PROJECT NOTIFICATION FORM

# Dock Square


Submitted to:
**Boston Planning and Development Agency**
One City Hall Square
Boston, MA 02201

Submitted by:
**FPG DS Owner One, LLC and**
**FPG DS Owner Two, LLC**
45 Main Street, #800
Brooklyn, NY 11201

Prepared by:
**Epsilon Associates, Inc.**
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
**Stantec Architecture**
**Dalton & Finegold, LLP**
**Howard Stein Hudson**
**Nitsch Engineering**
**Nauset Strategies**

**February 16, 2018**

Epsilon
ASSOCIATES INC.

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# Chapter 1.0

Introduction/Project Description

# 1.0 INTRODUCTION/ PROJECT DESCRIPTION

## 1.1 Introduction

FPG DS Owner One, LLC and FPG DS Owner Two, LLC (together, the Proponent), propose to construct a ten-story, approximately 195-unit residential addition atop the existing Dock Square Garage in Downtown Boston (the Project). The existing, seven-story parking structure contains 698 parking spaces, and ground-floor restaurant space currently occupied by the Hard Rock Café. The Project site, bounded by Clinton Street to the south, John F. Fitzgerald Surface Road to the east, and North Street to the west, also contains an approximately 6,057 square foot (sf) open space at the corner of Clinton and North streets.

The Project site is located near the Rose Fitzgerald Kennedy Greenway, an important achievement in both the life and history of the City of Boston. In addition to actively reconnecting the torn historic fabric of the City, the Greenway has increased pedestrian activity in the area. However, the current uses and building design at the Project site, established when an elevated highway passed by, fails to take advantage of the openness of today's Greenway. The Project includes re-cladding the brick façade of the of existing garage along its entire perimeter to create a warm-colored building base that fits into the context of the neighborhood. In addition to the benefits to the public realm, the Project also provides new housing, including new affordable housing units, construction and permanent jobs, and improved tax revenues for the City.

This Expanded Project Notification Form (PNF) is being submitted to the Boston Redevelopment Authority (BRA), doing business as the Boston Planning and Development Agency (BPDA), to initiate review of the Project under Section 80B of the Zoning Code, Large Project Review. The PNF offers a description of the Project, its minimal impacts and proposed mitigation strategies, and its substantial benefits to the City of Boston.

## 1.2 Project Identification

| | |
|---|---|
| Address/Location: | 20 Clinton Street |
| Developer: | FPG DS Owner One, LLC and FPG DS Owner Two, LLC<br>45 Main Street, #800<br>Brooklyn, NY 11201<br>(718) 907-7700<br>Jonathan Landau<br>John Matteson |

| | | |
|---|---|---|
| Architect: | Stantec Architecture<br>311 Summer Street<br>Boston, MA 02210<br>(617) 234-3100 | |
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| Landscape Architect | Stantec<br>226 Causeway Street<br>Boston, MA 02114<br>(617) 523-8103 | |
| | | Robert Corning<br>Mike Nowicki |
| Legal Counsel: | Dalton & Finegold, LLP<br>183 State Street, 5th Floor<br>Boston, MA 02109<br>(617) 936-7777 | |
| | | Jared Eigerman, Esq. |
| Permitting Consultants: | Epsilon Associates, Inc.<br>3 Clock Tower Place, Suite 250<br>Maynard, MA 01754<br>(978) 897-7100 | |
| | | Cindy Schlessinger<br>Talya Moked, LEED AP BD+C |
| Transportation Consultant | Howard Stein Hudson<br>11 Beacon Street, Suite 1010<br>Boston, MA 02108<br>(617) 482-7080 | |
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Michael K. Vaughan
Christine McMahon

## 1.3 Project Description

### *1.3.1 Project Site*

The Project site is an approximately 51,027 sf site located in downtown Boston, and is bounded by Clinton Street to the south, John F. Fitzgerald Surface Road to the northeast, and North Street to the northwest. The Project site currently contains a 698 space, seven-story parking structure, known as Dock Square Parking Garage, with restaurant space on the ground floor currently occupied by the Hard Rock Café. At the corner of North and Clinton streets, the Project site contains an underutilized brick-paved plaza that is open to the public. The Project site presents an opportunity to improve a blank spot in an otherwise active area. See Figure 1-1 for an aerial locus map and Figures 1-2 and 1-3 for photographs of the existing conditions on the Project site.

### *1.3.2 Area Context*

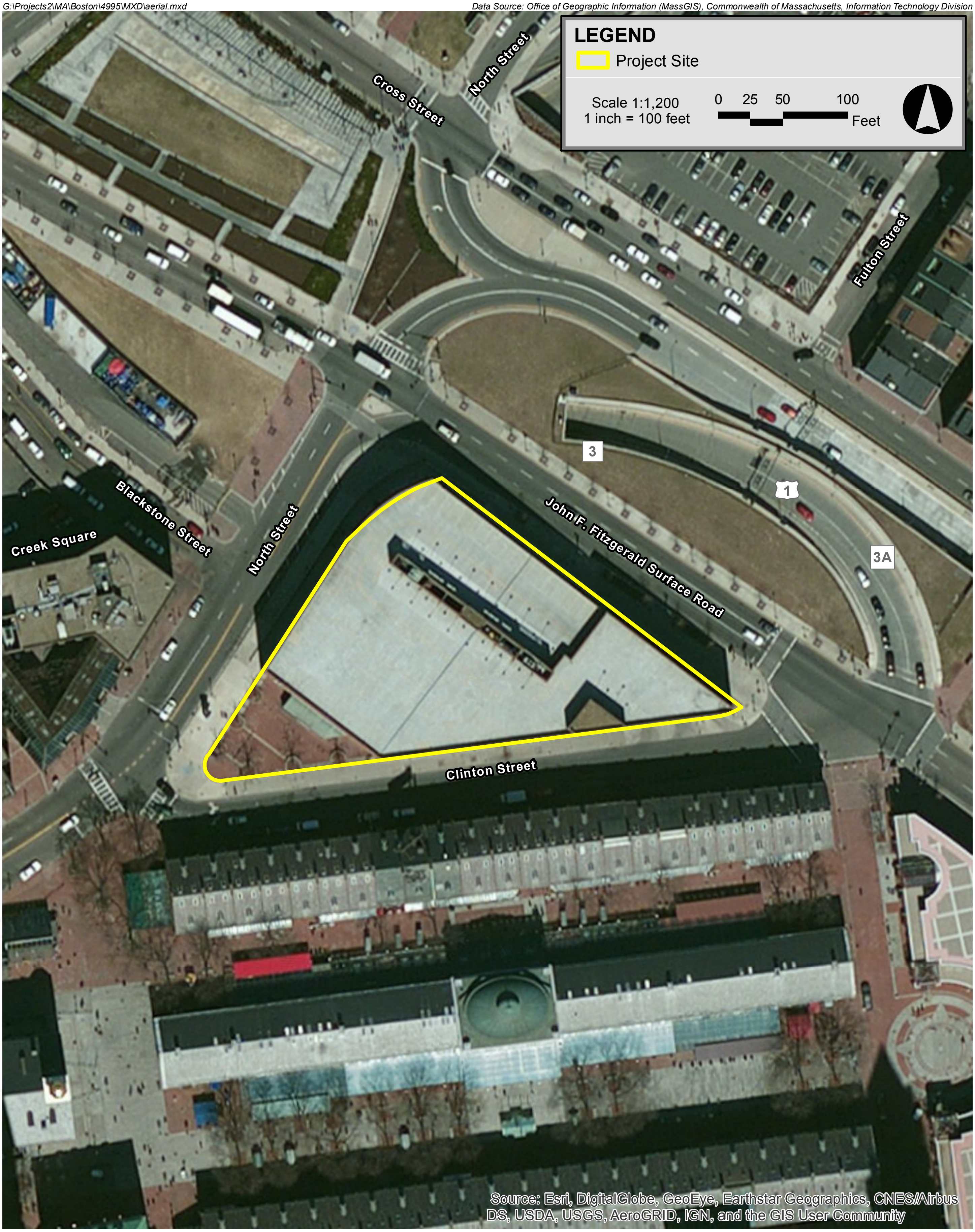
The area immediately surrounding the Project site has experienced significant improvements as a result of the removal of the elevated Central Artery highway, and of its replacement by the Rose Kennedy Greenway, along the northeastern edge of the Project site. To the south of the site is Faneuil Hall and Marketplace, with Post Office Square and the Financial District several blocks beyond that. The site also has convenient access to City Hall, the North End, and Boston Harbor. Within walking distance to innumerable restaurants and cultural establishments, the Project site is also near several public transit stops, on multiple lines: the MBTA Haymarket station (Green line B C D E, Orange line and Bus #92,93,111,117,424,426,428,434, and 450) is only a five-minute walk to the northwest, the MBTA Aquarium Station (Blue line) is a four-minute walk to the southeast, the MBTA Government Center station (Green line B C D E, Blue Line) is a five-minute walk to the west, and MBTA State Street station (Blue line and Orange line) is a four-minute walk to the southwest.

### *1.3.3 Proposed Project*

As shown in Table 1-1, the Project consists of an approximately 253,000 sf, ten-story vertical addition to the existing parking garage, which will contain approximately 195 residential units. The Project will reduce the current 698 publicly available garage parking spaces to 682 spaces, some of which will be made available for residents of the Project, which may include leasing spaces.

G:\Projects2\MA\Boston\4995\MXD\aerial.mxd

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division




**Dock Square Boston, Massachusetts**

Epsilon ASSOCIATES INC.

**Figure 1-1**

*Aerial Locus Map*


**Dock Square Boston, Massachusetts**

**Figure 1-2**

*Existing Conditions*


**Dock Square Boston, Massachusetts**

The garage will also be redesigned to include valet services and mechanical lifts, accounting for about 280 of the total spaces. In order to accommodate a ground-floor lobby for the residential addition, the restaurant space will be reduced from approximately 15,000 sf to approximately 8,000 sf. The existing restaurant space is not transparent to the street, and configuration of the ground level is expected to improve the pedestrian experience.

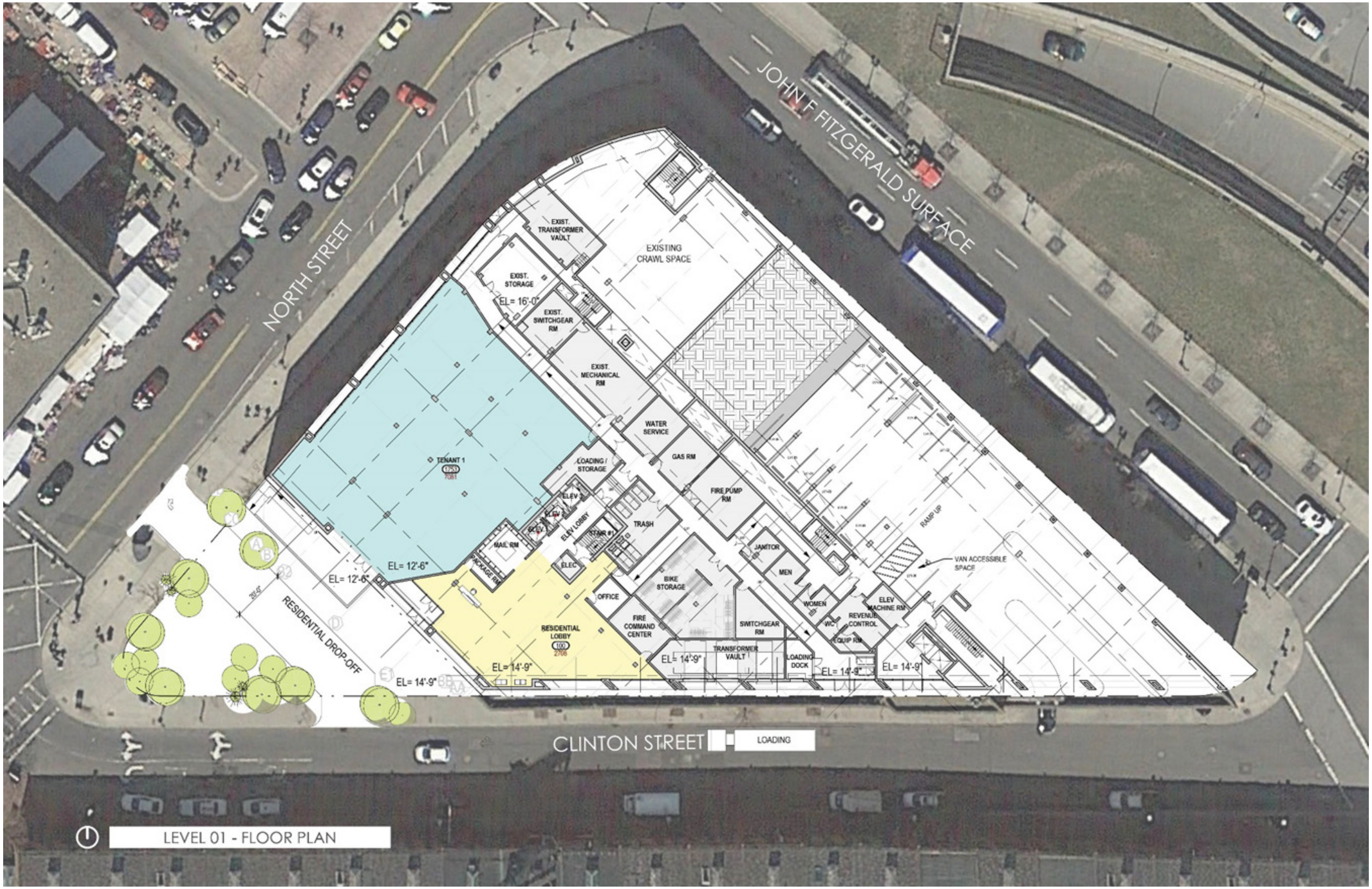
The new ground-floor, residential lobby will face the existing open space at the corner of Clinton and North streets. Amenity space for residents will be provided on the newly constructed eighth floor, including an outdoor patio/courtyard and a pool. In addition, the sloped roofline of the vertical addition allows for a series of terraces cascading down towards the Greenway. The residential units will be a mix of studios, one-bedroom, one-bedroom plus, two-bedroom, three-bedroom, and four-bedroom units. Figure 1-4 presents the site plan, and Appendix A presents floor plans, sections, and elevations.

**Table 1-1 Project Program**

| Project Element | Existing Dimension | Proposed Dimension |
|---|---|---|
| Residential | None | 195 units |
| Retail/Restaurant | 15,000 sf | 8,000 sf |
| **Total Square Footage** | 285,000 sf | 535,000 sf |
| Parking | 698 public spaces | 682 public spaces |
| Zoning Height | 76 feet (Clinton Street | 209 feet |
| Parcel Area | 51,027 sf | 51,027 sf |
| FAR | 5.59 | 10.48 |

The Project improves the corner of North and Clinton streets with a new one-way drive that will cut across the corner of the site from Clinton Street to North Street. This-cut through will provide convenient passenger drop off in front of the residential entrance and retail space and will alleviate the existing congested traffic at the adjacent street intersection.

The existing brick-paved plaza is currently underused in part because of its varying grades, with steps down from the adjacent public sidewalks. The Project would create a uniform grade for the plaza, and add plantings, tables, and chairs to make it more welcoming and usable to the public. In addition, the brick façade of the existing garage will be re-clad along its entire perimeter to create a warm-colored building base that fits into the context of the neighborhood. Together, these improvements will enhance the pedestrian experience at the site.




**Dock Square Boston, Massachusetts**

Stantec

**Figure 1-4**

*Site Plan*

### 1.3.4 *Consistency with the Greenway District Planning Study*

The Project site is addressed in the Greenway District Planning Study Use and Development Guidelines (the Guidelines), which were adopted by the then BRA Board in July 2010. The Guidelines cover seven sub-districts, with the Project site located within the Market District and Government Center sub-district. The central concept for this sub-district is to "shift this center of gravity north and provide a programmatic bridge between the tourism-focused activities of Quincy Market and the historic Haymarket."

The Project is consistent with the goals stated in the Guidelines, as follows:

- Improves the architectural quality of the existing garage to create greater continuities between the existing concentrations of activity;
- Increases residential opportunities west of the Greenway;
- Respects the scale and architecture of the existing neighborhood and adjacent landmarks; and
- Preserves views to the Custom House Tower from the Greenway and Blackstone Street, as well as from Boston Harbor to City Hall Plaza.

## 1.4 Public Benefits

The Project will provide many public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction and on an ongoing basis upon its completion.

*Smart Growth/Transit-Oriented Development*

The Project is consistent with smart-growth and transit-oriented development principles. Located near several Massachusetts Bay Transportation Authority (MBTA) (Orange, Green and Blue line) Stations, the Project supports the objectives of smart growth; specifically, new developments at existing nodes of excellent transit routes.

*Improved Urban Landscape*

The Project will transform a brick-veneered parking garage into a mixed-use, residential building, clad with high-quality materials, and softened with rooftop green space.

*Inclusionary Affordable Housing*

The Project is subject to the Mayor's Executive Order regarding inclusionary affordable housing, dated February 29, 2000, as amended, as well as the Boston Planning & Development Agency's (BPDA's) Inclusionary Development Policy (IDP). Thirteen percent (13%) of the approximately 195 dwelling units in the Project, or 25 units, will be IDP units, provided on-site.

*Sustainable Design/Green Building*

Energy conservation and other sustainable design measures are an integral component of the proposed Project. The Project will employ energy and water efficient features for mechanical, electrical, architectural, and structural systems, assemblies, and materials, where feasible. Sustainable design elements relating to building energy management systems, lighting, recycling, conservation measures, local building materials, and clean construction vehicles will be included, to the greatest extent practicable. The Proponent is committed to building a LEED certifiable project, incorporating sustainable design features into the Project to preserve and protect the environment.

*Increased Employment*

The Project will create approximately 250 construction jobs and approximately 25 permanent jobs once it is occupied. Consistent with City policy, the Project will include a construction workforce of 51% City of Boston Residents, 40% minority and 12% female.

*New Property Tax*

The Proponent anticipates that, following lease up, the Project will generate approximately $650,000 in net additional property tax revenues for the City of Boston, based on the Project's estimated hard construction cost of $120 million and current property tax rates for residential and commercial space.

## 1.5 Regulatory Controls and Permits

### *1.5.1 Boston Zoning Code*

The Project site is located within the Government Center/Markets District (Boston Zoning Code art. 45.) The Project site is also located within the Restricted Parking Overlay District (id. sec. 3-1A.C), and the Greenway Overlay District (id. art. 49A). The Project site is not located within one of the nine Protection Areas within the Government Center/Markets District. (Id. sec. 45-5.)

### *PDA Development Plan*

The Project is located within a subarea ("PDA III") of the Government Center/Markets District within which a Planned Development Area (PDA) may be designated. (Boston Zoning Map; Boston Zoning Code sec. 45-9.1.) The purposes of a PDA in this district are: to establish a more flexible zoning law and encourage large-scale redevelopment, while insuring high-quality design by providing planning and design controls; and to encourage development which knits together the surrounding neighborhoods through a new urban design for the area. (Id. sec. 45-9.) The PDA Development Plan for the Project will set forth the proposed location and appearance of structures, open spaces and landscaping, proposed uses of the area, densities, proposed traffic circulation, parking and loading facilities, and access to public transportation, and proposed dimensions of structures. (See id. sec. 80C-3.1.)

### *Off-Street Parking and Loading*

Off-street parking and loading for the Project will be determined through the Large Project Review process. The Project will result in approximately 682 parking spaces. The Project will include 402 self-parked spaces, and the remaining 280 vehicles will be accommodated by valet service, including the possible use of mechanical stackers. Residents of the Project will have access to the public parking garage, including by possible leasing spaces.

### *Barrier-Free Access (Article 30)*

The purposes of Article 30 of the Boston Zoning Code (Barrier-Free Access) are to ensure that physically handicapped persons have full access to buildings open to the public; to afford such persons the educational, employment, and recreational opportunities necessary to all citizens; and to preserve and increase the supply of living space accessible to physically handicapped persons. (Section 30-1.) The uses proposed under the Project are subject to the provisions Article 30. (Section 30-3.) The Project is designed to comply.

### *Green Buildings (Article 37)*

The purposes of Article 37 (Green Buildings) are: to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in Boston. (Section 37-1.) The Project is subject to the requirements of Article 37 because it is subject to Large Project Review. (Section 37-3.) The Project will comply. The Proponent is committed to developing a LEED-certifiable project, incorporating sustainable design features into the Project to preserve and protect the environment.

### *1.5.2 Urban Renewal*

The Project site is designated as Parcel E-8 of the Downtown Waterfront-Faneuil Hall Urban Renewal Area, created in 1964. The existing building was developed in accordance a Land Disposition Agreement (LDA) between the original developer and the then Boston Redevelopment Authority, dated July 29, 1979. The Proponent anticipates that the changes to the site under the Project will require a minor modification to the Downtown Waterfront-Faneuil Hall Urban Renewal Plan, and entering with the BPDA into an amendment to the LDA.

### *1.5.3 Inclusionary Affordable Housing*

The Project is subject to the Mayor's Executive Order regarding inclusionary affordable housing, dated February 29, 2000, as amended, as well as the BPDA's Inclusionary Development Policy (IDP). The Proponent plans to set aside thirteen percent (13%) of the approximately 195 dwelling units at the Project as IDP units.

## 1.6 Legal Information

### *1.6.1 Legal Judgments Adverse to the Proposed Project*

The Proponent is not aware of any legal judgments in effect or legal actions pending that would prevent the Proponent from undertaking the Project.

### *1.6.2 History of Tax Arrears on Property*

No property owned in the City of Boston by the Proponent is in tax arrears to the City of Boston.

### *1.6.3 Site Control/ Public Easements*

The Proponent holds fee simple title to the site under a Quitclaim Deed recorded on September 20, 2017, at the Suffolk County Registry of Deeds in Book 58550, at Page 137. A site survey, including a metes-and-bounds description is provided in Appendix B.

## 1.7 Anticipated Permits

Table 1-2 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project, based on currently available information. It is possible that only some of these permits or actions will be required, or that additional permits or actions will be required.

**Table 1-2 Anticipated Permits and Approvals**

| Agency | Permit, Review or Approval |
|---|---|
| *Federal Agencies* | |
| United States Environmental Protection Agency | NPDES General Permits |
| United States Federal Aviation Administration | Determination of No Hazard (construction crane) |
| *State Agencies* | |
| Massachusetts Department of Environmental Protection, Division of Air Quality Control | Notification prior to construction |
| *City Agencies* | |
| Boston Air Pollution Control Commission | Parking Freeze Permit |
| Boston Civic Design Commission | Schematic Design Review |
| Boston Committee on Licenses/Public Safety Commission | Parking Garage Permit<br>Flammable Storage License (parking garage) |
| Boston Fire Department | Approval of Fire Safety Equipment |
| Boston Inspectional Services Department | Building and Occupancy Permits |
| Boston Parks & Recreation Commission | Application to Erect Structure within 100 Feet of a Park |
| Boston Planning & Development Agency | Large Project Review (Section 80B)<br>Affordable Housing Agreement & Restriction<br>Cooperation Agreement<br>Boston Residents Construction Employment Plan<br>PDA Development Plan (Section 80C) |
| Boston Public Improvement Commission | Specific Repairs (sidewalks)<br>License, Maintenance, and Indemnification Agreement |
| Boston Transportation Department | Transportation Access Plan Agreement<br>Construction Management Plan<br>Street and Sidewalk Occupant Permits |
| Boston Water and Sewer Commission | Water and Sewer Connection Permits<br>General Service Application<br>Site Plan Review<br>Infiltration and Inflow (I&I) Fee |
| Boston Zoning Commission | PDA Development Plan (Section 80C) |

## 1.8 Public Participation

As part of its planning efforts, the Proponent has reached out to nearby residents and representatives of numerous neighborhood groups, elected officials, and public agencies. The formal community outreach begins with the filing of this PNF.

