APPENDIX A: Plot Plan

Contents

- Plot Plan

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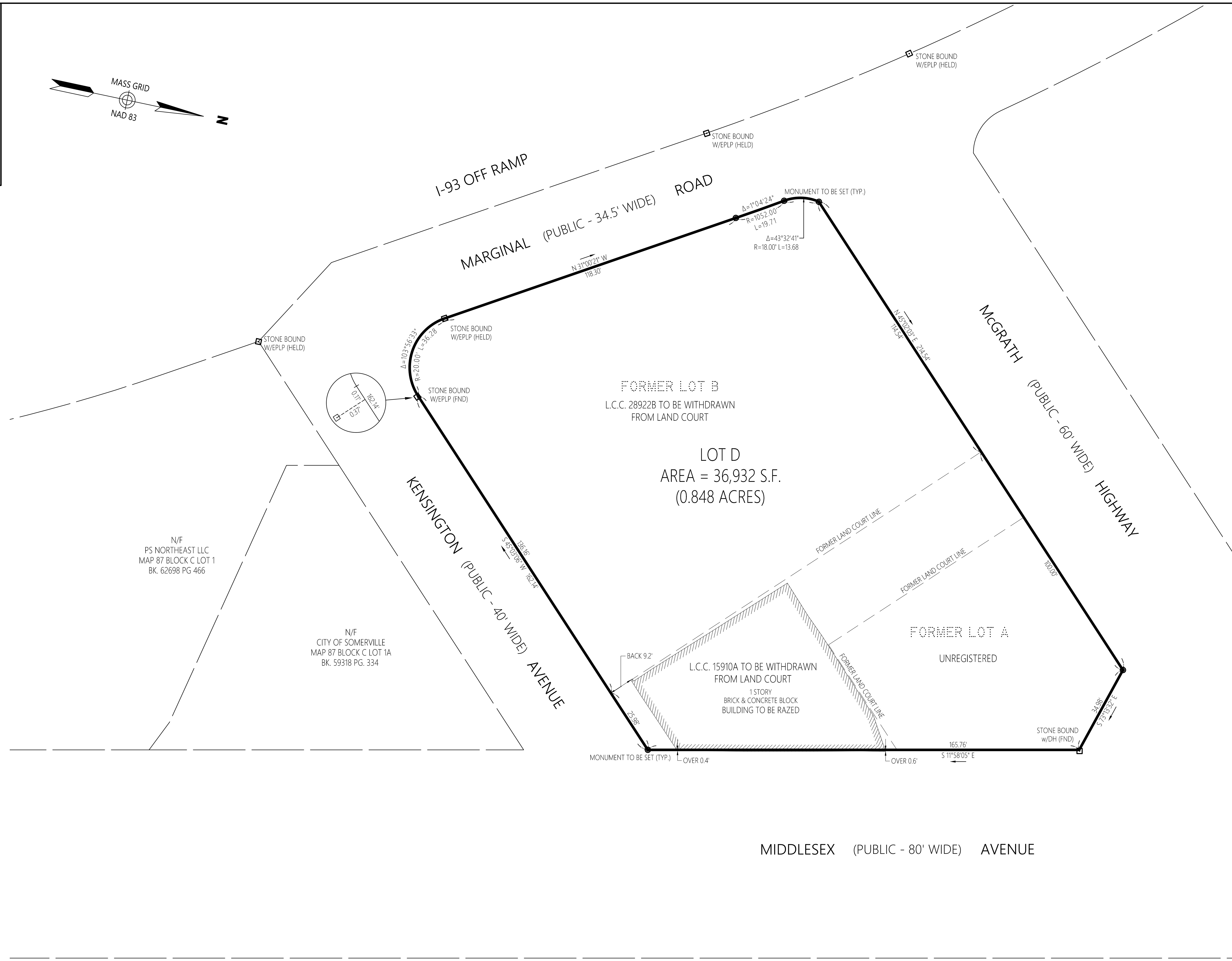
RESERVED FOR REGISTRY USE ONLY



SOMERVILLE PLANNING DIRECTOR

DATE: ____________

General Notes

1) THE PROPERTY LINES SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC. IN MARCH, 2020 AND FROM DEEDS AND PLANS OF RECORD.
2) THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY VHB, INC. IN MARCH, 2020.
3) HORIZONTAL DATUM IS BASED ON MASS. GRID SYSTEM, NAD 1983.
4) **LOT D CONSISTS OF TWO REGISTERED LAND PARCELS, CASE 15910A & 28922B, THAT ARE TO BE DE-REGISTERED.**
5) **THE PURPOSE OF THIS PLAN IS TO CONSOLIDATE LOTS "A" AND "B" INTO ONE PARCEL "LOT D".**

Plan References

REGISTRY OF DEEDS
PLAN 404 OF 2012
PLAN 146 OF 2001
PLAN 172 OF 1966
PLAN 1404 OF 1967 (SHLO 5723)
PLAN 2307 OF 1950
PLAN 1790 OF 1948
PLAN1658 OF 1947
PLAN 279 OF 1933

LAND COURT
10044A-D
12649C & D
15910A
21639A & B
28127A & B
288862A
28922A & B
32904A

Record Owner

PARCEL A
74M PROPERTY OWNER LLC
74 MIDDLESEX AVENUE
SOMERVILLE, MASS.
MAP 87 BLOCK B LOT 2
BK. 78188 PG. 189
CERT#276714
DOC#1885796

PARCEL B
74M PROPERTY OWNER LLC
845 McGRATH HIGHWAY
SOMERVILLE, MASS.
MAP 87 BLOCK B LOT 3
BK. 78188 PG. 189
CERT#276714
DOC#1885796

Certification

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

COMMONWEALTH OF MASSACHUSETTS
RUSSELL J. BOUSQUET
NO. 35389
REGISTERED
PROFESSIONAL LAND SURVEYOR

8-19-2021
DATE

PROFESSIONAL LAND SURVEYOR

20 0 20 40
SCALE IN FEET

CONSOLIDATION PLAN OF LAND
IN
SOMERVILLE
MASSACHUSETTS

OWNER: GREYSTAR

PREPARED BY: VHB, Inc.
Engineers | Scientists | Planners | Designers
101 Walnut Street, P.O. Box 9151
Watertown, MA 02471-9151
(617) 924-1770

SCALE: 1 INCH = 20 FEET
DATE: JUNE 27, 2021

\\vhb\gbl\proj\Wat-LD\14652.00 EDGE 74 Middlesex Ave\cad\sr\planset\14652.00-REG.dwg

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APPENDIX B: Development Review Reports

Contents

- Neighborhood Meeting Report
- Design Review Report
- UDC Design Recommendation

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NEIGHBORHOOD MEETING REPORT

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74 Middlesex
Building Application
Neighborhood Meeting Report

The Proponent has worked diligently to listen and respond to the public comments received from the community, and City departments during production of the Development Review Application. The following section describes the key comments received on the 74 Middlesex Project during two neighborhood meetings held on April 8, 2021 and June 26, 2021. Generally, the comments were supportive of the Project and did not result in any substantial refinements to the Project.

Building Meeting Notes/Comments

- **Bicycle Storage**
    - **Comment:** Will the Project incorporate bicycle parking for non-traditional bikes, e.g. cargo bikes or hand-powered bikes, for examples? Concerned about bicycle parking being relegated to a back of house space and being underutilized as is frequently seen in commercial buildings in the area.
    - **Response:** The Project proposes 101 secure, interior bicycle storage spaces. Approximately 11 of these spaces are anticipated to accommodate oversized bicycles. The bicycle storage program is strategically located in a visible area fronting the Civic Space with floor-to-ceiling glass storefront allowing enhanced light and security. The Proponent is also seeking opportunities to activate the bicycle storage area with staffed repair area and/or juice bar to further encourage bicycle commuting both at the building and within the larger Assembly community.

- **Solar Glare**
    - **Comment:** There was support for the nuance of the folding and angles of the building, but also some concern about the potential for solar glare/reflectance occurring from a block of windows at the same angle.
    - **Response:** Refer to Appendix A for the results of the Project's preliminary solar glare and heat loading analysis. The results of the solar glare analysis indicate that reflection impacts from the Project on motorist were predicted to be generally confined to within 350 feet of the building, however westbound drivers on McGrath Highway, and southbound drivers on Middlesex Avenue may experience some limited high impact glare events. These impacts are expected to be short in duration, lasting an average of less than 10 minutes, and will occur infrequently (fewer than 50 days per year annually). Additionally, given the slow speed of travel on these streets the reflections should be a nuisance at worst.
      At pedestrian level, reflections were predicted to fall most frequently onto the area immediately west and south of the proposed building. The maximum frequency of glare occurrence found at pedestrian level is approximately 29 percent of daytime hours. Reflections from the Building are not anticipated to negatively impact Foss park.

- **Indoor Air Quality**
    - **Comment:** Will the Project incorporate MERV 16 indoor air filtration?

- **Response:** Yes, the Project proposes to use MERV 16 Filter.

- **Green Roofs**
  - **Comment:** Is the Project exploring the potential to incorporate a green roof?
    Response: The Proponent is proposing to incorporate approximately 6,250 square feet of green roof on the mechanical penthouse roof, and approximately 2,700 square feet of green roof on the Level 2 canopy.

- **Future Connection between McGrath Highway/Foley Street:**
  - **Comment:** Does the Project's design leave room for the future extension of Foley Street?
  - **Response:** This connection is outside the scope of the Project, however the design of the Civic Space and off-site improvements would not preclude the future potential of this connection under/over I-93.

- **Work Force Development/Jobs:**
  - **Comment:** Are there any community space requirements in this zoning for this district?
  - **Response:** There are currently no required interior community space requirements within the Assembly Square Mixed Use District. The Proponent is open to providing spaces within the building for the community to host neighborhood meetings.

- **Work Force Development/Jobs:**
  - **Comment:** Are there plans for working with Somerville's job training programs to help train or create jobs for Somerville residents? I was primarily thinking about lab related jobs, but this could also include construction jobs.
    Response: The Proponent welcomes engagement with Somerville job training initiatives. Future tenants of the building will be the primary employers at the Project but the Proponent is willing to facilitate connection opportunities and anticipates a strong employee base within the Somerville community.

DESIGN REVIEW REPORT

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74 Middlesex Avenue Project
Design Review Report

The Project team presented to the Urban Design Commission on May 25, 2021 and June 8, 2021. The following provides a summary of the UDC's key recommendations, and a description of any changes to the proposed development made because of the feedback.

74 Middlesex Avenue – Building

- **Comment**: Applicant should further explore the bike room programming as an active use requirement.
    - **Response:** Since completing UDC review, the Proponent has worked with the City to process a request for plan revision and de minimus change to clarify the Project Site to include the Property at 74 Middlesex, and the abutting Kensington Avenue as well as on a portion of the parcel owned by the City of Somerville situated at 0 Middlesex Avenue (collectively, the "City Parcels"). The clarification to the Approved MPSP will allow for the use of the City Parcels and will grant easements therein by the City, which will revitalize the Middlesex Avenue Open Space and will combine with the area of Kensington Avenue situated between the Property and the Middlesex Avenue Open Space to create a new civic space (collectively, the "Kensington Neighborhood Park").
      Consistent with the Zoning Ordinance, the neighborhood park guidelines to not required adjacent buildings to provide active, ground level commercial uses to front the park.

      While there may no longer be an active use requirement, we continue to believe in the merits of having an animated façade along this portion of the building and are exploring including a sundries or beverage program, art installation and/or related seating to maximize the potential of this area of the building.

      During Neighborhood Meetings and community engagement there was consistent feedback in support of the bike room being positioned in a highly visible location rather than relegated to a back of house corridor as is frequently observed in commercial projects. We believe positioning the bike room along the Kensington Avenue building frontage and introducing vibrancy and activation through programming will encourage alternative commuting and help activate the Kensington Connector as a key pedestrian and bicycle gateway to the Assembly Square neighborhood.

- **Comment:** Reconsider building color (bronze); Needs further exploration into color palate and how to differentiate the building from other buildings in the skyline.
    - **Response:** We understand that the comment was made in an effort to encourage the color of 74 Middlesex to be distinct and different from the Encore Casino which is clad in gold reflective glazing. We continue to explore color, texture and pattern options which will achieve a natural look containing a subtle randomly variegated effect indicative of natural metals. We agree that we want to avoid overly polished and slick finishes that are used at the Encore Casino. We suggest that mock-ups be shared with the Commission at the appropriate time for review and comment.

- **Comment:** Moving forward, penthouse design needs to incorporate further depth of its return. Exaggerating the slope and angle will help accomplish the intent.
    - **Response:** Projections of the vertical shingling of the penthouse have been increased from 6″ to 10″.

- **Comment:** The Commission would like to see a future mockup of project before it goes in front of the Planning Board.
    - **Response:** Given the expecting timing of the Planning Board Meeting we suggest sharing metal panel mock-ups and wood samples with the Commission for review and comment.

UDC DESIGN RECOMMENDATIONS

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City of Somerville

URBAN DESIGN COMMISSION

City Hall 3rd Floor, 93 Highland Avenue, Somerville MA 02143

DESIGN REVIEW RECOMMENDATION

74 Middlesex Ave: Building

July 9, 2021

The Urban Design Commission (UDC) met virtually via GoToWebinar on May 25, 2021 and June 8, 2021 to review the **16-Story Lab Building** proposed at 74 Middlesex Ave in the High Rise zoning district of the Assembly Square Mixed-Use (ASMD) district and the Assembly Square neighborhood of Somerville. The purpose of design review, as established by the Somerville Zoning Ordinance, is for peers in the professional design community to provide advice and recommendations during the schematic design phase of the architectural design process. In accordance with the UDC's adopted Rules of Procedure and Section 15.1.4 Design Review of the Somerville Zoning Ordinance, this recommendation includes, at least, the following:

1. Identification of the preferred schematic design option
2. Identification if applicable design guidelines are satisfied
3. Guidance and recommended modifications to address any design issues or concerns

Design review was conducted over the course of two meetings and the Commission guided the Applicant through various recommendations and suggestions to the applicants preferred design concepts. Recommendations that were incorporated into the design through the review process included refining façade design option 2; further exploring the penthouse materiality; consider the idea of moving the bike room to a different location in the building base; and further examine the option to maintain a green buffer along Middlesex Ave streetscape.

Following a presentation of the revised design by the Applicant and review of the design guidelines for the HR district, the Commission provided the following final guidance and recommended modifications:

- Further exploration into the bike room programming as an active us requirement.
- Reconsider building color (bronze); Needs further exploration into color palate and how to differentiate the building from other buildings in the skyline.
- Moving forward, penthouse design needs to incorporate further depth of its return. Exaggerating the slope and angle will help accomplish the intent.
- Commission would like to see a future mockup of project before it goes in front of the Planning Board.

The Commission voted unanimously (3-0) to recommend preferred façade option (vertical fold), voted unanimously (3-0) for massing option 3, voted unanimously for preferred penthouse option (shingled), voted unanimously (3-0) for base option 3,

canopy option 3 and signage option 3, and voted (3-0) that all of the design guidelines for the HR district were satisfied, but to continue to explore bike room programing and building materiality and how it relates to the skyline.

Attest, by the voting membership: Frank Valdes
Debora Fennick
Andrew Arbaugh

Attest, by the meeting Co-Chairs: Sarah Lewis
Luisa Oliveria

Sarah Lewis,
UDC Co-Chair
Director of Planning &
Zoning

APPLICABLE DESIGN GUIDELINES:

HR – HIGH RISE DISTRICT			
LANGUAGE	**SATISFIED?**	**PRIORITY?**	**NOTES**
Facades should be visually divided into a series of architectural bays that are derived, in general, from the building's structural bay spacing.	YES (3-0)		
Piers, pilasters, or other features defining each architectural bay should either extend all the way to the ground or terminate at any horizontal articulation defining the base of the building.	YES (3-0)		
Architectural bays should align, in general, with individual or groups of storefronts and lobby entrances.	YES (3-0)		
Piers, pilasters, or other features defining each architectural bay should always project forward and be uninterrupted by any horizontal articulation, excluding any horizontal articulation used to differentiate the base of the building.	YES (3-0)		
Vents, exhausts, and other utility features on building facades should be architecturally integrated into the design of the building and should be located to minimize adverse effects on pedestrian comfort along sidewalks and within open spaces.	YES (3-0)		
Buildings at terminated vistas should be articulated with design features that function as focal points.	YES (3-0)		
Fenestration glazing should be inset from the plane of exterior wall surfaces.	YES (3-0)		
Ribbon windows should be avoided.	YES (3-0)		
Monotonous and repetitive storefront or lobby systems, awnings, canopies, sign types, colors, or designs should be avoided.	YES (3-0)		
Storefronts and lobby entrances should include awnings or canopies to provide weather protection for pedestrians and reduce glare for storefront display areas. Awnings should be open-ended and operable.	YES (3-0)		
Lobby entrances for upper story uses should be optimally located, well defined, clearly visible, and separate from the entrance for other ground story uses.	YES (3-0)		
Lobbies should be limited in both width and total area to preserve floor space and frontage for other ground story uses. Buildings should use any combination of facade articulation, a double-height ceiling, a distinctive doorway, a change in wall material, a change in paving material within the frontage area, or some other architectural element(s) to make lobbies visual and materially distinctive.	YES (3-0)		

HR – HIGH RISE DISTRICT			
LANGUAGE	**SATISFIED?**	**PRIORITY?**	**NOTES**
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.	YES (3-0)		
The type and color of materials should be kept to a minimum, preferably three (3) or fewer.	YES (3-0)		
Two (2) or more wall materials should be combined only one above the other, except for bay windows.	YES (3-0)		
Wall materials appearing heavier in weight should be used below wall materials appearing lighter in weight (wood and metal above brick, and all three above stone)	YES (3-0)		
Horizontal or vertical board siding or shingles, regardless of material, should be avoided.	YES (3-0)		
Architectural details and finish materials for the base of a building should be constructed of architectural concrete or pre-cast cementitious panels, natural or cast stone, heavy gauge metal panels, glazed or unglazed architectural terracotta, or brick.	YES (3-0)		
Exterior Insulation and Finish Systems (EIFS) should be avoided.	YES (3-0)		

Preferred Massing – Option 3

Preferred Façade Option – Vertical Fold (6/22/2021)

Preferred Building Base Options (5/25/2021)

Preferred Building Base Option

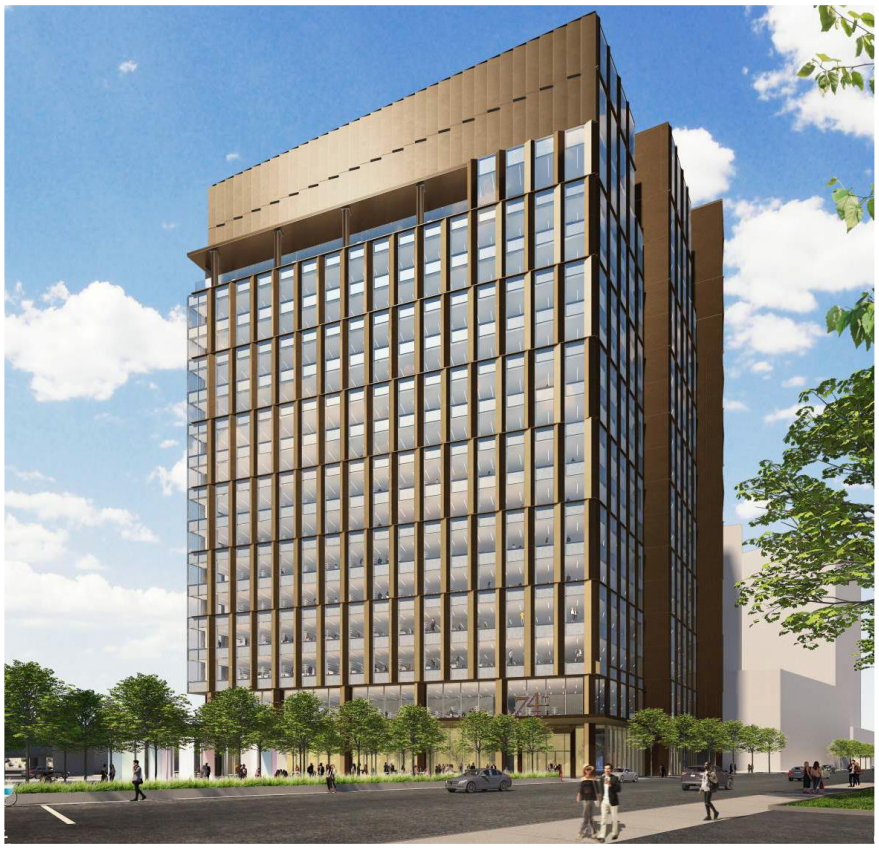
Preferred Canopy Option

Preferred Parking Signage Option

Preferred Storefront Signage Option

REMAING CONCERN
Bike Program

REMAING CONCERN
Building + Penthouse Materiality



APPENDIX C: Green Score

Contents

- Green Score Diagram and Supporting Plans

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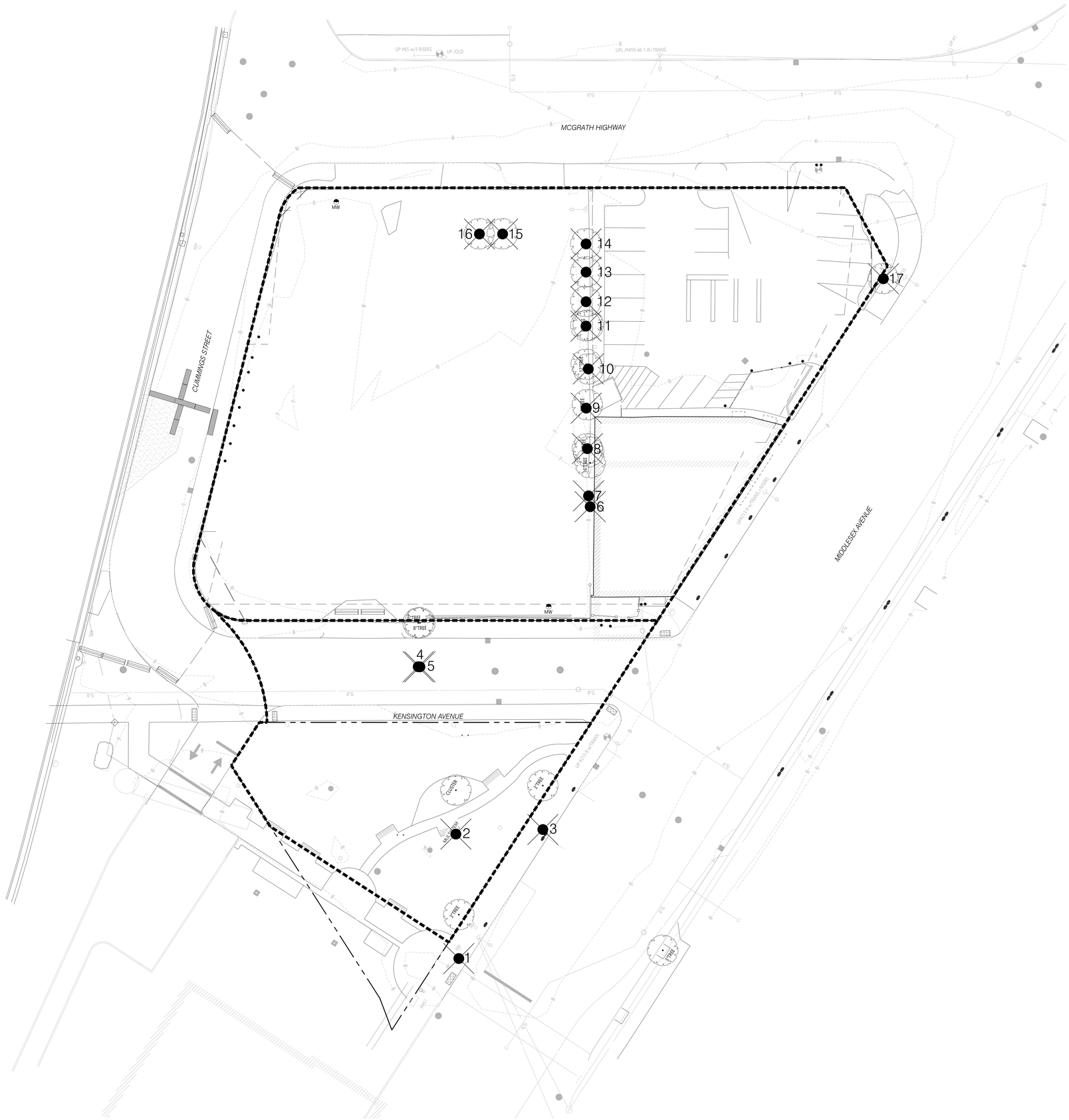


TREE REMOVAL PLAN LEGEND

REMOVE EXISTING TREE AND ROOT ZONE.
GRIND ROOT TO 3'-6" DEPTH

TREE REMOVAL PLAN NOTES

1. THOROUGHLY EXAMINE AND VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT.
2. PERFORM ALL TREE REMOVALS SO AS NOT TO DISTURB ANY EXISTING TREES TO REMAIN. IF EXISTING TREES ARE DAMAGED, CONTRACTOR TO REPLACE WITH TREE OF SAME SPECIES TO BE APPROVED BY THE LANDSCAPE ARCHITECT.

GENERAL VEGETATION CLEAN-UP & INVASIVE REMOVALS

1. REVIEW ALL AREAS OF THE SITE WITHIN PROPERTY LINE AND PROVIDE GENERAL CLEAN-UP OF EXISTING VEGETATION AND REMOVAL OF ALL DEAD PLANT MATERIAL & INVASIVE SPECIES.
2. CONTRACTOR TO ENGAGE LOCAL HORTICULTURISTS / BOTANIST AND AN ARBORIST TO REVIEW SITE AND PROVIDE REPORT FOR REMOVAL AND PRUNING PROTOCOL. REPORT TO BE PROVIDED TO LA AND OWNER FOR FINAL APPROVAL PRIOR TO PROCEEDING WITH WORK.
3. PENDING REPORT LA TO PROVIDE RECOMMENDATIONS TO CLIENT FOR LOW-MAINTENANCE PLANT MATERIAL FOR INDICATED LOCATIONS.
4. ROOTBALLS TO BE REMOVED WITH REMOVAL OF SHRUBS & PERENNIALS.

TREE REMOVAL SCHEDULE

TREES				
KEY	CALIPER	TREE SPECIES	COMMON NAME	CONDITION
1	3"	UNKNOWN	UNKNOWN	
2	3"	BETULA NIGRA	RIVER BIRCH	
3	3"	UNKNOWN	UNKNOWN	
4	6"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
5	8"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
6	16"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
7	12"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
8	8"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
9	12"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
10	8"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
11	TBD	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
12	12"	UNKNOWN	UNKNOWN	
13	16"	UNKNOWN	UNKNOWN	
14	12"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
15	14"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
16	8"	AILANTHUS ALTISSIMA	TREE OF HEAVEN	
17	6"	MALUS SPP	CRABAPPLE	

*TREE GRADES AND SPECIES CONFIRMATION PENDING ARBORIST REPORT

ELKUS | MANFREDI
ARCHITECTS

[address] 25 DRYDOCK AVENUE
BOSTON MASSACHUSETTS 02210
[tel] 617.426.1300

74 Middlesex

74 Middlesex Ave
Somerville, MA 02145

Client
Greystar
One Federal Street, Suite 1804
Boston / MA / 02110

Geotechnical Engineer
Haley Aldrich
70 Blanchard Rd #204
Burlington / MA / 01803

Civil Engineer
VHB
99 High Street, 10th Floor
Boston / MA / 02110

Landscape Architect
Mikyoung Kim Design
119 Braintree St #103
Boston / MA / 02134

Structural Engineer
McNamara/Salvia
101 Federal Street
Boston / MA / 02110

MEP Engineer
BR+A
10 Guest Street, 4th Floor
Boston / MA / 02135

Code Consultant
Jensen Hughes
1661 Worcester Road, Suite 501
New Haven / CT / 01701

LEED / Environmental Consultant
Atelier Ten
45 East 20th Street
New York/ NY / 10003

Building Envelope Consultant
Heintges
440 Park Avenue South, 15th Floor
New York, NY 10016

Elevator Consultant
VDA
101 Summer Street, 4th Floor
Boston / MA / 02110

Parking Consultant
DESMAN, Inc.
18 Tremont Street #300
Boston / MA / 02108

Lighting Consultant
Lam Partners
84 Sherman Street
Cambridge / MA / 02140

Wind Analysis
RWDI
85 Broad Street, 16th Floor
New York / NY / 10004

Specifications
Kalin Associates
1121 Washington Street #2
West Newton / MA / 02465

Facade Maintenance
Entek Engineering
166 Ames Street
Hackensack / NJ / 07601

Signage
Roll Barresi & Associates
48 Dunster Street
Cambridge / MA / 02138

SITE PLAN APPROVAL

MIKYOUNG KIM
MASSACHUSETTS
NO. LA 1397
REGISTERED LANDSCAPE ARCHITECT

PROJECT NUMBER:

DATE:

REVISIONS:

SEE PREVIOUS ISSUES FOR REVISIONS NOT LISTED HERE

SCALE: 1/16" = 1'-0"

DRAWING NAME:

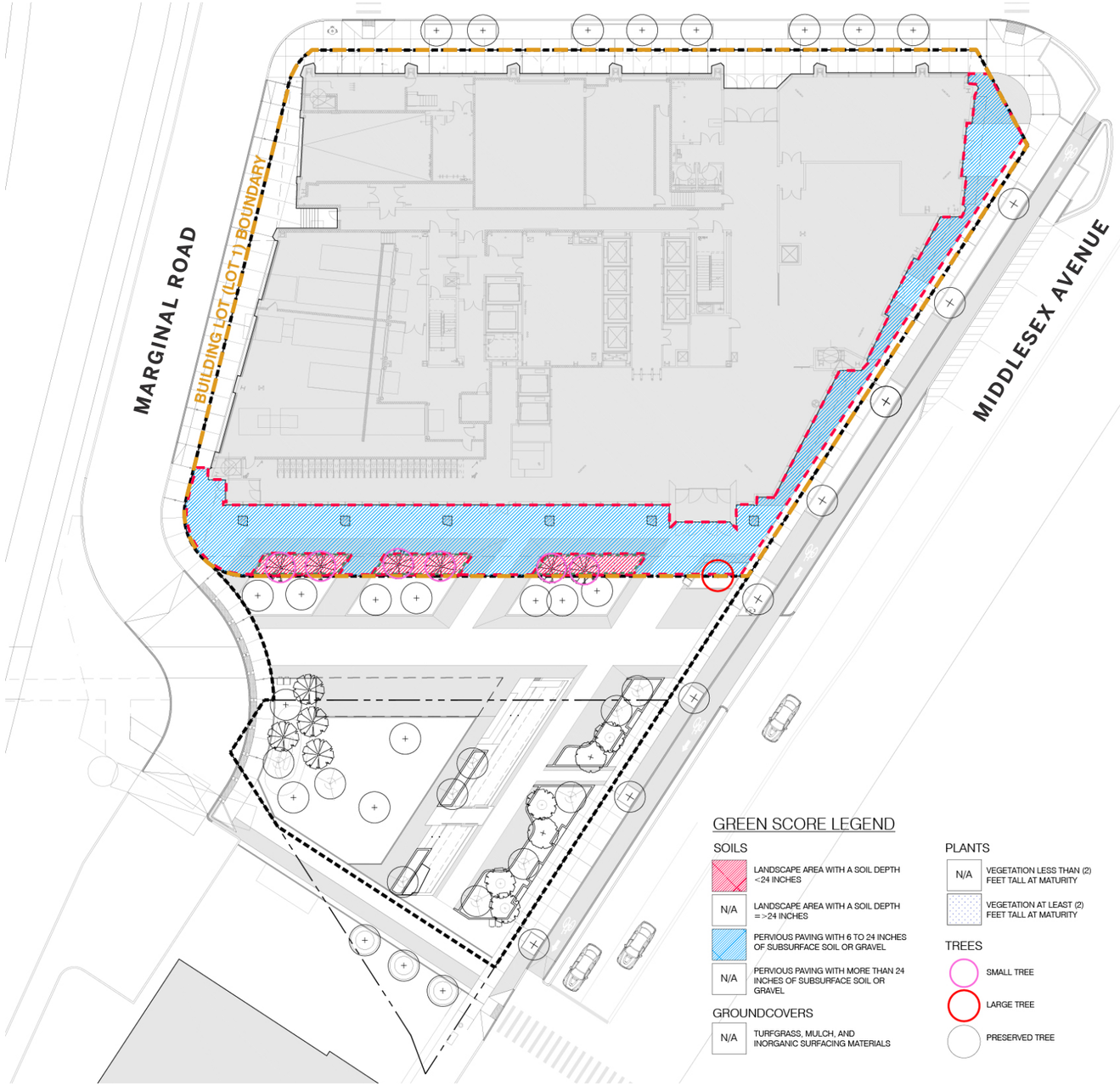
EXISTING TREE PLAN

Ref. North

DRAWING NUMBER:

GS.1

NOT FOR CONSTRUCTION



Somerville Green Score

DIRECTIONS:

1. Enter the Lot Area in square feet to the right >>>
2. Enter the area in square feet or the number of landscape elements

Area or Number: 36,932

	Area or Number	Sq Ft Credit	Multiplier	Weighted Area	Score Value	% of Score
Soils						
Landscaped area with a soil depth less than 24 inches *(enter square feet)*	655	actual sq ft	**0.3**	196.5	**0.005**	3%
Landscaped area with a soil depth equal to or greater than 24 inches *(enter square feet)*		actual sq ft	**0.6**	0	**0.000**	0%
Bonus score: Publicly Visible Landscape	655	actual sq ft	**0.1**	65.5	**0.002**	1%
Pervious Paving with 6 to 24 inches of subsurface soil or gravel *(enter square feet)*	4,570	actual sq ft	**0.2**	914	**0.025**	12%
Pervious Paving with more than 24 inches of subsurface soil or gravel *(enter square feet)*		actual sq ft	**0.5**	0	**0.000**	0%
Bonus score: Publicly Visible Landscape	4,570	actual sq ft	**0.1**	457	**0.012**	6%
Groundcovers						
Turf grass, mulch, and inorganic surfacing materials *(enter square feet)*		actual sq ft	**0.1**	0	**0.000**	0%
Plants						
Vegetation less than two (2) feet tall at maturity *(enter square feet)*	655	actual sq ft	**0.2**	131	**0.004**	2%
Bonus score: Publicly Visible Landscape	655	actual sq ft	**0.1**	65.5	**0.002**	1%
Bonus score: Native Species	655	actual sq ft	**0.1**	65.5	**0.002**	1%
Vegetation at least two (2) feet tall at maturity *(enter number of individual plants)*	22	12	**0.3**	79.2	**0.002**	1%
Bonus score: Publicly Visible Landscape	22	12	**0.1**	26.4	**0.001**	0%
Bonus score: Native Species	22	12	**0.1**	26.4	**0.001**	0%
Trees						
Small Tree *(enter number of trees)*	5	50	**0.6**	150	**0.004**	2%
Bonus score: Publicly Visible Landscape	5	50	**0.1**	25	**0.001**	0%
Bonus score: Native Species	5	50	**0.1**	25	**0.001**	
Bonus score: High Value Species	5	50	**0.1**	25	**0.001**	0%
Large Tree *(enter number of trees)*	1	450	**0.6**	270	**0.007**	4%
Bonus score: Publicly Visible Landscape	1	450	**0.1**	45	**0.001**	1%
Bonus score: High Value Species	1	450	**0.1**	45	**0.001**	1%
Preserved Tree *(enter DBH)*		65	**0.8**	0	**0.000**	0%
Engineered Landscape						
Vegetated Wall *(enter square feet)*		actual sq ft	**0.1**	0	**0.000**	0%
Rain gardens, bioswales, and stormwater planters *(enter square feet)*		actual sq ft	**1.0**	0	**0.000**	0%
Green Roof with up to 6" of growth medium *(enter square feet)*		actual sq ft	**0.1**	0	**0.000**	0%
Green Roof with 6"-10" of growth medium *(enter square feet)*	2,678	actual sq ft	**0.4**	1071.2	**0.029**	15%
Green Roof of 10"-24" growth medium *(enter square feet)*	6,173	actual sq ft	**0.6**	3703.8	**0.100**	50%
Green Roof of over 24" growth medium	N/A	Calculate as if soils, groundcovers, plants, and trees				N/A

Green Score = 0.200

Green Score District Requirements				
	NR & UR	**MR3 & MR4**	**MR5, MR6, & HR**	**FAB, CC, CB, CI**
Required Score:	0.35	0.25	0.20	0.20
Target Score:	0.40	0.3	0.25	-
Actual Green Score:	0.200	0.200	0.200	0.200

GREEN SCORE LEGEND

SOILS
- LANDSCAPE AREA WITH A SOIL DEPTH <24 INCHES
- N/A — LANDSCAPE AREA WITH A SOIL DEPTH = >24 INCHES
- PERVIOUS PAVING WITH 6 TO 24 INCHES OF SUBSURFACE SOIL OR GRAVEL
- N/A — PERVIOUS PAVING WITH MORE THAN 24 INCHES OF SUBSURFACE SOIL OR GRAVEL

GROUNDCOVERS
- N/A — TURFGRASS, MULCH, AND INORGANIC SURFACING MATERIALS

PLANTS
- N/A — VEGETATION LESS THAN (2) FEET TALL AT MATURITY
- VEGETATION AT LEAST (2) FEET TALL AT MATURITY

TREES
- SMALL TREE
- LARGE TREE
- PRESERVED TREE

ENGINEERED LANDSCAPE
- N/A — VEGETATED WALL
- N/A — RAIN GARDEN, BIOSWALE, AND STORMWATER PLANTERS
- GREEN ROOF WITH UP TO 6" OF GROWTH MEDIUM
- N/A — GREEN ROOF WITH 6"-10" OF GROWTH MEDIUM
- GREEN ROOF WITH 10"-24" OF GROWTH MEDIUM
- N/A — GREEN ROOF WITH OVER 24" OF GROWTH MEDIUM

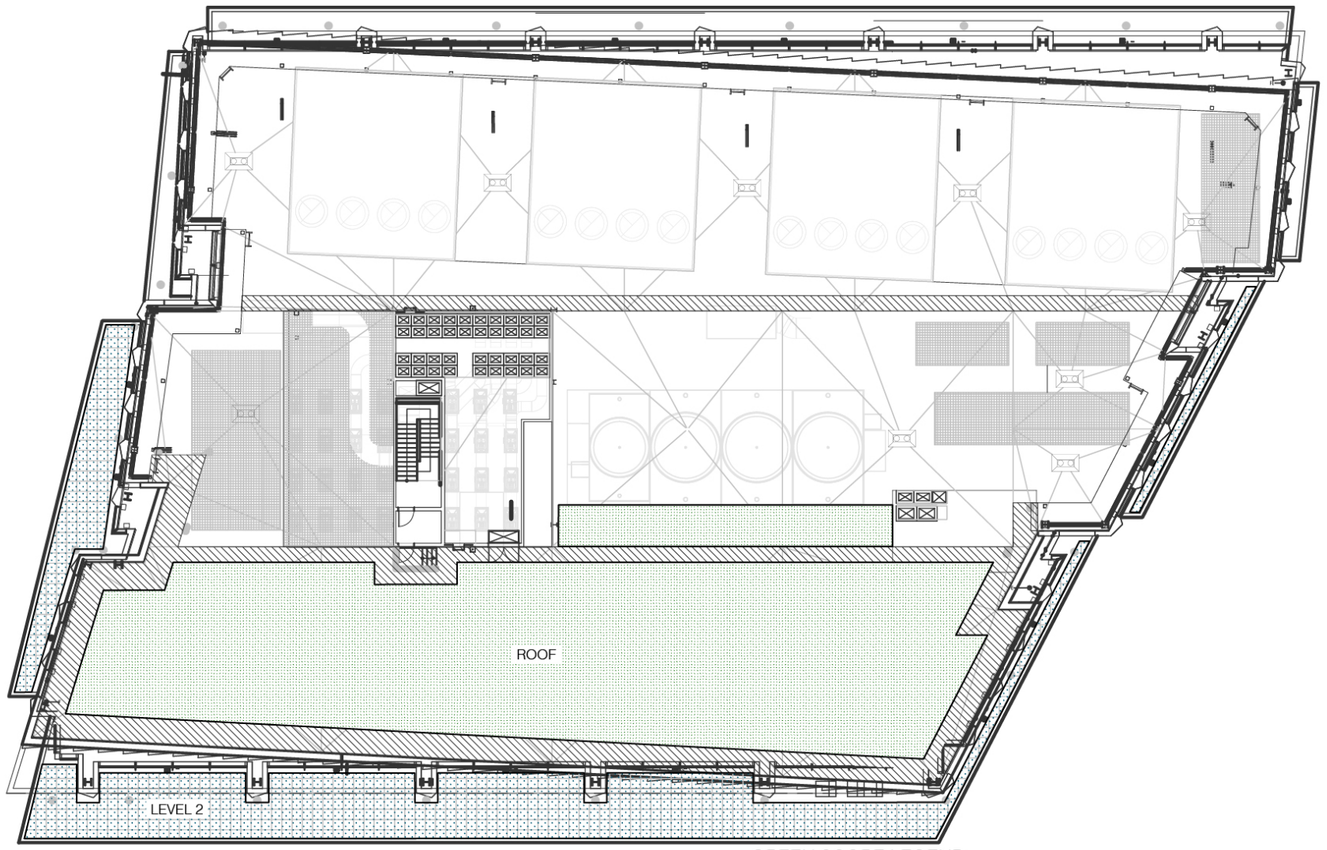
BONUS CREDIT
- PUBLICLY VISIBLE LANDSCAPE
- NATIVE SPECIES (>75% NATIVE PROPOSED)
- N/A — HIGH VALUE SPECIES
- N/A — 50% OF IRRIGATION IS HARVESTED RAINWATER
- N/A — FOOD CULTIVATION
- N/A — DE-PAVED LOT AREA

Source: Mikyoung Kim Design

mikyoung kim design

Figure GS.2a
Green Scorecard

74 Middlesex Avenue
Somerville, Massachusetts



GREEN SCORE LEGEND

SOILS

- LANDSCAPE AREA WITH A SOIL DEPTH <24 INCHES
- LANDSCAPE AREA WITH A SOIL DEPTH =>24 INCHES
- PERVIOUS PAVING WITH 6 TO 24 INCHES OF SUBSURFACE SOIL OR GRAVEL
- N/A — PERVIOUS PAVING WITH MORE THAN 24 INCHES OF SUBSURFACE SOIL OR GRAVEL

GROUNDCOVERS

- N/A — TURFGRASS, MULCH, AND INORGANIC SURFACING MATERIALS

PLANTS

- VEGETATION LESS THAN (2) FEET TALL AT MATURITY
- VEGETATION AT LEAST (2) FEET TALL AT MATURITY

TREES

- SMALL TREE
- LARGE TREE
- PRESERVED TREE

ENGINEERED LANDSCAPE

- N/A — VEGETATED WALL
- N/A — RAIN GARDEN, BIOSWALE, AND STORMWATER PLANTERS
- N/A — GREEN ROOF WITH UP TO 6" OF GROWTH MEDIUM
- GREEN ROOF WITH 6"-10" OF GROWTH MEDIUM
- GREEN ROOF WITH 10"-24" OF GROWTH MEDIUM
- N/A — GREEN ROOF WITH OVER 24" OF GROWTH MEDIUM

BONUS CREDIT

- PUBLICLY VISIBLE LANDSCAPE
- N/A — NATIVE SPECIES (100% NATIVE PRPOSED)
- N/A — HIGH VALUE SPECIES
- N/A — 50% OF IRRIGATION IS HARVESTED RAINWATER
- N/A — FOOD CULTIVATION
- N/A — DE-PAVED LOT AREA

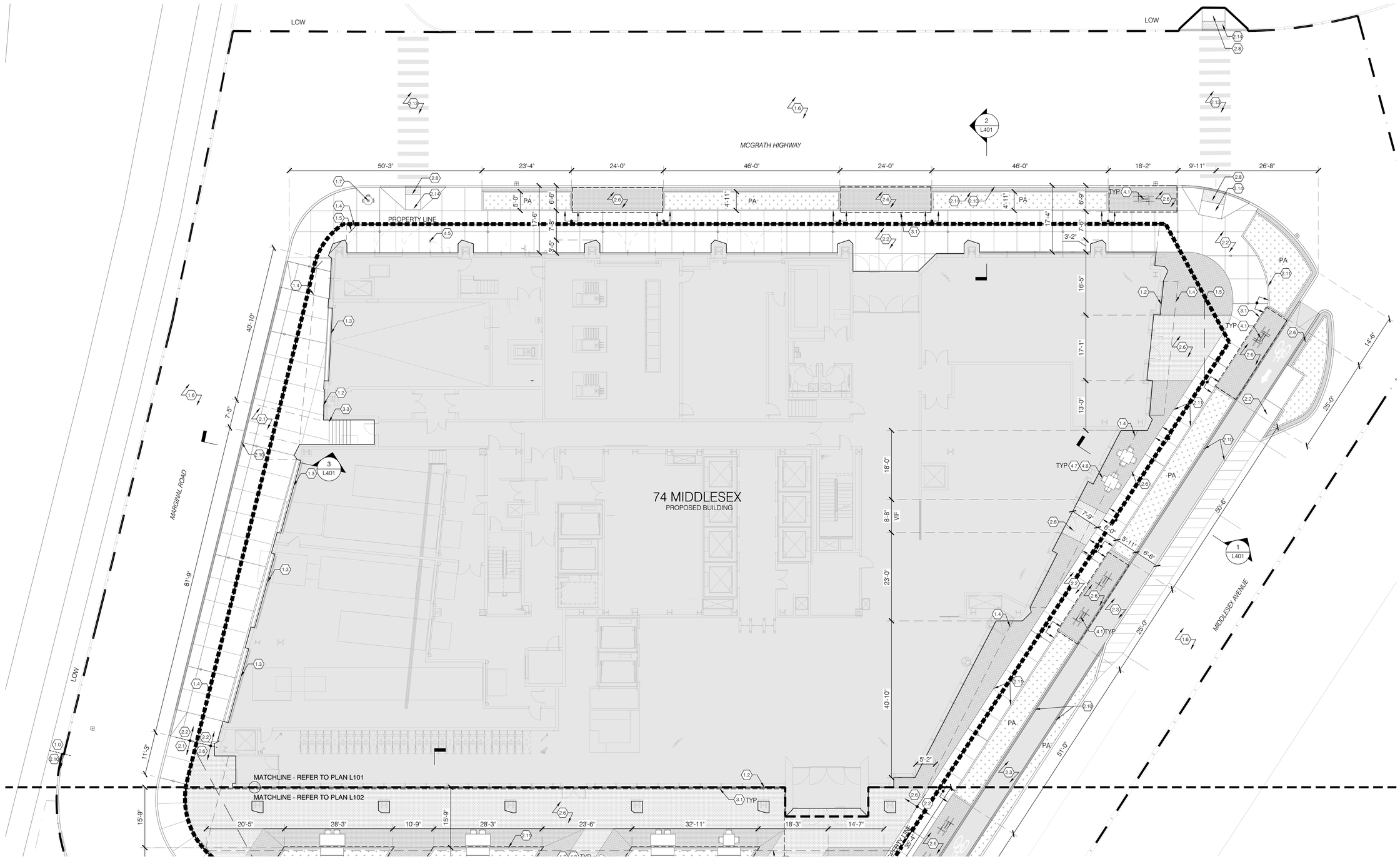
Source: Mikyoung Kim Design

mikyoung kim design

Figure GS.2b

Green Scorecard

74 Middlesex Avenue
Somerville, Massachusetts



LAYOUT AND MATERIALS PLAN KEY

1.0 EXISTING AND PROPOSED CONDITIONS

1.0	EXISTING CURB TO REMAIN AND BE PROTECTED	REFER TO CIVIL
1.1	EXISTING PAVING TO REMAIN AND BE PROTECTED	--
1.2	PROPOSED BUILDING BE PROTECTED	REFER TO ARCH
1.3	PROPOSED LOADING ENTRANCE	REFER TO CIVIL/ARCH
1.4	PROPOSED CANOPY, ABOVE	REFER TO ARCH
1.5	PROPOSED PARKING GARAGE, BELOW	REFER TO ARCH
1.6	PROPOSED PAVING IMPROVEMENTS	REFER TO CIVIL
1.7	PROPOSED UTILITY	REFER TO CIVIL

2.0 PAVEMENT, RAMPS, AND CURBS

2.1	PAVEMENT TYPE 1 - VEHICULAR	1/L520
2.2	PAVEMENT TYPE 2 - STANDARD	2/L520
2.3	PAVEMENT TYPE 3 - CYCLE TRACK	REFER TO CIVIL
2.4	PAVER TYPE 1 - CONCRETE (V)	4/L520

2.0 PAVEMENT, RAMPS, AND CURBS, CONT.

2.5	NOT USED	
2.6	PAVER TYPE 2 - PERMEABLE	5/L520
2.7	NOT USED	
2.8	PAVER TYPE 3 - DETECTABLE TILE	6/L520
2.9	PAVER TYPE 4 - STONE PAVER	6/L520
2.10	CURB TYPE 1 - VEHICULAR	1/L521
	RAISED CURB	
	TRANSITION / VARIABLE CURB REVEAL	
	FLUSH CURB	
2.11	CURB TYPE 2 - PLANTBED	2/L521
	RAISED CURB	
	FLUSH CURB	
2.12	DRIVE APRON	REFER TO CIVIL
2.13	PAVEMENT MARKINGS	REFER TO CIVIL
2.14	CURB RAMP	REFER TO CIVIL
2.15	DECK TYPE 1	1/L560

3.0 SITE ELEMENTS

3.1	EXTENT OF SILVA CELLS BELOW	3/L521
3.2	WALL TYPE 1	3/L530
3.3	STAIR AND RAILING TYPE 1	REFER TO ARCH
3.4	STEEL PLANTER EDGING	3/L511
3.5	CANOPY TYPE 1	1/L550
3.6	WATER FEATURE TYPE 1	1/L560

4.0 SITE FURNISHINGS

4.1	BIKE RACK TYPE 1	2/L540
4.2	NOT USED	
4.3	TRASH RECEPTACLE	6/L540
4.4	BOLLARD TYPE 1 - RETRACTABLE	4/L540
4.5	BOLLARD TYPE 2 - FIXED	5/L540
4.6	WATER FOUNTAIN	3/L540
4.7	TABLE TYPE 1	1/L540

4.0 SITE FURNISHINGS, CONT.

4.8	CHAIR TYPE 1	1/L540
4.9	TABLE TYPE 2	1/L540
4.10	CHAIR TYPE 2	1/L540
4.11	TABLE TYPE 3	1/L540
4.12	CHAIR TYPE 3	1/L540
4.13	BENCH TYPE 1	
	(A) FREESTANDING	4/L541
	(B) CONTINUOUS	1&2/L530
4.14	NOT USED	
4.15	BENCH TYPE 2	1/L540
4.16	NOT USED	
4.17	NOT USED	
4.18	BIKE STATION	--
4.19	CHAIR TYPE 4 - LOUNGE	1/L540
4.20	CHAIR TYPE 5 - KIDS LOUNGE	1/L540

5.0 DRAINAGE

REFER TO GRADING PLANS L201-L202

6.0 PLANTING

REFER TO PLANTING PLANS L301-L302

LAYOUT AND MATERIAL PLAN NOTES

1. REFER TO SHEET L000 FOR GENERAL LAYOUT AND MATERIALS NOTES

LAYOUT AND MATERIAL KEY NOTES

(1) REMOVE EXISTING CONCRETE PLAZA, SAW CUT AND REMOVE TO NEAREST CONTROL JOINT. EXCAVATE TO FULL 4'-2" DEPTH AND PROVIDE PLANTING SOIL PER DETAIL 2/L510. PROVIDE SAW CUT CONTROL JOINTS TO MATCH EXISTING PLAZA SCORING.

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SITE PLAN APPROVAL

PROJECT NUMBER:

DATE:

REVISIONS:

SEE PREVIOUS ISSUES FOR REVISIONS NOT LISTED HERE

SCALE: 1"=10'

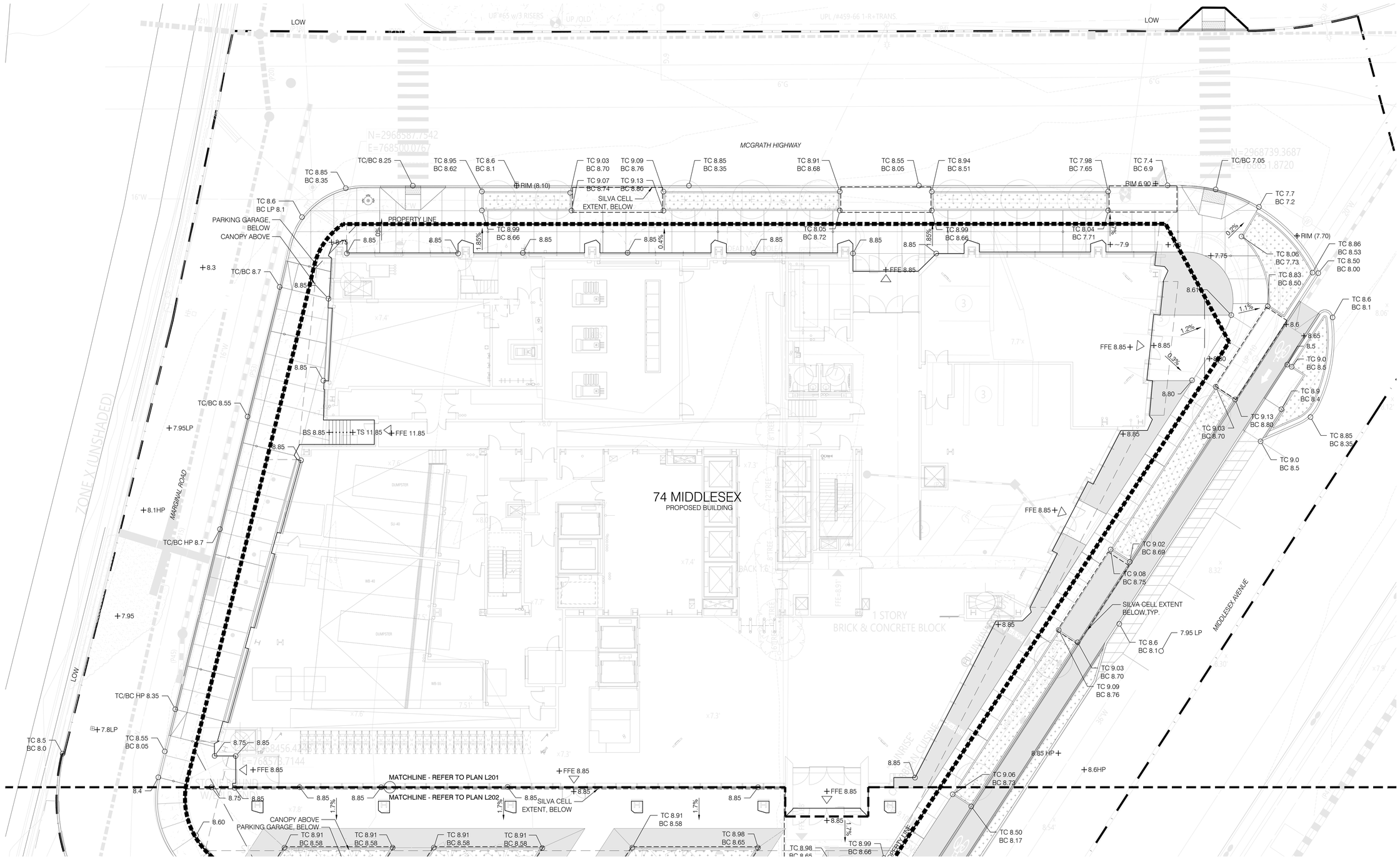
DRAWING NAME:

LAYOUT AND MATERIALS PLAN

Ref. North

DRAWING NUMBER:

GS.3



GRADING PLAN LEGEND

XXX	EXISTING CONTOUR
XXX	PROPOSED CONTOUR
(XX.XX)	EXISTING SPOT ELEVATION (VIF.)
[XX.XX]	PROPOSED SPOT ELEVATION
+HP	HIGH POINT ELEVATION
+LP	LOW POINT ELEVATION
X.XX	RATIO OF DOWN SLOPE (HOIZ:VERT)
0.00	DIRECTION/ PERCENTAGE OF DOWN SLOPE
	GRADE BREAK
BT	BOTTOM OF TRENCH ELEVATON

GRADING PLAN KEY

1.0 EXISTING/ PROPOSED SITE CONDITIONS BY OTHERS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

2.0 SURFACES, EDGING, AND CURBS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

3.0 SITE ELEMENTS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

4.0 SITE FURNISHINGS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

5.0 DRAINAGE

5.1	DRAIN TYPE 1 - AREA	REFER TO CIVIL
5.2	DRAIN TYPE 2 - TRENCH	REFER TO CIVIL
5.3	DRAIN TYPE 3 - OVERFLOW	REFER TO CIVIL
5.4	DRAIN TYPE 4 - DRAIN TILE	9/L510

GRADING PLAN NOTES

1. REFER TO SHEET L000 FOR GENERAL GRADING NOTES.
2. CROSS SLOPES AT ALL PAVED SURFACES SHALL NOT EXCEED 1.8%. LONGITUDINAL SLOPES SHALL NOT EXCEED 4.8%.
3. REFER TO CIVIL FOR ALL STREET CURB, BIKE LANE AND STREET GRADES. ADVISE ASAP OF ANY DISCREPANCIES.

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SITE PLAN APPROVAL

PROJECT NUMBER:

DATE:

REVISIONS:

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SCALE: 1"=10'

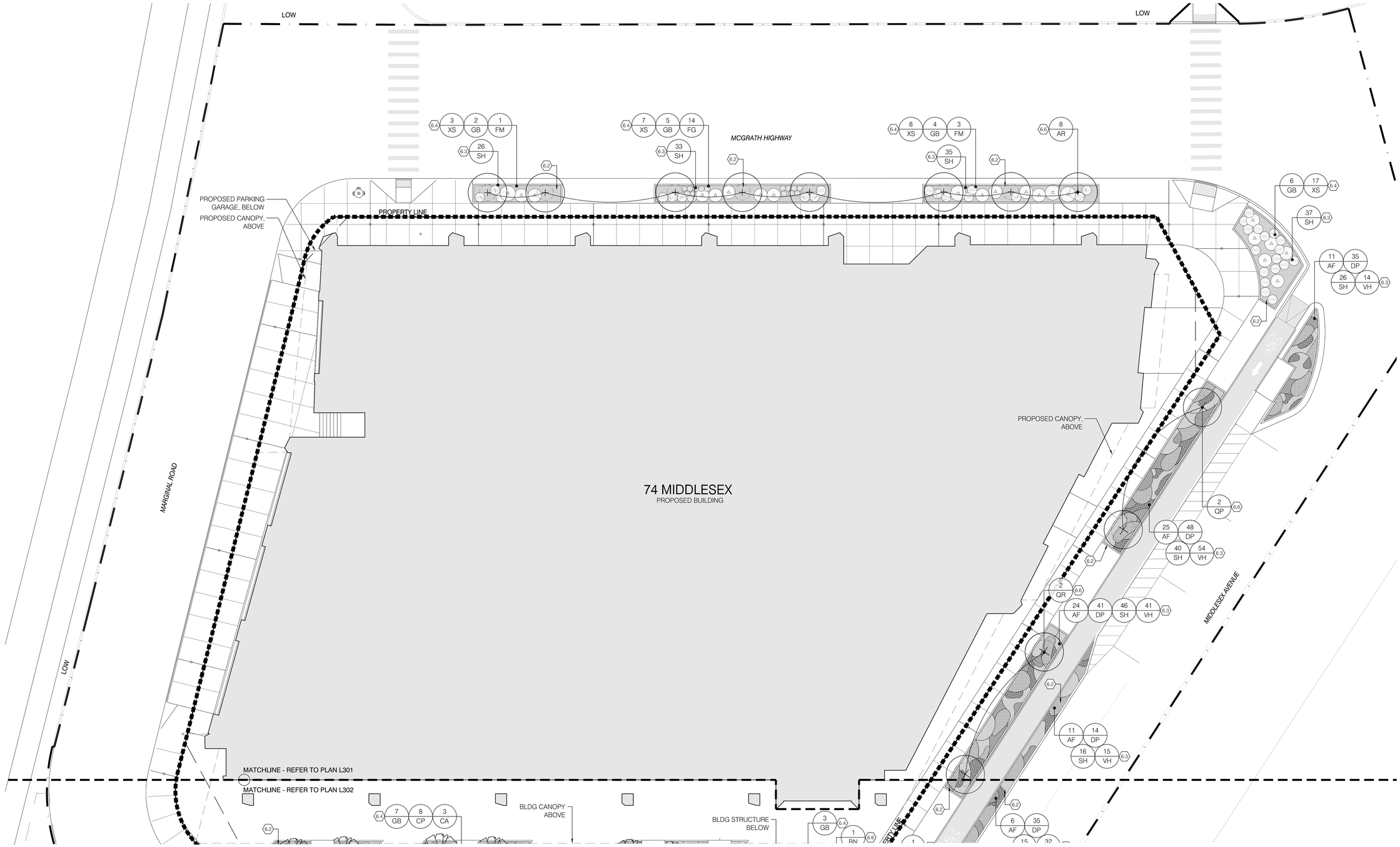
DRAWING NAME:

GRADING PLAN

Ref. North

DRAWING NUMBER:

GS.4



PLANTING PLAN KEY

1.0 EXISTING PROPOSED CONDITIONS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

2.0 SURFACES, EDGING, AND CURBS

REFER TO LAYOUT AND MATERIALS PLAN L101

3.0 SITE ELEMENTS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

4.0 SITE FURNISHINGS

REFER TO LAYOUT AND MATERIALS PLAN L101-L103

5.0 DRAINAGE

REFER TO GRADING PLANS L201-L203

6.0 PLANTING

6.1	SOIL PROFILE 1 - LAWN	1/L510
6.2	SOIL PROFILE 2 - PLANT BED	2/L510
6.3	PERENNIAL PLANTING	5/L510

6.0 PLANTING (CONTINUED)

6.4	SHRUB PLANTING	6/L510
6.5	LANDSCAPE EDGING	7/L510
6.6	TREE TYPE 1 - AT PLANT BED	1/L511
6.7	TREE TYPE 2 - AT LAWN	2/L511
6.8	TREE TYPE 3 - STREETSCAPE	3/L511

PLANTING PLAN NOTES

1. REFER TO SHEET L000 FOR ADDITIONAL PLANTING NOTES.
2. PLANT QUANTITIES LISTED IN PLANTING SCHEDULE INDICATE COMBINED TOTAL FOR ALL PLANTING AREAS.
3. REFER TO SPECIFICATIONS FOR SOIL MIX AND SOIL PREPARATION INSTRUCTIONS.
6. ANY ALTERNATE PLANTS SHALL BE SUBMITTED FOR APPROVAL BY LA.
7. ALL PLANTING AREAS TO CONTAIN IRRIGATION. REFER TO IRRIGATION DRAWINGS FOR DESIGN AND INSTALLATION.

