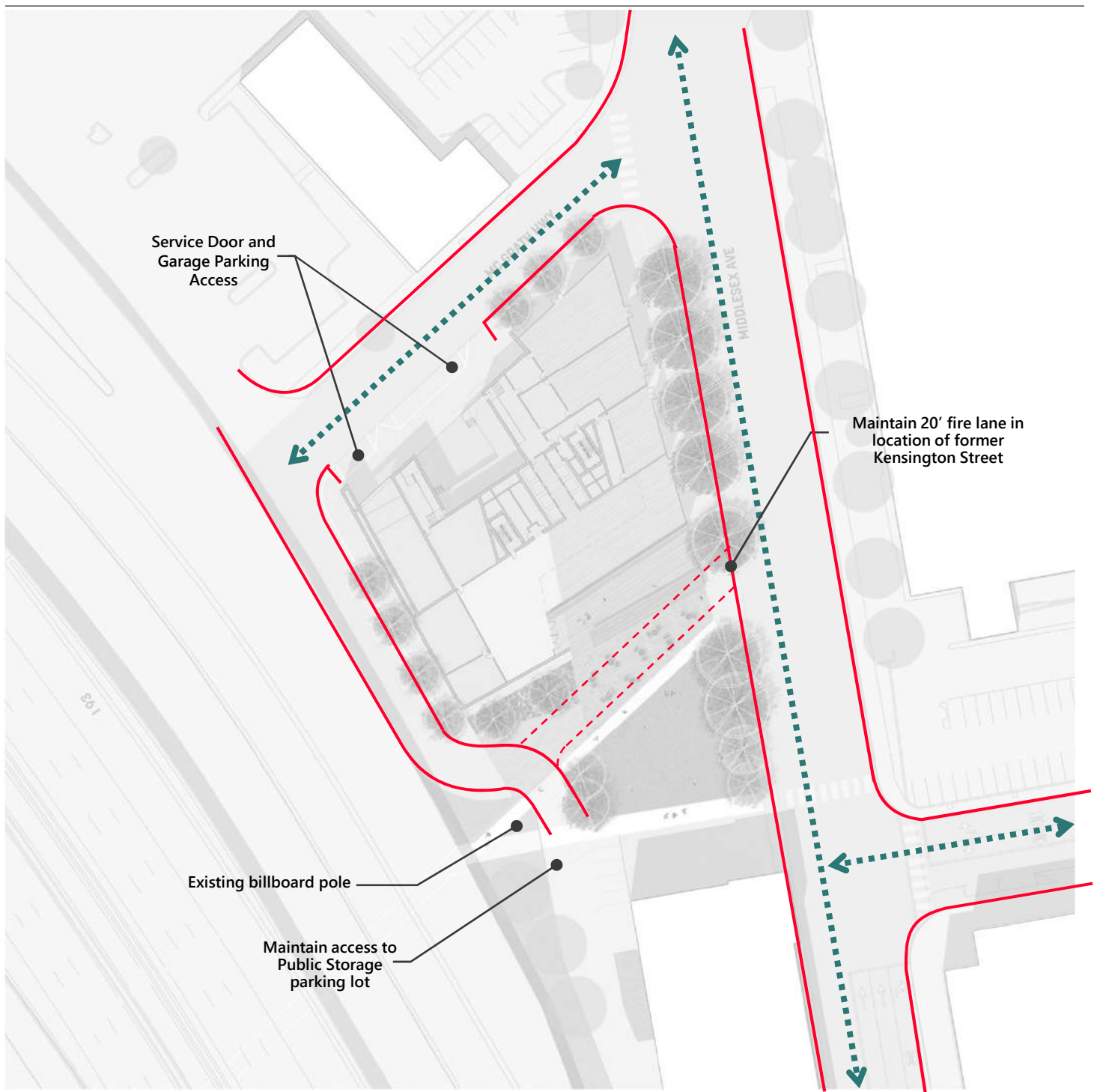
Ref: 14652.00
February 13, 2020



Memorandum

➤ **Vehicle Parking Plan**

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Legend:

..... Vehicular Access

— Curb line



Vehicle Access & Parking Plan

Figure A-5

EDGE Assembly Square
Somerville, Massachusetts

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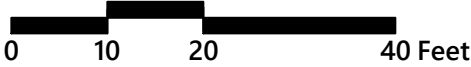
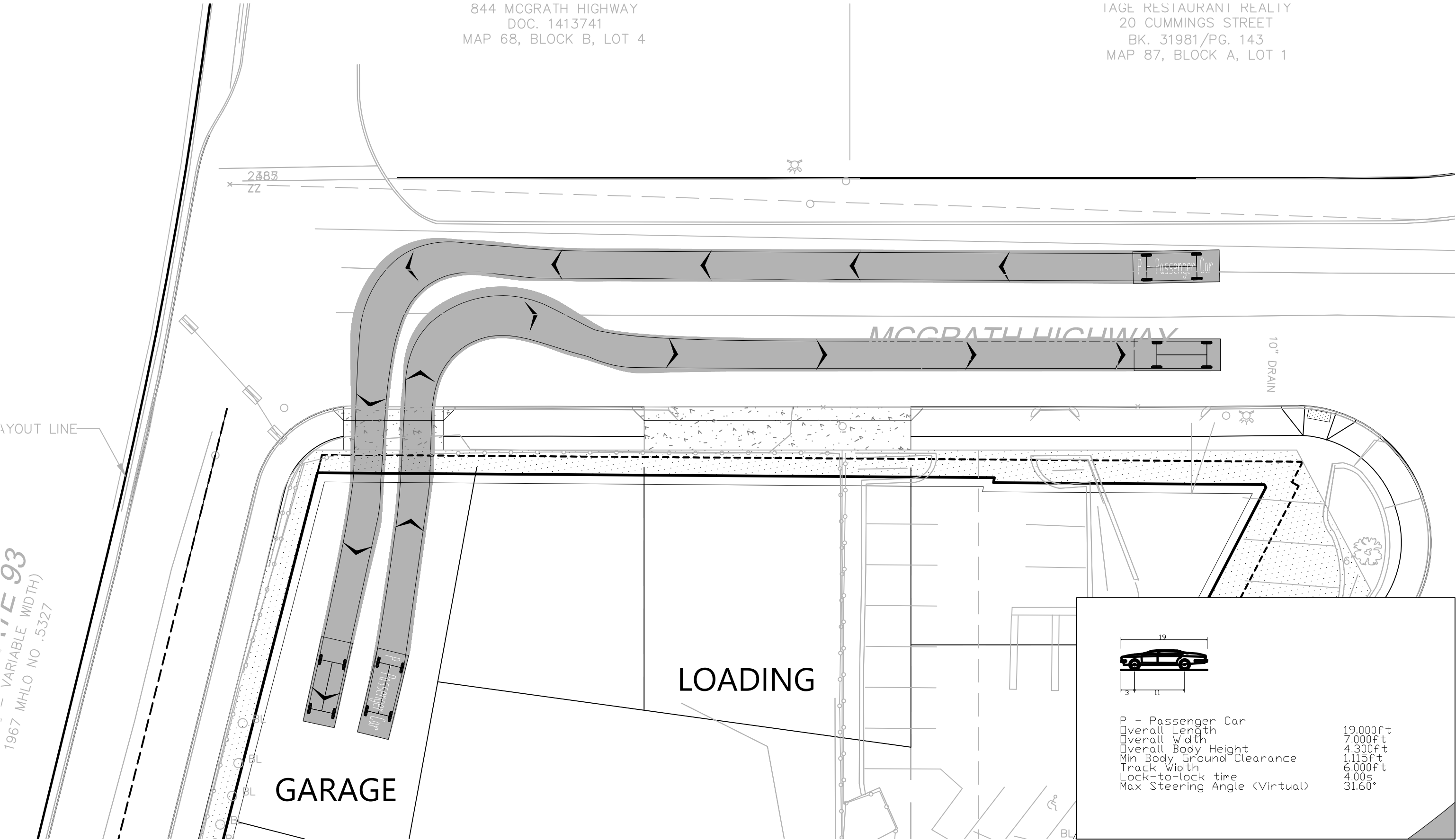
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February 13, 2020