The Proponent continues to be committed to a comprehensive and effective community outreach and will continue to engage the community to ensure public input on the Project. The Proponent looks forward to working with the BPDA and city agencies, local officials, neighbors, and others as the design and review processes move forward.

## 1.9 Schedule

It is anticipated that construction will commence in the second quarter of 2019. Once begun, construction is expected to last approximately 24 months and finish in the second quarter of 2021.

# Chapter 2.0

Transportation

# 2.0 TRANSPORTATION

The Transportation study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. Results of the transportation study show that with the Project, all of the intersections and approaches studied are expected to continue to operate at acceptable levels of service or remain at the same level of service as the No-Build (2024) Condition.

## 2.1 Project Description

The Project site is located at 20 Clinton Street in downtown Boston. The site is on a triangular lot bounded by the John F. Fitzgerald Surface Road to the northeast, North Street to the west, and Clinton Street to the south. The site is improved with a seven-story brick building containing the Dock Square Parking Garage, with a total of 698 parking spaces, and a retail space consisting of approximately 15,000 sf containing the Hard Rock Café. Additionally, the site contains a small plaza to the west of the building.

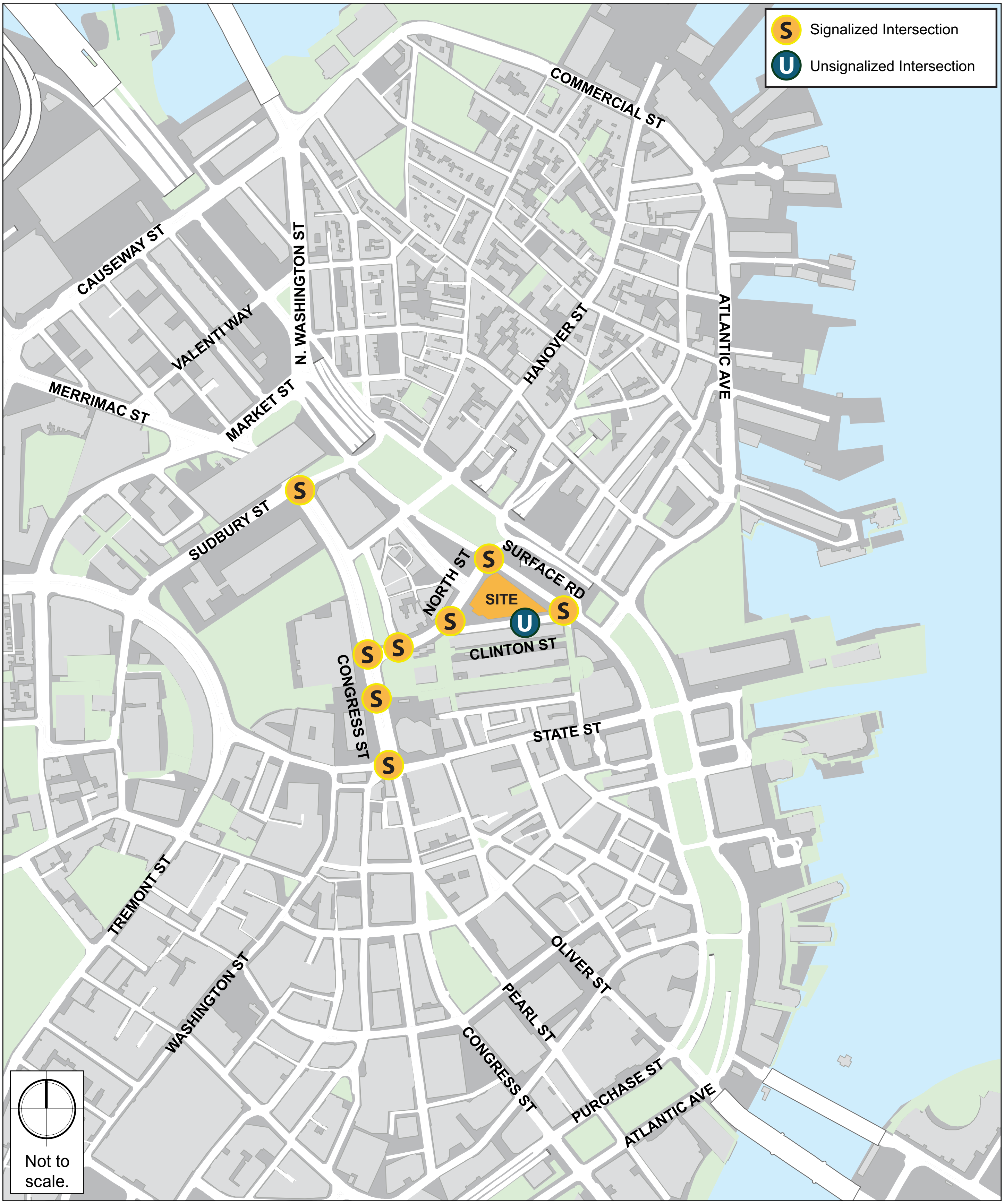
The proposed Project will reduce the current 698 publicly available garage parking spaces to 682 spaces, maintain approximately 8,000 sf of retail space, and will include the construction of 195 new residential units above the existing garage. The residential units will be located on floors 8 to 17 and consist of a mix of studios and one- to four-bedroom units. Of the approximately 682 parking spaces, approximately 280 will be provided via valet parking services and/or automated mechanical lifts.

Primary access to the parking garage will be provided via the existing Dock Square Parking Garage entrance along Clinton Street. Additionally, a residential pick-up/drop-off area will be provided to the west of the building connecting Clinton Street and North Street. Pedestrian access to the site will be provided along Clinton Street and at the pick-up/drop-off area to the west of the building.

### *2.1.1 Study Area*

The transportation study area runs along the Congress Street and Surface Road corridors, bounded by Congress Street to the west, Sudbury Street to the north, Surface Road to the east, and State Street to the south. The study area consists of the following seven intersections in the vicinity of the Project site, also shown on Figure 2-1:

- Surface Road/North Street/I-93 NB Off Ramp (signalized);
- Surface Road/Clinton Street/I-93 SB Off Ramp (signalized);
- North Street/Clinton Street/Hotel Driveway (signalized);
- Congress Street/North Street/Union Street/City Hall Driveway (signalized);




**Dock Square Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

**Figure 2-1**
*Study Area Intersections*

- Congress Street/Sudbury Street (signalized);
- Congress Street/State Street/Devonshire Street (signalized); and
- Clinton Street/Dock Square Garage (unsignalized).

### *2.1.2 Study Methodology*

The transportation study and its supporting analyses were conducted in accordance with BTD guidelines, and are described below.

The Existing (2017) Condition analysis includes an inventory of the existing transportation conditions that was undertaken in the fall of 2017 such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected at the study area intersections. A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2024, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2024) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project site.

The Build (2024) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates and to the traffic volumes developed as part of the No-Build (2024) Condition analysis. The transportation study identified expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Project.

An evaluation of short-term traffic impacts associated with construction activities is also provided.

## 2.2 Existing Condition

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular and pedestrian volumes, average daily traffic volumes, public transportation availability, parking, curb usage, and loading conditions.

### *2.2.1 Existing Roadway Conditions*

The study area includes the following roadways, which are categorized according to the Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning functional classifications:

*Congress Street* is classified as an urban principal arterial under BTD jurisdiction located to the west of the Project site. Congress Street generally runs in a north-south direction between New Chardon Street to the north and Northern Avenue in the Seaport District to the south. Within the study area, Congress Street consists of three travel lanes in each direction. Sidewalks are provided along both sides of Congress Street. Parking is not permitted along either side of Congress Street.

*Sudbury Street* is classified as an urban principal arterial under BTD jurisdiction located to the north of the Project site. Sudbury Street runs one-way northeast-bound between Cambridge Street and Cross Street. Sudbury Street generally consists of two travel lanes, but widens at intersections (Congress Street and Surface Road) to include turning lanes. Sidewalks are provided along both sides of Congress Street and parallel and angled parking is provided along Sudbury Street; the diagonal parking is generally reserved for the Boston Police Department and the District Attorney.

*John F. Fitzgerald Surface Road (Surface Road)* is an urban principal arterial roadway under MassDOT jurisdiction located adjacent to the northeast of the Project site. Surface Road runs one-way southeast-bound along the subsurface John F. Fitzgerald Expressway (I-93) between North Washington Street and Purchase Street. Within the study area, Surface Road consists of two travel lanes and a bike lane, but generally consists of three travel lanes and a bike lane further south. Parking is not permitted along either side of the roadway, however tour buses can park during restricted hours. Sidewalks are typically provided along the western side of Surface Road and the Rose Fitzgerald Kennedy Greenway is located to the east side, providing a linear pedestrian park.

*North Street* is classified as an urban minor arterial roadway under BTD jurisdiction located to the south of the Project site. North Street runs in an east-west direction between Congress Street to the west and Surface Road to the east. North Street consists of two lanes in the westbound direction, two lanes in the eastbound direction west of Clinton Street, and one lane in the eastbound direction east of Clinton Street. Sidewalks are provided along both sides of North Street. Parking is restricted along both sides of North Street within the study area.

*Clinton Street* is classified as an urban minor arterial roadway under BTD jurisdiction located to the southeast of the Project site. Clinton Street runs in an east-west direction between North Street to the west and Surface Road to the east. Clinton Street consists of two travel lanes and is one-way in the westbound direction. Sidewalks are provided along both sides of Clinton Street. Parking is allowed along the south side of Clinton Street.

*Union Street* is classified as a local roadway under BTD jurisdiction located to the west of the Project site. Union Street runs in a north-south direction between Hanover Street to the north and North Street to the south. Union Street consists of a single lane of travel and is one-way in the northbound direction. Sidewalks and on-street parking are provided along both sides of Union Street.

*State Street* is an urban principal roadway under BTD jurisdiction located to the south of the Project site. State Street runs one-way in the westbound direction between Washington Street to the east and Atlantic Avenue to the west. State Street generally consists of two travel lanes and a parking lane. Parking is provided along the north side of the street.

*Devonshire Street* is an urban minor arterial roadway under BTD jurisdiction located to the southwest of the Project site. Devonshire Street runs one-way in the southbound direction between State Street to the north and Franklin Street to the south and changes to one-way in the northbound direction from Summer Street in the south to Franklin Street in the north. Devonshire Street generally consists of one travel lane marked with Sharrows. Sidewalks and on-street parking is provided along both sides of the street.

### *2.2.2 Existing Intersection Conditions*

Existing conditions at the study area intersections are described below.

*Surface Road/North Street/I-93 Northbound Off-Ramp* is a four-legged, signalized intersection with three approaches. The North Street eastbound approach consists of a single channelized right-turn only lane. The I-93 Northbound Off-Ramp westbound approach consists of two lanes, a shared left-turn/through lane and a through only lane. The Surface Road southbound approach consists of two lanes, a through lane and a shared through/right-turn lane and bicycle lane. Sidewalks are provided along both sides of Surface Road and North Street. Pedestrians are prohibited from the I-93 Northbound Off-Ramp. Crosswalks and pedestrian signals are provided for all crossings except across the southeast side of the intersection. A parking lane for tour buses is provided along the Surface Road southbound approach.

*Surface Road/Clinton Street/I-93 Southbound Off-Ramp* is a four-legged, signalized intersection with two approaches. The I-93 Southbound Off-Ramp westbound approach consists of three lanes, a left-turn only lane, a shared through/left-turn lane, and a through only lane. The Surface Road southbound approach consists of three lanes, two through only lanes and a shared through/right-turn lane. Sidewalks are provided along both sides of Surface Road and Clinton Street. Pedestrians are prohibited from the I-93 Southbound Off-Ramp. Crosswalks and pedestrian signals are provided for all crossings except across the southeast side of the intersection. Commercial vehicle parking is allowed along the south side of Clinton Street.

*North Street/Clinton Street/Hotel Driveway* is a four-legged, signalized intersection with four approaches. The North Street eastbound approach consists of a single shared left/through lane. The North Street westbound approach consists of two lanes, a through only lane and a shared through/right-turn lane. The Clinton Street northbound approach consists of two lanes, a left-turn only lane and a shared left/through/right-turn lane. The Hotel Driveway southbound approach functions as two lanes, a left-turn only lane and a right-turn only lane. Sidewalks are provided along both sides of North Street and Clinton Street. Crosswalks and pedestrian signals are provided across the west and south crossings. Pedestrians cross the hotel driveway without a signal at sidewalk level. There is a cab stand on the southerly side of Clinton Street at the northbound approach. Commercial vehicle parking is allowed along the southwest side of Clinton Street.

*Congress Street/North Street/City Hall Driveway* is a four-legged, signalized intersection. The North Street westbound approach consists of an exclusive left-turn lane and a shared left-turn/right-turn lane. No parking lane is provided on either side of North Street. Opposite from North Street, a driveway for City Hall pick-up and drop-off also uses the signal at this intersection. The Congress Street northbound and southbound approaches consist of three travel lanes each with left and right turns permitted. Sidewalks are provided along both sides of North Street and Congress Street. Crosswalks are provided for all crossings and pedestrian signals are provided for all crossings except the west crossing of the City Hall driveway.

*North Street/Congress Street/Union Street* is a cluster of three intersections consisting of the North Street/Congress Street intersection, the North Street/Union Street intersection, and the Congress Street/Pedestrian Crossing intersection. These three intersections will be treated as one intersection for the remainder of chapter 2.

The North Street/Congress Street intersection has four-legs and four approaches. The City Hall Garage eastbound approach consists of one shared left-turn/through/right-turn lane. The North Street westbound approach consists of two lanes, a left-turn only lane, and a shared left-turn/through/right-turn lane. The Congress Street northbound and southbound approaches each consist of three lanes, one shared left-turn/through lane, one through only lane, and one shared through/right-turn lane. Crosswalks with pedestrian signal equipment and curb ramps are provided across all intersection approaches.

The North Street/Union Street intersection has three legs and two approaches. The North Street eastbound approach consists of two lanes, a shared left-turn/through lane, and a through only lane. The North Street westbound approach consists of two lanes, a through lane, and a shared through/right-turn lane. Crosswalks with pedestrian signal equipment and curb ramps are provided across the north and east legs of the intersection.

The Congress Street/Pedestrian Crossing intersection has two legs with two approaches. The Congress Street northbound and southbound approaches each consist of three through lanes. A signalized crossing allows pedestrians to cross Congress Street.

*Sudbury Street/Congress Street* is a four-legged, signalized intersection with three approaches. The Sudbury Street eastbound approach consists of three lanes, a left-turn only lane, a through only lane, and a shared through/right-turn lane. The Congress Street northbound approach consists of three lanes, two through only lanes and a shared through/right-turn lane. The Congress Street southbound approach consists of four lanes, a left-turn only lane and three through only lanes. Angled parking is provided for Boston Police Department vehicles along the north side of Sudbury Street. Sidewalks and crosswalks with pedestrian signal equipment and curb ramps are provided across all roadways.

*Congress Street/State Street/Devonshire Street* is a five-legged, signalized intersection with three approaches. The State Street westbound approach consists of three lanes, a left-turn only lane, a shared left-turn/bear-left/through lane and a through only lane. The Congress Street northbound approach consists of two through only lanes. The Congress Street southbound approach consists of three lanes, a through only lane, a shared through/bear-right/right-turn lane, and a right-turn only lane. Crosswalks, pedestrian signal equipment, and curb ramps are provided across all the approaches to the intersection. There is a cab stand on the north side of the State Street approach. Parking is prohibited along all other approaches.

*Clinton Street/Dock Square Garage* is a three-legged, unsignalized intersection with two approaches. The Clinton Street westbound approach consists of a shared through/right-turn lane. The Dock Square Garage driveway southbound approach consists of a right-turn only lane. There is a crosswalk provided across the southbound approach. On-street parking for commercial vehicles is provided along the south side of Clinton Street.

### *2.2.3 Existing Parking*

An inventory of the existing on-street parking in the vicinity of the Project was collected. On-street parking surrounding the Project site consists of predominately cab/valet stands, commercial parking and loading areas, and residential restricted parking. The on-street parking regulations within the study area are shown in Figure 2-2.

#### 2.2.3.1 Car Sharing Services

Car sharing enables easy access to short-term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period, and returned to their designated location.

Zipcar is the primary company in the Boston car sharing market. There are currently nine Zipcar locations close to the Project site. The nearby car sharing locations are shown in Figure 2-3.

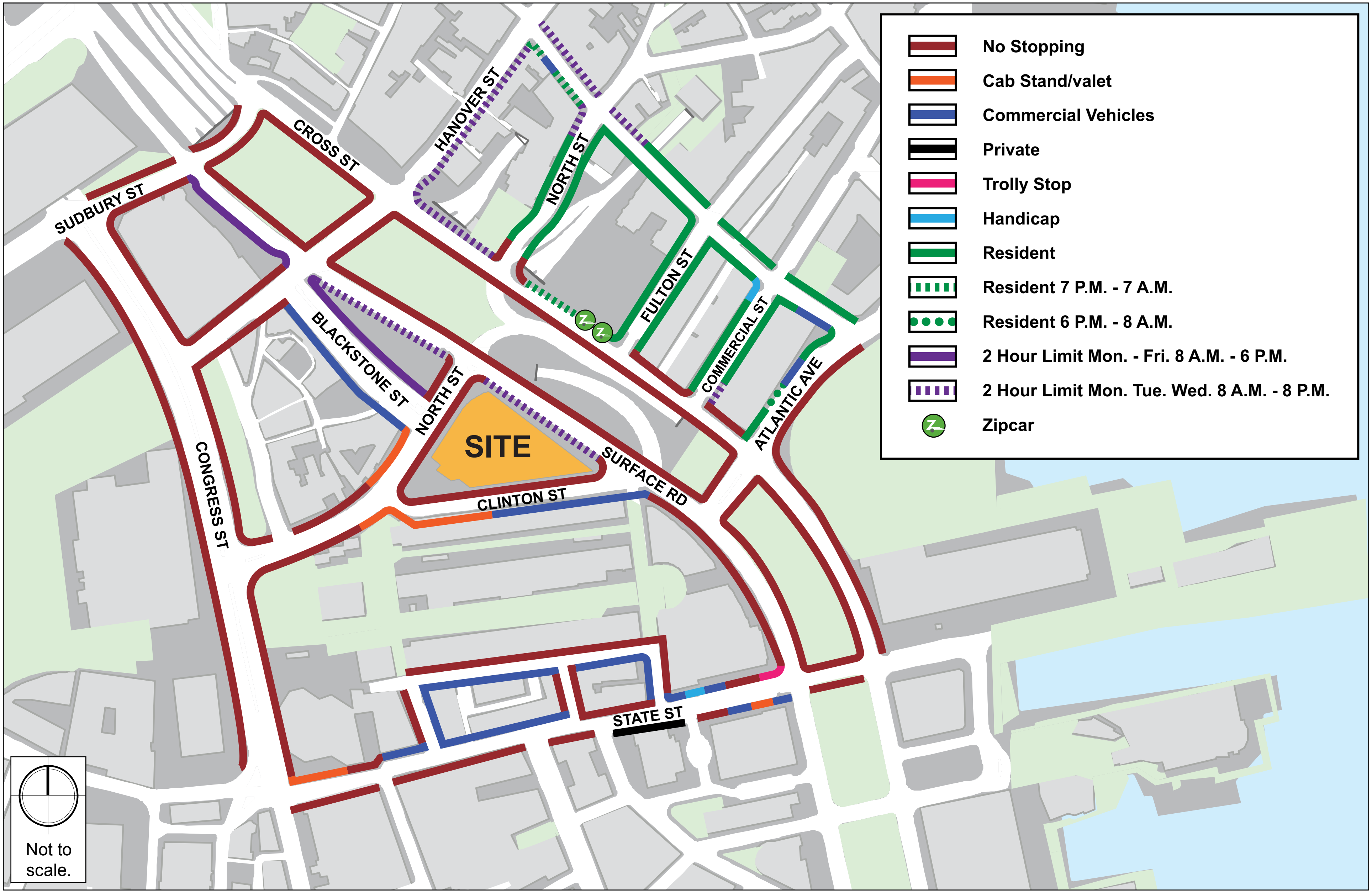



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**Figure 2-2**
*On-street Parking*


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**Figure 2-3**
*Car Sharing Services*

### *2.2.4 Existing Traffic Data*

Traffic volume data was collected at the seven study area intersections on November 16, 2017. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. peak period and the weekday p.m. peak period (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Appendix C.

#### 2.2.4.1 Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the November 2017 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is 0.97. This indicates that average month traffic volumes are approximately three percent less than the traffic volumes that were collected. Therefore, the traffic counts were not adjusted downward to reflect average month conditions, and provide a conservatively high analysis consistent with the peak season traffic volumes. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix C.

#### 2.2.4.2 Existing Vehicular Traffic Volumes

The existing traffic volumes that were collected in November 2017 were balanced through the network, and then used to develop the Existing (2017) Condition traffic volumes. The Existing (2017) weekday a.m. and p.m. peak hour traffic volumes are shown in Figure 2-4 and Figure 2-5, respectively.

### *2.2.5 Existing Bicycle Volumes and Accommodations*

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is conveniently located in close proximity to several bicycle facilities. The City of Boston's "Bike Routes of Boston" map shows Congress Street, Cambridge Street, Merrimac Street, Cross Street, and Martha Road are designated as advanced bike routes suitable for experienced and traffic-confident cyclists. State Street, Causeway Street, Commercial Street, and Endicott Street are designated as intermediate routes, suitable for riders with some on-road experience. The pathway from Chatham Street to North Street between Faneuil Hall and the Quincy Marketplace, Thoreau Path in Charles River Park, and the pathway through North Station to the Charles River bike paths are shared-use bike paths designated as beginner routes designated for children and riders with no experience.