PLANT SCHEDULE - AREA 1

KEY	PLANT TYPE	COMMON NAME	QTY	ROOT	SIZE	NOTES
TREES						
AR	*Acer rubrum 'Bowhall'*	RED MAPLE	8	B+B	3" CAL	MULTI-STEM
QP	*Quercus palustris*	PIN OAK	2	B+B	3" CAL	
QR	*Quercus rubra*	RED OAK	2	B+B	3" CAL	
SHRUBS						
CA	*Clethra alnifolia*	SWEET PEPPERBUSH	6	POT	#7	
FG	*Fothergilla gardenii*	DWARF FOTHERGILLA	26	POT	2'-0" H	
FM	*Fothergilla 'Mount Airy'*	FOTHERGILLA	13	POT	2'-0" H	
GB	*Gaylussacia baccata*	BLACK HUCKLEBERRY	17	POT	#7	
XS	*Xanthorhiza simplicissima*	YELLOWROOT	63	POT	#5	

KEY	PLANT TYPE	COMMON NAME	QTY	ROOT	SIZE	NOTES
PERENNIALS/ GROUNDCOVER						
AF	*Agastache 'Black Adder'*	ANISE HYSSOP	71	POT	#1	PLANT 18" OC
CS	*50% Carex appalachica 50% Carex pennsylvanica*	SEDGE SPP	72	POT	#1	PLANT 10" OC
DP	*Dalea purpurea*	PURPLE PRAIRIE CLOVER	138	POT	#1	PLANT 12" OC
EL	*Erigeron pulchellus 'Lynnhaven Carpet'*	ROBIN'S PLANTAIN	166	POT	#1	PLANT 10" OC
SH	*50% Sporobolus heterolepis 25% Descampsia flexuosa 25% Descampsia cespitosa*	NATIVE GRASS SPP	365	POT	#1	PLANT 18" OC
VH	*Verbena hastata f. rosea 'Pink Spires'*	VERBENA	124	POT	#1	PLANT 12" OC

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SITE PLAN APPROVAL

COMMONWEALTH OF MASSACHUSETTS — MIKYOUNG KIM — NO. LA 1787 — REGISTERED LANDSCAPE ARCHITECT

PROJECT NUMBER:

DATE:

REVISIONS:

SEE PREVIOUS ISSUES FOR REVISIONS NOT LISTED HERE

SCALE: 1"= 10'

DRAWING NAME:

PLANTING PLAN

Ref. North

DRAWING NUMBER:

GS.5

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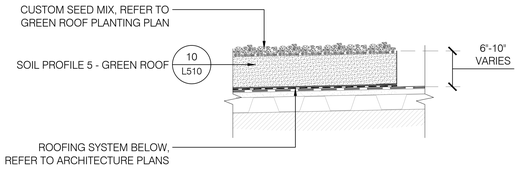
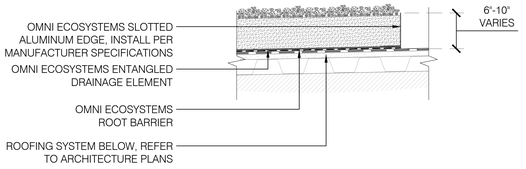
SITE PLAN APPROVAL

NOTE :

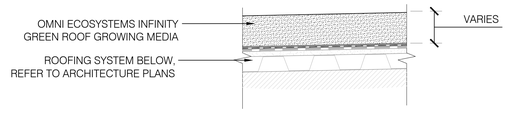
1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.



12 SEED MIX PLANTING — SECTION
1" = 1'-0"



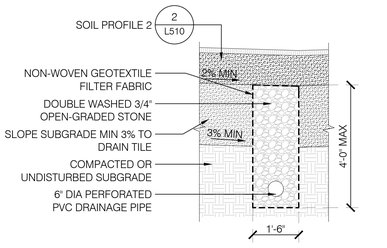
11 GREEN ROOF SYSTEM TYPE 1 — SECTION
1" = 1'-0"



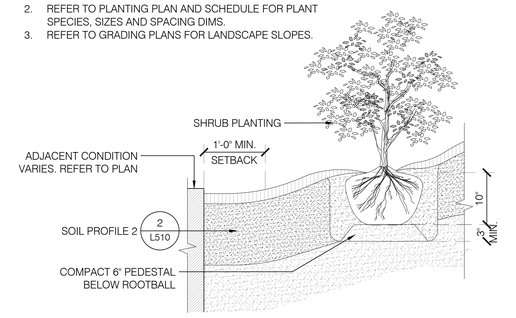
10 SOIL PROFILE 5 - GREEN ROOF — SECTION
1" = 1'-0"

NOTE :

1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.
2. REFER TO PLANTING PLAN AND SCHEDULE FOR PLANT SPECIES, SIZES AND SPACING DIMS.
3. REFER TO GRADING PLANS FOR LANDSCAPE SLOPES.



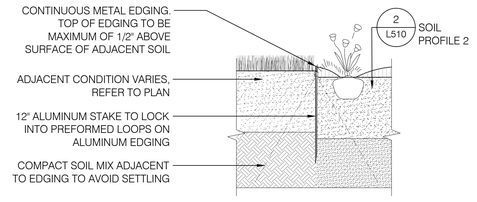
9 DRAIN TILE — SECTION
1/2" = 1'-0"



8 SLOPED PLANTBED — SECTION
1" = 1'-0"

NOTE :

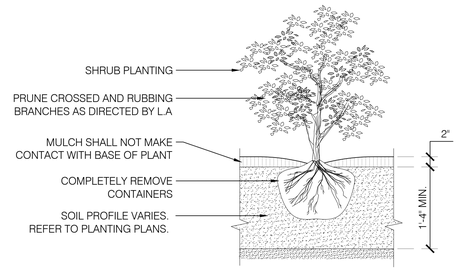
1. REFER TO PLANTING PLANS FOR LOCATION OF LANDSCAPE EDGING.
2. REFER TO GRADING PLANS FOR FINISH GRADE ELEVATIONS.
3. TOP OF EDGING TO BE A 1/4 INCH ABOVE SURFACE MATERIAL.
4. ADJUST STAKE TO 18 INCH OR 24 INCH IF NEEDED.



7 LANDSCAPE EDGING — SECTION
1" = 1'-0"

NOTE :

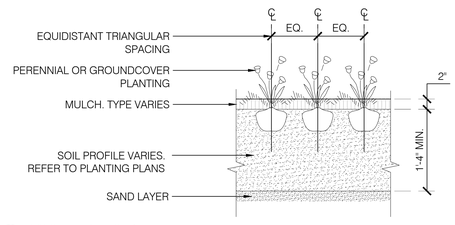
1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.
2. REFER TO PLANTING PLAN AND SCHEDULE FOR SPECIES, SIZE AND SPACING DIMS.
3. PROVIDE 1'-4" MIN SOIL DEPTH AT SHRUBS.



6 SHRUB PLANTING — SECTION
1" = 1'-0"

NOTE :

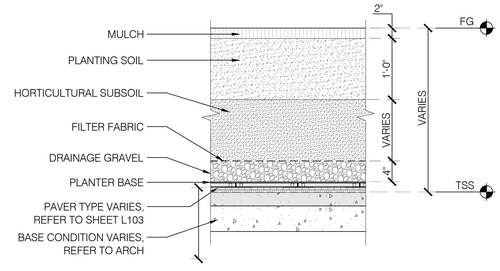
1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.
2. REFER TO PLANTING PLAN AND SCHEDULE FOR SPECIES, SIZE AND SPACING DIMS.
3. ROOTS OF CONTAINER PLANTS SHALL BE LOOSENED PRIOR TO PLACEMENT IN SOIL.



5 PERENNIAL PLANTING — SECTION
1" = 1'-0"

NOTE :

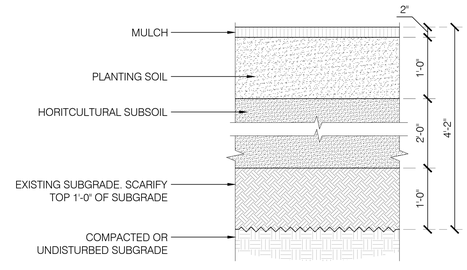
1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES AND GRAVEL SIZES.
2. REFER TO GRADING PLANS FOR FINISH GRADE ELEVATIONS.
3. PROVIDE FULL DEPTH 'PLANTING SOIL' WHEN SOIL PROFILE <1'-6".



4 SOIL PROFILE 4 - PLANTER — SECTION
1" = 1'-0"

NOTE :

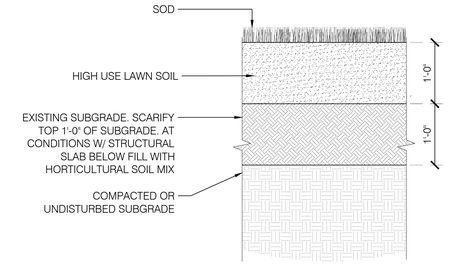
1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.
2. REFER TO GRADING PLANS FOR FINISH GRADE ELEVATIONS.
3. PLANTING SOIL SHALL BE COMPACTED TO 85% PROCTOR WITH A FLUSH CONDITION ADJACENT TO CONCRETE. SOIL SETTLEMENT IS NOT ACCEPTABLE.
4. PROVIDE FULL DEPTH 'PLANTING SOIL' WHEN SOIL PROFILE <1'-6"



2 SOIL PROFILE 2 - PLANTBED — SECTION
1" = 1'-0"

NOTE :

1. REFER TO SPECIFICATION FOR PLANTING SOIL MIXES.
2. REFER TO GRADING PLANS FOR FINISH GRADE ELEVATIONS.



1 SOIL PROFILE 1 - LAWN — SECTION
1" = 1'-0"

PROJECT NUMBER:

DATE:

REVISIONS:

SEE PREVIOUS ISSUES FOR REVISIONS NOT LISTED HERE

SCALE: AS NOTED

DRAWING NAME:

PLANTING DETAILS

Ref. North

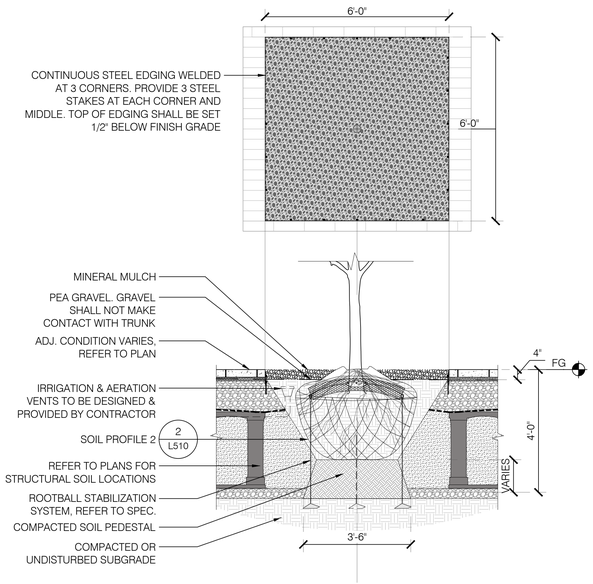
DRAWING NUMBER:

GS.6

NOT FOR CONSTRUCTION

NOTE :

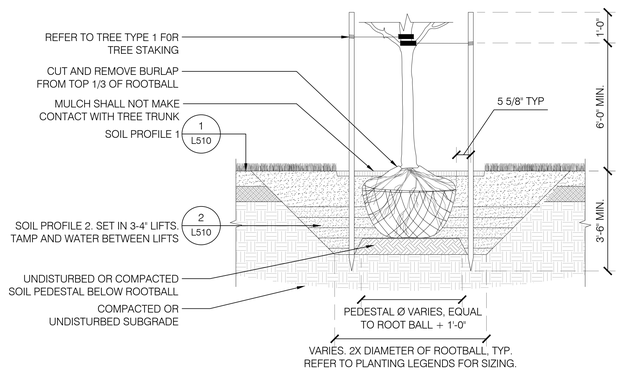
1. PEDESTAL HEIGHT SHALL ACCOMMODATE ROOT BALL SET 4" BELOW FINISH GRADE. REFER TO PLANTING SCHEDULE FOR TREE SIZING.



3 TREE TYPE 3 - AT STREETSCAPE SECTION
1/2" = 1'-0"

NOTE :

1. PEDESTAL HEIGHT SHALL ACCOMMODATE ROOT BALL SET FLUSH TO FINISH GRADE. REFER TO PLANTING SCHEDULE FOR TREE SIZING.

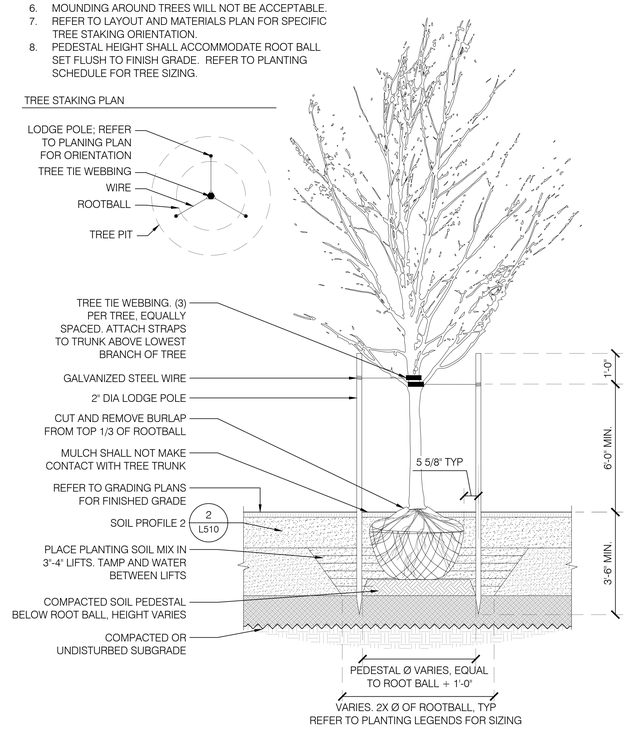


2 TREE TYPE 2 - LAWN SECTION
1/2" = 1'-0"

NOTE :

1. ORIENT TREE TO HAVE SIMILAR SOLAR ASPECT AS NURSERY OR AS DIRECTED BY LANDSCAPE ARCHITECT. TAGS ARE TO BE PLACED ON THE NORTH SIDE AT NURSERY.
2. DO NOT PRUNE OR THIN CANOPY UNLESS DIRECTED TO DO SO BY LA.
3. CONTRACTOR SHALL REMOVE EXCESS FILL FROM TOP OF TRUNK. SET ROOT FLARE 2" HIGHER THAN FINISHED GRADE. REMOVE ROPE FROM CROWN TO PREVENT GIRDLING.
4. PRIOR TO STAKING, REVIEW EXTENT OF LIMBING UP WITH LA.
5. TREE STAKING MAY BE OMITTED IF ROOTBALL AND CANOPY PROVIDE A STABLE GROWING CONDITION. CONDITION TO BE REVIEWED BY LA AND CONTRACTOR.
6. MOUNDING AROUND TREES WILL NOT BE ACCEPTABLE.
7. REFER TO LAYOUT AND MATERIALS PLAN FOR SPECIFIC TREE STAKING ORIENTATION.
8. PEDESTAL HEIGHT SHALL ACCOMMODATE ROOT BALL SET FLUSH TO FINISH GRADE. REFER TO PLANTING SCHEDULE FOR TREE SIZING.

TREE STAKING PLAN



1 TREE TYPE 1 - AT PLANTBED SECTION
1/2" = 1'-0"

NOT FOR CONSTRUCTION

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SITE PLAN APPROVAL

COMMONWEALTH OF MASSACHUSETTS
MIYOUNG KIM
No. LA 1305
REGISTERED LANDSCAPE ARCHITECT

PROJECT NUMBER:

DATE:

REVISIONS:

SEE PREVIOUS ISSUES FOR REVISIONS NOT LISTED HERE

SCALE: AS NOTED

DRAWING NAME:

PLANTING DETAILS

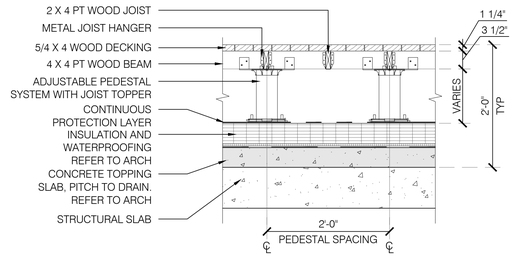
Ref. North

DRAWING NUMBER:

GS.7

NOTE :

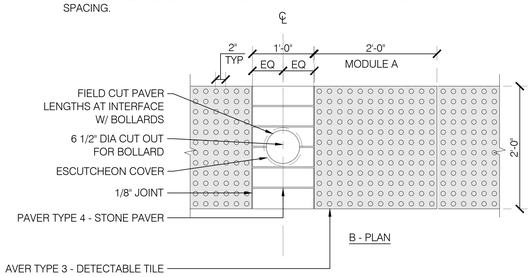
1. REFER TO SPECIFICATION FOR WOOD SPECIES AND FINISH.
2. ALL CONNECTIONS AT INTERFACE WITH WOOD MATERIAL TO BE FASTENED WITH STAINLESS STEEL HARDWARE.
3. ALL FASTENERS TO BE HIDDEN FROM FINISH SURFACE.

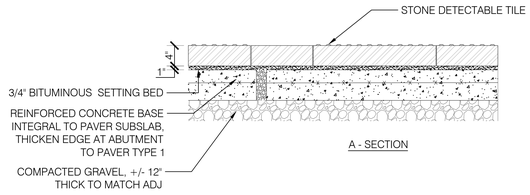


8 DECK TYPE 2 - AT TERRACE SECTION
1" = 1'-0"

NOTES :

1. REFER TO LAYOUT PLAN FOR EXTENT OF DETECTABLE WARNING PAVER AT DROP-OFF. PROVIDE 2'-0" WIDE CUSTOM RADIAL PAVERS TO MATCH CURB LAYOUT AND RADII. ALL RADIAL PAVERS SHALL MAINTAIN TYPICAL TRUNCATED DOME SPACING.

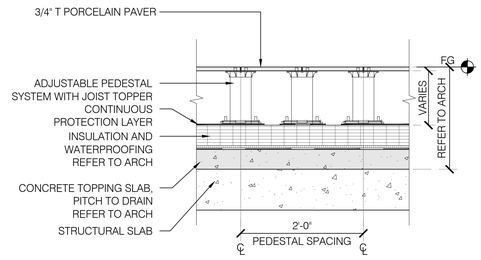




6 PAVER TYPE 3 & 4 - DETECTABLE TILE AND STONE PAVER AS NOTED
1" = 1'-0"

NOTE :

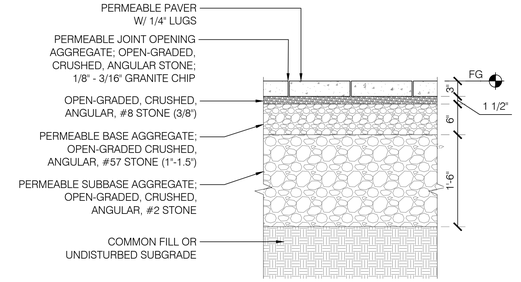
1. REFER TO LAYOUT PLAN AND SPEC FOR SPECIFIED PAVER LAYOUT.
2. REFER TO GRADING PLANS FOR FG.



7 PAVER TYPE 5 - PORCELAIN ROOF PAVER SECTION
1" = 1'-0"

NOTES :

1. REFER TO LAYOUT PLAN AND SPEC FOR SPECIFIED PAVER LAYOUT.
2. REFER TO GRADING PLANS FOR FG.
3. ALL PAVERT TO BE GAGUED AT FACTORY FOR 3" DEPTH
4. REFER TO 3/L521 FOR PERMEABLE PAVER DETAIL AT SILVA CELLS.

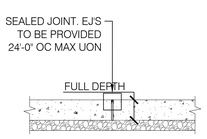


5 PAVER TYPE 2 - PERMEABLE SECTION
1" = 1'-0"

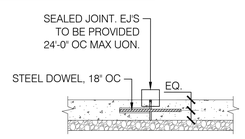
NOTE :

1. REFER TO LAYOUT AND MATERIALS PLANS FOR CONTROL JOINT (CJ) AND EXPANSION JOINT (EJ) LOCATIONS.
2. PROVIDE FULL DEPTH EJ AT ALL VERTICAL ELEMENTS AND MATERIAL TRANSITIONS.
3. SAWCUTS TO BE CONTINUOUS AND FREE OF ANY IRREGULARITIES. EXTENT OF SAWCUT SHALL MEET ALL PERPENDICULAR JOINTS, JOINTS WHICH FALL SHORT ARE NOT ACCEPTABLE.
4. TOOLED EDGES OF PAVEMENT AND JOINTS IN CONCRETE ARE UNACCEPTABLE. PROVIDE FINISH TO JOINT EDGE.

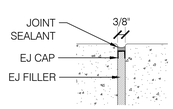
A - EXPANSION JOINT



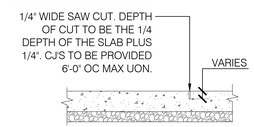
B - DOWELED EXPANSION JOINT



C - SEALED JOINT ENLARGEMENT



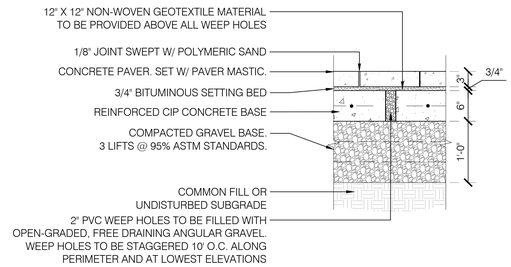
D - SAW CUT CONTROL JOINT



3 CONCRETE JOINTING SECTION
1" = 1'-0"

NOTE :

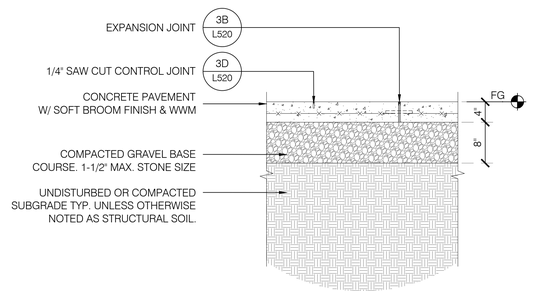
1. REFER TO LAYOUT PLAN AND SPEC FOR SPECIFIED PAVER LAYOUT.
2. REFER TO GRADING PLANS FOR FG.
3. ALL PAVERT TO BE GAGUED AT FACTORY FOR 3" DEPTH



4 PAVER TYPE 1 - VEHICULAR SECTION
1" = 1'-0"

NOTE :

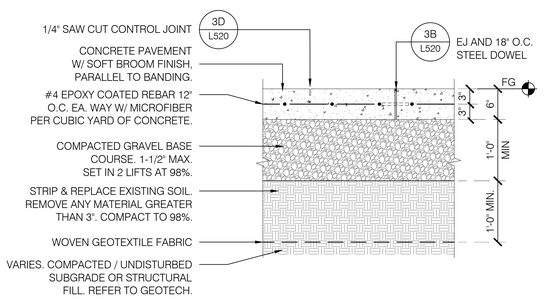
1. REFER TO SPECIFICATIONS FOR CONCRETE CURING METHOD, COLOR, AND FINISH.
2. REFER TO LAYOUT AND MATERIALS PLANS FOR STRUCTURAL SOIL LOCATIONS.



2 PAVEMENT TYPE 2 - STANDARD SIDEWALK VIEW
1" = 1'-0"

NOTE :

1. REFER TO SPECIFICATIONS FOR CONCRETE CURING METHOD, COLOR, AND FINISH.
2. PROVIDE EXPANSION JOINTS AT TRANSITIONS BETWEEN CONCRETE BANDS AND AT ALL VERTICAL ELEMENTS.
3. PROVIDE TOOLED JOINT ALONG MARGIN OF ALL SURFACE FLUSH STRUCTURES, SUCH AS MANHOLE VAULTS, AND DRAINS.



1 PAVEMENT TYPE 1 - VEHICULAR CONCRETE SECTION
1" = 1'-0"

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SITE PLAN APPROVAL

PROJECT NUMBER:

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SCALE: AS NOTED

DRAWING NAME:

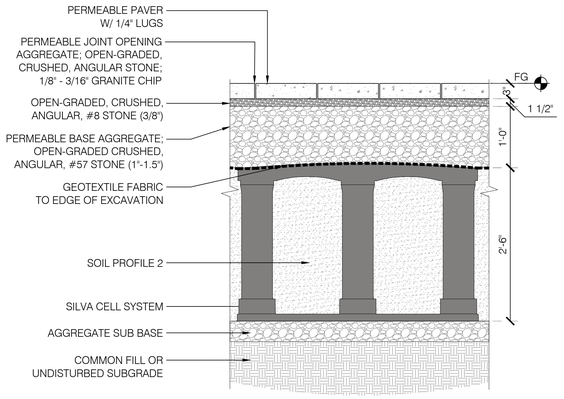
PAVING AND CURBING DETAILS

DRAWING NUMBER:

GS.8

NOTES :

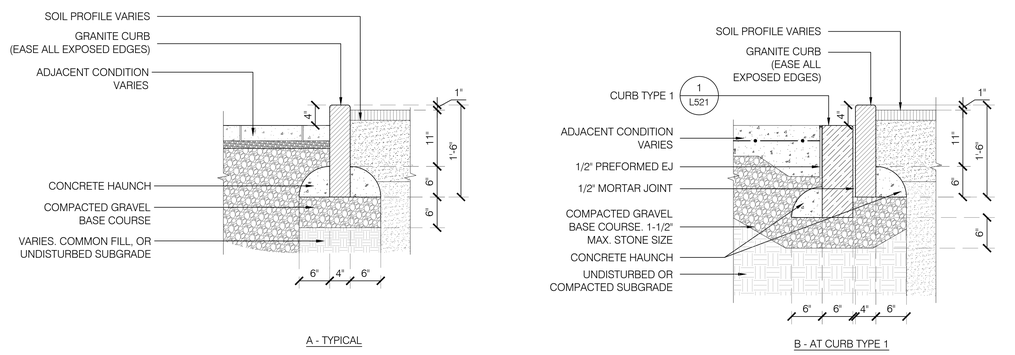
1. REFER TO LAYOUT PLAN AND SPEC FOR SPECIFIED PAVER LAYOUT.
2. REFER TO GRADING PLANS FOR FG.



3 PAVER TYPE 3 AT SILVA CELLS
1" = 1'-0"
VIEW

NOTES :

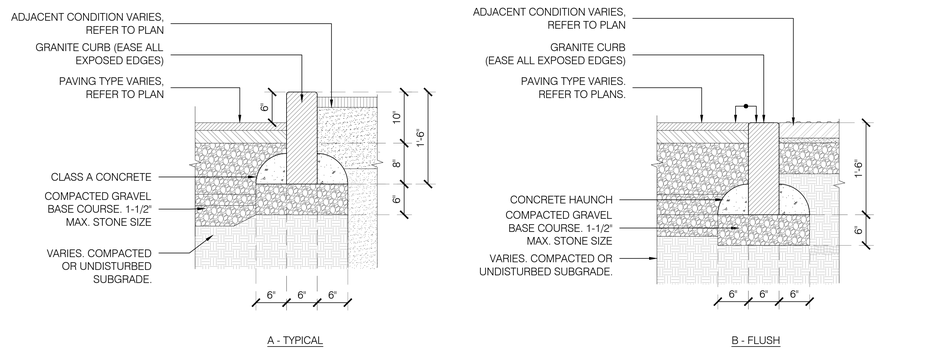
1. ALL JOINTS BETWEEN CURBING SECTIONS SHALL BE 1/4". FILL FULL WITH MORTAR.
2. ALIGN CURB JOINTS WITH ADJACENT PAVEMENT JOINTING.
3. REFER TO CURB SPECIFICATIONS FOR FINISH AND COLOR.
4. ADJACENT CONDITION VARIES, REFER TO LAYOUT & MATERIALS PLAN.



2 CURB TYPE 2 - PLANTBED
1" = 1'-0"
SECTION

NOTES :

1. ALL JOINTS BETWEEN CURBING SECTIONS SHALL BE 1/4". FILL FULL WITH MORTAR.
2. ALIGN CURB JOINTS WITH ADJACENT PAVEMENT JOINTING.
3. REFER TO CURB SPECIFICATIONS FOR FINISH AND COLOR.
4. ADJACENT CONDITION VARIES, REFER TO LAYOUT & MATERIALS PLAN.



1 CURB TYPE 1 - VEHICULAR
1" = 1'-0"
SECTION

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48 Dunster Street
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SITE PLAN APPROVAL

PROJECT NUMBER:

DATE:

REVISIONS:

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SCALE: AS NOTED

DRAWING NAME:

PAVING AND CURBING DETAILS

DRAWING NUMBER:

GS.9

APPENDIX D: Sustainability

Contents

- Sustainable and Resilient Buildings Questionnaire
- 74 Middlesex LEED Memo
- LEED Scorecard
- Affidavit
- Certification of Required Materials

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SUSTAINABLE AND RESILIENT BUILDINGS QUESTIONNAIRE

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INTRODUCTION

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 (Questionnaire) with the required Development Review Application. A Development Review Application is considered incomplete unless a completed questionnaire is submitted with the application. It is strongly recommended that the development team meets with staff from the Office of Sustainability and Environment prior to submitting the Development Review Application.

The purpose of this Questionnaire is to minimize the adverse environmental impacts in the design, construction, and occupancy of buildings in Somerville and to ensure that the impacts of future climate conditions are carefully evaluated.

Please review the following documents before completing the Questionnaire:

- **Somerville Climate Change Vulnerability Assessment**
- **Carbon Neutrality Pathway Assessment**
- **Somerville Climate Forward**

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. Carbon neutrality is defined as the net-zero release of carbon dioxide and other greenhouse gases (GHG) within Somerville's municipal boundary. Reducing greenhouse gas emissions is critical to avoiding the worst impacts of climate change and to protecting the health, safety, and welfare of current and future generations. In 2017, the Somerville Board of Aldermen passed a resolution reaffirming the city's carbon neutrality goal. And In 2018, Somerville released its first community-wide climate action plan, Somerville Climate Forward.

To achieve carbon neutrality by 2050 and to minimize adverse environmental impacts, Somerville will need to drastically reduce greenhouse gas emissions from electricity, buildings, transportation, and waste disposal. To meet these goals, all buildings within the city will need to pursue net zero emissions. New development should

be designed to maximize envelope performance and energy efficiency, produce or procure renewable energy, and phase out fossil fuel use through electrification of building systems. 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 asked 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.

BACKGROUND: CLIMATE CHANGE VULNERABILITY

Despite efforts to minimize greenhouse gas emissions, climate change is already impacting Somerville and changes to the climate will continue to intensify. 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.

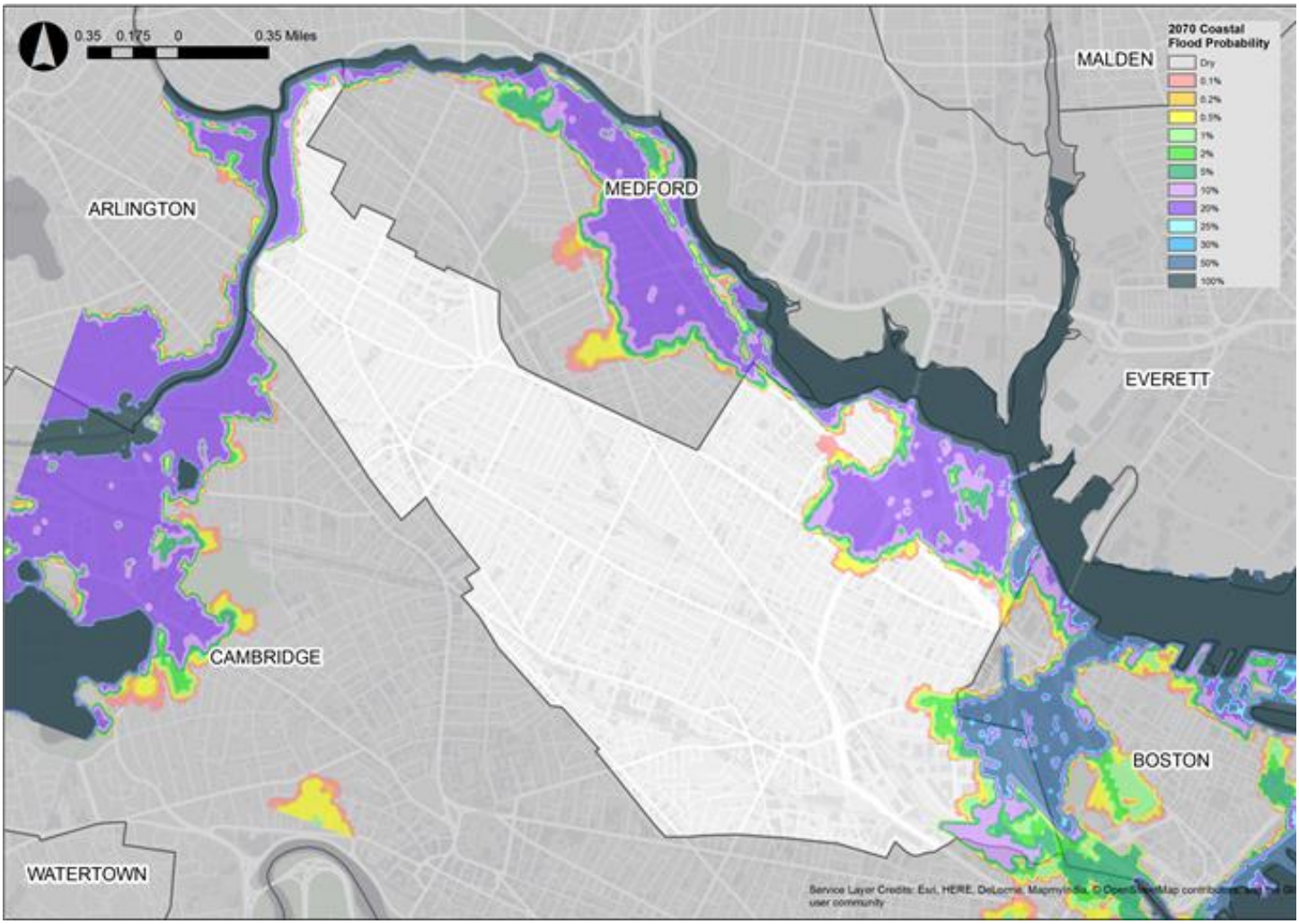
Several areas of Somerville are already prone to flooding from intense precipitation. With climate change, precipitation events will become more intense—meaning that a greater volume of rain will fall in a shorter period of time. Somerville is projected to experience more than a 30% increase in rainfall during a 100-year 24-hour event. This increase in precipitation will increase the risk of flooding in areas where the drainage system does not have sufficient capacity.

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, resulting in flooding for areas of Assembly Square, Ten Hills, and Winter Hill.

As the climate continues to change, average seasonal temperatures are also expected to increase and the number of days above 90 degrees Fahrenheit (historically 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. In 2018 there were 23 days over 90 degrees.
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. 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. There will also be increasing demand for indoor cooling.

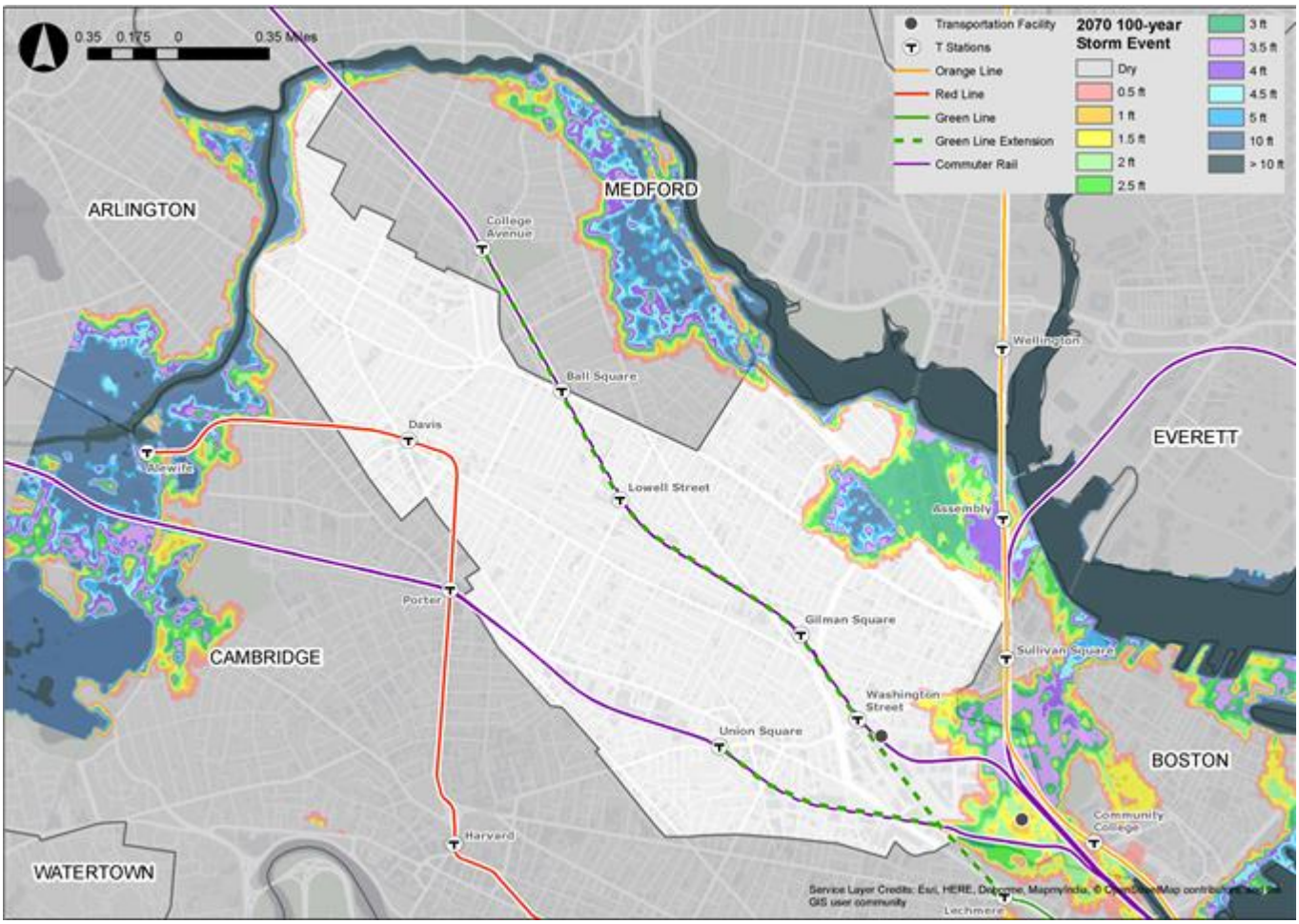
The following maps and figures provide an overview of projected climate exposure. Please review the Climate Change Vulnerability Assessment for more detailed analysis on Somerville's exposure, vulnerability, and risk to climate change. For higher resolution maps and GIS files, please contact Hannah Payne, Sustainability Coordinator, at hpayne@somervillema.gov.

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 there is a nearly certain chance that the area will flood at least once in a given 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. This map does not account for drainage (Somerville Climate Change Vulnerability Assessment, 2017)

2070 Coastal Flood Depth from 2070 100-year Storm Event

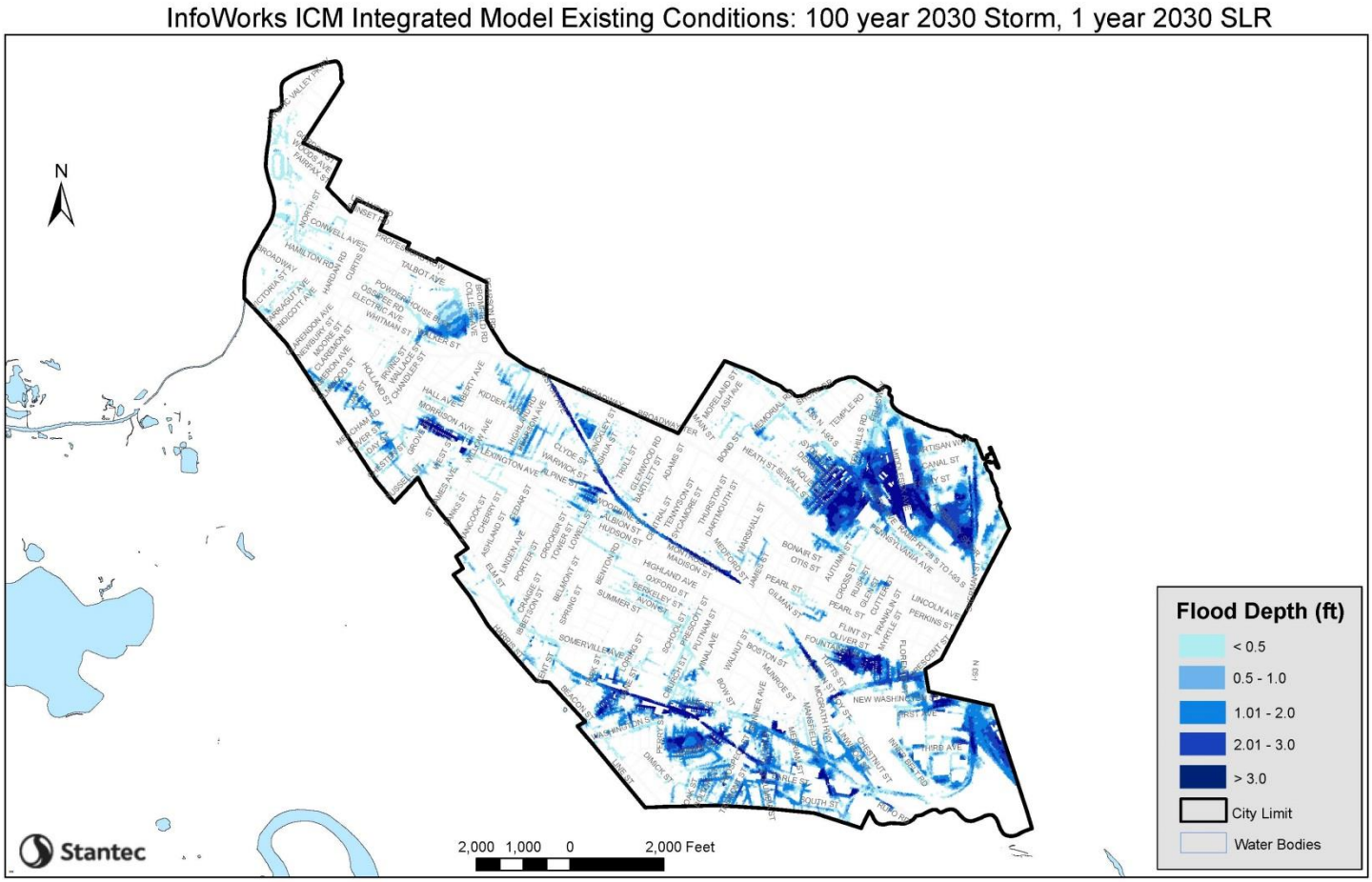


This map shows the projected flood depths of a 100-year coastal storm event in 2070 along with public transportation infrastructure assets. This map does not account for drainage (Somerville Climate Change Vulnerability Assessment, 2017)

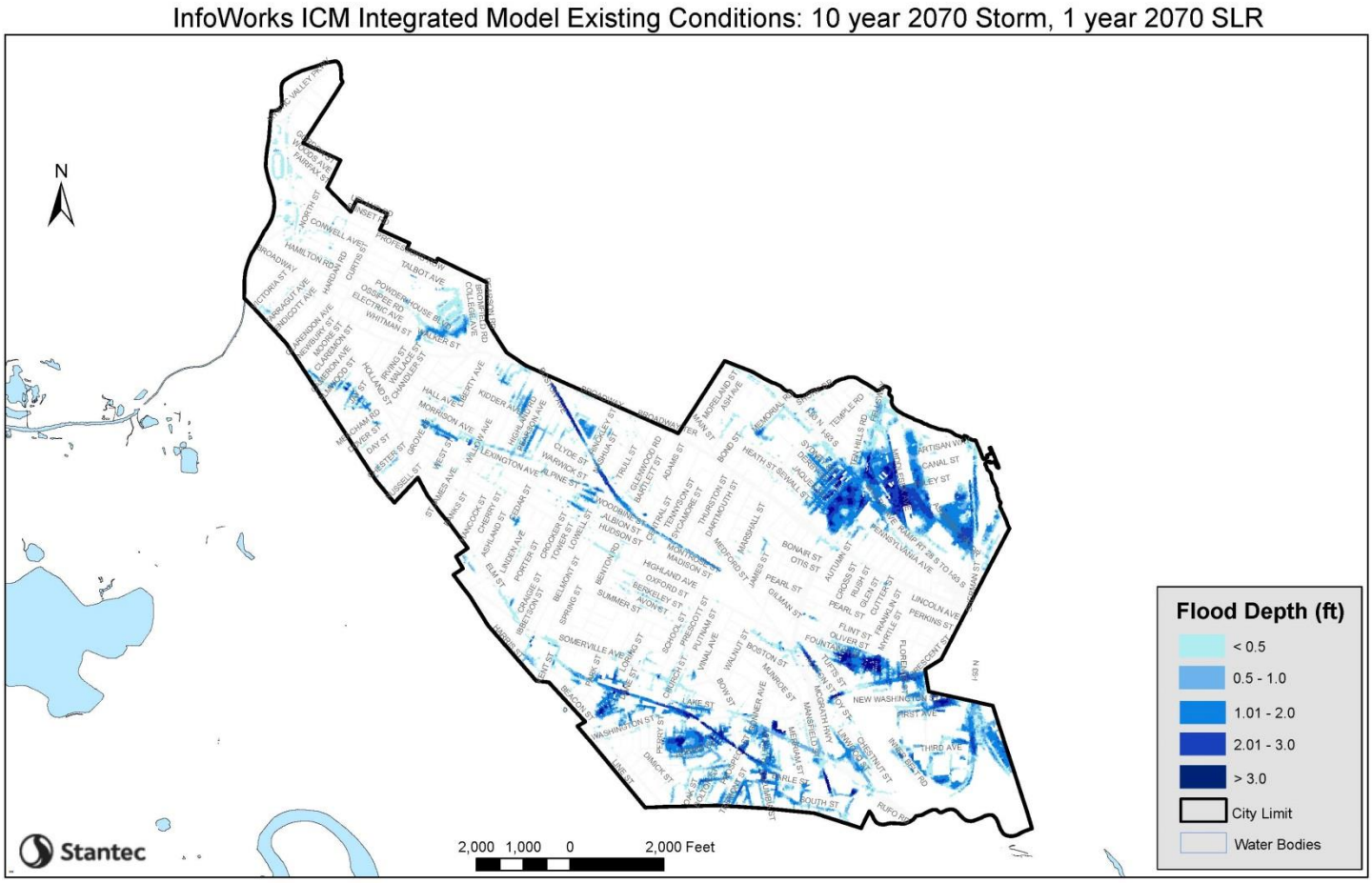
Precipitation Projections

Precipitation-based flooding is projected to increase in Somerville and is currently more of an immediate and widespread threat than sea level rise and storm surge. The intensification of both the frequency and intensity of rainfall events is likely to cause increased risk of flooding during rain events.

Storm Type	Present-day Rainfall	2030 Rainfall	2070 Rainfall
10-year (10% annual chance), 24-hour	4.9 in	5.6 in	6.4 in
100-year (1% annual chance), 24-hour	8.9 in	10.2 in	11.7 in



This map shows the impact of both precipitation-based flooding and sea level rise and storm surge. This map shows the modeled flood depths of a 100-year, 24-hour Design Storm with 1-year storm surge and sea level rise projections in 2030. Unlike the maps above, this includes modeling of the drainage system, which takes into account how water will be conveyed out of the city. The model is based on how the system is designed to function, so actual areas of flooding and depth of flooding could vary (Stantec, 2019).



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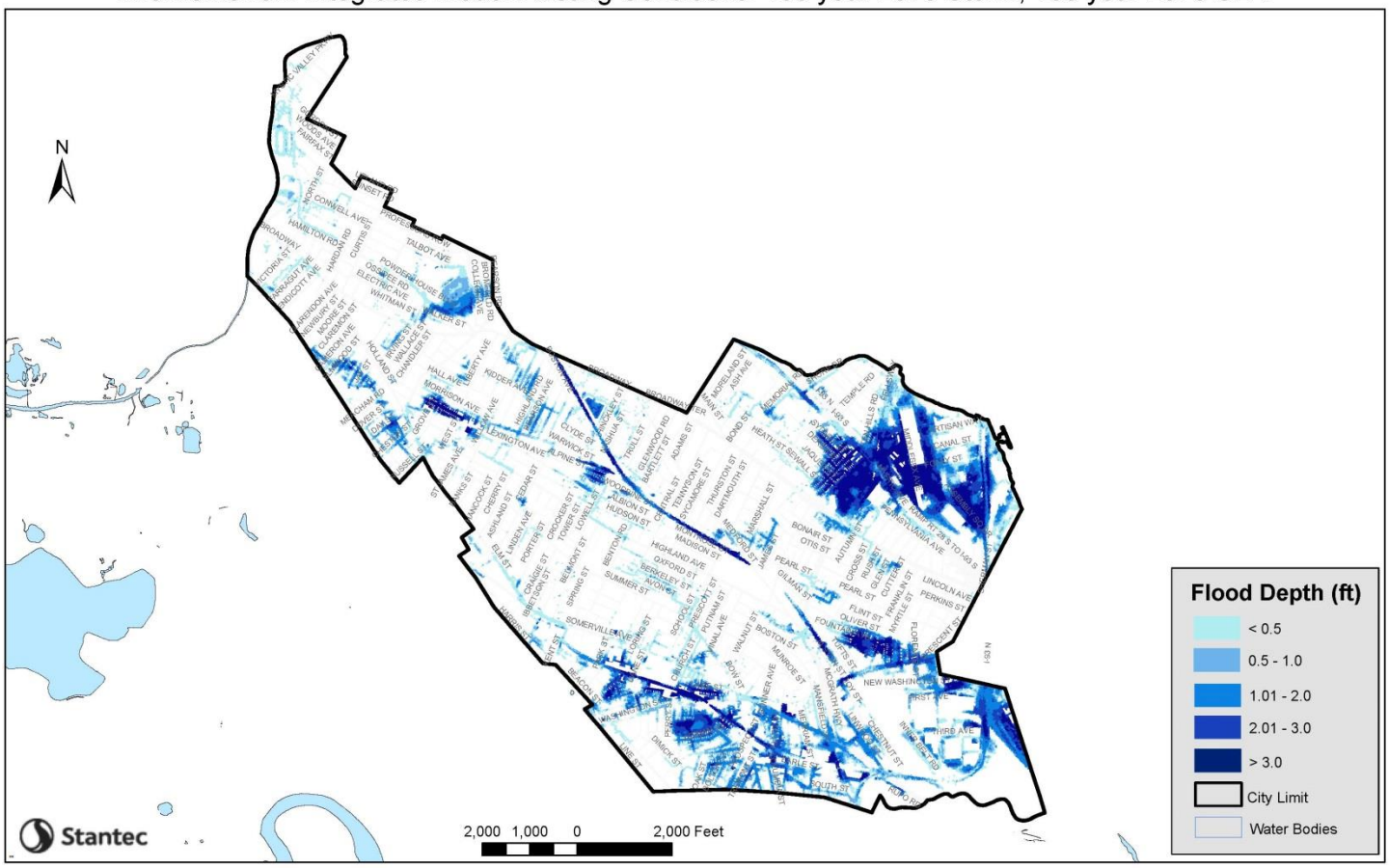
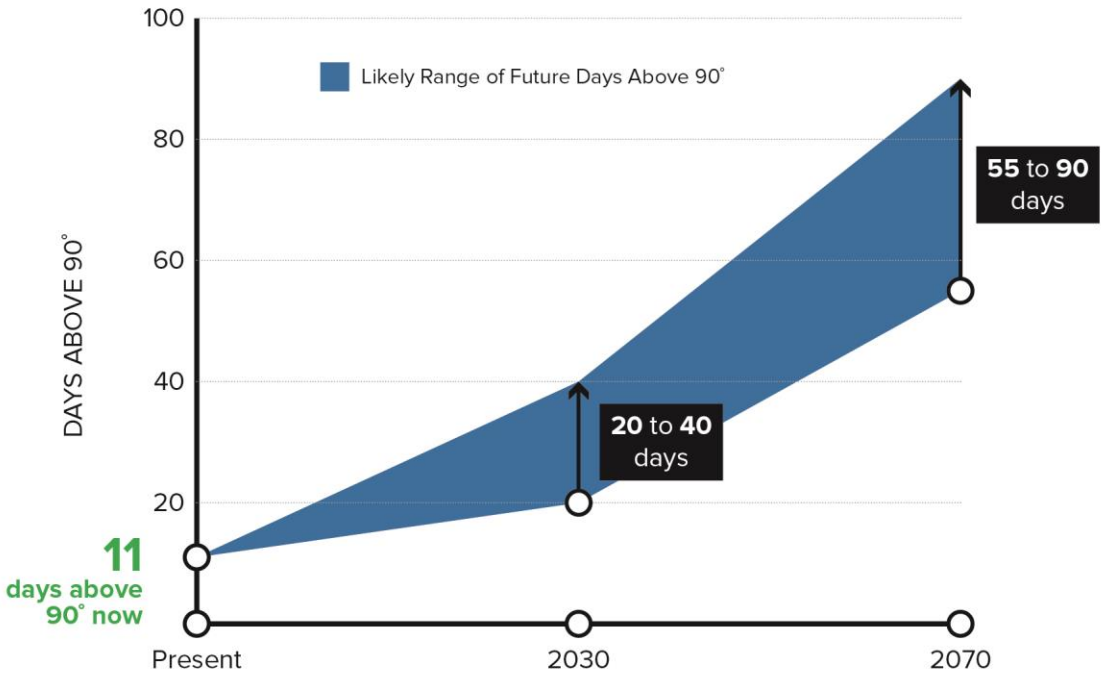
InfoWorks ICM Integrated Model Existing Conditions: 100 year 2070 Storm, 100 year 2070 SLR



This map shows the impact of both precipitation-based flooding and sea level rise and storm surge. This map shows the modeled flood depths of 2070 100-year, 24-hour Design Storm with 100-year storm surge and sea level rise projections in 2070. This map includes modeling of the drainage system, which takes into account how water will be conveyed out of the city. The model is based on how the system is designed to function, so actual areas of flooding and depth of flooding could vary (Stantec, 2019).

Temperature Projections



(Somerville Climate Change Vulnerability Assessment 2017)

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

RESOURCES:

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

- **Passive House Principles**
- **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

SUSTAINABLE & RESILIENT BUILDINGS QUESTIONNAIRE

Section 1: Proposal Information

Proposal Name	74 Middlesex Avenue
Address	74 Middlesex Avenue Somerville, MA 02145
Developer	Greystar
Business Address	One Federal Street, Suite 1803 Boston, MA 02110
Designated Contact	Ryan Souls
Telephone Number	857-254-1329
Contact's Email Address	Ryan.souls@greystar.com
Date Submitted	June 28, 2021
Filing Type (Development review application, Building Permit, or CoA)	Development Review Application
Is this a revised Questionnaire?	No. This is the first formal submission associated with the Development Review Application requesting Site Plan Approval.
Is MEPA Approval Required?	No; MEPA Review is not required.

Section 2: Building & Site Details

2.1 Building Information

Building Uses	Office & Laboratory, retail, assembly, below-grade parking
Gross Floor Area	446,000 square feet of GFA (excluding mechanical penthouse and below-grade parking)
Expected Life of Building	60+ Years
Expected Life of Building Systems: HVAC, electrical, boilers, plumbing, telecom, lighting, energy management.	15-30 years
Type of Heating System(s)	Air-source heat pumps (ASHPs) with supplemental condensing boilers
Type of Cooling System(s)	Air-source heat pumps (ASHPs) with supplemental centrifugal chillers

2.2. Green Building

Green Building Professional(s): Name(s) and contact information	Atelier Ten Contact: Jennifer Chalos 212-254-2500 x228 Jennifer.chalos@atelierten.com
Professional Credentials: Green Building Program Certification(s)	LEED AP BD+C

Building LEED Rating	LEEDv4 CS Platinum
Building LEED Point Score	84 (points indicated as high probability)
Will you pursue LEED certification through the USGBC?	TBD
Are any other green building certifications being pursued? (Passive House, Enterprise Green Communities, etc.). Please describe.	No

2.3. Electric Vehicle Parking

The number of electric vehicles (EVs) in Somerville is expected to increase significantly over the next decade with more electric vehicles coming to market than ever before. Conservative estimates based on historical trends alone suggest 20% of personal vehicles in Somerville will be electric by 2040. Installing capacity for EV supply equipment (EVSE) has been shown to be more feasible and cost effective during construction than when retrofitting parking areas to support the installation of EVSE in the future[1]. Providing EVSE can increase the property value, become a future revenue source, and provide an amenity that more tenants and commuters will be looking for. It is recommended that parking facilities be designed to allow for the most flexibility to adapt to future needs of electric vehicles and changing mobility needs. The City of Somerville recommends 25% of spaces have installed charging access and up to 100% of spaces be "EV - Ready" (everything but the station installed). Eversource currently has a program to pay the associated infrastructure costs of EV charging, including infrastructure needed to be "EV ready." Please consult with Eversource to determine if any installation costs could be covered through their Make Ready Program.

Total # of Parking Spaces	350
EVSE Plugs (number and voltage/ level of plugs)	EV charging stations to be provided for 5% of parking spaces, which results in 18 EVSE stations based on the current design. (Level 2 charging capacity: 208 V)
EV Ready Spaces (everything but station is installed)	The number of EV ready spaces the project can accommodate is currently being evaluated and will not be known until the power load is confirmed with Eversource.
Please share any other information on your EV strategy. Have you spoken with Eversource? Are you	The project team is targeting at least 5% of spaces to have installed infrastructure for EVSE. The team has reached out to Eversource for additional information about potential funding. Eversource indicated that

[1] http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf; https://www.richmond.ca/__shared/assets/Residential_EV_Charging_Local_Government_Guide51732.pdf

talking with EVSE providers? Have you considered EVSE needs in conjunction with your parking and mobility management plans?	they are still waiting for 2021 funding to be awarded but are accepting applications in the interim based on their confidence that funding will be awarded. The project team will continue to investigate funding through Eversource to maximize the number of spaces with EV infrastructure.

2.4 Key Building Efficiency Metrics
The following should be provided for each building type (office, retail, multifamily, hotel, restaurant, etc.).

Vertical Envelope Performance
Note these values are preliminary and subject to change as the design is refined and the envelope backstop analysis is updated.

Vertical Envelope	ASHRAE Reference Building (ASHRAE 90.1-2013)			Proposed Building		
	Percent of Vertical Area	**R value** *(see note 1)*	**U value** *(see note 2)*	**Percent of Vertical Area**	**R value** *(see note 1)*	**U value** *(note 2)*
Framed, insulated Wall	60%	R-13 + R-10 c.i.	U-value U-0.055	7%	R-13 + R-7.5 c.i..	U-value U-0.064
Opaque glass, curtain wall, shadowbox, spandrel	NA - ASHRAE reference building has no spandrel			57%	R-20	U-value U-0.10
Vision glass	40%	N/A	U-value U-0.42	36%	N/A	U-value U-0.23
	100%		***Aggregate U*** *U-0.201*	***100%***		***Aggregate U*** *U-0.146*
			Aggregate R *R-5*			***Aggregate*** *R-6.8*

Notes:

1. Show in format of R+R c.i. where first R is amount of discontinuous insulation and second R is amount of continuous insulation.

2. U values shall be based on indicated R+R c.i. and shall conform to Appendix A of ASHRAE 90.1 2013.

3. U value includes frame, per NRFC standard methods.

4. Aggregate U is calculated as: $(U_1\%_1 + U_2\%_2 + U_3\%_3)$ where U is the respective thermal transmittance values and $\%_1$ is the percent area of framed insulated wall; $\%_2$ is the percent area of opaque glass, curtain, or shadowbox; and $\%_3$ is the percent area of vision glass. Only areas adjacent to conditioned space are counted, areas adjacent to unconditioned spaces (e.g. parking garages, mechanical penthouses)

are not counted. Aggregate R is the inverse of aggregate U. For percent areas for ASHRAE reference building, see Table G3.1.1-1 in ASHRAE 90.1 2013.

Other Performance Metrics

Note these values are preliminary and subject to change as the design is refined and the energy model is updated. The peak heating and cooling values represent the coincidental peak with all efficiency measures and include operational diversity.

	ASHRAE Reference Building (ASHRAE 90.1 2013)	**Proposed Building**
Air Infiltration (ACH 50)	0.25 (CFM/sqft façade)	0.25 (CFM/sqft façade)
Aggregate Vertical Envelope R	U-0.201 (R-5)	U-0.146 (R-6.8)
Roof R	R-30 c.i. (U-0.032)	R-30 c.i. (U-0.032)
Lowest level conditioned floor above unconditioned space (if any) R	R-19 (U-0.052)	R-10 c.i. (U-0.074) TBC
Cooling End Use (kBtu/sf-yr)	8.8 kBtu/sf-yr	8.6 kBtu/sf-yr
Heating End Use (kBtu/sf-yr)	76.5 kBtu/sf-yr	11.8 kBtu/sf-yr
Peak Heating (Btu/hr-sf)	38.9 Btu/sf-yr	23.1 Btu/sf-yr
Peak Cooling (Btu/hr-sf)	59.7 Btu/sf-yr	57.2 Btu/sf-yr
Site EUI (kBtu/hr-sf)	191 kBtu/sf-yr	114 kBtu/sf-yr

Section 3. Planning for Net Zero Emissions and Energy Resilience

3.1. How is the building currently designed to reduce energy usage? Please describe the key design features of the building including:

A) Building envelope performance (including roof, foundation, walls, and window assemblies)
B) How has the design team integrated energy performance into the building and site design and engineering (orientation, massing, mechanical systems, envelope, etc.)?
C) Efficiency of heating and cooling systems. Will these systems be electric? Provide reasoning for selection of heating and cooling systems.

The building envelope will utilize efficient and high-performing materials including low-e, argon-filled triple pane glazing. All opaque wall and roof assemblies will strive to use materials that reduce embodied carbon, have high recycled content, and minimize thermal bridging. The exterior and interior lighting will employ high efficiency LED fixtures and meet the targeted LPD and controls goals. The design intends to collect stormwater and HVAC equipment condensate and reuse the water for indoor flush fixtures, exterior irrigation demand, and cooling tower makeup.

The heating plant is composed of air source heat pumps and a heat recovery chiller to provide a measure of electrification. The building also has high efficiency condensing boilers sized for the entire heating load for

backup and/or when heat pump capacity is exceeded. The heat recovery chiller allows for energy to be reused when simultaneous heating and cooling loads exist as well as providing electrification of the heating plant. The air source heat pumps allow for partial electrification of the heating plant and to reduce natural gas usage by the boilers. This approach was taken to reduce the building natural gas usage substantially. The current analysis indicates approximately a 90% reduction in natural gas compared to a building served by only natural gas boilers.

The cooling plant is composed of water-cooled centrifugal chillers paired with cooling towers and a heat recovery chiller, along with a water-side economizer. The cooling plant will be entirely electric. The intent is for the centrifugal chillers to provide the majority of cooling with air source heat pumps to provide cooling during peak cooling conditions. The heat recovery chiller allows for energy to be reused when simultaneous heating and cooling loads exist. The intent is to provide a system that is able to respond to cooling loads in the most efficient way.