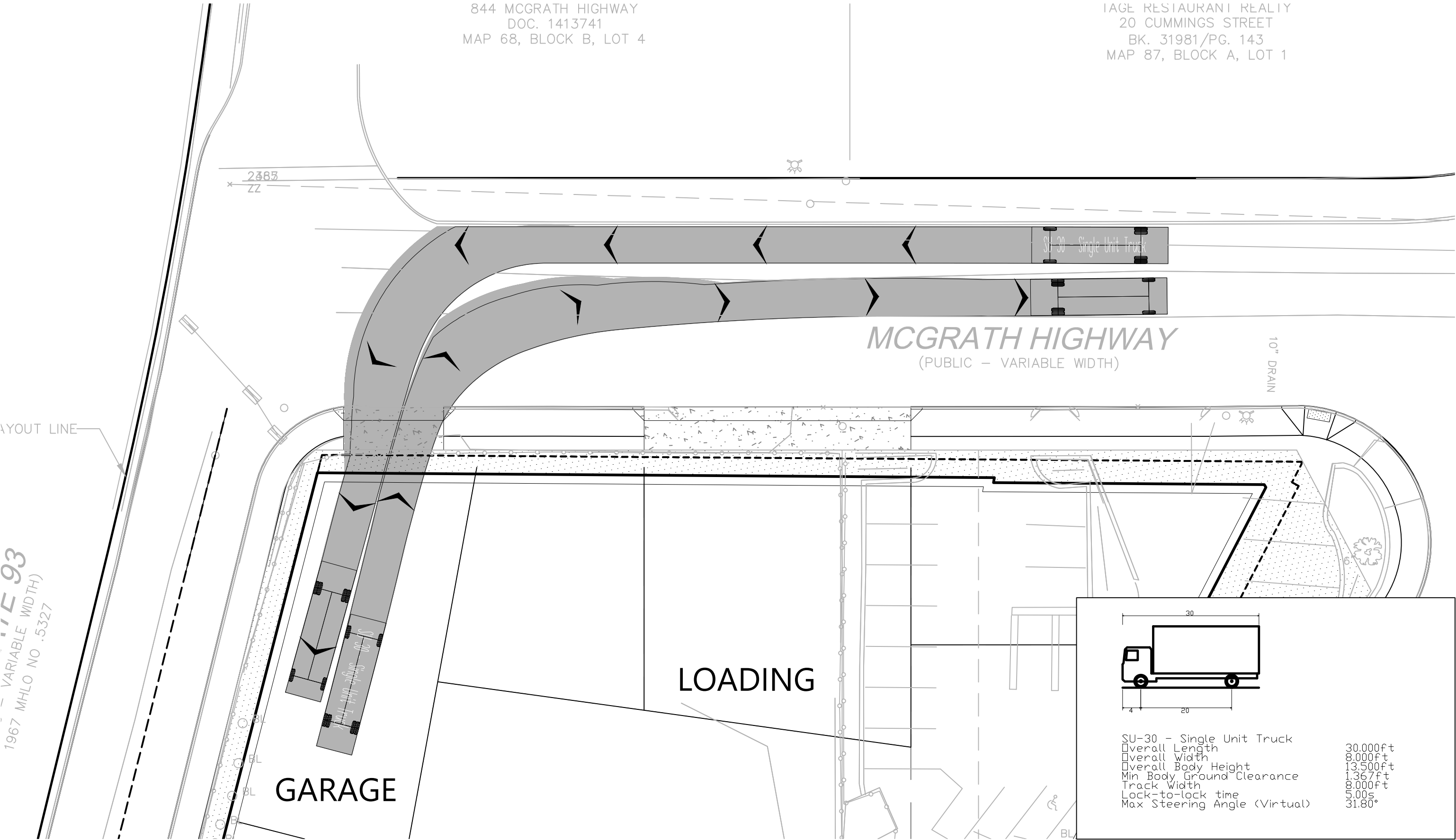


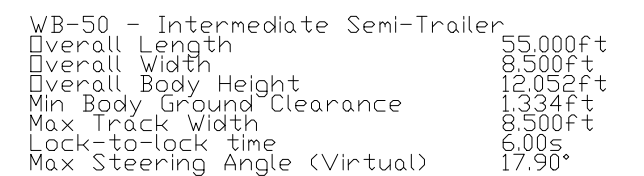
Memorandum

➤ **Vehicle Tracking Diagrams**

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TRANSPORTATION SUPPORTING DOCUMENTATION

Contents

- Traffic Volume Count Data
- Seasonal Adjustment Factors
- Public Transportation
- Vehicular Crash Data
- Background Projects
- Trip Generation Projections
- Trip Distribution Calculation Worksheets
- Site-Generated Traffic Volume Networks
- Intersection Capacity Analyses

*Materials are available for download at the website below:

<https://tinyurl.com/EDGE-Assembly-Appendices>

APPENDIX D: Utility Analysis

Contents

- Title 5 Wastewater and Water Generation Calculations
- Sewer Flows from Annual Water Usage
- Pipe Capacity Nomograph

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TITLE 5 WASTEWATER AND WATER GENERATION CALCULATIONS

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Computations

Project:	Edge Assembly Square	Project #	14652.00
Location:	74 Middlesex Ave, Somerville	Sheet	1
Calculated by:	EAV	Date:	2/11/2020
Checked by:		Date:	
Title	Proposed Sewer Generation Calculations		

		Commercial						
Parcel	Total	Office: 75GPD/1,000SF		R&D (Office) 200GPD/1,000SF		Retail: 50GPD/1,000SF		Average Daily Flow GPD
	Bldg SF	SF	GPD	SF	GPD	SF	GPD	
Program	525,000	498,000	37,350	0	0	27,000	1,350	38,700
								0.06 CFS
Assumed water demand is 110% of sewer generation (GPD):						42,570		
Peak flow is based on TR-16, factor is 5.6 (GPD):						108,360		
Proposed peak flow				(CFS)		0.17		
Estimated I/I flow				(GPD)		35,400		
Fee (\$14.35/G)						\$507,990		
Notes:								
1. Average daily flows are based on Title 5 flows.								
2. Research & Development (R&D) 200 GPD/1,000 SF is based on previously developed projects in Somerville as recommended by the City Engineering department.								
3. Square footage values are based on EDGE & Kyle Greaves' email dated 2/10/2020.								



Computations

Project:	Assembly Edge	Project #	14652.00
Location:	74 Middlesex Ave, Somerville	Sheet	1
Calculated by:	EAV	Date:	1/14/2020
Checked by:		Date:	
Title	Existing Sewer Generation Calculations		

		Commercial						
Parcel	Total	Office: 75GPD/1,000SF		Restaurant, Fast Food 20GPD/per seat		Restaurant 35GPD/per seat		Average Daily Flow
	Bldg SF	SF	GPD	Seats	GPD	Seats	GPD	GPD
Sunrise	1,917	0	0	0	0	60	2,100	2,100
Dunkin	1,917	0	0	60	1,200			1,200
Total								3,300
								0.003 CFS
Assumed water demand is 110% of sewer generation (GPD):						3,630		
Peak flow is based on TR-16, factor is 5.6 (GPD):						9,240		
Existing peak flow				(CFS)	0.014			
Notes:								
1. Average daily flows are based on Title 5 flows								
2. SF of existing building is based on existin condition plan provided by DCI								

SEWER FLOWS FROM ANNUAL WATER USAGE

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EDGE Assembly Square: Sewer Flows from Annual Water Usage

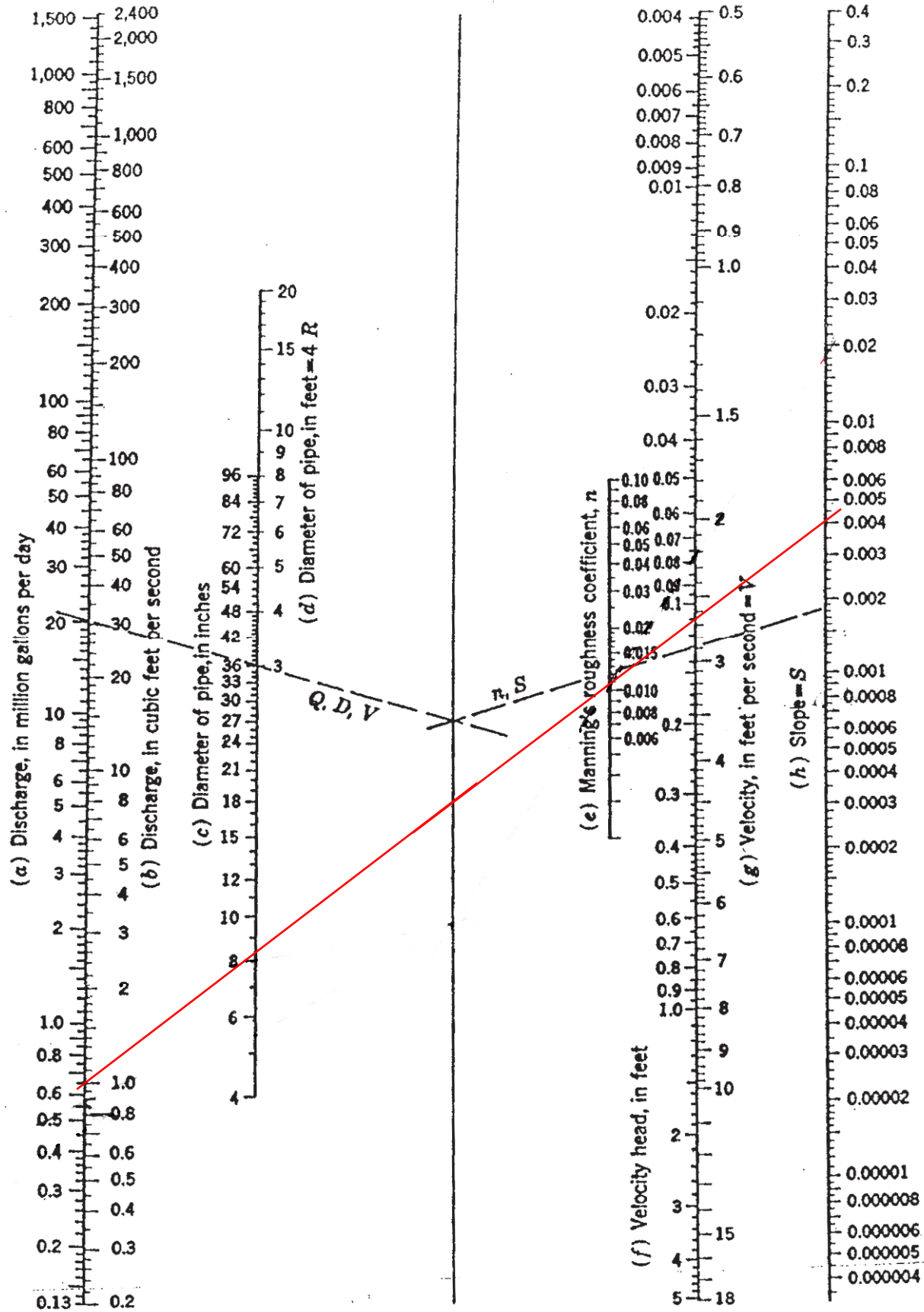
McGrath Highway Sewer Flows From Annual Water Usage					
Address	Account Number	Billing Units (BU)	Rate (ft ³ /BU)	Flow(ft ³ /year)	Flow(ft ³ /sec)
50 Middlesex Ave	144056001	583.39	100	58339	0.001849918
76 Middlesex Ave	144055001	356.5	100	35650	0.001130454
76A Middlesex Ave	144055011	264.3	100	26430	0.00083809
175 Fellsway West	144051001	285.5	100	28550	0.000905315
120 Middlesex Ave	144051011	63.77	100	6377	0.000202213
25 Cummings Street	661025021	5087	100	508700	0.016130771
132 Middlesex Ave	144052001	67.35	100	6735	0.000213565
96 Middlesex Ave	144048001	1292	100	129200	0.004096905
PROPOSED					0.109990795
				Existing Flow(ft ³ /sec) =	0.025367231