Additionally, the Connect Historic Boston (phase one) cycle track has been recently completed. Connect Historic Boston is a two-way cycle track that creates a family-friendly, low-stress bicycle route that makes a full circuit of downtown. Phase one included a

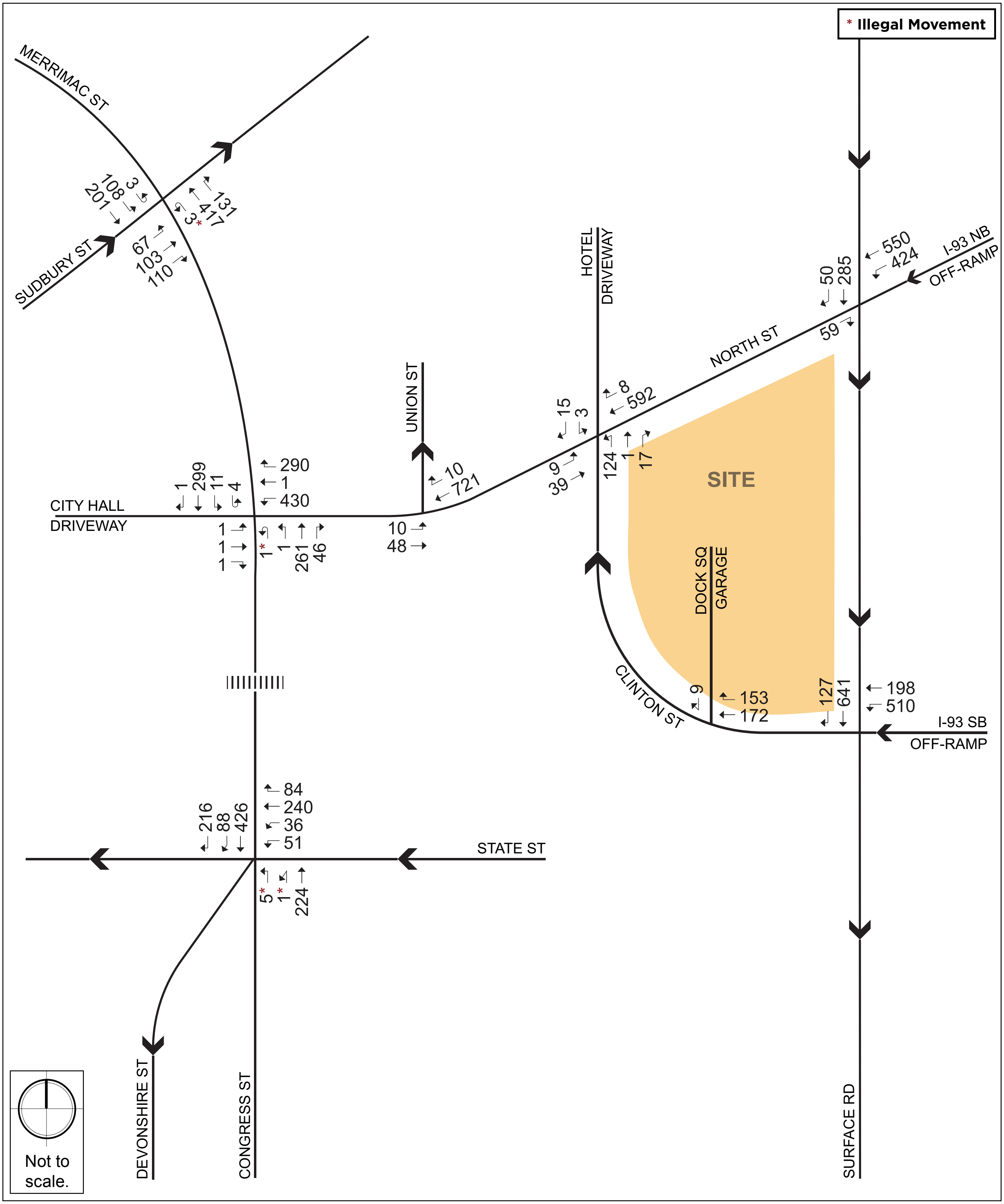


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**Figure 2-4**
*Existing (2017) Condition Traffic Volumes, Weekday a.m. Peak Hour*

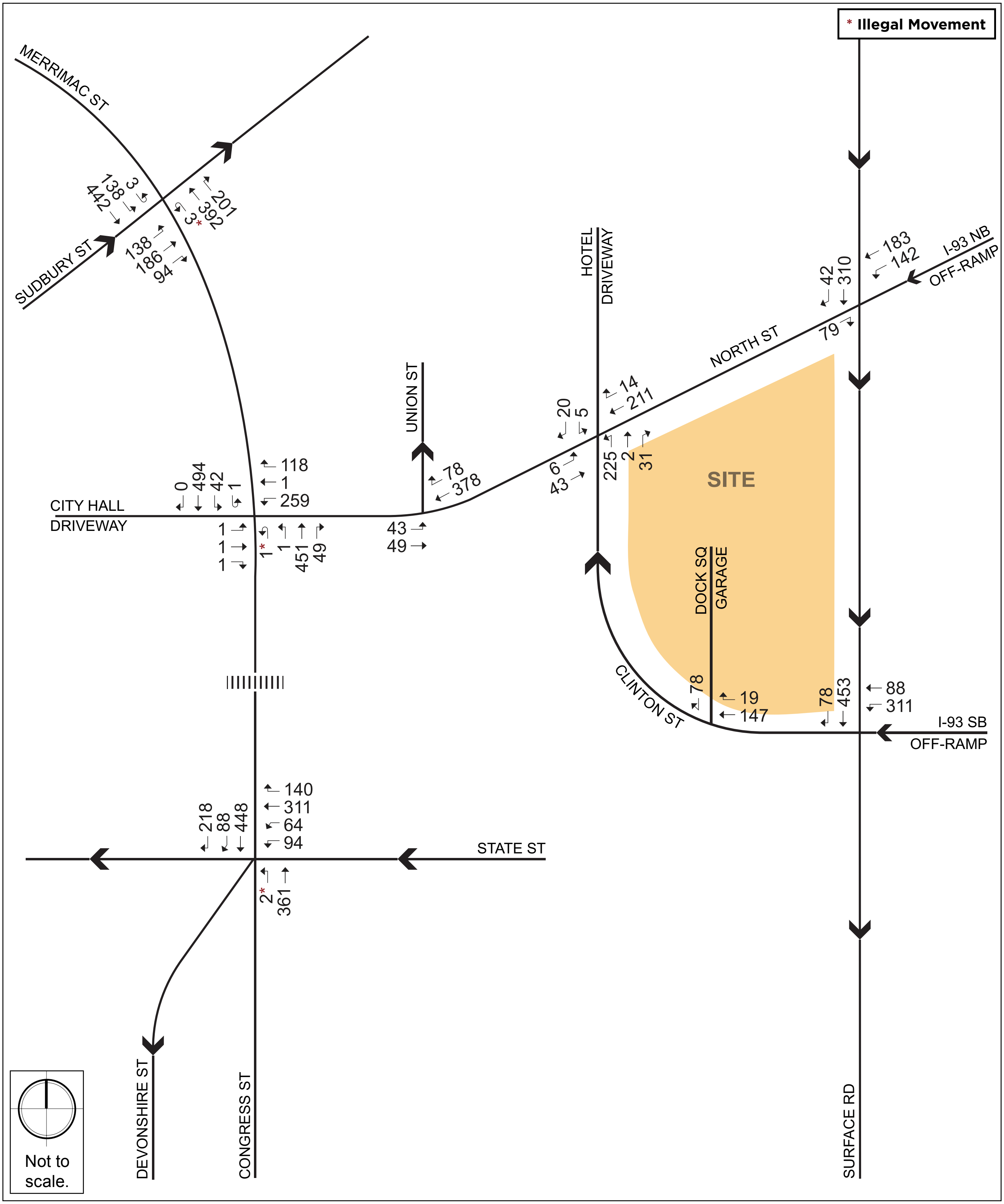


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**Figure 2-5**

*Existing (2017) Condition Traffic Volumes, Weekday p.m. Peak Hour* grade-separated, protected cycle track along Staniford Street, Causeway Street, Commercial Street, and Atlantic Avenue. The remaining connections will include a reconstruction of the Blackstone Block, Constitution Road in Charlestown, and Joy Street, with later connections to South Station and Park Street

Bicycle counts were conducted concurrent with the vehicular TMCs and are presented in Figure 2-6. As shown in the figure, bicycle volumes are heaviest along the Surface Road and Congress Street during the peak periods.

#### 2.2.5.1 Bicycle Sharing Services

The site is also located in proximity to bicycle sharing stations provided by Hubway. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 185 stations and 1,800 bicycles in four municipalities. As shown in Figure 2-7 there are eight Hubway locations in proximity of the Project site.

### *2.2.6 Existing Pedestrian Volumes and Accommodations*

In general, sidewalks are provided along all roadways and are generally in good condition. Almost all of the sidewalks in the vicinity are concrete or brick. Faneuil Hall, a pedestrian mall and tourist destination, is located to the south of the Project site. Additionally, Christopher Columbus Park and the Greenway are located to the east.

To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersections and are presented in Figure 2-8. As shown in the figure, pedestrian activity is heavy throughout the study area.

### *2.2.7 Existing Public Transportation Services*

The Project site is located less than 1,000 feet from the Haymarket Station, which provides connections to Orange Line, Green Line and many local and regional bus routes, and State Street Station, which provides connections to Orange Line and Blue Line. Additionally, North Station is located within a quarter-mile of the Project site. North Station provides access to the MBTA's regional commuter rail trains serving the northern and northwestern suburbs of Boston. Table 2-1 provides a brief summary of all routes. A map of nearby public transportation facilities is shown on Figure 2-9.

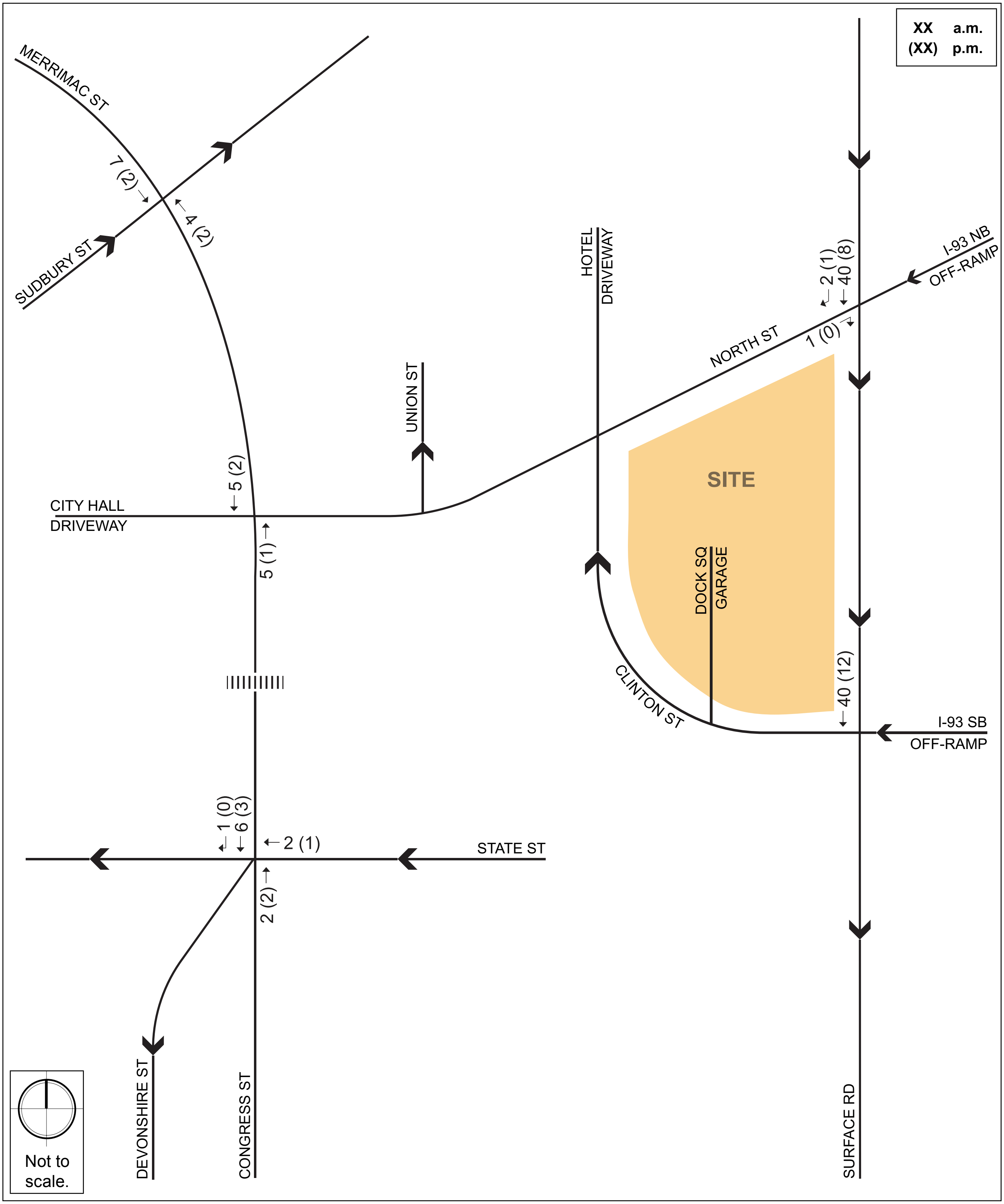


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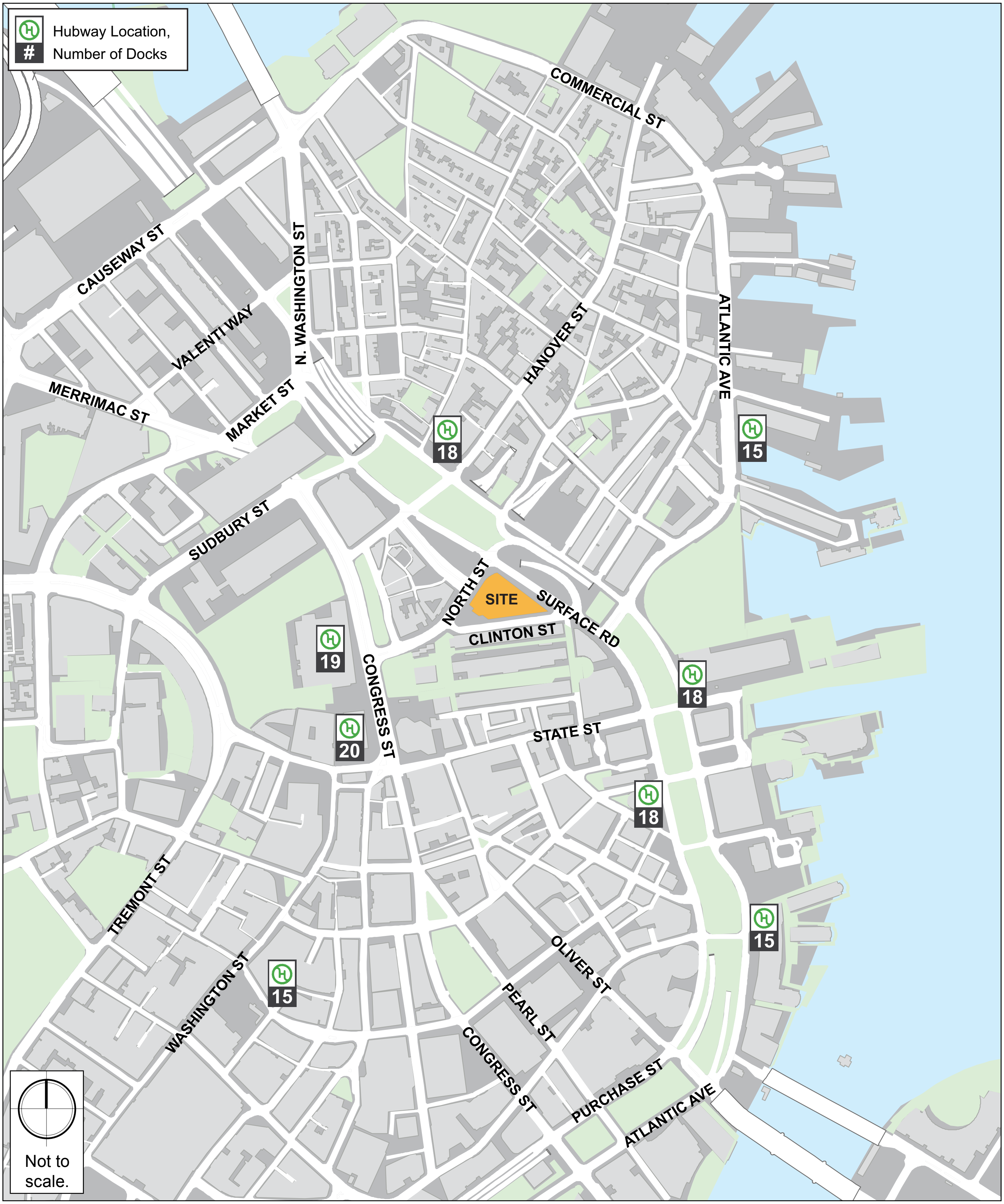
**Figure 2-6**
*Existing (2017) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours*




**Dock Square** **Boston, Massachusetts**

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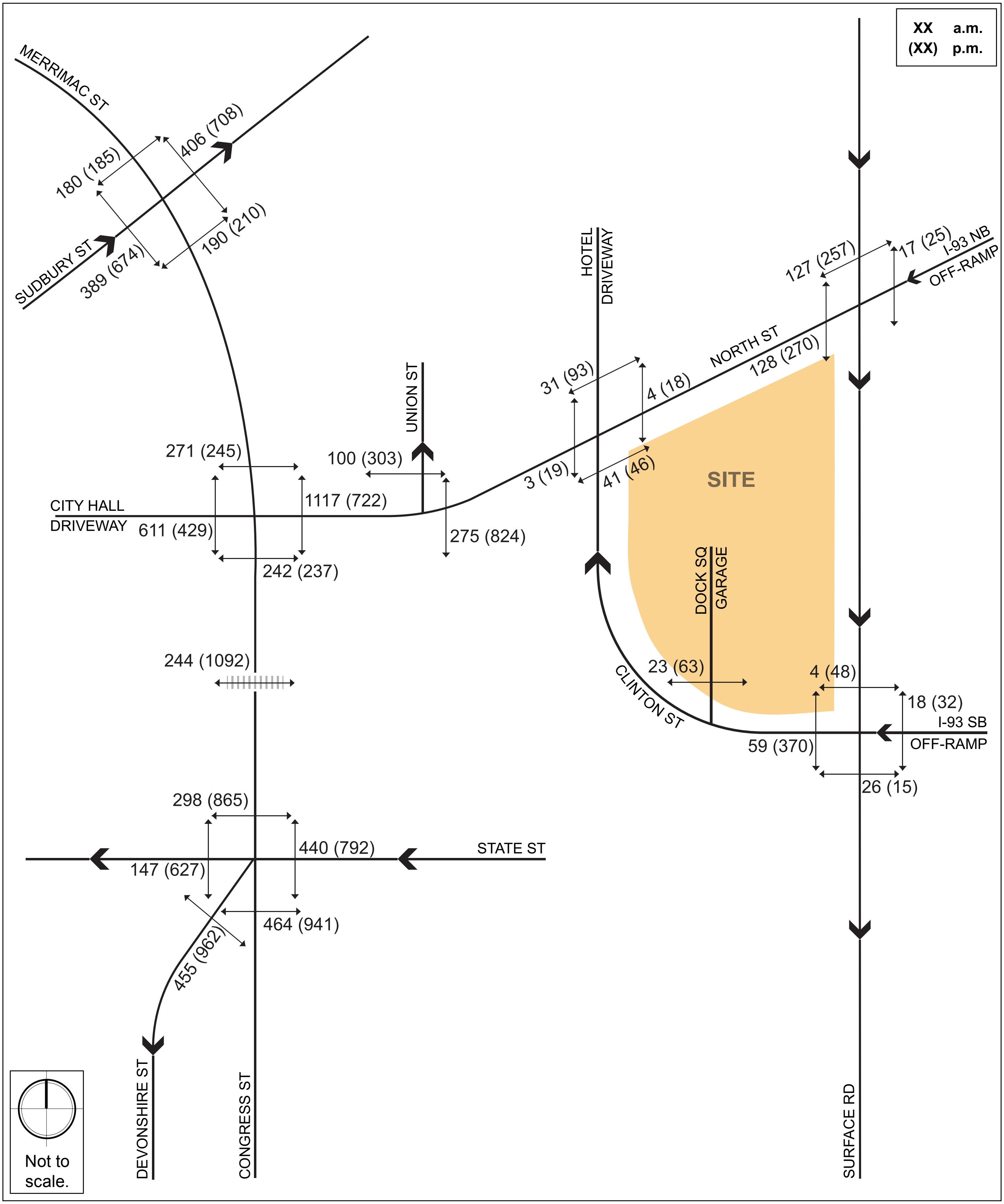
**Figure 2-7**
*Bike Sharing Services*




**Dock Square Boston, Massachusetts**



**Figure 2-8**

*Existing (2017) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours*


**Dock Square** **Boston, Massachusetts**

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**Figure 2-9**
*Public Transportation*

### Table 2-1 Existing Public Transportation Service Summary

| Transit Service | Description | Rush-hour Headway (minutes)* |
|---|---|---|
| | **Rapid Transit** | |
| Orange Line | Forest Hills–Oak Grove | 6 |
| Blue Line | Bowdoin–Wonderland | 6 |
| Green Line | B Branch – Boston College – Lechmere<br>C Branch – Cleveland Circle - Lechmere<br>D Branch – Riverside - Lechmere<br>E Branch – Heath Street – Lechmere | 6–7 |
| | **Local Bus Routes** | |
| Route 4 | North Station – Tide Street | 11-15 |
| Route 92 | Assembly Square Mall – Downtown Boston | 15-18 |
| Route 93 | Sullivan Square Station – Downtown Boston | 7–8 |
| Route 111 | Woodlawn or Broadway & Park Avenue – Haymarket Station | 7-10 |
| | **Express Bus Routes** | |
| Route 325 | Elm Street, Medford – Haymarket Station | 15-20 |
| Route 326 | West Medford – Haymarket Station | 12-20 |
| Route 352 | Express Bus-Burlington – Boston | 20-30 |
| Route 354 | Express Bus-Woburn – Boston | 15-20 |
| Route 424 | Eastern Ave/Essex St. – Haymarket or Wonderland | 30 |
| Route 426 | Central Sq. Lynn – Haymarket or Wonderland | 15-20 |
| Route 428 | Oaklandvale – Haymarket Station | 30-40 |

* Headway is the time between buses.

### *2.2.9 Existing (2017) Condition Traffic Operations Analysis*

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 9) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2010 Highway Capacity Manual (HCM).

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-2 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay. LOS D or better is typically considered desirable during the peak hours of traffic in urban and suburban settings.

## Table 2-2 Vehicle Level of Service Criteria

| Level of Service | Average Stopped Delay (seconds/vehicle) | |
|---|---|---|
| | Signalized Intersections | Unsignalized Intersections |
| A | ≤10 | ≤10 |
| B | >10 and ≤20 | >10 and ≤15 |
| C | >20 and ≤35 | >15 and ≤25 |
| D | >35 and ≤55 | >25 and ≤35 |
| E | >55 and ≤80 | >35 and ≤50 |
| F | >80 | >50 |

Source: 2010 Highway Capacity Manual, Transportation Research Board.

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes these other calculated measures.

The volume-to-capacity ratio (v/c ratio) is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour, and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a “worst case” condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Table 2-3 and Table 2-4 summarize the Existing (2017) Condition capacity analysis for the study area intersection during the weekday a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

Table 2-3 Existing (2017) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **12.1** | - | - | - |
| North Street EB right | A | 1.7 | 0.07 | 5 | 6 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 12.4 | 0.51 | 186 | 236 |
| Surface Road SB thru \| thru/right | B | 13.1 | 0.40 | 48 | 73 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **29.1** | - | - | - |
| I-93 SB Off-Ramp WB left | C | 26.5 | 0.51 | 184 | 276 |
| I-93 SB Off-Ramp WB left/thru | C | 25.3 | 0.48 | 188 | 278 |
| Surface Road SB thru \| thru \| thru/right | C | 31.9 | 0.64 | 154 | 197 |
| **North Street/Clinton Street/Hotel Driveway** | **B** | **17.3** | - | - | - |
| North Street EB left/thru | D | 38.5 | 0.08 | 38 | 75 |
| North Street WB thru \| thru/right | B | 11.4 | 0.39 | 151 | 195 |
| Clinton Street NB left | D | 36.2 | 0.22 | 48 | m81 |
| Clinton Street NB left/thru/right | D | 36.2 | 0.22 | 48 | m80 |
| Hotel Driveway SB left | D | 39.7 | 0.01 | 2 | 10 |
| Hotel Driveway SB right | A | 0.4 | 0.06 | 0 | 0 |
| **Congress Street/North Street/City Hall Driveway** | **B** | **18.3** | - | - | - |
| City Hall Driveway EB left/through/right | C | 23.7 | 0.01 | 1 | 8 |
| North Street WB left | C | 21.3 | 0.83 | 26 | #413 |
| North Street WB left/thru/right | A | 8.8 | 0.59 | 8 | 61 |
| Congress Street NB left/thru \| thru \| thru/right | A | 2.2 | 0.40 | 0 | 4 |
| Congress Street SB left/thru \| thru \| thru/right | D | 40.4 | 0.47 | 74 | 104 |
| **North Street/Union Street** | **B** | 15.7 | - | - | - |
| North Street EB left | A | 0.8 | 0.02 | 0 | m1 |
| North Street EB thru | A | 2.1 | 0.05 | 1 | 2 |
| North Street WB thru \| thru/right | B | 17.0 | 0.63 | 105 | 126 |
| **Congress Street/Pedestrian Crossing** | **A** | **8.8** | - | - | - |
| Congress Street NB thru \| thru \| thru | C | 27.7 | 0.61 | 37 | 88 |
| Congress Street SB thru \| thru \| thru | A | 0.8 | 0.24 | 1 | m1 |

Table 2-3 Existing (2017) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **Congress Street/Sudbury Street** | **C** | **29.5** | **-** | **-** | **-** |
| Sudbury Street EB left | D | 46.1 | 0.26 | 47 | 92 |
| Sudbury Street EB thru \| thru | D | 43.9 | 0.20 | 37 | 64 |
| Sudbury Street EB right | B | 14.6 | 0.47 | 0 | 55 |
| Congress Street NB thru \| thru \| thru/right | C | 26.4 | 0.38 | 110 | 146 |
| Congress Street SB left | E | 65.2 | 0.67 | 92 | m111 |
| Congress Street SB thru \| thru \| thru | B | 14.2 | 0.09 | 34 | m42 |
| **Congress Street/State Street/Devonshire Street** | **C** | **20.7** | **-** | **-** | **-** |
| State Street WB left | C | 31.2 | 0.13 | 29 | 61 |
| State Street WB bear-left/ thru \| thru/ right | C | 33.2 | 0.49 | 107 | 156 |
| Congress Street NB thru \| thru | B | 12.8 | 0.21 | 32 | 45 |
| Congress Street SB thru \| thru/bear-right | B | 16.4 | 0.47 | 134 | 167 |
| Congress Street SB right | B | 15.8 | 0.38 | 96 | 143 |
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | **-** | **-** | **-** | **-** | **-** |
| Clinton Street thru \| thru/right | A | 0.0 | 0.20 | - | 0 |
| Dock Square Garage SB right | A | 9.9 | 0.02 | - | 1 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
Grey shading indicates LOS E or LOS F under the Existing (2017) Condition.