3.2 Will the building be a net zero carbon building? A net zero carbon building is a highly energy efficient building that does not burn fossil fuels and either produces or procures enough carbon-free electricity to meet the building's total energy demand. If the building will not be a net zero carbon building, provide a technical description of how the building's systems will be transitioned over time to achieve net zero carbon emissions, including how and when systems can be transitioned in the future to carbon-free alternatives (provide timeline including 2030, 2040, and 2050 targets). Description must include whether any remaining emissions will be offset with on-site or off-site renewables and at what quantity. Changes could include, but are not limited to, addition of on-site renewable energy generation, energy storage, additional energy efficiency measures, building electrification, or other measures that would further reduce greenhouse gas emissions.

The project will strive to minimize dependence on natural gas by prioritizing electrification of building systems to the greatest extent possible. The design team is currently evaluating electrification options that would integrate with the long-term vision for a low-carbon New England power grid. The design currently includes electric water-cooled centrifugal chillers, air-source heat pumps, and a heat recovery chiller which are optimally sized to generate the majority of the chilled water and heating hot water required to condition the building. Condensing boilers supply supplemental heating hot water under peak conditions. The building is set-up so that all base building systems can be transitioned to all-electric over time. Eliminating the natural gas supply entirely may be challenging since the tenant labs require flexibility for conducting experiments and research. A potential pathway to net zero carbon would include replacement of supplemental condensing hot water boilers with electric heat pumps or electric resistance boilers by 2040. By 2050, tenants would need to be engaged for a commitment to eliminate natural gas consumption.

To support the City of Somerville's net-zero goals and the projects path to LEED Platinum, the project intends to purchase Green-e Energy certified renewable energy credits to offset 50% of the base building's annual energy use.

3.3 Describe any and all incentives, rebates, grants provided by utilities, government organizations, and other organizations being pursued to maximize building efficiency and to reduce emissions. Description must include any incentives that were considered but are not being pursued, including reasoning for each decision.

The team is considering applying for the Eversource / Mass Save - New Buildings and Major Renovations Path 2: Whole Buildings EUI Reduction incentive program. This incentive program provides financial incentives based on a percent EUI reduction beyond the Mass Save baseline and provides a cost share for the technical assistance and energy modeling fees. To be eligible, the project must have a goal of meeting at least 10% EUI reduction from the Mass Save baseline, which is based on the Massachusetts energy code using either International Energy Conservation Code - IECC 2018 or ASHRAE 90.1-2016.

- An overview of the incentive program is available here: https://www.masssave.com/en/saving/business-rebates/new-buildings-and-major-renovations/whole-building-energy-use-intensity-reduction
- A full description of the current Mass Save baseline is available here: https://www.masssave.com/-/media/Files/PDFs/Business/Energy_Code_Baseline.pdf?la=en&hash=1D0A5D90B03A32B2833D3D0EEE3522E573B67D52

Additionally, the team is considering applying for the Eversource Electric Vehicle Charging Station Program. This program provides financial support for all of the associated infrastructure costs to support EV chargers at up to 5% of parking spaces when the building is complete, and an additional 5% of parking spaces in the future.

3.4 Evaluate feasibility of on-site renewable generation. Please describe your analysis and findings. Analysis should consider incentives available. Will any renewable energy generation be incorporated into the project? If so, please describe (system type and capacity). If no, could it be added in the future? And will any off-site renewable energy be purchased?

At this time, renewable energy generation systems are not planned for the project roof since the majority of the roof area is allocated to mechanical equipment required for the lab program. Areas not dedicated to mechanical equipment, have been designed as green roofs. The roof is expected to primarily be used for mechanical equipment throughout the life of the building, therefore renewable energy generation systems are unlikely to be added in the future. The project will rely on the electric grid to provide power for the building heating and cooling systems. Additionally, the project will procure RECs and/or carbon offsets until the grid is further decarbonized.

3.5. Are any on-site energy storage systems planned? Please describe.

The Proponent does not currently anticipate any on-site energy storage.

3.6 Does the electric utility's infrastructure have enough capacity to support the addition of your building's energy load? Please provide confirmation from utility.

The design team will coordinate with the local utility company during the next phase of the design. Introductory Load Letters have been developed for submission with Eversource.

3.7 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. Please describe what features could be added in the future (i.e. roof will be designed to support solar or green roof installation of X size).

The building's roof areas will incorporate high albedo roofing materials to help mitigate heat island effects. In addition, approximately 6,176 square feet of green roof is planned for the mechanical penthouse roof and 2,624 square feet of green roof on the Level 2 canopy. Note there are limitations of the building's roof area due to requirements for base building mechanical equipment and tenant equipment.

Section 4: Climate Change Risk and Vulnerability

4.1 Climate Vulnerability Exposure
(check all that apply)

- ✓ Sea Level Rise & Storm Surge
- ✓ Precipitation Induced Flooding
- ✓ Heat
- ☐ Other(s):

4.2 How is your site vulnerable to projected climate change impacts?

According to the Somerville Climate Change Vulnerability Assessment and the figures included in this Questionnaire, the site is vulnerable to precipitation-based flooding and sea level rise and storm surge when considering the 100-yr 2030 Storm with 1-yr 2030 Sea Level Rise (SLR), the 10-year 2070 Storm with 1-yr 2070 SLR, and the 100-yr 2070 Storm with 100-year 2070 SLR. Future flood depths at the site are projected to be more than 3.0 feet.

Additionally, the Project Site lies within an area of high outdoor heat exposure and consequently will experience negative impacts from the urban heat island effect, which will threaten utility systems, building performance, and public health.

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

Section 5: Managing Heat Risks

5.1 Describe all building features that will keep building occupants safe and comfortable during extreme heat, including mechanical systems and non-mechanical design elements to cool building (orientation, envelope, operable windows, etc.).

The mechanical systems for the project include a dedicated outdoor air system serving either fan coil units or active chilled beams, three water-cooled centrifugal chillers, a water-side economizer, air source heat pumps, and a heat recovery chiller to provide efficient cooling to the indoor spaces. The building will incorporate a high thermal performance envelope including triple pane glazing that aligns with the provisions of the ECC 2018 of Massachusetts. Additionally, the roof and site hardscape will incorporate high albedo materials to reduce the effects of urban heat island.

5.2 How has increased demand for indoor cooling been factored into the building design and energy management strategy?

The building cooling is sized for ASHRAE 0.4% design day (91/73 F wb/db)

This project is utilizing advanced heat recovery systems and premium efficiency chillers, selected and sized to efficiently provide ventilation air and cooling chilled water to the tenant zone. At the tenant zone, decoupled cooling systems (fan coil units, heat pumps, and/or active chilled beams) will provide efficient demand control zone-level cooling. These decoupled cooling systems, combined with demand control ventilation, will limit the building's use of outdoor air to the minimum amount required for ventilation purposes.

5.3 List any indoor spaces without cooling and their uses.

Parking garage, fuel oil room, dry valve rooms, loading dock, incoming gas skid room, stairwells, entry vestibules are not provided space cooling.

5.4 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's uncovered roof and hardscape will be high albedo to limit heat island effect and contribute to a more comfortable outdoor space. Materials will be selected to comply with the solar reflectance index

requirements listed in the SZO, which align with the LEED v4 Heat Island Reduction credit requirements. The team is also working to develop strategies to reduce heat island associated with paving in the civic space, including vegetated shading and high solar reflectance materials. Approximately 8,262 square feet of uncovered hardscape exists in the project currently. To limit heat island effect from these surfaces the design team is looking at pavers with high albedo and light-colored standard concrete for sidewalks. Other hardscape areas are located beneath building canopies which provides adequate shading and reduces further effects of heat island. The Project incorporates approximately 13,250 SF of landscaped areas both on and off-site. The landscaping on-site (excluding the green roof) will be 100% native species that are appropriate for the climate. Lastly, the project design consolidates parking in a four-level underground parking structure, which helps to reduce potential heat island effect associated with traditional surface parking lots.

Section 6: Managing Flood Risks

6.1 Is the site susceptible to flooding from sea level rise and storm surge and/or rain events now or during the building's expected lifetime? Please refer to the Somerville Climate Change Vulnerability Assessment and the updated stormwater flooding maps provided in the Background section of this Questionnaire. Additional maps and data are available by request (email hpayne@somervillema.gov)

As described in Section 4, according to Somerville Climate Change Vulnerability Assessment and figures contained in this Questionnaire, the project site will be vulnerable to precipitation-based flooding and sea level rise and storm surge based on projections for 2030 and 2070. The Project Site is vulnerable to increasing precipitation-based flooding during the 100-year 2030 storm (1-year 2030 SLR), the 10-year 2070 storm (1 year 2070 SLR), and the 100 year 2070 storm (100 year 2070 SLR).

Precipitation events will become more frequent and more intense, leading to flooding in areas of the City where the drainage system may not have enough capacity and much of the area is covered with impervious surfaces.

If you answered YES to the previous question, please complete the remainder of Section 6. Otherwise, you have completed the Questionnaire. Thank you.

6.2 Flooding Design Considerations

Proposed Site Elevation - Low	7.3 (ft)	Proposed Site Elevation - High	8.35 (ft)
Lowest elevation of life-safety systems	9.64 (ft)	Proposed First Floor Elevation	8.35 (ft)

Nearest flood elevation for the 2070 10-year storm	12 (ft)	Nearest flood elevation for the 2070 100-year storm	13 (ft)

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

The first floor uses of the building include retail/amenity space, bicycle storage, miscellaneous storage areas, lobby, restrooms, loading dock, and mechanical/electrical support spaces. There is a parking garage located below ground which serves the building.

6.4 Are there any flood-sensitive assets, utilities, mechanical equipment, or life-safety systems 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

The finished floor elevation (FFE) of the proposed building will be at elevation 8.35 feet, which will be resilient to precipitation-based flooding from the current 10-year storm event in the area. All electrical systems, including the transformer vault on the ground floor will be elevated above the FFE to elevation 13.35 feet be resilient to 2070 10-year storm event flooding. The fire pump and jockey pump sit on concrete pads which are approximately 12” high. The fire pump’s drip rim base is about 3-1/2” high so the fire pump is located at elevation 9.64 feet.

The following equipment is below flood elevation: fuel oil system; glycol system to heat exterior soffits and parking garage ceiling; parking garage systems (electrical rooms, ventilation fans); water entry and booster pumps; hot water heaters; storm water reclaim system; groundwater and garage sump pumps; and irrigation system. The design of the building will consider watertight wall penetrations for utilities at the building face to prevent the intrusion of elevated groundwater levels.

6.5. Residential and commercial buildings should be designed to maintain regular operations during a 10-year storm in 2070. **Describe how the site and building have been designed to maintain regular operations--meaning all systems will remain operational and all occupied spaces are protected from flooding--**

during the 2070 10-year storm. Please refer to both the 2070 coastal flood probability map and the 2070 10-year storm and 1-year sea level rise scenario (pages 3 and 6). Resilience measures 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
- Energy storage and backup generation
- Wet flood-proofing (allowing water to flow through building envelope)
- Dry flood-proofing (preventing water from entering building)

The elevation of the site and the elevation of the building and ground floor are set to allow at grade access to the building ground floor, loading and garage from the adjacent streets. Raising the building, ground floor and access to garage and loading to an elevation above projected future flooding is not practical. The Project will rely on resilience measures including a combination of wet flood-proofing and dry flood-proofing and raising critical building systems (transformers and main electrical room equipment).

The ground floor elevation is set at elevation 8.35 feet and will require a combination of both wet and dry flood-proofing to improve resiliency, including strategies to dry flood-proof vertical penetrations in the ground floor leading to the underground garage, e.g. elevator shafts.

The garage entrance is set at elevation 7.9 feet and will require dry flood-proofing measures be installed at a future date. All electrical systems and life safety systems, including the transformer pads within the building on the ground floor will be elevated above the FFE to elevation 13.35 feet be resilient to 2070 10-year storm event flooding.

Wastewater and stormwater backflow prevention will be designed into building infrastructure in order to maintain operations and prevent backflow of sewer and stormwater into the building through these systems during flooding events.

6.6 Residential buildings should be designed to allow occupants to shelter in place during a catastrophic storm (100-year event) today and in the future, this means all life-safety systems should be above the 2070 100-year flood elevation. **How will your site and building be impacted by the 2070 100-year, 24-hour storm and how will your site and building be designed to protect against those impacts?** Please evaluate impact based on both the 2070 coastal flood depth model for the 100-year storm and the 2070 100-year, 100-year sea level rise model (pages 4 and 7). Summarize anticipated pre- and post-event policies, strategies, and actions necessary to facilitate post-flood recovery.

This section is not applicable, the Project does not include any residential uses.

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

All chemical storage is located at Level 1. The fuel oil tank in the parking garage will be provided with hold-down straps to prevent its movement (and line breaks) in the event the garage is flooded.

6.8 Will the site be accessible by a typical vehicle during a 10-year event (up to 6 inches of water) and by emergency vehicles (up to 12 inches of water) during a 100-year event?

According to the figures included in this Questionnaire showing precipitation-based flooding in 2030 and 2070, street flooding depths at the Site will be in excess of 3 feet, therefore the site will not be accessible by typical or emergency vehicles during projected future 10-year and 100-year events.

74 MIDDLESEX LEED MEMO

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Site Plan Application LEED Memo

74 Middlesex Avenue

Atelier Ten has compiled a list of the LEED credits being targeted to support the LEED v4 Platinum certifiable goal for 74 Middlesex. All credits currently designated as high achievability in the provided LEED Appraisal are included in this memo along with a description of how the project's proposed design intends to meet the credit criteria.

The project will be designed to achieve LEED Platinum under LEED v4 BD+C: Core and Shell. Where beneficial to the project, select v4 credits have been substituted for the v4.1 version as permitted by GBCI. Credit substitutions are indicated in the LEED Appraisal as well as in this memo. The LEED Appraisal details the proposed path for the project to earn a LEED v4 Platinum certifiable rating, which requires compliance with all 12 prerequisites and selected credits to meet the minimum 80-point threshold. The current LEED Appraisal indicates 84 points in high achievability, which is above the minimum 80-point threshold for Platinum. During the next phase of design, additional information and coordination with the design team is needed to verify that the targeted points remain achievable.

To achieve LEED Platinum certifiable, Atelier Ten recommends targeting a minimum score of 85 points, which provides a 5-point buffer to account for GBCI's review and potential design modifications. The design team members should focus on addressing the action items for prerequisites and credits that indicate their firm named as a responsible party in the "Responsible" column in the LEED Appraisal, with the goal of verifying compliance with the 'High' achievability points.

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T +1 (212) 254 4500
F +1 (212) 254 1259
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atelierten.com

Location & Transportation

LTc2 Sensitive Land Protection *(2 points)*
The project site is located on previously developed land which meets the requirements to achieve this credit.

LTc3 High Priority Site *(3 points)*
Haley & Aldrich has indicated contamination of the project site and confirmed that the site will undergo remediation in accordance with MassDEP requirements to achieve this credit.

LTc4 Surrounding Density and Diverse Uses *(4 points)*
As the project is located in an urban environment, the site is within a ½ mile of at least 8 basic services. The Walk Score compliance path is recommended based on the surrounding density of the project. The site has a Walk Score of 89 enabling the achievement of 4 LEED points.

LTc5 Access to Quality Transit (v4.1) *(4 points)*
The qualifying MBTA rail and bus routes within the required proximity to the site can achieve 4 LEED points.

LTc6 Bicycle Facilities (v4.1) *(1 point)*
The project site is connected to a bicycle network and the current design includes a bike storage area providing at least 104 total storage spaces and 9 shower facilities meeting the LEED requirements for 101 long term storage spaces, 4 short-term spaces, and 9 showers based on the building occupancy estimates.

LTc7 Reduced Parking Footprint (v4.1) *(1 point)*
The project consolidates parking in a 4-level underground parking structure that includes 350 parking spaces, well below the required threshold of 647 spaces to meet LEED requirements. Elkus Manfredi Architects has confirmed that the minimum local code requirement of 350 parking spaces will not be exceeded.

LTc8 Green Vehicles (v4.1) *(1 point)*
The proposed design includes 18 parking spaces with electric vehicle supply equipment (EVSE) to satisfy LEED electric vehicle criteria.

Sustainable Sites

SSc1 Site Assessment *(1 point)*
The design team will compile results of site assessments completed for the project including surveys for topography, hydrology, climate, vegetation, soils, human use, and human health effects.

SSc2 Protect or Restore Habitat *(1 point)*
Due to site limitations, it is unlikely that the project will be able to restore 30% of the previously developed site with native and adapted vegetation, however, one point can still be achieved through financial support to an accredited land trust or conservation organization on a dollar per square foot basis. Based on the proposed LEED boundary, the estimated financial support amount is approximately $20,000.

SSc3 Open Space (v4.1) *(1 point)*
The site design includes approximately 21,200 square feet of physically accessible open space with about 7,000 square feet of that space being vegetated, thus meeting the requirements for the provision of outdoor space for at least 30% of the total site area with minimum 25% of that outdoor space being vegetated.

SSc4 Rainwater Management (v4.1) *(3 points)*
74 Middlesex incorporates stormwater management best practices that meet MEPA stormwater requirements for run-off rates and phosphorus levels. The project has been designed to retain rainfall from the 90th percentile rain event to achieve 3-points. Stormwater will be collected and reused for fixture flushing and irrigation.

SSc5 Heat Island Reduction *(2 points)*
Approximately 9,000 square feet of uncovered hardscape exists in the project currently. To limit heat island effect from these surfaces the design team is looking at pavers with high albedo and light-colored standard concrete for sidewalks. A portion of the hardscape areas are located beneath the building tower canopy which provides adequate shading and further reduces the effects of heat island. The site incorporates 7,000 square feet of additional landscaped areas and 8,750 square feet of green roof at Level 2 and the Mechanical Level, as well as water features in the civic space. The vegetation for the site has been chosen to be native or adapted plantings that are appropriate for the climate. Lastly, the project design consolidates parking in a 4-level underground parking structure, which helps to reduce potential heat island effect associated with traditional surface parking lots.

SSc6 Light Pollution Reduction *(1 point)*
The Somerville Zoning Ordinance requires the reduction of light pollution and glare from outdoor lighting fixtures and reduction of excessive light levels as existing fixtures are replaced over time. The project will design exterior lighting to meet LEED BUG requirements.

SSc7 Tenant Design and Construction Guidelines *(1 point)*
Greystar will develop tenant guidelines for design and construction to educate future tenants in implementing sustainable design and construction features in their fit outs.

Water Efficiency

WEp1 / WEc1 Outdoor Water Use Reduction *(2 points)*
To reduce irrigation demand, the design incorporates an efficient drip irrigation system for planting beds as well as native and adapted plantings. The design also includes a water reuse strategy to collect and treat stormwater and condensate for irrigation, showing potential to achieve a 100% reduction in outdoor potable water use.

WEp2 / WEc2 Indoor Water Use Reduction *(6 points)*
For indoor water use, the project is currently targeting a 26% indoor water use reduction through efficient fixture selection by specifying the following maximum flow rates:

- Water closet: 1.28 gpf
- Lavatory faucet: 0.35 gpm
- Shower: 1.25 gpm
- Kitchen faucet: 1.75 gpm

To accommodate gender neutral restrooms, the design does not include urinals which reduces the potential for indoor water savings through fixture specification. To increase water use savings, the project intends to collect and reuse stormwater and mechanical equipment condensate for flush fixtures to achieve a 50% overall potable water use reduction for indoor plumbing fixtures.

WEp3 Building-Level Water Metering *(Prerequisite)*
The current design includes building-level water metering. Greystar will sign a commitment letter agreeing to share water metering data with USGBC for 5 years to achieve this prerequisite.

WEc3 Cooling Tower Water Use *(1 point)*
The Design Team is evaluating strategies for reducing potable water required for the cooling towers. Due to the lab air change requirement, cooling tower make-up water represents a large demand accounting for about 36% of the project's annual water demand. As such, the Design Team aims to maximize cycles of concentration. To evaluate the appropriate cycles of concentration, a potable water analysis will be conducted. It is recommended that excess condensate water not used to supply irrigation and indoor fixture demand is reused for cooling tower make-up to reduce the potable water demand as feasible.

WEc4 Water Metering *(1 point)*
The project will include submetering of at least two water subsystems including irrigation and one of the following:

- Indoor plumbing fixtures and fittings
- Domestic hot water
- Reclaimed water
- Other process water

Energy & Atmosphere

EAp1 / EAc1 Fundamental Commissioning and Verification & Enhanced Commissioning *(6 points)*

ICO Energy and Engineering has been engaged to verify that the design meets the owner's project requirements and comply with both the prerequisite and credit requirements. To meet the project's LEED Platinum goal, all four categories of enhanced commissioning are being pursued: fundamental, enhanced, monitoring-based, and envelope.

EAp2 / EAc2 Optimize Energy Performance *(13 points)*

The team is targeting at least 12 LEED points under the Optimize Energy Performance Credit. The current DD energy analysis indicates the Proposed Design achieves 40% energy use savings and 17% energy cost savings compared to an ASHRAE 90.1-2013 Baseline. Due to the focus on building electrification combined with the high cost of electricity in Somerville, the team has decided to pursue an Alternative Compliance Path (ACP) which considers carbon emissions and source energy, in addition to the traditional metric of energy cost. When considering these additional measures, the average calculated savings is approximately 31%, thus meeting the targeted energy performance goal for LEED and contributing up to 13 LEED points.

The Proposed Design savings are due to the following energy efficiency measures incorporated in the design which contribute to savings in heating, cooling, lighting, and fan energy:

- Triple pane glazing
- Reduced lighting power density (MA Energy Conservation Code 2018 Prescriptive LPDs)
- Dedicated outdoor air system serving fan coil units
- Staged exhaust fans
- Air-source heat pumps (ASHP)
- Condensing natural gas boilers
- Heat recovery chiller
- Water-side economizer

EAp3 Building-Level Energy Metering *(1 point)*

The project will include building-level energy meters for each utility energy source. Greystar will sign commitment letter agreeing to share water metering data with USGBC for 5 years to achieve this prerequisite.

EAp4 Fundamental Refrigerant Management *(Prerequisite)*

The mechanical systems are designed to not use CFC-based refrigerants in new heating, ventilating, air-conditioning, and refrigeration equipment.

EAc5 Renewable Energy (v4.1) *(5 points)*

To support the City of Somerville's net-zero goals and the project's path to LEED Platinum the project intends to purchase Green-e Energy certified tier 2 renewable energy credits to offset the building's annual site energy use.

Materials & Resources

MRp1 Storage & Collection of Recyclables *(Prerequisite)*
Collection and storage areas for recyclables will be included in the building to meet this prerequisite.

MRp2 Construction and Demolition Waste Management Planning *(Prerequisite)*
The contractor must develop and implement a construction and demolition waste management plan.

MRc1 Building Life-Cycle Impact Reduction (v4.1) *(2 points)*
Atelier Ten will be conducting a whole-building life-cycle assessment for the structure and enclosure of the building to understand the environmental impact, enabling the project to achieve at least 1 LEED point. The project will also target 5%-10% reductions in embodied carbon by incorporating impact reduction measures into the design to achieve additional points.

MRc2 Building Product Disclosure & Optimization: Environmental Product Declarations (v4.1) *(1 point)*
The design team and contractor will coordinate to specify and procure at least 10 permanently installed products from three different manufacturers that have environmental product declarations.

MRc3 Building Product Disclosure & Optimization: Sourcing of Raw Materials (v4.1) *(1 point)*
The design team and contractor will coordinate to specify and procure products that meet responsible sourcing and extraction criteria. The project will target at least 20% by cost of the total value of permanently installed products in the project.

MRc4 Building Product Disclosure & Optimization: Material Ingredients (v4.1) *(1 point)*
The design team and contractor will coordinate to specify and procure at least 10 different products from three different manufacturers that have Health Product Declarations, Cradle-to-Cradle Certificates, Declare Labels, UL Product Lens, Reach Optimization, etc. to meet material ingredient disclosure criteria. For an additional point, the design team is considering specifying 10 products that comply with material ingredient optimization criteria.

MRc5 Construction & Demolition Waste Management (v4.1) *(1 point)*
The contractor must implement the construction and demolition waste management plan and demonstrate a 75% waste diversion rate with at least 3 site-separated material streams.

Indoor Environmental Quality

EQp1 Minimum IAQ Performance *(Prerequisite)*
Minimum outdoor air intake flow requirements have been designed in accordance with ASHRAE 62.1-2010 and outdoor airflow measurement devices will be installed on the project.

EQp2 Environmental Tobacco Smoke (ETS) Control *(Prerequisite)*
Greystar will prohibit smoking inside the building and outside within 25 feet of building openings.

EQc1 Enhanced Air Quality Strategies *(2 points)*
The current design indicates MERV 14 and MERV 16 filters will be provided for supply air systems, meeting the minimum MERV 13 requirement. Spaces with potentially hazardous chemicals or gases will be provided with sufficient exhaust, deck-to-deck partitions, and self-closing doors. Additionally, 10' entryway systems will be provided for all regularly used entrances of the building and densely occupied spaces will be provided with CO_2 monitors.

EQc2 Low-Emitting Materials (v4.1) *(3 points)*
The design team is specifying VOC compliant materials for paints, coatings, adhesives, sealants, insulation, flooring, ceilings, and composite wood. The contractor must track products throughout construction.

EQc3 Construction IAQ Management Plan *(1 points)*
The contractor must develop and implement an indoor air quality (IAQ) management plan for the construction and pre-occupancy phases of the building that meets SMACNA IAQ Guidelines for Occupied Buildings Under Construction.

EQc4 Daylight (v4.1) *(2-3 points)*
Atelier Ten's preliminary daylight analysis indicates the potential for the project to earn up to 3 points. The provision of manual or automatic glare-control devices will be required as part of the base building or as a binding requirement in a signed tenant lease to achieve this credit.

EQc5 Quality Views *(1 point)*
Atelier Ten will conduct calculations to confirm compliance with the quality views requirements in CD.

Innovation

INc1.1 Innovation: O+M Starter Kit – Integrated Pest Management & Green Cleaning Policy *(1 point)*

Greystar will provide both an Integrated Pest Management Plan and Green Cleaning Policy for the base building to meet the LEED v4 O+M requirements.

INc1.2 Innovation: Sustainable Wastewater Management *(1 point)*

This innovation credit requires reduction of wastewater from toilets and urinals or reuse of building wastewater on site. The proposed design includes stormwater and mechanical equipment condensate collection and reuse for irrigation and indoor flush fixtures to reduce potable water consumption.

INc1.3 Innovation: Purchasing – Lamps *(1 point)*

The project will include all LED lighting fixtures, meeting the requirements of the innovation credit.

INc1.4 Innovation: Occupant Comfort Survey *(1 point)*

Greystar will develop an occupant comfort survey to be distributed to building occupants in order to achieve this innovation credit.

INc1.5 Innovation: Exemplary Performance – SSc5 Heat Island Reduction *(1 point)*

To achieve exemplary performance for heat island reduction, the project will meet both options 1 and 2 of the credit, including the provision of all parking under cover.

INc2 LEED Accredited Professional *(1 point)*

This credit will be met by having a LEED AP on the design team.

Regional Priority

RPc1.1 Regional Priority: Rainwater Management *(1 point)*

To earn this regional priority credit the project must achieve at least 2 points for SSc4 Rainwater Management. The design team is targeting to retain at least the 90th percentile storm event using low-impact development and green infrastructure, exceeding the regional priority requirements.

RPc1.2 Regional Priority: Optimize Energy Performance *(1 point)*

To earn this regional priority credit the project must achieve at least 8 points for EAc2 Optimize Energy Performance. The design team is targeting to reduce building energy consumption by at least 40% compared to ASHRAE 90.1-2010 baseline for 13 LEED points, exceeding regional priority requirements.

RPc1.4 Regional Priority: Indoor Water Use Reduction *(1 point)*

To earn this regional priority credit the project must achieve at least 4 points for WEc2 Indoor Water Use Reduction. The design team is targeting a 50% indoor water use reduction for 6 LEED points, exceeding regional priority requirements.

LEED SCORECARD

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LEED v4 Core & Shell
74 Middlesex Ave
last updated: 6/17/2021

Certified 40 to 49 points **Silver** 50 to 59 points **Gold** 60 to 79 points **Platinum** 80 or more points
Achievability rating: **High** = 90%, **Med** = 60%, **Low** = 10%, **NP** = not possible.

Achievability			
high	med	low	NP
84	11	3	12

83 Projected Points

1	0	0	0		**Integrative Process**	**Standard**	**Comments**	**Responsible**
1				IP Credit 1	**Integrative Process**	Perform preliminary energy model and water budget before the completion of SD and document in OPR & BOD.	A10 to coordinate with project team to integrate recommendations from SD energy analysis and water budget into the BOD and OPR.	A10
16	0	0	4		**Location & Transportation**	**Standard**	**Comments**	**Responsible**
			20	LT Credit 1	**LEED for Neighborhood Development Location**	Locate the project in within a development certified under LEED for Neighborhood Development.	Project site is not located in a LEED Neighborhood Development.	--
2				LT Credit 2	**Sensitive Land Protection**	Locate the development footprint on land that has been previously developed - OR - does not meet LEED criteria for sensitive land (prime farmland, floodplains, habitat for threatened species, near water bodies, in or near wetlands).	The project site is located on previously developed land.	A10
3				LT Credit 3	**High Priority Site**	Locate the project on an infill site in historic district (2pts) - OR - site with priority designation (2pts) - OR - brownfield site where contaminated soil/groundwater remediation is required (3pts).	Haley Aldrich has indicated that the site will be remediated as part of the project.	Haley Aldrich
4			2	LT Credit 4	**Surrounding Density and Diverse Uses**	Locate on a site with an existing density of 22,000sf/acre - 35,000 sf/acre and within 1/2 mile of 4-8 basic services.	The project site is located within a 1/2 mile of at least 8 basic services. The Walk Score compliance path is recommended based on the surrounding density for the site. The project site has a walkscore of 89 which complies for 4 points.	A10
4			2	LT Credit 5	v4.1 **Access to Quality Transit**	Locate any functional entry of the project within 1/2 mile of a rail station or ferry terminal that meets min. daily transit service - OR - 1/4 mile of bus, streetcar or rideshare that meets min. daily transit service.	Qualifying MBTA rail and bus routes (Orange Line, 95, 90, 89, 101) can achieve 4 points.	A10
1				LT Credit 6	v4.1 **Bicycle Facilities**	Provide short term (2.5% peak visitors) and long term (5% all regular occupants) bike parking within 200ft (short term) of any main entrance and 300 ft (long term) of any functional entry, FTE showers, and access to bicycle network.	The project site is connected to a bicycle network. EMA has confirmed long-term bicycle storage of 101 spaces and short-term storage of 4 spaces will be met. 100% DD drawings indicate 9 shower facilities, satisfying LEED criteria.	EMA / A10
1				LT Credit 7	v4.1 **Reduced Parking Footprint**	No off-street parking serving project - OR - provide 30% reduction in parking capacity from base ratios for parking spaces, by building type and do not exceed minimum local code requirements - OR - provide carshare vehicle parking spaces for at least 1% of total parking spaces; if the project has fewer than 100 parking spaces, provide one carshare vehicle parking space.	The 100% DD design complies with requirements through inclusion of 350 parking spaces. EMA has confirmed local code requirement of 350 parking spaces is not exceeded.	EMA / A10
1				LT Credit 8	v4.1 **Electric Vehicles**	Install electric vehicle supply equipment (EVSE) for 5% (or 2 spaces, whichever is greater) of parking spaces OR make 10% of parking spaces (or at least 6 spaces) EV ready for future use.	The 100% DD parking count indicates 18 EV spaces, satisfying the 5% requirements.	EMA / BR+A
10	0	1	0		**Sustainable Sites**	**Standard**	**Comments**	**Responsible**
Y				SS Prereq 1	**Construction Activity Pollution Prevention**	Create and implement erosion control plan that meets the 2003 EPA Construction General Permit.	Civil engineer to develop erosion and sedimentation control plan and specifications. Contractor to implement ESC plan.	VHB / Contractor
1				SS Credit 1	**Site Assessment**	Complete comprehensive site survey; topography, hydrology, climate, vegetation, soils, human use and human health effects.	Design team to work to complete a comprehensive site assessment with guidance from A10.	EMA / A10 / MKD / VHB
1		1		SS Credit 2	**Protect or Restore Habitat**	Protect 40% of greenfield area, restore soils, and restore 30% of previously developed site with native/adapted plants (2pts) - OR - provide $0.40/sf to accredited land trust (1pt).	Current landscape accounts for 14% of the site. Project is not likely to achieve restoration of 30% of all portions of the site with native plantings. Estimated cost to achieve Option 2 is $20,000.	Greystar
1				SS Credit 3	v4.1 **Open Space**	Provide outdoor space greater than or equal to 30% of the total site area (including building footprint), with min. 7.5% of the total site area (25% of the outdoor space) being vegetated area.	Based on the 100% DD documents, the site includes 21,000 sq. ft. of open space meeting the 30% threshold, and 7,000 sq. ft. of that open space is vegetated meeting the 25% threshold.	A10 / MKD
3				SS Credit 4	v4.1 **Rainwater Management**	Retain runoff for the 80th percentile (1pt) or 85th percentile (2pts) or 90th percentile (3pts) using low-impact development (LID) and green infrastructure (structural or non-structural). For zero lot line, reduce the rainfall event for the 70th percentile (1pt), 75th percentile (2pts) or 80th percentile (3pts) - OR - retain on site the increase in runoff volume between the proposed design conditions and the natural land cover conditions that existed prior to any disturbance.	As noted in the Somerville Zoning Ordinance - To every extent practicable, storm water should be reused on site for irrigation or other purposes. Civil engineer to develop design strategies to retain the 90th percentile rain event on site.	VHB
2				SS Credit 5	**Heat Island Reduction**	Meet high albedo requirements for roof and site (2pts) - OR - place a minimum of 75% parking under cover (1pt).	EMA to specify roof materials with SRI of 82 or greater to meet LEED credit requirements and Somerville Zoning Ordinance. If entire qualifying roof area has an SRI of 82, approximately 1,170 square feet of site hardscape must have a SR of 0.33 to achieve 2 points for Option 1. An additional EP point can be earned for placing 100% of parking under cover.	EMA / MKD / A10
1				SS Credit 6	**Light Pollution Reduction**	Meet uplight and light trespass requirements, and do not exceed exterior signage luminance requirements.	The Somerville Zoning Ordinance requires the reduction of light pollution and glare from outdoor lighting fixtures and reduction of excessive light levels as existing fixtures are replaced over time. EMA/Exterior lighting designer to design exterior lighting to meet LEED BUG requirements.	EMA / Exterior Lighting Designer
1				SS Credit 7	**Tenant Design and Construction Guidelines**	Publish an illustrated document to educate tenants in implementing sustainable design and construction features in their tenant improvement build-outs.	Greystar to develop tenant design and construction guidelines.	Greystar

10	1	0	0	Water Efficiency		Standard	Comments	Responsible
Y				WE Prereq 1	**Outdoor Water Use Reduction:** 30%	Reduce outdoor water use by 30% over the baseline specified in LEED.	MKD to provide outdoor water use calculations and to confirm that the project will meet this prerequisite.	MKD
Y				WE Prereq 2	**Indoor Water Use Reduction:** 20%	Reduce indoor water use by 20% over the baseline specified in LEED, use fixtures with WaterSense label, and meet requirements for process water use.	To align with the project's LEED Platinum goal, the design assumes collection of stormwater and condensate for reuse in indoor flush fixtures to achieve a 50% water use reduction. BR+A to confirm that process water requirements will be met.	A10 / BR+A
Y				WE Prereq 3	**Building-Level Water Metering**	Install permanent water meters for building and grounds, and commit to share data with USGBC for 5 years.	BR+A to confirm implementation of building-level water metering and Greystar to commit to share data with USGBC for 5 years.	BR+A / Greystar
2				WE Credit 1	**Outdoor Water Use Reduction:** 50% Reduction / No Potable Water Use	Reduce potable water used for irrigation by 50% (1pt) - AND - use no potable water for irrigation (1pt).	Design to reuse stormwater for irrigation demand. Landscape architect to confirm that no potable water will be used for irrigation.	MKD
6				WE Credit 2	**Indoor Water Use Reduction:** 25% / 30% / 35% / 40% / 45% / 50%	Reduce building water use over LEED baseline.	To align with the project's LEED Platinum goal, the design assumes collection of stormwater and condensate for reuse in indoor flush fixtures to achieve a 50% water use reduction.	A10
1	1			WE Credit 3	**Cooling Tower Water Use**	Conduct a water analysis to optimize cooling tower cycles. Maximizing cycles (1pt), >10 cycles or 20% non-potable water use (2pts).	BR+A to evaluate cycles of concentration and design team to evaluate feasibility of stormwater and condensate reuse for cooling tower makeup water for second point.	BR+A
1				WE Credit 4	**Water Metering**	Install permanent water meters for two or more water subsystems.	BR+A to confirm metering of at least two water subsystems.	BR+A
24	**4**	**0**	**5**	**Energy & Atmosphere**		**Standard**	**Comments**	**Responsible**
Y				EA Prereq 1	**Fundamental Commissioning and Verification**	Engage commissioning agent by end of DD, develop and execute a commissioning plan, and prepare O&M plan for current facilities.	Greystar has engaged ICO as the qualified commissioning authority to provide fundamental commissioning for the project.	ICO
Y				EA Prereq 2	**Minimum Energy Performance**	Reduce energy cost by 5%, compared to ASHRAE 90.1-2010, Appendix G; meet mandatory provisions of ASHRAE 90.1-2010. -OR Comply with HVAC and service water heating requirements for the climate zone in ASHRAE 50% Advanced Energy Design Guide, and meet ASHRAE 90.1-010 mandatory and prescriptive provisions.	A10 to perform an energy analysis for the building and confirm that this prerequisite will be met.	A10 / BR+A
Y				EA Prereq 3	**Building-Level Energy Metering**	Install meters to provide data on total energy consumption, and commit to share data with USGBC for 5 years.	BR+A to provide building-level energy meters for each utility energy source. Greystar to share at least 5 years of data with USGBC.	BR+A / Greystar
Y				EA Prereq 4	**Fundamental Refrigerant Management**	Eliminate CFCs in building HVAC&R, and complete CFC phase-out conversion before project completion for any CFC equipment to remain.	BR+A to confirm compliance with refrigerant use requirements.	BR+A
6				EA Credit 1	**Enhanced Commissioning**	Complete CD review, post occupancy review, and recommissioning manual (3pts), and develop monitoring procedures (+1pt) - AND/OR - complete envelope Cx (+2pts)	Greystar has engaged ICO as the qualified commissioning authority to provide enhanced commissionig scope, monitoring-based commissioning, and envelope commissioning.	ICO
3				EA Credit 2	**Optimize Energy Performance:** 3% / 5% / 7%	Reduce building energy cost by 3% / 5% / 7% compared to ASHRAE 90.1-2010, Appendix G.	Project team to target at least a 26% energy cost savings compared to ASHRAE 90.1-2010 Appendix G Baseline. A10 to perform energy analysis and coordinate energy efficiency measures with design team.	A10 / BR+A
3				EA Credit 2	**Optimize Energy Performance:** 9% / 11% / 13%	Reduce building energy cost by 9% / 11% / 13% compared to ASHRAE 90.1-2010, Appendix G.		
3				EA Credit 2	**Optimize Energy Performance:** 15% / 17% / 19%	Reduce building energy cost by 15%/ 17%/ 19% compared to ASHRAE 90.1-2010, Appendix G.		
3				EA Credit 2	**Optimize Energy Performance:** 21% / 23% / 26%	Reduce building energy cost by 21% / 23% / 26% compared to ASHRAE 90.1-2010, Appendix G.		
1	2			EA Credit 2	**Optimize Energy Performance:** 29% / 32% / 35%	Reduce building energy cost by 29%/ 32%/ 35% compared to ASHRAE 90.1-2010, Appendix G.		
			3	EA Credit 2	**Optimize Energy Performance:** 39% / 43% / 47%	Reduce building energy cost by 39%/ 43%/ 47% compared to ASHRAE 90.1-2010, Appendix G.		
	1			EA Credit 3	**Advanced Energy Metering**	Install meters for tenant spaces to independently meter energy consumptions for all systems dedicated to tenant space, with minimum of one meter per energy source per floor. Install advanced metering for base-building energy sources, per reference guide.	BR+A to provide at least one meter per energy source per floor for the building.	BR+A
			2	EA Credit 4	v4.1 **Grid Harmonization**	Design building and equipment for participation in demand response programs through load shedding or shifting for any project, even if program is available (2pts) - OR - if DR program not available, provide infrastructure for future (1pt) OR implement one or more of the Load Flexibility and Management Strategies (1-2 pts)	Credit achievability may be challenging due to limited Owner-controlled areas in C&S building. BR+A to coordinate with Greystar to investigate potential for a system with the capability for real-time, fully-automated demand response for at least 10% of the estimated peak electric demand.	BR+A / Greystar
5				EA Credit 5	v4.1 **Renewable Energy**	Use on-site renewable energy systems or procure renewable energy from offsite sources for all or a portion of the building's annual energy use (1-5 pts).	Credit can be achieved through purchase of RECs and carbon offsets, or through combination of on-site renewable energy generation and purchase of offsets. Somerville Zoning Ordinance requires all new buildings to include a green roof, PV, or both for 100% of the roof area not occupied by building systems equipment or required outdoor amenity spaces.	Greystar
	1			EA Credit 6	**Enhanced Refrigerant Management**	Select refrigerants with low global warming potential and ozone depletion potential.	BR+A to confirm compliance with the credit requirements and design systems with low-impact refrigerants.	BR+A
6	**4**	**1**	**3**	**Materials & Resources**		**Standard**	**Comments**	**Responsible**
Y				MR Prereq 1	**Storage & Collection of Recyclables**	Provide space for the collection and storage of paper, cardboard, glass, plastic, metals, and at least two of the following: batteries, mercury-containing lamps, and electronic waste.	Recycling receptacles are required in conjunction with litter receptacles. EMA to provide location of recycling storage areas. The prerequisite will be met.	EMA
Y				MR Prereq 2	**Construction and Demolition Waste Management Planning**	Develop and implement a construction and demolition waste management plan.	Contractor to develop and implement a construction and demolition waste management plan.	Contractor
2	1		3	MR Credit 1	v4.1 **Building Life-Cycle Impact Reduction**	Option 2: Whole-building life-cycle assessment. Path 1 (1pt) (conduct a cradle-to-grave LCA of the structure and enclosure), Path 2 (2pts) (conduct a LCA of the projects structure and enclosure demonstrating a min. 5% reduction in at least 3 of the 6 categories (one must be GWP), Path 3 (3pts) (conduct a LCA of the structure and encloser demonstrating a 10% reduction in 3 impact categories, Path 4 (4pts) (demonstrate a 20% reduction for GWP and 10% reduction in two other impact categories and incorporate reuse and/or salvage materials.)	A10 to conduct a whole-building life-cycle assessment for the structure and enclosure of the building.	A10
1		1		MR Credit 2	v4.1 **Building Product Disclosure & Optimization:** Environmental Product Declarations	Use 10 products sourced from three different manufacturers that meet disclosure criteria (1pt) - AND/OR - use products that have an embodied carbon optimization report or action plan separate from the LCA or EPD, for 10% by cost (1 pt.) or 10 products from 3 different manufacturers.	EMA to specify at least 10 permanently installed products from three different manufacturers with EPDs. Contractor to track compliant products throughout construction.	EMA / Contractor
1	1			MR Credit 3	v4.1 **Building Product Disclosure & Optimization:** Sourcing of Raw Materials	Use products sourced that meet at least one responsible sourcing and extraction criteria (extended producer responsibility and/or take-back program (50%), bio-based materials (50%-100%), FSC certified wood products (100%), material reuse (200%), recycled content (100%)) for at least 20% from at least 3 different manufacturers (1 pt.) / or 40% from at least 5 manufacturers of the total materials cost (2pts).	EMA to specify products that meet responsible sourcing and extraction criteria. Contractor to track compliant products throughout construction and target at least 20% by cost of the total value of permanently installed products in the project.	EMA / Contractor
1	1			MR Credit4	v4.1 **Building Product Disclosure & Optimization:** Material Ingredients	Use 10 products sourced from five different manufacturers that demonstrate the chemical inventory of the products (1pt) - AND/OR - use products from at least three different manufacturers that document their material ingredient optimization by 10% material cost or 10 compliant programs (1pt) through a Material Ingredient Screening and Optimization Action Plan, Advanced Inventory & Assessment or Material Ingredient Optimization.	EMA to specify at least 10 permanently installed products from three different manufacturers with HPDs, C2C labels, Declare labels, UL Product Lens, Reach Optimization, etc. to meet Option 1 for 1 point. EMA to also target 10 products that comply with material ingredient optimization criteria for an additional point, with guidance from A10. Contractor to track compliant products throughout construction.	EMA / Contractor
1	1			MR Credit 5	v4.1 **Construction & Demolition Waste Management**	Follow the Waste Management Plan and divert at least 50% (1pt) - OR - generate less than 15 lbs/sqft of waste (1pt) - OR - generate less than 10 lbs/sqft of waste (2pts).	Contractor to implement the C+D WMP, and demonstrate at least 50% diversion rate.	Contractor
7	**2**	**1**	**0**	**Indoor Environmental Quality**		**Standard**	**Comments**	**Responsible**

Y				EQ Prereq 1	**Minimum IAQ Performance**	For mechanically ventilated spaces: Meet minimum outdoor air intake flow requirements determined by ASHRAE 62.1-2010 ventilation rate procedure, meet sections 4 through 7 of ASHRAE 62.1-2010, and monitor outdoor air intake flows.	BR+A to confirm that the minimum outdoor air intake flow requirements are met in accordance with ASHRAE 62.1-2010 and provide outdoor airflow measurement devices.	BR+A
Y				EQ Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Prohibit smoking inside building, locate exterior smoking areas at least 25 feet away from building, and post no-smoking signage within 10 ft of all building entrances.	Greystar to confirm smoking will be prohibited inside the building and prohibited outside within 25 feet of building openings. EMA to include no-smoking signage at building entries.	Greystar / EMA
2				EQ Credit 1	**Enhanced Air Quality Strategies**	Provide entryway systems, prevent interior cross-contamination, and specify MERV 13 filters (1pt) - AND/OR - prevent exterior contamination or increase ventilation or monitor CO2 (1pt).	BR+A to confirm at least MERV 13 filters will be provided for supply air systems, sufficient exhaust for spaces with potentially hazardous chemicals/gases, and design for one of the following enhanced IAQ strategies: exterior contamination prevention; increased ventilation; CO2 monitoring; other source control monitoring. EMA to provide 10' entryway systems at all regularly-used entries, and self-closing doors and deck-to-deck partitions in spaces with potentially hazardous chemicals/gases. Walk off mats shown on drawing A101 at three vestibule entrances. MERV 13 filters to be added to drawings.	BR+A / EMA
3				EQ Credit 2	v4.1 **Low-Emitting Materials:** 2 / 3 / 4 / 5 categories	Achieve the threshold level of compliance with VOC emissions and content standards for 2, 3, 4 or 5 product categories 1-3 pts + exemplary.	EMA to specify compliant materials for paints, coatings, adhesives, sealants, insulation, flooring, ceilings, and composite wood. Contractor to track products throughout construction.	EMA / Contractor
1				EQ Credit 3	**Construction IAQ Management Plan**	Develop an IAQ plan for construction and preoccupancy phases that meets SMACNA IAQ Guidelines for Occupied Buildings Under Construction.	Contractor to develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building.	Contractor
	2	1		EQ Credit 4	v4.1 **Daylight:** 40% / 55% / 75%	Provide manual or automatic glare-control devices AND Option 1: Average $SDA_{300/50\%}$ value for regularly occupied floor area is at least 40% (1pt), 55% (2pts), 75% (3pts) - OR - Option 2: meet illuminance level requirements for 55% (1pt), 75% (2pts), 90% (3pts) of regularly occupied floor area through simulation - OR - Option 3: meet illuminance level requirements for 55% of regularly occupied floor area at 1 time (1pt), 75% at 2 times (2pts), 90% at 2 times (3pts) through measurement.	EMA to confirm manual or automatic glare-control devices will be included in the base building. A10 has conducted a daylight analysis during DD.	A10
1				EQ Credit 5	**Quality Views**	Provide direct views to the outside that meet 2 out of 4 LEED view criteria in 75% of regularly occupied spaces.	A10 to conduct calculations to confirm compliance with quality views requirements.	A10
6	**0**	**0**	**0**	**Innovation**		**Standard**	**Comments**	**Responsible**
1				IN Credit 1.1	**Innovation,** O+M Starter Kit	Pursue LEED O+M credits that include Site Management Policy, Systems, O+M Plan, Purchasing, Waste and Renovation Policies, Green Cleaning Policy, and IPM plan.	Greystar to provide LEED v4 policies for 2 of the following: Site Management, Purchasing and Waste, Facility Maintenance and Renovations, Green Cleaning, and Integrated Pest Management.	Greystar
1				IN Credit 1.2	**Innovation,** Sustainable Wastewater Management	Reduce wastewater from toilets and urinals from the baseline - OR - Reuse building wastewater on site.	BR+A and A10 to coordinate on potential strategies to reuse water on site to reduce non-potable water consumption.	BR+A / A10
1				IN Credit 1.3	**Innovation,** Purchasing - Lamps	Implement a lighting purchasing plan that specifies an overall building average of 35 picograms of mercury per lumen-hour or less.	The 100% DD light fixture schedule indicates all lighting will be LED.	LAM
1				IN Credit 1.4	**'Innovation,** Occupant Comfort Survey	Administer at least one occupant comfort survey every two years to collect anonymous responses regarding at least one of the following: acoustics, building cleanliness, indoor air quality, lighting, and thermal comfort. The responses must be collected from a representative sample of building occupants making up at least 30% of the total occupants.	Greystar to develop occupant comfort survey to be distributed to building occupants.	Greystar
1				IN Credit 1.5	**Innovation,** Exemplary Performance - SSc5 Heat Island Reduction	Achieve Option 1 and locate 100% of parking under cover.	The project is locating 100% of parking in a below grade garage. Achievement of Option 1 for Heat Island Reduction can allow for the project to earn a point for exemplary performance.	A10
1				IN Credit 2	**LEED™ Accredited Professional**	LEED Accredited Professional on design team.	A10 has multiple LEED APs on the project team, meeting credit requirements.	A10
4	**0**	**0**	**0**	**Regional Priority**		**Standard**	**Comments**	**Responsible**
1				RP Credit 1.1	**Regional Priority**, SSc4 Rainwater Management	Achieve at least 2 points for SSc4 Rainwater Management	Project team is targeting to retain at least the 90th percentile using low-impact development and green infrastructure, exceeding regional priority requirements.	VHB
1				RP Credit 1.2	**Regional Priority**, EAc2 Optimize Energy Performance	Achieve at least 8 points for EAc2 Optimize Energy Performance	Project team is targeting to reduce the building energy cost by at least 25% compared to ASHRAE 90.1-2010 baseline, exceeding regional priority requirements.	BR+A / A10
1				RP Credit 1.3	**Regional Priority**, MRc1 Building Life-Cycle Impact Reduction	Achieve at least 2 points for MRc1 Building Life-Cycle Impact Reduction	Owner to confirm if consultant will be engaged to perform an LCA and determine achievability with the 2-pt threshold for MRc1 Building Life-Cycle Impact Reduction.	Greystar
1				RP Credit 1.4	**Regional Priority**, WEc2 Indoor Water Use Reduction	Achieve at least 4 points for WEc2 Indoor Water Use Reduction	Project team is targeting at least 40% water use reduction to meet regional priority requirements.	A10 / BR+A

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AFFIDAVIT

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atelier ten

Affidavit

74 Middlesex Avenue – Sustainable Development

I, Jennifer Chalos, personally appeared before the undersigned notary public, and under oath or affirmation make the following statements:

- I am a LEED Accredited Professional with BD+C specialty, credential ID 11015706-AP-BD+C, currently employed by Atelier Ten.
- I confirm that I am the LEED Accredited Professional for 74 Middlesex Avenue located in Somerville, MA.
- I have been actively involved in 74 Middlesex Avenue and have coordinated with the other project team members, including but not limited to Greystar Real Estate Partners, Elkus Manfredi Architects, BR+A Consulting Engineers, Vanasse Hangen Brustlin, and Mikyoung Kim Design to develop the LEED v4 Core and Shell scorecard.
- To the best of my knowledge, 74 Middlesex Avenue is being planned and designed with the goal of being LEED Platinum certifiable.
- 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.

DATED this the 24 day of June, 2021

Jennifer Chalos
Senior Environmental Designer

SWORN TO AND SUBSCRIBED before me, this the 24th day of June, 2021

NOTARY PUBLIC FOR THE STATE OF New York

MY COMMISSION EXPIRES June 24th 20 Dec 28, 2023

DAVID SANTOS
Notary Public, State of New York
No. 01SA6334917
Qualified in New York County
Commission Expires Dec 28, 2023

LONDON
GLASGOW
EDINBURGH
NEW YORK
NEW HAVEN
SAN FRANCISCO
BANGKOK
SINGAPORE
MELBOURNE
SYDNEY

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New York, New York 10003
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F +1 (212) 254 1259
newyork@atelierten.com
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CERTIFICATION OF REQUIRED MATERIALS

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CITY OF SOMERVILLE, MASSACHUSETTS
OFFICE OF SUSTAINABILITY AND ENVIRONMENT
JOSEPH A. CURTATONE
MAYOR

Jennifer Chalos
Atelier Ten
104 West 29th Street, 8th Floor
New York NY 10001
jennifer.chalos@atelierten.com

July 26, 2021

Dear Jennifer,

I have done a completeness check of the sustainability submission for 74 Middlesex Avenue. The materials you have provided are satisfactory for meeting the Office of Sustainability and Environment's submittal requirements. I signed the Certificate of Required Sustainability Materials dated July 26, 2021.

Please note the following comments on your submission:

The current proposal is to install EV charging at 5% of parking spaces, or 18 EV charging stations. The City of Somerville recommends that at least 25% of parking spaces be equipped with EV charging infrastructure and that the garage design has the capacity to electrify all spaces in the future. We expect greater and greater demand for EV charging, and it is much more cost effective to build in the capacity to expand charging capabilities during construction than needing to retrofit down the line. I acknowledge that you are currently in discussion with Eversource, and please note that we expect that later in 2021 more clarity on incentives will be available. In addition, there continue to be more opportunities to collect revenue from charging usage to help defray costs.

The LEED narrative omitted information on a number of the prerequisites. In future LEED narrative submissions, please be consistent on prerequisite and credit descriptions.

Please let me know if you have any questions.