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PIPE CAPACITY NOMOGRAPH

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EDGE Assembly Square: Pipe Capacity Nomograph



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APPENDIX E: Environmental Supporting Documentation

Contents

- Environmental Report Summary and Potential Response Actions

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HALEY & ALDRICH, INC.
465 Medford St.
Suite 2200
Boston, MA 02129
617.886.7400

16 January 2020
File No. 134081-003

TO: Ms. Sarah Lewis, Director of Planning
City of Somerville – Planning and Zoning

FROM: Haley & Aldrich, Inc.
Marya E. Gorczyca, Douglas M. Lindsay, LSP

Subject: Environmental Report Summary and Potential Response Actions
Proposed Office Building
74 Middlesex Avenue and 845 McGrath Highway
Somerville, Massachusetts

On behalf of EDGE, this memorandum presents a summary of existing information on environmental site conditions and our evaluation of environmental response actions to be conducted at the above-referenced property, located at 74 Middlesex Avenue and 845 McGrath Highway, in Somerville, Massachusetts (herein referred to as the “subject site”). The subject site is comprised of three (3) parcels of land totaling 0.85-acres. Refer to Figure 1, Project Locus for the general site location. Our evaluation is based on available reports prepared by others and includes the following:

1. “Phase I Limited Site Investigation – 845 McGrath Highway”, 30 August 1989, prepared by Miller Engineering, Inc., prepared for United Truck Leasing Corp.
2. “Phase II Comprehensive Assessment/Phase III Evaluation/Response Action Outcome – Former United truck Leasing 845 McGrath Highway”, 13 November 1996, prepared by Coneco Environmental, prepared for Mr. Robert Adams.
3. “Phase I & II Environmental Property Assessment”, 74 Middlesex Avenue, Somerville, Massachusetts, prepared by Environmental & Energy (E&E) dated 3 May 2017.
4. “Soil Management Plan” 845 McGrath Highway & 74-76 Middlesex Avenue, Somerville, Massachusetts, dated 10 May 2017 prepared by Environmental & Energy (E&E), E&E File No. ECLP-0805.
5. “Additional Soil Assessment and Characterization Results”, 845 McGrath Highway, Somerville, MA 02145” prepared by Cooperstown Environmental dated 23 October 2017.
6. “Soil Disposal Plan”, 845 McGrath Highway, Somerville, MA prepared by 21Environmental, Inc. dated 18 October 2018.

No subsurface explorations were completed by Haley & Aldrich for this evaluation.

Site History

The subject site consists of filled land with a history of use for trucking storage and maintenance activities and storage of waste oil, gasoline and fuel oil in underground storage tanks (USTs). The former United Truck Leasing Corporation buildings located at 845 McGrath Highway were demolished around 2013 and known USTs were previously removed. A filling station with two gasoline tanks were located at 74 Middlesex Turnpike (northeastern portion of the subject site) in the 1930's. There are no records available regarding the removal or closure of these tanks. The subject site is located in a former industrial area where other adjacent properties are reported to also have environmentally impacted near surface fill soils.

Regulatory History

Environmental site assessments conducted during and subsequent to UST removals have identified elevated concentrations of chemical constituents in soil and groundwater requiring management under state of Massachusetts Department of Environmental Protection (MassDEP) environmental regulations. The subject site is a Listed Disposal Site due to the conditions previously identified dating back to 1989 and has two Release Tracking Numbers (RTNs) 3-0002891 (845 McGrath Highway address) and 3-0035323 (74 Middlesex Avenue address) and is subject to Response Actions under the Massachusetts Contingency Plan (MCP) at 310 CMR 40.000.

845 McGrath Highway – RTN 3-0002891

United Truck Leasing Corporation formerly conducted truck fueling and maintenance activities. Waste oil, gasoline and diesel fuel were formerly stored in USTs which were removed from the southern and western portions of the subject site in July 1989. Evidence of impacted soil and groundwater was reportedly encountered during excavation at each of the four tank locations. The subject site was subsequently listed as a Non-Priority Confirmed Disposal Site. Monitored Natural Attenuation was proposed as the best Remedial Alternative for the subject site and a Temporary Class C Response Action Outcome (RAO) (now known as a Temporary Solution) was filed with the MassDEP in 1996. The Temporary Solution requires evaluation every five years to determine whether a Permanent Solution is possible. The Five-Year Periodic Review Report was due to the MassDEP on 1 April 2019 and it appears that this report has not been submitted.

A soil vapor survey was completed in May 2017 and detected tetrachloroethene (PCE) concentrations exceeding residential thresholds in three soil gas samples collected from the eastern boundary of the subject site and detected trichloroethylene (TCE) above residential thresholds in one soil vapor sample. The source of soil vapor impacts was believed to be a former waste oil pit adjacent to the former building located on the vacant portion of the subject site as well as a former self-contained Safety-Kleen machine inside the site building. A summary of the soil vapor survey was reviewed however analytical results were not available.

74 Middlesex Avenue – RTN 3-0035323

Previous site investigations conducted in 2017 identified concentrations of lead, total petroleum hydrocarbons (TPH), antimony and benzo(b)fluoranthene in soil which exceeded the MassDEP reportable concentrations (RCS-1). The MassDEP was notified of the release on 22 January 2019. The release log form and release transmittal lists McGrath Middlesex, LLC as a potentially responsible party. Additional information regarding impending remediation was not identified.

Site Conditions and Proposed Development

The subject site is currently vacant with the exception of a low-rise commercial building at the south east corner. Site grades are relatively flat ranging from approximately El. 14 to 16 City of Somerville Datum. The subject site is surrounded by City of Somerville streets on each side. Interstate Highway I-93 owned by the Massachusetts Department of Transportation (MassDOT) is located approximately 50 ft to the west.

The proposed redevelopment of the subject site includes construction of a commercial office building. Construction of two levels of below grade parking over the entire site is being considered.

Proposed Environmental Scope of Work

Based on our current understanding of the subject site, the following environmental tasks are identified as follows:

MCP COMPLIANCE AND SUBMITTALS

Haley & Aldrich will serve as LSP-of-record during the redevelopment of the subject site. Under the Temporary Solution regulatory status of the subject site, a Five-Year Periodic Review Report was due to the MassDEP on 1 April 2019. The Five-Year Periodic Review Report will be prepared and submitted to MassDEP to maintain the Temporary Solution in accordance with 310 CMR 40.1050 of the MCP. We believe that submission of the Five-Year Periodic Review Report will be sufficient for compliance with the MCP.

If additional MassDEP reportable conditions are encountered during site investigation or construction, Haley & Aldrich will notify the MassDEP per the requirements of 310 CMR 40.0310 of the MCP.

Prior to the commencement of soil excavation and removal activities, Haley & Aldrich will prepare and submit a Release Abatement Measure (RAM) Plan status reports and closure report to the MassDEP per the requirements of 310 CMR 40.044 of the MCP.

Additional MCP submittals may be required during the course of construction and may include Immediate Response Action Plans and Completion Reports and another Five-Year Periodic Review of the Temporary Solution. A Permanent Solution Statement with or without Conditions may be prepared following the completion of site redevelopment and depending on sampling results and a risk

characterization. Based on the volume of impacted soil to be removed during redevelopment the implementation of an Activity and Use Limitation (AUL) is not expected.

SOIL AND GROUNDWATER CHARACTERIZATION

The results of environmental testing of soil samples from previous site assessments and environmental studies indicate impacted soils requiring special testing handling and management during construction. The groundwater quality is not clear as various previous environmental assessments have made different conclusions regarding groundwater quality.

Additional subsurface investigations will be required for project design, soil and groundwater management, and building construction. Based on an average planned depth of excavation of 30 ft, a 37,000 sf site, 15 % swell factor and 1.7 tons/cy conversion factor, we estimate a total volume of 47,000 cy or 80,000 tons of surplus excavated material requiring off-site disposition, a portion of which is environmentally impacted.

A new soil boring program will be conducted to precharacterize soil for selection, review and acceptance of receiving facilities. Additional monitoring wells will be installed and sampled to evaluate the nature and extent of previously documented groundwater impacts. A soil precharacterization report will be prepared for facility selection and contractor review.

DEWATERING

The planned below grade garage construction will be below site groundwater levels. An impervious temporary excavation support system to limit groundwater seepage into the excavation and temporary construction dewatering will be required. A discharge permit from appropriate Agencies will be required for off-site discharge of any construction dewatering effluent into the surrounding storm drain system. Based on the environmental conditions it is expected that a NPDES Remediation General Permit (RGP) will be required from the US EPA. A representative groundwater sample and a receiving waters sample will be collected and analyzed for the NPDES discharge criteria. A Notice of Intent permit application will be prepared and submitted to US EPA for review

Following receipt of the RGP, influent and effluent samples will be analyzed per the permit requirements. A dewatering system may include fractionation tanks, sediment filters, and treatment to remove contaminants to achieve the permit discharge effluent criteria.

ENVIRONMENTAL SOIL MANAGEMENT AND MONITORING

Environmental characterization of soil and written receiving facility acceptance will be required prior to off-site transport of soil. For each selected facility, a soil approval package will be prepared for review. The soil approval package will include an LSP opinion letter, waste profile form, analytical data and a shipping document (bill of lading or material shipping record).