Table 2-4 Existing (2017) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **16.9** | **-** | **-** | **-** |
| North Street EB right | B | 16.9 | 0.13 | 34 | 64 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 17.7 | 0.24 | 74 | 105 |
| Surface Road SB thru \| thru/right | B | 16.1 | 0.27 | 94 | 145 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **27.2** | **-** | **-** | **-** |
| I-93 SB Off-Ramp WB left | C | 31.9 | 0.37 | 114 | 184 |
| I-93 SB Off-Ramp WB left/thru | C | 30.1 | 0.34 | 113 | 181 |
| Surface Road SB thru \| thru \| thru/right | C | 24.3 | 0.33 | 91 | 117 |

Table 2-4 Existing (2017) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **North Street/Clinton Street/Hotel Driveway** | **C** | **24.0** | **-** | **-** | **-** |
| North Street EB left/thru | C | 20.7 | 0.10 | 26 | 46 |
| North Street WB thru \| thru/right | C | 20.7 | 0.20 | 51 | 79 |
| Clinton Street NB left | C | 29.1 | 0.31 | 66 | 103 |
| Clinton Street NB left/thru/right | C | 29.5 | 0.31 | 72 | 128 |
| Hotel Driveway SB left | C | 35.0 | 0.02 | 3 | 13 |
| Hotel Driveway SB right | A | 0.5 | 0.07 | 0 | 0 |
| **Congress Street/North Street/City Hall Driveway** | **C** | **29.4** | **-** | **-** | **-** |
| City Hall Driveway EB left/through/right | C | 31.7 | 0.01 | 1 | 9 |
| North Street WB left | C | 25.5 | 0.70 | 28 | #62 |
| North Street WB left/thru/right | B | 11.4 | 0.58 | 5 | 28 |
| Congress Street NB left/thru \| thru \| thru/right | A | 1.2 | 0.39 | 1 | 0 |
| Congress Street SB left/thru \| thru \| thru/right | E | 64.3 | 0.54 | 151 | 191 |
| **North Street/Union Street** | **C** | **31.8** | **-** | **-** | **-** |
| North Street EB left | A | 0.7 | 0.05 | 0 | m0 |
| North Street EB thru | A | 1.0 | 0.04 | 0 | m0 |
| North Street WB thru \| thru/right | D | 37.9 | 0.55 | 143 | 197 |
| **Congress Street/Pedestrian Crossing** | **B** | **11.8** | **-** | **-** | **-** |
| Congress Street NB thru \| thru \| thru | C | 28.2 | 0.54 | 78 | 106 |
| Congress Street SB thru \| thru \| thru | A | 0.8 | 0.24 | 2 | 4 |
| **Congress Street/Sudbury Street** | **C** | **24.1** | **-** | **-** | **-** |
| Sudbury Street EB left | D | 49.7 | 0.54 | 95 | 154 |
| Sudbury Street EB thru \| thru | D | 42.7 | 0.37 | 65 | 97 |
| Sudbury Street EB right | A | 8.5 | 0.39 | 0 | 29 |
| Congress Street NB thru \| thru \| thru/right | B | 11.2 | 0.52 | 42 | 61 |
| Congress Street SB left | E | 78.3 | 0.87 | 101 | m0 |
| Congress Street SB thru \| thru \| thru | B | 11.4 | 0.19 | 56 | m68 |
| **Congress Street/State Street/Devonshire Street** | **C** | **20.8** | **-** | **-** | **-** |
| State Street WB left | C | 31.1 | 0.22 | 53 | 98 |
| State Street WB bear-left/ thru \| thru/ right | D | 36.3 | 0.68 | 162 | 224 |
| Congress Street NB thru \| thru | B | 19.8 | 0.31 | 56 | 80 |
| Congress Street SB thru \| thru/bear-right | A | 9.3 | 0.51 | 88 | 111 |
| Congress Street SB right | A | 9.4 | 0.40 | 61 | 93 |

Table 2-4 Existing (2017) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | - | - | - | - | - |
| Clinton Street thru \| thru/right | A | 0.0 | 0.11 | - | 0 |
| Dock Square Garage SB right | B | 10.3 | 0.12 | - | 10 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
Grey shading indicates LOS E or LOS F under the Existing (2017) Condition.

As shown in Table 2-3 and Table 2-4, the majority of intersections and approaches have acceptable operations (LOS D or better) under the Existing (2017) Condition with the following exception:

- The signalized intersection of **Congress Street/North Street/City Hall Driveway** currently operates at LOS B during the weekday a.m. peak hour and LOS C during the weekday p.m. peak hour. The Congress Street southbound approach operates at LOS E during the weekday p.m. peak hour. The longest queue length at the intersection occurs at the North Street westbound approach during the weekday a.m. peak hour and the Congress Street southbound approach during the weekday p.m. peak hour.

- The signalized intersection of **Congress Street/Sudbury Street** currently operates at LOS C during both the weekday a.m. and p.m. peak hours. The southbound Congress Street exclusive left-turn approach operates at LOS E during the both the weekday a.m. and p.m. peak hours. The longest queue length occurs at the Congress Street northbound approach during the weekday a.m. peak hour and at the Sudbury Street eastbound approach during the weekday p.m. peak hour.

## 2.3 No-Build (2024) Condition

The No-Build (2024) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

### *2.3.1 Background Traffic Growth*

The methodology to account for generic future background traffic growth, independent of this Project, may be affected by changes in demographics, smaller scale development projects, or projects unforeseen at this time. Based on a review of recent and historic traffic data collected recently and to account for any additional unforeseen traffic growth, a traffic growth rate of one-half percent per year, compounded annually, was used.

### *2.3.2 Specific Development Traffic Growth*

Traffic volumes associated with known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. The site-specific background projects are mapped on Figure 2-10. The development projects are summarized below:

**The Merano** – This project, located between Beverly Street and Medford Street, involves the construction of a new, mixed-use project including 209,000 square feet of office space, a 110-room Marriot Town Place for long-term stays, a 170-room Courtyard Marriot for short stays, and 227 parking spaces on-site. The project is currently under construction.

**The Boston Garden** – The mixed-use transit-oriented project currently proposed will include 497 residential units, a 306-room hotel, 810,000 sf of office space, 235,000 sf of retail/restaurant space including a neighborhood grocery store, and over 65,000 sf in expansions to elevators, lobbies, concessions, and an atrium hall for TD Garden and North Station's use. An addition of 800 parking spaces are planned to be added beneath the Project site and will be connected to the existing 1,275 parking space garage underneath the Boston Garden. The project is currently under construction.

**Garden Garage** – This site is located on Martha Road and Lomasney Way on approximately three acres of land at Longfellow Place in Boston's West End. The project will create two new buildings on the site of the existing above-ground Garden Garage. The West Tower will consist of approximately 190 residential apartment units and approximately 3,000 square feet of ground-floor retail and the East Tower will consist of approximately 310 residential apartment units. In addition, the existing 650-space garage will be replaced with an 850-space underground parking structure, resulting in a net increase of 200 new spaces. The project has been approved by the BPDA board.

**Congress Square** – This project will consist of the rehabilitation of the existing office buildings into three components with a mix of ground floor and lower level retail/restaurant uses with either office, residential, or hotel uses on the upper floors. Congress Square includes approximately 458,300 sf of which approximately 92,700 sf is new construction. In addition, 35 residential units will be constructed as well. The project is currently under construction.


Dock Square Boston, Massachusetts



**Figure 2-10**

*Area Developments*

**102-110 Broad Street** – This project will replace the existing uses with 52 new residential condominium units and approximately 3,500 sf of commercial/café space. A total of approximately 35 parking spaces will be located in an underground automated parking structure. The project is currently under construction.

**Bulfinch Crossing** – This project calls for the construction of a 2.4 million sf development including 771 residential units, 204 new hotel rooms, 1.3 million sf of offices, 82,500 sf of retail space and 1,159 parking spaces. The project has been approved by the BPDA board.

**The Haymarket Hotel** – This project consists of a 5 to 6 story hotel containing approximately 225 rooms along with 25,000 sf of ground floor market/retail space. Parking will not be provided on site. A valet service will be provided for both the hotel and restaurant uses and will use the curb along Surface Road adjacent to the site tor operations. The project has been approved by the BPDA board.

**55 India Street** – This project calls for mixed-use development consisting of the construction of a 12-story building containing 44 residential condominium units and approximately 4,000 sf of ground floor retail/restaurant space that will replace the public parking and Zipcar spaces. No parking will be provided on the project site. The project has been approved by the BPDA board.

**115 Winthrop Square** – This project calls for the demolition of the Winthrop Square Garage and the construction of a mixed-use high-rise residential building. There will be 500 residential units built in addition to 750,000 sf of office space, restaurant space, and a Great Hall. There will be approximately 550 parking spaces provided on-site. The project is currently under review by the BPDA.

**Lewis Wharf** – This project calls for a two-building hotel connected by an enclosed one story pavilion. The hotel will have approximately 300 rooms on an approximately nine acre site comprising the Lewis Wharf piers and pavement areas. The plans also call for 5,000 sf of restaurant space, 7,000 sf of meeting/function rooms, and 379 parking spaces below grade. In addition, there are plans for there to be 104,774 sf of public open space. The project is currently under review by the BPDA.

**One Post Office Square** – This project proposes improvements to the existing office tower, an addition of 140,000 sf of office use, and an expanded retail space. A letter of intent has been submitted for this project.

### *2.3.3 Proposed Infrastructure Improvements*

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area. The proposed infrastructure improvements are listed below:

**Bulfinch Crossing Signal Improvements** – Intersection improvement such as adaptive technology, minor geometric changes, lane use changes, and signal timing and coordination at six signalized intersections in the downtown along Sudbury Street, New Chardon Street, Congress Street, and North Street.

### *2.3.4 No-Build (2024) Condition Traffic Volumes*

The one-half percent per year annual growth rate, compounded annually, was applied to the Existing (2017) Condition traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the No-Build (2024) Condition traffic volumes. The No-Build (2024) weekday a.m. and p.m. peak hour traffic volumes are shown on Figure 2-11 and Figure 2-12, respectively.

### *2.3.5 No-Build (2024) Condition Traffic Operations Analysis*

The No-Build (2024) Condition capacity analysis uses the same methodology as the Existing (2017) Condition capacity analysis. Tables 2-5 and Table 2-6 present the No-Build (2024) Condition capacity analysis for the weekday a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the Existing (2017) Condition and the No-Build (2024) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix C.

**Table 2-5 No-Build (2024) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour**

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **13.2** | - | - | - |
| North Street EB right | A | 5.4 | 0.09 | 24 | 32 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 13.0 | 0.55 | 208 | 264 |
| Surface Road SB thru \| thru/right | B | 15.2 | 0.50 | 56 | 82 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **31.5** | - | - | - |
| I-93 SB Off-Ramp WB left | C | 28.5 | 0.61 | 237 | 350 |
| I-93 SB Off-Ramp WB left/thru | C | 32.0 | 0.72 | 318 | 460 |
| Surface Road SB thru \| thru \| thru/right | C | 32.5 | 0.80 | 193 | 243 |
| **North Street/Clinton Street/Hotel Driveway** | **D** | **37.5** | - | - | - |
| North Street EB left/thru | A | 8.5 | 0.11 | 12 | 35 |
| North Street WB thru \| thru/right | A | 6.0 | 0.33 | 110 | 122 |
| Clinton Street NB left | F | 113.8 | 0.60 | 105 | m138 |
| Clinton Street NB left/thru/right | F | 109.2 | 0.55 | 98 | m129 |
| Hotel Driveway SB left | C | 34.3 | 0.02 | 3 | 8 |
| Hotel Driveway SB right | A | 2.9 | 0.10 | 0 | 0 |

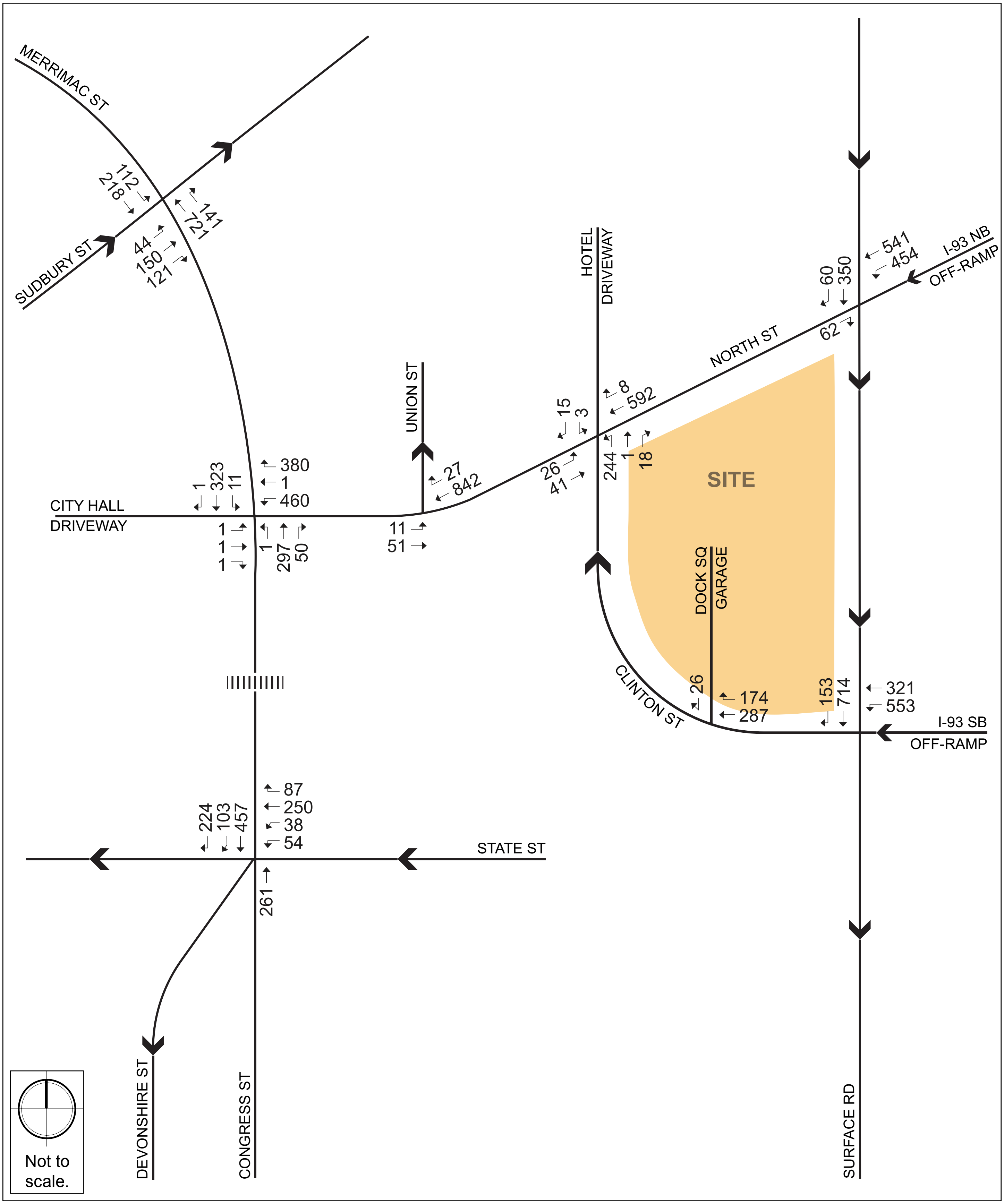


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**Figure 2-11**

*No-Build (2024) Condition Traffic Volumes, Weekday a.m. Peak Hour*

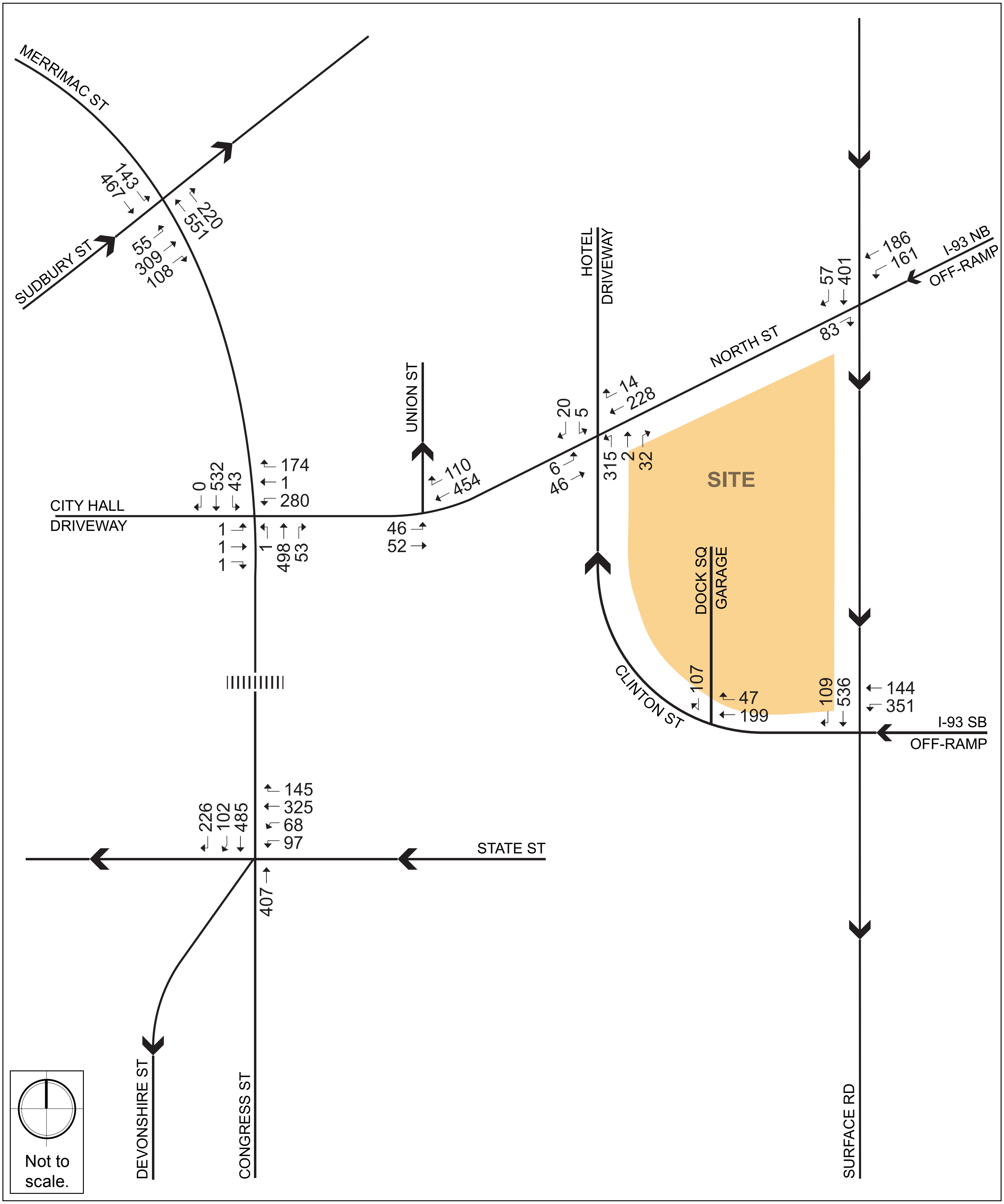


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**Figure 2-12**

*No-Build (2024) Condition Traffic Volumes, Weekday p.m. Peak Hour*

## Table 2-5 No-Build (2024) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **Congress Street/North Street/City Hall Driveway** | **D** | **39.6** | - | - | - |
| City Hall Driveway EB left/through/right | C | 23.0 | 0.01 | 1 | 8 |
| North Street WB left | C | 32.8 | 0.93 | 23 | m#470 |
| North Street WB left/thru/right | E | 73.2 | 0.76 | 116 | m188 |
| Congress Street NB left/thru \| thru \| thru/right | A | 3.9 | 0.47 | 8 | 15 |
| Congress Street SB left/thru \| thru \| thru/right | D | 42.0 | 0.58 | 80 | 113 |
| **North Street/Union Street** | **E** | **67.9** | - | - | - |
| North Street EB left | A | 1.2 | 0.03 | 1 | m1 |
| North Street EB thru | A | 2.6 | 0.06 | 2 | 3 |
| North Street WB thru \| thru/right | E | 73.5 | 0.80 | 258 | 417 |
| **Congress Street/Pedestrian Crossing** | **B** | **10.9** | - | - | - |
| Congress Street NB thru \| thru \| thru | C | 32.4 | 0.66 | 49 | 65 |
| Congress Street SB thru \| thru \| thru | A | 1.2 | 0.24 | 0 | m2 |
| **Congress Street/Sudbury Street** | **C** | **23.6** | - | - | - |
| Sudbury Street EB left | D | 40.0 | 0.16 | 31 | 66 |
| Sudbury Street EB thru \| thru | D | 40.6 | 0.28 | 57 | 90 |
| Sudbury Street EB right | B | 13.6 | 0.50 | 0 | 59 |
| Congress Street NB thru \| thru \| thru/right | C | 23.8 | 0.51 | 175 | 216 |
| Congress Street SB left | D | 37.8 | 0.21 | 41 | m49 |
| Congress Street SB thru \| thru \| thru | A | 6.0 | 0.12 | 41 | m42 |
| **Congress Street/State Street/Devonshire Street** | **C** | **21.3** | - | - | - |
| State Street WB left | C | 33.8 | 0.15 | 33 | 68 |
| State Street WB bear-left/ thru \| thru/ right | D | 35.4 | 0.52 | 120 | 170 |
| Congress Street NB thru \| thru | C | 21.6 | 0.21 | 67 | 98 |
| Congress Street SB thru \| thru/bear-right | B | 13.6 | 0.51 | 152 | 189 |
| Congress Street SB right | B | 13.5 | 0.40 | 105 | 156 |
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | - | - | - | - | - |
| Clinton Street thru \| thru/right | A | 0.0 | 0.29 | - | 0 |
| Dock Square Garage SB right | A | 10.0 | 0.04 | - | 3 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
Grey shading indicates a decrease in LOS from the Existing (2017) Condition) to LOS E or LOS F.