Regards,

Oliver Sellers-Garcia, Director

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FORM: CRM (May 24, 2021)
Discontinue Prior Editions

CITY OF SOMERVILLE

Inspectional Services • Planning Board • Zoning Board of Appeals

CERTIFICATION OF REQUIRED MATERIALS
BY CITY OF SOMERVILLE DEPARTMENT OF SUSTAINABILITY & ENVIRONMENT

Development Site Address:	74 Middlsex Avenue
Applicant Name:	74M Property Owning LLC, Ryan Souls

As required by the City of Somerville's Development Review Submittal Requirements, I certify that I have received and approved the following development review materials for the development proposal identified above:

☑ Sustainable & Resilient Building Questionnaire

☐ Net-Zero Ready Building: PHIUS+
- Building Resilience & Sustainability Narrative
- Copy of signed PHIUS+ Certification Contract
- Copy of signed PHIUS+ Certification Fee Receipt

☐ Net-Zero Ready Building: Zero Carbon
- Building Resilience & Sustainability Narrative
- Evidence of ILFI Premium Membership
- Evidence of ILFI New Zero Carbon Project Registration

☑ LEED Certifiability
- LEED Gold or Platinum checklist
- LEED Narrative
- Signed affidavit by LEED accredited professional

Signature: _____ Date: July 26, 2021

Sustainability & Environment Representative

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APPENDIX E: Environmental Analyses

Contents

- Shadow Studies
- Pedestrian Wind Study
- Solar Reflection Study

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SHADOW STUDIES

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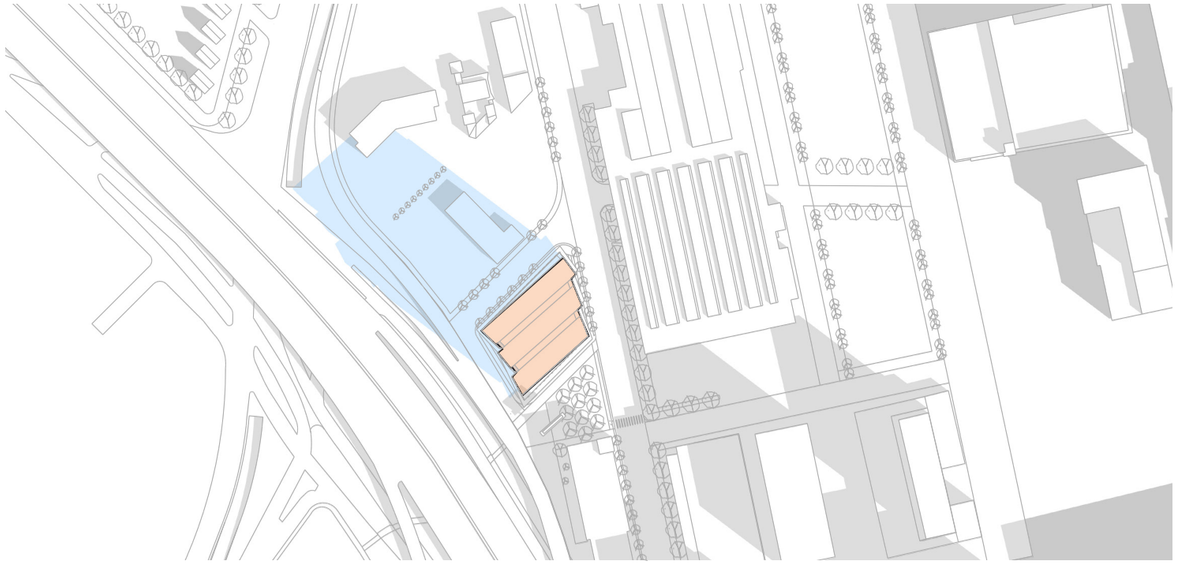

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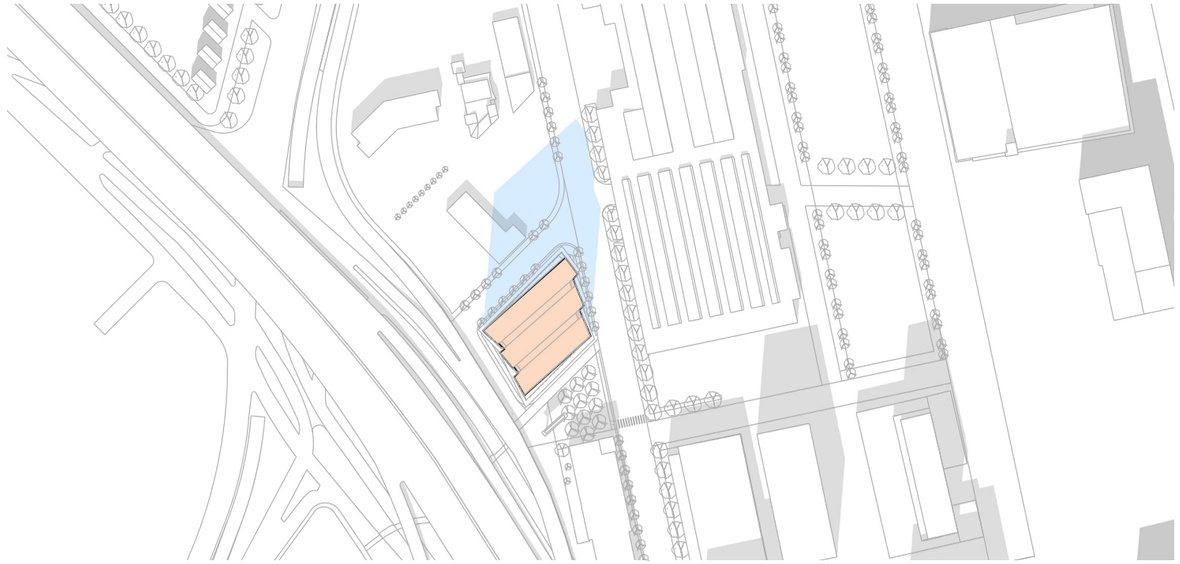

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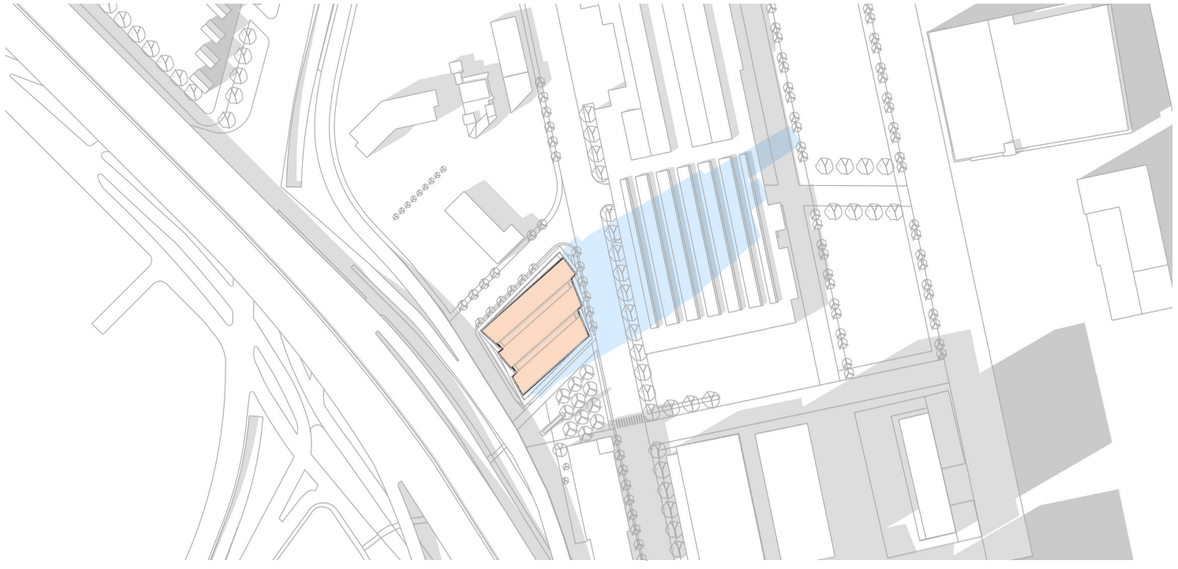

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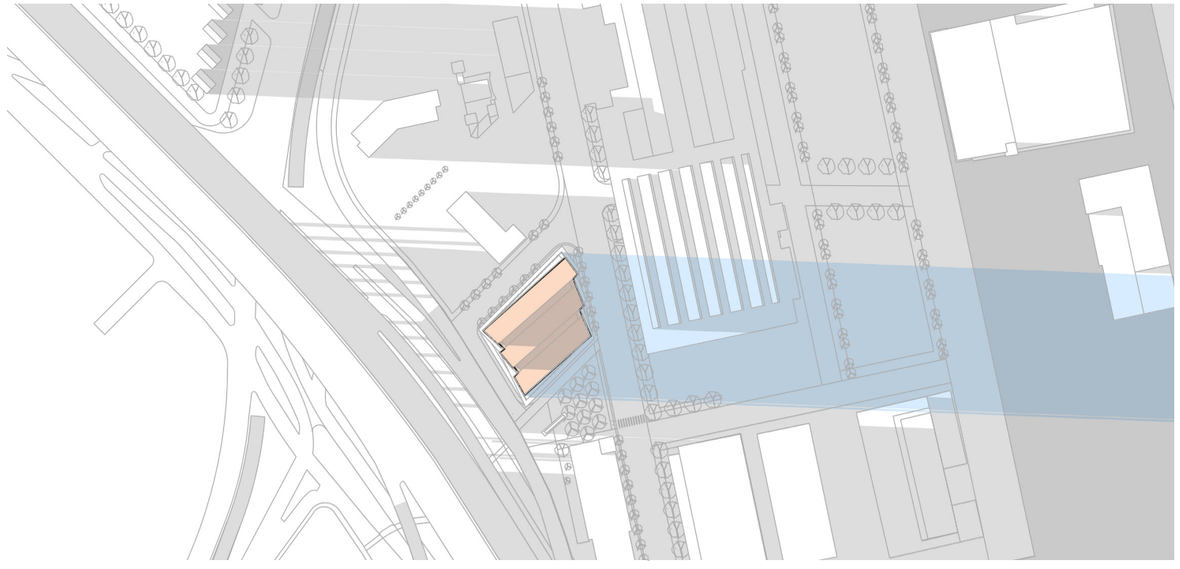


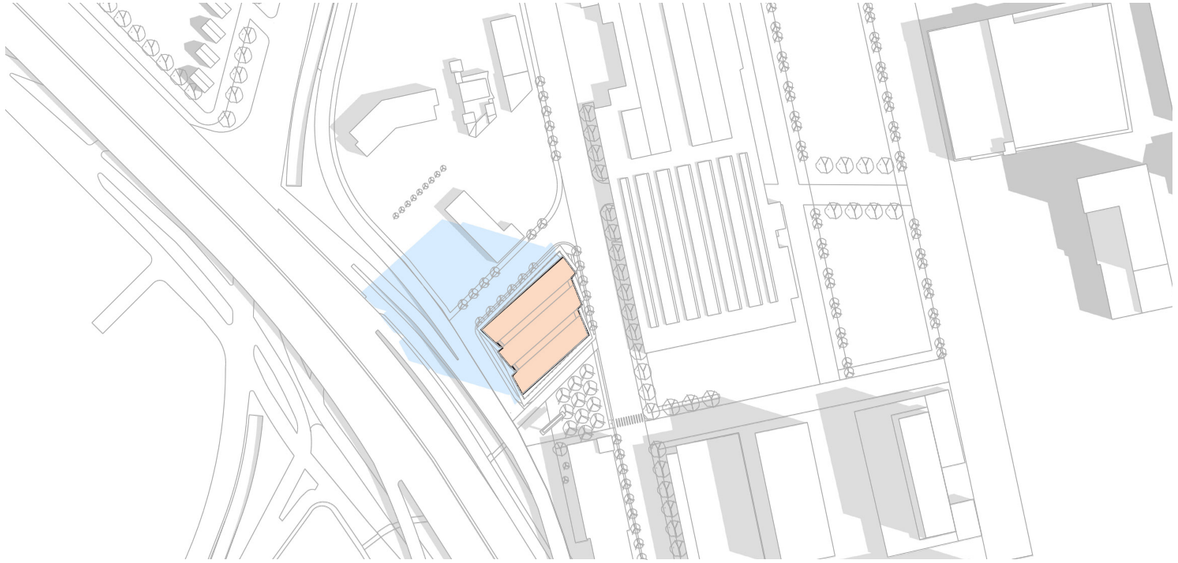
MARCH 21 **6:00 PM**

ELKUS | MANFREDI ARCHITECTS

Figure A.1a

SHADOW STUDIES: MARCH 21

74 Middlesex Avenue
Somerville, Massachusetts



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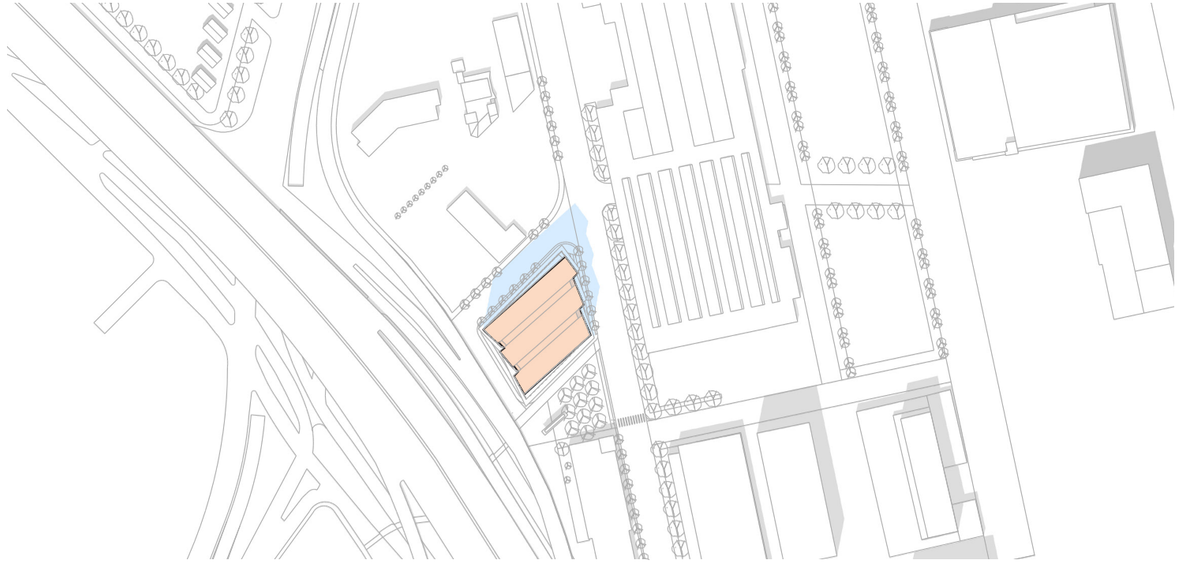

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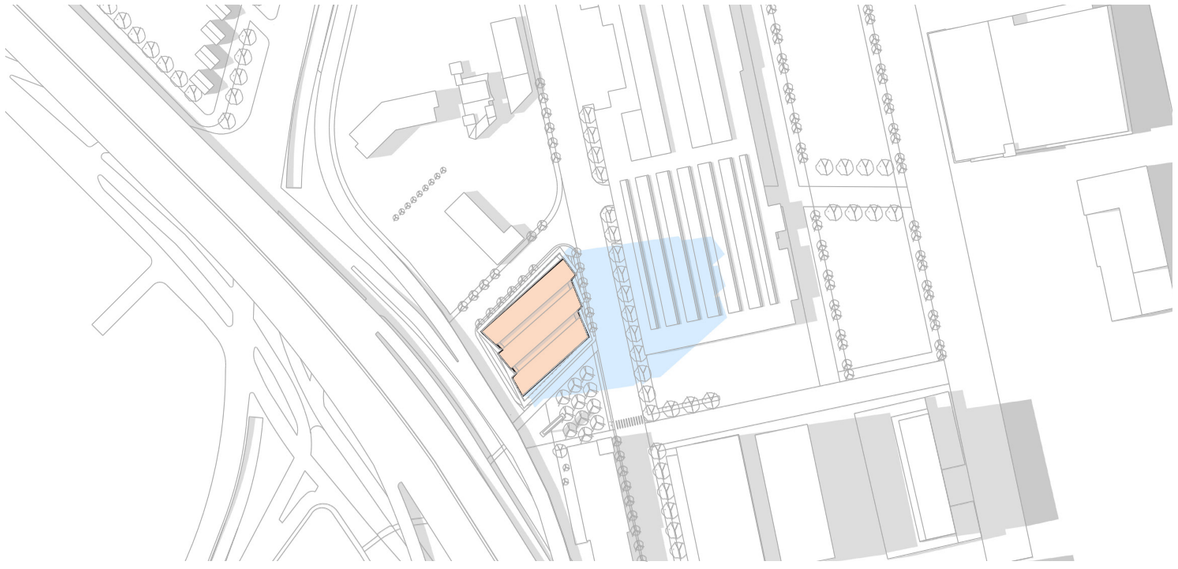

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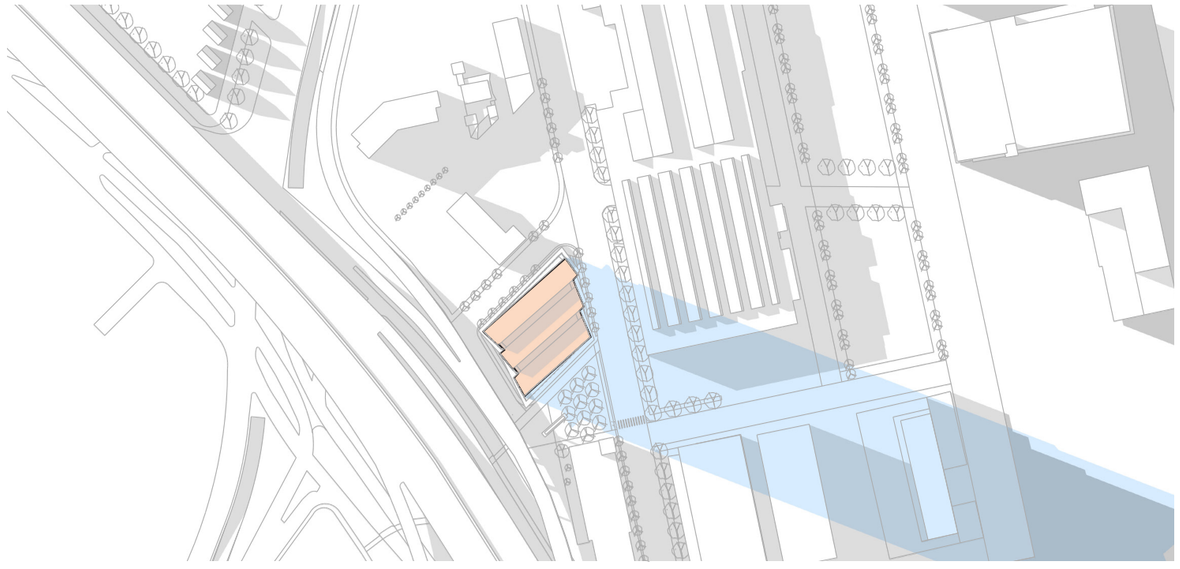


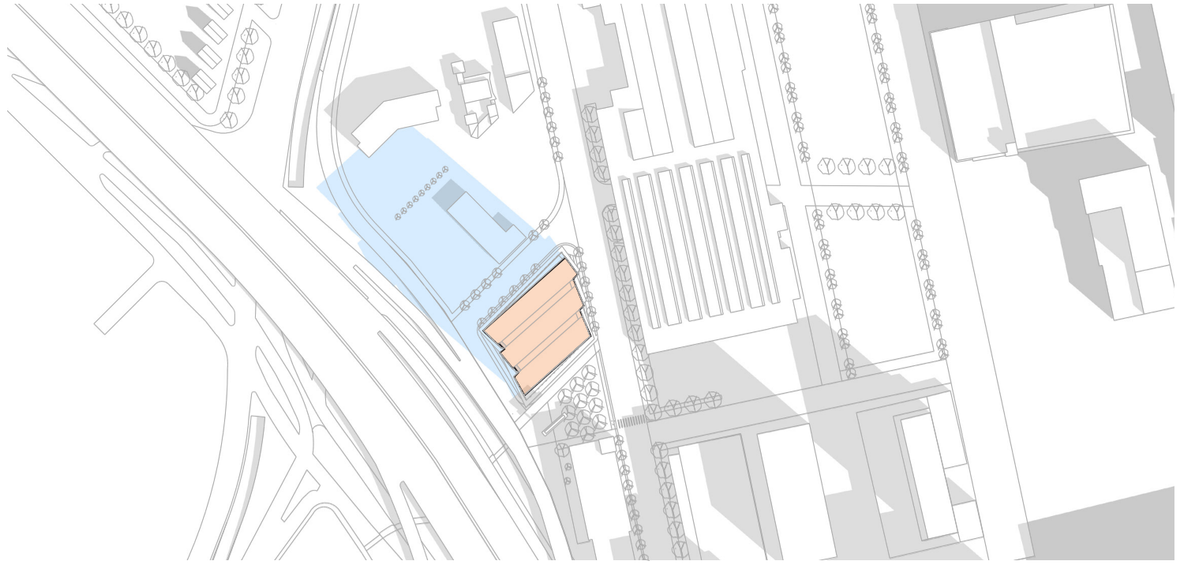
JUNE 21 **6:00 PM**

ELKUS | MANFREDI ARCHITECTS

Figure A.1b

SHADOW STUDIES: JUNE 21

74 Middlesex Avenue
Somerville, Massachusetts



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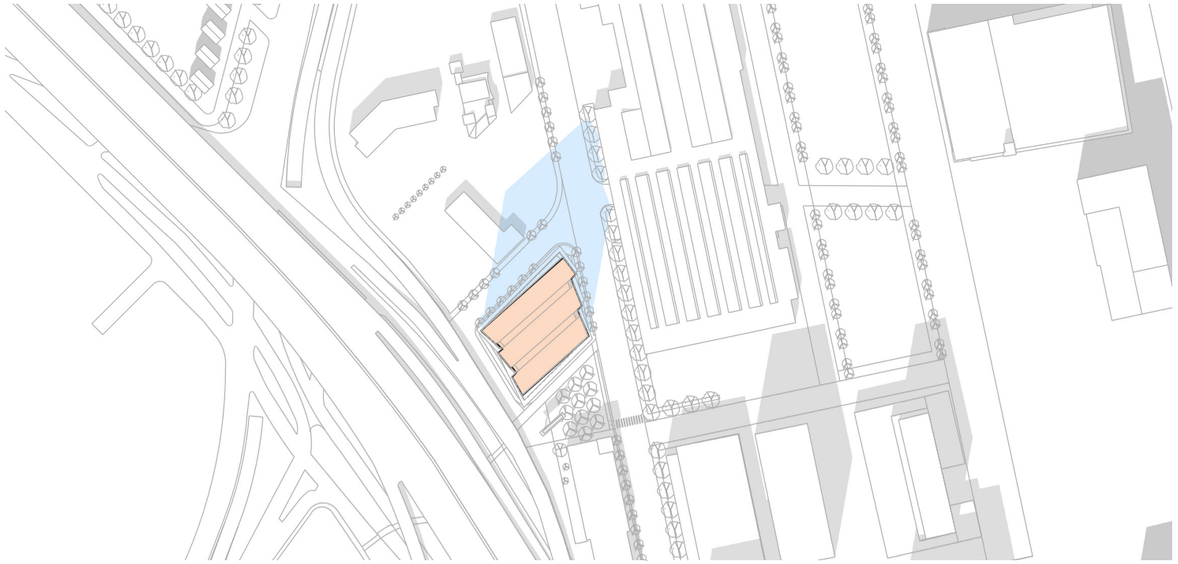

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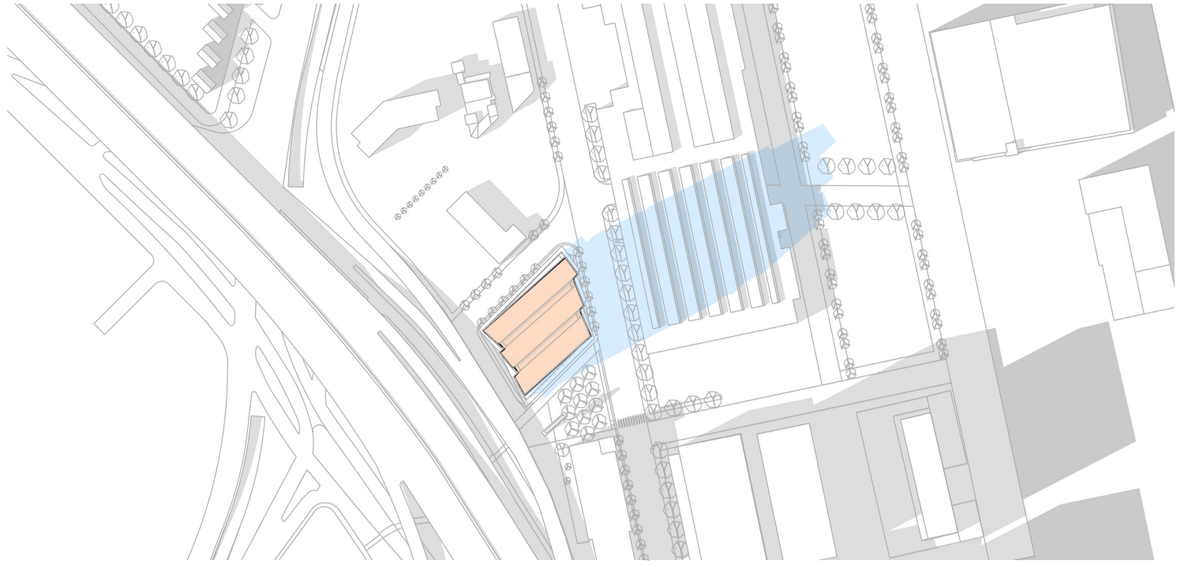

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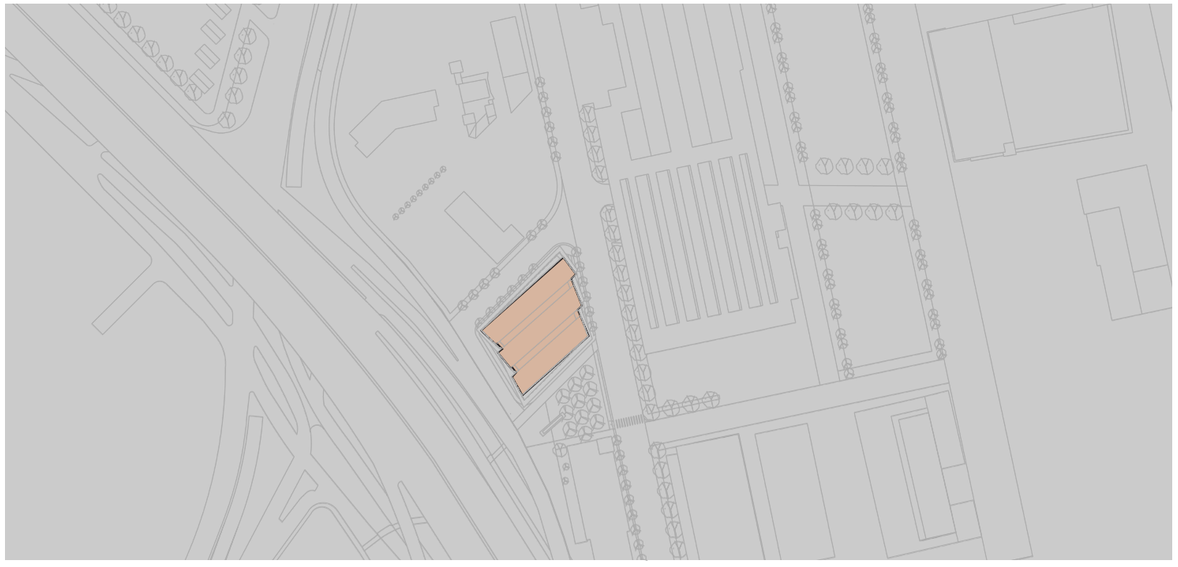


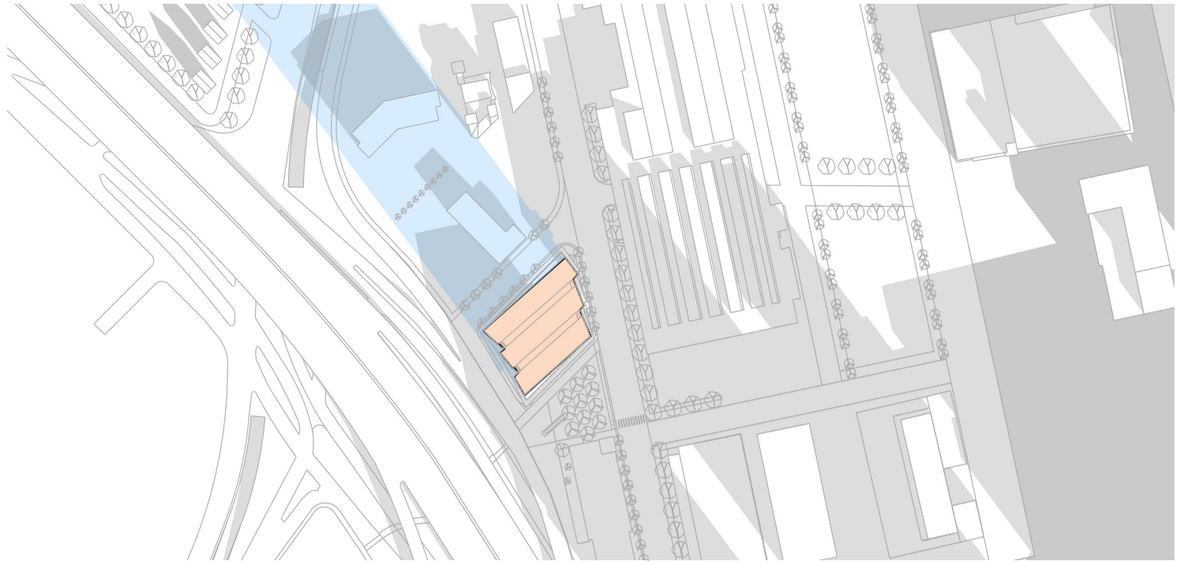
SEPTEMBER 21 **6:00 PM**

ELKUS | MANFREDI ARCHITECTS

Figure A.1c

SHADOW STUDIES: SEPTEMBER 21

74 Middlesex Avenue
Somerville, Massachusetts



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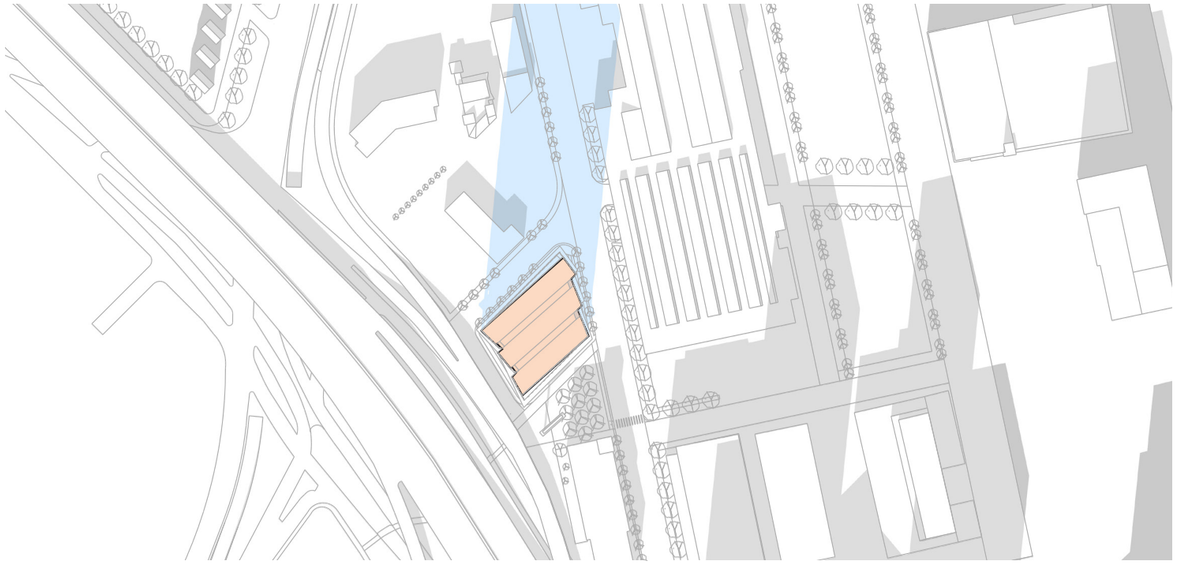

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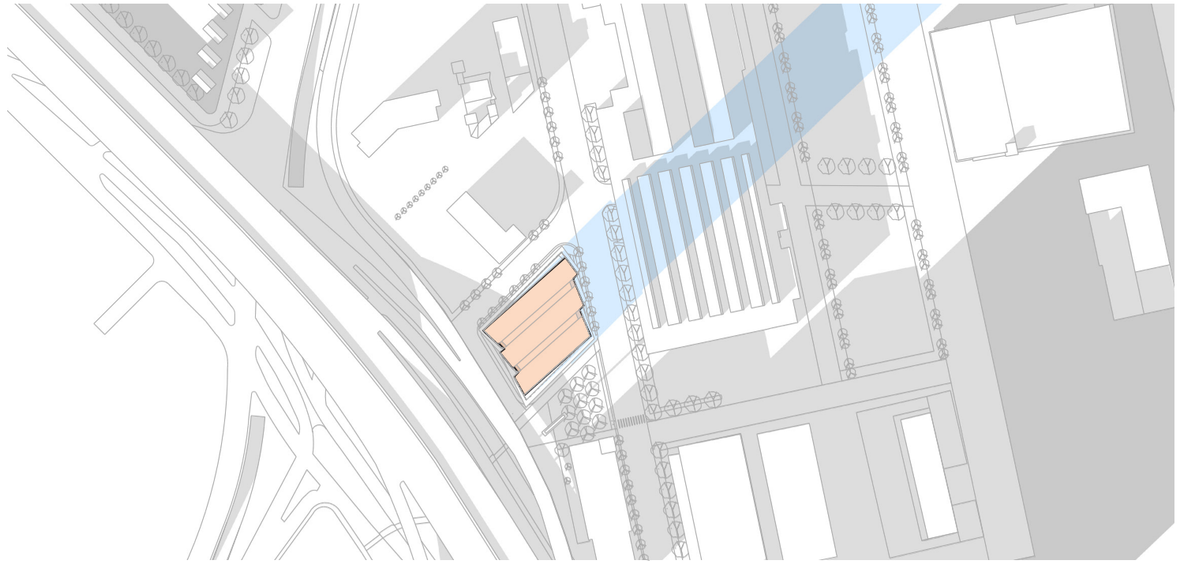

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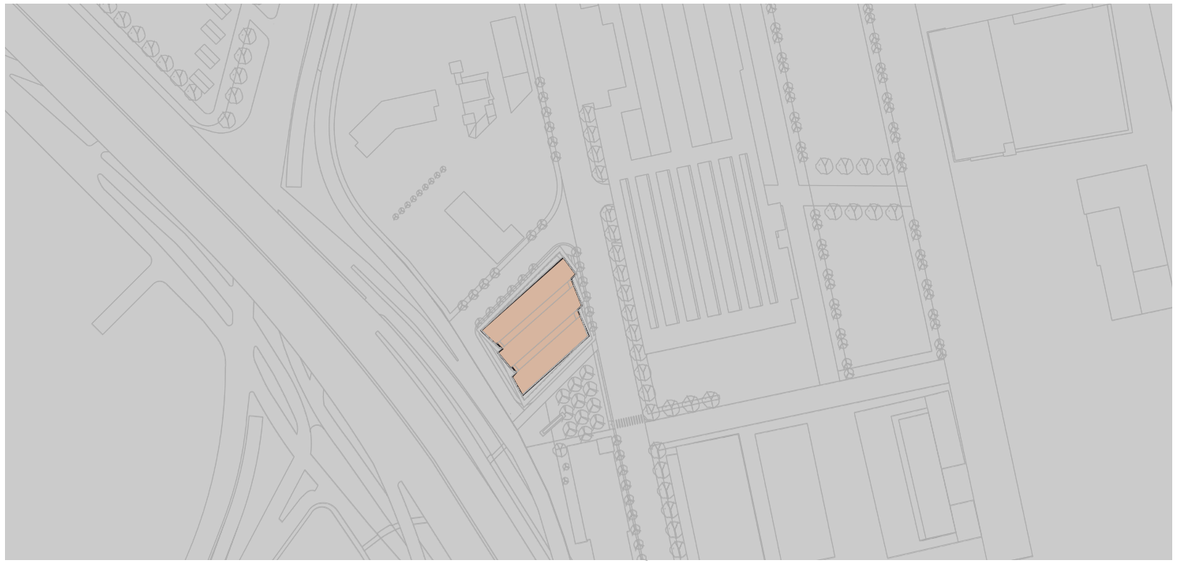

DECEMBER 21 **6:00 PM**

ELKUS | MANFREDI ARCHITECTS

Figure A.1d

SHADOW STUDIES: DECEMBER 21

74 Middlesex Avenue
Somerville, Massachusetts

PEDESTRIAN WIND STUDY

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PRELIMINARY RESULTS

74 MIDDLESEX AVENUE

BOSTON, MA

PEDESTRIAN WIND STUDY
RWDI #2101756
February 11, 2021

SUBMITTED TO

John Mitchell
Associate
jmitchell@elkus-manfredi.com

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Boston, MA 02210
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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed 74 Middlesex Avenue in Somerville, MA (Image 1). The potential wind conditions have been assessed based on wind-tunnel testing of the project under the No Build, Build and Full Build configurations (Images 2A through 2C), and the local wind records (Images 3 and 4) and compared to the Mean Speed and Effective Gust criteria adopted by the Boston Planning and Development Agency (BPDA). The results of the assessment are shown on site plans in Figures 1A through 2C, and the associated wind speeds are listed in Tables 1 and 2 on annual and seasonal bases, respectively. The key findings are summarized as follows:

Mean Speed

- In the No Build scenario and on an annual basis, mean speeds on and around the existing site are suitable for the intended use at most locations, with uncomfortable conditions to the south of the project site.
- With the addition of the proposed building in the Build scenario, the addition of the proposed development is expected to increase mean speeds at most locations on and around the project site, with uncomfortable conditions anticipated to the north, east and south of the proposed building. Dangerous conditions are anticipated at the northeast and northwest corners of the proposed building, and at an isolated location in the park to the south of the project site. The higher mean speeds stem primarily from the open and exposed nature of the site.
- With the addition of the future buildings to the surroundings in the Full Building scenario, mean speeds are expected to be similar to the Build scenario.

Effective Gust

- The effective gust criterion is met at most locations tested for the No Build scenario on an annual basis, except one location at the northeast corner of the existing building to the south of the project site.
- With the addition of the proposed building in the Build scenario, wind speeds are expected to meet the effective gust criterion on an annual basis at all but 14 locations, to the project northeast, northwest and south of the proposed building.
- With the addition of the future buildings to the surroundings in the Full Build scenario, wind speeds are expected to meet the effective gust criterion on an annual basis at all but 17 locations, around the four corners of the proposed building, and in the park to the south of the proposed building.

Above Grade

- Above-grade mean speeds are predicted to be comfortable for the intended use throughout the year.
- Above-grade wind speeds are anticipated to meet the effective gust criterion at all locations tested, both on annual and seasonal bases for both Build and Full Build scenarios.

While referring to the BPDA Wind Criteria description that follows, we encourage the design team to review the results and assess them against the intended pedestrian usage at specific locations. If there are locations where improved conditions are desired, the RWDI team is prepared to discuss and suggest conceptual wind control strategies. Additional commentary regarding background on wind flow patterns, wind comfort levels, and any further recommendations for wind control measures to help moderate wind activity in areas of high wind activity will be presented within the final report. Prior to issuing the report, we suggest that we have a teleconference to go over the results and discuss the types/locations/feasibilities of possible wind control measures.

Image 1: Aerial View of the Existing Site and Surroundings (Photo Courtesy of Google™ Earth)

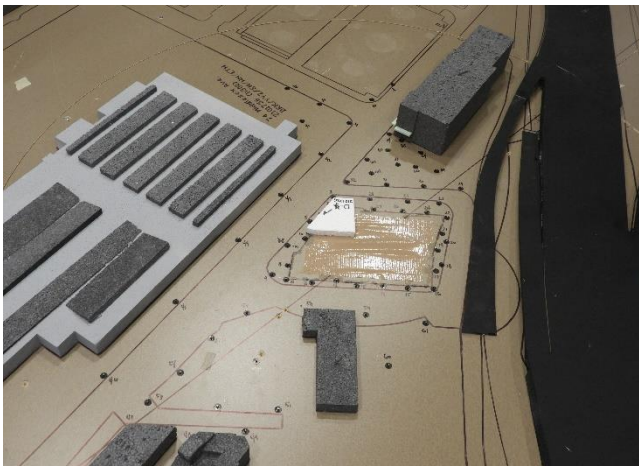


Image 2A: Wind Tunnel Study Model – No Build Configuration

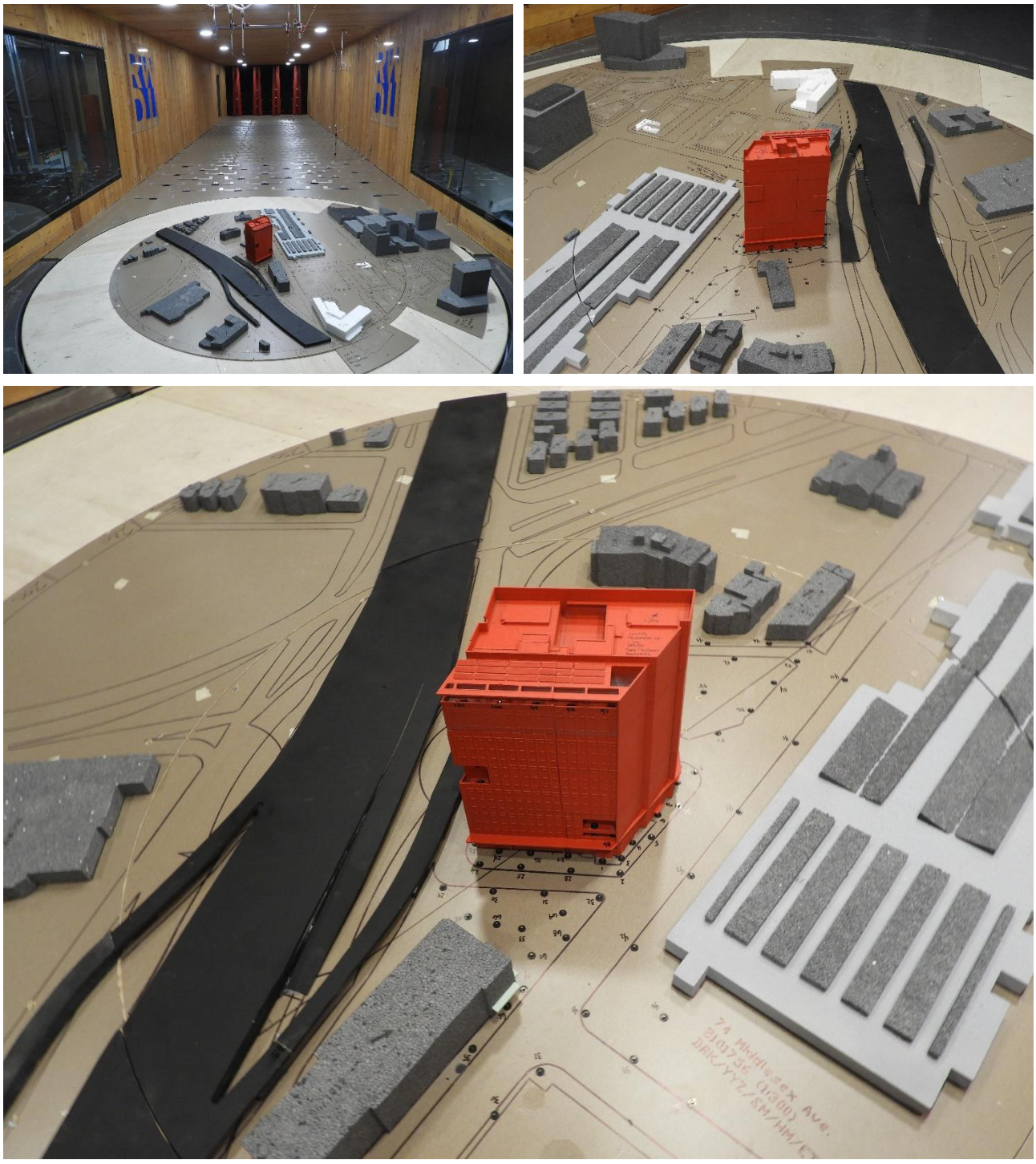


Image 2B: Wind Tunnel Study Model – Build Configuration

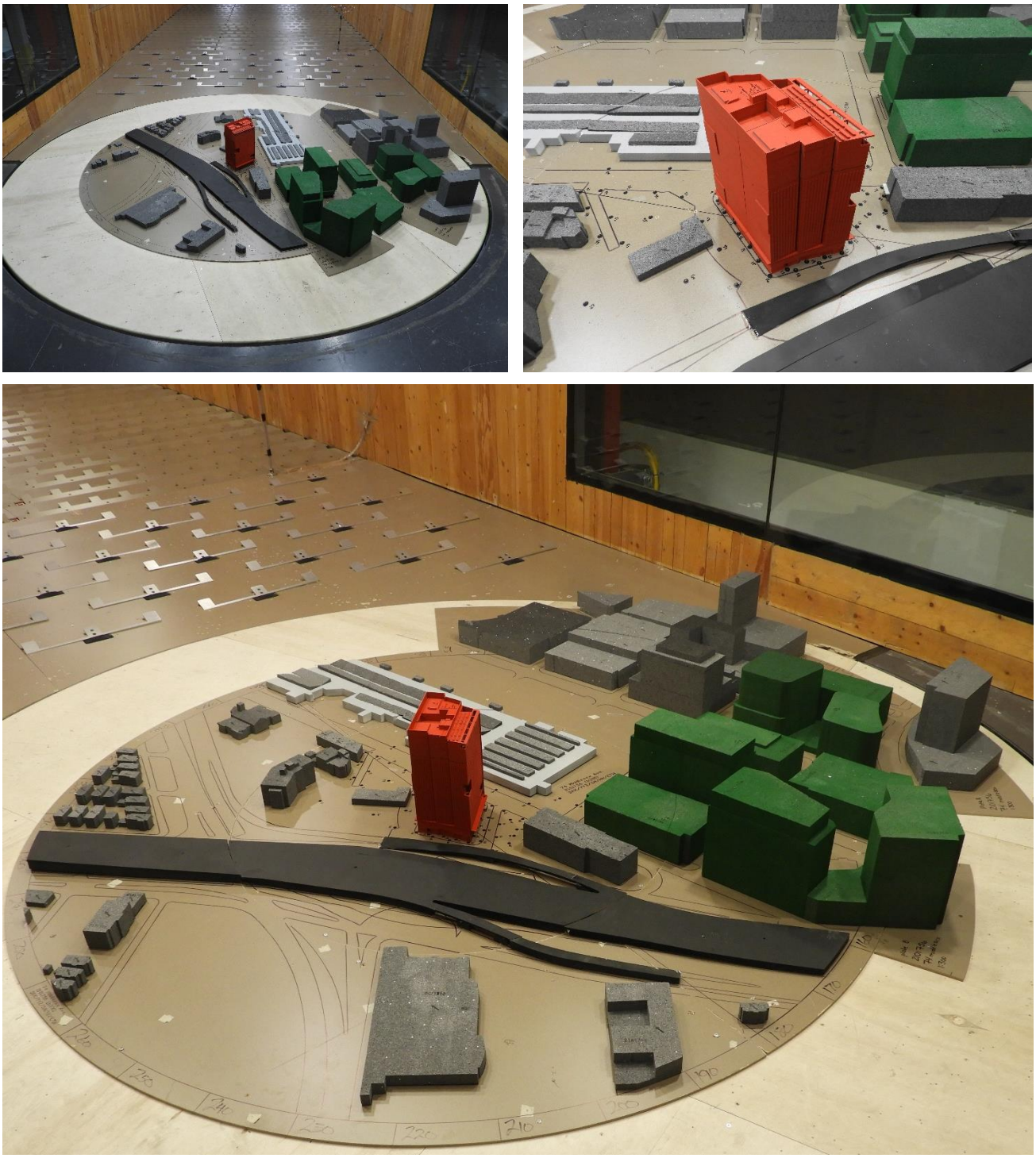
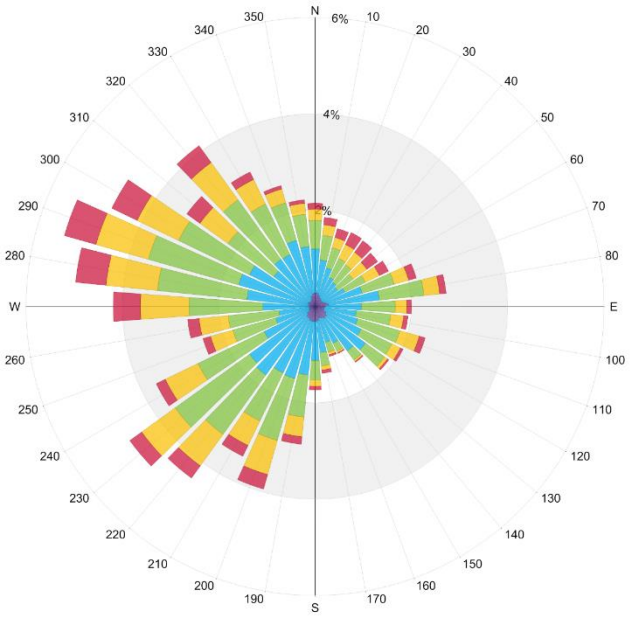
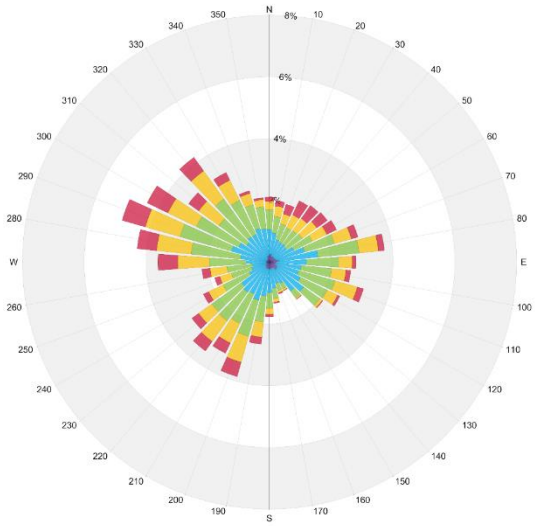


Image 2C: Wind Tunnel Study Model – Full Build Configuration

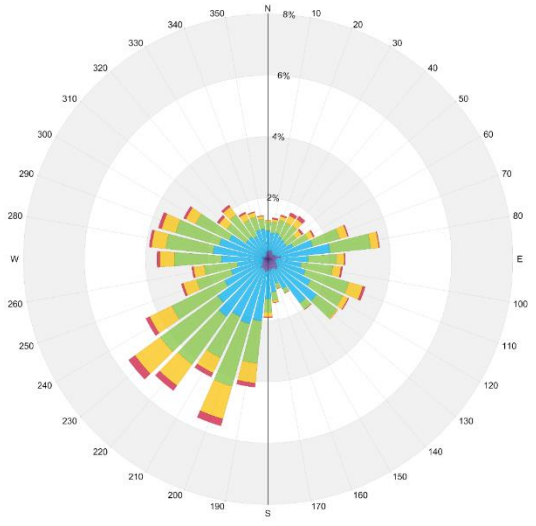


Wind Speed (mph)	Probability (%) Annual
Calm	3.0
1-5	7.9
6-10	32.5
11-15	32.4
16-20	16.3
>20	7.9

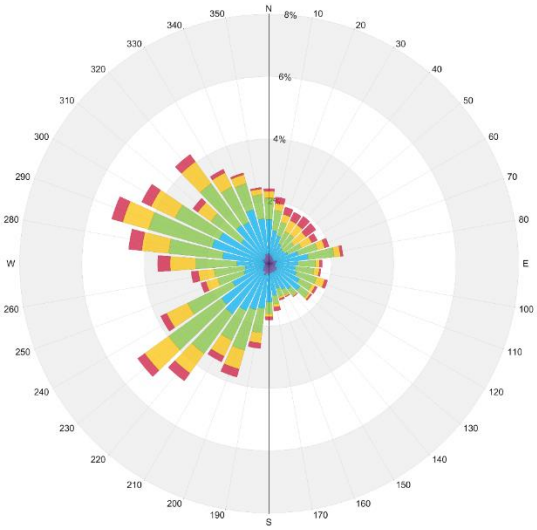
Image 3: Annual Directional distribution of winds approaching Boston Logan International Airport from 1995 through 2018



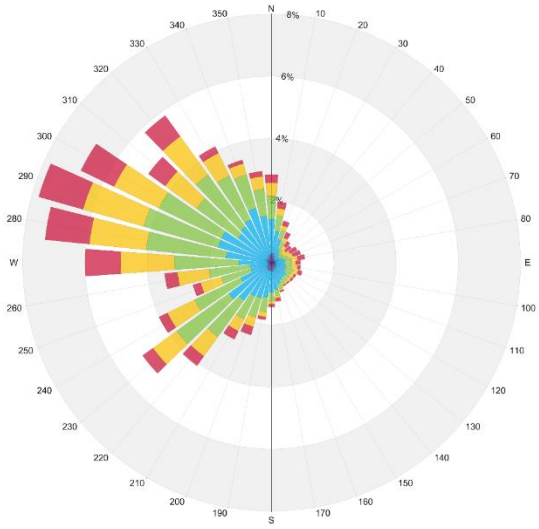
Spring (March – May)



Summer (June – August)



Fall (September – November)



Winter (December – February)

Wind Speed (mph)	Probability (%) Spring	Summer	Fall	Winter
Calm	2.8	3.0	3.4	2.6
1-5	6.8	9.4	8.7	6.5
6-10	28.9	38.8	34.6	27.9
11-15	32.3	34.4	32.0	30.9
16-20	19.2	11.8	14.5	19.7
>20	10.1	2.6	6.8	12.4

Image 4: Seasonal Directional Distribution of Winds Approaching Boston Logan International Airport from 1995 through 2018

BPDA Wind Criteria

The Boston Planning and Development Agency (BPDA) has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BPDA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than 1% of the time.

The second set of criteria used by the BPDA to determine the acceptability of specific locations is based on the work of Melbourne. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time.

Wind Acceptability	Effective Gust Speed (mph)
Acceptable	≤ 31
Unacceptable	> 31
Comfort Category	Mean Wind Speed (mph)
Comfortable for Sitting	< 12
Comfortable for Standing	≤ 15
Comfortable for Walking	≤ 19
Uncomfortable for Walking	> 19
Dangerous	> 27

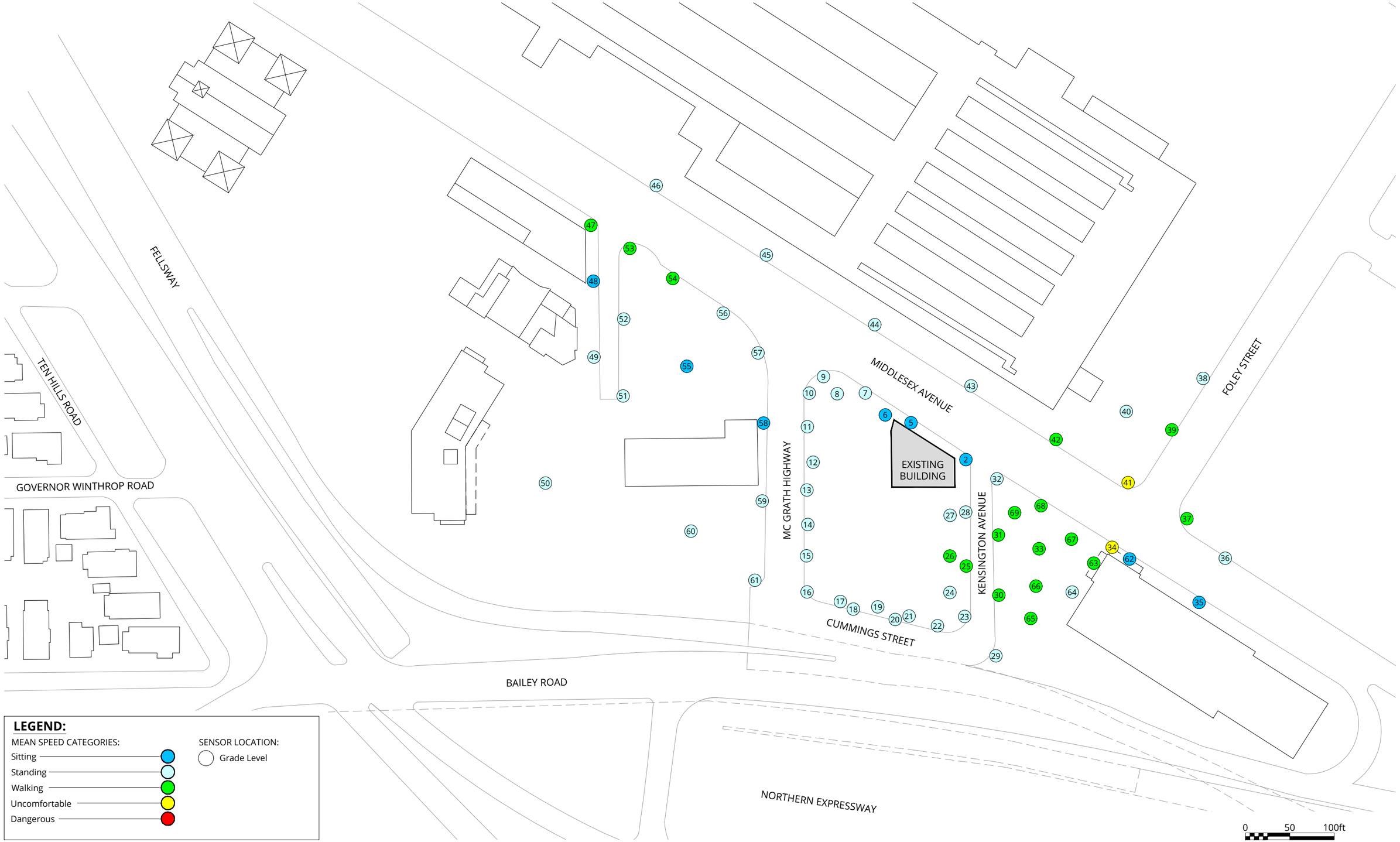
**Effective gust and mean wind speeds are based on a 1% exceedance or 99 percentile wind speeds.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust and other loose material in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BPDA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently uncomfortable for more passive activities such as sitting.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report represent an average for the total population. Also, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (1% of the time). Higher wind speeds will occur but on a less frequent basis.

FIGURES



LEGEND:

MEAN SPEED CATEGORIES:
- Sitting
- Standing
- Walking
- Uncomfortable
- Dangerous

SENSOR LOCATION:
- Grade Level

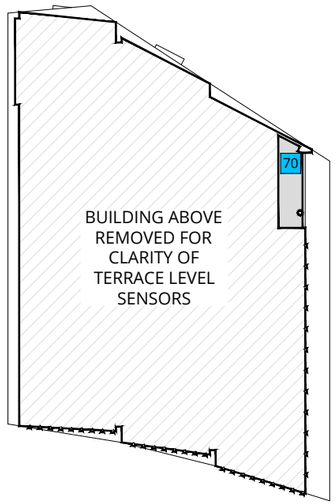
Pedestrian Wind Conditions - Mean Speed
No Build
Annual

74 Middlesex Avenue - Somerville, MA

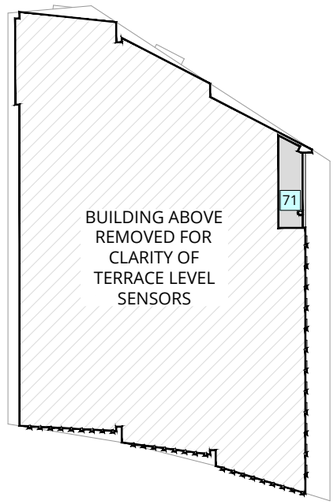
Project North True North

Project #2101756

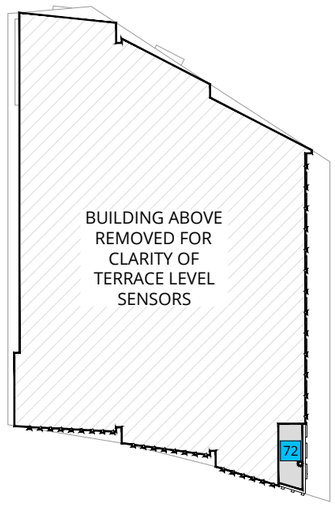
Drawn by:	GRE	Figure:	1A
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		



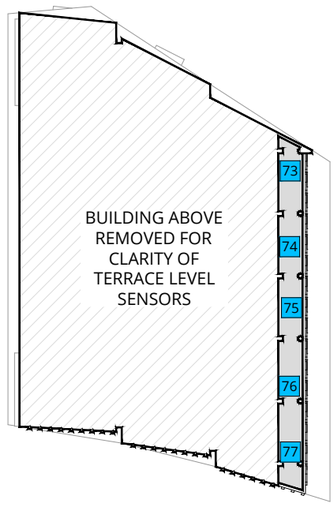
Above Grade Sensors - Level 3 Terrace
Approx. Scale: 1"=80'



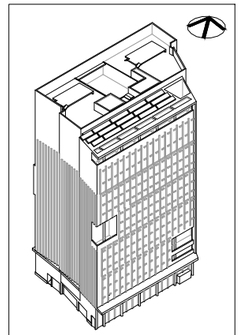
Above Grade Sensors - Level 4 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Level 9 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Penthouse Terrace
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

MEAN SPEED CATEGORIES:
- Sitting
- Standing
- Walking
- Uncomfortable
- Dangerous

SENSOR LOCATION:
- Grade Level
- Terrace Level
- Entrance Location

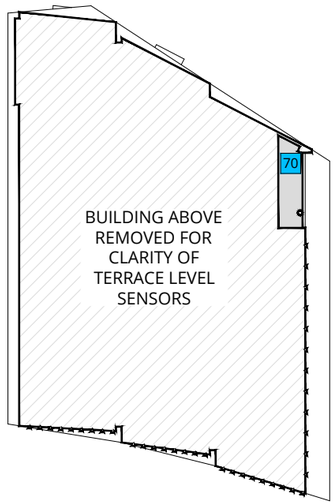
Pedestrian Wind Conditions - Mean Speed
Build
Annual

74 Middlesex Avenue - Somerville, MA

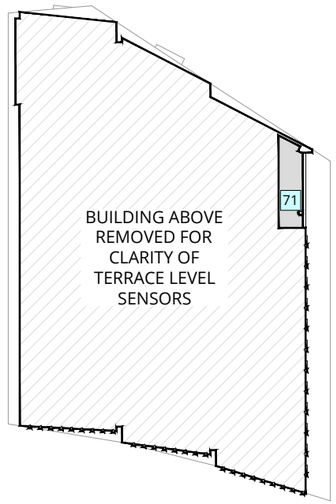
Project North True North

Project #2101756

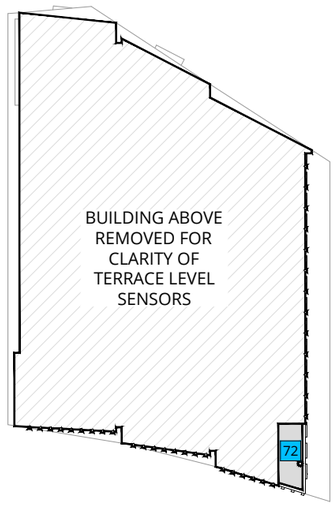
Drawn by:	GRE	Figure:	1B
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		



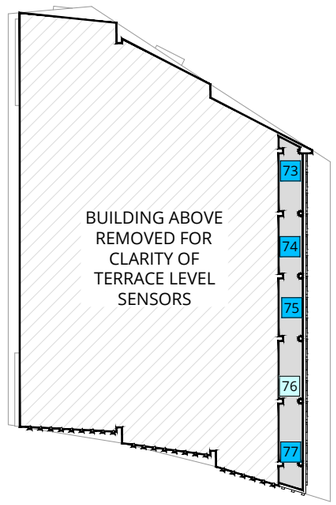
Above Grade Sensors - Level 3 Terrace
Approx. Scale: 1"=80'



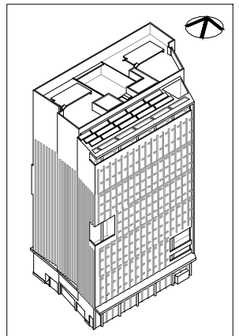
Above Grade Sensors - Level 4 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Level 9 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Penthouse Terrace
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

MEAN SPEED CATEGORIES:
- Sitting
- Standing
- Walking
- Uncomfortable
- Dangerous

SENSOR LOCATION:
- Grade Level
- Terrace Level
- Entrance Location

Pedestrian Wind Conditions - Mean Speed

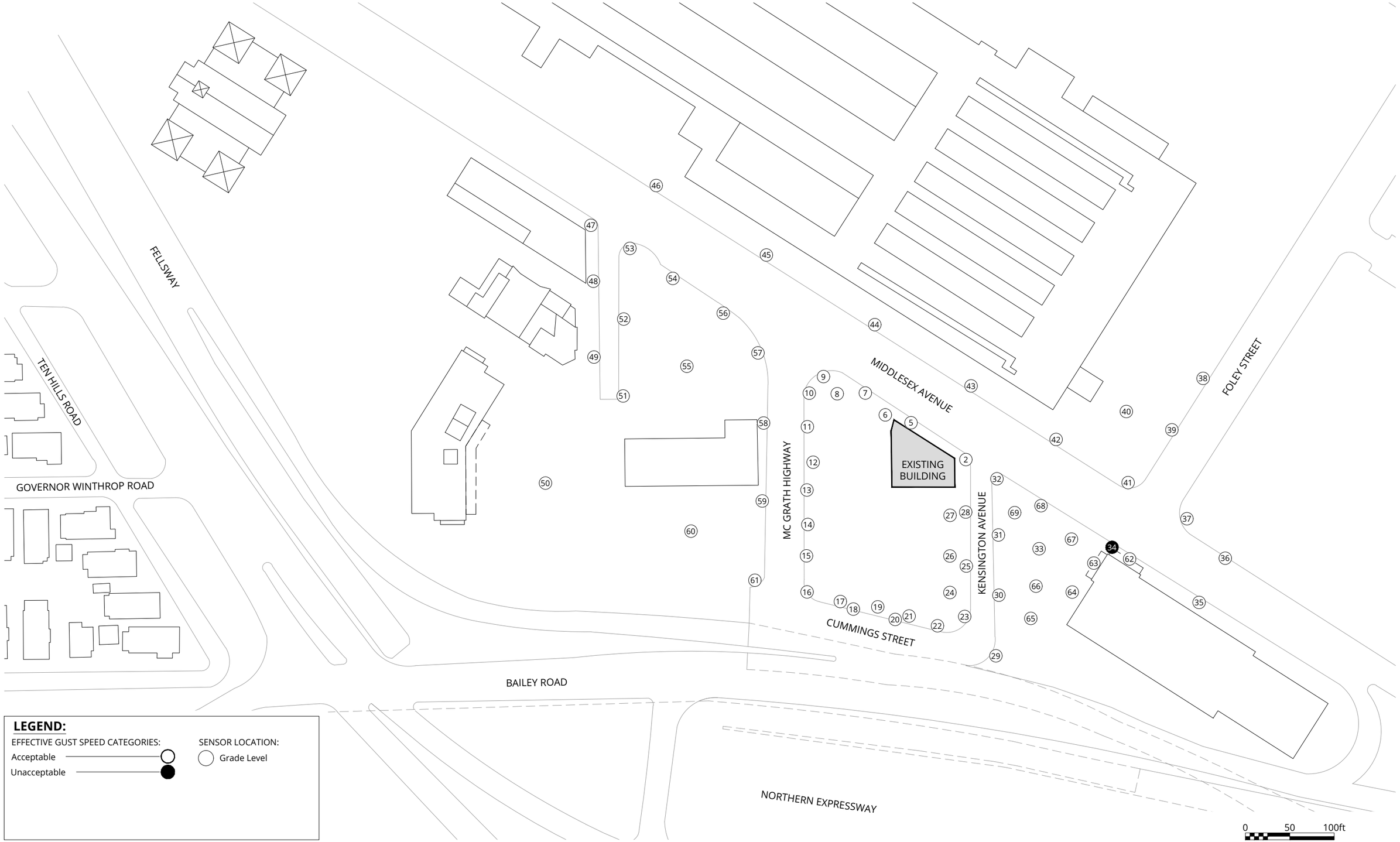
Full Build
Annual

74 Middlesex Avenue - Somerville, MA

Project North True North

Project #2101756

Drawn by:	GRE	Figure:	1C
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		



LEGEND:

EFFECTIVE GUST SPEED CATEGORIES:
- Acceptable
- Unacceptable

SENSOR LOCATION:
- Grade Level

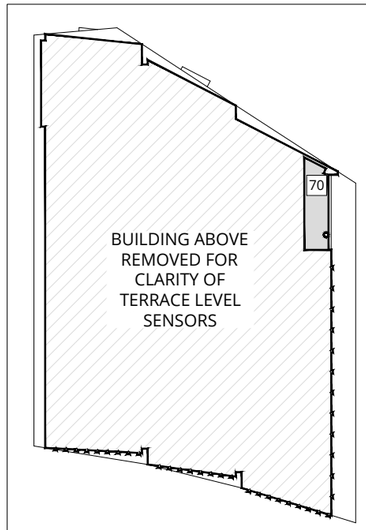
Pedestrian Wind Conditions - Effective Gust Speed
No Build
Annual

74 Middlesex Avenue - Somerville, MA

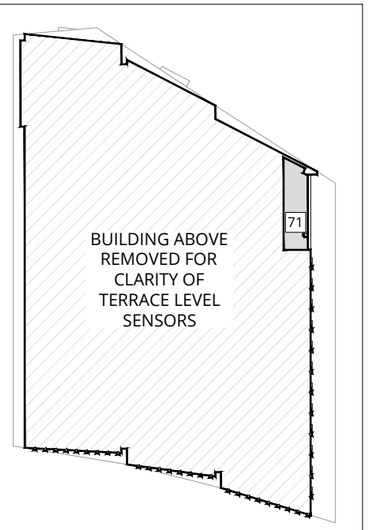
Project North / True North

Project #2101756

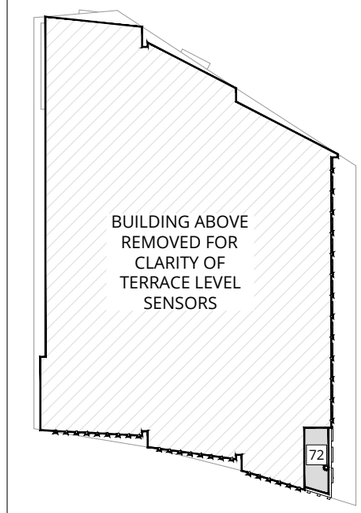
Drawn by:	GRE	Figure:	2A
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		



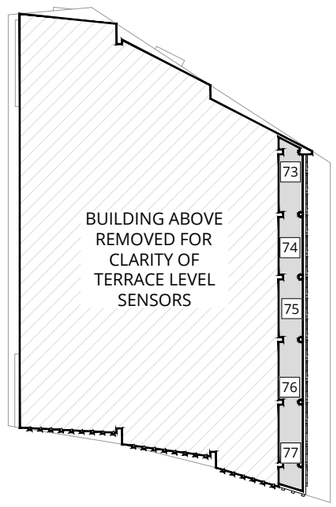
Above Grade Sensors - Level 3 Terrace
Approx. Scale: 1"=80'



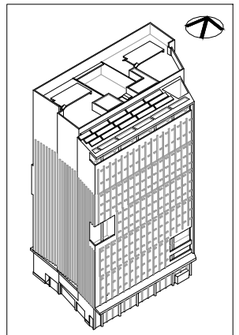
Above Grade Sensors - Level 4 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Level 9 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Penthouse Terrace
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