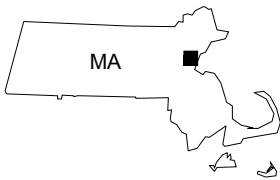
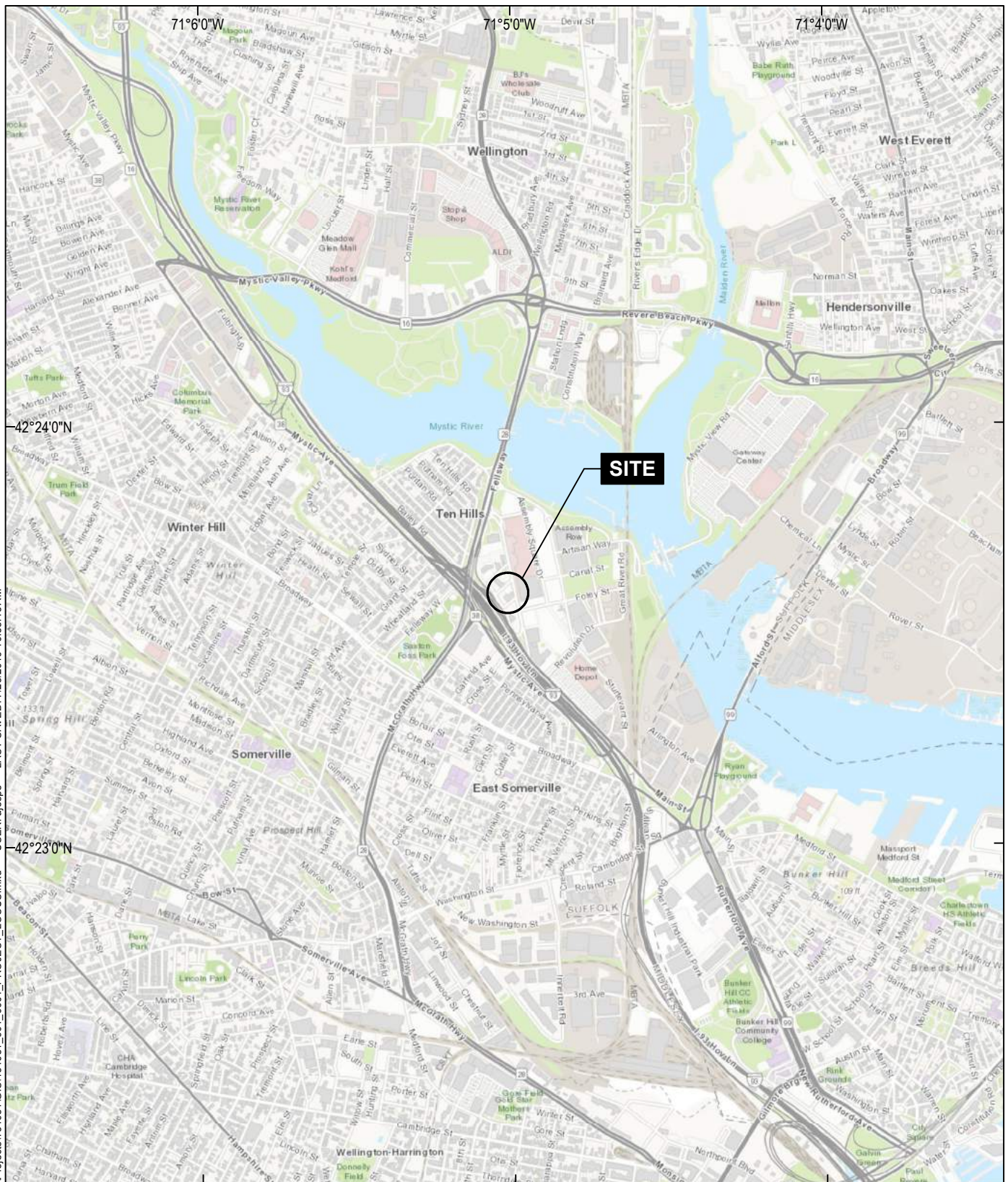
Following facility acceptance, Haley & Aldrich will provide excavation oversight, air monitoring, monitor and document soil quantities, and coordinate with the excavator, transporter and receiving facilities.

During soil excavation, upwind and downwind dust monitoring will also be performed for compliance with action levels specified in the RAM Plan or contractor provided Soil Management Plan.

Please contact us if you have questions or require additional information.

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MAP SOURCE: ESRI
SITE COORDINATES: 71°5'1"W 42°23'36"N

**HALEY
ALDRICH**

74 MIDDLESEX AVENUE
SOMERVILLE, MASSACHUSETTS

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
JULY 2019

FIGURE 1

APPENDIX F: Civic Space Study

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MASTER PLAN SPECIAL PERMIT

APPENDIX F: CIVIC SPACE STUDY
EDGE ASSEMBLY SQUARE

SUBMITTED TO THE CITY OF SOMERVILLE
FEBUARY 19TH, 2020

CONTEXT

EXISTING CONDITIONS ANALYSIS

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EXISTING CONDITIONS ANALYSIS

The following chapter analyzes the existing and future context of the project site to help determine the optimal design and programming for the new civic spaces proposed by the EDGE Assembly Square Project.

1.1 Study Area



Exhibit: Map of Civic Spaces within the Study Area
Source: ESRI / MassGIS

The map above shows existing civic spaces located within a roughly 10 minute walk (or half a mile) of the Project Site. This walkshed area encompasses both the Assembly Square district and portions of the Ten Hills, Winter Hill, and East Somerville neighborhoods immediately south of I-93. This same study area boundary is used throughout this section of the report. The civic spaces mapped above are a combination of smaller spaces recently developed as part of the transformation of the Assembly Square Mixed Use District (ASMD), and larger existing open spaces, such as the waterfront parks along the Mystic River and Foss Park.

1.2 Study Area Civic Spaces

	<u>Park Name</u>	<u>Type</u>	<u>Square Footage</u>	<u>Acreage</u>	<u>% of Total</u>
1	Grimmons Park	Neighborhood Park	17,000	0.39	1%
2	Blessing of the Bay, Paddle Boston	Community Park	131,000	3.01	9%
3	Sylvester Baxter Riverfront Park	Community Park	261,000	5.99	18%
4	Chuckie Harris Park and Harris Park	Neighborhood Park	27,000	0.62	2%
5	Foss Park	Regional Park	560,200	12.86	40%
6	Draw Seven State Park	Regional Park	321,000	7.37	23%
7	Partners Publicly Accessible Park	Community Park	73,953	1.70	5%
8	XMBLY <i>(Proposed)</i>	Community Park	20,000	0.46	1%

The study area includes [2] regional parks that together provide 63 percent of the study area's available civic space. The largest regional park is Foss Park south of I-93, which supports active recreation with tennis courts, a basketball court, ballfields, a flex/soccer field, and a public pool. Located along the river east of Assembly Row, Draw Seven State Park offers opportunities for passive recreation, such as walking along the river or picnicking on the lawn.

The study area also includes [4] community parks that together total 485,953 square feet and provide 35 percent of the available civic space. The largest community park is Sylvester Baxter Riverfront Park at 261,000 square feet, which includes flexible lawn, walking paths, a riverfront amphitheatre, and a children's play area. The two smaller community parks, XMBLY and Partner's Healthcare Park, are primarily flexible lawn spaces.

The study area also includes [2] neighborhood parks that together total 30,500 square feet and 2 percent of the available civic space. Grimmons Park offers the Ten Hills residential neighborhood children's play areas for a variety of ages, as well as a splash pad. Chuckie Harris Park offers the East Somerville residential neighborhood children's play, a sprinkler fountain, and an outdoor seating area with fixed tables and chairs.

1.3 Walkshed Analysis

Walkshed analyses were performed on the eight civic space types present in the study area. The analysis reveals that a majority of residents and workers in the study area can reasonably walk to one or more existing civic spaces. However, these are different levels of access by neighborhoods: the Ten Hills residential neighborhood has easy access to 10 percent of the civic spaces; the Winter Hill neighborhood and the East Somerville neighborhoods have easy access to 42 percent of the civic space in the district, and the Assembly Square District has the greatest access, with 48 percent of the civic space within the district walkable for both its residents and employees.

The EDGE Assembly Square project is well located to contribute to the relative scarcity of civic spaces on the west side of the Assembly Square District, where only 6 percent of civic space is currently provided. This civic space will also be relatively convenient to the lower income communities southwest of I-93 via the Kensington Connector underpass.