Table 2-6 No-Build (2024) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **18.6** | - | - | - |
| North Street EB right | A | 9.3 | 0.15 | 35 | 56 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 18.8 | 0.33 | 106 | 112 |
| Surface Road SB thru \| thru/right | C | 20.0 | 0.41 | 173 | 216 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **26.5** | - | - | - |
| I-93 SB Off-Ramp WB left | C | 23.0 | 0.38 | 128 | 198 |
| I-93 SB Off-Ramp WB left/thru | C | 22.5 | 0.36 | 128 | 197 |
| Surface Road SB thru \| thru \| thru/right | C | 29.3 | 0.66 | 124 | 158 |
| **North Street/Clinton Street/Hotel Driveway** | **C** | **28.2** | - | - | - |
| North Street EB left/thru | D | 42.1 | 0.10 | 41 | 83 |
| North Street WB thru \| thru/right | B | 11.6 | 0.23 | 30 | 40 |
| Clinton Street NB left | D | 41.7 | 0.56 | 106 | 152 |
| Clinton Street NB left/thru/right | D | 39.7 | 0.51 | 115 | 195 |
| Hotel Driveway SB left | C | 30.8 | 0.03 | 4 | 11 |
| Hotel Driveway SB right | A | 2.6 | 0.10 | 0 | 0 |
| **Congress Street/North Street/City Hall Driveway** | **D** | **39.5** | - | - | - |
| City Hall Driveway EB left/through/right | C | 31.7 | 0.01 | 1 | 9 |
| North Street WB left | F | 105.9 | 0.98 | 80 | m#302 |
| North Street WB left/thru/right | D | 46.5 | 0.75 | 0 | m81 |
| Congress Street NB left/thru \| thru \| thru/right | A | 2.7 | 0.48 | 10 | 12 |
| Congress Street SB left/thru \| thru \| thru/right | D | 40.9 | 0.65 | 104 | 149 |
| **North Street/Union Street** | **E** | **71.3** | - | - | - |
| North Street EB left | A | 1.2 | 0.07 | 1 | m1 |
| North Street EB thru | A | 1.9 | 0.05 | 1 | m1 |
| North Street WB thru \| thru/right | F | 84.0 | 0.82 | 182 | #298 |
| **Congress Street/Pedestrian Crossing** | **A** | **9.4** | - | - | - |
| Congress Street NB thru \| thru \| thru | C | 21.4 | 0.59 | 68 | 86 |
| Congress Street SB thru \| thru \| thru | A | 1.1 | 0.25 | 0 | m1 |

## Table 2-6 No-Build (2024) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **Congress Street/Sudbury Street** | **C** | **20.3** | - | - | - |
| Sudbury Street EB left | D | 36.3 | 0.19 | 34 | 72 |
| Sudbury Street EB thru \| thru | D | 40.6 | 0.52 | 110 | 157 |
| Sudbury Street EB right | B | 12.1 | 0.44 | 0 | 52 |
| Congress Street NB thru \| thru \| thru/right | B | 13.7 | 0.46 | 79 | 102 |
| Congress Street SB left | D | 43.2 | 0.27 | 48 | m55 |
| Congress Street SB thru \| thru \| thru | A | 9.8 | 0.25 | 95 | m103 |
| **Congress Street/State Street/Devonshire Street** | **C** | **22.1** | - | - | - |
| State Street WB left | C | 33.2 | 0.22 | 58 | 105 |
| State Street WB bear-left/ thru \| thru/ right | D | 36.0 | 0.62 | 176 | 237 |
| Congress Street NB thru \| thru | C | 24.0 | 0.31 | 112 | 153 |
| Congress Street SB thru \| thru/bear-right | B | 13.0 | 0.51 | 121 | 151 |
| Congress Street SB right | A | 3.8 | 0.31 | 26 | 60 |
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | - | - | - | - | - |
| Clinton Street thru \| thru/right | A | 0.0 | 0.16 | - | 0 |
| Dock Square Garage SB right | B | 10.2 | 0.14 | - | 13 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
Grey shading indicates a decrease in LOS from the Existing (2017) Condition) to LOS E or LOS F.

As shown in Table 2-5 and Table 2-6, the majority of intersections and approaches continue to operate at acceptable levels (LOS D or better) under the No-Build (2024) Condition with the following exception:

- The signalized intersection of **North Street/Clinton Street/Hotel Driveway** will decrease from LOS B to operate at LOS D during the weekday a.m. peak hour and continue to operate at LOS C during the weekday p.m. peak hour. The Clinton Street northbound exclusive left-turn approach decreases from LOS D to LOS F during the weekday a.m. peak hour. The Clinton Street northbound shared left-turn/through/right-turn approach decreases from LOS D to LOS F during the weekday a.m. peak hour. The longest queue length at the intersection occurs at the Clinton Street northbound approach during both the weekday a.m. and p.m. peak hours.

- The signalized intersection of **Congress Street/North Street/City Hall Driveway** will decrease from LOS B to LOS D during the weekday a.m. peak hour and decrease from LOS C to LOS D during the weekday p.m. peak hour. The North Street westbound shared left-turn/through/right-turn approach decreases from LOS A to LOS E during the weekday a.m. peak hour. The North Street westbound exclusive left-turn approach decreases from LOS C to LOS F during the weekday p.m. peak hour. The longest queues at the intersection occur at the North Street westbound left approach during both the weekday a.m. and p.m. peak hour.

- The signalized intersection of **North Street/Union Street** will decrease from LOS B to LOS E during the weekday a.m. peak hour and from LOS C to LOS E during the weekday p.m. peak hour. The North Street westbound approach decreases from LOS B to LOS E during the weekday a.m. peak hour and from LOS D to LOS F during the weekday p.m. peak hour. The longest queues occur at the North Street westbound approach during both the weekday a.m. and p.m. peak hour.

## 2.4 Build (2024) Condition

As previously mentioned, the Project site is located at 20 Clinton Street in downtown Boston and contains the Dock Square Parking Garage with a total of 698 public parking spaces, a retail space consisting of approximately 15,000 sf containing the Hard Rock Café, and a small plaza.

The proposed Project will maintain the 698 publicly available garage parking spaces as well as approximately 8,000 sf of the retail space, and will include the construction of 195 new residential units above the existing garage. The residential units will be located on floors 8 to 17 and consist of a mix of studios, and one- to four-bedroom units. The Project will also include an additional 195 garage parking spaces to be provided via valet parking services and/or automated mechanical lifts.

### *2.4.1 Site Access and Vehicle Circulation*

Vehicular access to the garage will remain unchanged from the existing condition. The Project will maintain the primary garage driveway with three lanes. The Project will create a new drop-off area to the west of the building between Clinton Street and North Street. Pedestrians will access the site via Clinton Street and the pick-up/drop-off area to the west of the building. The site access plan is shown in Figure 2-13.

### *2.4.2 Project Parking*

The parking goals developed by the BTD for this section of downtown Boston are a maximum of 0.5 to 1.0 parking spaces per residential unit within a ten-minute walk of an MBTA station.

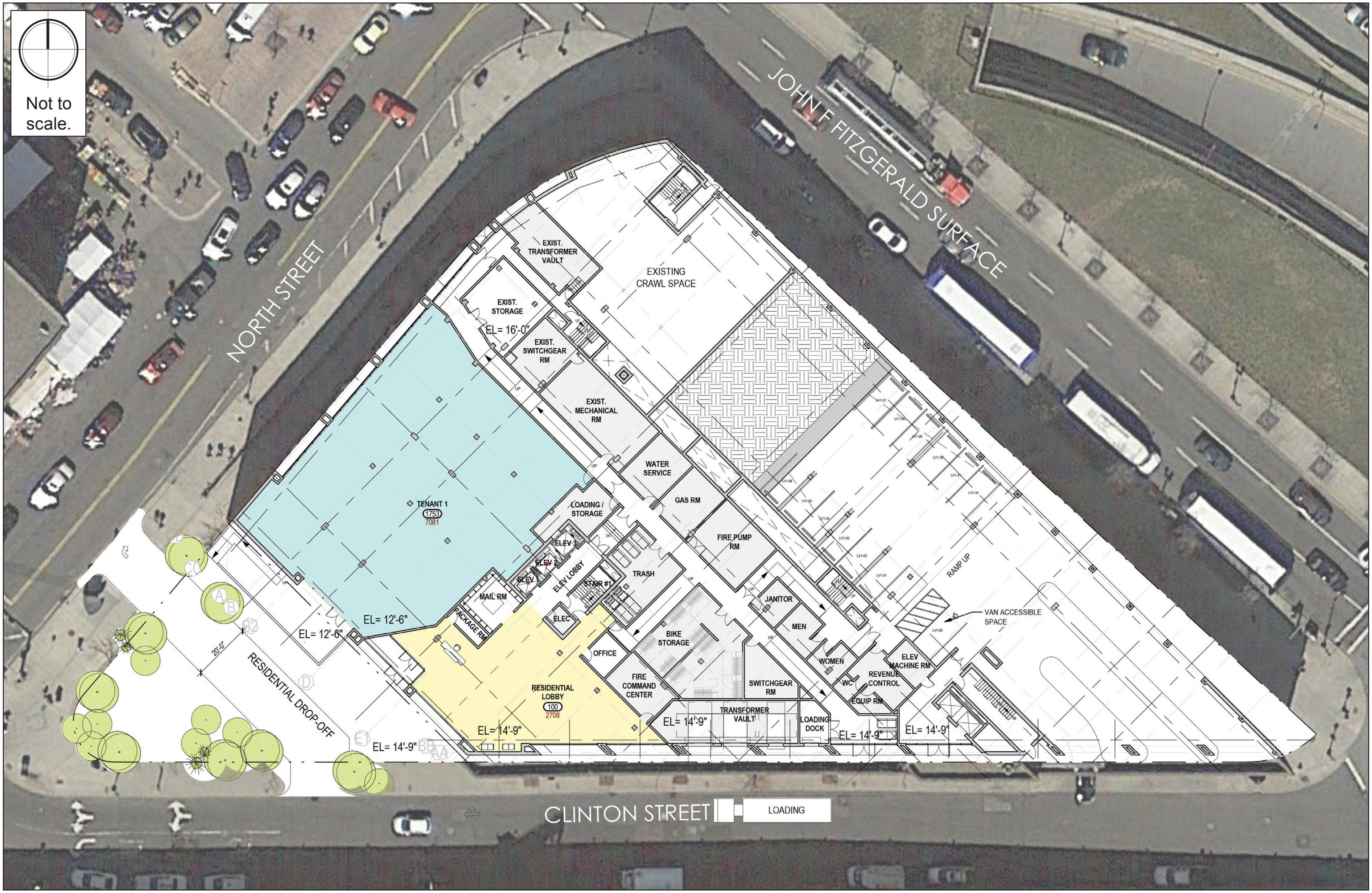


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**Figure 2-13**
*Site Plan*

The existing Dock Square Parking Garage has an existing parking supply of 698 parking spaces available for the public looking. The Project will reduce this capacity to approximately 682 public parking spaces and redesign the garage to include valet services and mechanical lifts, accounting for approximately 280 of the total spaces. Patrons visiting the retail component, and residents of the upper-story units of the Project will be able to utilize the existing public parking spaces on-site, including potentially leasing spaces to the residents.

### *2.4.3 Loading and Service Accommodations*

Residential units primarily generate delivery trips related to small packages and prepared food on a daily basis. Move-in/move-out activity is also related to residential units, although less frequent. Loading and service operations will occur along the pick-up/drop-off area and the designated loading zones around the site. These areas will accommodate all deliveries, trash pick-up, and residential move-in/move-out activity.

### *2.4.4 Trip Generation Methodology*

Determining the future trip generation of the Project is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, and walk/bicycle trips associated with a proposed development and specific land use program(s). A project's location and proximity to different travel modes determines how people will travel to and from a site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[1] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use code (LUC) was used:

**Land Use Code 221 – Multifamily Housing High-Rise.** A High-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have over 10 levels (floors). Calculations of the number of trips use ITE's average rate per dwelling units.

**Land Use Code 820 – Shopping Center.** The shopping center land use code is defined as an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store, and also provides on-site parking facilities sufficient to

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1 Trip Generation Manual, 10th Edition; Institute of Transportation Engineers; Washington, D.C.; 2017.

serve its own parking demands. Shopping center trip generation estimates are based on the gross leasable area (GLA) of the center. Calculations of the number of trips use ITE's average rate per 1,000 square feet.

### *2.4.5 Mode Share*

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in Area 2 – Downtown. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-7.

**Table 2-7 Travel Mode Share**

| Land Use | | Walk/Bicycle Share | Transit Share | Auto Share | Vehicle Occupancy Rate |
|---|---|---|---|---|---|
| Daily | | | | | |
| Residential | In | 42% | 30% | 28% | 1.13 |
| | Out | 42% | 30% | 28% | 1.13 |
| Retail | In | 59% | 20% | 21% | 1.78 |
| | Out | 59% | 20% | 21% | 1.78 |
| a.m. Peak | | | | | |
| Residential | In | 7% | 52% | 41% | 1.13 |
| | Out | 51% | 18% | 31% | 1.13 |
| Retail | In | 14% | 46% | 40% | 1.78 |
| | Out | 58% | 10% | 32% | 1.78 |
| p.m. Peak | | | | | |
| Residential | In | 51% | 18% | 31% | 1.13 |
| | Out | 7% | 52% | 41% | 1.13 |
| Retail | In | 58% | 10% | 32% | 1.78 |
| | Out | 14% | 46% | 40% | 1.78 |

### *2.4.6 Existing Trip Generation*

The existing site, as previously stated, consists of the 698 parking spaces in the Dock Square Parking Garage as well as approximately 15,000 square feet of restaurant space. Counts were conducted at the existing curb cuts to determine the trip generation for the existing uses on the site. It was assumed that all of the trips entering/exiting the site were primary trips beginning or ending at the site. The existing trips to the site are expected to remain on site as no public parking spaces are proposed to be removed.

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[2] Summary of Travel Trends: 2009 National Household Travel Survey; FHWA; Washington, D.C.; June 2011.

### *2.4.7 Project Trip Generation*

The mode share percentages shown in Table 2-7 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates for the Project. The trip generation for the Project by mode is shown in Table 2-8. The detailed trip generation information is provided in Appendix C.

**Table 2-8 Project Trip Generation**

| Land Use | | Walk/Bicycle Trips | Transit Trips | Vehicle Trips |
|---|---|---|---|---|
| Daily | | | | |
| Residential[1] | In | 206 | 147 | 121 |
| | Out | 206 | 147 | 121 |
| | Total | 412 | 294 | 242 |
| Retail[2] | In | 153 | 52 | 31 |
| | Out | 153 | 52 | 31 |
| | Total | 306 | 104 | 62 |
| Total | In | 359 | 199 | 152 |
| | Out | 359 | 199 | 152 |
| | Total | 718 | 398 | 304 |
| a.m. Peak Hour | | | | |
| Residential[1] | In | 1 | 9 | 6 |
| | Out | 27 | 9 | 14 |
| | Total | 28 | 18 | 20 |
| Retail[2] | In | 1 | 4 | 2 |
| | Out | 2 | 1 | 1 |
| | Total | 3 | 5 | 3 |
| Total | In | 2 | 13 | 8 |
| | Out | 29 | 10 | 15 |
| | Total | 31 | 23 | 23 |
| p.m. Peak Hour | | | | |
| Residential[1] | In | 25 | 9 | 13 |
| | Out | 2 | 16 | 12 |
| | Total | 27 | 25 | 25 |
| Retail[2] | In | 14 | 3 | 4 |
| | Out | 4 | 12 | 6 |
| | Total | 18 | 15 | 10 |
| Total | In | 39 | 12 | 17 |
| | Out | 6 | 28 | 18 |
| | Total | 45 | 40 | 35 |

1. ITE Trip Generation Rate, 10th Edition, LUC 221 (Multifamily Housing High-Rise), 195 units.
2. ITE Trip Generation Rate, 10th Edition, LUC 820 (Shopping Center), 7,753 square feet.

As shown in Table 2-8, there is expected to be 718 new pedestrian/bicycle trips, 398 new transit trips, and 304 new vehicle trips throughout the day. During the weekday a.m. peak hour, there is expected to be 31 new pedestrian trips (2 entering and 29 exiting), 23 new transit trips (13 boarding and 10 alighting), and 23 new vehicle trips (8 entering and 15 exiting). During the weekday p.m. peak hour, there is expected to be 45 new pedestrian trips (39 entering and 6 exiting), 40 new transit trips (12 boarding and 28 alighting), and 35 new vehicle trips (17 entering and 18 existing).

### *2.4.8 Trip Distribution*

The trip distribution identifies the various travel paths for vehicles associated with the Project. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 2 – Downtown, and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-14 for entering vehicles and in Figure 2-15 for exiting vehicles.

### *2.4.9 Build Traffic Volumes*

The vehicle trips were distributed through the study area based on the trips distribution shown in Figure 2-14 and Figure 2-15. The Project-generated trips for the weekday a.m. and p.m. peak hours are shown in Figure 2-16 and Figure 2-17, respectively. The project generated trips were added to the No-Build (2024) Condition vehicular traffic volumes to develop the Build (2024) Condition vehicular traffic volumes. The Build (2024) Condition weekday a.m. and p.m. peak hour traffic volumes are shown on Figure 2-18 and Figure 2-19, respectively.

### *2.4.10 Bicycle Accommodations*

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for residents and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply 195 indoor secure bicycle parking/storage spaces within the Project site at a ratio of one per residential unit. Additionally, outdoor public bicycle racks will be installed around the Project site for guests and visitors.

### *2.4.11 Build Condition Traffic Operations Analysis*

The Build (2024) Condition analysis uses the same methodology as the Existing (2017) Condition analysis and No-Build (2024) Condition analysis. Table 2-9 and Table 2-10 present the Build (2024) Condition capacity analysis for the weekday a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

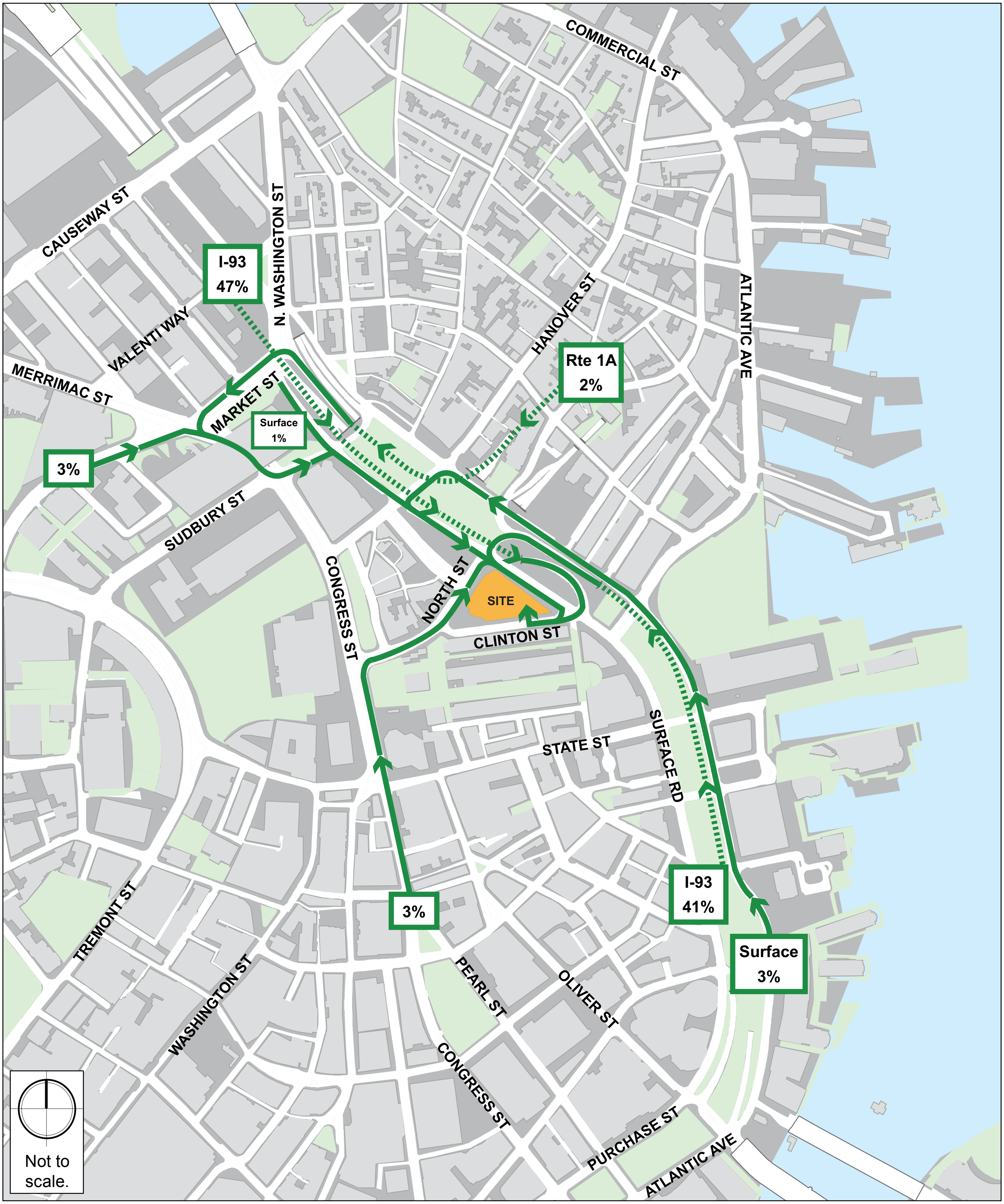


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**Figure 2-14**
*Entering Trip Distribution*


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**Figure 2-15**
*Exiting Trip Distribution*