EFFECTIVE GUST SPEED CATEGORIES:
- Acceptable
- Unacceptable

SENSOR LOCATION:
- Grade Level
- Terrace Level
- Entrance Location

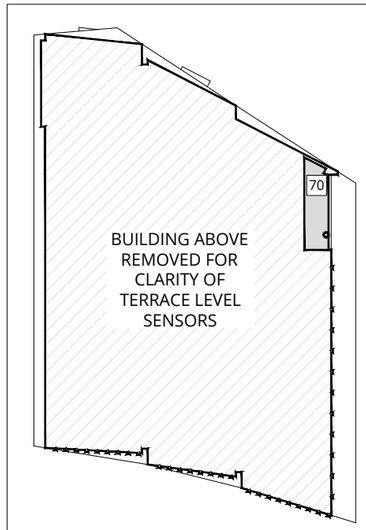
Pedestrian Wind Conditions - Effective Gust Speed
Build
Annual

74 Middlesex Avenue - Somerville, MA

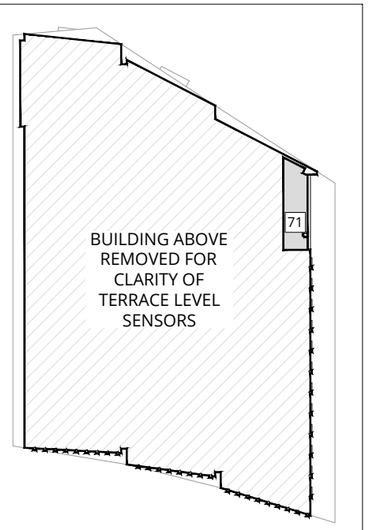
Project North True North

Project #2101756

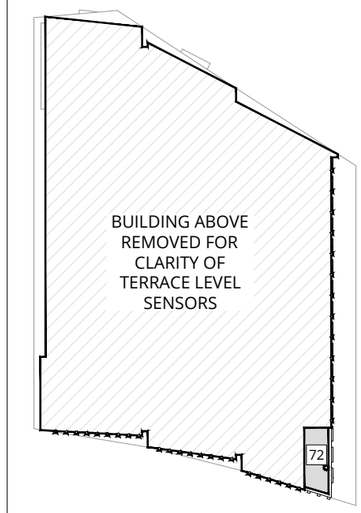
Drawn by:	GRE	Figure:	2B
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		



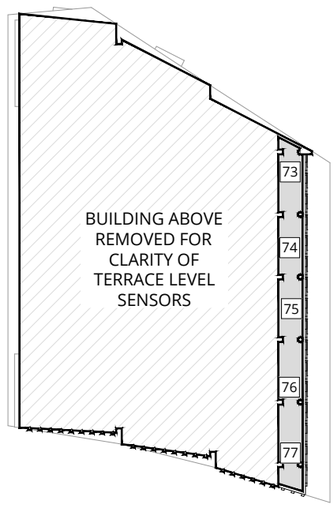
Above Grade Sensors - Level 3 Terrace
Approx. Scale: 1"=80'



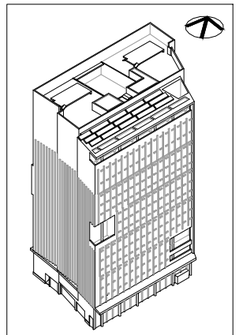
Above Grade Sensors - Level 4 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Level 9 Terrace
Approx. Scale: 1"=80'



Above Grade Sensors - Penthouse Terrace
Approx. Scale: 1"=80'



Isometric View of Building

LEGEND:

EFFECTIVE GUST SPEED CATEGORIES:
- Acceptable
- Unacceptable

SENSOR LOCATION:
- Grade Level
- Terrace Level
- Entrance Location

Pedestrian Wind Conditions - Effective Gust Speed
Full Build
Annual

74 Middlesex Avenue - Somerville, MA

Project North True North

Project #2101756

Drawn by:	GRE	Figure:	2C
Approx. Scale:	1"=100'		
Date Revised:	Feb. 3, 2021		

TABLES

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
1	A	-	-		-	-		-
	B	Annual	19	-	Walking	28	-	Acceptable
	C	Annual	21	-	Uncomfortable	29	-	Acceptable
2	A	Annual	12		Sitting	18		Acceptable
	B	Annual	22	83%	Uncomfortable	28	56%	Acceptable
	C	Annual	23	92%	Uncomfortable	29	61%	Acceptable
3	A	-	-		-	-		-
	B	Annual	25	-	Uncomfortable	31	-	Acceptable
	C	Annual	26	-	Uncomfortable	32	-	Unacceptable
4	A	-	-		-	-		-
	B	Annual	13	-	Standing	18	-	Acceptable
	C	Annual	14	-	Standing	18	-	Acceptable
5	A	Annual	11		Sitting	17		Acceptable
	B	Annual	19	73%	Walking	25	47%	Acceptable
	C	Annual	18	64%	Walking	25	47%	Acceptable
6	A	Annual	12		Sitting	18		Acceptable
	B	Annual	12		Sitting	17		Acceptable
	C	Annual	11		Sitting	17		Acceptable
7	A	Annual	13		Standing	19		Acceptable
	B	Annual	17	31%	Walking	25	32%	Acceptable
	C	Annual	15	15%	Standing	23	21%	Acceptable
8	A	Annual	14		Standing	20		Acceptable
	B	Annual	12	-14%	Sitting	18		Acceptable
	C	Annual	12	-14%	Sitting	18		Acceptable
9	A	Annual	15		Standing	21		Acceptable
	B	Annual	31	107%	Dangerous	39	86%	Unacceptable
	C	Annual	31	107%	Dangerous	40	90%	Unacceptable
10	A	Annual	14		Standing	19		Acceptable
	B	Annual	32	129%	Dangerous	39	105%	Unacceptable
	C	Annual	32	129%	Dangerous	39	105%	Unacceptable
11	A	Annual	13		Standing	19		Acceptable
	B	Annual	20	54%	Uncomfortable	27	42%	Acceptable
	C	Annual	21	62%	Uncomfortable	27	42%	Acceptable
12	A	Annual	13		Standing	18		Acceptable
	B	Annual	7	-46%	Sitting	12	-33%	Acceptable
	C	Annual	7	-46%	Sitting	12	-33%	Acceptable
13	A	Annual	14		Standing	20		Acceptable
	B	Annual	15		Standing	22		Acceptable
	C	Annual	15		Standing	22		Acceptable
14	A	Annual	15		Standing	21		Acceptable
	B	Annual	18	20%	Walking	24	14%	Acceptable
	C	Annual	19	27%	Walking	25	19%	Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
15	A	Annual	15		Standing	21		Acceptable
	B	Annual	15		Standing	21		Acceptable
	C	Annual	15		Standing	22		Acceptable
16	A	Annual	15		Standing	21		Acceptable
	B	Annual	30	100%	Dangerous	38	81%	Unacceptable
	C	Annual	30	100%	Dangerous	39	86%	Unacceptable
17	A	Annual	13		Standing	19		Acceptable
	B	Annual	15	15%	Standing	21	11%	Acceptable
	C	Annual	15	15%	Standing	21	11%	Acceptable
18	A	Annual	13		Standing	18		Acceptable
	B	Annual	14		Standing	23	28%	Acceptable
	C	Annual	14		Standing	23	28%	Acceptable
19	A	Annual	14		Standing	20		Acceptable
	B	Annual	12	-14%	Sitting	19		Acceptable
	C	Annual	12	-14%	Sitting	19		Acceptable
20	A	Annual	14		Standing	20		Acceptable
	B	Annual	15		Standing	23	15%	Acceptable
	C	Annual	14		Standing	23	15%	Acceptable
21	A	Annual	14		Standing	19		Acceptable
	B	Annual	15		Standing	22	16%	Acceptable
	C	Annual	15		Standing	22	16%	Acceptable
22	A	Annual	13		Standing	20		Acceptable
	B	Annual	25	92%	Uncomfortable	31	55%	Acceptable
	C	Annual	25	92%	Uncomfortable	32	60%	Unacceptable
23	A	Annual	14		Standing	21		Acceptable
	B	Annual	22	57%	Uncomfortable	31	48%	Acceptable
	C	Annual	23	64%	Uncomfortable	32	52%	Unacceptable
24	A	Annual	15		Standing	21		Acceptable
	B	Annual	11	-27%	Sitting	16	-24%	Acceptable
	C	Annual	10	-33%	Sitting	15	-29%	Acceptable
25	A	Annual	16		Walking	22		Acceptable
	B	Annual	17		Walking	25	14%	Acceptable
	C	Annual	19	19%	Walking	26	18%	Acceptable
26	A	Annual	16		Walking	22		Acceptable
	B	Annual	11	-31%	Sitting	16	-27%	Acceptable
	C	Annual	11	-31%	Sitting	17	-23%	Acceptable
27	A	Annual	14		Standing	20		Acceptable
	B	Annual	13		Standing	19		Acceptable
	C	Annual	14		Standing	20		Acceptable
28	A	Annual	15		Standing	21		Acceptable
	B	Annual	21	40%	Uncomfortable	30	43%	Acceptable
	C	Annual	23	53%	Uncomfortable	31	48%	Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
29	A	Annual	15		Standing	22		Acceptable
	B	Annual	25	67%	Uncomfortable	33	50%	Unacceptable
	C	Annual	24	60%	Uncomfortable	33	50%	Unacceptable
30	A	Annual	16		Walking	23		Acceptable
	B	Annual	26	62%	Uncomfortable	35	52%	Unacceptable
	C	Annual	27	69%	Uncomfortable	37	61%	Unacceptable
31	A	Annual	16		Walking	23		Acceptable
	B	Annual	23	44%	Uncomfortable	31	35%	Acceptable
	C	Annual	24	50%	Uncomfortable	32	39%	Unacceptable
32	A	Annual	13		Standing	19		Acceptable
	B	Annual	22	69%	Uncomfortable	29	53%	Acceptable
	C	Annual	22	69%	Uncomfortable	29	53%	Acceptable
33	A	Annual	16		Walking	23		Acceptable
	B	Annual	26	62%	Uncomfortable	35	52%	Unacceptable
	C	Annual	27	69%	Uncomfortable	36	57%	Unacceptable
34	A	Annual	25		Uncomfortable	32		Unacceptable
	B	Annual	20	-20%	Uncomfortable	29		Acceptable
	C	Annual	15	-40%	Standing	24	-25%	Acceptable
35	A	Annual	10		Sitting	15		Acceptable
	B	Annual	12	20%	Sitting	18	20%	Acceptable
	C	Annual	17	70%	Walking	23	53%	Acceptable
36	A	Annual	13		Standing	20		Acceptable
	B	Annual	15	15%	Standing	22		Acceptable
	C	Annual	17	31%	Walking	24	20%	Acceptable
37	A	Annual	19		Walking	26		Acceptable
	B	Annual	15	-21%	Standing	22	-15%	Acceptable
	C	Annual	20		Uncomfortable	28		Acceptable
38	A	Annual	13		Standing	20		Acceptable
	B	Annual	13		Standing	20		Acceptable
	C	Annual	19	46%	Walking	29	45%	Acceptable
39	A	Annual	17		Walking	23		Acceptable
	B	Annual	15	-12%	Standing	23		Acceptable
	C	Annual	17		Walking	26	13%	Acceptable
40	A	Annual	15		Standing	22		Acceptable
	B	Annual	19	27%	Walking	30	36%	Acceptable
	C	Annual	15		Standing	24		Acceptable
41	A	Annual	22		Uncomfortable	28		Acceptable
	B	Annual	23		Uncomfortable	33	18%	Unacceptable
	C	Annual	18	-18%	Walking	28		Acceptable
42	A	Annual	18		Walking	24		Acceptable
	B	Annual	18		Walking	27	12%	Acceptable
	C	Annual	18		Walking	28	17%	Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
43	A	Annual	14		Standing	20		Acceptable
	B	Annual	22	57%	Uncomfortable	31	55%	Acceptable
	C	Annual	22	57%	Uncomfortable	31	55%	Acceptable
44	A	Annual	14		Standing	21		Acceptable
	B	Annual	25	79%	Uncomfortable	33	57%	Unacceptable
	C	Annual	25	79%	Uncomfortable	33	57%	Unacceptable
45	A	Annual	15		Standing	22		Acceptable
	B	Annual	15		Standing	23		Acceptable
	C	Annual	15		Standing	23		Acceptable
46	A	Annual	15		Standing	22		Acceptable
	B	Annual	14		Standing	21		Acceptable
	C	Annual	15		Standing	22		Acceptable
47	A	Annual	19		Walking	25		Acceptable
	B	Annual	17	-11%	Walking	25		Acceptable
	C	Annual	17	-11%	Walking	25		Acceptable
48	A	Annual	11		Sitting	16		Acceptable
	B	Annual	14	27%	Standing	21	31%	Acceptable
	C	Annual	14	27%	Standing	22	38%	Acceptable
49	A	Annual	15		Standing	21		Acceptable
	B	Annual	18	20%	Walking	24	14%	Acceptable
	C	Annual	19	27%	Walking	25	19%	Acceptable
50	A	Annual	14		Standing	21		Acceptable
	B	Annual	16	14%	Walking	22		Acceptable
	C	Annual	16	14%	Walking	23		Acceptable
51	A	Annual	13		Standing	20		Acceptable
	B	Annual	16	23%	Walking	22		Acceptable
	C	Annual	16	23%	Walking	23	15%	Acceptable
52	A	Annual	15		Standing	21		Acceptable
	B	Annual	18	20%	Walking	25	19%	Acceptable
	C	Annual	18	20%	Walking	26	24%	Acceptable
53	A	Annual	18		Walking	24		Acceptable
	B	Annual	16	-11%	Walking	24		Acceptable
	C	Annual	16	-11%	Walking	24		Acceptable
54	A	Annual	16		Walking	22		Acceptable
	B	Annual	16		Walking	23		Acceptable
	C	Annual	16		Walking	23		Acceptable
55	A	Annual	12		Sitting	18		Acceptable
	B	Annual	16	33%	Walking	23	28%	Acceptable
	C	Annual	16	33%	Walking	23	28%	Acceptable
56	A	Annual	15		Standing	21		Acceptable
	B	Annual	17	13%	Walking	25	19%	Acceptable
	C	Annual	17	13%	Walking	25	19%	Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
57	A	Annual	14		Standing	20		Acceptable
	B	Annual	22	57%	Uncomfortable	31	55%	Acceptable
	C	Annual	22	57%	Uncomfortable	31	55%	Acceptable
58	A	Annual	12		Sitting	17		Acceptable
	B	Annual	22	83%	Uncomfortable	28	65%	Acceptable
	C	Annual	22	83%	Uncomfortable	29	71%	Acceptable
59	A	Annual	15		Standing	21		Acceptable
	B	Annual	21	40%	Uncomfortable	29	38%	Acceptable
	C	Annual	21	40%	Uncomfortable	29	38%	Acceptable
60	A	Annual	15		Standing	21		Acceptable
	B	Annual	19	27%	Walking	28	33%	Acceptable
	C	Annual	19	27%	Walking	29	38%	Acceptable
61	A	Annual	15		Standing	21		Acceptable
	B	Annual	25	67%	Uncomfortable	32	52%	Unacceptable
	C	Annual	26	73%	Uncomfortable	33	57%	Unacceptable
62	A	Annual	11		Sitting	18		Acceptable
	B	Annual	13	18%	Standing	19		Acceptable
	C	Annual	13	18%	Standing	20	11%	Acceptable
63	A	Annual	18		Walking	25		Acceptable
	B	Annual	27	50%	Uncomfortable	36	44%	Unacceptable
	C	Annual	23	28%	Uncomfortable	34	36%	Unacceptable
64	A	Annual	13		Standing	20		Acceptable
	B	Annual	27	108%	Uncomfortable	34	70%	Unacceptable
	C	Annual	24	85%	Uncomfortable	34	70%	Unacceptable
65	A	Annual	18		Walking	26		Acceptable
	B	Annual	27	50%	Uncomfortable	34	31%	Unacceptable
	C	Annual	26	44%	Uncomfortable	34	31%	Unacceptable
66	A	Annual	16		Walking	25		Acceptable
	B	Annual	29	81%	Dangerous	37	48%	Unacceptable
	C	Annual	29	81%	Dangerous	37	48%	Unacceptable
67	A	Annual	18		Walking	24		Acceptable
	B	Annual	27	50%	Uncomfortable	34	42%	Unacceptable
	C	Annual	24	33%	Uncomfortable	34	42%	Unacceptable
68	A	Annual	16		Walking	22		Acceptable
	B	Annual	20	25%	Uncomfortable	29	32%	Acceptable
	C	Annual	21	31%	Uncomfortable	31	41%	Acceptable
69	A	Annual	17		Walking	23		Acceptable
	B	Annual	22	29%	Uncomfortable	30	30%	Acceptable
	C	Annual	22	29%	Uncomfortable	31	35%	Acceptable
70	A	-	-		-	-		-
	B	Annual	6	-	Sitting	8	-	Acceptable
	C	Annual	6	-	Sitting	9	-	Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
71	A	-	-		-	-		-
	B	Annual	15	-	Standing	21	-	Acceptable
	C	Annual	15	-	Standing	21	-	Acceptable
72	A	-	-		-	-		-
	B	Annual	10	-	Sitting	17	-	Acceptable
	C	Annual	12	-	Sitting	19	-	Acceptable
73	A	-	-		-	-		-
	B	Annual	10	-	Sitting	15	-	Acceptable
	C	Annual	10	-	Sitting	16	-	Acceptable
74	A	-	-		-	-		-
	B	Annual	10	-	Sitting	15	-	Acceptable
	C	Annual	10	-	Sitting	16	-	Acceptable
75	A	-	-		-	-		-
	B	Annual	11	-	Sitting	17	-	Acceptable
	C	Annual	11	-	Sitting	17	-	Acceptable
76	A	-	-		-	-		-
	B	Annual	12	-	Sitting	18	-	Acceptable
	C	Annual	13	-	Standing	18	-	Acceptable
77	A	-	-		-	-		-
	B	Annual	11	-	Sitting	16	-	Acceptable
	C	Annual	11	-	Sitting	16	-	Acceptable

Configurations	Mean Wind Criteria Speed (mph)		Effective Gust Criteria (mph)	
No Build	≤ 12	Comfortable for Sitting	≤ 31	Acceptable
Existing site and surroundings	13 - 15	Comfortable for Standing	> 31	Unacceptable
Build	16 - 19	Comfortable for Walking		
Project with existing surroundings	20 - 27	Uncomfortable for Walking		
Full Build	> 27	Dangerous Conditions		
Project with future surroundings				

Notes

1) Wind Speeds are for a 1% probability of exceedance

2) % Change is based on comparison with Configuration A

3) % changes less than 10% are excluded

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
1	A	-	-	-	-	-	-	-	-
	B	22	16	20	20	31	22	28	28
	C	23	17	21	21	32	23	29	29
2	A	13	10	12	13	19	15	17	19
	B	24	18	22	23	30	23	29	30
	C	25	19	23	25	31	24	29	31
3	A	-	-	-	-	-	-	-	-
	B	27	19	26	26	34	24	32	33
	C	28	20	26	26	34	25	33	33
4	A	-	-	-	-	-	-	-	-
	B	15	10	14	13	20	14	19	19
	C	15	10	14	14	20	14	19	19
5	A	12	9	11	12	18	14	17	18
	B	19	14	19	20	27	20	26	27
	C	18	13	17	19	26	19	25	26
6	A	13	10	12	14	18	14	17	19
	B	12	10	12	13	18	14	17	19
	C	11	8	11	12	18	13	16	18
7	A	13	10	12	14	19	15	18	20
	B	18	14	17	19	25	20	24	27
	C	16	12	15	17	24	18	23	25
8	A	14	11	13	15	20	16	19	21
	B	13	10	12	13	19	14	17	19
	C	13	10	12	13	19	15	18	19
9	A	15	11	14	16	22	16	20	23
	B	32	23	28	34	40	30	36	43
	C	32	23	28	34	41	30	36	44
10	A	14	11	13	15	20	16	19	21
	B	32	24	29	35	40	29	36	42
	C	32	24	30	35	40	30	37	43
11	A	14	11	13	14	19	16	18	20
	B	21	16	19	23	27	21	25	29
	C	21	16	19	23	27	21	25	30
12	A	14	11	13	14	19	16	18	20
	B	7	5	7	8	12	9	11	13
	C	8	6	7	8	13	10	11	13
13	A	15	11	14	16	20	16	19	22
	B	16	12	15	17	23	17	21	24
	C	16	12	15	17	23	18	21	24
14	A	16	12	14	17	22	16	20	23
	B	19	16	18	20	25	21	23	25
	C	20	17	19	21	26	23	25	26

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
15	A	15	11	14	17	21	16	20	23
	B	16	11	15	16	22	17	21	23
	C	16	12	15	16	23	17	21	24
16	A	15	11	14	17	21	16	19	23
	B	31	25	28	32	40	32	36	41
	C	32	26	29	33	41	33	37	43
17	A	14	10	12	15	19	14	17	21
	B	15	13	14	15	22	18	20	23
	C	16	14	15	16	22	19	20	23
18	A	13	9	12	14	18	14	17	20
	B	14	11	13	15	24	18	22	26
	C	14	12	13	15	24	18	21	26
19	A	15	11	13	16	20	15	19	22
	B	12	9	11	13	19	15	18	21
	C	12	10	11	13	20	15	18	21
20	A	15	11	13	16	21	15	19	22
	B	15	11	14	17	24	17	21	26
	C	15	11	13	16	23	17	21	25
21	A	14	11	13	15	20	15	19	21
	B	15	11	14	17	22	16	20	24
	C	15	11	14	17	22	16	20	24
22	A	14	11	13	15	20	16	19	21
	B	25	19	23	28	31	25	29	35
	C	25	19	23	27	32	25	30	35
23	A	15	13	14	15	22	19	20	22
	B	23	21	22	24	31	27	30	32
	C	23	21	23	24	32	29	32	34
24	A	15	12	14	16	22	17	20	23
	B	12	10	11	12	17	14	16	18
	C	11	9	10	10	16	14	15	16
25	A	16	13	15	17	22	18	21	23
	B	19	14	18	18	28	21	25	26
	C	21	15	19	19	29	22	26	27
26	A	16	12	15	17	22	18	21	24
	B	12	10	11	12	17	14	16	18
	C	12	10	11	12	18	15	17	18
27	A	15	12	14	16	21	17	19	22
	B	14	11	13	13	21	16	19	20
	C	15	12	14	14	22	17	20	21
28	A	15	12	14	16	21	17	20	23
	B	24	17	22	21	34	23	30	29
	C	27	18	24	23	35	24	32	31

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
29	A	16	14	15	16	23	20	21	23
	B	26	19	24	28	33	26	31	36
	C	24	19	23	27	33	25	30	36
30	A	17	15	16	17	24	21	23	25
	B	26	23	26	27	36	30	35	38
	C	28	24	26	29	38	32	36	40
31	A	16	13	15	17	23	19	22	24
	B	25	19	23	23	33	27	31	32
	C	26	20	24	25	34	28	32	34
32	A	14	11	13	15	20	16	19	21
	B	23	17	22	23	30	23	28	30
	C	24	18	22	23	31	25	29	31
33	A	16	13	15	17	23	20	22	24
	B	26	22	25	28	36	29	34	39
	C	27	21	26	29	36	29	34	39
34	A	25	19	23	28	33	24	30	36
	B	21	15	20	23	30	22	28	32
	C	16	13	14	16	25	19	23	26
35	A	10	8	9	10	16	12	15	16
	B	14	9	12	14	20	14	18	19
	C	18	14	17	19	24	18	22	24
36	A	14	11	13	15	21	16	19	22
	B	15	14	15	16	22	20	22	23
	C	17	15	17	18	25	21	24	26
37	A	20	14	18	21	27	20	24	29
	B	15	14	15	16	22	20	21	23
	C	21	15	20	22	30	22	27	31
38	A	13	11	13	15	20	16	19	22
	B	14	12	13	14	21	18	20	22
	C	19	16	18	21	29	24	27	32
39	A	17	13	16	19	23	18	22	25
	B	15	13	14	16	23	20	22	25
	C	18	14	17	19	27	21	25	27
40	A	15	12	14	17	22	17	21	24
	B	19	15	18	21	30	23	28	33
	C	15	12	14	16	24	19	23	26
41	A	22	17	20	25	29	21	26	31
	B	24	18	22	26	34	26	31	38
	C	19	15	18	20	28	22	26	30
42	A	18	14	17	20	24	19	22	26
	B	19	14	18	20	28	22	26	30
	C	19	14	18	20	29	22	27	31

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
43	A	14	11	13	15	21	16	19	22
	B	23	17	22	24	32	24	29	33
	C	23	17	21	24	32	24	29	34
44	A	15	11	14	15	22	16	20	23
	B	26	20	24	28	33	26	31	36
	C	26	20	24	28	34	26	32	37
45	A	16	12	14	17	23	17	21	24
	B	15	12	15	16	23	19	23	26
	C	15	13	15	16	24	20	23	25
46	A	16	13	15	17	22	17	21	23
	B	14	12	14	15	21	17	20	23
	C	15	12	14	16	22	18	21	23
47	A	20	16	19	20	27	21	25	27
	B	18	15	17	18	26	22	24	26
	C	18	15	17	18	26	22	24	26
48	A	11	10	11	11	17	14	16	16
	B	15	12	14	15	22	19	21	23
	C	15	13	14	15	23	19	21	23
49	A	15	14	15	16	21	19	21	22
	B	18	15	17	19	25	21	24	26
	C	19	17	18	20	26	22	24	27
50	A	15	12	14	15	21	18	20	22
	B	16	13	15	17	23	18	21	24
	C	17	13	16	18	23	18	22	25
51	A	13	11	13	14	20	17	19	22
	B	17	14	15	17	23	19	22	24
	C	16	13	15	17	23	19	22	25
52	A	15	13	14	16	21	18	20	22
	B	18	15	17	19	26	22	24	27
	C	19	16	18	20	26	22	25	28
53	A	19	14	17	19	26	19	23	27
	B	17	14	16	17	24	20	23	25
	C	17	14	16	18	25	20	23	26
54	A	17	12	15	17	23	17	21	24
	B	16	12	15	17	23	18	22	25
	C	16	13	15	17	23	18	22	25
55	A	13	10	12	13	19	14	17	19
	B	17	14	16	17	24	19	22	25
	C	16	13	15	17	24	18	22	25
56	A	16	12	14	16	22	17	20	23
	B	18	14	17	19	26	19	24	28
	C	17	13	16	19	26	19	24	28

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
57	A	15	12	14	15	21	16	20	22
	B	22	17	21	24	31	24	29	34
	C	22	17	20	24	31	23	28	34
58	A	13	11	12	12	18	15	17	18
	B	22	17	21	24	29	22	27	31
	C	22	17	21	24	29	22	27	31
59	A	15	11	14	17	21	16	20	23
	B	22	18	21	22	30	25	28	31
	C	22	19	21	23	31	26	29	31
60	A	15	11	14	17	21	16	19	23
	B	20	17	18	20	29	24	27	31
	C	20	17	19	21	30	24	27	32
61	A	15	11	14	16	21	16	19	23
	B	26	23	24	26	33	29	31	35
	C	26	23	25	27	34	30	32	35
62	A	12	10	11	12	19	15	17	19
	B	14	10	13	15	21	15	19	21
	C	14	12	13	14	21	18	20	21
63	A	18	13	16	20	26	19	23	28
	B	27	20	25	31	36	27	34	40
	C	23	17	21	26	34	25	31	38
64	A	13	10	12	14	21	16	19	22
	B	27	20	24	29	34	26	31	38
	C	25	18	22	27	34	25	31	38
65	A	19	17	18	20	27	24	26	28
	B	27	21	26	29	35	27	33	37
	C	26	20	25	29	34	27	32	37
66	A	16	15	16	18	25	22	24	26
	B	29	23	28	32	38	30	35	41
	C	30	23	28	33	38	30	36	41
67	A	18	14	16	19	25	19	23	26
	B	27	21	25	29	34	27	32	38
	C	24	18	23	28	34	26	32	37
68	A	17	13	15	18	23	18	21	24
	B	21	17	20	22	30	25	29	31
	C	22	17	21	23	32	26	30	34
69	A	17	13	16	18	23	19	22	25
	B	23	19	22	23	31	26	30	32
	C	23	19	22	24	32	27	31	33
70	A	-	-	-	-	-	-	-	-
	B	6	4	5	6	9	6	8	9
	C	7	6	6	7	9	8	9	10

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
71	A	-	-	-	-	-	-	-	-
	B	16	12	14	17	21	16	20	23
	C	16	12	15	17	22	16	20	23
72	A	-	-	-	-	-	-	-	-
	B	11	9	10	11	18	15	17	18
	C	13	11	11	12	20	17	18	19
73	A	-	-	-	-	-	-	-	-
	B	10	8	10	10	15	13	15	16
	C	11	9	10	11	16	14	16	17
74	A	-	-	-	-	-	-	-	-
	B	10	8	9	10	16	13	15	16
	C	11	9	10	11	16	13	15	17
75	A	-	-	-	-	-	-	-	-
	B	12	10	11	12	18	15	16	18
	C	12	9	11	12	18	15	17	18
76	A	-	-	-	-	-	-	-	-
	B	13	12	12	13	19	17	18	18
	C	14	12	13	13	20	17	18	19
77	A	-	-	-	-	-	-	-	-
	B	11	10	11	11	16	14	16	16
	C	12	10	11	12	17	14	16	16

Seasons	Months	Mean Wind Criteria Speed (mph)	
Spring	March - May	≤ 12	Comfortable for Sitting
Summer	June - August	13 - 15	Comfortable for Standing
Fall	September - November	16 - 19	Comfortable for Walking
Winter	December - February	20 - 27	Uncomfortable for Walking
Annual	January - December	> 27	Dangerous Conditions

Effective Gust Criteria (mph)	
≤ 31	Acceptable
> 31	Unacceptable

Configurations	
No Build	Existing site and surroundings
Build	Project with existing surroundings
Full Build	Project with future surroundings

Notes

SOLAR REFLECTANCE STUDY

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REPORT

74 MIDDLESEX AVENUE

DETAILED SOLAR REFLECTION ANALYSIS

JUNE 17, 2021
PROJECT #2101756

SUBMITTED TO
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EXECUTIVE SUMMARY

RWDI was retained to investigate the impact that solar reflections emanating from the proposed 74 Middlesex Avenue development will have on the surrounding urban realm.

Thermal Impacts on People

The planar nature of the facades of the proposed development ensure that reflected sunlight will not focus (multiply) in any particular area. Therefore, RWDI does not expect any significant thermal impacts (i.e. risks to human safety or property damage) to occur either on the site or in the surrounding neighborhood.

Visual Glare Impact on Drivers

As with the addition of any glazed building, drivers travelling in the vicinity of the buildings were predicted to experience an increased level of visual glare impact. Drivers along Kensington Avenue, Mc Grath Highway and Middlesex Avenue were predicted to experience reflections from the building which can cause a high level of impact. That being said, these impacts were predicted to be short in duration and some occurred at times where the sun would also be within the driver's field-of-view, which would likely act to reduce the perceived impact on drivers.

Visual Glare Impact on Pedestrians and Facades

Typical levels of visual glare was predicted for pedestrians and building occupants in the vicinity of the development. These types of reflections represent at worst a visual nuisance, as viewers can safely look away or close blinds. These potential impacts were predicted to be possible in a very small fraction of the year, no more than 8.0% of the daytime annually, on the adjacent buildings. RWDI would consider these results typical of impacts seen in any urban space.

Thermal Impact on Facades

At all studied facade areas, reflections were predicted to be low intensity and short duration. Hence, RWDI would not expect these reflections to lead to a significant additional cooling load for a building. Should an individual choose to expose themselves to the reflected energy, they may feel warm, however this would be a temporary experience and one which would easily be remedied by closing window treatments.

Overall Impact of Reflections

The predicted impacts of this development on its surrounds are typical of any modern building of this size. Additional details on when reflections were predicted to occur throughout the year, as well as predicted durations and intensities can be found in Appendix A. If mitigation is desired, strategies to minimize the reflection impacts have been provided if desired by the design team. For further details, refer to the Mitigation Suggestions section on page 22.

TABLE OF CONTENTS

INTRODUCTION

This report provides the computer modeling results of reflected sunlight from the proposed 74 Middlesex Avenue development in Somerville, MA. The proposed office and lab building will be located at the intersection of Middlesex Avenue and Kensington Avenue (Figure 1). It is our understanding that the development will be surrounded by typical urban spaces such as busy roadways, and other buildings.

RWDI was retained to investigate the impact that solar reflections emanating from the proposed development will have on the surrounding urban terrain.

A preliminary set of simulations was conducted to determine peak reflection intensities and the frequency of reflection occurrence for a broad area around the development. This served to identify areas which may experience high intensity or very frequent reflections. This information informed the selection of 27 points for a more detailed analysis.

These receptor points represent drivers, pedestrians, and building facades and the detailed results allow RWDI to quantify the frequency, intensity and duration of glare events at the receptors as well as the sources of those reflections.

Figure 1: Location of the Proposed Building (Highlighted in Blue) (Map Credit: Google Earth)

Urban Reflections

While a common occurrence, solar reflections from buildings can lead to numerous visual and thermal issues.

Visual glare can:

- Impair the vision of motorists and others who cannot easily look away from the source;
- Cause nuisance to pedestrians or occupants of nearby buildings; and,
- Create undesirable patterns of light throughout the urban fabric.

Heat gain can:

- Affect human thermal comfort;
- Be a safety concern for people and materials, particularly if multiple reflections are focused in the same area; and
- Create increased cooling needs in conditioned spaces affected by the reflections.

The most significant safety concerns with solar reflections occur with concave facades (Figure 2) which act to focus the reflected light in a single area. RWDI does not expect this to be a concern given the form of the project.

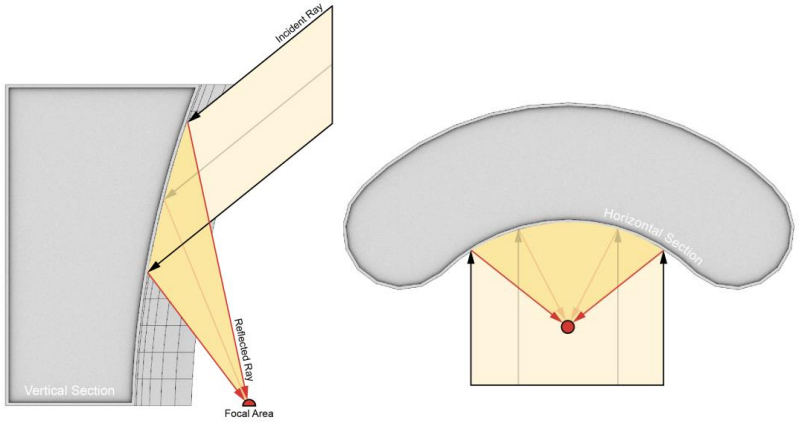


Figure 2: Illustration of Reflection Focusing Due to a Concave Facade

Methodology

RWDI assessed the potential for reflection impacts using RWDI's in-house proprietary *Eclipse* software, in two phases as per the steps outlined below:

- The Phase 1 'Screening' assessment began with the development of a 3D model of the area of interest (as shown in Figure 3). This was then subdivided into many smaller triangular patches (see Figure 4).
- For each hour in a year, the expected solar position was determined, and "virtual rays" were drawn from the sun to each triangular patch of the 3D model. Each ray that was considered to be "unobstructed" was reflected from the building surface and tracked through the surrounding area. The study domain included the entire pedestrian realm within 1,000 feet of the proposed building.
- The total reflected energy at that hour from all of the patches was computed and its potential for visual and thermal impacts assessed.
- Finally, a statistical analysis was performed to assess the frequency, and intensity of the glare events occurring throughout the year in the vicinity of the project. The criteria used to assess the level of impact can be found in Appendix B of this report.

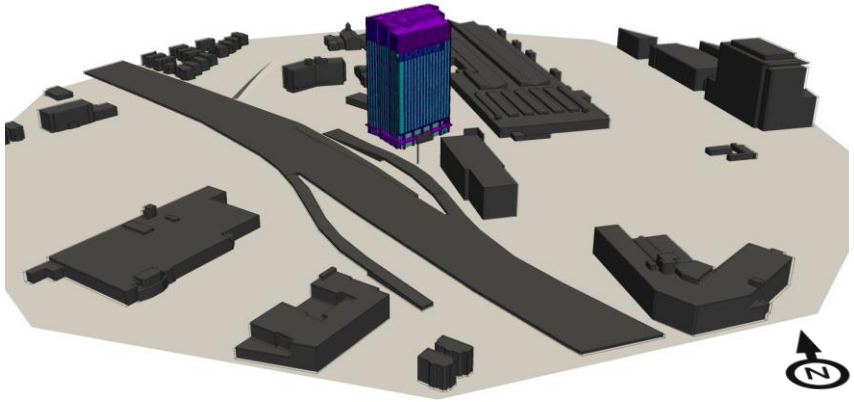


Figure 3: 3D Computer Model of the Proposed Development and Surrounding Context

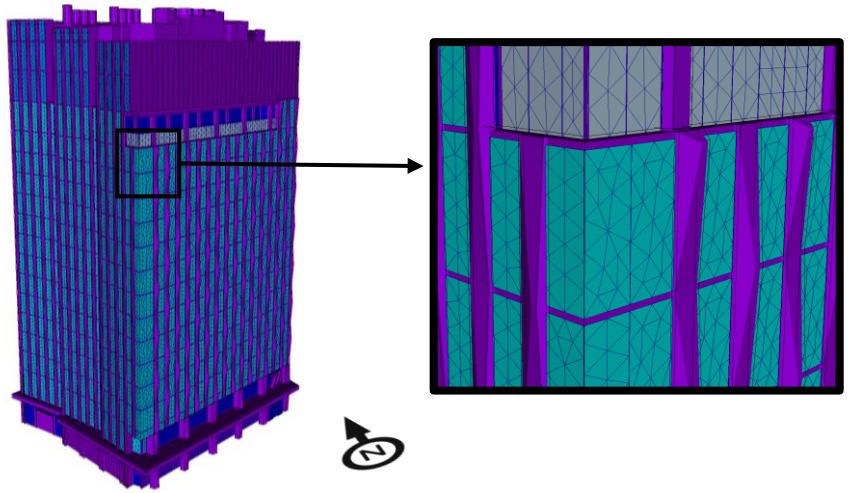


Figure 4: Close-up View of the Model, Showing Surface Subdivisions

Methodology (cont'd)

- Based on the findings of the Screening analysis, multiple representative 'receptor points' were selected to undergo the Phase 2 'Detailed' analysis.

- The points were chosen to understand in greater detail how reflections from the building will impact drivers, pedestrians and the rest of the built environment. The selected locations of the points are discussed further in the Detailed Analysis section this report.

- The Detailed analysis process is similar to the Screening analysis, except reflections are analyzed at one-minute increments for the entire year and the source of the reflections is stored for each receptor point.

- In addition to the frequency and duration of reflection impacts, the Detailed analysis allows for the prediction of when impacts can occur, how long they can occur for and the locations of problematic glare sources.

Assumptions and Limitations

Meteorological Data

This analysis used 'clear sky' solar data computed at the location of Boston Logan International Airport. This approach uses mathematical algorithms to derive solar intensity values for a given location, ignoring local effects such as cloud cover. This provides an assessment of a complete year showing the full extent of when and where glare could ever occur.

Radiation Model

RWDI's analysis is only applicable to the thermal and visual impacts of solar radiation (i.e. ultraviolet, visible and infrared wavelengths) on people and property in the vicinity of the development. It does not consider the impact of the building related to any other forms of radiation, such as cellular telephone signals, RADAR arrays, etc.

Study Building and Surrounds Models

The analysis was conducted based on a 3D model of the proposed development provided by Elkus Manfredi Architects to RWDI up to May 14, 2021.

The surroundings model was developed based on data made available by the City of Boston. The surrounds model includes all buildings which currently exist or are approved for construction by the BPDA.

The ground surface and the surrounding buildings were topographically corrected based on a high-resolution LiDAR survey conducted by the National Oceanic and Atmospheric Administration (NOAA) in 2013-2014. NOAA states that the horizontal accuracy of this data set is 16.5 inches at a 95% confidence level. Its vertical accuracy is stated as 4.8 inches at a 95% confidence level.

Potential reductions of solar reflections due to the presence of Vegetation or other non-architectural obstructions were not included, nor are reflections from other buildings. Light that has reflected off several surfaces is assumed to have a negligible impact. As such, only a single reflection from the development was included in the analysis.

Assumptions and Limitations (cont'd)

Facade Material Reflectance

Based on correspondence with Elkus Manfredi Architects to RWDI on May 13, 2021, three insulated glazing units (IGUs) are currently planned to be used for the tower glazing. Upon review of their reflectance characteristics, all the units have a nominal visible reflectance between 11% and 16%. The full spectrum reflectance (which relates to heat gain related issues) was found to be nominally between 39% and 50%. RWDI understands that two options are under consideration for the storefront and lobby glazing. As the visible reflectance for both glazing options was similar, the option with the higher full spectrum reflectance was assumed in this study for conservatism.

Glass balustrades were also noted in the 3D model. These are unlikely to be IGUs, therefore we have assumed that they are typical laminated safety glass with a visible and full spectrum reflectance of 8% and 7% respectively.

The reflectance properties of the reflective elements are summarized in Table 1. Figure 5 illustrates the location of the reflective materials on the facades.

Applicability of Results

The results presented in this report are highly dependent on both the form and materiality of the facade. Should there be any changes to the design, it is recommended that RWDI be contacted and requested to review their potential effects on the findings of this report.

This analysis also assumes reasonable and responsible behaviour on the part of people in the vicinity of the project. A reasonable and responsible person would not purposely look towards a bright reflection, purposely prolong their exposure to reflected light or heat, or otherwise intentionally try to cause discomfort/harm to themselves or others and/or damage to property.

This report has endeavored to provide a robust and suitably conservative analysis of the potential effects of reflected sunlight, contextualized based on current industry and academic research, and common best practices. Regulation and enforcement of performance requirements is the responsibility of the relevant regional regulatory authority.

Assumptions and Limitations (cont'd)

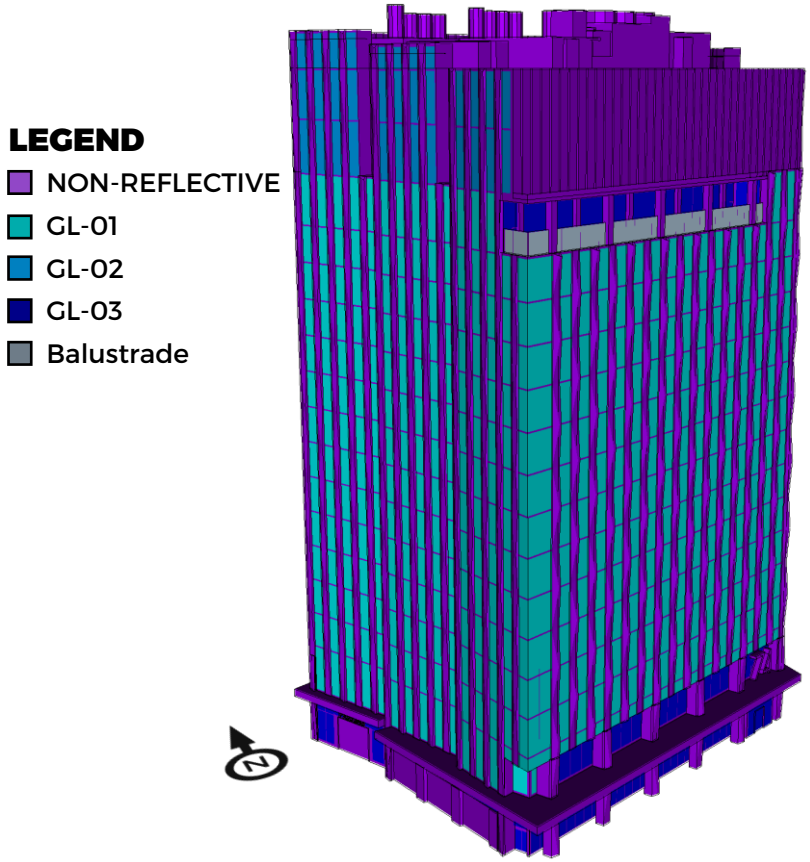


Figure 5: Locations of Reflective Building Elements (Surrounding Context removed for Clarity)

Table 1: Nominal Visible and Full Spectrum Reflectance Values of the Reflective Building Elements

Location	Material	Visible Reflectance	Full Spectrum Reflectance
GL-01 (Typical Curtain Wall)	Triple paned Glazing with Interpane Ipasol Ultraselect 62/29 on surface #2 and iplus1.1 on surface #5	11%	43%
GL-02 (Typical Penthouse)	Triple paned Glazing with Interpane Stopray Ultra-70 on surface #2 with iplus 1.1 on surface #5	13%	50%
GL-03 (Typical Storefront & Lobby)	Triple paned Glazing with Interpane iplus top 1.1 on surface #2 with iplus 1.1 on surface #5	16%	39%
Balustrade	Single Pane Clear Glass	8%	7%

Presentation of Results

This section presents the screening results pertaining to the solar impacts of the development on the surrounding urban area. The following three plots are presented:

Peak Annual Reflected Irradiance
This plot displays the annual peak intensity of all reflections emanating from the development at a typical pedestrian height (5 feet) above local grade.

Two versions of this plot are included:

- **Visible Reflectance (Visual Glare):** This plot (Figure 6a) displays the intensity of reflected visible light only. Depending on the ambient conditions, reflection intensities as low as 50 W/m² could be visible to people outdoors.

- **Full Spectrum Reflectance (Heat Gain):** This plot (Figure 6b) presents the total intensity of a reflection, including both visible light and thermal energy which relates to the risk of excessive heat gain. For full spectrum reflectance, RWDI considers 1500 W/m² as a short-term thermal comfort threshold and reflections above 2500 W/m² as a human safety threshold (refer to Appendix B).

Frequency of Significant Visual Reflections
This plot (Figure 6c) identifies the locations of the most frequent significant reflections emanating from the facades. In this context a 'significant' reflection is one that is at least 50% as intense as one that would cause after imaging on a viewer (refer to Appendix B).

As this criteria is visually based, the visible reflectance of the facades was used.

In order to attain a complete understanding of the impact that reflections may have on drivers, other factors must be considered, including the duration of the reflections and when they occur. The following plots serve to illustrate the general characteristics of reflections from the development and inform the locations of the receptor points used in the detailed phase of work which will analyze these factors in greater detail.

Peak Annual Reflected Irradiance - Visible Reflectance (Visual Glare)

Reflections as low as 50 W/m² may be visible to people, depending on outdoor lighting levels.

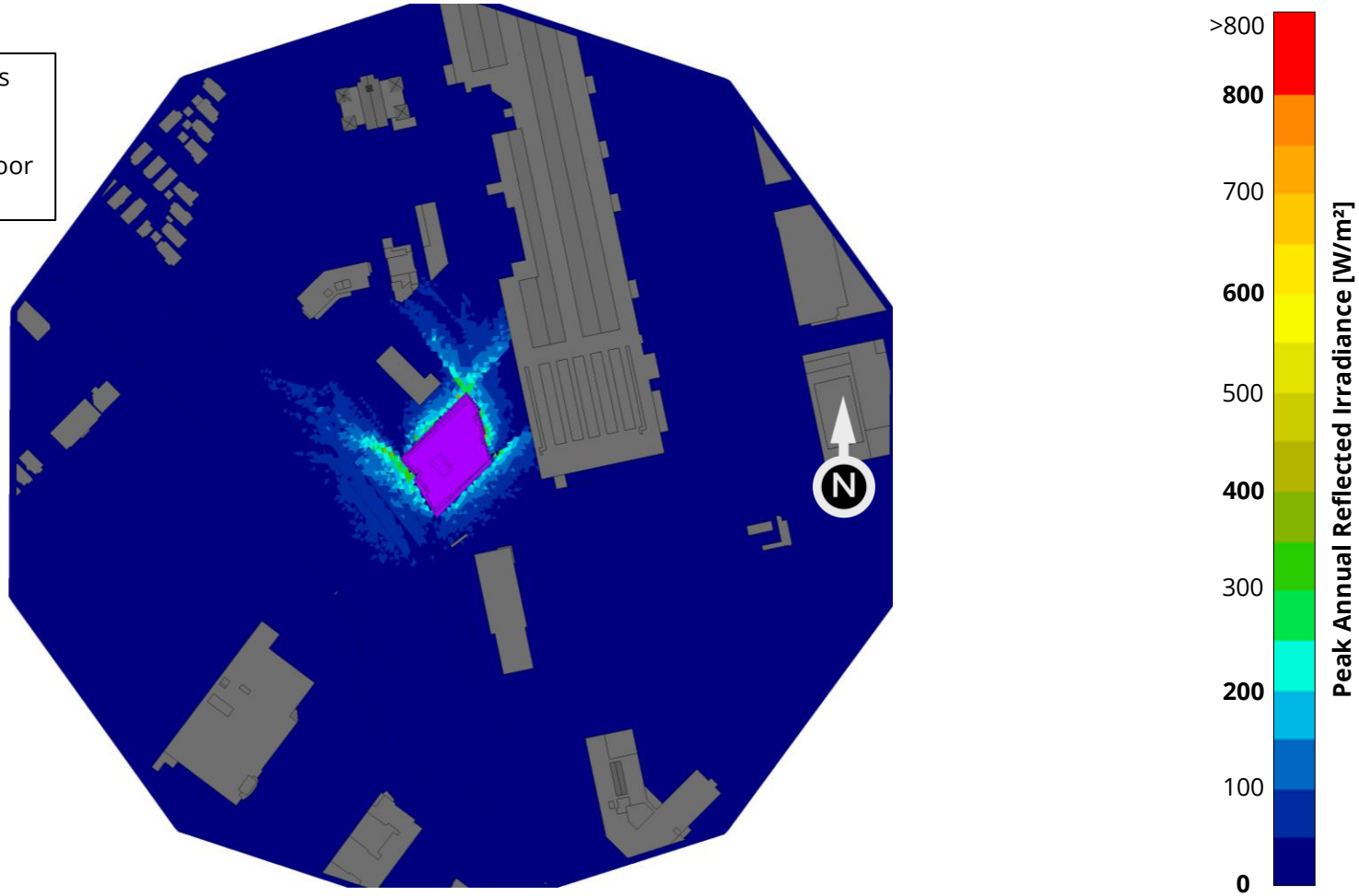


Figure 6a: Maximum Annual Intensity of Visible Reflections at Pedestrian Height

Peak Annual Reflected Irradiance - Full Spectrum Reflectance (Heat Gain)

800 W/m² represents a typical intensity for direct sunlight.

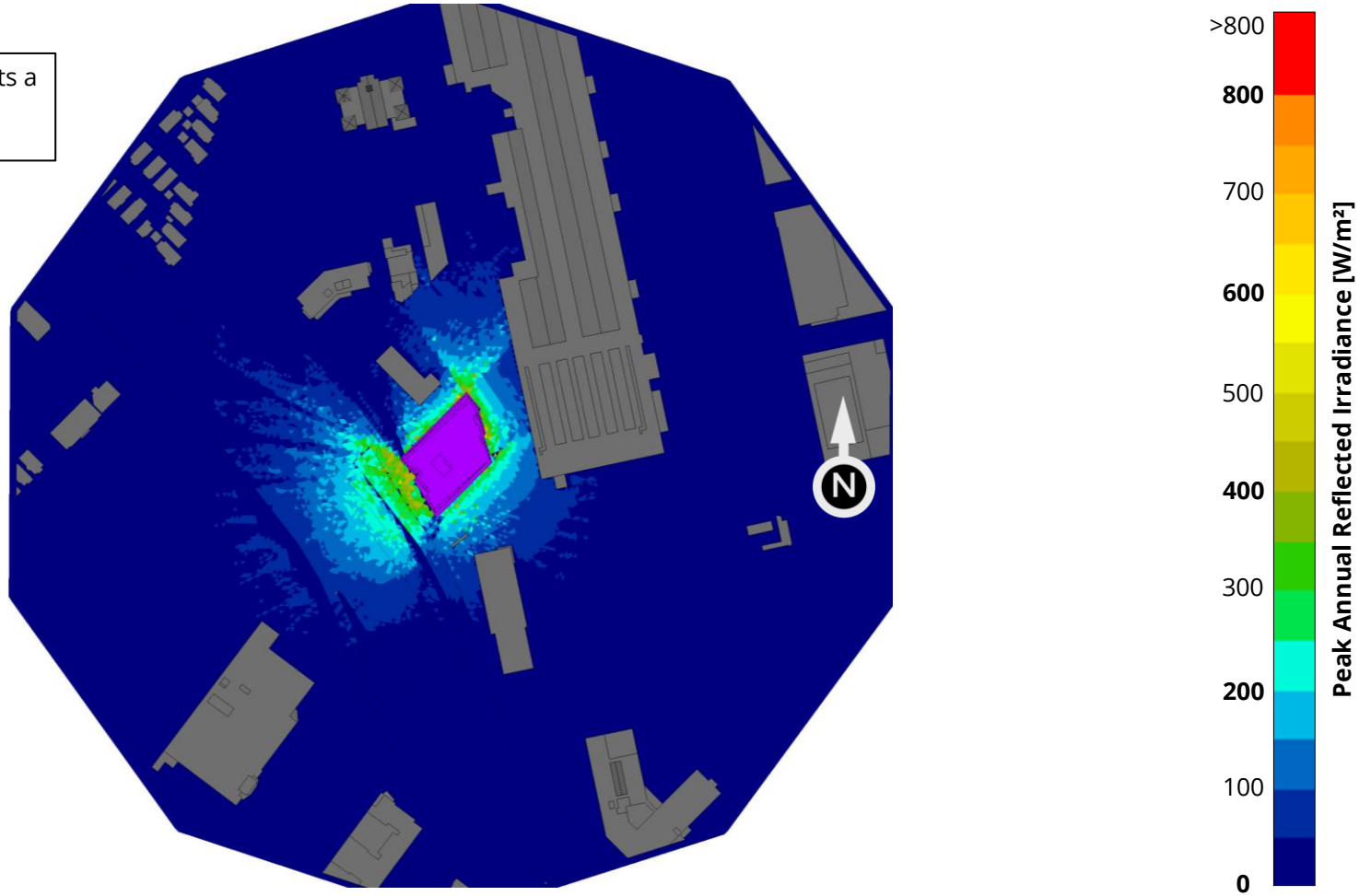


Figure 6b: Maximum Annual Intensity of Full Spectrum Reflections at Pedestrian Height

Frequency of Significant Visible Reflections

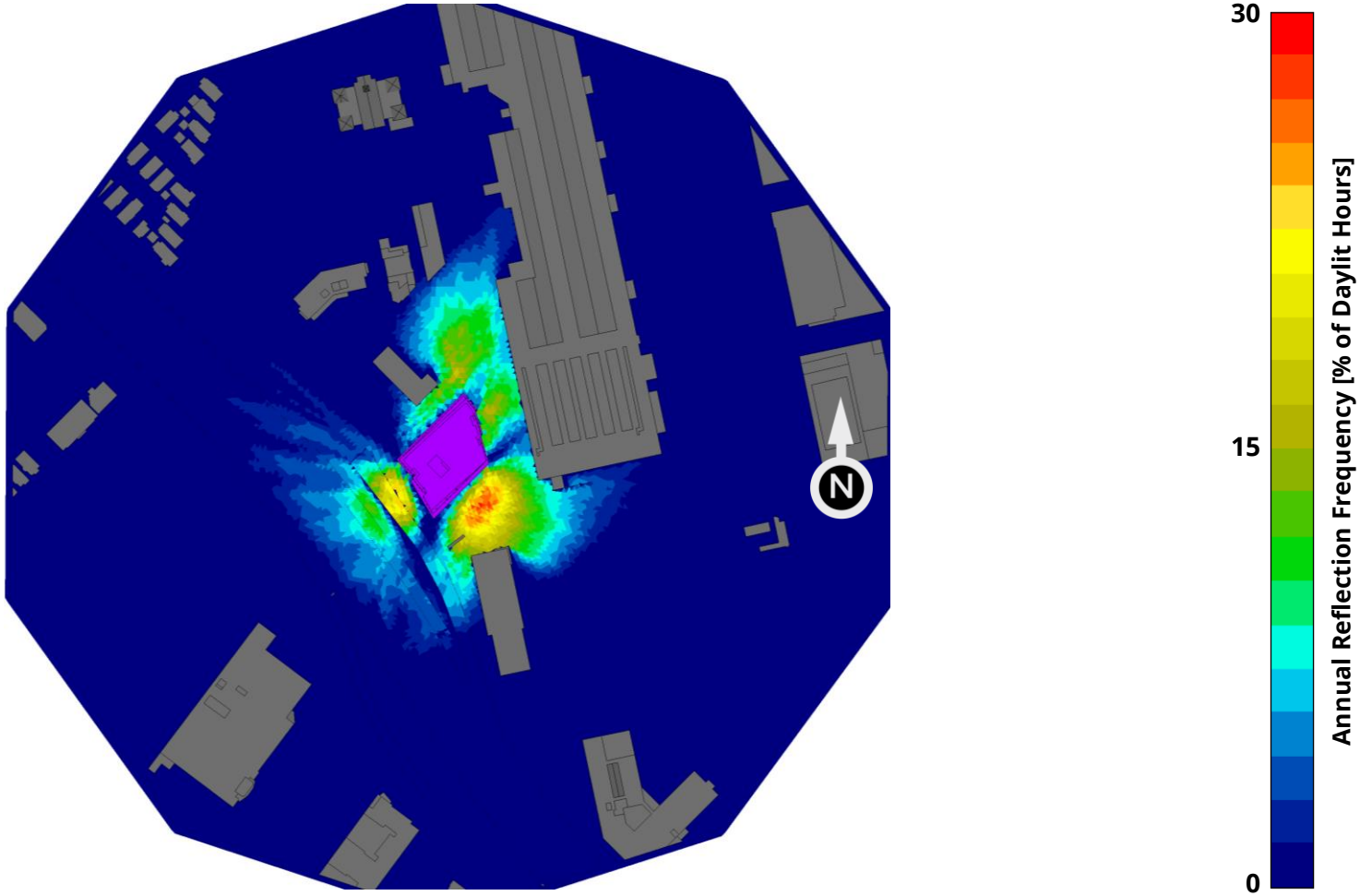


Figure 6c: Frequency (% of Daylit Hours) Where Significant Visible Reflections Can Occur

SCREENING ANALYSIS OBSERVATIONS

1. Like any contemporary building, the reflective surfaces of the proposed development are naturally causing solar reflections in the surrounding neighborhood.

2. The planar nature of the facades of the building prevent reflections from focusing (concentrating) in any particular area. Thus, RWDI does not anticipate any heat gain issues on people or property.

3. At pedestrian level, reflections were predicted to fall most frequently onto the area immediately west and south of the proposed building. The maximum frequency of glare occurrence found at pedestrian level is approximately 29% of daytime hours.

4. Reflections from the development were predicted to be generally confined to within 350 feet of the building and may impact northbound drivers on Mystic Avenue as well as northbound and southbound drivers on Middlesex Avenue and the Northern Expressway. Likewise, drivers traveling east and west on Kensington Avenue and Mc Grath Highway may also be impacted.

5. The occupants of the buildings located close to the development were predicted to experience visible reflections from the development. That being said, the reflections are unlikely to pose a risk to safety. They are likely a nuisance at worst, as the occupants can look away or close blinds.

6. Pedestrians in the vicinity of the project also have the potential of experiencing intermittent reflections. This condition is common in many urban centers and is unlikely to present a significant safety risk.

7. RWDI does not anticipate reflections from this development to have a significant impact on Foss Park.

8. The exact nature of these impacts are explored further in the following detailed analysis section.

DETAILED ANALYSIS RESULTS

Based on the findings of the Screening Analysis and the risk levels associated with reflections effecting specific areas, 27 representative points were selected for the Detailed Analysis. These points are described in Table 2 and illustrated in Figure 7.

Table 2: Receptor Descriptions

Receptor Number	Receptor Description
D1-D2	Northbound drivers on Northern Expressway
D3	Southbound drivers on Northern Expressway
D4-D5	Northbound drivers on the Northern Expressway off-ramp
D6	Northbound drivers on the Northern Expressway on-ramp
D7	Northbound drivers on Mystic Avenue
D8-D9	Drivers travelling east and west on Kensington Avenue
D10-D11	Drivers travelling north and south on Cummings Street
D12-D13	Drivers travelling east and west on Mc Grath Highway
D14-D16	Drivers travelling north and south on Middlesex Avenue
P17	Pedestrians in the neighbouring amenity space
P18	Pedestrian crossing Middlesex avenue
P19	Pedestrian crossing Mystic Avenue
P20	Pedestrian on sidewalk along Mc Grath Highway

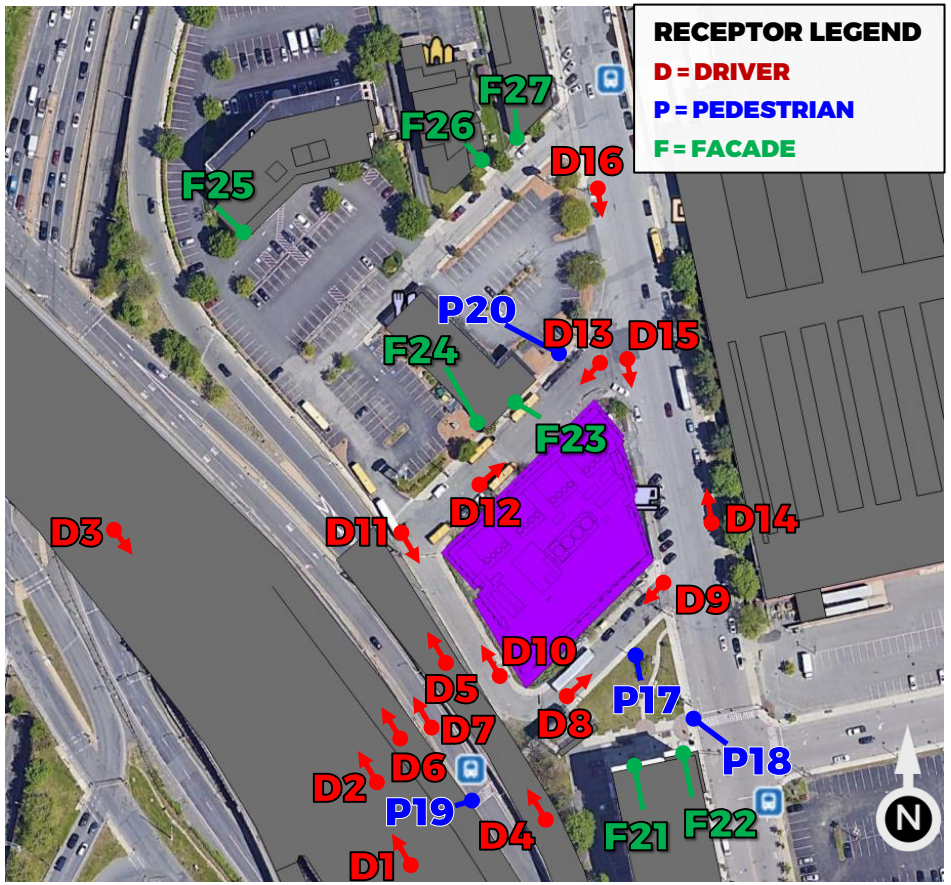


Figure 7a: Receptor Locations (Map Underlay Credit: Microsoft Bing Maps)

DETAILED ANALYSIS RESULTS

Table 2: Receptor Descriptions (continued)

Receptor Number	Receptor Description
F21-F22	Facades on 50 Middlesex Avenue on approximately the 3rd floor
F23-F24	Facades on the 99 Restaurants building approximately the 1st floor
F25	Facades on 23 Cummings Street approximately the 4th floor
F26	Facades on 9 Cummings Street approximately the 2nd floor
F27	Facades on 120 Middlesex Avenue approximately the 2nd floor

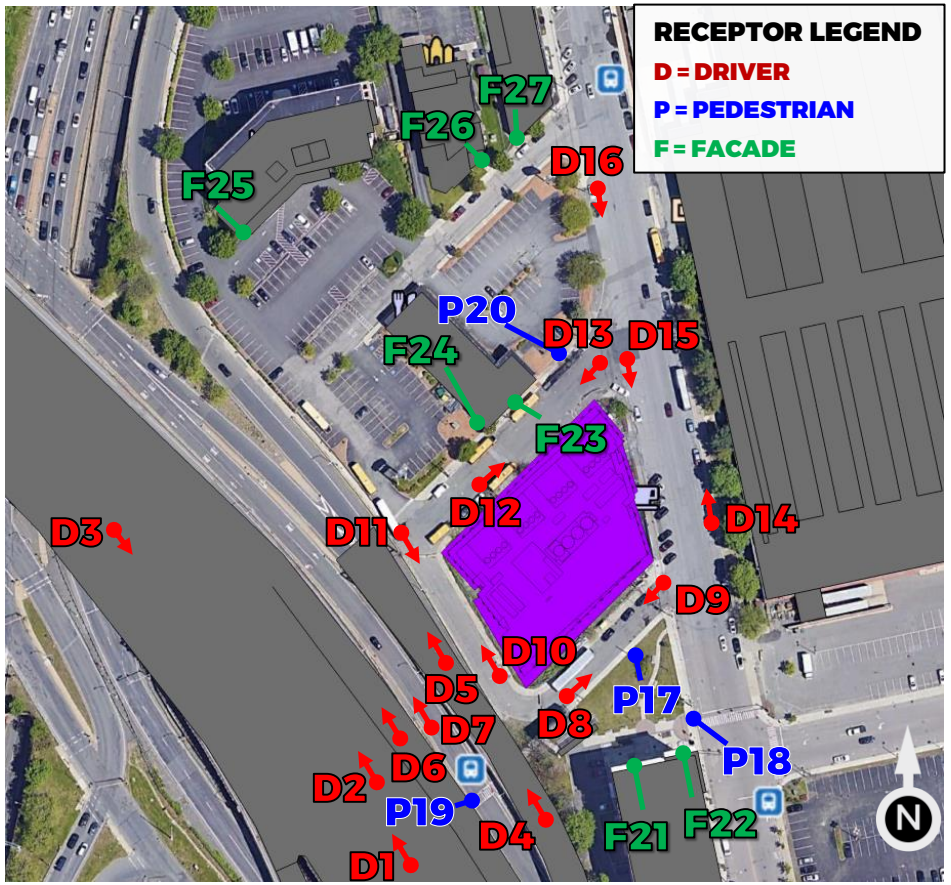


Figure 7: Receptor Locations (Map Underlay Credit: Microsoft Bing Maps)

DETAILED ANALYSIS RESULTS

Table 3 summarizes the level of visual and thermal impact from the development's reflections at each of the studied locations. For each category (visual impact, thermal impacts on people, thermal impacts on facades/property) the point is classified as experiencing one of four impact levels:

- **Low** impacts indicate that either no reflections reach the receptor, or that reflections which do reach the location are unlikely to lead to visual or thermal concerns.