*Exhibit: Regional Park Walkshed Analysis
Source: ESRI / MassGIS*

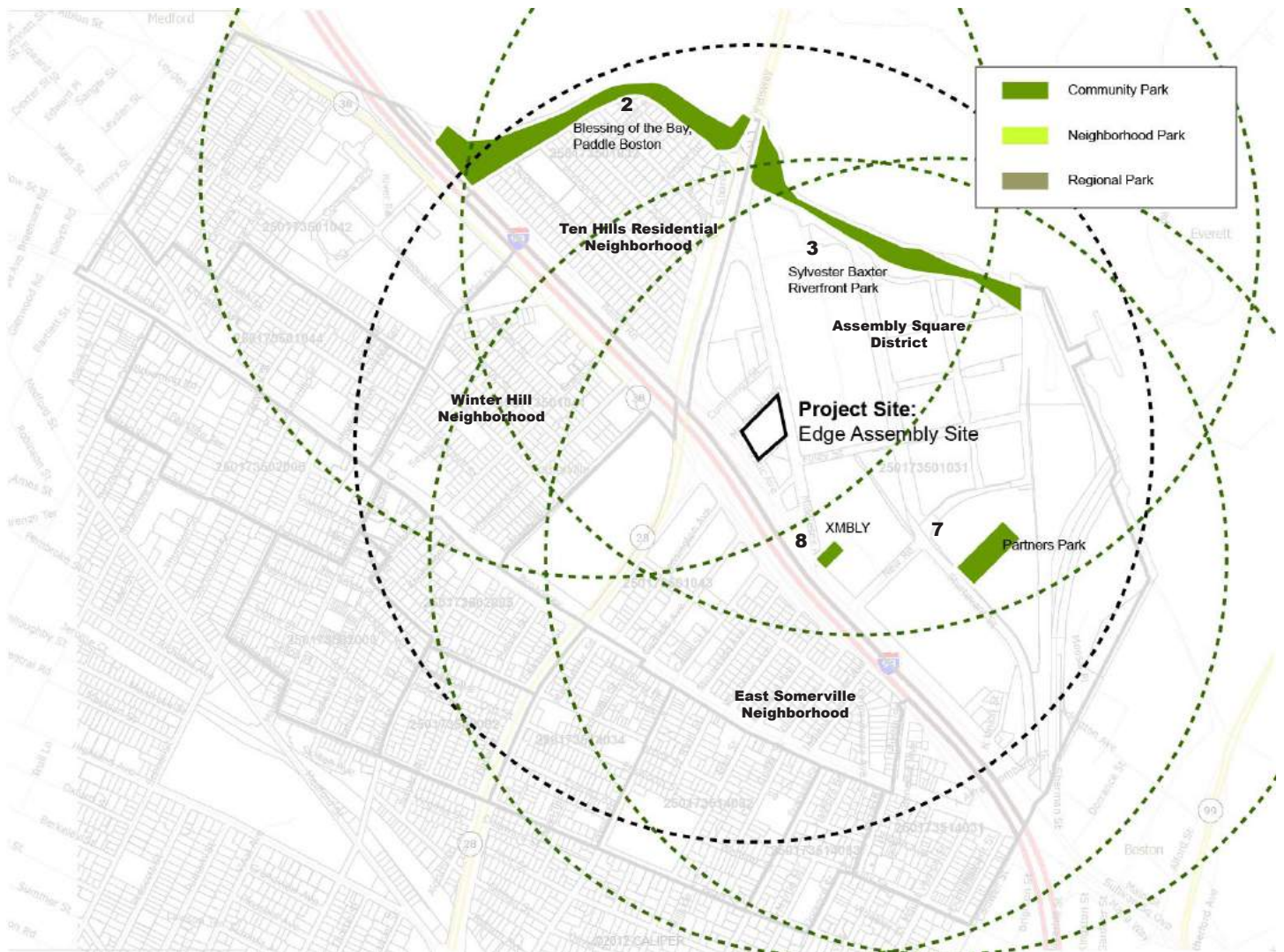


Exhibit: Community Park Walkshed Analysis
Source: ESRI / MassGIS

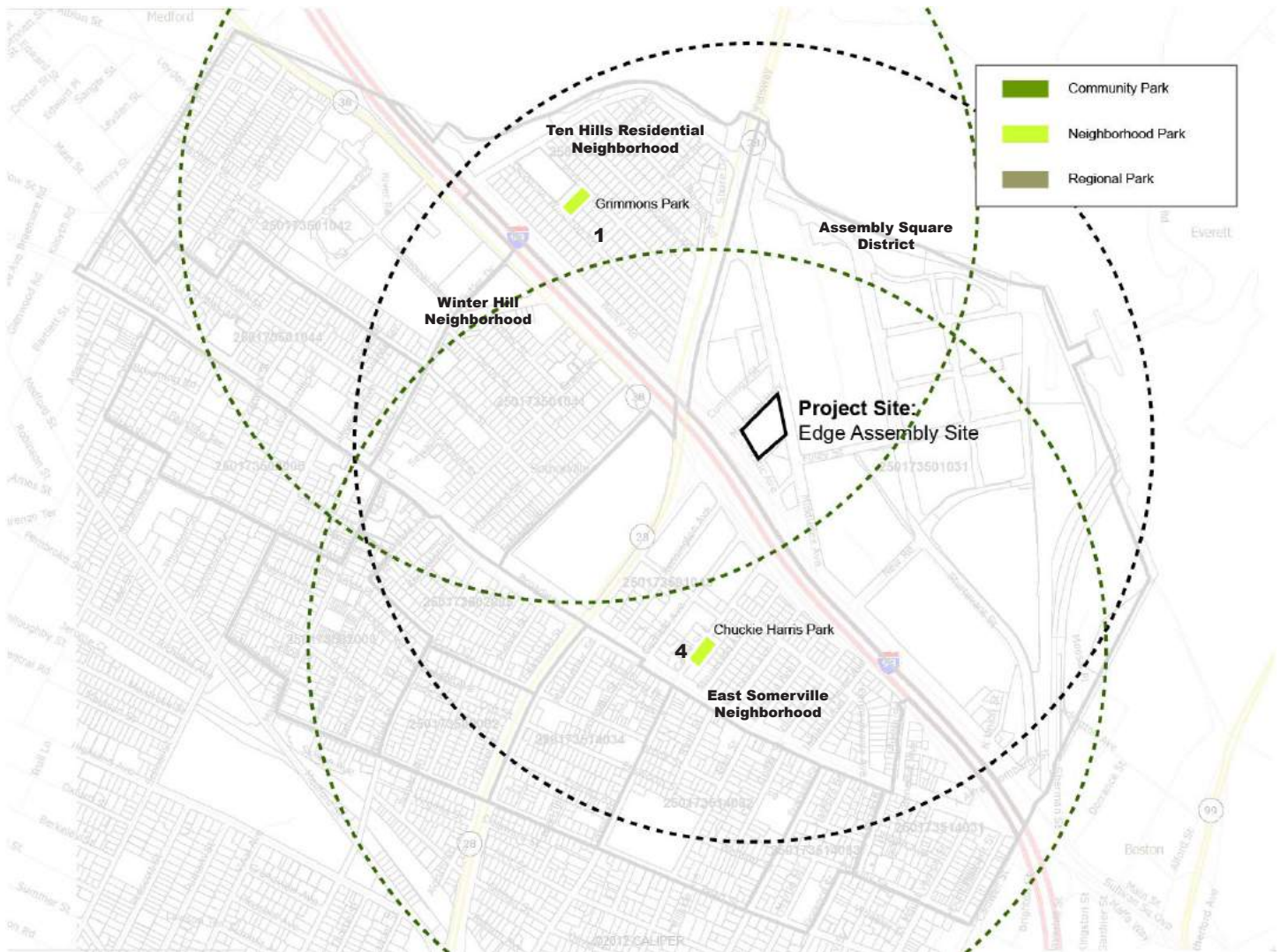


Exhibit: Neighborhood Park Walkshed Analysis
Source: ESRI / MassGIS

1.4 Context Maps

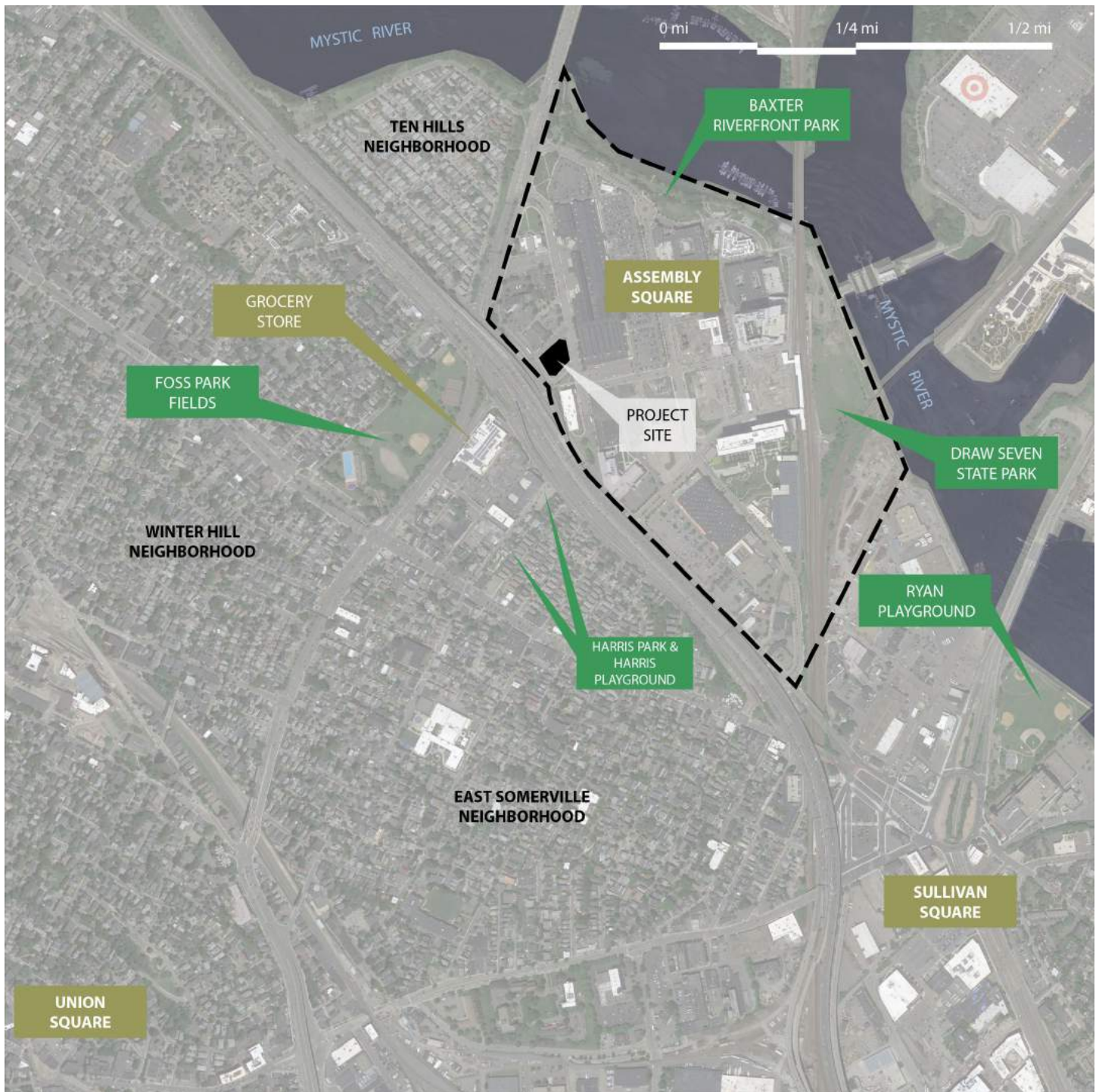


Exhibit: Context Map

1.5 Demographics Analysis

According to the US Census, there are 14 neighborhoods within half a mile of the study area, comprised of 6,219 households (Occupied Housing Units). These households include 15,803 people, with a median age of 41. Of individuals within the study area, 37 percent are Minority/non-white or Hispanic. The median household income between February 2019 and February 2020 (in 2017 inflation-adjusted dollars) is \$55,428.