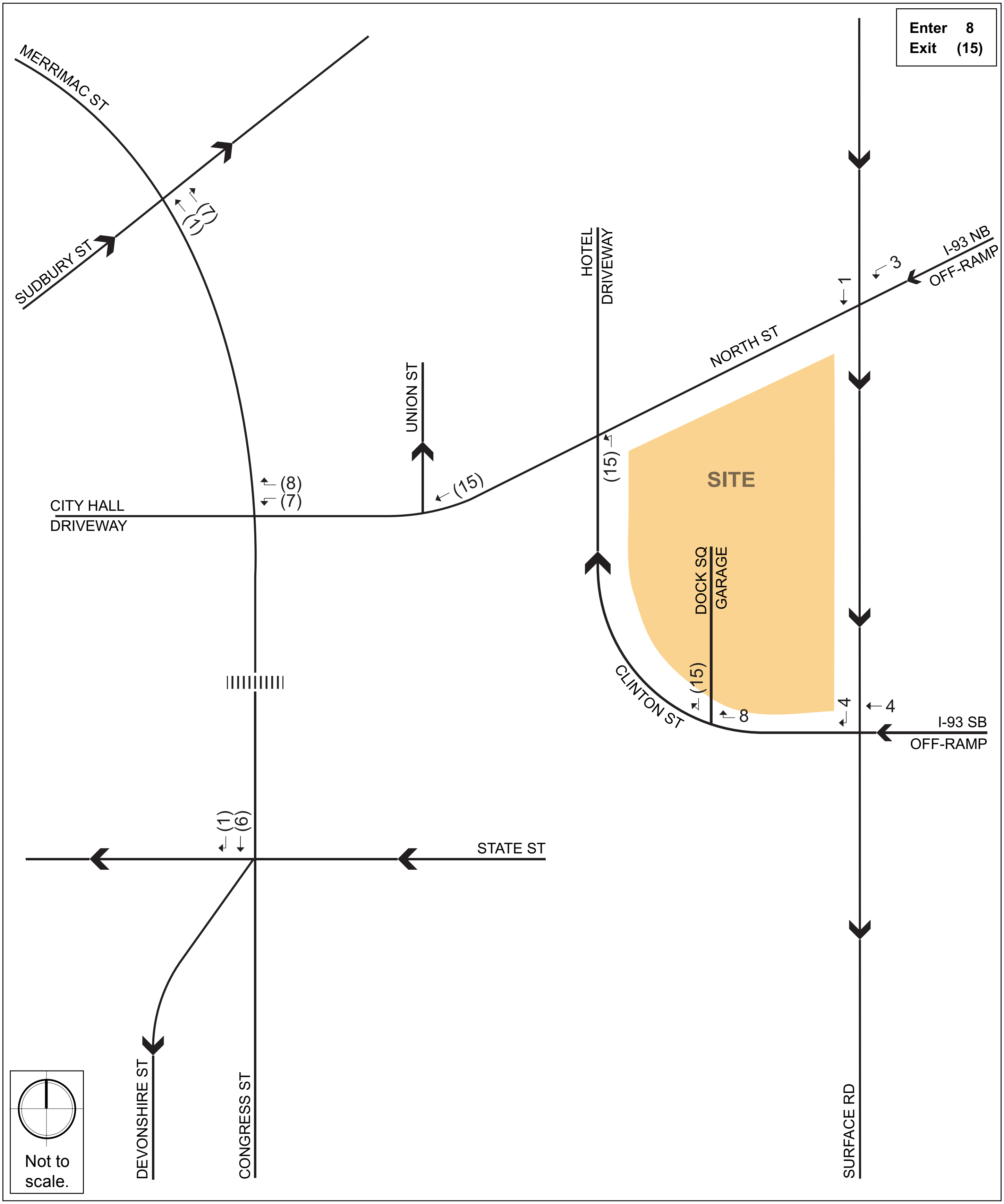


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**Figure 2-16**

*Project Generated Vehicle Trips, Weekday a.m. Peak Hour*

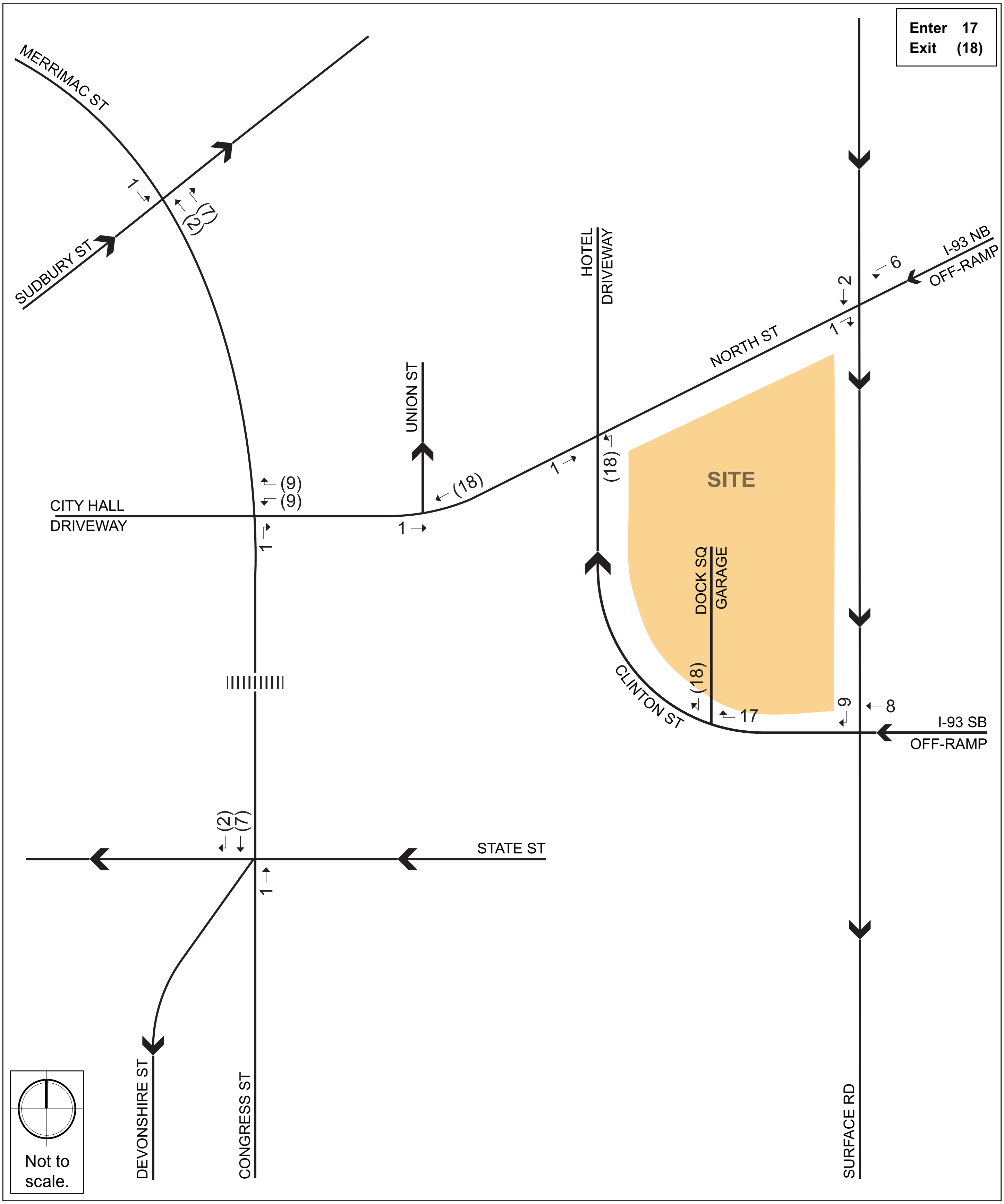


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**Figure 2-17**

*Project Generated Vehicle Trips, Weekday p.m. Peak Hour*

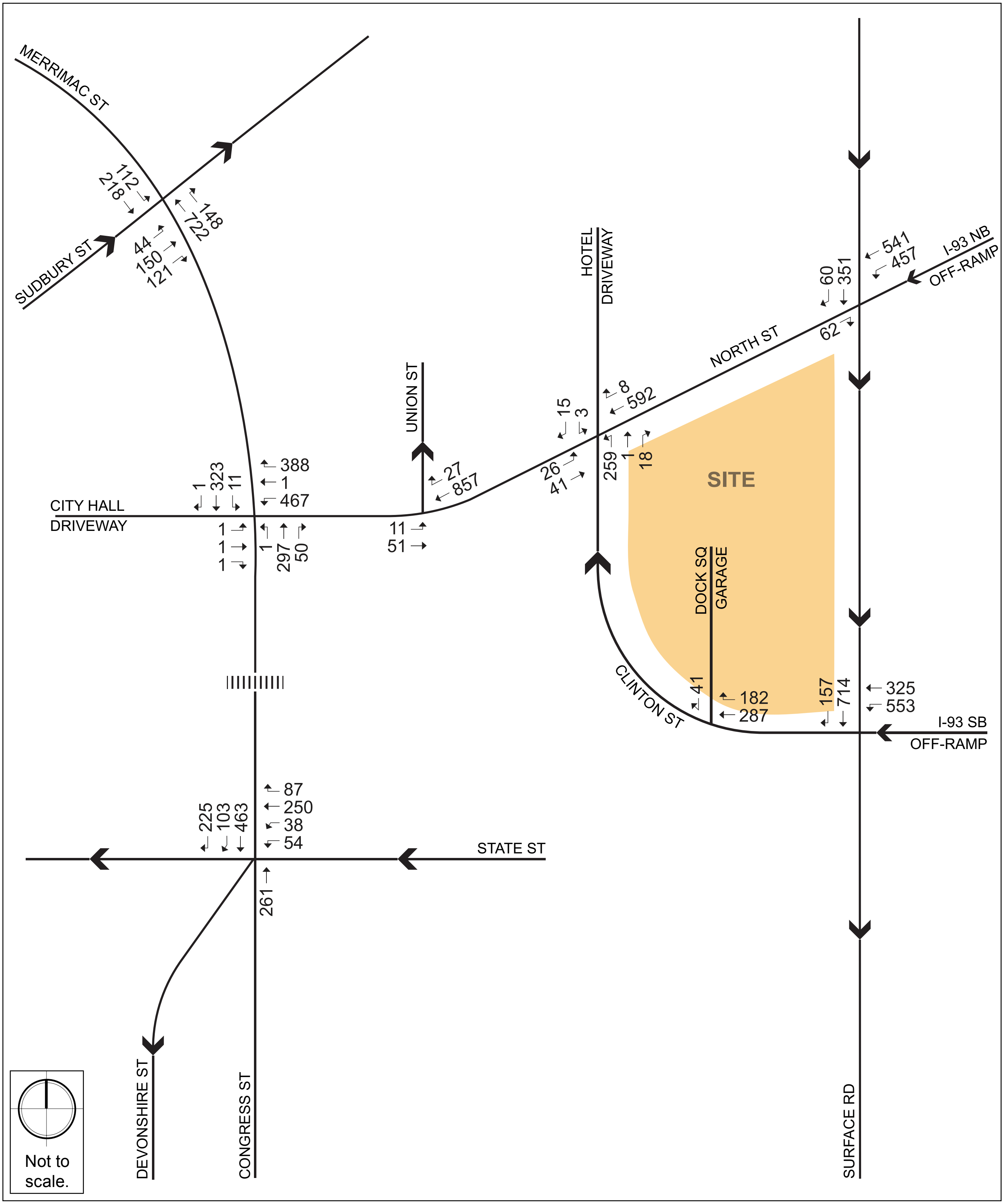


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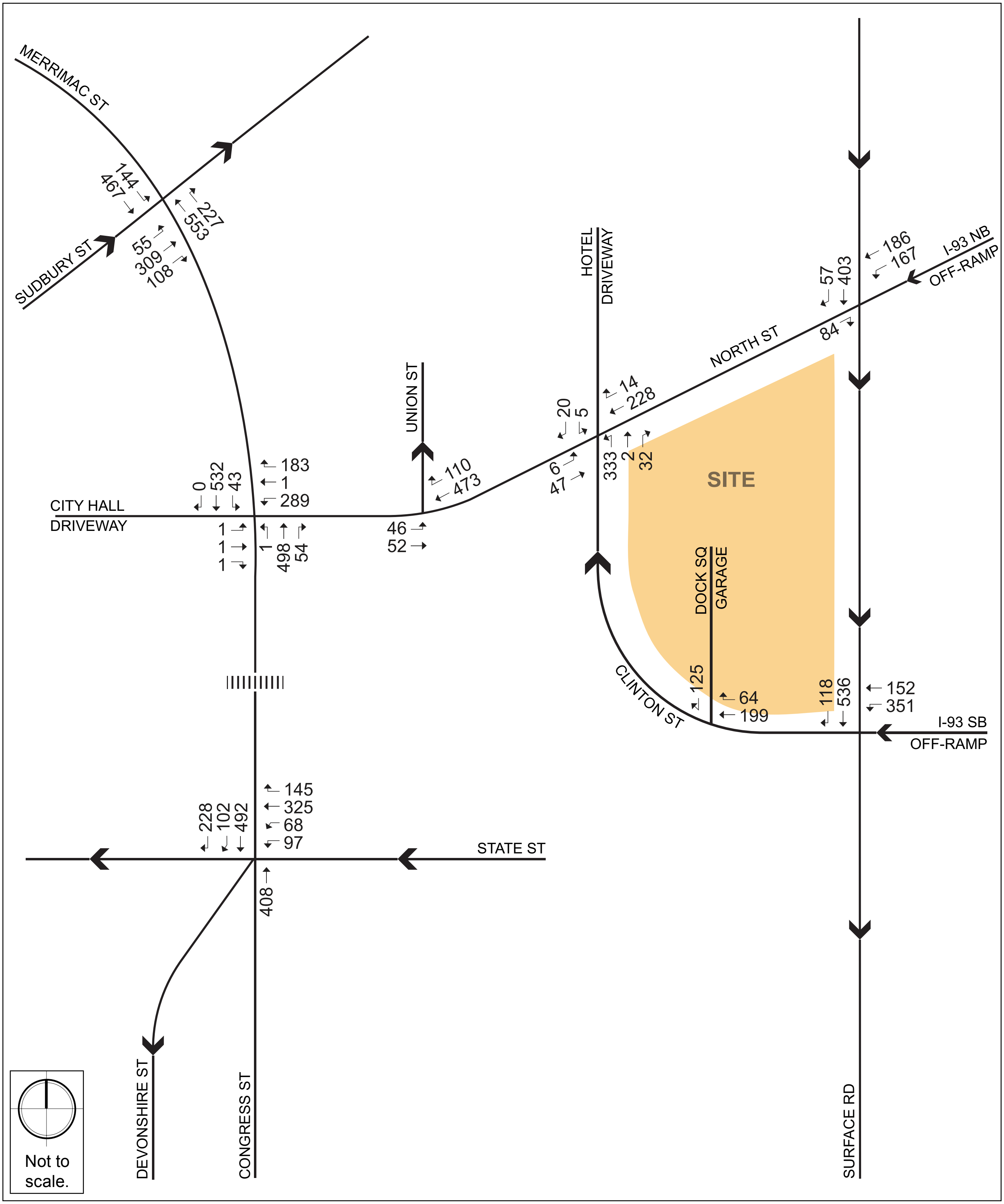
**Figure 2-18**

*Build (2024) Condition Traffic Volumes, Weekday a.m. Peak Hour*




**Dock Square   Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

**Figure 2-19**

*Build (2024) Condition Traffic Volumes, Weekday p.m. Peak Hour*

## Table 2-9 Build (2024) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **13.2** | - | - | - |
| North Street EB right | A | 5.4 | 0.09 | 23 | 32 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 13.0 | 0.55 | 209 | 265 |
| Surface Road SB thru \| thru/right | B | 15.3 | 0.50 | 56 | 82 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **31.6** | - | - | - |
| I-93 SB Off-Ramp WB left | C | 28.5 | 0.61 | 237 | 350 |
| I-93 SB Off-Ramp WB left/thru | C | 32.3 | 0.72 | 322 | 463 |
| Surface Road SB thru \| thru \| thru/right | C | 32.7 | 0.80 | 193 | 245 |
| **North Street/Clinton Street/Hotel Driveway** | **D** | **39.1** | - | - | - |
| North Street EB left/thru | A | 8.5 | 0.11 | 12 | 35 |
| North Street WB thru \| thru/right | A | 6.0 | 0.33 | 110 | 121 |
| Clinton Street NB left | F | 115.7 | 0.64 | 113 | m150 |
| Clinton Street NB left/thru/right | F | 109.7 | 0.57 | 107 | m138 |
| Hotel Driveway SB left | C | 34.3 | 0.03 | 3 | 8 |
| Hotel Driveway SB right | A | 2.9 | 0.10 | 0 | 0 |
| **Congress Street/North Street/City Hall Driveway** | **D** | **40.7** | - | - | - |
| City Hall Driveway EB left/through/right | C | 23.0 | 0.01 | 1 | 8 |
| North Street WB left | D | 36.1 | 0.94 | 30 | m#468 |
| North Street WB left/thru/right | E | 73.4 | 0.76 | 125 | m185 |
| Congress Street NB left/thru \| thru \| thru/right | A | 3.9 | 0.47 | 8 | 15 |
| Congress Street SB left/thru \| thru \| thru/right | D | 42.0 | 0.58 | 80 | 113 |
| **North Street/Union Street** | **E** | **69.9** | - | - | - |
| North Street EB left | A | 1.2 | 0.03 | 1 | m1 |
| North Street EB thru | A | 2.6 | 0.06 | 2 | 3 |
| North Street WB thru \| thru/right | E | 75.6 | 0.81 | 347 | 426 |
| **Congress Street/Pedestrian Crossing** | **B** | **10.8** | - | - | - |
| Congress Street NB thru \| thru \| thru | C | 32.4 | 0.66 | 49 | 65 |
| Congress Street SB thru \| thru \| thru | A | 1.2 | 0.25 | 0 | m2 |
| **Congress Street/Sudbury Street** | **C** | **23.7** | - | - | - |
| Sudbury Street EB left | D | 40.0 | 0.16 | 31 | 66 |
| Sudbury Street EB thru \| thru | D | 40.6 | 0.28 | 57 | 90 |
| Sudbury Street EB right | B | 13.6 | 0.50 | 0 | 59 |
| Congress Street NB thru \| thru \| thru/right | C | 24.0 | 0.51 | 177 | 218 |
| Congress Street SB left | D | 37.8 | 0.21 | 41 | m49 |
| Congress Street SB thru \| thru \| thru | A | 6.0 | 0.12 | 41 | m42 |

## Table 2-9 Build (2024) Condition, Capacity Analysis Summary, Weekday a.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **Congress Street/State Street/Devonshire Street** | **C** | **21.3** | - | - | - |
| State Street WB left | C | 33.8 | 0.15 | 33 | 68 |
| State Street WB bear-left/ thru \| thru/ right | D | 35.4 | 0.52 | 120 | 170 |
| Congress Street NB thru \| thru | C | 21.6 | 0.21 | 67 | 98 |
| Congress Street SB thru \| thru/bear-right | B | 13.7 | 0.52 | 154 | 192 |
| Congress Street SB right | B | 13.6 | 0.41 | 106 | 157 |
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | - | - | - | - | - |
| Clinton Street thru \| thru/right | A | 0.0 | 0.30 | - | 0 |
| Dock Square Garage SB right | B | 10.1 | 0.06 | - | 5 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

## Table 2-10 Build (2024) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| Signalized Intersections | | | | | |
| **Surface Road/North Street/I-93 NB Off-Ramp** | **B** | **18.6** | - | - | - |
| North Street EB right | A | 9.1 | 0.15 | 34 | 55 |
| I-93 NB Off-Ramp WB left/thru \| thru | B | 18.9 | 0.33 | 108 | 114 |
| Surface Road SB thru \| thru/right | C | 20.2 | 0.42 | 174 | 217 |
| **Surface Road/Clinton Street/I-93 SB Off-Ramp** | **C** | **26.5** | - | - | - |
| I-93 SB Off-Ramp WB left | C | 23.0 | 0.38 | 128 | 198 |
| I-93 SB Off-Ramp WB left/thru | C | 22.7 | 0.37 | 133 | 205 |
| Surface Road SB thru \| thru \| thru/right | C | 29.2 | 0.67 | 123 | 157 |
| **North Street/Clinton Street/Hotel Driveway** | **C** | **30.2** | - | - | - |
| North Street EB left/thru | D | 42.2 | 0.10 | 43 | 84 |
| North Street WB thru \| thru/right | B | 11.6 | 0.23 | 30 | 40 |
| Clinton Street NB left | D | 45.6 | 0.59 | 113 | m161 |
| Clinton Street NB left/thru/right | D | 42.0 | 0.53 | 122 | m206 |
| Hotel Driveway SB left | C | 30.8 | 0.03 | 4 | 11 |
| Hotel Driveway SB right | A | 2.7 | 0.10 | 0 | 0 |

Table 2-10 Build (2024) Condition, Capacity Analysis Summary, Weekday p.m. Peak Hour (Continued)

| Intersection/Approach | LOS | Delay (s) | V/C Ratio | 50th Percentile Queue (ft) | 95th Percentile Queue (ft) |
|---|---|---|---|---|---|
| **Congress Street/North Street/City Hall Driveway** | **D** | **41.0** | - | - | - |
| City Hall Driveway EB left/through/right | C | 31.7 | 0.01 | 1 | 9 |
| North Street WB left | F | 105.7 | 1.03 | ~95 | m#310 |
| North Street WB left/thru/right | D | 53.4 | 0.76 | 24 | m81 |
| Congress Street NB left/thru \| thru \| thru/right | A | 2.7 | 0.48 | 10 | 13 |
| Congress Street SB left/thru \| thru \| thru/right | D | 40.9 | 0.65 | 104 | 149 |
| **North Street/Union Street** | **E** | **73.0** | - | - | - |
| North Street EB left | A | 1.1 | 0.07 | 1 | m1 |
| North Street EB thru | A | 1.9 | 0.05 | 1 | m1 |
| North Street WB thru \| thru/right | F | 85.6 | 0.85 | 197 | #314 |
| **Congress Street/Pedestrian Crossing** | **A** | **9.4** | - | - | - |
| Congress Street NB thru \| thru \| thru | C | 21.4 | 0.59 | 68 | 86 |
| Congress Street SB thru \| thru \| thru | A | 1.2 | 0.26 | 0 | m1 |
| **Congress Street/Sudbury Street** | **C** | **20.3** | - | - | - |
| Sudbury Street EB left | D | 36.3 | 0.19 | 34 | 72 |
| Sudbury Street EB thru \| thru | D | 40.6 | 0.52 | 110 | 157 |
| Sudbury Street EB right | B | 12.1 | 0.44 | 0 | 52 |
| Congress Street NB thru \| thru \| thru/right | B | 13.9 | 0.46 | 81 | 103 |
| Congress Street SB left | D | 43.2 | 0.27 | 48 | m55 |
| Congress Street SB thru \| thru \| thru | A | 9.8 | 0.25 | 95 | m103 |
| **Congress Street/State Street/Devonshire Street** | **C** | **22.1** | - | - | - |
| State Street WB left | C | 33.2 | 0.22 | 58 | 105 |
| State Street WB bear-left/ thru \| thru/ right | D | 36.0 | 0.62 | 176 | 237 |
| Congress Street NB thru \| thru | C | 24.0 | 0.31 | 112 | 153 |
| Congress Street SB thru \| thru/bear-right | B | 13.1 | 0.51 | 125 | 155 |
| Congress Street SB right | A | 3.9 | 0.31 | 26 | 63 |
| Unsignalized Intersections | | | | | |
| **Clinton Street/Dock Square Garage** | - | - | - | - | - |
| Clinton Street thru \| thru/right | A | 0.0 | 0.17 | - | 0 |
| Dock Square Garage SB right | B | 10.5 | 0.17 | - | 15 |

m – volume for 95th percentile queue is metered by upstream signal.
# – 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

As shown in Table 2-9 and Table 2-10, all of the intersections and approaches are expected to continue to operate at acceptable levels (LOS D or better) or remain at the same level of service as the No-Build (2024) Condition, under the Build (2024) Condition.

- The signalized intersection of **North Street/Union Street** will continue to operate at LOS E during both the weekday a.m. and p.m. peak hours under the Build (2024) Condition. The North Street westbound approach continues to operate at LOS F during both the weekday a.m. and p.m. peak hours and the longest queues continue to occur at the North Street westbound approach.

## 2.5 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project-traffic impacts. The TDM program may include an on-site transportation coordinator, transit pass subsidies for employees, secure bicycle parking areas, and distributions of transit maps and schedules to residents, guests, and employees. TDM measures will be described and evaluated in the Transportation Access Plan Agreement (TAPA).

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents and patrons of the site. The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact.

The Proponent is prepared to take advantage of good transit access in marketing the Proposed Project to future residents and office tenants by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel.

The TDM measures for the Project may include but are not limited to the following:

- **Transportation Coordinator:** The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities;

- **Orientation Packets:** The Proponent will provide orientation packets to new residents containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals;

- **Real-Time Transit Information Board:** The Proponent will provide information on travel alternatives for employees and visitors in real time via the Project website and in the building lobby;

- **Newsletter:** Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, and other travel options;

- **Website:** Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby;

- **Electric Vehicle Charging:** The Proponent will explore the feasibility of providing electric vehicle charging station(s) within the garage;

- **Bicycle Accommodation:** The Proponent will provide bicycle storage in secure, sheltered areas for residents. Subject to necessary approvals, public use bicycle racks for visitors will be placed near building entrances;

- **Vehicle Sharing Program:** The Proponent will explore the feasibility of providing spaces in the garage for a car sharing service; and

- **Bicycle Sharing Program:** The Proponent will explore the possibility of expanding Hubway in the vicinity of the Project site to meet the demands of the Project and the surrounding community.