- **Moderate** impacts indicate the potential for visual nuisance, minor thermal discomfort to people, or minor heating of materials. Moderate impacts do not indicate a significant safety risk and are common in urban areas. They represent effects such as intermittent visual glare on pedestrians or occupants of adjacent buildings which can be safely self-mitigated.

- **High** impacts indicate the potential for risks to safety, either through impairing the visual acuity of a vehicle operator or through reflection intensities high enough to cause injury or property damage. When the sun is also in a driver's field of view, RWDI would expect that brightness of the sun to dominate over the less intense reflected light, likely reducing the perceived effect of high impact reflections. This situation is noted in Table 3 where applicable, as are notes on high impact reflection frequencies and durations.

- **Very High/Damaging** impacts indicate the potential for extreme risks to safety, either due to reflected energy intensities well in excess of RWDI's ceiling exposure limit or visual glare bright enough to damage the retina faster than an individual can blink.

The minute-by-minute results for each point are presented as 'Annual Reflection Impact Diagrams' which distill an entire year's worth of data into a single diagram. The diagrams for each of the receptor points as well as an explanation for how to read the diagrams are provided in Appendix A.

For further detail on RWDI's criteria refer to Appendix B.

The level of mitigation required (discussed further in the Overall Observations and Conclusions section), is determined based on a combination of factors including the predicted level of impact, the frequency and duration of the impacts, and the risk level associated with activities likely to be engaged in at the location.

DETAILED ANALYSIS RESULTS

Table 3: Summary of Overall Predicted Impacts on Receptors

Receptor Number	Receptor Type	Assumed Activity Risk Level	Assumed Ability to Self-Mitigate	Peak Reflected Light Visual Impact	Duration / Number of Days with High Impact Reflection	Percentage of High Impacts Where the Sun Is Also Visible	Peak Reflected Solar Thermal Impact on People	Peak Reflected Solar Thermal Impact on Facade
D1	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D2	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D3	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D4-D8	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D9	Driver	High	Low	***High***	Longest Duration: **13 minutes** Average Duration: **9 minutes** No. of days: **46**	***0%***	***Low***	N/A
D10-D11	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D12	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D13	Driver	High	Low	***High***	Longest Duration: **11 minutes** Average Duration: **3 minutes** No. of days: **48**	***91%***	***Low***	N/A
D14	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D15	Driver	High	Low	***High***	Longest Duration: **17 minutes** Average Duration: **6 minutes** No. of days: **38**	***0%***	***Low***	N/A
D16	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
P17-P20	Pedestrian	Low	High	***Moderate***	N/A	N/A	***Low***	N/A
F21-F24	Facade	Low	High	***Moderate***	N/A	N/A	N/A	***Low***
F25	Facade	Low	High	***Low***	N/A	N/A	N/A	***Low***
F26-F27	Facade	Low	High	***Moderate***	N/A	N/A	N/A	***Low***

OVERALL OBSERVATIONS AND CONCLUSIONS

Thermal Impacts on People

1. The planar facades of the proposed development ensure that reflected sunlight will not focus (multiply) in any particular area. Therefore, RWDI does not expect any significant thermal impacts (i.e. risks to human safety or property damage) to occur either on the site of the development or in the surrounding neighborhood.

Visual Glare Impact on Drivers

2. As with the addition of any glazed building, drivers travelling in the vicinity of the buildings are expected to experience an increased level of visual glare impact. Some reflections with a high visual impact potential were predicted. Some of these impacts may alter a driver's experience since the glare occurs at times when the sun would not be within a driver's field-of-view. In particular, a driver's experience could be altered when:

   - Travelling west on Kensington Avenue (receptor D9); and
   - Travelling south on Middlesex Avenue (receptor D15)

   The high impact reflections predicted at these locations can last up to 17 minutes, but on average last 6 to 9 minutes. The impacts on Kensington Avenue were predicted between 1:45 pm EST and 2:15 pm EST from December to mid-January. The impacts on Middlesex Avenue were predicted between 9:00 am EST and 10:00 am EST from December to early January. This equates to high impact glare being possible at the receptors on Kensington Avenue and Middlesex Avenue in 0.16% and 0.35% of the daytime respectively.

3. The other high impact glare events predicted in this analysis occur at times when the sun would also be in a driver's field-of-view. This represents a situation where a driver would already experience intense glare from the sun, likely reducing the perceived impact of any reflected light due to both the intensity of the sun compared to the reflection, but also because a driver would already expect glare to occur at that time from that location. This analysis predicts the potential for such impacts along Mc Grath Highway (D13). Impacts at this receptor was predicted to be generally short in duration, lasting 11 minutes at most, and possible 0.16% of the daytime annually with 91% of those impacts coinciding with the sun also being visible to a driver.

4. For the remainder of the driver receptors, visual glare impacts were predicted to be moderate at worst, and therefore are not expected to pose a significant safety concern to drivers. For further details refer to the visual impact diagrams for all driver receptors (D1-D16) illustrated in Appendix A.

OVERALL OBSERVATIONS AND CONCLUSIONS

Visual Glare Impacts on Pedestrians and Facades

5. Moderate levels of visual impact were predicted to fall on the pedestrian and facade receptors studied in this analysis.

6. The potential impacts predicted along the facade of 50 Middlesex Avenue (F21-F22) can last between 13 to 23 minutes at most, but on average last between 5 and 7 minutes. These reflections were predicted mainly in the morning hours between 7:00 am EST and 10:15 am EST between mid-January and late November. This equates to glare being possible between 2.0% and 5.7% of the daytime annually.

7. Impacts to the businesses south of Commonwealth Avenue (F23-F24) were predicted during the afternoon hours between 2:00 pm EST and 5:00 pm EST between March and mid-October. Reflections are expected to last between 29 and 47 minutes at most, but on average 14 minutes or less. These reflections are possible no more than 8.0% of the daytime annually.

8. Impacts to the businesses along Middlesex Avenue (F26-F27) were predicted last between 12 to 19 minutes at most, but on average last between 9 and 13 minutes. These reflections were predicted to occur briefly in the morning hours between 8:00 am EST and 10:00 am EST between September to mid-April. This equates to glare being possible 0.8% of the daytime annually.

9. The potential visual impacts noted above do not present a safety risk, but rather a temporary nuisance at worst which can be mitigated by briefly closing blinds or looking away from the glare source.

Thermal Impacts on Facades

9. The majority of reflected solar energy at the studied facade areas was predicted to be low intensity (less than 300 W/m^2) and short duration. Hence, RWDI would not expect these reflections to lead to a significant additional cooling load for a building. Should an individual choose to expose themselves to the reflected energy, they may feel warm however this would be a temporary experience and once which would easily be remedied by closing window treatments.

MITIGATION SUGGESTIONS

Overall, the reflections emanating from the proposed 74 Middlesex Avenue development onto the surrounding neighborhood are comparable to reflections elsewhere in the city. However, if there are concerns about the predicted reflection impacts, RWDI offers the following suggestions for further consideration (refer to Figures 8 and 9 on the following two pages for a mark-up of these recommendations):

1. **Building Mounted Shading Devices:** The impacts predicted at the receptors on Kensington Avenue and Mc Grath Highway (D9, D13) could be reduced or eliminated outright by constructing physical blockages. In particular, employing vertical mullion fins approximately between 9 and 13 inches deep in the locations highlighted in Figures 8 and 9 would reduce the frequency and duration of high-impact reflections falling onto these receptors.

It should be noted that building mounted shading devices need careful design to ensure that they do not lead to potential problems with wind induced noise or vibration, snow and ice build up, etc. Thus, if mitigation via facade mounted shading structures is desired, RWDI would recommend re-running the simulations with the proposed shading devices included to predict their effectiveness.

2. **Glazing Surface Modification:** Modifying the exterior surface of a section on the east facade and the glass doors on the north façade (highlighted in Figure 8 and 9) to diffuse reflected light (i.e. by "frosting" or roughening the exterior surface) could also help in reducing the frequency of reflections predicted on Mc Grath Highway and on Middlesex Avenue (D13 and D15).

MITIGATION SUGGESTIONS

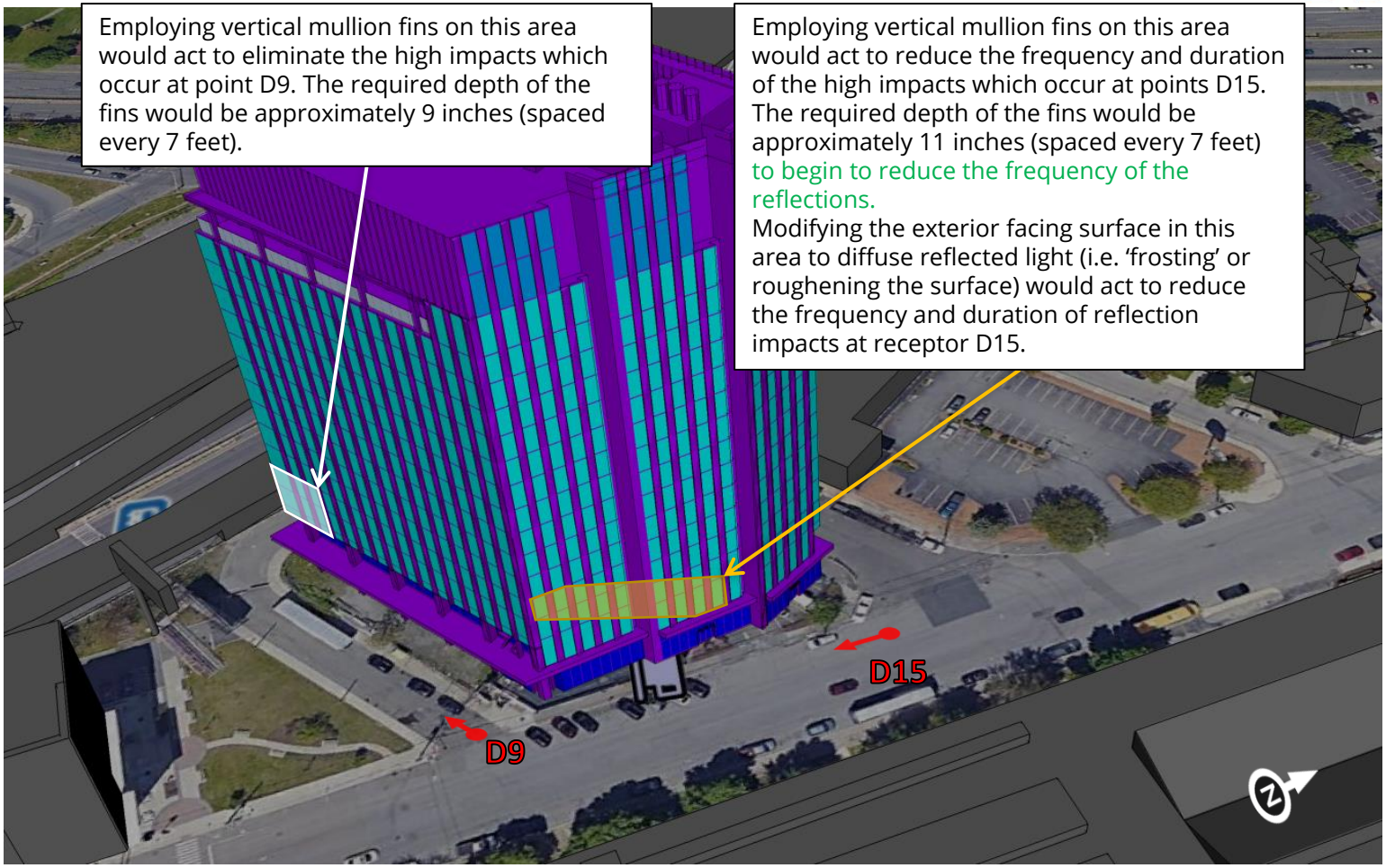


Figure 8: Markup of Facade Locations Where Building-mounted Shading Devices and Surface Modification Would be an Appropriate Approach

MITIGATION SUGGESTIONS

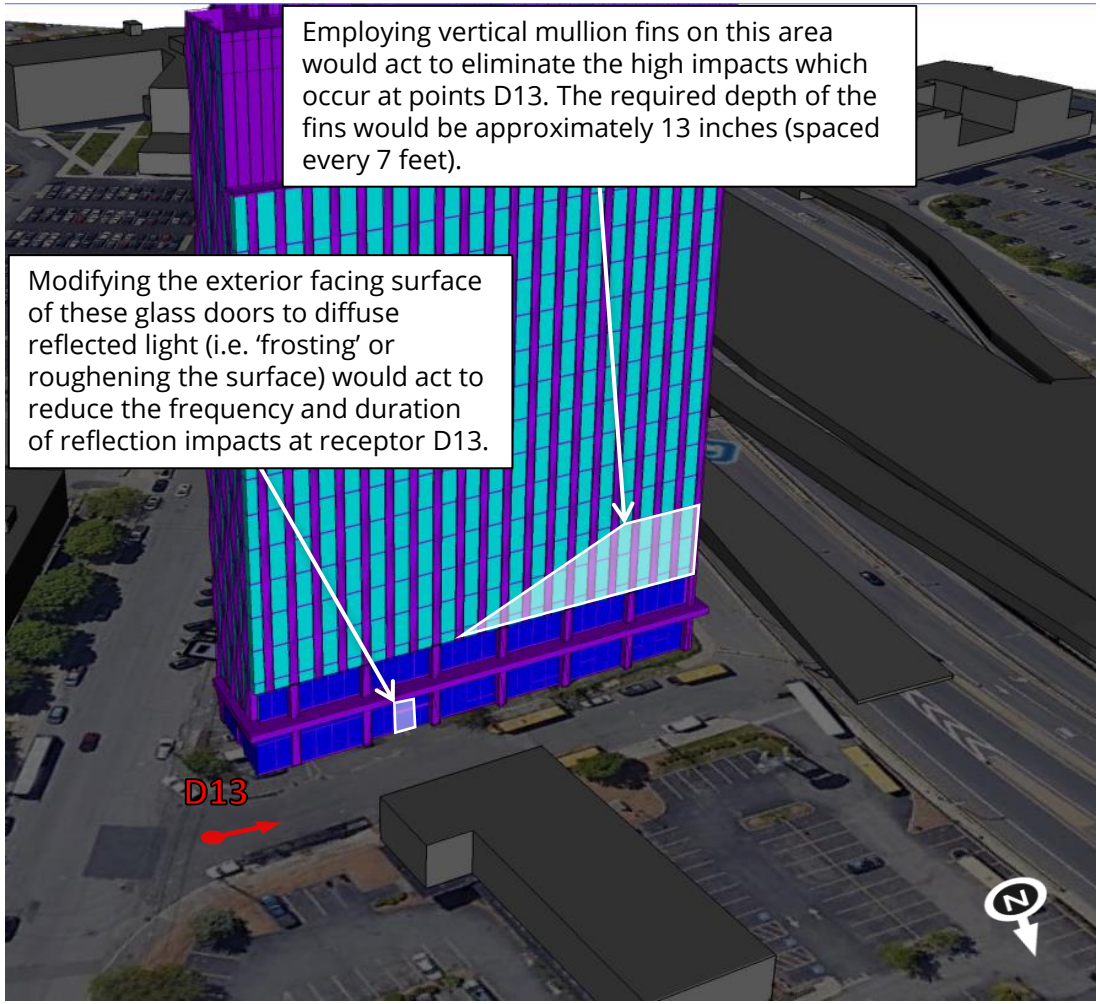


Figure 9: Markup of Facade Locations Where Building-mounted Shading Devices and Surface Modification Would be an Appropriate Approach

APPENDIX A

ANNUAL REFLECTION IMPACT DIAGRAMS

Presentation of Results

The frequency, duration, and intensity of glare events throughout the year is illustrated using "annual impact diagrams" (see Figure A1 below for the general layout of these plots). The color of the plot for a given combination of date and time indicates the relative impact of any glare sources found. The horizontal axis of the diagram indicates the day of the year, and the vertical axis indicates the hour of the day.

We note that the referenced times are in local standard time, so in jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

The following pages present the impact categories for three types of Annual Impact Diagrams: Visual Impact, Thermal Impact on People, and Thermal Impact on Property. More information on RWDI's criteria is available in Appendix B.

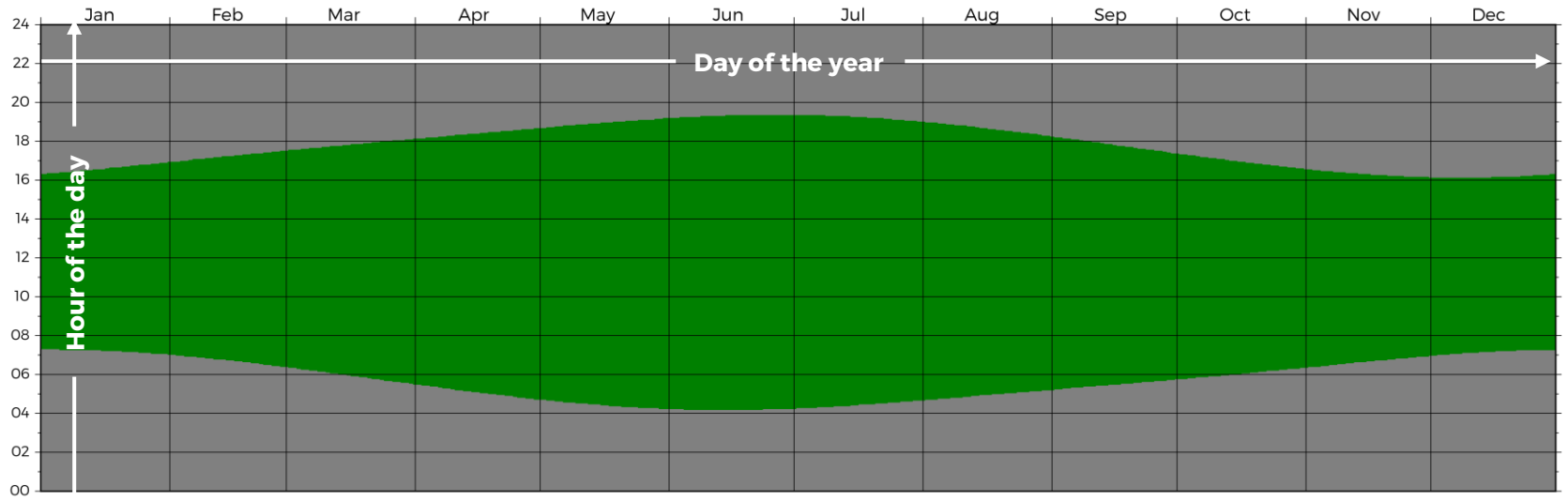


Figure A1: Layout of Annual Reflection Impact Diagram

Visual Impact Categories

Low: Either no significant reflections occur or the reflections will have a minimal effect on a viewer, even when looking directly at the source.

Moderate: The reflections can cause some visual nuisance only to viewers looking directly at the source.

High: The reflections can reduce visual acuity for viewers operating vehicles or performing other high-risk tasks who are unable to look away from the source, posing a significant risk of distraction.

Damaging: The brightest glare source is bright enough to permanently damage the eye for a viewer looking directly at the source.

Hatched areas indicate times and dates when the sun would also be in a driver's field of view.

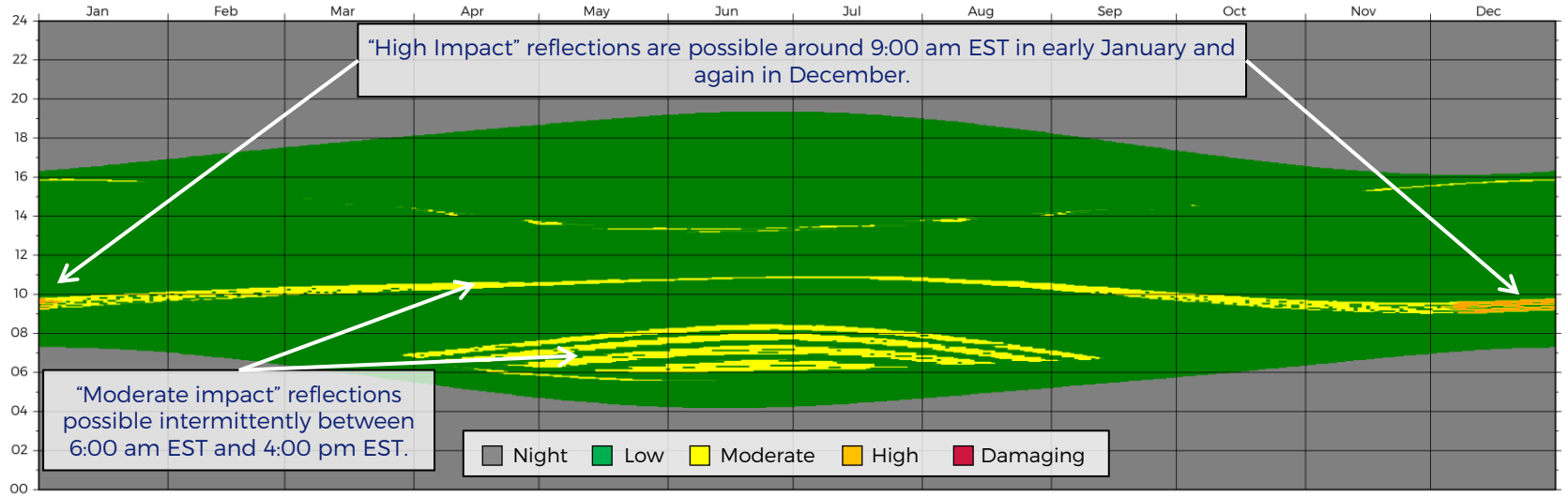


Figure A2: Example of Annual Visual Glare Impact Diagram – Receptor D15

Thermal Impact Categories for People

Low: Either no significant reflections occur or the reflection intensity is below the short-term exposure threshold of 1500 W/m².

Moderate: The reflection intensity is above the short-term exposure threshold of 1500 W/m² but below the safety threshold of 2500 W/m². Such reflections would quickly cause thermal discomfort in people.

High: The reflection intensity is above the safety threshold of 2500 W/m² but below 3500 W/m². This level of exposure to bare skin would lead to the onset of pain within 30 seconds.

Very High: Reflection intensity exceeds 3500 W/m². This level of exposure leads to second degree burns on bare skin within 1 minute.

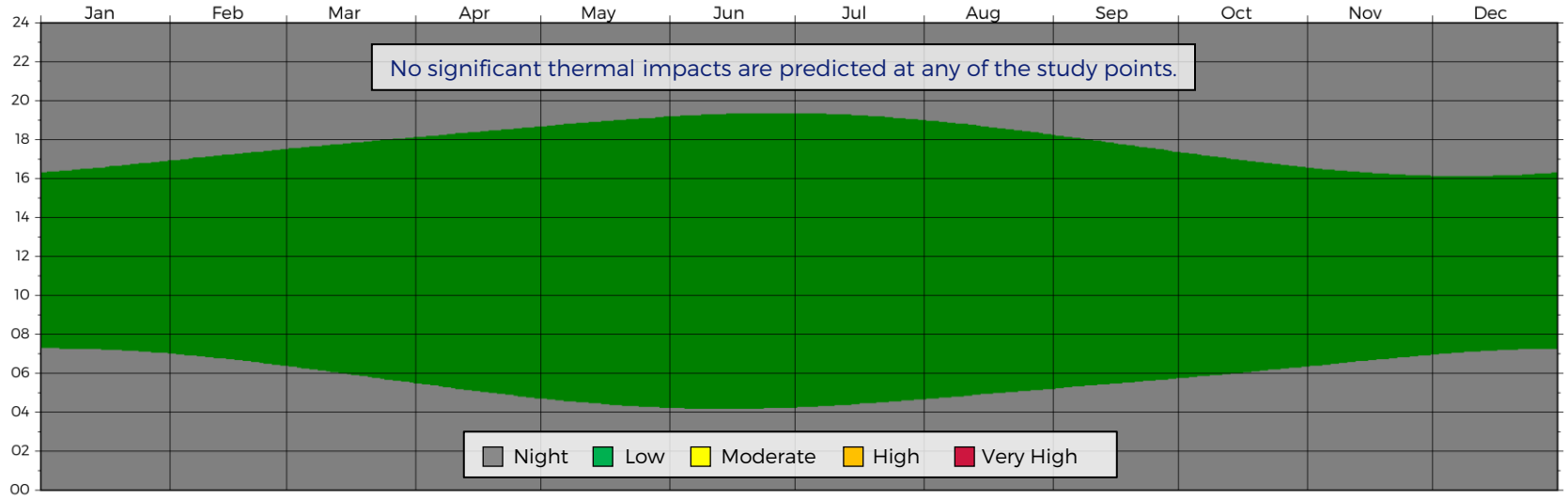


Figure A3: Example of Annual Pedestrian Thermal Impact Diagram – Receptor P15

Thermal Impact Categories for Property

A different scale is used to illustrate the reflected thermal energy on facades in order to provide further clarity on the potential for heat gain issues. The diagrams illustrate the irradiance levels of all predicted reflection events along with their frequency and duration.

The format of the diagram is similar to the diagrams described in the previous pages. The color of the plot for a given combination of date and time indicates the intensity of the reflected light at that point in time.

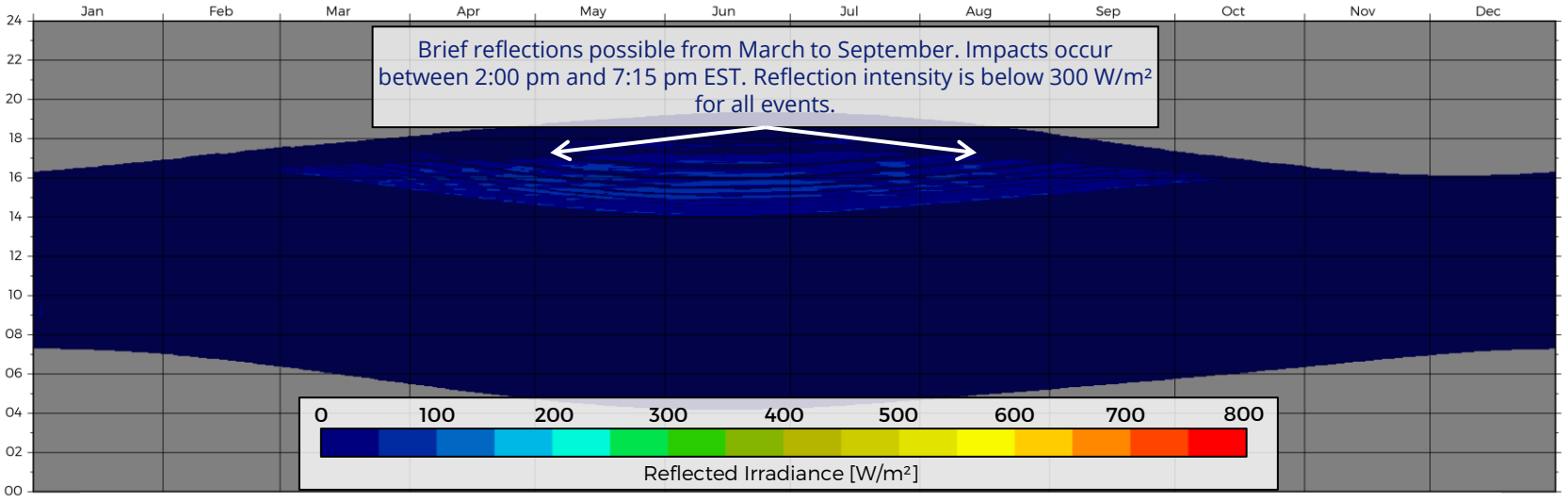
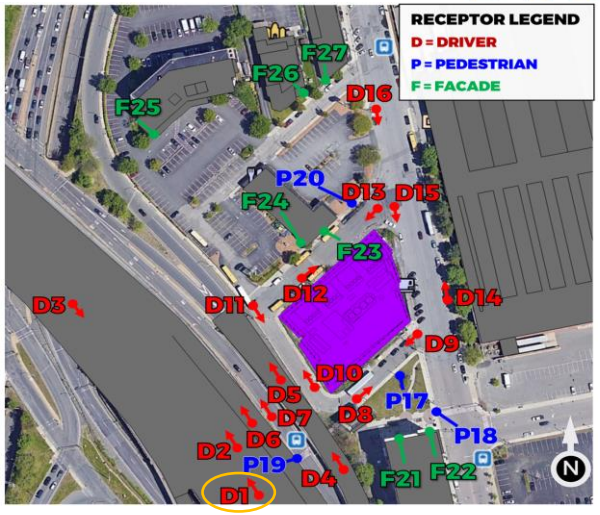


Figure A4: Example of Annual Property Thermal Impact Diagram – Receptor F23

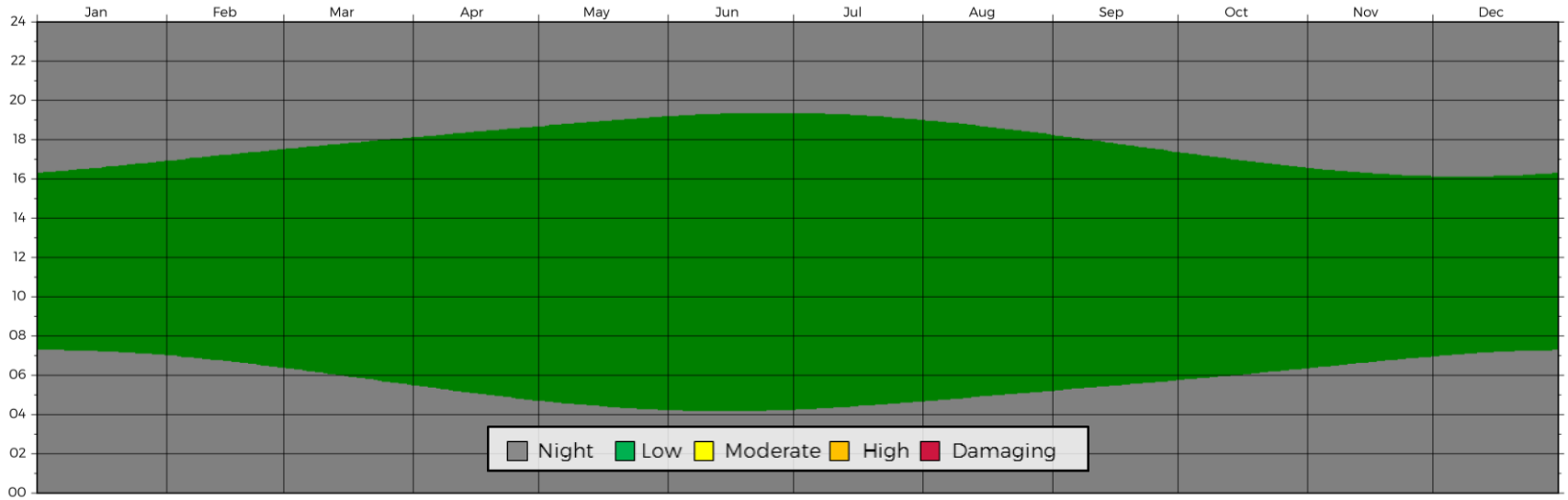
ANNUAL VISUAL IMPACT

Driver Receptor D1

Receptor D1 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on Northern Expressway.



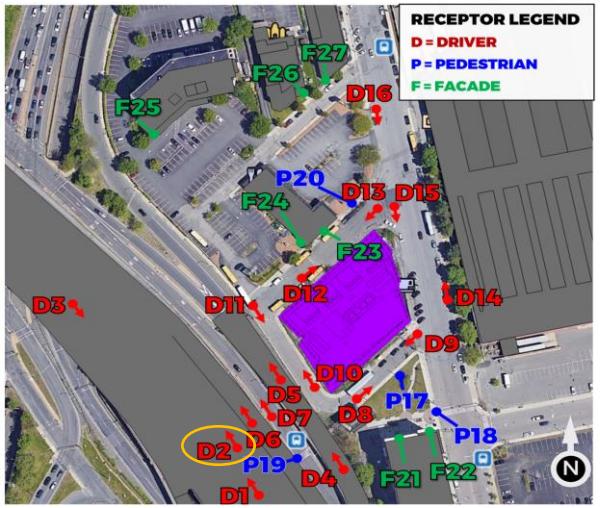
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



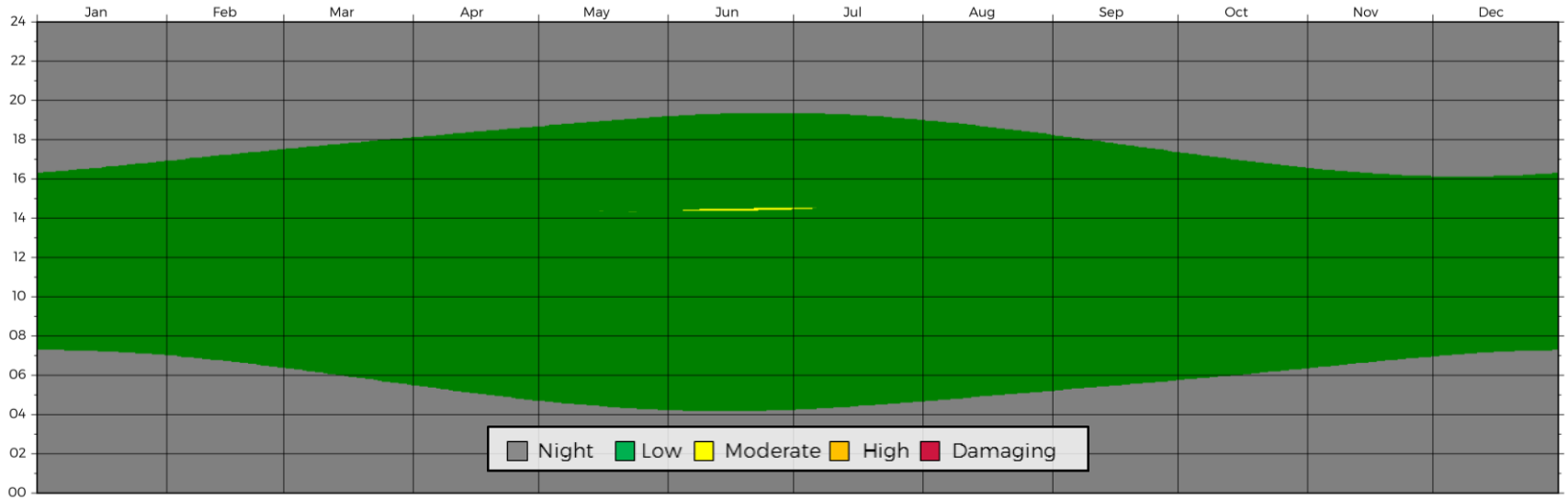
ANNUAL VISUAL IMPACT

Driver Receptor D2

Receptor D2 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on Northern Expressway.



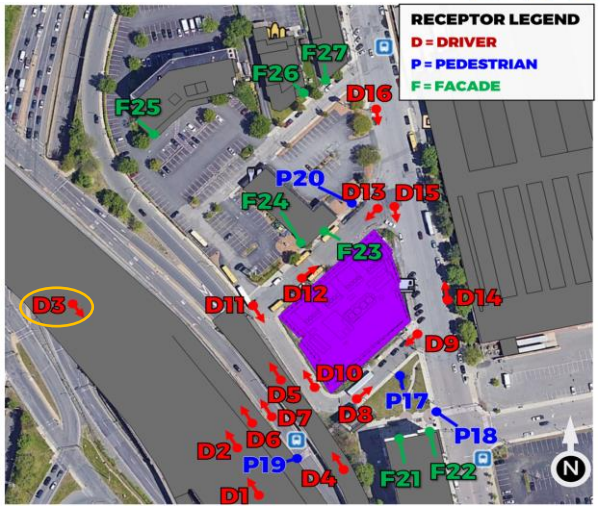
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



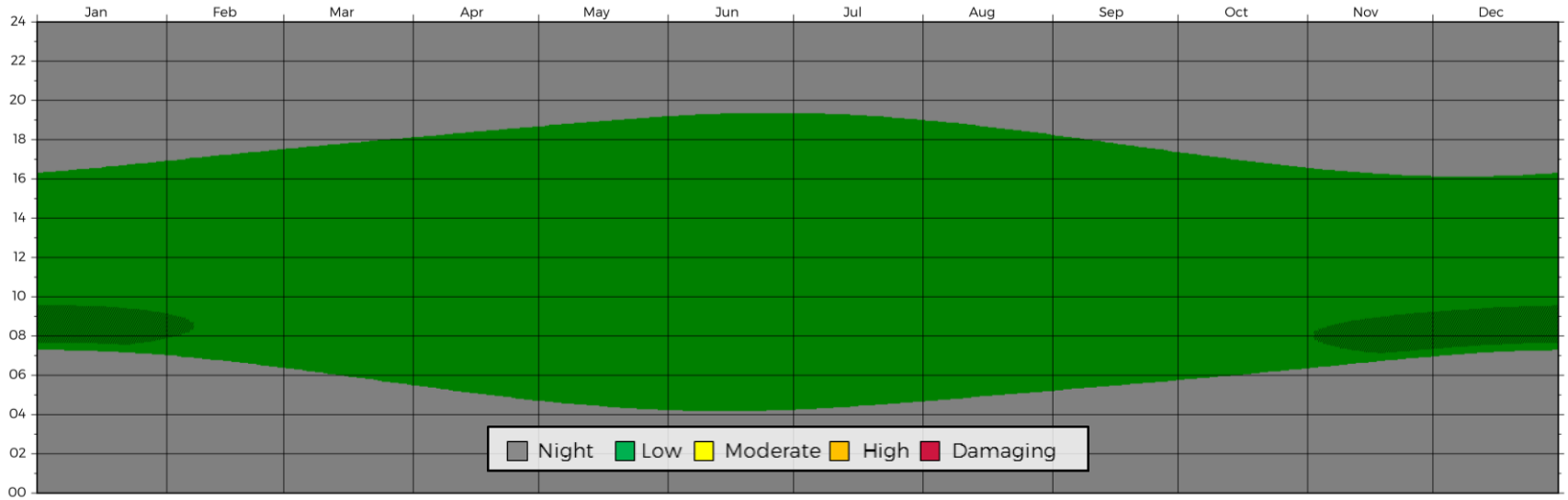
ANNUAL VISUAL IMPACT

Driver Receptor D3

Receptor D3 was chosen to assess the visual impact associated with solar reflections affecting southbound drivers on Northern Expressway.



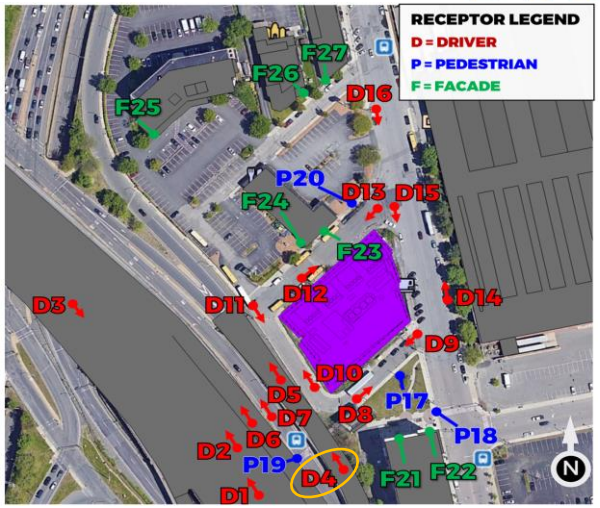
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



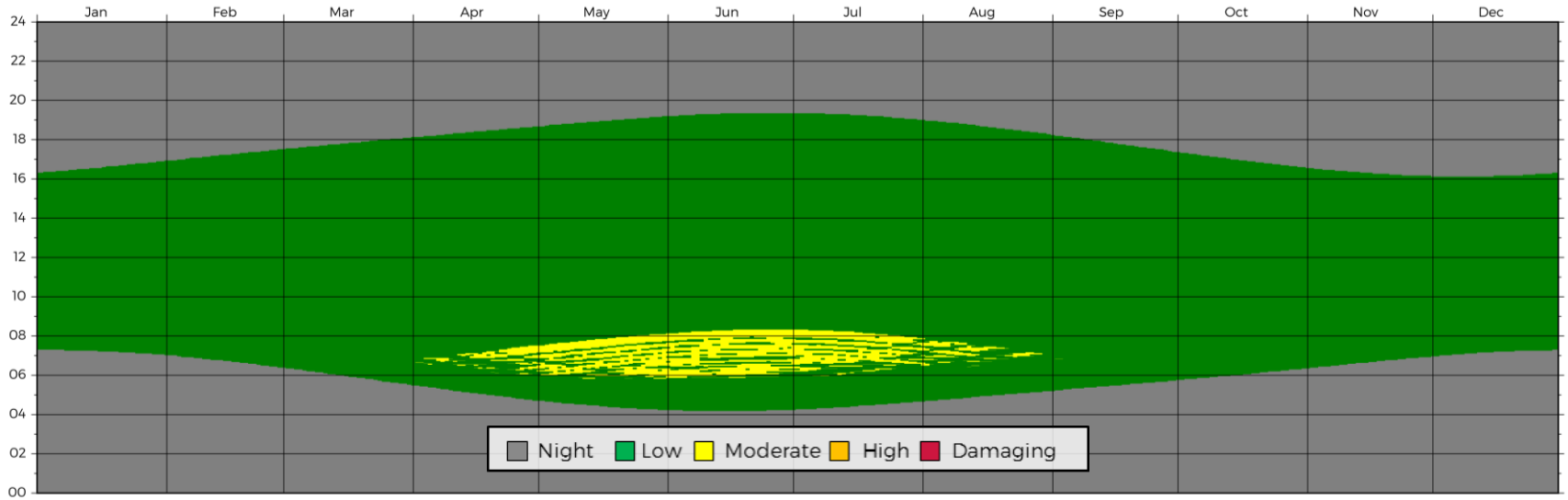
ANNUAL VISUAL IMPACT

Driver Receptor D4

Receptor D4 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on the Northern Expressway off-ramp.



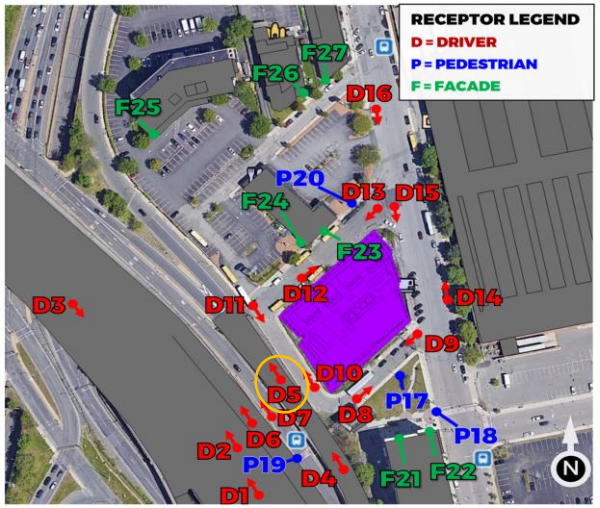
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



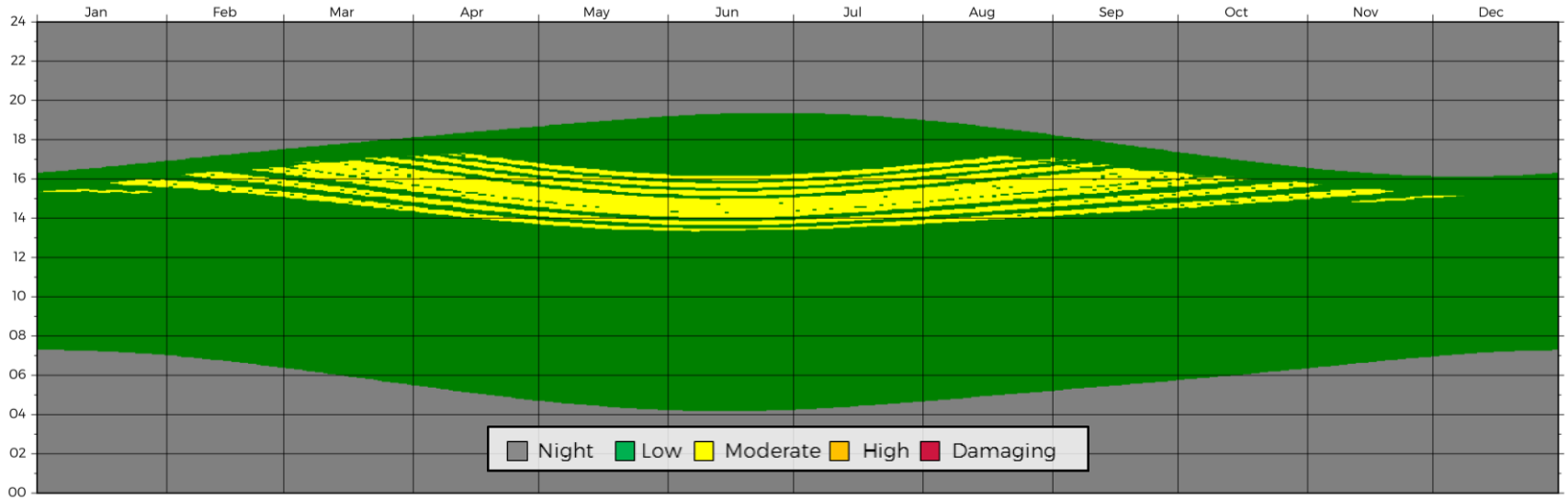
ANNUAL VISUAL IMPACT

Driver Receptor D5

Receptor D5 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on the Northern Expressway off-ramp.



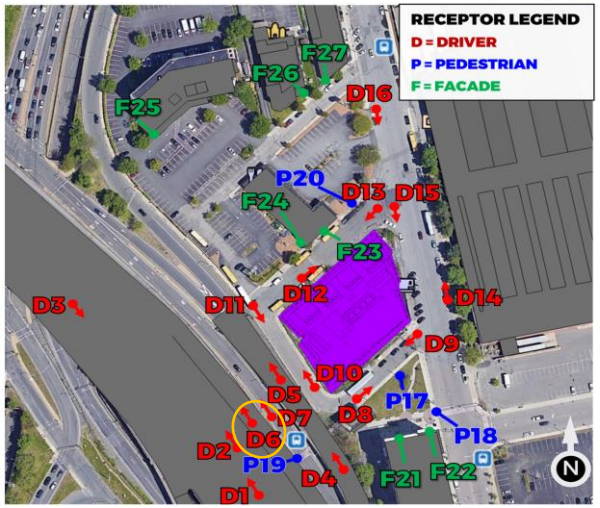
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



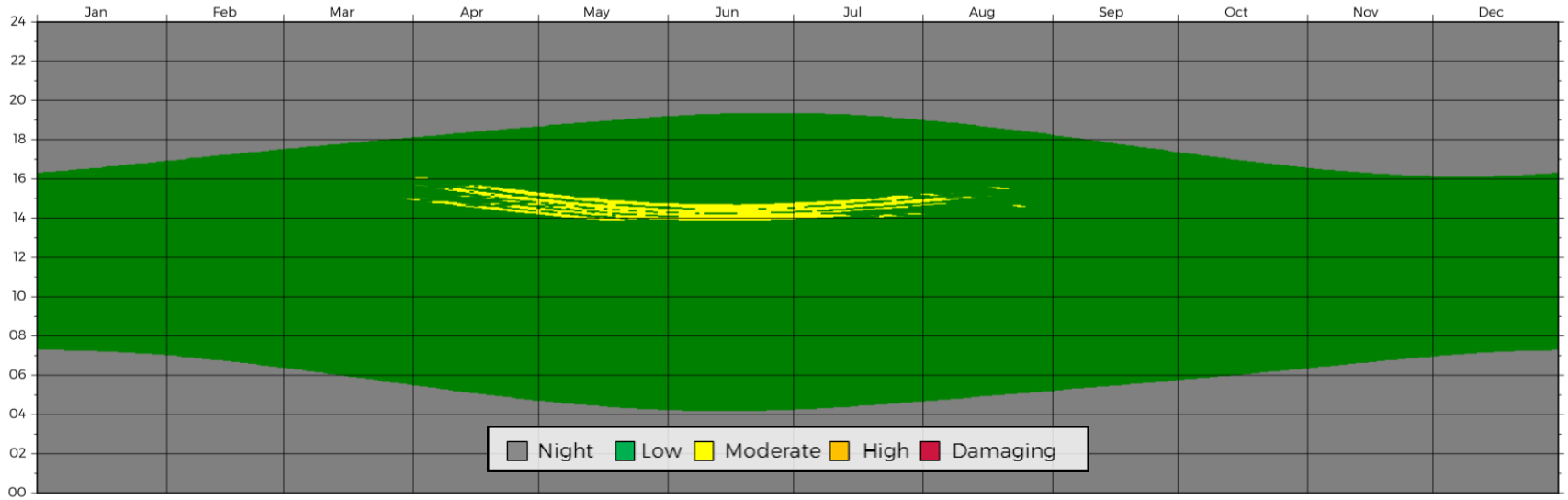
ANNUAL VISUAL IMPACT

Driver Receptor D6

Receptor D6 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on the Northern Expressway on-ramp.



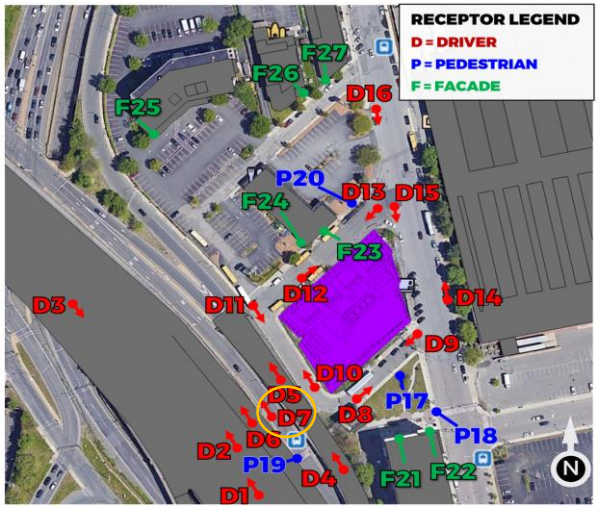
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



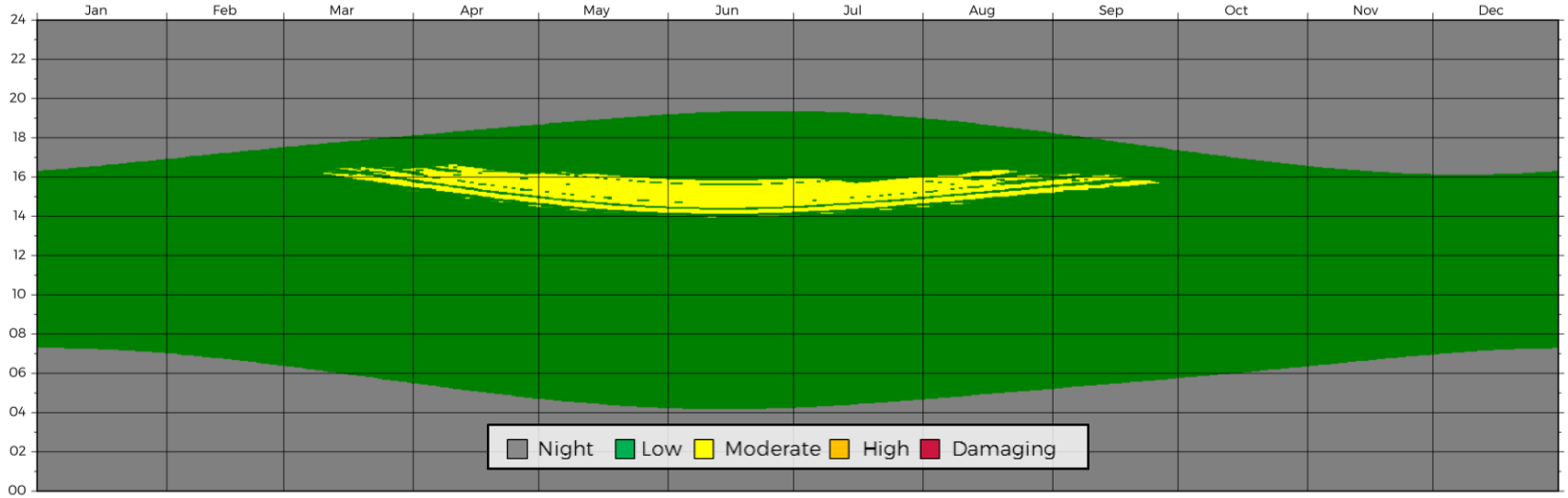
ANNUAL VISUAL IMPACT

Driver Receptor D7

Receptor D7 was chosen to assess the visual impact associated with solar reflections affecting northbound drivers on Mystic Avenue.



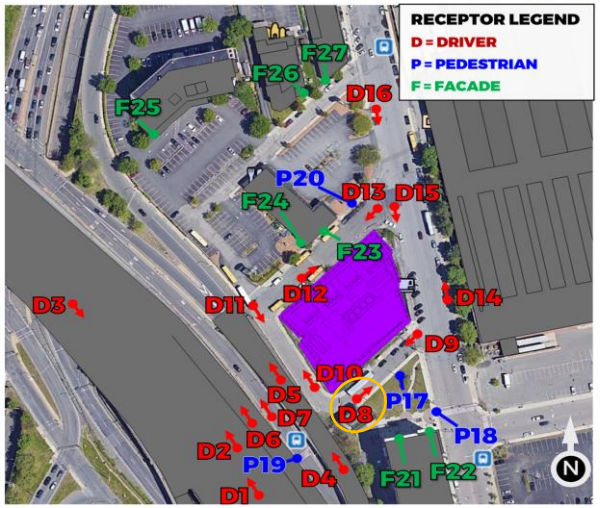
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



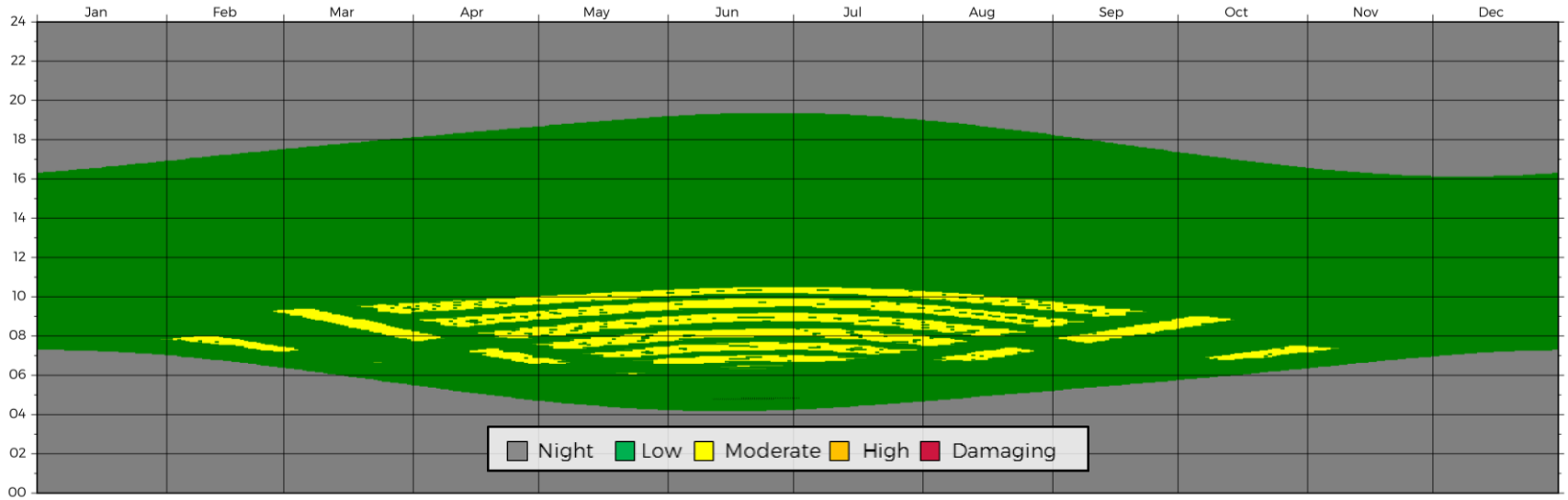
ANNUAL VISUAL IMPACT

Driver Receptor D8

Receptor D8 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling east on Kensington Avenue.



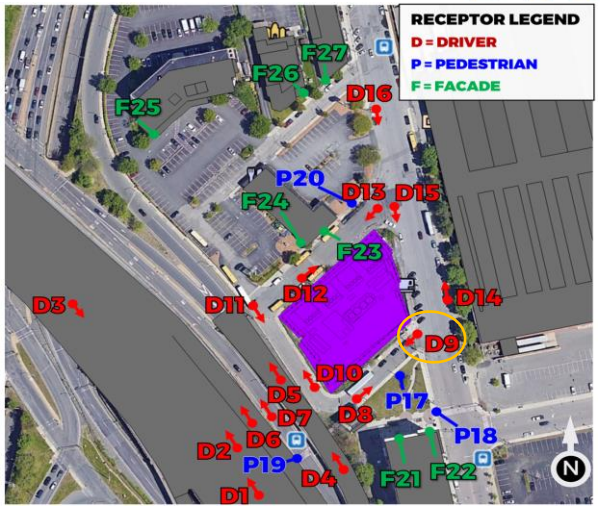
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



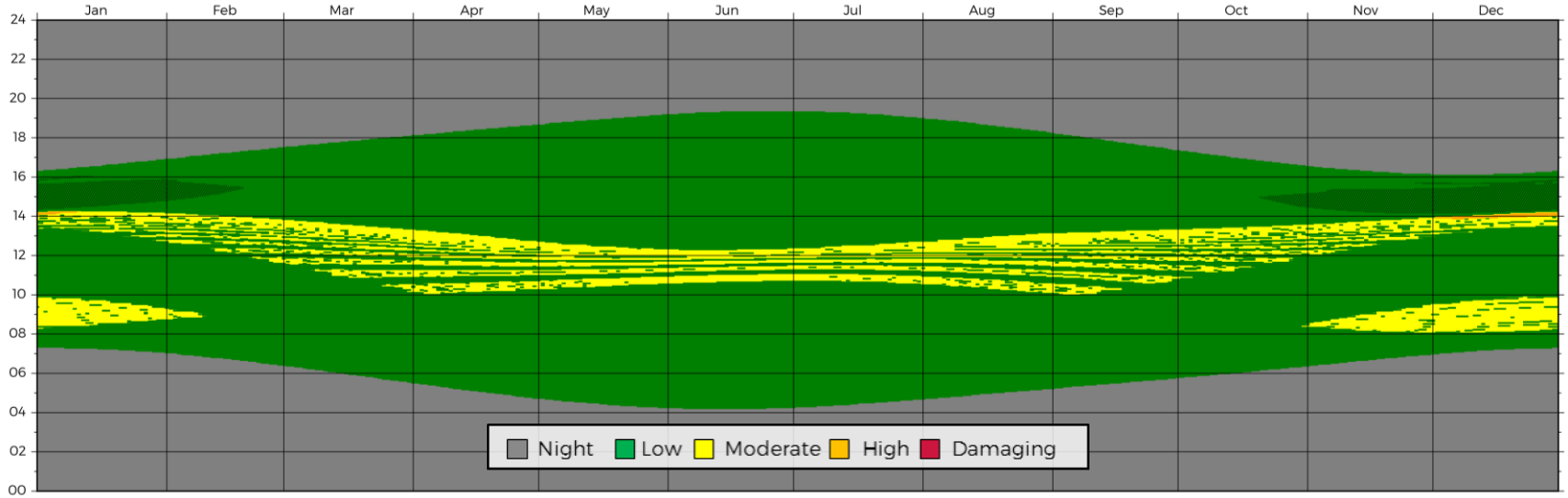
ANNUAL VISUAL IMPACT

Driver Receptor D9

Receptor D9 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling west on Kensington Avenue.