Demographics															
Block Group/Neighborhood	TotalPop	HousingUnits	Occupied	Vacant	MedianAge	Total Race	WhiteAlong	% minority	Black or African American alone	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races:	Two or more races: - Two races including Some other race
250173501031	0	0	0	0	-	0	0		0	0	0	0	0	0	0
250173501032	1,388	540	540	0	36	1,388	1,221	12%	33	7	42	0	75	10	10
250173501041	2,024	1,000	960	40	34	2,024	1,321	35%	111	0	247	0	300	45	45
250173501042	2,865	1,055	1,055	0	32	2,865	1,097	62%	1,653	0	81	0	0	34	34
250173501043	1,634	505	490	15	31	1,634	859	47%	20	0	313	0	416	26	26
250173501044	1,087	584	487	97	42	1,087	583	46%	91	0	407	0	0	6	6
250173502002	351	238	223	15	37	351	289	18%	43	0	0	0	0	19	19
250173502003	1,085	419	378	41	37	1,085	906	16%	0	0	151	0	11	17	17
250173502005	553	303	248	55	57	553	303	45%	32	0	142	0	0	76	76
250173502006	825	451	430	21	44	825	797	3%	0	0	0	0	28	0	0
250173514031	1,066	359	336	23	25	1,066	619	42%	0	0	124	0	207	116	35
250173514032	767	362	330	32	32	767	644	16%	6	0	63	0	33	21	21
250173514033	752	395	371	24	39	752	460	39%	114	0	92	0	86	0	0
250173514034	1,406	388	371	17	38	1,406	906	36%	177	0	147	0	17	159	159
total		6,219				15,803	10,005		5,798	37%					
non-minority								>25% minority	minority	percent minority					

Median Income	
Block Group/Neighborhood	Median household income in the past 12 months (in 2017 inflation-adjusted dollars)
250173501031	-
250173501032	85,893
250173501041	67,381
250173501042	22,607
250173501043	74,898
250173501044	35,199
250173502002	79,609
250173502003	85,550
250173502005	75,114
250173502006	73,409
250173514031	58,485
250173514032	65,395
250173514033	41,250
250173514034	88,250
MA median income	77,385
source	https://www.deptofnumbers.com/income/massachusetts/
< 65% MA median	50,300

Environmental Justice Populations

Among the 14 neighborhoods within the study area, there are eight Environmental Justice Populations, or neighborhoods whose annual median household income is equal to or less than 65 percent of the statewide median, or whose population is made up of 25 percent Minority individuals. Census data within the study area for foreign born and lacking in English proficiency is not available at the block group level. The Massachusetts median income is \$77,385; 65 percent of this is \$50,300 (data source: <https://www.deptofnumbers.com/income/massachusetts/>). The Environmental Justice Neighborhoods are all located southwest of I-93, just west of the Project Site.

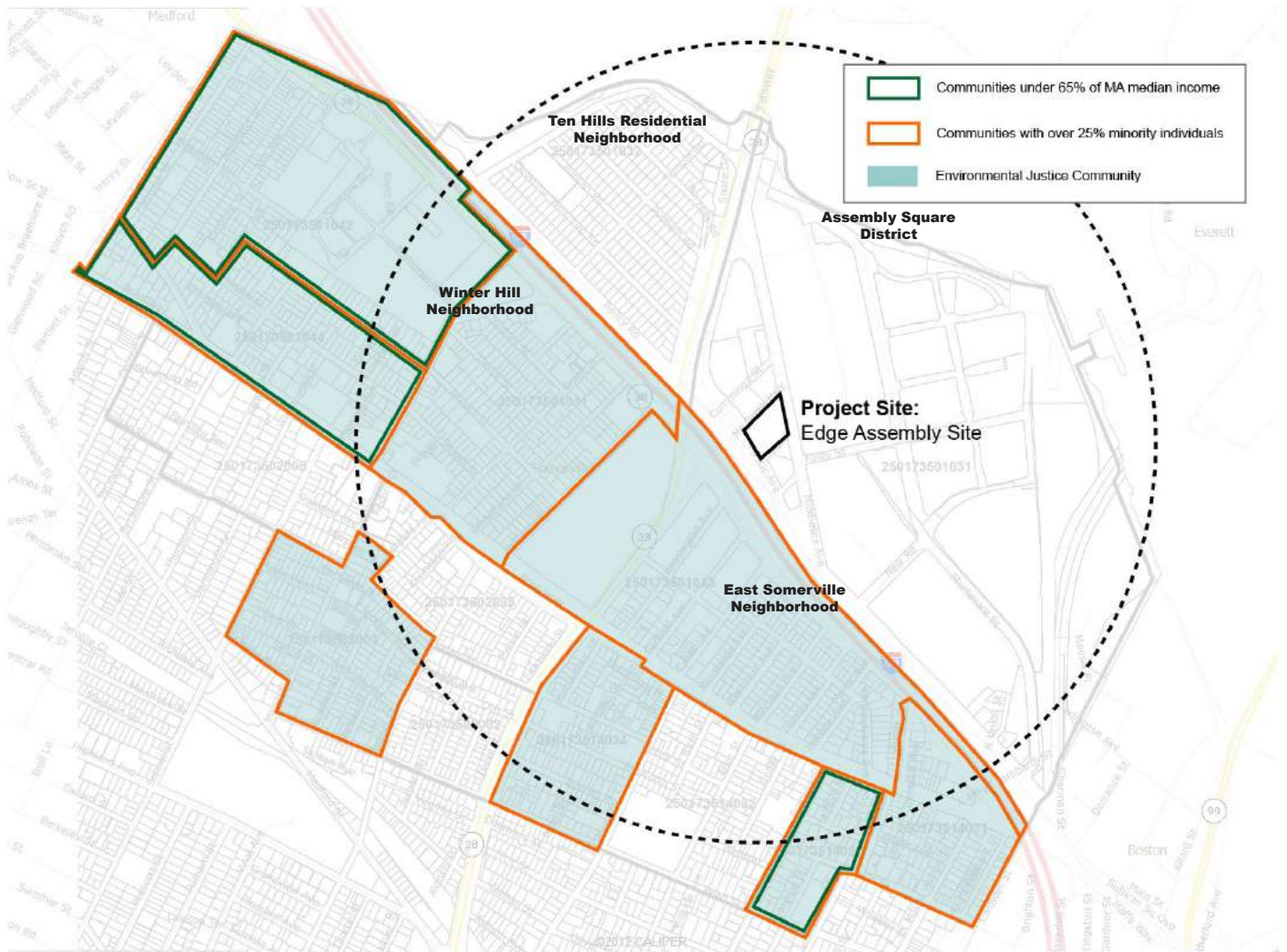


Exhibit: Social Justice Populations
Source: ESRI / MassGIS

Adjacency to Specific Uses

Existing uses that might impact civic space needs were mapped within the study area, such as schools, daycare centers, affordable housing, elderly housing, senior centers, religious institutions and large employers. The ASMD includes a relative abundance of large employers, as well as one school, the Lincoln Technical Institute, which is oriented towards technical/professional studies.

Housing in the district northeast of I-93 includes the established Ten Hills neighborhood as well as several newer luxury towers in Assembly Row: Montaje Apartments, Ava Somerville, and Avalon at Assembly Row. The Project Site is a short walk from the restaurants and amenities associated with Assembly Square and Assembly Row. Ongoing planned development associated with Assembly Row and XMBLY will bring a diversity of new retail and restaurant offerings to the neighborhood, and will also provide new residential and office space. These developments will also introduce new open spaces, public realm improvements and pedestrian amenities that will continue the ongoing transformation of a historic, largely industrial district into a vibrant, 24/7 mixed use community.

The neighborhoods within half a mile of the project site southwest of I-93, Winter Hill and East Somerville, are well established residential neighborhoods with lower income levels. These neighborhoods include a greater abundance of uses serving their residents, such as public housing, public schools, day care centers, a grocery store, and restaurants, especially on Broadway.



Exhibit: Surrounding Land Use Context
Source: ESRI / MassGIS

Another important feature that will impact the design of this project's civic space is the I-93 elevated highway, about 150 feet from the site, and the highway offramp, immediately to the west of the site. This feature will be a source of noise and exhaust, and a visual presence on the west side of the site. A large advertising billboard within the Public Storage property south of the project site is also visually prominent.



Exhibit: Existing Photo of Site and I-93

NEEDS ASSESSMENT

2.1 Existing Plans

The project's location within the ASMD provides a unique opportunity to continue the revitalization of the neighborhood set forth by the City and the neighborhood of a balanced, dense and vibrant mixed-use district that emphasizes pedestrian and transit-oriented planning and design, and prioritizes the creation of new pedestrian-oriented public spaces. The design of the Project is intended to integrate into the fabric of the ASMD and the context of the continued buildout of the neighborhood, while also enhancing the site as a pedestrian and bicycle gateway into the district from the west per SomerVision2040.

As described below, approximately 25 percent of the Project Site, approximately 9,000 SF, will be provided on-site as publicly accessible open space. This is primarily composed of streetscape wrapping around the building, with an enlarged sidewalk width along the Site's east and south frontages enhancing the sense of place along Middlesex Avenue and Kensington Avenue. In order to satisfy the 25 percent civic space requirement in the ASMD, the Project proposes to create a through-block plaza by designating 2,891 SF of on-site area and transitioning 6,378 SF of an adjacent existing secondary street.. Additionally, the project proposes approximately 7,476 SF of off-site improvements to the adjacent Middlesex Avenue Open Space that was previously improved by an abutter, but has potential to better serve neighborhood needs through further design and programming.



Exhibit: Neighborhood Open Space Plan

Civic Space Proposal - Kensington Plaza

The Project envisions the decommissioning of the adjacent Kensington Avenue to create a new, approximately 9,000 SF civic space ("Kensington Plaza"). This through block plaza will create an attractive event and gathering space. Improvements will include a new hardscape plaza, seating, signage and lighting that will create a welcoming and safe space at all times of the day. Plantings and other improvements will help to screen the noise and sight of the I-93 off-ramp. Kensington Plaza will also connect the Project's lobby and ground floor active uses to the Middlesex Avenue Open Space and strong east-west desire line to the south, so that this string of open spaces are experienced as one unified design. The east-west pedestrian desire line, which extends from the East Somerville neighborhood, Stop and Shop, and Foss Park to the west to Foley Street to the east, will likely be the primary source of pedestrians and bikes passing by the site to other destinations.