## 2.6 Transportation Mitigation Measures

Although the traffic impacts associated with the new trips are minimal (generating approximately one new vehicle trip every two to three minutes during the weekday a.m. and p.m. peak hours), the Proponent will continue to work with the City of Boston so that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponent is responsible for preparation of the TAPA, a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed.

The Project expects to contribute to mitigation measures to improve the existing transportation conditions in the area. Potential additional mitigation measures that could be appropriate for a Project with this level of impact include:

- Pedestrian and bicycle improvements in the area; and

- Traffic signal infrastructure improvements in the area.

Further mitigation measures will be discussed with BTD as the Project moves through the permitting process. All mitigation measures will be detailed in the TAPA.

The Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project.

## 2.7 Evaluation of Short-term Construction Impacts

Most construction activities will be accommodated within the current Project site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a CMP to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

To minimize transportation impacts during the construction period, the following measures will be considered for the CMP:

- Limited construction worker parking on-site;
- Encouragement of worker carpooling;
- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

The CMP to be executed with the City prior to commencement of construction will document all committed measures.

# Chapter 3.0

## Environmental Review Component

# 3.0 ENVIRONMENTAL REVIEW COMPONENT

## 3.1 Wind

### *3.1.1 Introduction*

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Stantec Architecture to assess and consult on the pedestrian wind conditions on and around the Project. The Project site is located between Clinton Street, North Street, and John F. Fitzgerald Surface Road. The objective of the study is to assess the effect of the proposed Project on local conditions in pedestrian areas around the study site and provide recommendations for minimizing adverse effects.

The study involved wind simulations on a 1:400 scale model of the proposed building and surroundings. These simulations were then conducted in one of RWDI's boundary-layer wind tunnels in Guelph, Ontario, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the BPDA were used in this study. This section describes the methods and presents the results of the wind tunnel simulations.

The results of the wind analysis show that the effective gust criterion is met both seasonally and annually at all locations, and that wind speeds will typically remain within the recommended comfort categories for sidewalks and entrances. The results of the wind analysis also show that with the exception of one new location, at the northern corner of the Project, and one existing condition at Mercantile and Congress streets, wind speeds are typically within the recommended comfort categories for sidewalks and entrances with the addition of the Project to the site. Mitigation measures are being explored to improve wind conditions at this location.

### *3.1.2 Overview*

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

### *3.1.3 Methodology*

#### 3.1.3.1 Test Configurations

Information concerning the site and surroundings was derived from site plans and elevations of the Project provided by the design team. The following configurations were simulated:

- No Build: Includes the existing site and all existing and surrounding BPDA approved buildings; and

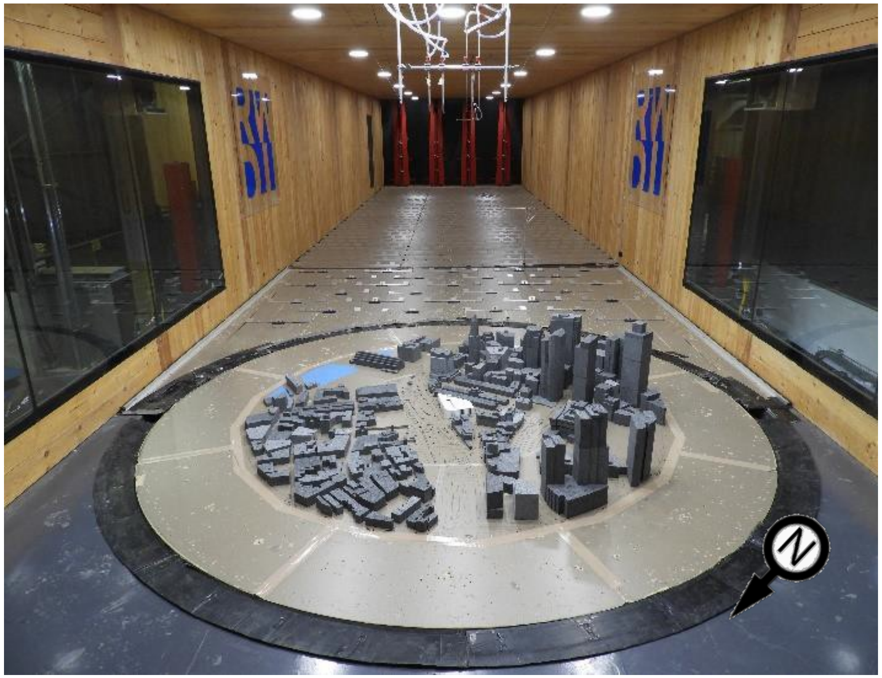
- Build: Includes the proposed Dock Square Project and all existing and BPDA approved surroundings.

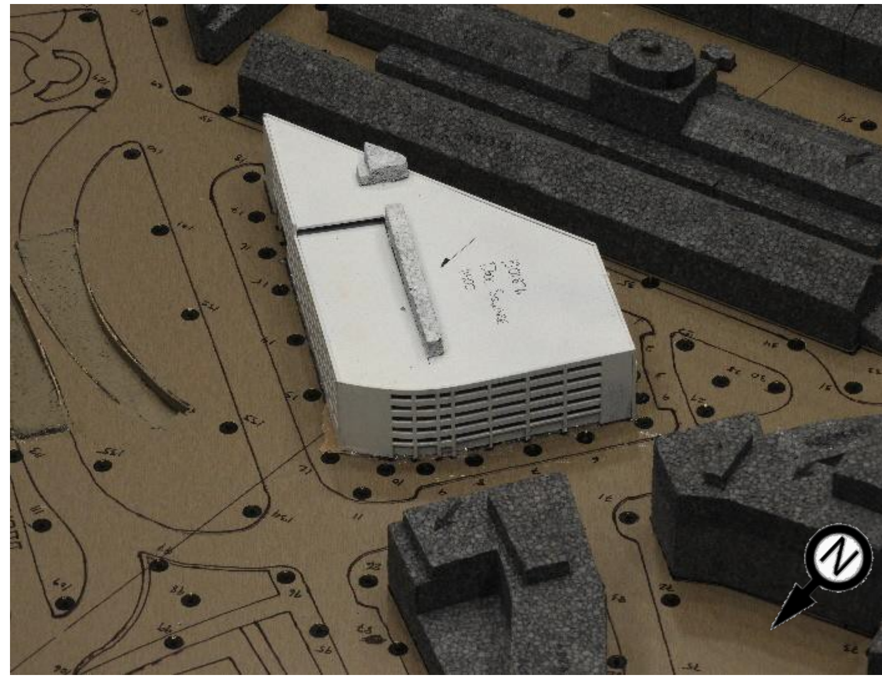
As shown in Figures 3.1-1 and 3.1-2, the wind tunnel model included the Project and all relevant surrounding buildings and topography within a 1600 foot radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 135 wind speed sensors connected to the wind tunnel data acquisition system for recording the mean and fluctuating components of wind speed at a full-scale height of 5 feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and root-mean-square (RMS) speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data recorded from 1986 to 2016 at Boston's Logan International Airport, in order to predict full-scale wind conditions. The analysis was performed separately for each of the four seasons as well as for the entire year.

#### 3.1.3.2 Meteorological Data

Figures 3.1-3 and 3.1-4 presents "wind roses" summarizing the seasonal and annual wind climates in the Boston area, based on the data from Logan International Airport. The first figure in Image 3.1-3, for example, summarizes wind data for the spring season (i.e., March, April, and May). In general, the prevailing winds for this time of year are from the west-northwest, northwest, east, southwest and south-southwest. However, in the case of strong winds (speeds greater than 20 mph, red bands), the most common wind directions are northeast, west-northwest and southwest.

On an annual basis (Figure 3.1-5), the most common wind directions are those between south-southwest and northwest. Winds from the east and east-southeast are also relatively common. In the case of strong winds, northeast, west-northwest and southwest are the dominant wind directions.





**Dock Square Boston, Massachusetts**

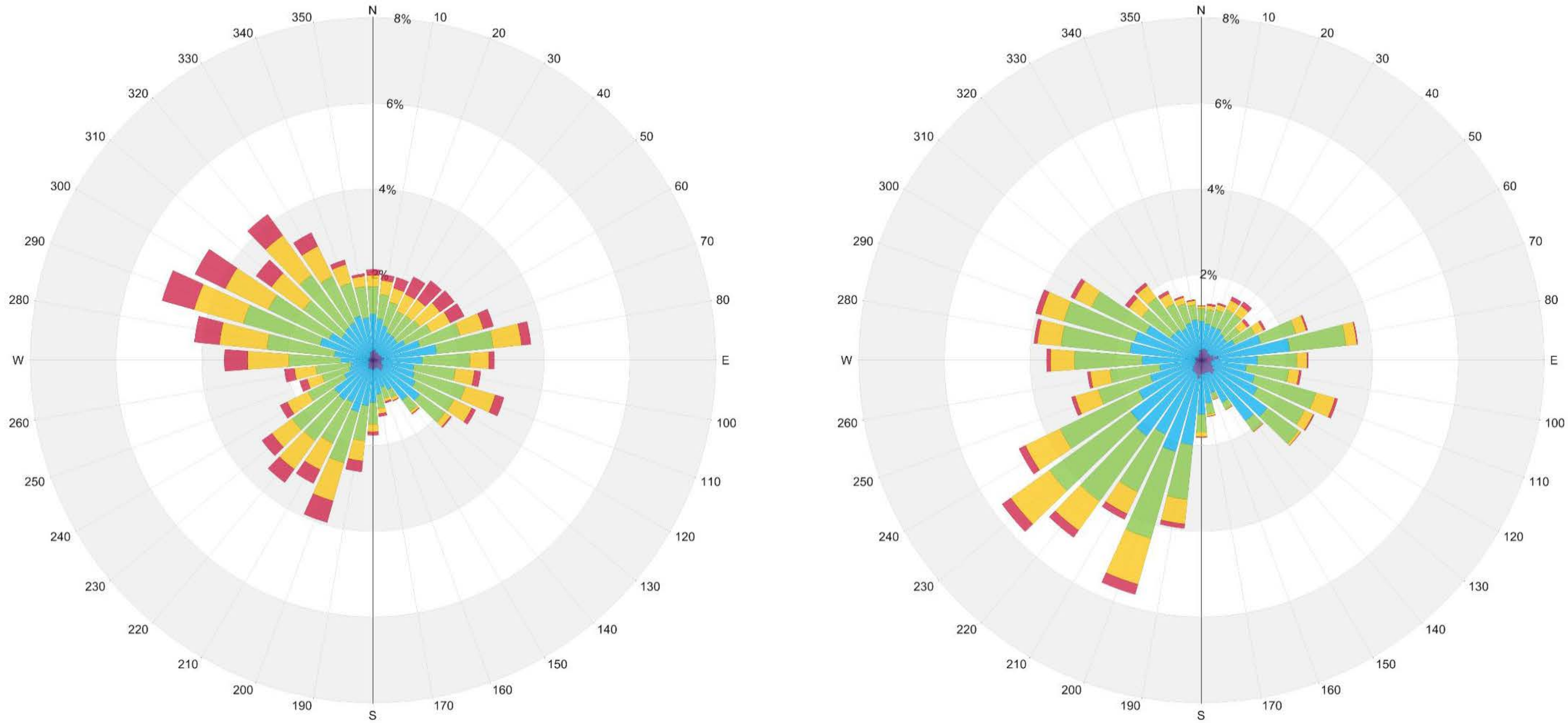
**Figure 3.1-1**

*Wind Tunnel Study Model – No Build*

Dock Square    Boston, Massachusetts

**Figure 3.1-2**

*Wind Tunnel Study Model – Build*




**Spring**
**(March - May)**

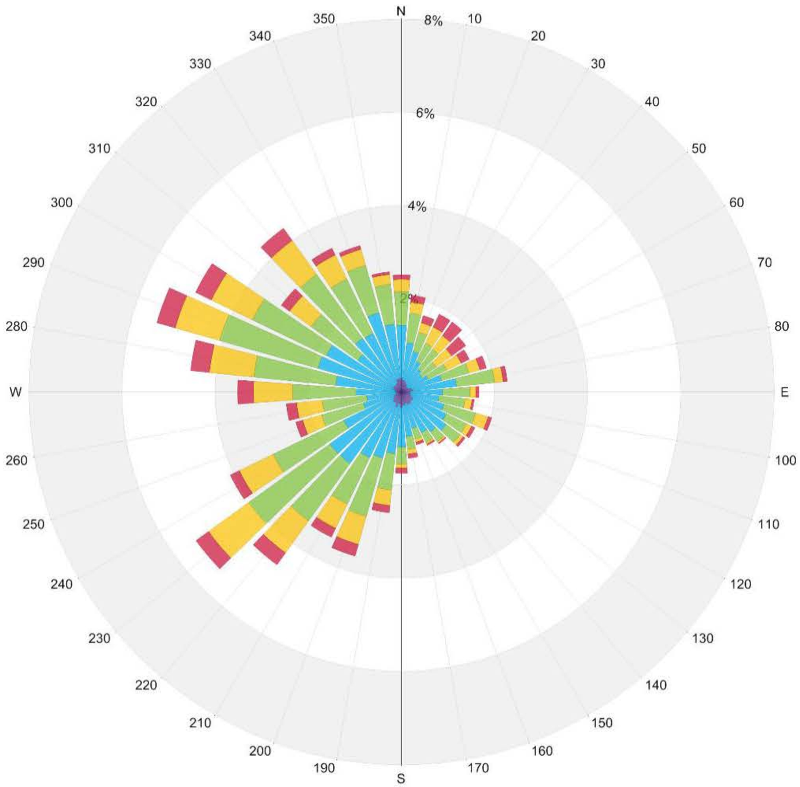
Summer
(June - August)

| Wind Speed (mph) | Probability (%) Spring | Probability (%) Summer |
|---|---|---|
| Calm | 2.4 | 2.7 |
| 1-5 | 6.4 | 8.9 |
| 6-10 | 28.5 | 38.1 |
| 11-15 | 32.9 | 35.1 |
| 16-20 | 19.7 | 12.6 |
| >20 | 10.2 | 2.7 |

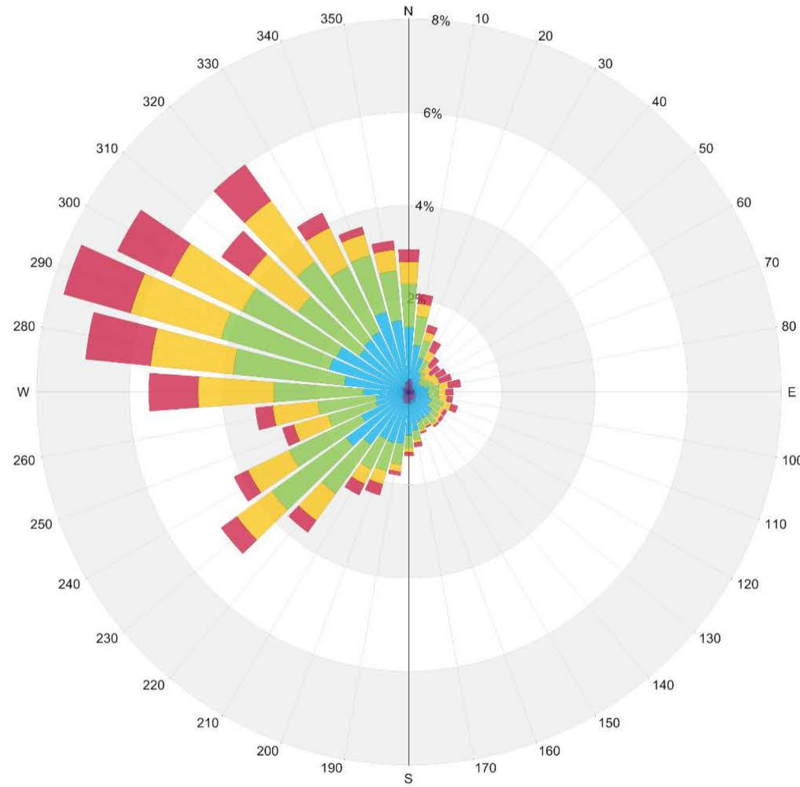
**Dock Square Boston, Massachusetts**

**Figure 3.1-3**

*Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1991-2016)*




**Fall**
**(September - November)**



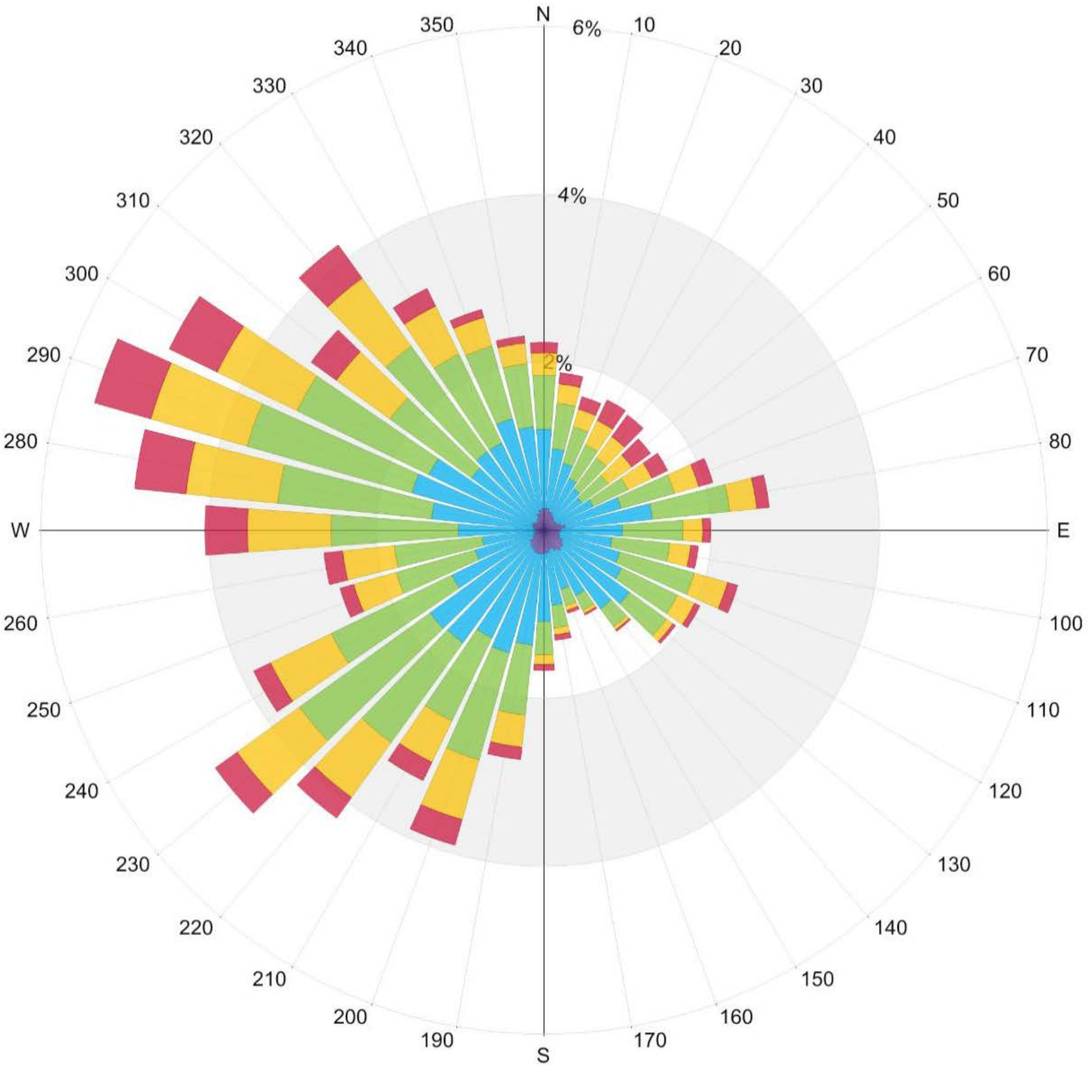

**Winter**
**(December - February)**

| Wind Speed (mph) | Probability (%) Fall | Winter |
|---|---|---|
| Calm | 2.9 | 2.3 |
| 1-5 | 8.0 | 6.2 |
| 6-10 | 34.3 | 27.6 |
| 11-15 | 32.8 | 31.0 |
| 16-20 | 15.3 | 20.1 |
| >20 | 6.7 | 12.8 |



**Figure 3.1-4**

*Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1991-2016)*




| Wind Speed (mph) | Probability (%) |
|---|---|
| Calm | 2.6 |
| 1-5 | 7.4 |
| 6-10 | 32.1 |
| 11-15 | 33.0 |
| 16-20 | 16.9 |
| >20 | 8.1 |

**Annual Winds**

**Dock Square Boston, Massachusetts**

**Figure 3.1-5**

*Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1991-2016)*

### *3.1.4 BPDA Wind Criteria*

The 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 one percent 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[1]. 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 one-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are presented in Table 3.1-1.

**Table 3.1-1 Boston Planning and Development Agency Mean Wind Criteria***

| Level of Comfort | Wind Speed |
|---|---|
| Dangerous | > 27 mph |
| Uncomfortable for Walking | >19 and ≤27 mph |
| Comfortable for Walking | >15 and ≤19 mph |
| Comfortable for Standing | >12 and ≤15 mph |
| Comfortable for Sitting | <12 mph |

* Applicable to the hourly mean wind speed exceeded one percent of the time.

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 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 at the study site. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among

[1] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 - 249.

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 (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

### *3.1.5 Predicted Wind Conditions*

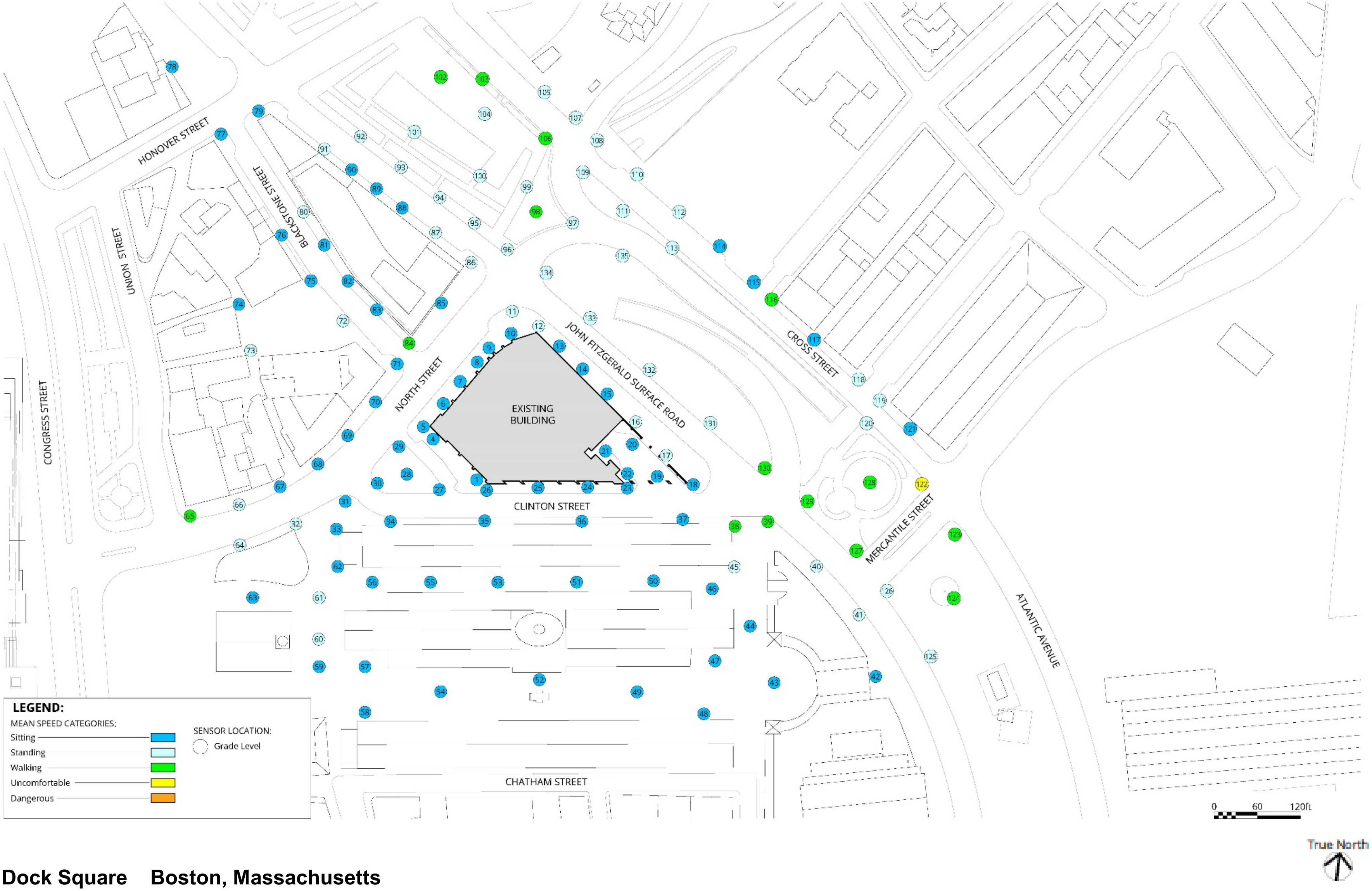
Figures 3.1-6 through 3.1-9 graphically depict the wind conditions at each wind measurement location based on the annual winds. Table 1 in Appendix D presents the mean and effective gust wind speeds annually and Table 2 in Appendix D presents the same information for each season. In both tables, the colors represent the comfort category that this location falls within as defined in the footer of the tables. Typically, summer and fall winds tend to be more comfortable than annual winds, while winter and spring winds are less comfortable than the annual winds. The following summary of pedestrian wind conditions is based on the annual winds for each configuration tested, except where noted below in the text.