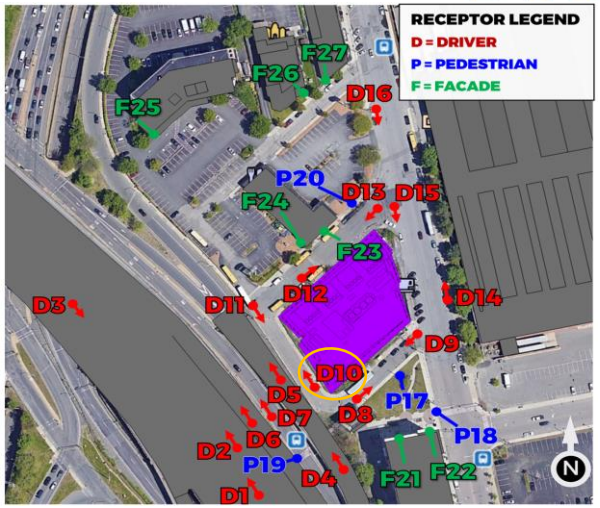
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



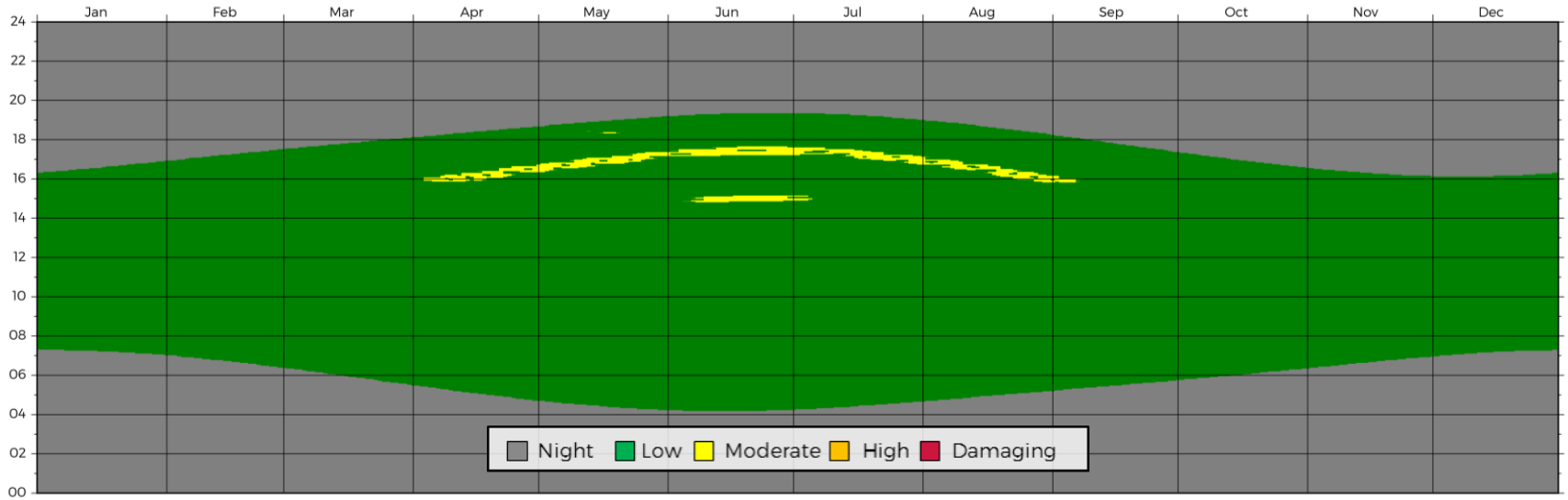
ANNUAL VISUAL IMPACT

Driver Receptor D10

Receptor D10 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling north on Cummings Street.



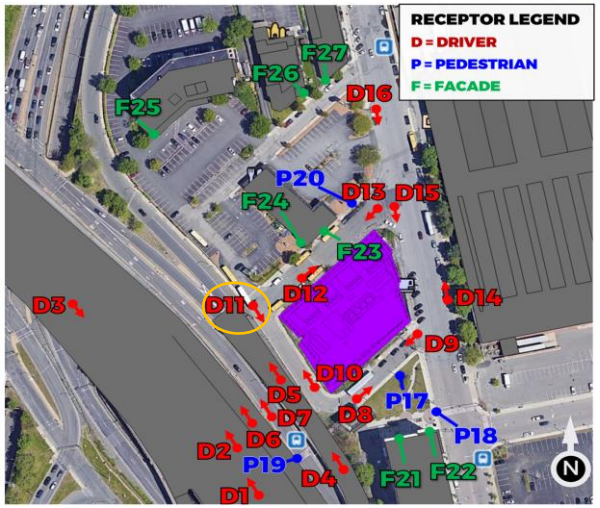
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



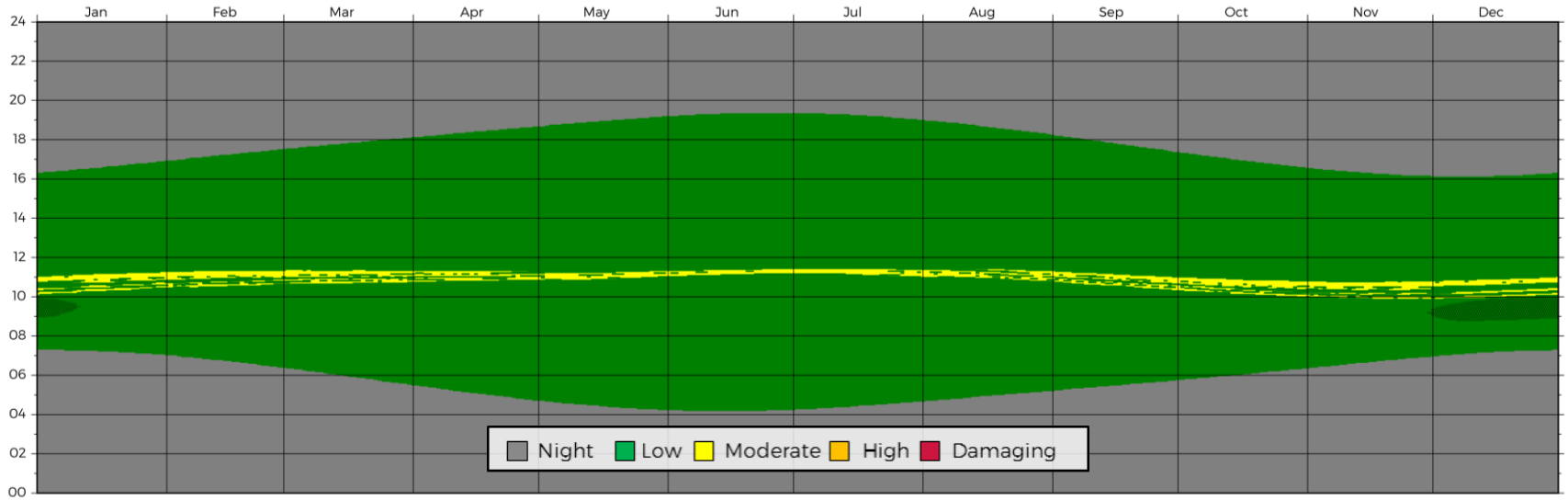
ANNUAL VISUAL IMPACT

Driver Receptor D11

Receptor D11 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling south on Cummings Street.



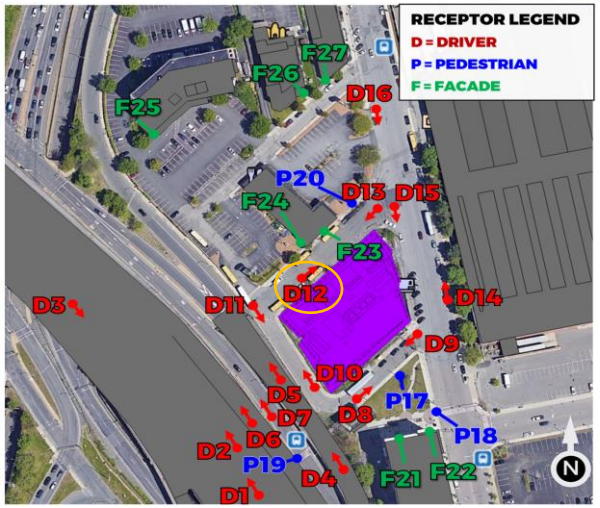
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



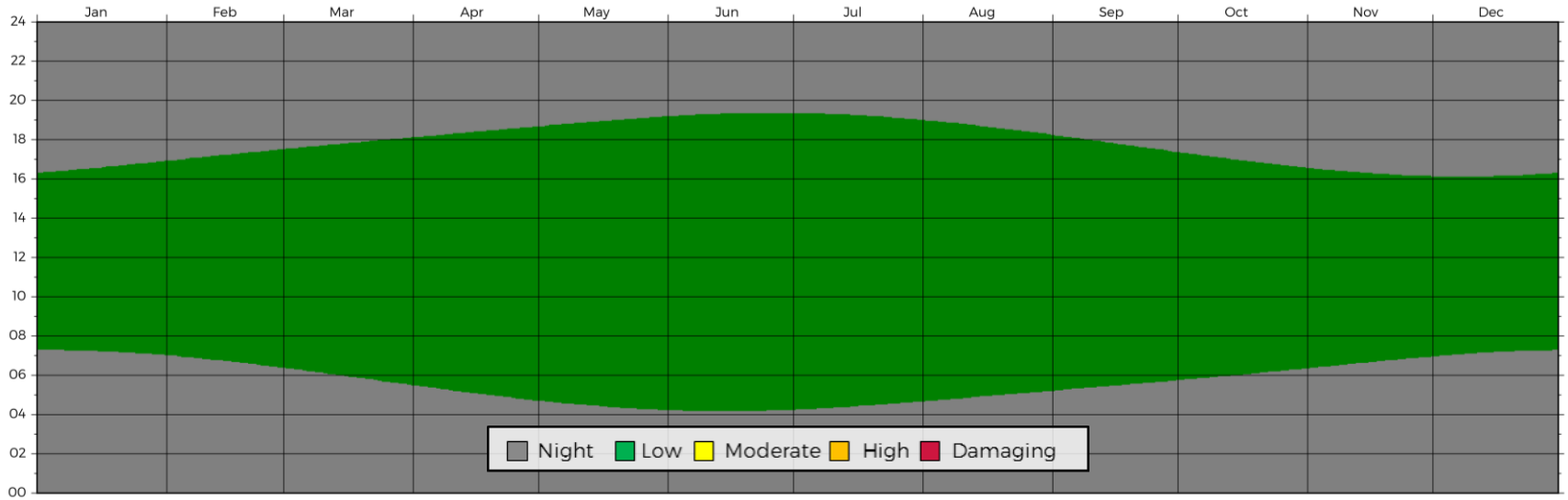
ANNUAL VISUAL IMPACT

Driver Receptor D12

Receptor D12 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling east on Mc Grath Highway.



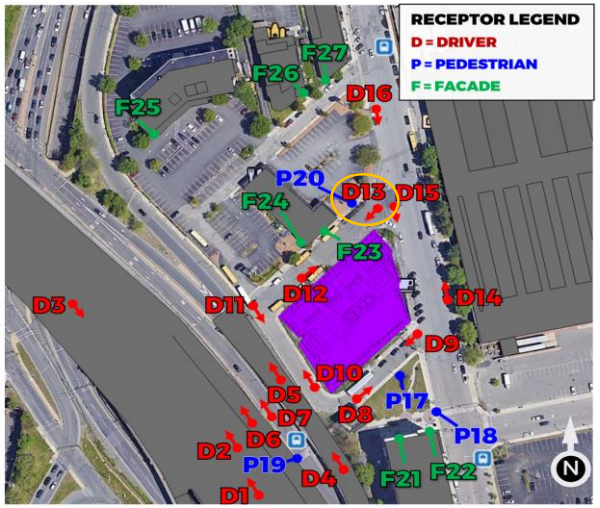
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



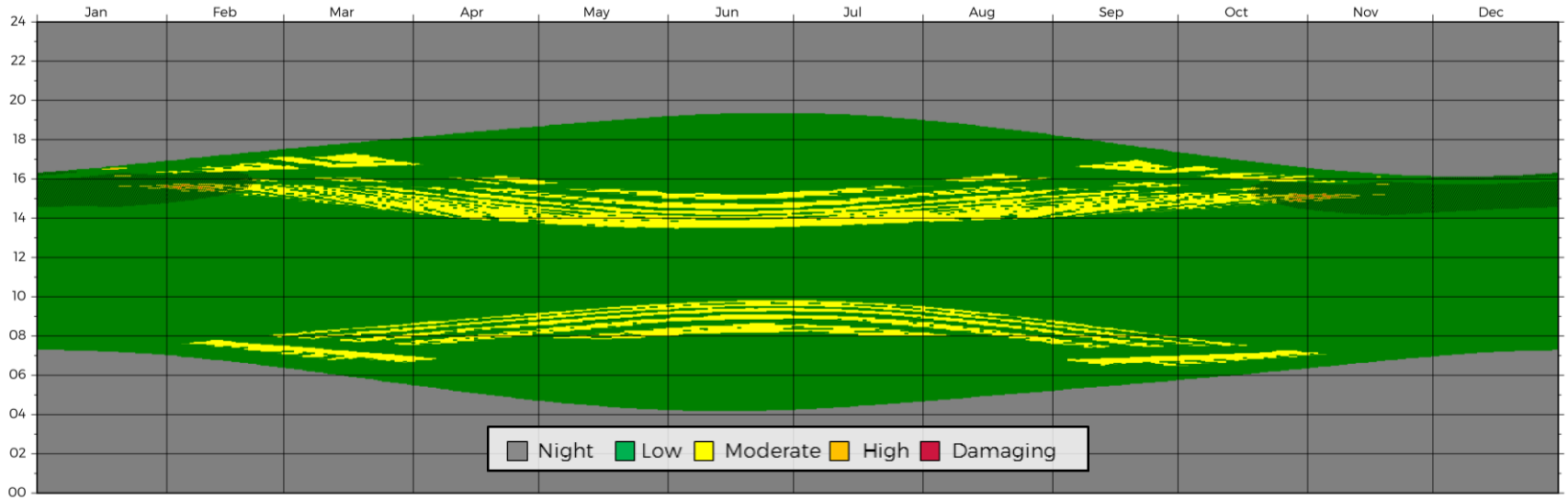
ANNUAL VISUAL IMPACT

Driver Receptor D13

Receptor D13 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling west on Mc Grath Highway.



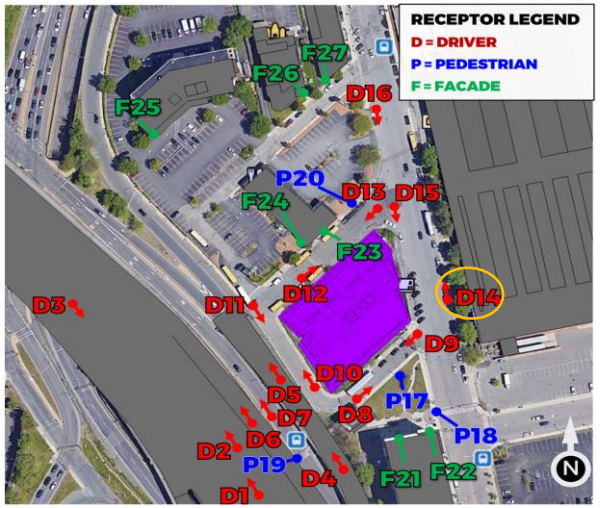
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



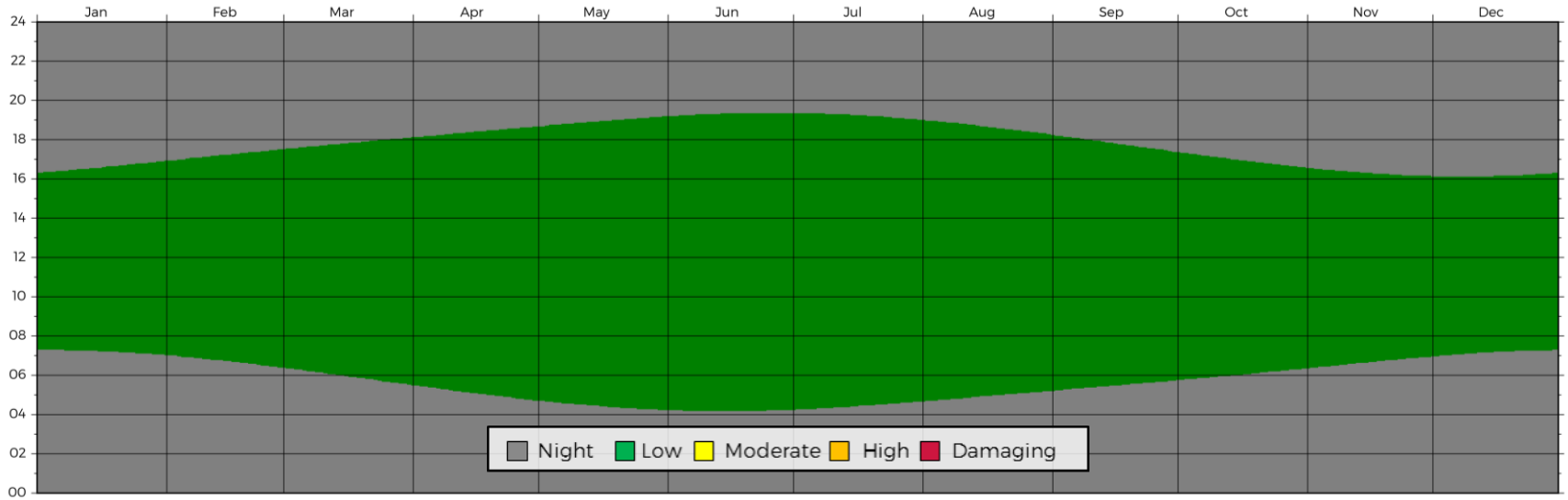
ANNUAL VISUAL IMPACT

Driver Receptor D14

Receptor D14 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling north on Middlesex Avenue.



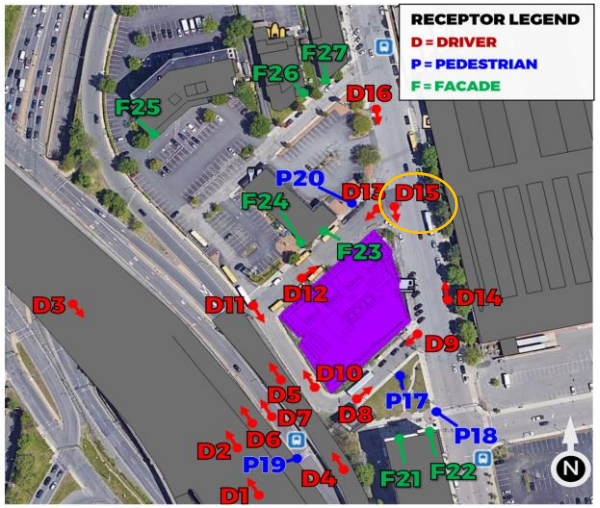
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



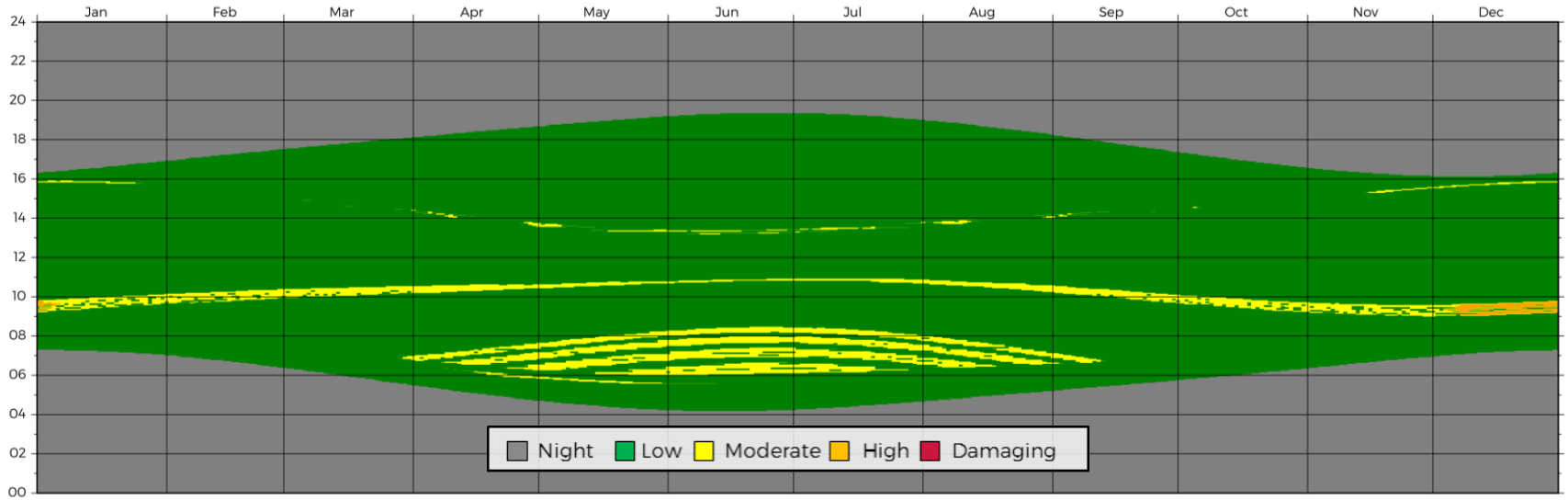
ANNUAL VISUAL IMPACT

Driver Receptor D15

Receptor D15 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling south on Middlesex Avenue.



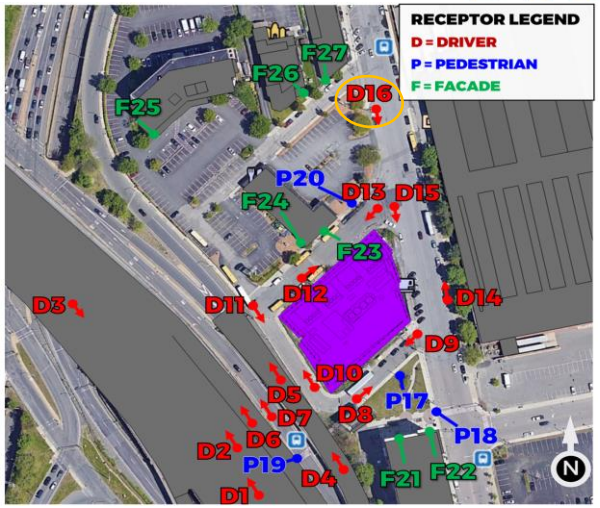
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



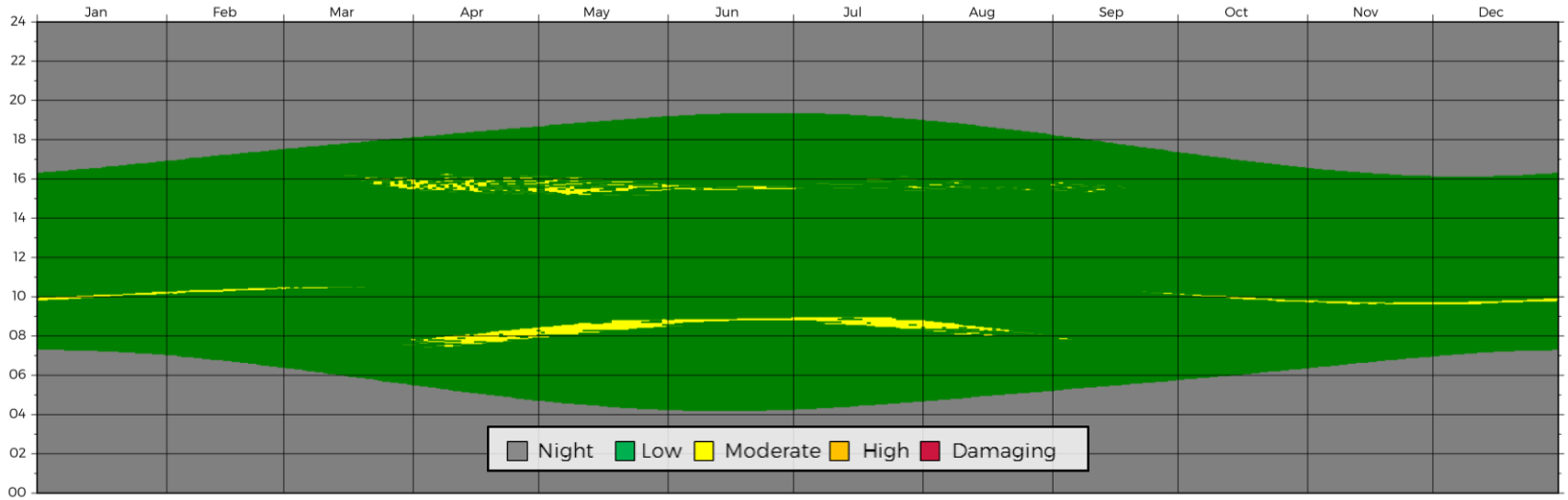
ANNUAL VISUAL IMPACT

Driver Receptor D16

Receptor D16 was chosen to assess the visual impact associated with solar reflections affecting drivers travelling south on Middlesex Avenue.



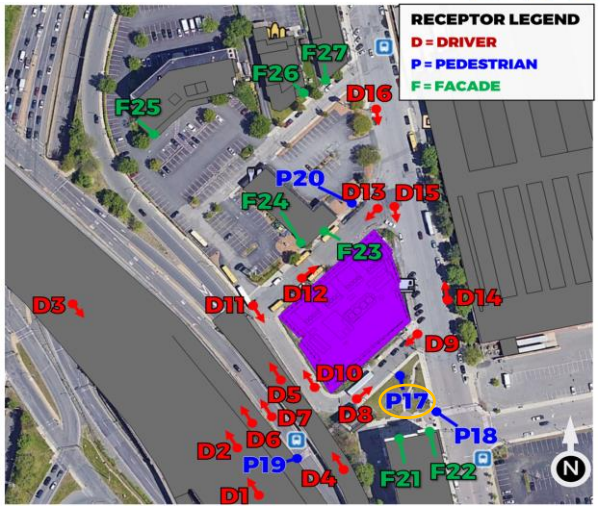
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



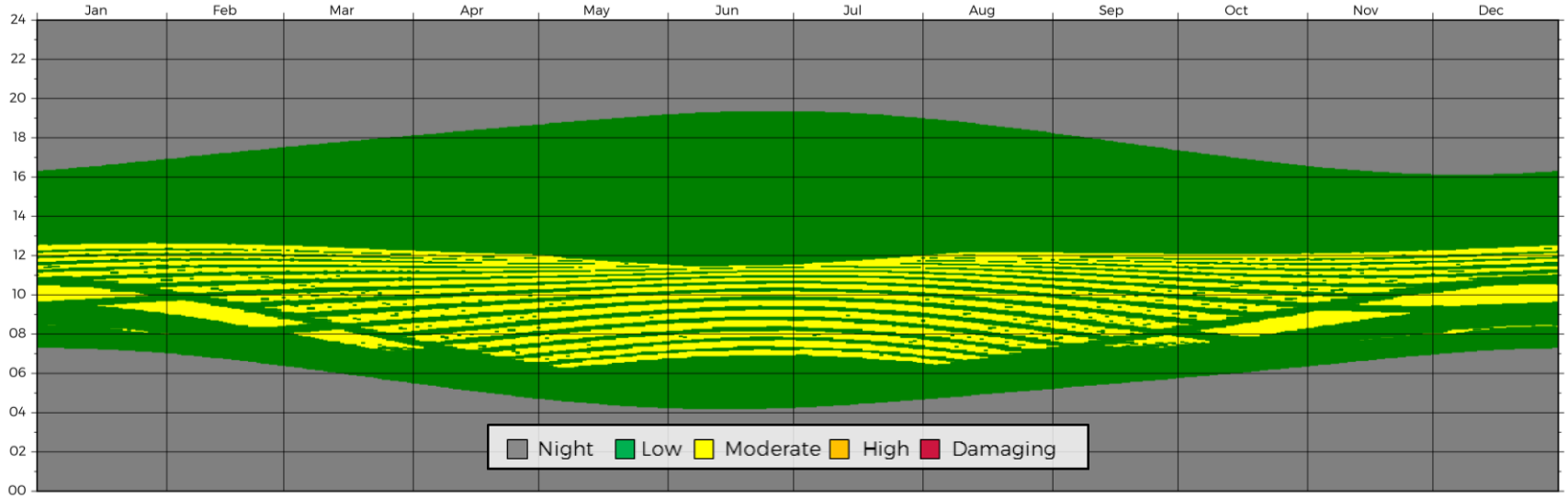
ANNUAL VISUAL IMPACT

Pedestrian Receptor P17

Receptor P17 was chosen to assess the visual impact associated with solar reflections affecting pedestrians in the neighbouring amenity space.



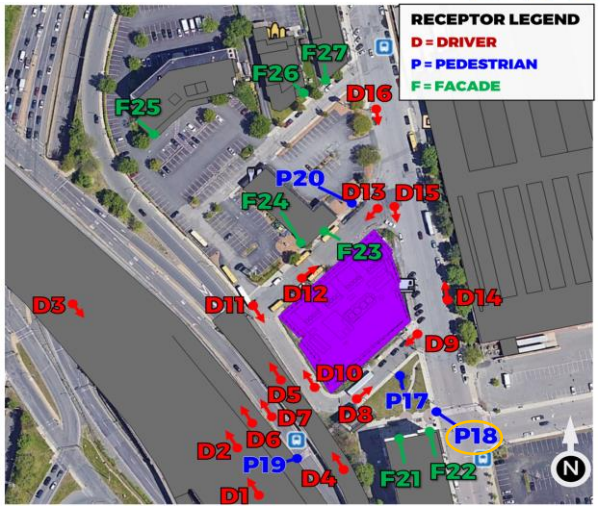
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



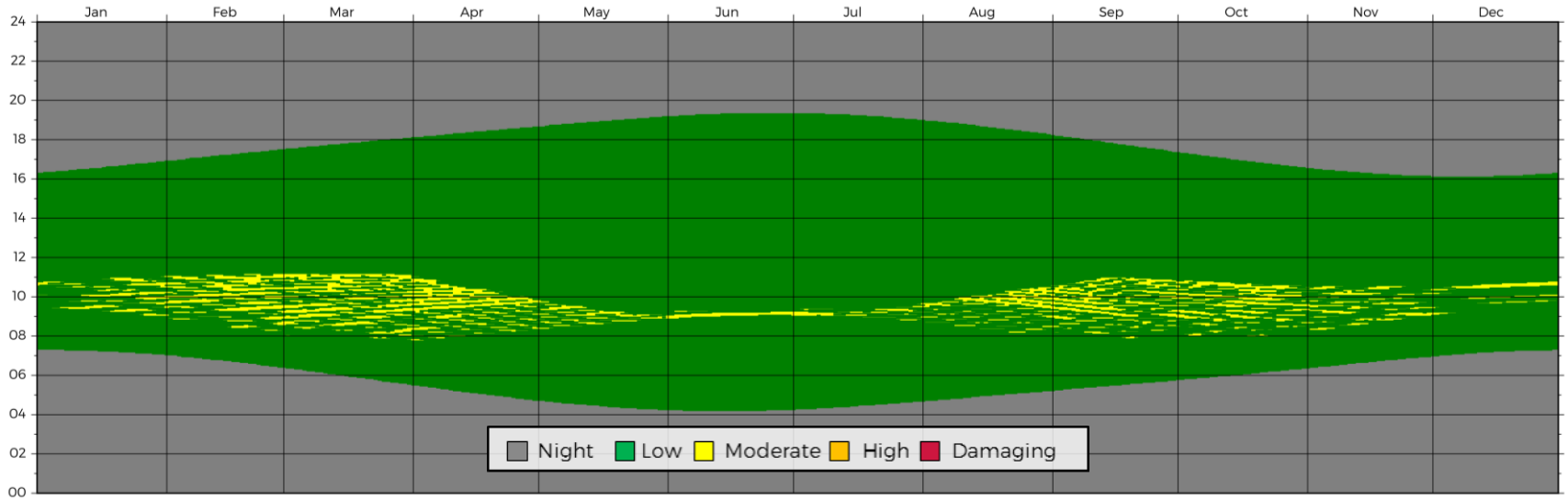
ANNUAL VISUAL IMPACT

Pedestrian Receptor P18

Receptor P18 was chosen to assess the visual impact associated with solar reflections affecting pedestrian crossing Middlesex avenue.



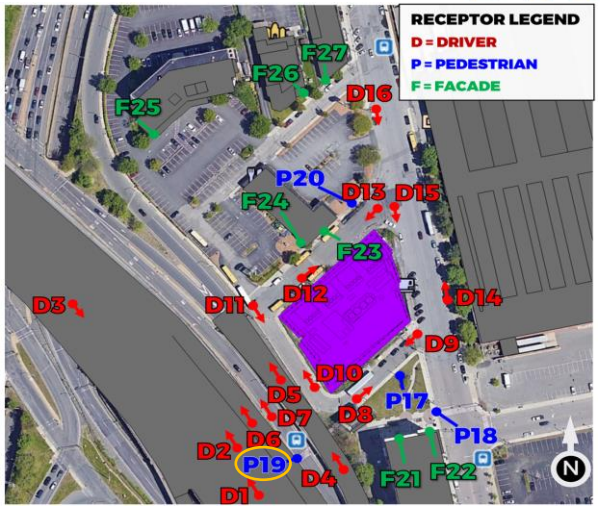
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



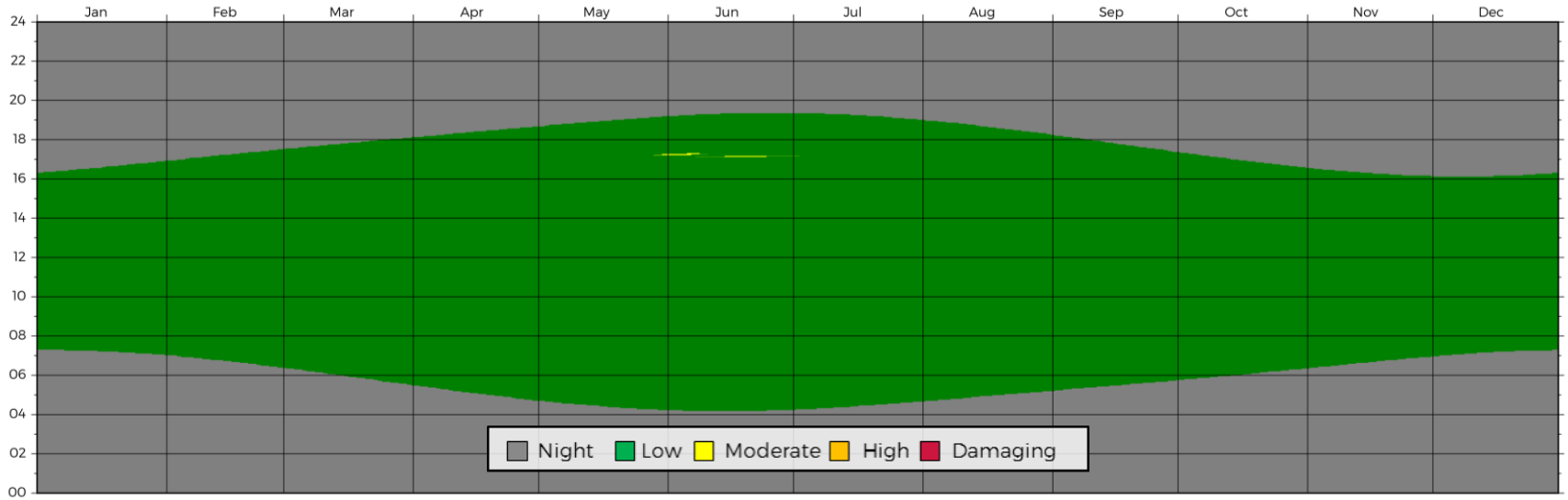
ANNUAL VISUAL IMPACT

Pedestrian Receptor P19

Receptor P19 was chosen to assess the visual impact associated with solar reflections affecting pedestrian crossing Mystic Avenue.



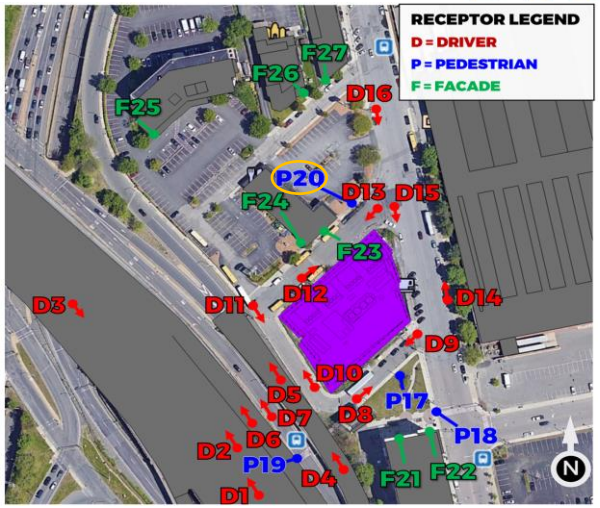
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



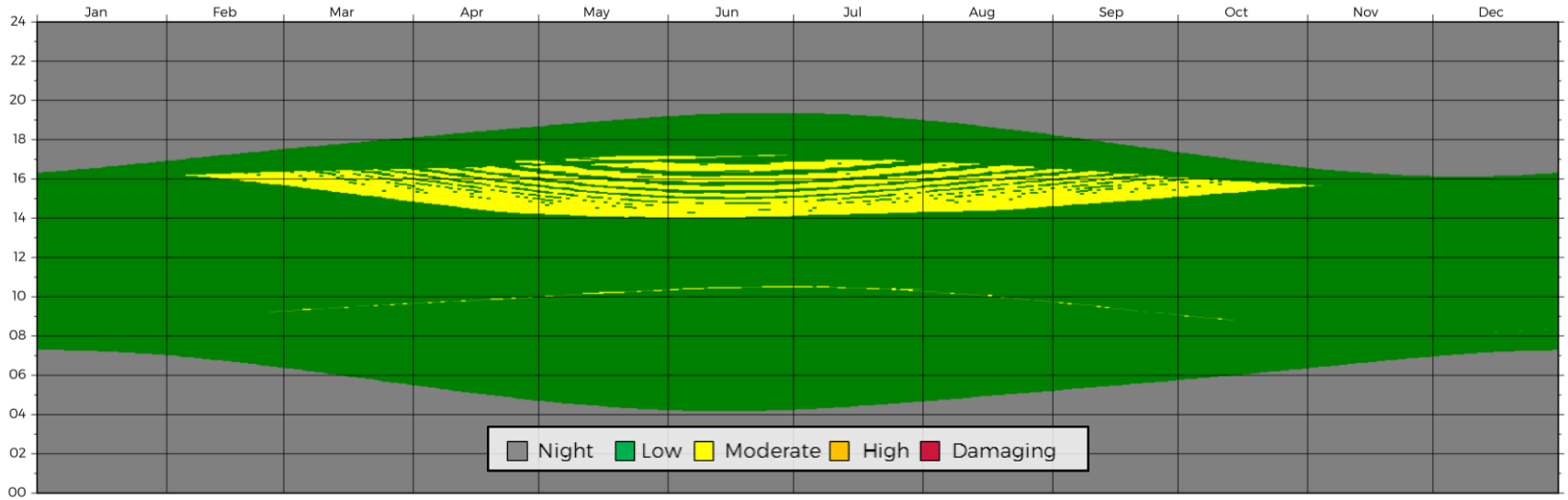
ANNUAL VISUAL IMPACT

Pedestrian Receptor P20

Receptor P20 was chosen to assess the visual impact associated with solar reflections affecting pedestrian on cross-walk along Mc Grath Highway.



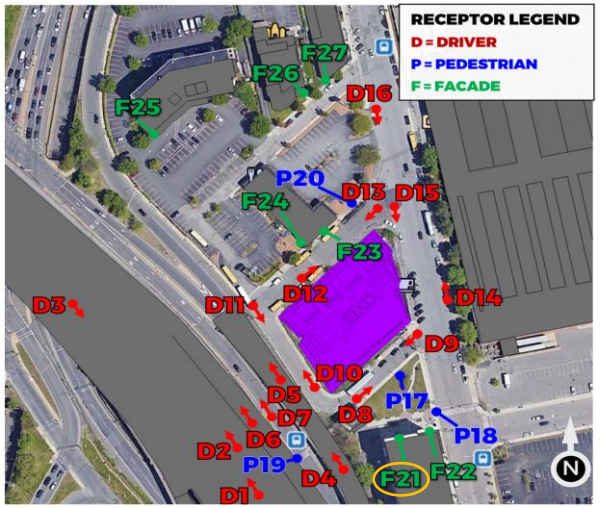
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



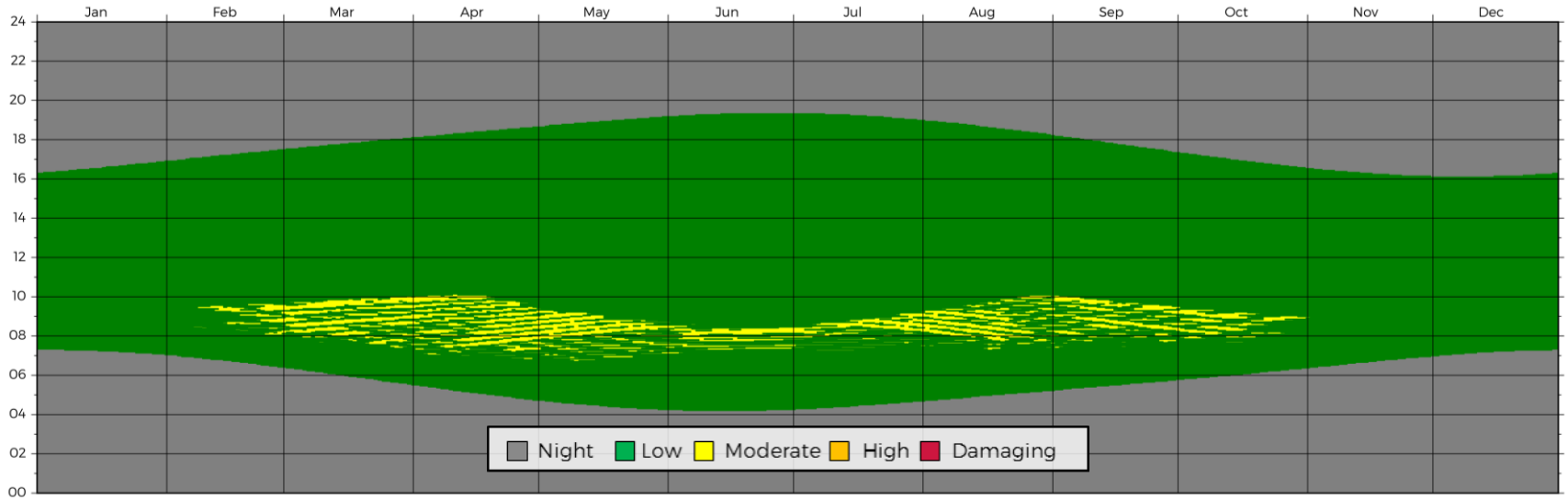
ANNUAL VISUAL IMPACT

Facade Receptor F21

Receptor F21 was chosen to assess the visual impact associated with solar reflections affecting facades on 50 Middlesex Avenue on approximately the 3rd floor.



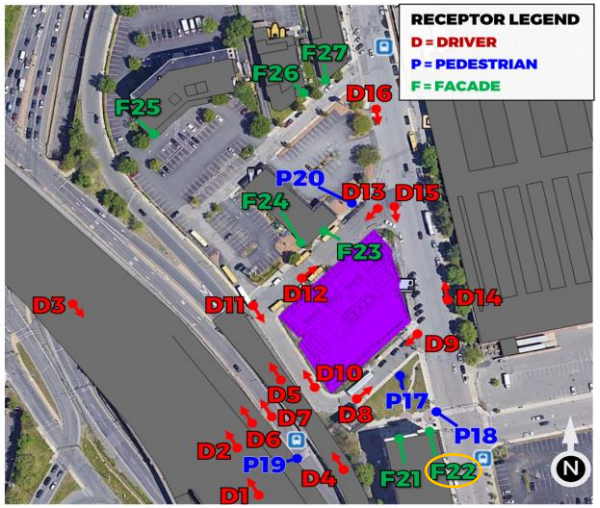
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



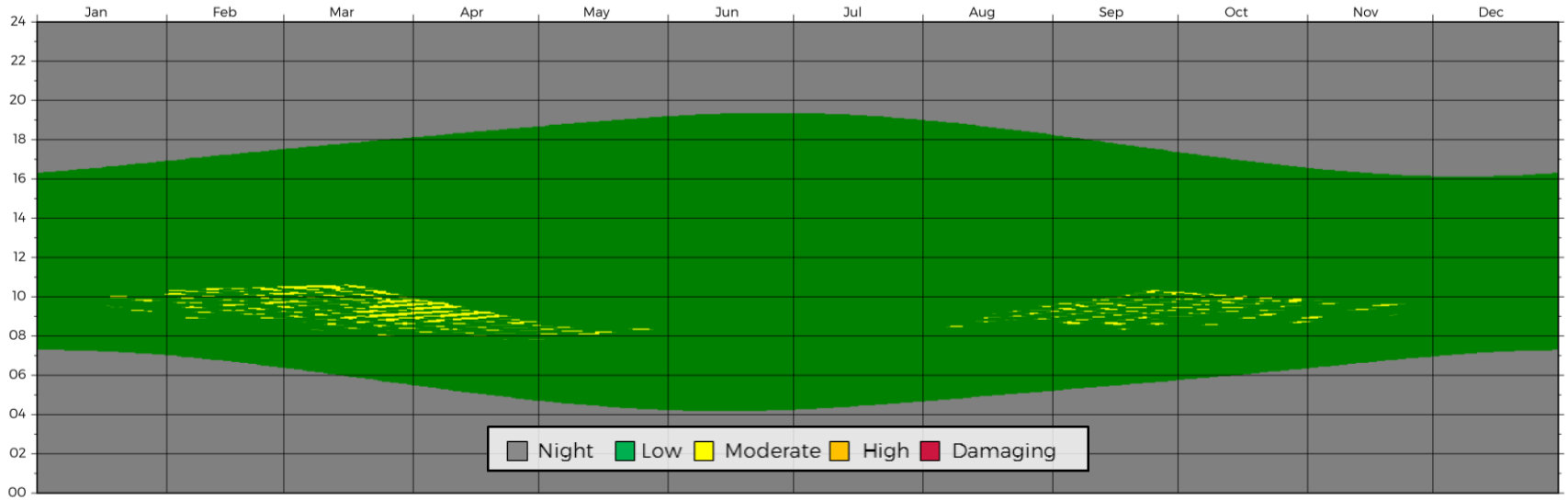
ANNUAL VISUAL IMPACT

Facade Receptor F22

Receptor F22 was chosen to assess the visual impact associated with solar reflections affecting facades on 50 Middlesex Avenue on approximately the 3rd floor.



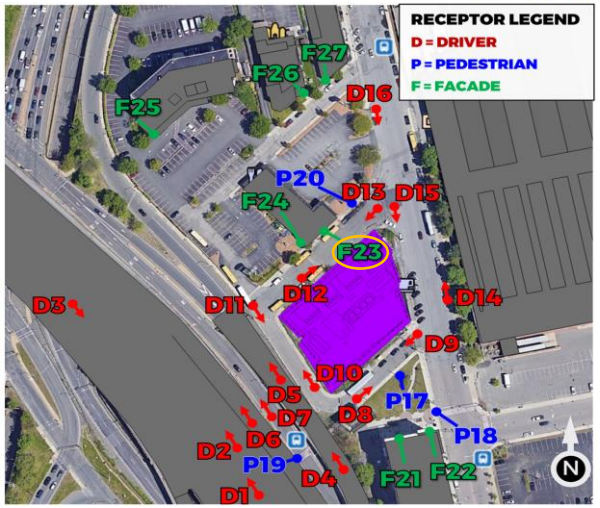
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



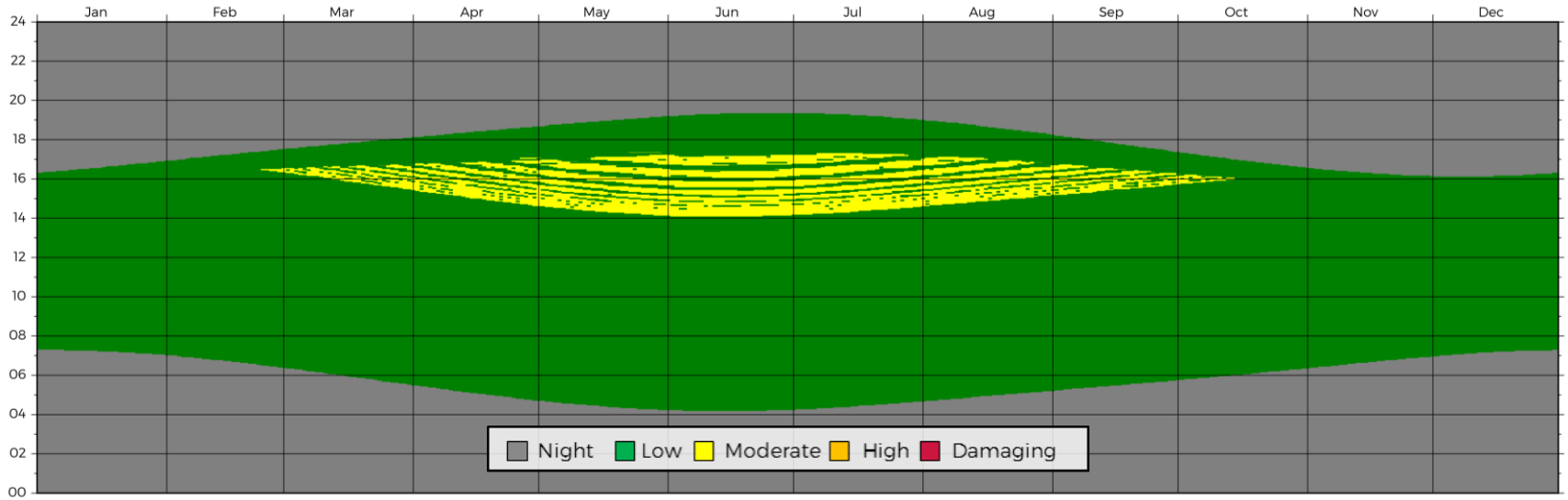
ANNUAL VISUAL IMPACT

Facade Receptor F23

Receptor F23 was chosen to assess the visual impact associated with solar reflections affecting facades on the 99 Restaurants building approximately the 1st floor.



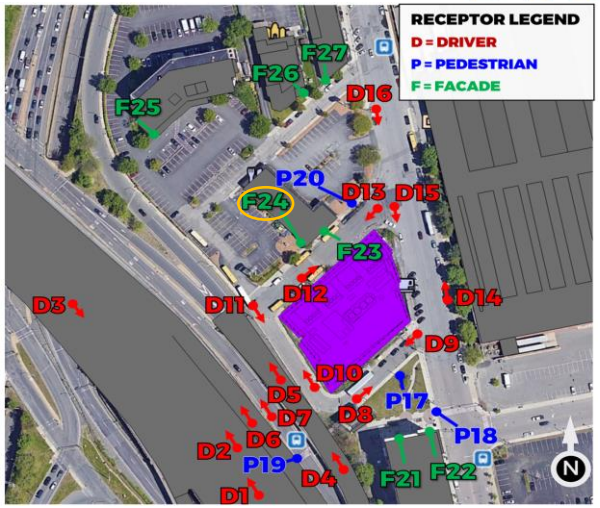
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.



ANNUAL VISUAL IMPACT

Facade Receptor F24

Receptor F24 was chosen to assess the visual impact associated with solar reflections affecting facades on the 99 Restaurants building approximately the 1st floor.



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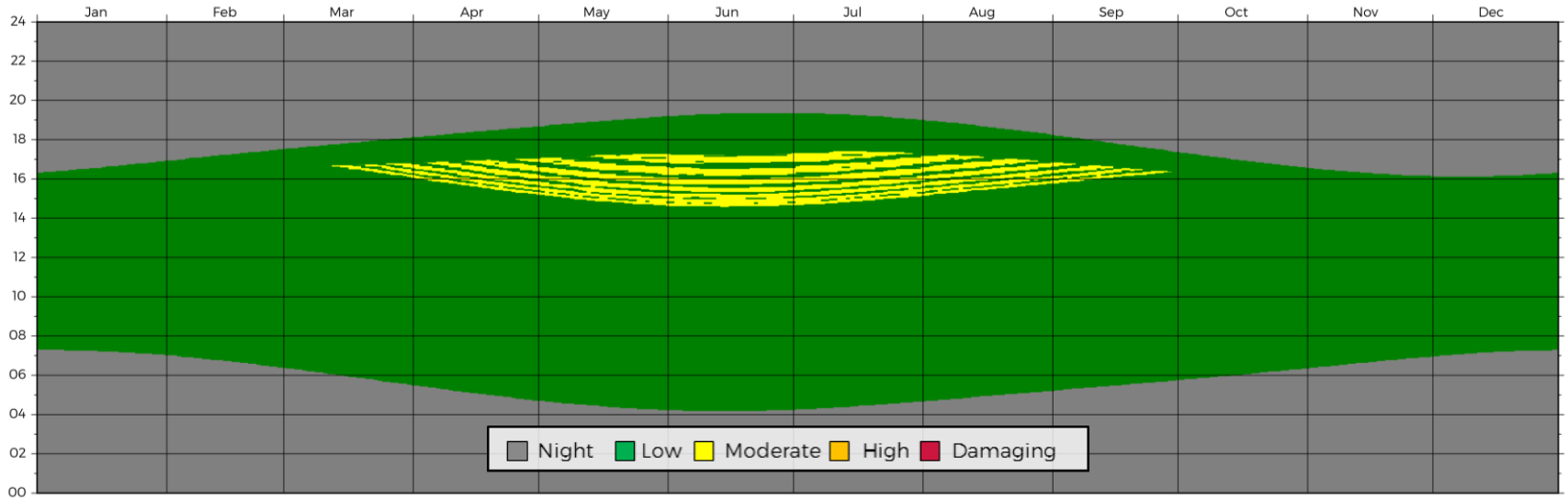
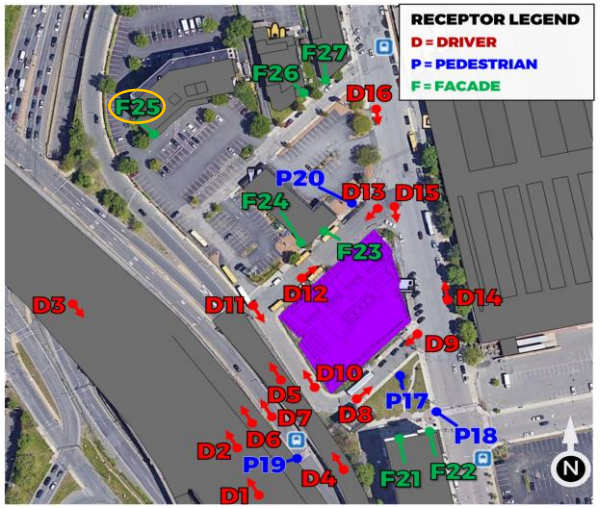


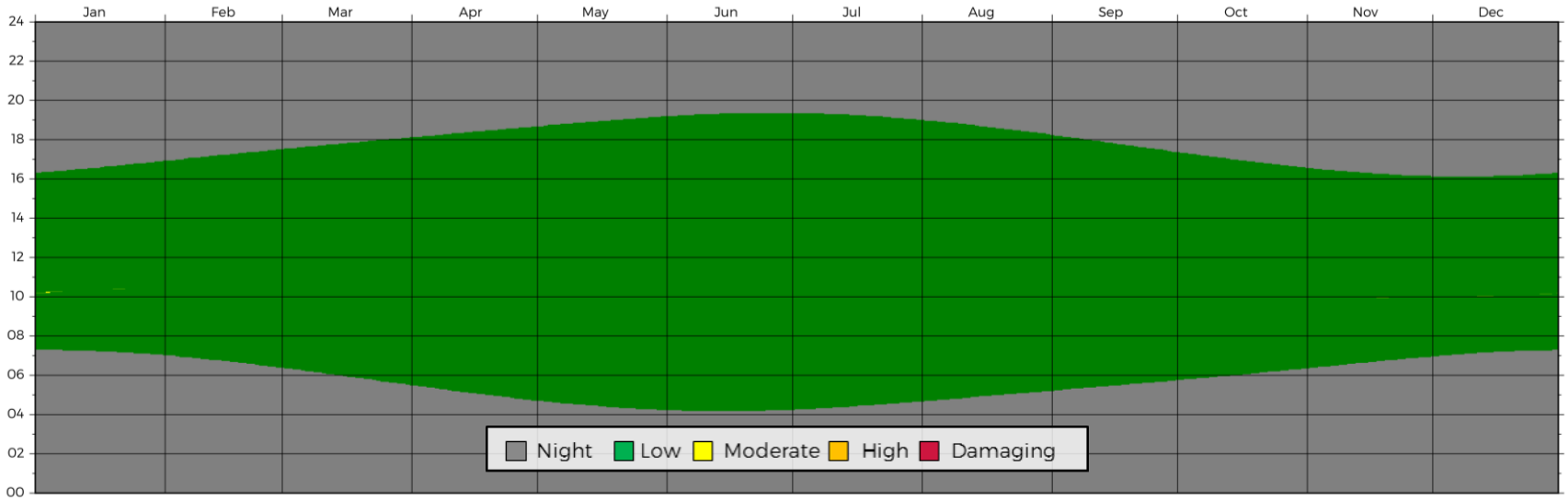
ANNUAL VISUAL IMPACT

Facade Receptor F25

Receptor F25 was chosen to assess the visual impact associated with solar reflections affecting facades on 23 Cummings Street approximately the 4th floor.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.

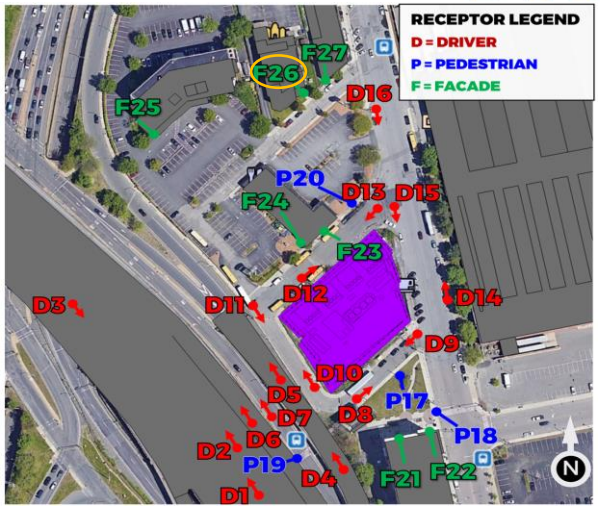




ANNUAL VISUAL IMPACT

Facade Receptor F26

Receptor F26 was chosen to assess the visual impact associated with solar reflections affecting facades on 9 Cummings Street approximately the 2nd floor.



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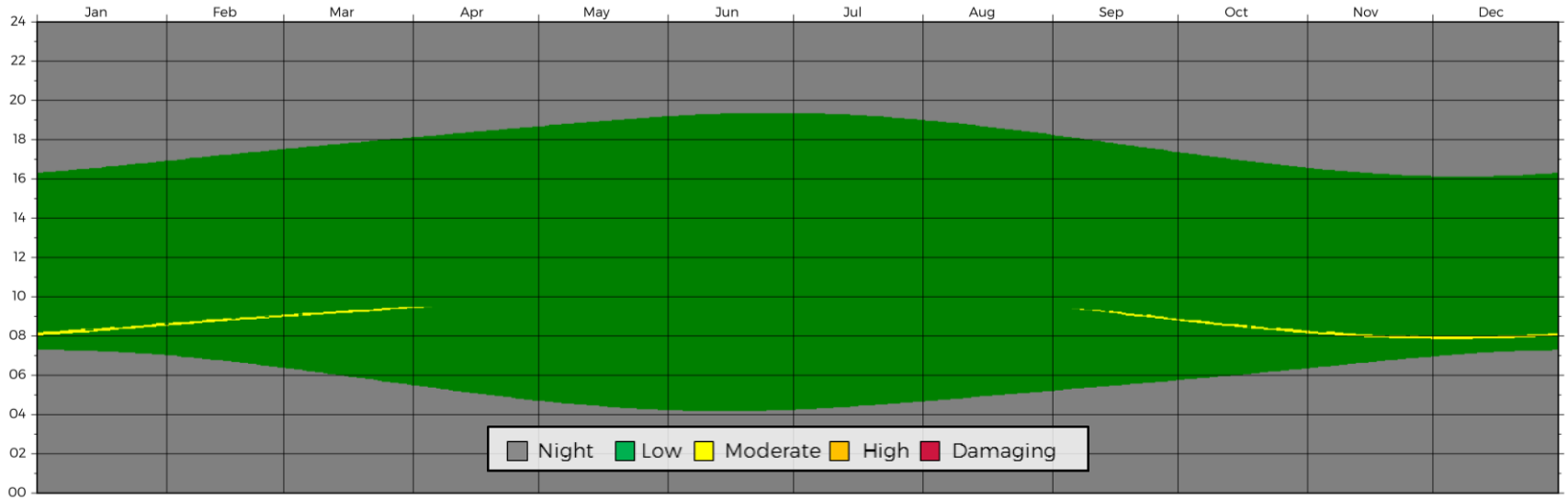
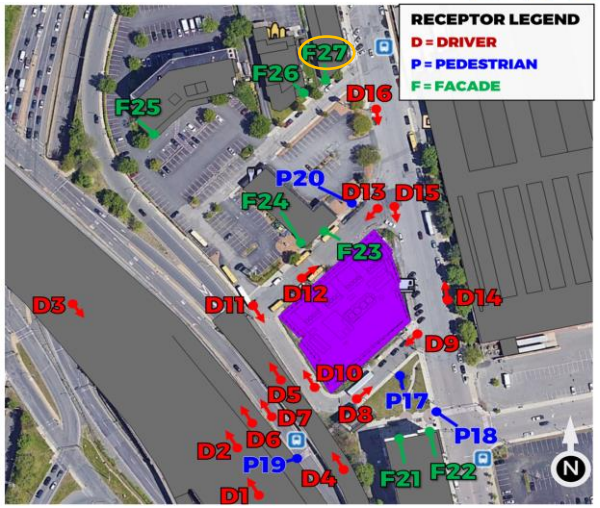


ANNUAL VISUAL IMPACT

Facade Receptor F27

Receptor F27 was chosen to assess the visual impact associated with solar reflections affecting facades on 120 Middlesex Avenue approximately the 2nd floor.