These proposed civic space improvements require the City of Somerville to decommission its vehicular rights on the adjacent Kensington Avenue thoroughfare, while retaining ownership of the Kensington right-of-way (ROW). This ROW would be designed to function as a fire lane, though the pavement would be designed to be pedestrian in visual character. The City would grant the Proponent an easement that dedicates the new civic space to the public in perpetuity, and in return, would allow the adjacent decommissioned Kensington right-of-way to be counted towards the required amount of civic space. The Proponent is prepared to improve and maintain these off-site improvements. The Proponent will continue to coordinate closely with the City on the decommissioning of this public way, which would require a vote from the City Councilor and final approval from the Mayor.

Other Off-Site Open Space Improvements

To further enhance the quality of public space around the Project Site, the Project is exploring the opportunity to link the on-site open space (the building's entry plaza, public sidewalks, and multi-modal transportation connections), as well as the new Kensington Plaza, with the adjacent Middlesex Avenue Open Space through revitalization of this space. The Middlesex Avenue Open Space, which extends from Kensington Avenue on the north to the Public Storage facility property to the south, is not used to contribute to this Project's open space commitment; improvements here will be considered off-site improvements to City-owned land. The Proponent is prepared to improve and maintain these off-site improvements. These are intended to enhance the quality of this landscape, as well as to strengthen the link between Foley Street to the east and the Kensington Underpass, the Stop and Shop, and the East Somerville neighborhood to the west. Integrated design of these three open spaces will yield a more connected, safe, and vibrant public realm. Public bicycle storage is being considered in this location adjacent to the existing hardscaped seating area north of the Public Storage building.

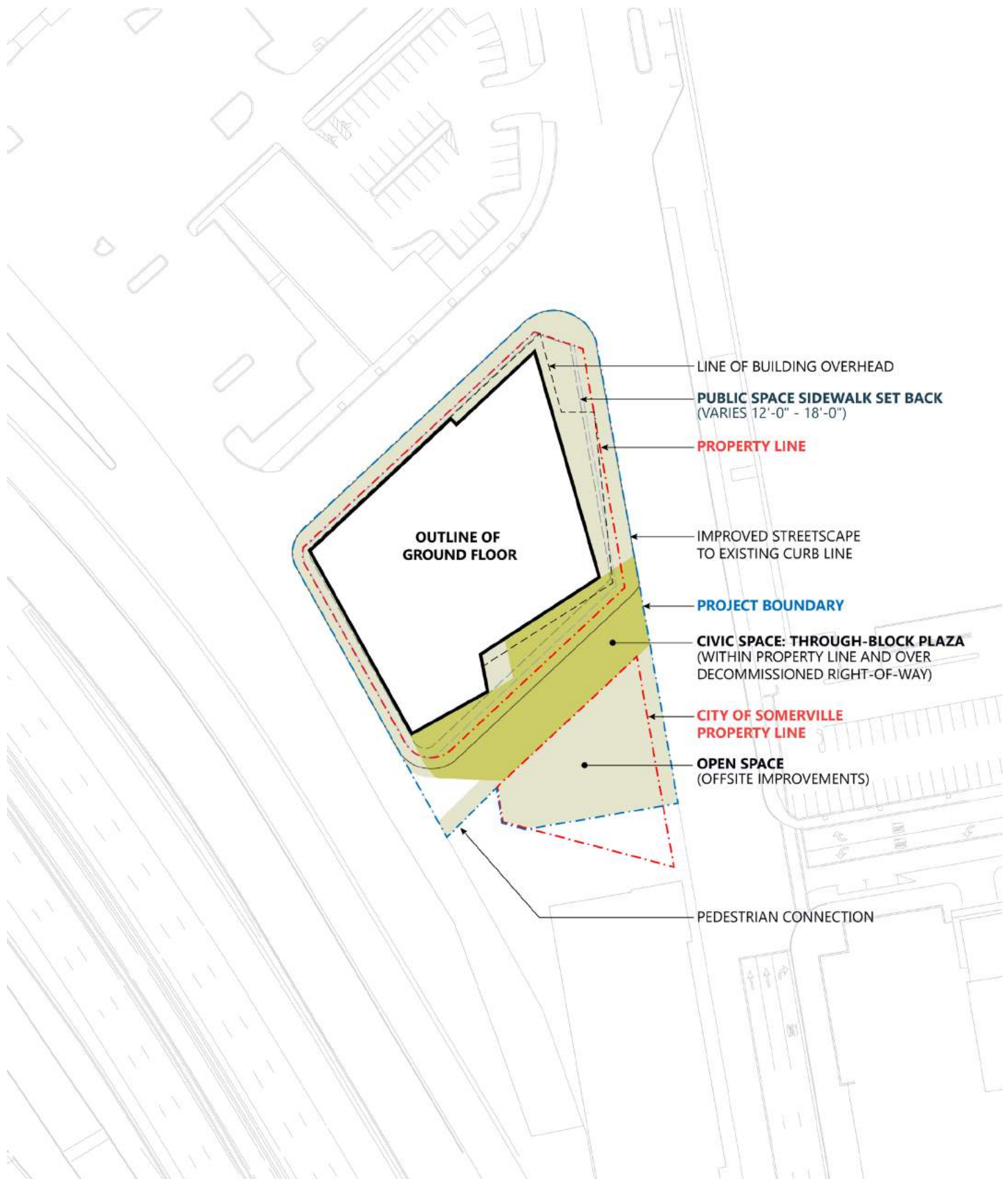


Exhibit: Civic Space and Offsite Improvements

2.2 Departmental Feedback

Departmental feedback will be collected after the initial submission.

2.3 Findings From Existing Conditions Analysis

The existing uses within the ASMD include an abundance of large employers, suggesting that in the near term, many civic space users from within the district may be workers, who will be likely to use the space predominantly at lunchtime, with some activity at the margins of the work day. Additionally, the established family-centered neighborhoods of East Somerville and Ten Hills are also within a comfortable walking distance from the site, so spaces designed for local residents and families could also be well-used. In the future, as more housing is built within and around Assembly Square, there may be an increased need for family-oriented spaces throughout the day. However, the lack of immediately adjacent residential units suggests more of an office worker user base. The east-west pedestrian desire line will also bring pedestrians and commuters past and through the site to the metro. Amenities that support this connection for biking may also be desirable.

The designation of eight Environmental Justice Communities southwest of I-93 and the presence of higher income residents north of I-93 suggest that the highway reinforces a socioeconomic divide between these districts. The location of the project site at the western edge of the ASMD positions it as a potential gateway that may be designed to mitigate the impact of the highway as a hard edge for pedestrians. The design of a strong east-west pedestrian and bicycle route that connects from the underpass to Foley street is critical to enhancing connectivity between these neighborhoods.

The presence of I-93 suggests that noise and visual buffers, such as dense planting and perhaps a moving water feature, could help to make the site a more hospitable place to hang out in versus pass through. Designing Kensington Plaza to support programmed events could also help attract people from beyond the project's users to the site. Given the presence of I-93, active uses, such as lawn games or outdoor maker space, may be better suited to the site than passive areas for quiet contemplation.

2.4 Neighborhood Feedback

A neighborhood meeting called by City Council President Matthew McLaughlin was held on January 22 to introduce the Project's team and master plan design approach. The design team discussed concepts of openness at the ground floor to enhance a connection to the outdoor plaza and open space. Community feedback from this meeting was used to inform the development proposal in the master plan submission. Following input by the Design Review Committee, a second neighborhood meeting will be held to present the Site Plan and gather public feedback. At that time, representative surveys will be performed by the City and the applicant utilizing a methodology approved by the City of Somerville.

2.5 Conclusions

This project has the potential to contribute to many of the City of Somerville's goals for identified in SomerVision 2040. By developing the EDGE Assembly Square project, the ASMD will gain a welcoming pedestrian and bicycle gateway connecting it to the neighborhoods southwest of I-93. In addition, residents of the Winter Hill Neighborhood and the East Somerville Neighborhood will achieve accessibility to 42 percent of the civic space within these neighborhoods, and Assembly Square District residents and employees will achieve access to 48 percent of the civic space within the district. The design and programming of the civic space itself will be critical to ensuring that it will be well-used by both workers and residents of the surrounding communities.

APPENDIX G: Neighborhood Meeting Summary

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- Neighborhood Meeting Summary
- Sign-in Sheet

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Neighborhood Meeting Report

Date: January 22, 2020

Introduction:

- City Council President Matthew McLaughlin (Ward 1) introduced the meeting.
- Ryan Sullivan and Max Mastrella introduced the Project Team, and provided an introduction to EDGE.

Presentation:

- Project Team

Questions and Answers/Comments:

Question: How tall is the Partners Building?

Response: The Partners building is approximately 13 Floors, or about 166 feet.

Question: Would the new zoning accommodate the proposed height of the project?

Response: (Sarah Lewis): Yes, there will be a new overlay district for the ASMD sub-area at the conclusion of the Neighborhood Planning Process, which is scheduled to begin in early February.

Question: Have you had a talk with Federal Realty Investment Trust about how the KMART parcel will be sited.

Response: (Sarah Lewis): Revisioning this parcel will be part of the Neighborhood Plan update that is about to get started. There are larger issues planning issues to discuss concerning the redevelopment of the retail strip that includes Kmart, Home Depot, etc.

Question: You indicated you would make the ground floor transparent, what can you do make it accessible. The Boston Public Library Café is a great example.

Response: (Sasaki): The Proponent is committed to siting active uses, including retail and restaurant uses on the ground floor that will make the Project's ground floor feel less like a commercial lobby, and more engaging. The Project Team is still working through the specifics, but we understand the importance of getting this right. Additional details will be provided as the design advances, during the Site Plan approval process.

Question: How do you plan to balance the concepts of openness and connectivity, but also address the noise and air quality challenges associated with Project's proximity to I-93.

Response: (AECOM): Jason from AECOM introduced his role as the "integrator" of varying disciplines to improve and address high performance building design.

Question: Is the Project Team looking into the Passivehouse standard/certification for the envelope?

Response: (AECOM): The Project Team is taking into consideration Passivehouse standards early in the design process, including a high-quality envelope, building orientation, etc.

Question: The Public was concerned about how the design of the building would impact bird safety. How will our design take into account bird safety and what steps will we take to address this topic?