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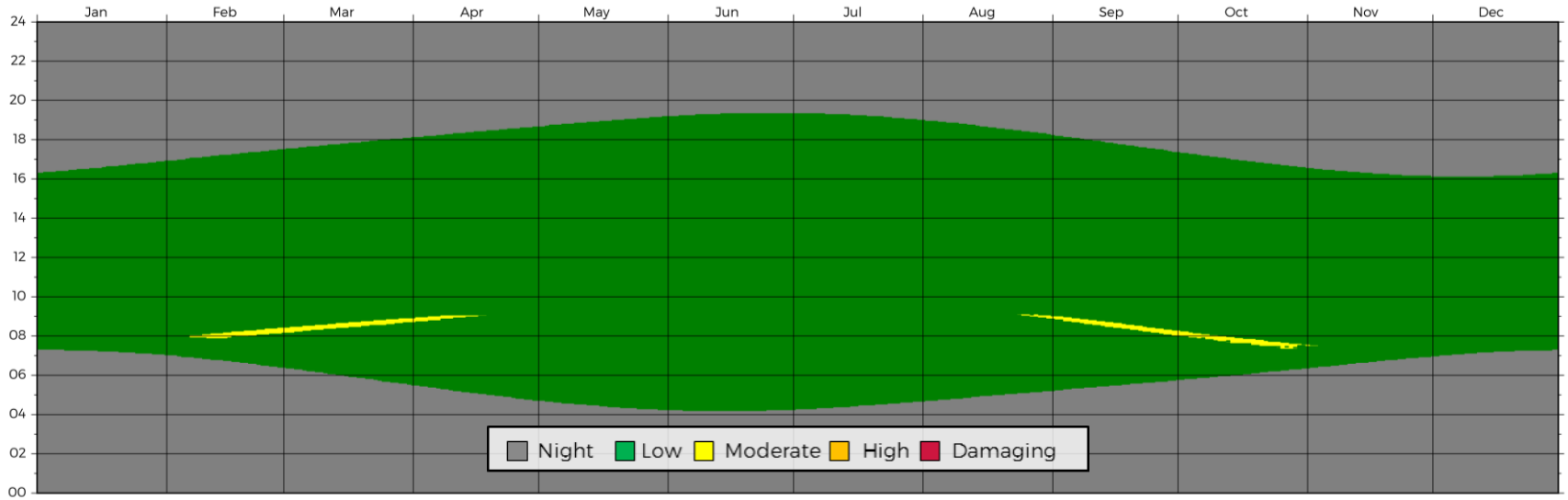
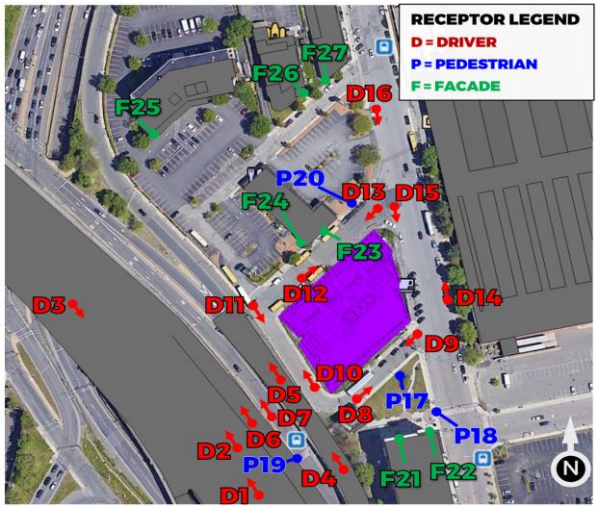


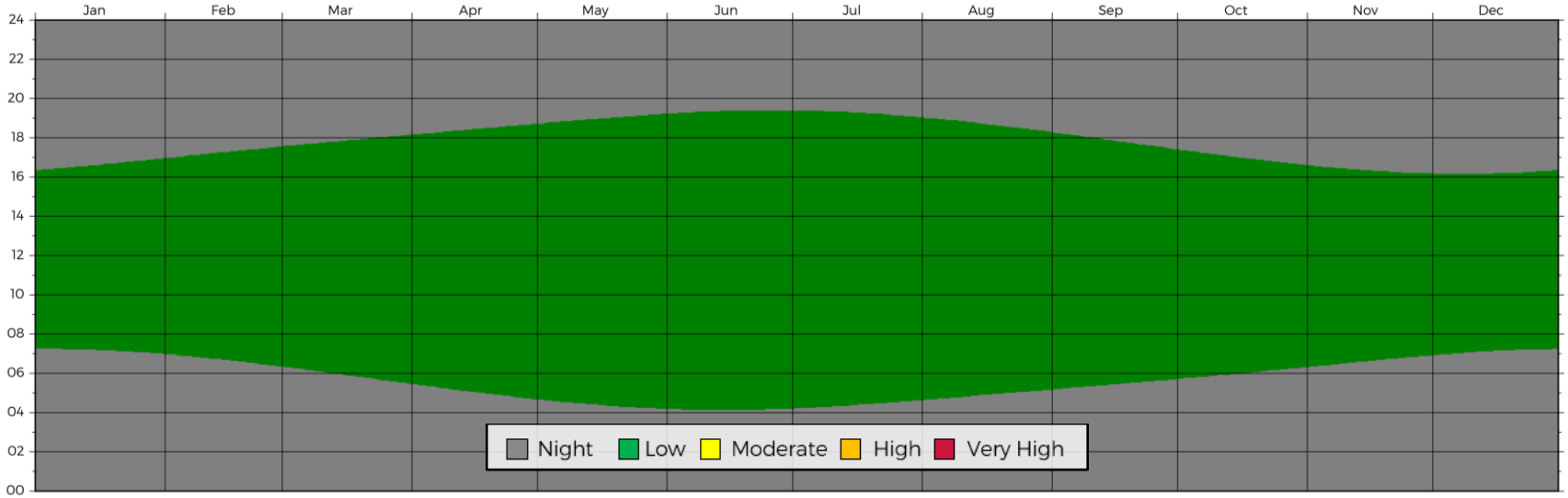
ANNUAL THERMAL IMPACT - PEOPLE

All Receptors

All reflection impacts at all receptors were found to have intensities below RWDI's short-term and human safety threshold values.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by one hour when appropriate.

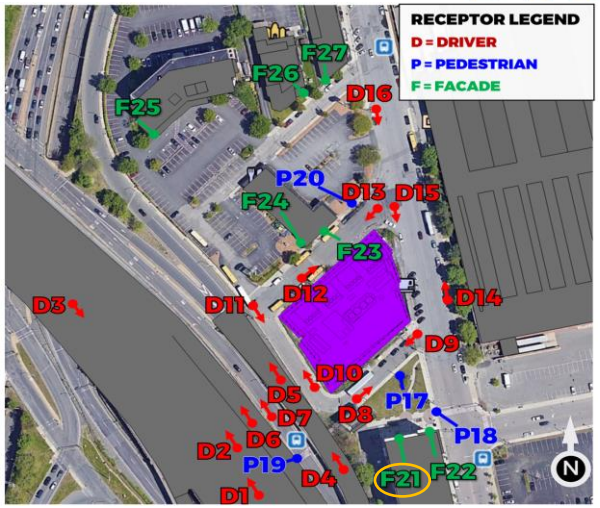




ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F21

Receptor F21 was chosen to assess the thermal impact associated with solar reflections affecting facades on 50 Middlesex Avenue on approximately the 3rd floor.



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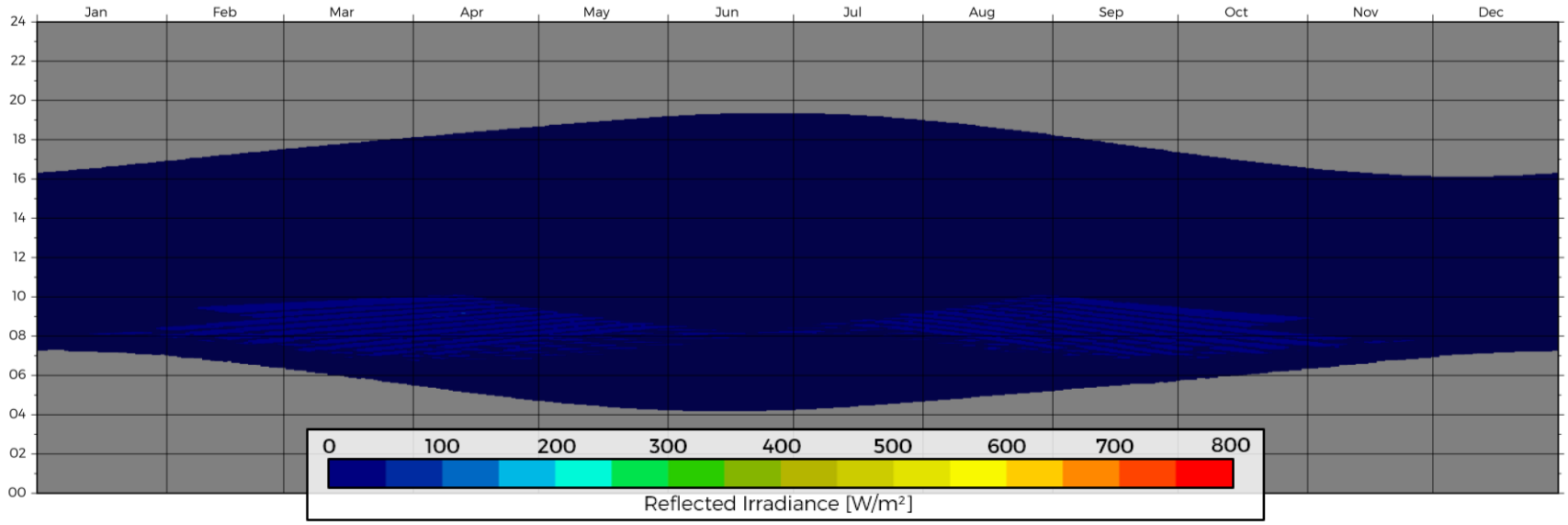

ANNUAL THERMAL IMPACT - PROPERTY

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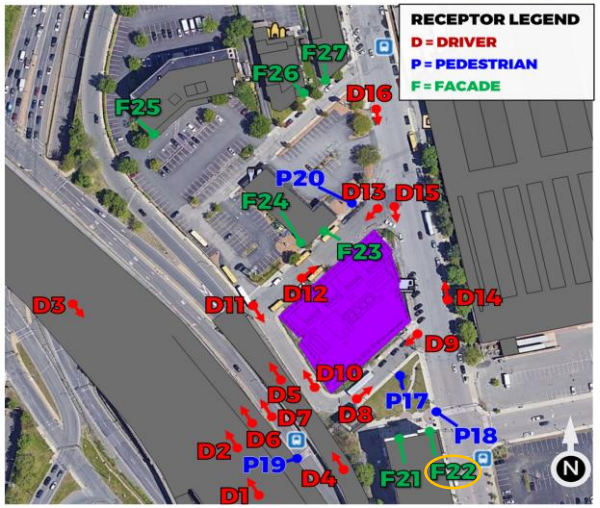

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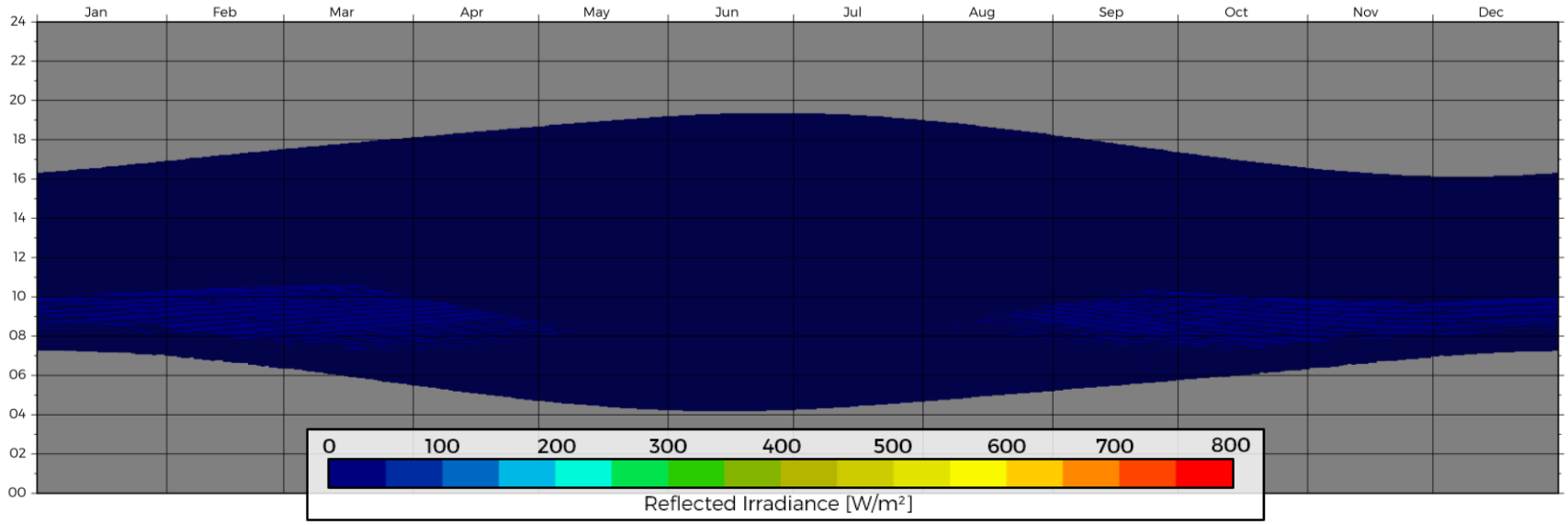

ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F23

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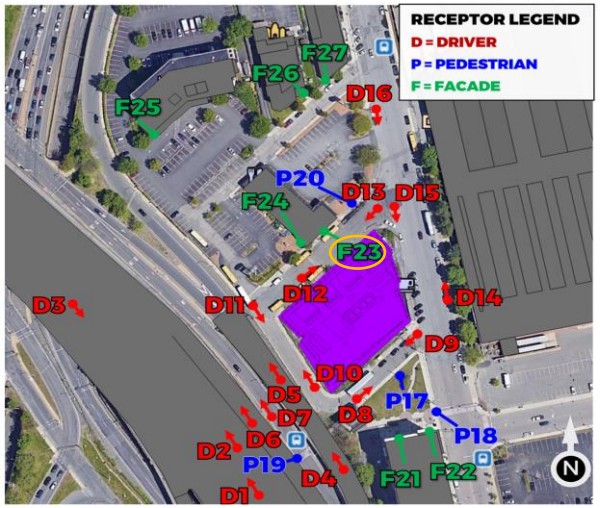

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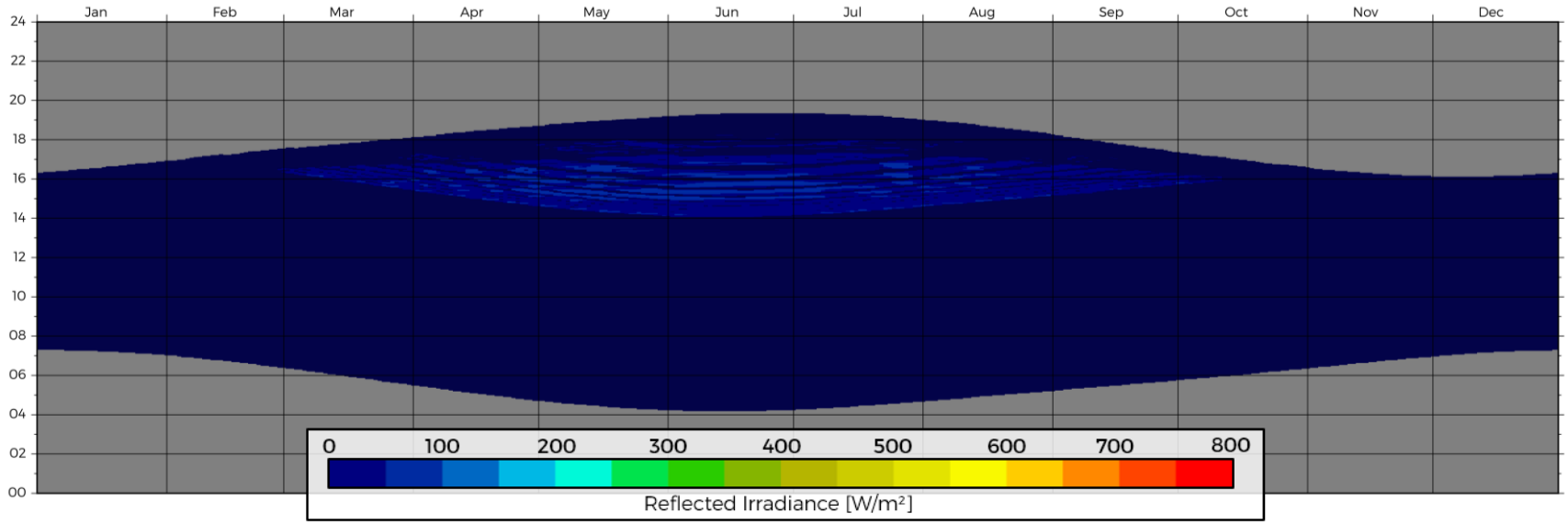

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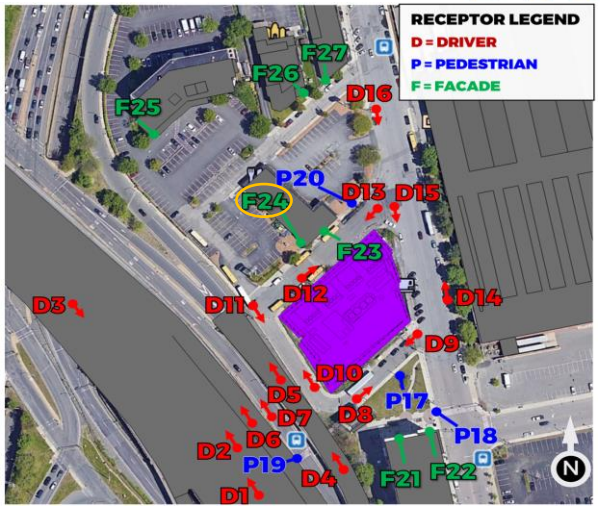

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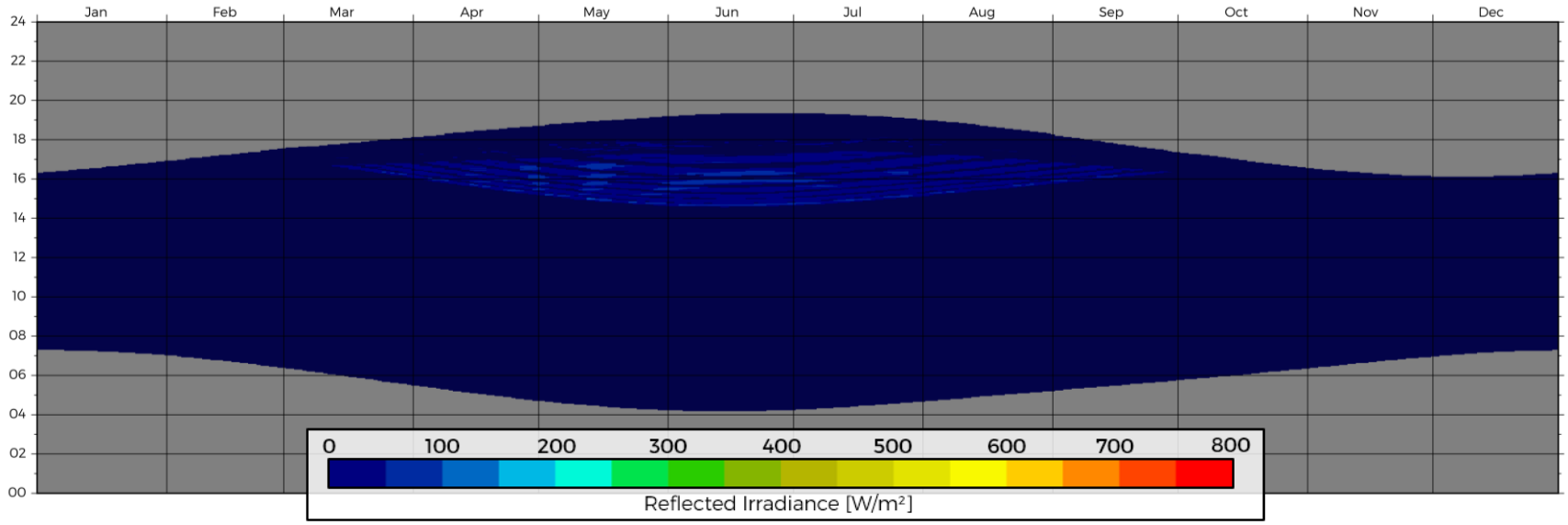

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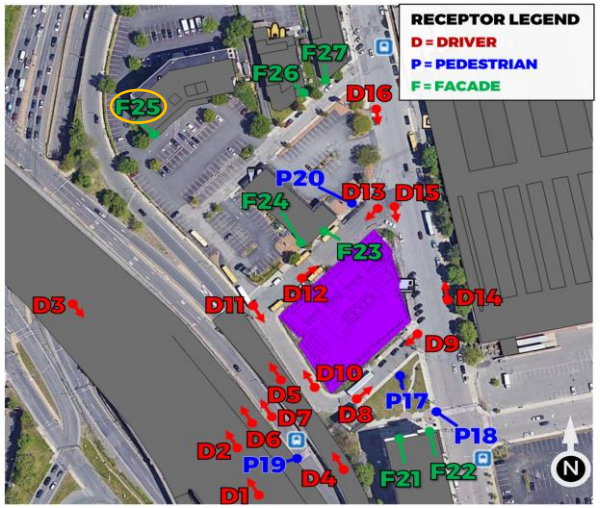

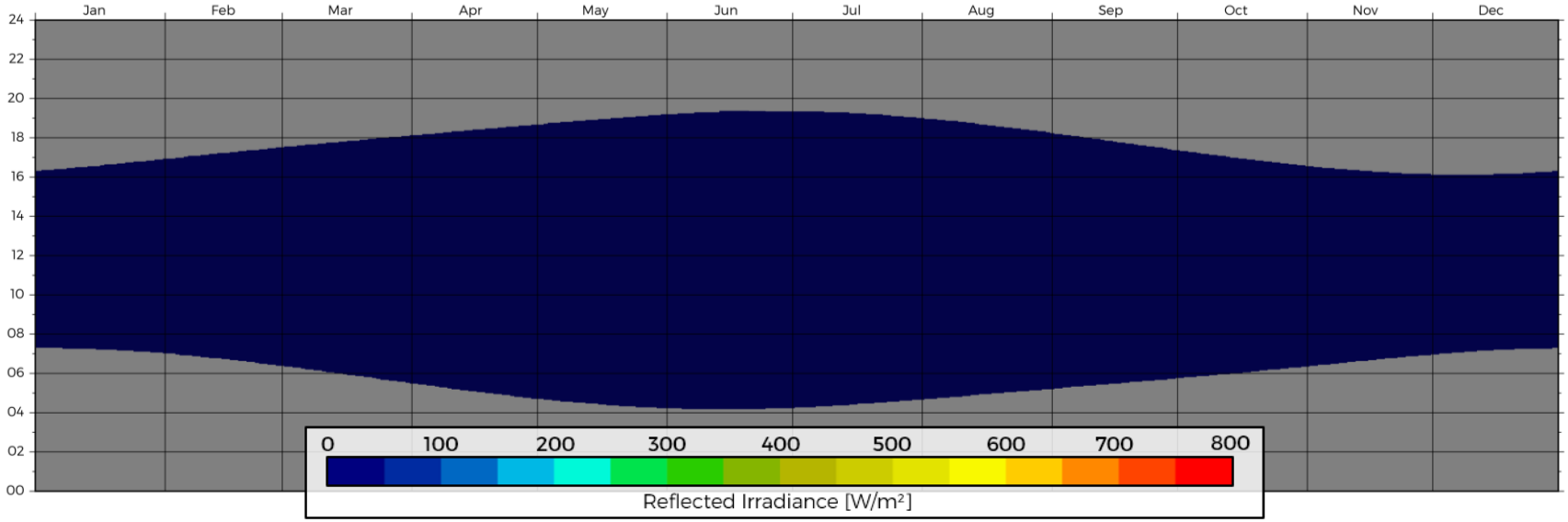

ANNUAL THERMAL IMPACT - PROPERTY

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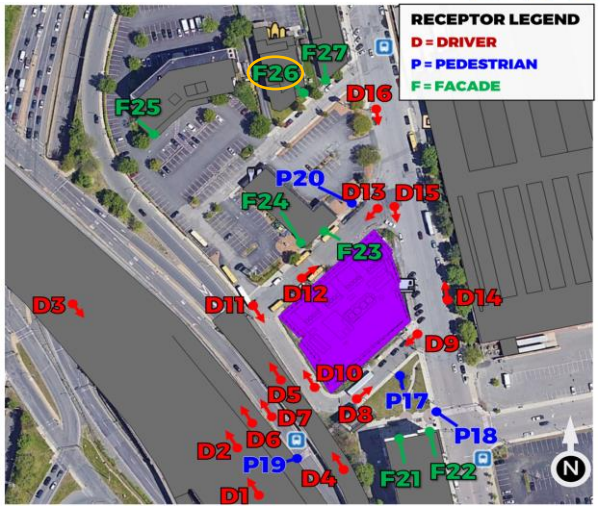

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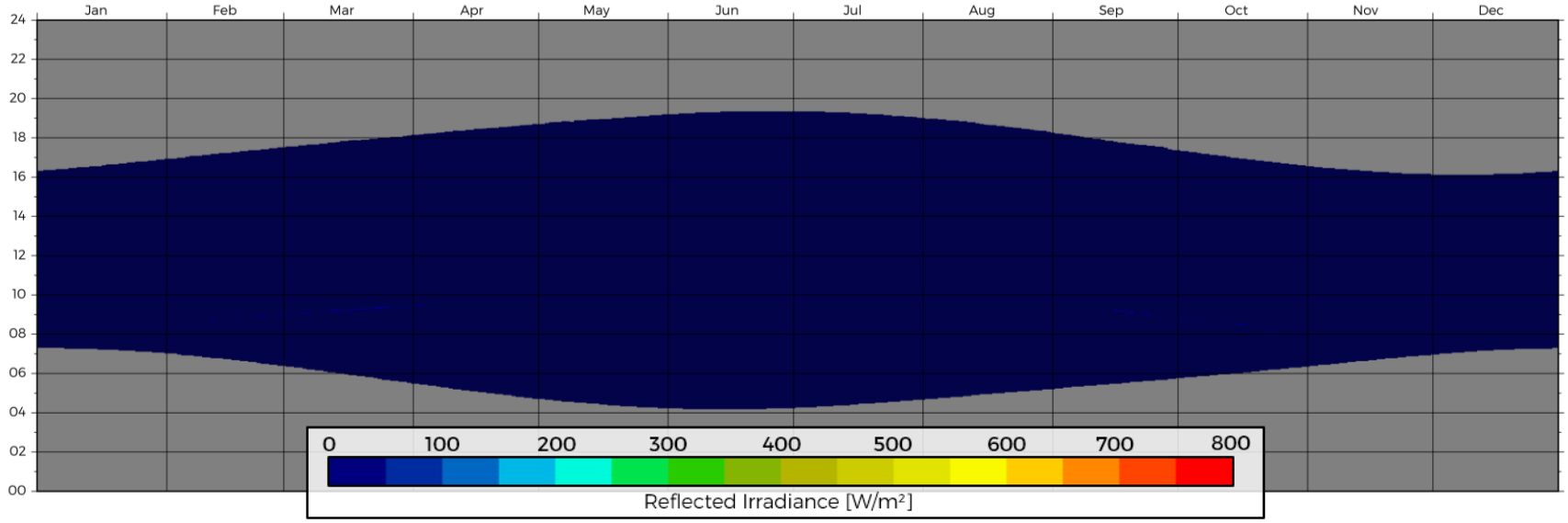

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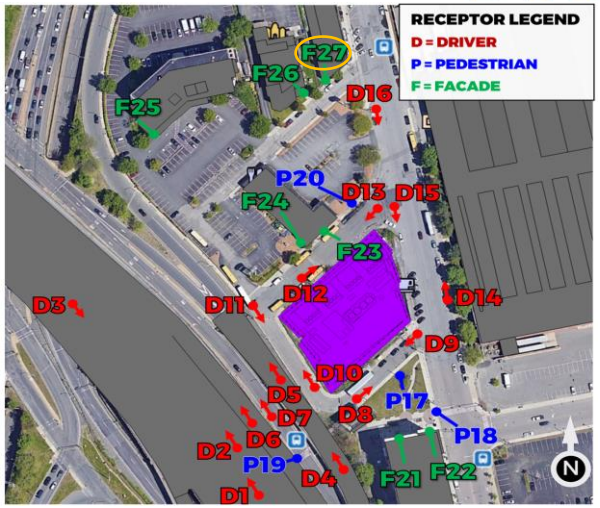

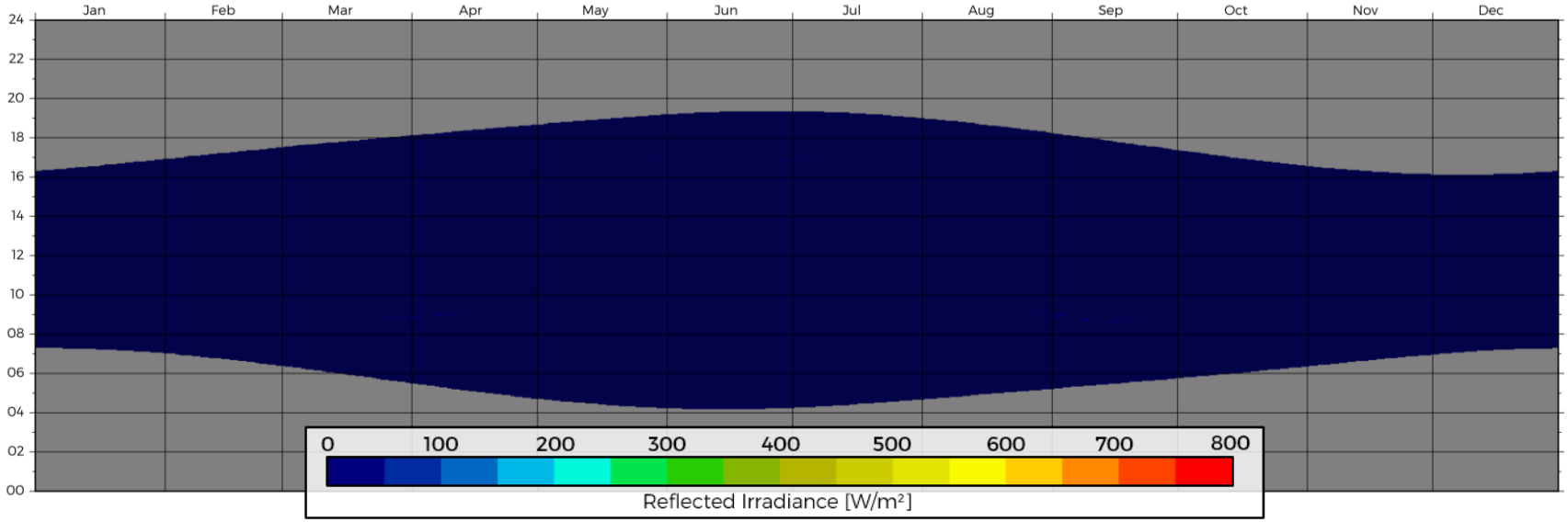

APPENDIX B

RWDI REFLECTION CRITERIA

Visual Glare

There are currently no criteria or standards that define an "acceptable" level of reflected solar radiation from buildings. RWDI has conducted a literature review of available scientific sources[1] to determine levels of solar radiation that could be considered acceptable to individuals from a visual standpoint.

Many glare metrics are designed for interior use and have been found to not correlate well with the glare impact humans perceive from direct sun or in outdoor environments. RWDI uses the methodology of Ho et al[2], which defines glare impact based on a physical reaction rather than on a preference-based correlation.

Based on the intensity of the glare source and the size of the source in the field of view (Figure B1), the risk of that source causing temporary flash blindness (i.e. the after images visible after one is exposed to a camera flash in a dark room) faster than a person can reflexively close their eyes can be determined.

If this 'after-imaging' can occur faster than the human blink reflex, it presents an unavoidable effect on a person based on physiology rather than preference. This forms the basis of how we determine if a reflection is 'significant'.

This methodology was previously required by the United States Federal Aviation Administration (FAA) to determine the risk of glare to pilots and other airport staff under FAA Interim Policy 78 FR 63276. While the need to use this exact metric has since been relaxed under FAA Policy 86 FR25801, RWDI still feels that it is appropriate for this work.

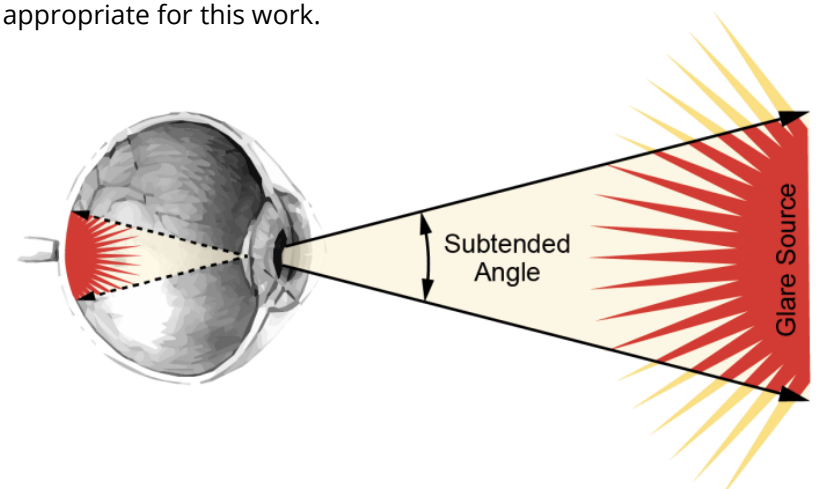

Figure B1: Schematic Illustrating the Subtended Angle of a Glare Source

Visual Glare (cont'd)

At the screening level, we conservatively take any reflections at least 50% of the intensity required to cause after-images as a "significant" reflection to be counted in the frequency analysis. In the detailed phase of work, we use the typical threshold level.

As a reference, point 1 on Figure B2 illustrates where looking directly at the sun falls in terms of irradiance on the retina (the back of the eye) and the size of the angle that the sun subtends in the sky. This puts it just at the border of causing serious damage before the blink reflex can close the eye.

The other points in Figure B2 correspond to the following:

2. Direct viewing of high-intensity car headlamp from 50 feet / 15 m
3. Direct viewing of typical camera flash from 7 feet / 2 m
4. Direct viewing of high-intensity car headlamp from 5 feet / 1.5 m
5. Direct viewing of frosted 60W light bulb from 5 feet / 1.5 m
6. Direct viewing of average computer monitor from 2 feet / 0.6 m

Note that the retinal irradiances described on this page are significantly higher than the irradiance levels discussed elsewhere in this report. This is because the human eye focuses the energy on to the retina. The magnitude of the increase is dependent on the geometry of the human eye and the source of the glare, both of which are computed per the Ho et al methodology.

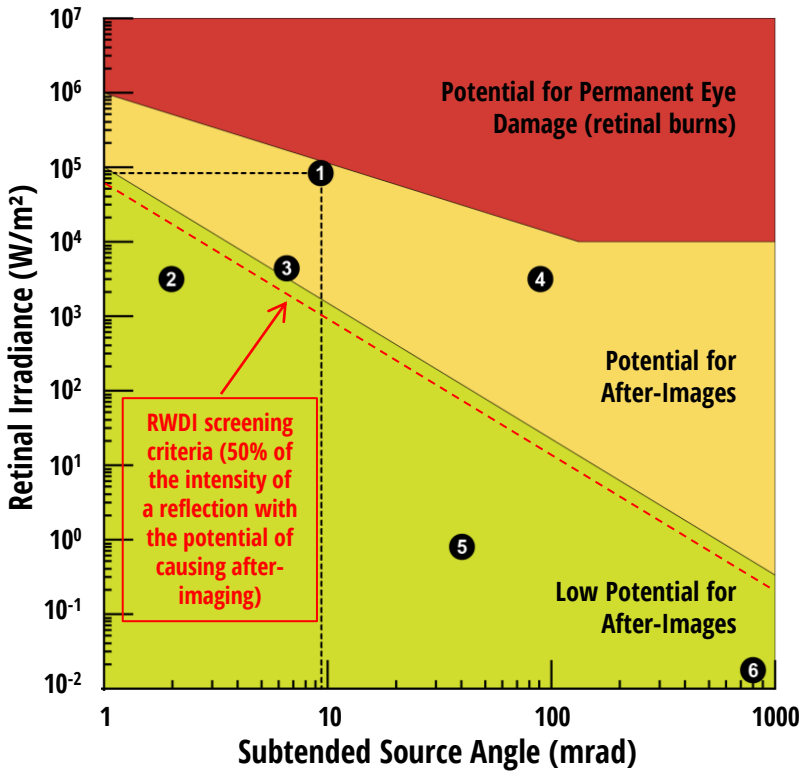

Figure B2: After-Imaging Potential From Various Glare Sources

Visual Glare (cont'd)

Significant glare impacts on the operators of vehicles or heavy equipment pose a particular risk to public safety due to operator distraction or reduction in their visual acuity. Thus, in the detailed analysis, RWDI assigns an assumed view direction to those engaged in "high-risk" activities (e.g. driving a car or flying a plane) as well as an assumed field of view.

The assigned directions and fields of view acknowledge that an operator is particularly sensitive to reflections emanating from the direction in which they are travelling (and therefore cannot safely look away from) and also that the opaque elements of the vehicle will act to obstruct reflections beyond a given angle.

For drivers the critical angle is taken to be 20° away from the direction of view[3]. Thus, any reflections emanating from within this 20° field of view are considered 'high' impacts, whereas reflections emanating from outside this cone are classified as 'moderate' impacts. This angle is adjusted as needed for impacts on other vehicles such as aircraft[4], trains[5], and other heavy equipment[6].

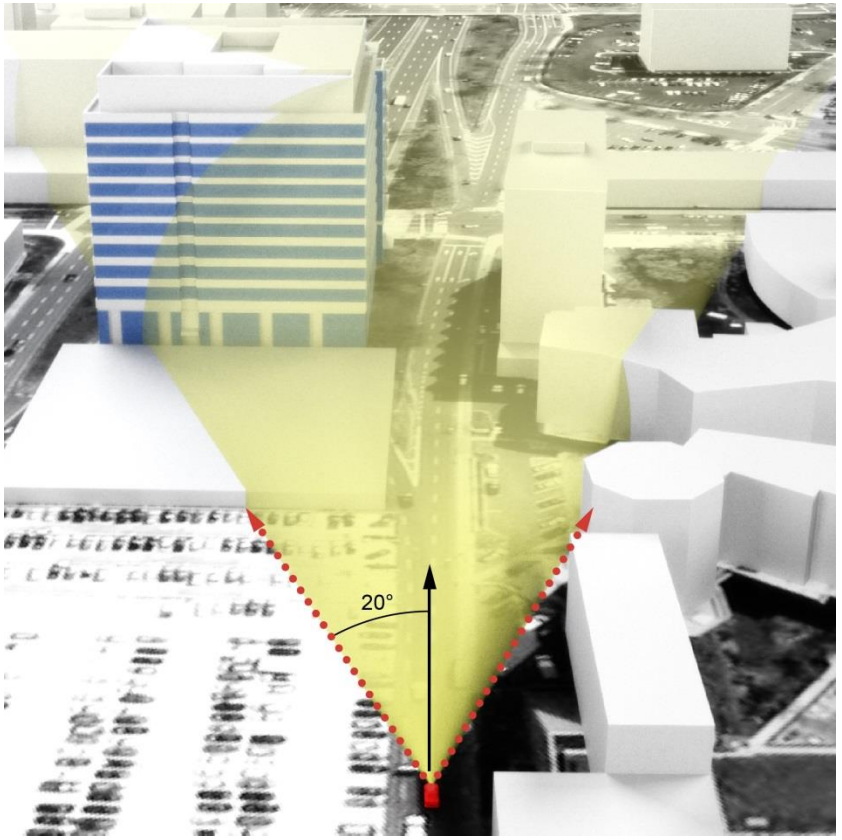

Figure B3: Illustration of a Driver's 20° Field of View

Thermal Impact (Heat Gain) on People

The primary sources for exposure limits to thermal radiation come from fire protection literature. However, there is currently inconsistency between different bodies regarding what level of exposure can be reasonably tolerated by people.

The U.S. National Fire Protection Association (NFPA) defines 1,700 W/m² as an upper limit for a tenable egress environment[7]; i.e. an individual could escape through such an environment successfully, though they would not necessarily emerge unscathed. The British Standards Institution[8] sets their limit at 2,000 W/m², which "*...is tolerable for ~ 5 min[utes]...*". Other researchers[9] have found that higher irradiance levels (3,500 – 5,000 W/m²) can be tolerated in outdoor environments for several minutes without issue.

The only current quantitative guideline specific to reflections comes from the City of London's Planning Note on 'Solar Convergence'[10]. Produced in conjunction with the UK Building Research Establishment (BRE), this document indicates that no areas should receive 10,000 W/m² or more for any duration, exposures above 2,500 W/m² should be limited to less than 30 seconds; and that "*...areas with reflected irradiances above 1,500 W/m², and preferably those above 1000 W/m², should be minimized.*"

It should be noted that all these thresholds are guideline values only, and that in reality many factors (skin color, age, clothing choice, etc.) influence how a person reacts to thermal radiation.

Clearly, there are currently no definitive guidelines or criteria with respect to the issue of thresholds for exposure to thermal irradiance in an urban setting. We know this criterion should be lower than the thresholds set in the context of an individual escaping from a fire and greater than typical peak solar noon levels of 1,000 W/m² which people commonly experience.

Therefore, RWDI's opinion at this time, is that reasonable criteria is to establish 2,500 W/m² as a ceiling exposure limit, which reflection intensity should not exceed for any length of time; and 1,500 W/m² as a short term (10 minutes or less) exposure limit.

Thermal Impact (Heat Gain) on Property

The impact of solar irradiance on different materials is primarily based on the temperature gains to the material which can cause softening, deformation, melting, or in extreme cases, combustion. These temperature gains are difficult to predict as they are highly dependent on the convective heat transfer from air movement around the object and long-wave radiative heat transfer to the surroundings.

Generally, irradiance levels at or above 10,000 W/m² for more than 10 minutes are required to ignite common building and automotive materials in the presence of a pilot flame. That value increases to 25,000 W/m² when no pilot flame is present[11,12,13]. However, some materials like plastics and even some asphalts may begin to soften and deform at lower temperatures. For example, some plastics can deform at a temperature of 140°F (60°C), or lower if force is applied. The applied force typically comes from the thermal expansion of the material, the force of gravity acting on the material or an external mechanical force (i.e. someone or something pushing or pulling on it).

Aside from the risk of damage to the material itself, a hot surface poses a safety risk to any person who may come into contact with it. This is particularly important in an urban context as the individual may not expect the object to be heated. NASA[14] defines an upper limit of 111°F (44°C) for surfaces that require extended contact time with bare skin. Surface temperatures below this limit can be handled for any length of time without causing pain.

That said, surfaces within the urban realm are routinely exposed to reflections from windows, metal panels and bodies of water without causing material damage or excessive heating.

Therefore, as this time, RWDI takes a conservative approach and **uses a value of 1,000 W/m², consistent with a single (i.e. non-focused) reflection of the sun's peak intensity, as a baseline threshold for reflected irradiance on stationary objects.**

However, this is simply a starting point. As noted, depending on the environmental conditions and material properties of the object/assembly other values may be used instead.

References

1. Danks, R., Good, J., and Sinclair, R., “Assessing reflected sunlight from building facades: A literature review and proposed criteria.” *Building and Environment*, 103, 193-202, 2016.

2. Ho, C., Ghanbari, C. and Diver, R., "Methodology to Assess Potential Glint and Glare Hazards From Concentrating Solar Power Plants: Analytical Models and Experimental Validation," *Journal of Solar Energy Engineering,* vol. 133, no. 3, 2011.

3. Vargas-Martin, F., and Garcia-Perez, M.A., "Visual fields at the wheel." *Optometry and Vision Science* 82, no. 8 (2005): 675-681.

4. Rogers, J.A., et al, "Evaluation of Glare as a Hazard for General Aviation Pilots on Final Approach." *Federal Aviation Administration* (2015).

5. Jenkins, D.P., et al, "A practical approach to glare assessment for train cabs." *Applied Ergonomics* 47 (2015): 170-180.

6. Hinze, J.W., and Teizer J., "Visibility-related fatalities related to construction equipment." *Safety Science* 49, no. 5 (2011): 709-718.

7. National Fire Protection Association. (2017). NFPA 130: standard for fixed guideway transit and passenger rail systems. NFPA.

8. The application of fire safety engineering principles to fire safety design of buildings – Part 6: Human Factors’ PD 7974-6:2019, British Standards Institution, 2019.

9. Raj, P.K., “Field tests on human tolerance to (LNG) fire radiant heat exposure, and attenuation effects of clothing and other objects”, *Journal of Hazardous Materials,* vol. 157 no. 2-3, 2008.

10. Department of the Built Environment. (2017). Solar Convergence Planning Advice Note. City of London Corporation.

11. Building Research Establishment: ‘Fire spread in car parks’ BD2552, Department of Communities and Local Government 2010.

12. SFPE Handbook of Fire Protection Engineering 4th Edition NFPA/SPFE 2008 USA

13. V. Babrauskas ‘Ignition Handbook’ Fire Science Publishers + SFP, 2003

14. E Ungar, K Stroud ‘A New Approach to Defining Human Touch Temperature Standards’ National Aeronautics and Space Agency , 2010

APPENDIX F: Request for Plan Revision and De Minimis Change

Contents

- Master Plan Special Permit Plan Revision and Request for De Minimis Change

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August 18, 2021

VIA ELECTRONIC MAIL

City of Somerville
Mayor's Office of Strategic Planning &
Community Development
City Hall
93 Highland Avenue
Somerville, Massachusetts 02143
Attention: Sarah A. Lewis, RA, LEED-AP, CNUa
Director of Planning and Zoning
Email: slewis@somervillema.gov

RE: 74 Middlesex Avenue, Somerville (the "Property")
Master Plan Special Permit Decision in Case No. MPSP 2020-0001, dated June 21, 2020 (the "MPSP")
Plan Revision and Request for De Minimis Change

Dear Sarah -

I write this letter for my client, 74M Property Owner, LLC (the "**Applicant**"), the owner of the Property, and holder of the MPSP. Capitalized terms used, but not otherwise defined, in this letter shall have the meanings ascribed to them in the Application for Master Plan Special Permit dated February 19, 2020, by Edge Assembly Square for the Property (the "**MPSP Application**").

The Project described in the MPSP Application consists of the redevelopment of the Property with an approximately 525,000 square foot Commercial Building, containing laboratory and office uses and approximately 27,000 square feet of first floor retail and active uses and below-grade parking for up to 350 vehicles. The Property measures approximately 36,932 square feet of land area. The MPSP Application also includes within the Project the creation of substantial new Civic Spaces in a portion of the abutting Kensington Avenue as well as on a portion of the parcel owned by the City of Somerville situated at 0 Middlesex Avenue (and referred to as the Middlesex Avenue Open Space in the MPSP Application)(said portions of Kensington Avenue and the Middlesex Avenue Open Space as will contain the referenced Civic Space, collectively, the "**City Parcels**"). These components were depicted in Figure 2.12 of the MPSP Application, which outlined the "Project Boundary".

The Applicant desires to revise the MPSP and the certain of the underlying plans to have the Development Site clarified so as to include the Property and the City Parcels with the

Property being referred to as "Lot 1" and the City Parcels being defined as Lot 2. In order to affect this change, the Applicant requests the following revisions to the MPSP.

1. **Civic and Open Space**. Amend and restate Section 2.3.2 of the MPSP Application as follows:

"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, while no Open Space is required in the ASMD for projects containing over 50,000 sf of development, the Property will contain publicly accessible Open Space measuring approximately 8,529 square feet. Additionally, the Development Site will contain a "Neighborhood Park Civic Space", which will be comprised entirely of the land area of the City Parcels and described in Appendix F and below. The Civic Space will be designed to meet the requirements of a Neighborhood Park Civic Space. As indicated on Figure 2.12, the Development Site will contain approximately 49,987 square feet of land area, which will require a minimum of 12,496.75 square feet of Civic Space. As currently planned, the Civic Space on the City Parcels will total approximately 13,055 square feet (which is approximately 26% of the land area of the Development Site). Therefore, the planned Neighborhood Park Civic Space will be in excess of the twenty-five percent (25%) Civic Space requirement (measured as a percentage of the land area of the overall Development Site) contained in the ASMD (Section 7.4.5.b.i. of the SZO). Refer to Figures 2.11 through 2.13. The conceptual design and programming of these areas are described below.

The public Open Space and Civic Space around and within 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.

Kensington Neighborhood Park

The Project envisions the use of the City Parcels and granting easements therein by the City, which will revitalize the Middlesex Avenue Open Space and will combine with the area of Kensington Avenue situated between the Property and the Middlesex Avenue Open Space to create a new civic space (collectively, the "**Kensington Neighborhood Park**"). Kensington Neighborhood Park 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 the 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 proposed use of the City Parcels for Civic Space will require the City to grant an easement that dedicates the new civic space to the public in perpetuity and also grants an easement to the Applicant for the continued maintenance, repair and replacement of the Kensington Neighborhood Park. The City of Somerville will retain ownership of the Kensington right-of-way (ROW) and will deliver an Owner's Authorization with regard to the Civic Space Site Plan Review Application as well as the revisions to the MPSP Application.

The Applicant will continue to coordinate closely with the City on the granting of the above easements, which will require a vote from the City Council and final approval from the Mayor."

2. **Revision to Open Space Plan**. Figure 2.12 of the MPSP Application is replaced by Figure 2.12 attached to this letter and incorporated herein by reference. The revisions to the Figure include the following:

    a. revise the Development Site boundaries to include the Property and the City Parcels;
    b. identify the Property and the City Parcels as two (2) separate lots;
    c. revise the Project Site to remove unnecessary portions of Kensington Avenue southwest of the Development Site;
    d. revise the City of Somerville property line to include the City Parcels as a single parcel;
    e. depict the Civic Space as a single Civic Space that qualifies as a "Neighborhood Park"; and
    f. remove the reference to "Open Space (Offsite Improvements)" in reference to the Middlesex Avenue Open Space.

3. **Revision to Civic Space Plan**. Figure 2.13 of the MPSP Application is replaced by Figure 2.13 attached to this letter and incorporated herein by reference. The revisions to the Figure include the following:

    a. revise the Development Site boundaries to include the Property and the City Parcels;
    b. identify the Property and the City Parcels as two (2) separate lots;
    c. revise the Project Site to remove unnecessary portions of Kensington Avenue southwest of the Development Site;
    d. revise the City of Somerville property line to include the City Parcels as a single parcel;
    e. depict the Civic Space as a single Civic Space that qualifies as a "Neighborhood Park" and delete references to "Through-Block Plaza (within Property Line and Over Decommissioned Right-of-Way)";
    f. Update the Civic Space Summary to provide for
        i. a "Total Lot Area" of 49,987 square feet, which includes the 36,932 square foot Property and the City Parcels, which total 13,055 square feet in the aggregate (5,838 square feet within Kensington Avenue and 7,127 square feet in the Middlesex Avenue Open Space); and
        ii. 100% of the area of the City Parcels comprising Civic Space, which exceeds the 12,496.75 square feet of Civic Space required as a result of the size of the Development Site; and
    g. remove the reference to "Open Space (Offsite Improvements)" in reference to the Middlesex Avenue Open Space.

In addition, to the above changes to the MPSP Application and plans contained therein, the Applicant requests the following a de minimis change under Section 15.4 and Section 7.4.of the City of Somerville Zoning Ordinance (the "**SZO**") with regard to the MPSP as follows:

- Condition 4. Revise said Condition to delete the words "a subsequent Site Plan Approval application" from the third (3rd) line thereof and replace such term with "the issuance of a Civic Space Permit"; and

- Condition 10. Revise said Condition to delete from the first (1st) and second (2nd) lines thereof, the clause "Upon approval of a subsequent Site Plan Approval for the Through Block Plaza Civic Space" therefrom, and substitute therefor the clause "Prior to the issuance of a Certificate of Occupancy for the building,".

These changes are intended to permit the planning, installation and maintenance of the Kensington Neighborhood Park Civic Space that the Applicant is required to construct and maintain, pursuant to the MPSP. These changes will formally add the full area of the

proposed Civic Space to the Development Site, which revision is consistent with the purpose and intent of the SZO.

As it relates to the modification to Condition 4, we understand that the Planning Board did not intend to require the grant of an actual easement by the City to the Applicant before the Applicant could apply for Site Plan Approval for the Civic Space. Rather, the Planning Board intended that the Applicant receive the right to have the requisite authorization to apply for Site Plan Approval relative to the Civic Space. By receiving the Owner's Authorization from the City and adding the City Parcels to the Development, the need to enter into an easement presently is unnecessary. Being allowed to proceed with the Site Plan Approval process for the Civic Space presently will inform the scope and extent of the Civic Space, before the City enters into a permanent maintenance easement with the Applicant and sets in place the permanent rights and the obligations of the Applicant and the City as it relates to the Civic Space. We believe that the requested change is consistent with the Planning Board's intent.

As for the proposed change to Condition 10, this change is also intended to reflect that the City's desires to maintain the public rights in and to Kensington Avenue (and not decommission said thoroughfare), while desiring to have the Civic Space constructed and maintained by Owner in connection with Owner's construction of its proposed laboratory project on the Property. The requested changes also recognize that Owner will not construct below-grade garage improvements under Kensington Avenue, and that Owner will not require any easement rights within Kensington Avenue other than the right to install, construct, maintain, repair and replace the Civic Space on the City Parcels. As noted above, the City will (in keeping with the requirements of the SZO) include in the easement to the Applicant an easement dedicating the use of the City Parcels to public open space in perpetuity.

We believe that the proposed changes are clearly de minimis pursuant to the provisions of Section 15.4.c. Pursuant to Section 15.4.c., the Director of Planning & Zoning in Somerville has the authority to determine whether a plan revision to a previously approved MPSP is a de minimis revision. Section 15.4.e. provides that the Director of Planning & Zoning may make a determination that a proposed revision is de minimis upon finding that the revised application:

a. does not contravene the previously published public notice, any finding, or attached condition made by the review board for the original development review application;

b. does not detrimentally impact matters of substance identified in the meeting minutes of the original public meetings or public hearings; and

c. features changes that are insignificant to the degree that persons familiar with the original application would not notice a substantial change in operational or built outcome.

The above changes to the to the MPSP generally, as well as Condition 4 and Condition 10 of the MPSP, do not have any material impact on the Project and will not result in any change to the proposed area of the planned Civic Space. These changes will not result in any discernable changes between the Project as depicted in the MPSP Application and what ultimately is constructed, subject to changes that may occur during the Site Plan Approval process. Additionally, the public notice for the MPSP did not indicate the nature of any easement or other rights to be obtained by the Applicant in and to the City Parcels and the timing of the granting thereof. As a result, the changes do not contravene the public notice for the MPSP hearing or the intent of any finding or condition contained in the MPSP.

In addition to the above, the referenced proposed changes referenced do not constitute a Major Amendment under Section 7.4.4.d.i. of the CZO, because they do not:

a. increase the floor area or lot coverage of the proposed development by fifteen percent (15%) or more;

b. result in any substantial change to the access to the Development Site; or

c. not result in any condition that is substantially more detrimental to the ASMD or the surrounding neighborhood than the previously approved plans.

As a result of the above, we believe that the proposed changes to the Approved Project constitute a de minimis change to the Development Plan and should be approved as such by the Director of Planning & Zoning.

Finally, for your files, we note that a copy of which has been recorded with the Middlesex South District Registry of Deeds in Book 78188, at Page 193, and registered with the Middlesex South Registry District of the Land Court as Document No. 1885797.

Should you have any questions concerning the above, please feel free to contact me.

Thank you.

Sincerely,

Darren M. Baird
Counsel for and on behalf
of 74M Property Owner, LLC

Attachments: Figure 2.12 and Figure 2.13

cc.: Gary Kerr and Ryan Souls (Greystar Real Estate Partners)
Anthony D. Galluccio (Galluccio & Watson)
File

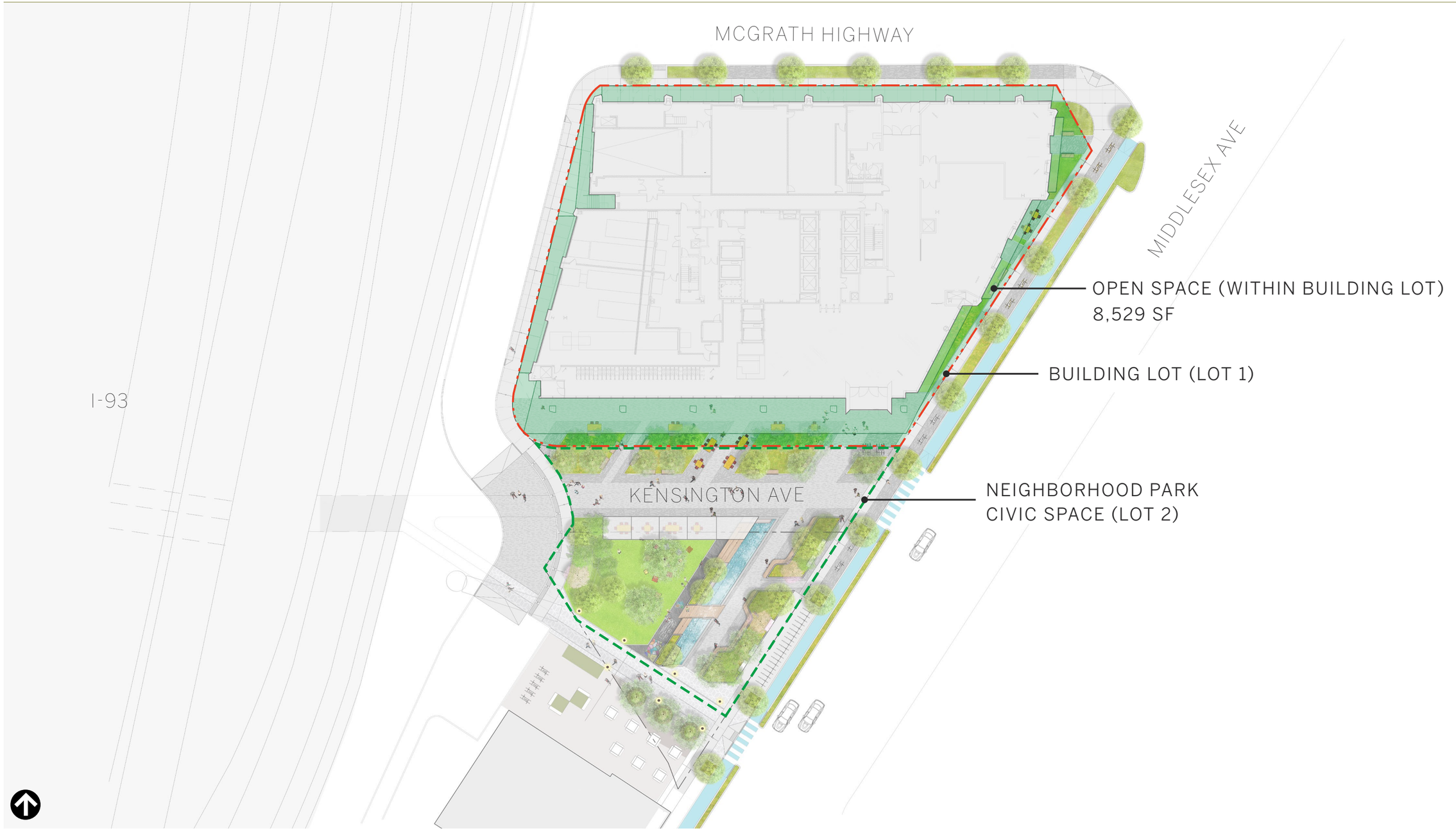

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Figure 2.12
Open Space Plan

74 Middlesex Avenue
Somerville, Massachusetts

CIVIC SPACE SUMMARY	
Total Lot Area :	49,987 SF
Civic Space - Kensington Ave. :	5,838 SF
Civic Space - Middlesex Ave. Open Space :	7,217 SF
Civic Space Total (26%)	13,055 SF

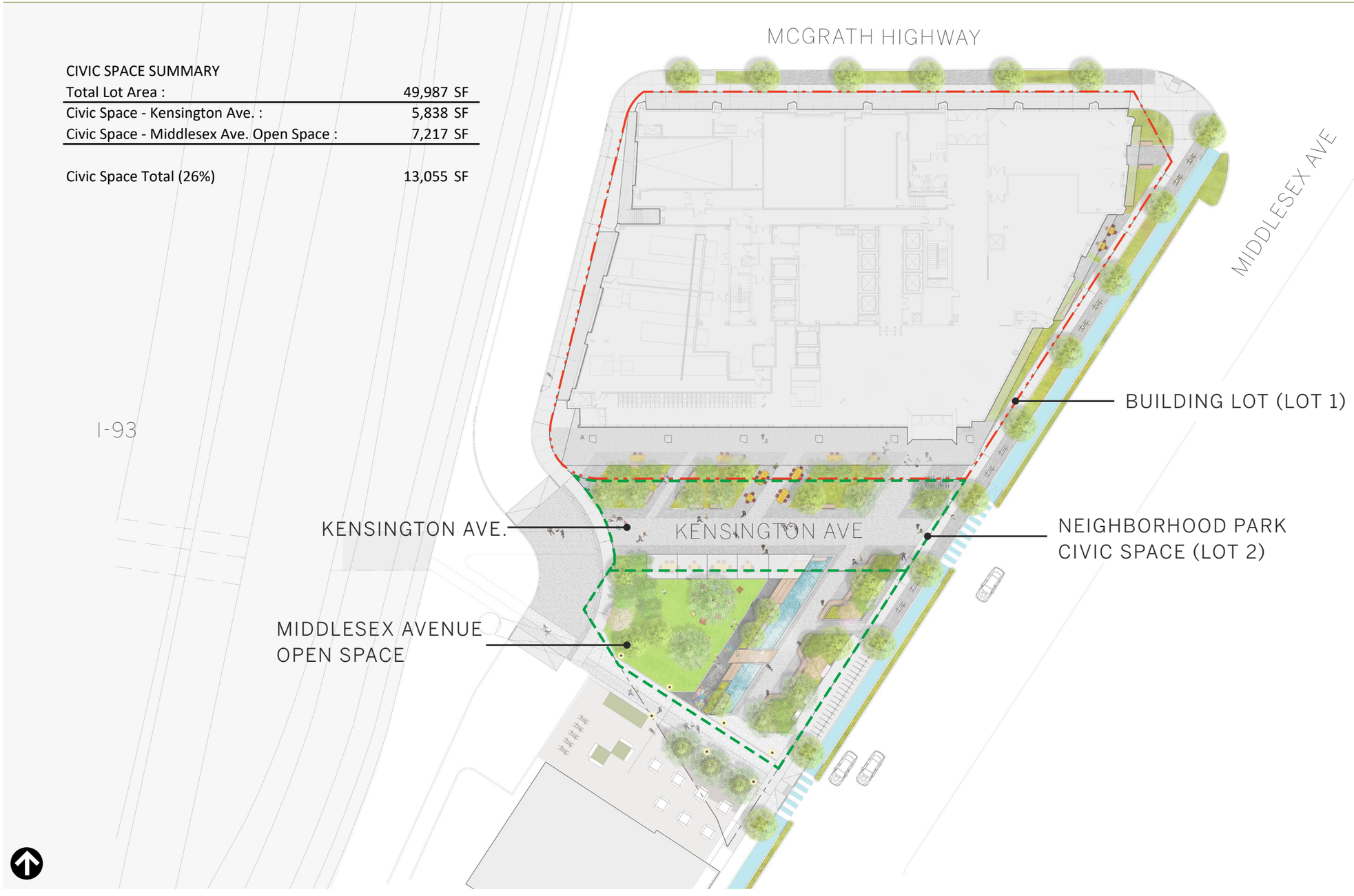

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Figure 2.13
Civic Space Plan

74 Middlesex Avenue
Somerville, Massachusetts