Response: (Sasaki): The Project's design is utilizing a lower amount of glass, which will have a positive impact on bird safety. The Project Team will continue to look into this topic as the design advances.

Question: How do you handle the HVAC needs/constraints for an all lab building?

Response: (AECOM) The Proponent has engaged a lab consultant, and the Project Team is working early in the design process to build in flexibility to accommodate the space and MEP needs for an all lab-use.

Question: Are you considering integrating solar PV?

Response: (AECOM): The Proponent will continue to investigate the feasibility of on-site energy generation, which is critical to reducing anticipated demand on the utility grid. The Proponent is considering and exploring incorporation of a rooftop solar Photovoltaic (PV) system, building mounted PV, as well as a ground-source heat pump system as part of the Project.

Question: How much vehicle parking does the Project currently propose?

Response: (Sasaki): The Project is currently exploring below-grade parking, which will be available for use only by tenants of the building.

Question: There is some concern over the potential for solar glare impacts.

Response: (AECOM): Early design work has focused on understanding and maximizing the building orientation to control daylight and reduce unwanted solar/heat gain. The Project Team will continue to evaluate the building envelope as the design advances to optimize the amount of solar exposure, minimize solar gain and glare and maximize beneficial daylighting at workspaces, while still designing a consistent building look and feel from all directions.

Question: What are the next steps?

Response: As the Project Team starts to review any comments from this meeting, the next step will be to prepare and submit their meeting summary as a part of their Master Plan Special Permit application. During the subsequent Site Plan approval process, the Project Team will host two additional neighborhood meetings, and will also meet with the Design Review Committee.

Question: What is the timing for the neighborhood plan?

Response: (Sarah Lewis): The timing of the neighborhood plan will overlap with the production of the development review application for this Project. At this time the City is supportive of advancing development review for this site because it is very concise, and somewhat isolated in the context of the larger redevelopment opportunities associated with the ASMD. The Project Team has actively engaged with City Planning Staff to date, and will be engaged in the neighborhood planning process as they move through the development review process.

Comment: Advancing this project will also help set the bar for sustainability for other projects.

Response: The Proponent appreciates the community's support. Recognizing the unique opportunity to enhance the ASMD through the transformation of the Project Site and its current uses, the Proponent proposes a building driven by Edge's four core principles: sustainability, wellbeing, design, and technology. Together, these principles have resulted in a Project that emphasizes sustainability, occupant wellbeing, and connectivity, and has positioned the Project to raise the bar for sustainable buildings in the City of Somerville.

Comment: Everyone focuses on the Kensington Underpass. We would like to see the City take this land back from MassDOT in the long-term, and to program and improve the space similar to what Ink Block did in the South End of Boston.

Response: As proposed, the Project will improve the connection between Assembly Row and the Project Site, and improve the pedestrian and bicycle connection between Foley Street to the residential and commercial neighborhoods of East Somerville to the west of I-93 through the Kensington Underpass.

Comment: There are massive sewer lines running through the neighborhood, which could potentially be used for geothermal energy.

Response: (AECOM): The Proponent is evaluating the potential for ground source heat pumps (geothermal) energy.

Comment: The Encore Casino has indicated that they are willing to pay for a footbridge connecting the casino and the Assembly MBTA Stop across the Mystic, however they won't pay for connection to get people across the tracks. There could be an opportunity here to help the City address this need.

Response: Throughout the coming months, the Proponent expects to work diligently with the community and with the City to complete the MPSP and Site Plan review and approval processes. During these processes a comprehensive package of public benefits and mitigation will further discussed.

Comment: I would recommend that you contact the Assembly Square's transportation management association (TMA).

Response: The Proponent will become a member of Assembly Connect, Assembly Square's Transportation Management Association. The Proponent currently is taking the internal steps needed to initiate becoming a member of the TMA, and this requirement will be satisfied within the timeframe noted above.

Comment: The Mystic River Task Force has requested the opportunity to sit down with the Project Team in the future to discuss and better understand the details on the air infiltration system.

Response: The Proponent is committed to meeting and working with the Task Force and other community groups throughout the development review process.

Comment: We have always been concerned over siting residential buildings near I-93. We are very excited about the new proposed commercial use, and believe that you can anticipate community support, even for the additional requested height.

Response: The Proponent appreciates the community's support, and looks forward to a continued dialogue during the development review process.

Comment: We recommend setting up an early meeting with Green and Open Somerville about the open space and proposed public realm improvements.

Response: The Proponent is committed to meeting and working with community groups throughout the development review process.

Comment: We recommend setting up an early meeting with the Mystic River Watershed Association.

Response: The Proponent is committed to meeting and working with community groups throughout the development review process.

Comment: Keep in mind that the Partners Building/Operations would be a good resource regarding resiliency. They have a great handle on current and future Mystic River flooding.

Response: The Proponent appreciates the comment.

Comment: We encourage the Project Team to look into pedestrian wind issues.

Response: A pedestrian wind comfort analysis will be provided as a component of the Site Plan review application.

Comment: The community room located in the Public Storage Building could use some upgrades/funding.

Response: Throughout the coming months, the Proponent expects to work diligently with the community and with the City to complete the MPSP and Site Plan review and approval processes. During these processes a comprehensive package of public benefits and mitigation will further discussed.

Comment: We encourage the Project Team to look into available research on electric glass that automatically tints to help manage heat load.

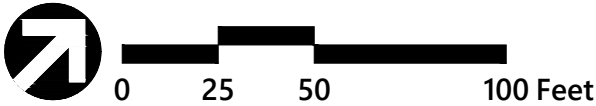
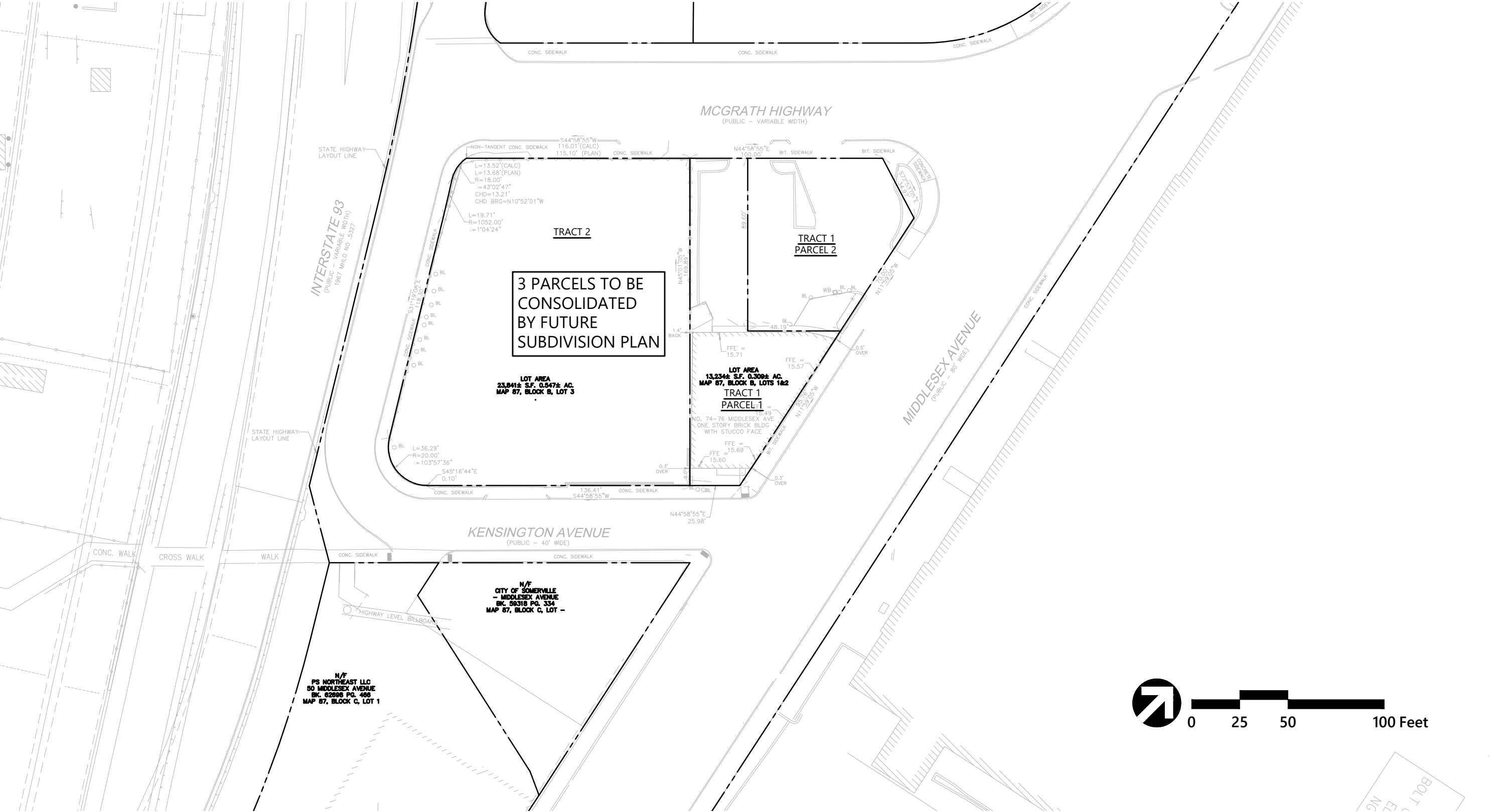
Response: The Proponent appreciates the comment. Early design work has focused on understanding and maximizing the building orientation to control daylight and reduce unwanted heat gain from solar exposure. The building floor-plate and exterior walls have been rotated toward an east-west axis, offering opportunities to regulate the amount of energy gained through the building's envelope. The exterior walls of the Project will consist of a high-performance enclosure designed as a "kit of parts", providing flexibility to adapt the window size ratio and deepen the articulated façade where beneficial on each elevation. Subsequently, the façade openings and window-to-wall ratios on each building elevation are optimized and are proportionate to the amount of solar exposure, minimizing solar gain while providing views and maximizing beneficial daylighting at workspaces, while still designing a consistent building look and feel from all directions.

ATTACHMENT A: Plat Plan

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Plat Plan

EDGE Assembly Square
Somerville, Massachusetts