#### 3.1.5.1 No-Build

The No-Build configuration was tested with the existing parking garage structure and surroundings, as shown in Figure 3.1-1 and Figure 3.1-6. As indicated in Figure 3.1-6, mean wind speeds comfortable for walking or better are predicted throughout the site annually, except at one location. Uncomfortable conditions are expected at the west corner of Cross Street and Mercantile Street on an annual basis (see Location 122 in Figure 3.1-6). The effective gust criterion is met seasonally and annually at all locations around the site for the No-Build configuration (see Figure 3.1-8 and Appendix D).

#### 3.1.5.2 Build

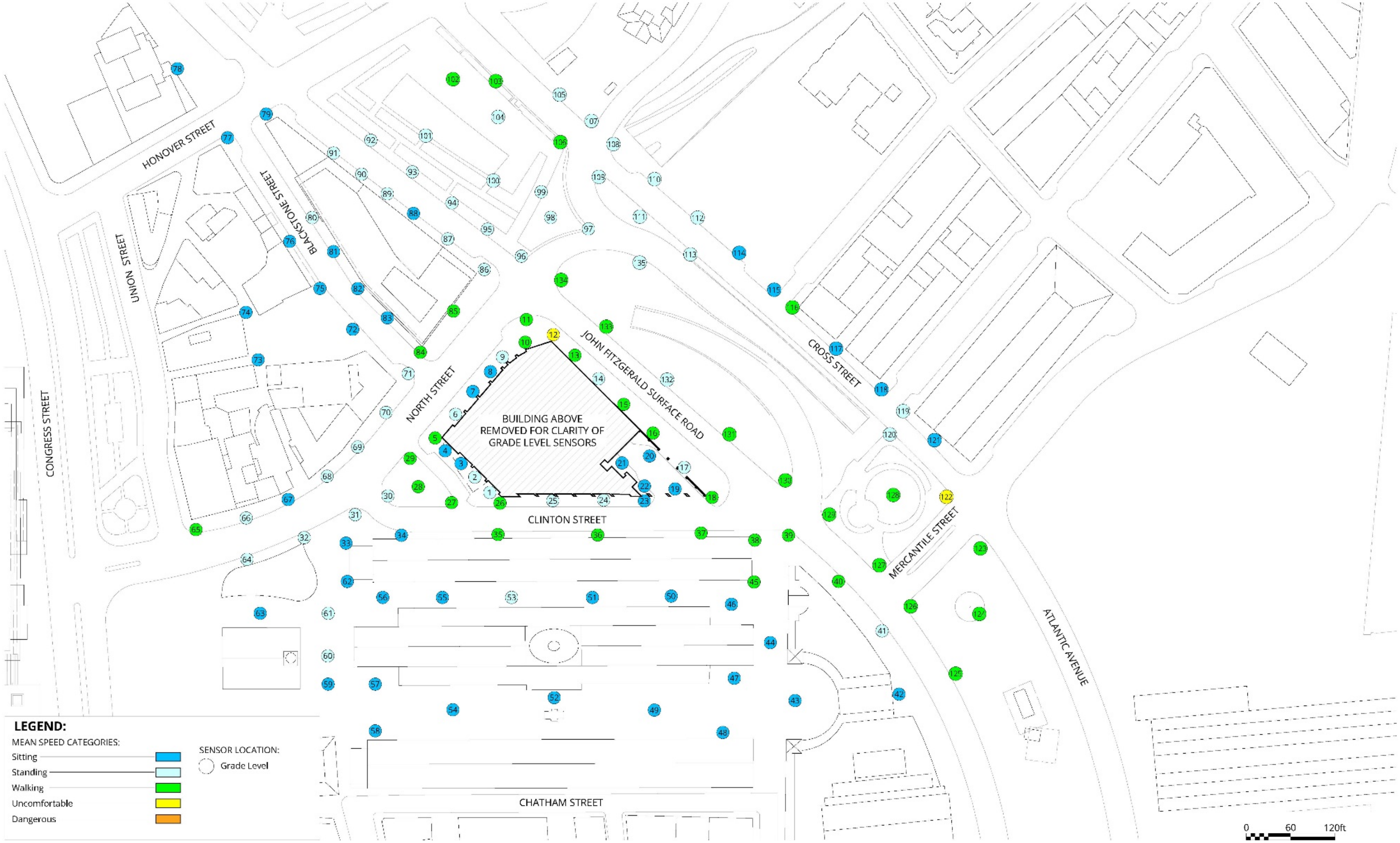
With the addition of the Project, annual mean wind speed conditions are typically expected to remain comfortable for walking or better around the outskirts of the site, with the exception of the pre-existing uncomfortable conditions at Location 122 at Mercantile and Congress streets (Figure 3.1-7). Although the increase in height from the Project is predicted to result in some localized increases in wind speeds immediately surrounding the site, these wind speeds typically remain within the recommended comfort categories for sidewalks and entrances. One additional exception, however, occurs at the northern corner of the building (see Location 12 in Figure 3.1-7) and is a marginal exceedance of the walking criteria (see Location 12 in Table 1 of Appendix D). This location may occasionally be windier than preferred during the winter and spring months. Elevated wind speeds at




**Dock Square Boston, Massachusetts**

**Figure 3.1-6**

*Pedestrian Wind Conditions – Mean Speed – No-Build*

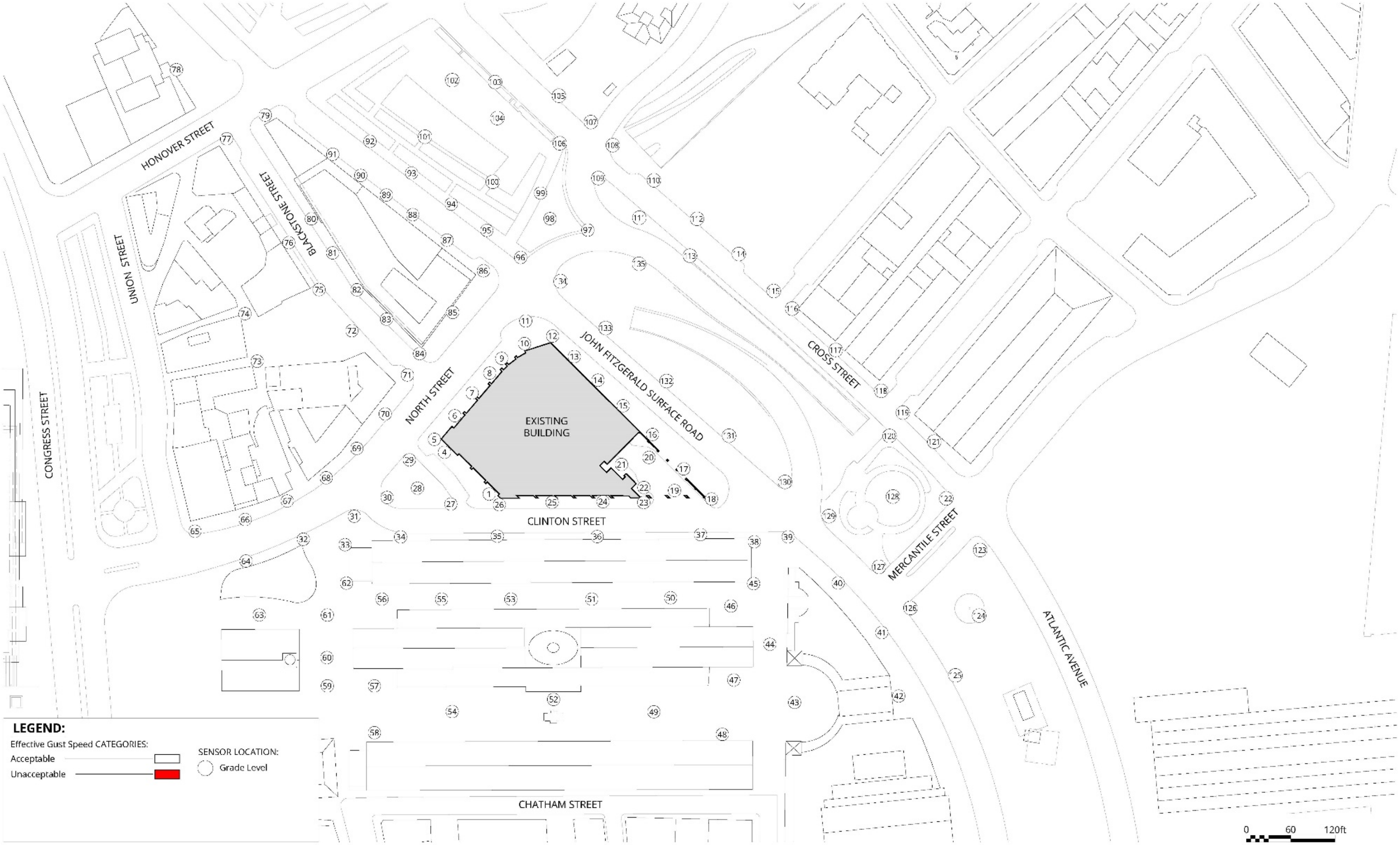



True North

**Dock Square Boston, Massachusetts**

**Figure 3.1-7**

*Pedestrian Wind Conditions – Mean Speed – Build*

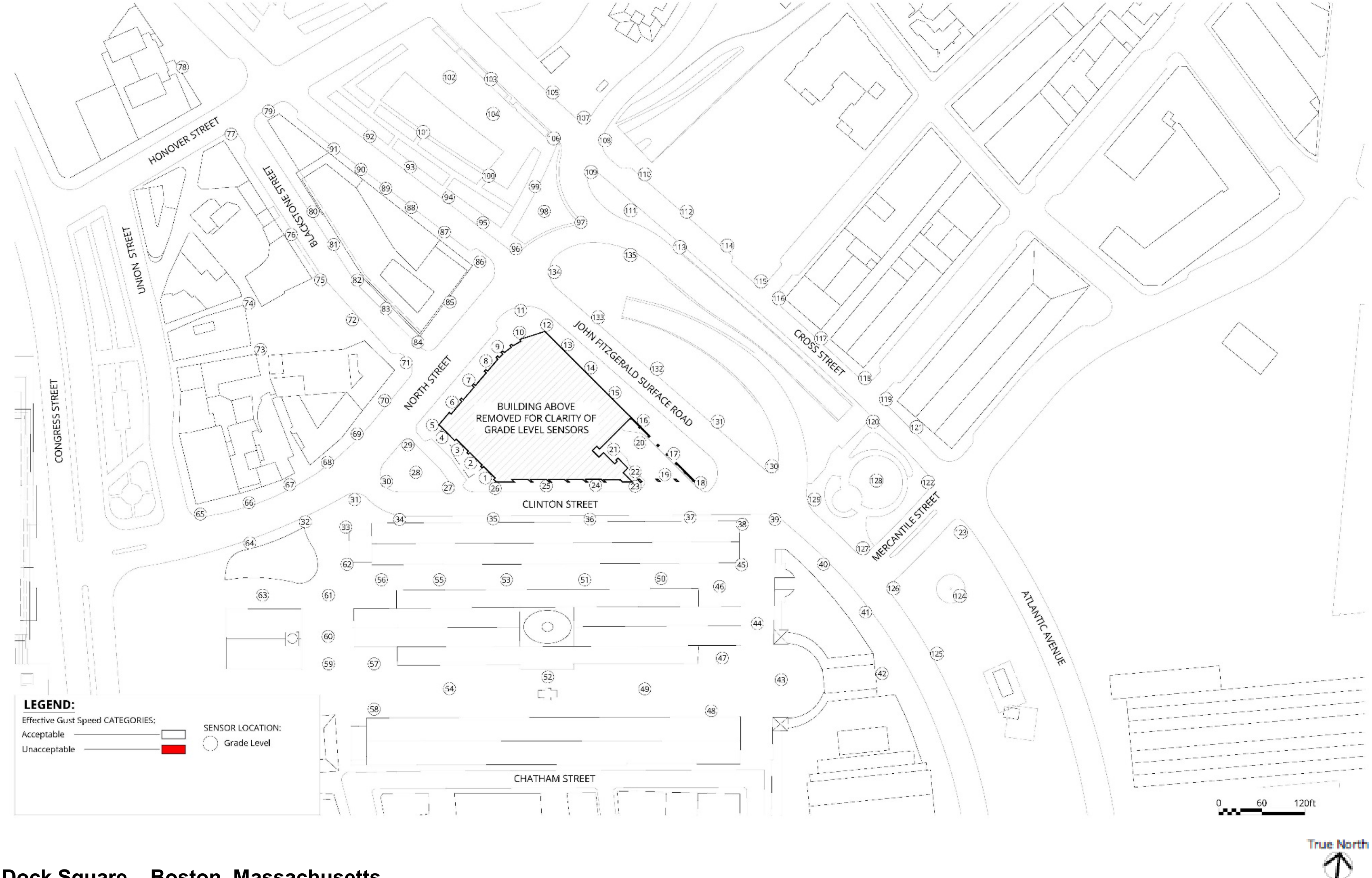



True North

**Dock Square Boston, Massachusetts**

**Figure 3.1-8**

*Pedestrian Wind Conditions – Effective Gust Speed – No-Build*




**Dock Square Boston, Massachusetts**

**Figure 3.1-9**

*Pedestrian Wind Conditions – Effective Gust Speed – Build* this location are the result of strong northwesterly winds during the winter and spring downwashing off the northwest façade of the Project and accelerating around the north corner. Generalized downwashing and corner acceleration flow patterns are illustrated in Figure 3.1-10.

Mitigation measures to improve wind conditions at Location 12 are being explored, such as localized marcescent landscaping with underplanting at the street corner and/or an overhead canopy at the building corner.

The effective gust criterion is also met seasonally and annually at all locations around the site for the Build configuration (Figure 3.1-9 and Appendix D).

### *3.1.6 Conclusions*

The results of the wind analysis show that with the exception of one new location, at the northern corner of the Project and one existing condition at Mercantile and Congress streets, wind speeds typically are within the recommended comfort categories for sidewalks and entrances with the addition of the Project to the site. Mitigation measures are being explored to improve wind conditions at this location. The effective gust criterion is met both seasonally and annually at all locations in both the No-Build and Build Configurations.

## 3.2 Shadow

### *3.2.1 Introduction and Methodology*

As typically required by the BPDA, a shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

The Greenway District Planning Study Use and Development Guidelines state that "New development along the Greenway will be required to minimize any shadow impacts over and above those shadows that might be cast by an as-of-right development scheme in conformance with current zoning". The shadow analysis has been prepared in compliance with these guidelines, and shows the anticipated impacts from the Project in comparison to the existing condition and as-of-right alternative, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks, and bus stops adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable altitude and azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14 at the end of this section.

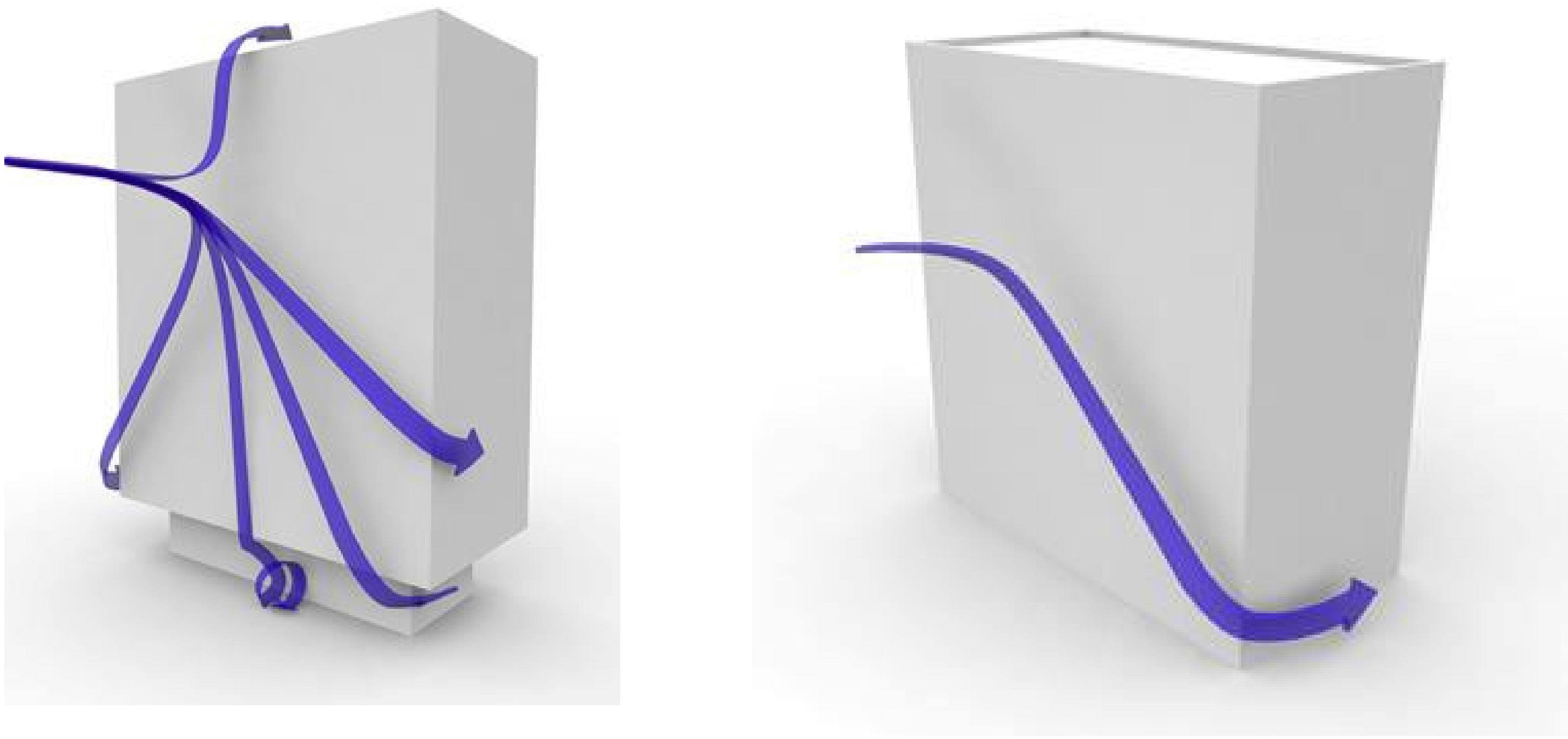




**Figure 3.1-10**

*General Downwashing (left) and Corner Acceleration (right) Wind Patterns*

The results of the analysis show that during most of the time periods studied, new shadow from the Project will extend only slightly beyond the as-of-right alternative shadows, with the shadow from both generally limited to nearby streets and sidewalks. Of the 14 time periods studied, no new shadow is cast onto any bus stops near the Project. During five of the time periods studied, no new shadow is cast onto public open space by the as-of-right alternative or the Project. During two of the time periods studied, new shadow from the Project just reaches the edge of the Greenway adjacent to the site (June 21 at 12:00 p.m., and September 21 at 9:00 a.m.), and during two time periods, all Project shadows on the Greenway also occur in the as-of-right alternative (March 21 at 3:00 p.m. and September 21 at 3:00 p.m.). The Project will cast shadow onto the Greenway during five other time periods (March 21 at 12:00 p.m., June 21 at 3:00 p.m., September 21 at 12:00 p.m., and December 21 at 9:00 a.m. and 12:00 p.m.).

### *3.2.2 Vernal Equinox (March 21)*

At 9:00 a.m. during the vernal equinox, new shadow from the as-of-right alternative and the Project will be cast to the northwest onto North Street and its western sidewalk, a portion of Blackstone street and its northern sidewalk, and onto a portion of John F. Fitzgerald Surface Road and its southern sidewalk. New shadow from the Project will extend slightly beyond the as-of-right alternative onto additional portions of Blackstone Street and John F. Fitzgerald Surface Road and their sidewalks. No new shadow will be cast onto nearby bus stops or open space.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the north onto John F. Fitzgerald Surface Road and its northern sidewalk, and onto the portion of the Greenway adjacent to the site. New shadow from the Project will extend beyond the as-of-right alternative onto a small additional portion of the Greenway, however, most of the additional shadow from the Project will be limited to the I-93 ramp. No new shadow will be cast onto nearby bus stops or other open spaces.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast onto Cross Street and its sidewalks, and onto the portion of the Greenway adjacent to the site. New shadow from the Project will extend slightly beyond the as-of-right alternative onto a small portion of Commercial Street and its sidewalks. No new shadow will be cast onto nearby bus stops or other open spaces.

### *3.2.3 Summer Solstice (June 21)*

At 9:00 a.m. during the summer solstice, new shadow from the as-of-right alternative and the Project will be cast to the northwest onto North Street. New shadow from the Project will extend slightly beyond the as-of-right alternative onto a small additional portion of North Street. No new shadow will be cast onto nearby bus stops or open spaces.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the north onto John F. Fitzgerald Surface Road and its southern sidewalk. New shadow from the Project will extend slightly beyond the as-of-right alternative onto a small additional portion of John F. Fitzgerald Surface Road and its northern sidewalk, and will just reach the edge of the Greenway. No new shadow will be cast onto nearby bus stops or other open spaces.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the east onto Clinton Street, onto John F. Fitzgerald Surface Road, and onto a small portion of the Greenway adjacent to the site. New shadow from the Project will extend beyond the as-of-right alternative onto a small additional portion of Clinton Street, and onto a portion of the Armenian Heritage Park. No new shadow will be cast onto bus stops or other open spaces.

At 6:00 p.m., most of the area is under existing shadow. Both the as-of-right alternative and the Project do not cast new shadows.

### *3.2.4 Autumnal Equinox (September 21)*

At 9:00 a.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto North Street and its western sidewalk, a portion of Blackstone street and its northern sidewalk, and onto a portion of John F. Fitzgerald Surface Road and its southern sidewalk. New shadow from the Project will extend slightly beyond the as-of-right alternative onto additional portions of Blackstone Street and John F. Fitzgerald Surface Road and their sidewalks, and will just reach the edge of the Greenway. No new shadow will be cast onto nearby bus stops or other open space.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the north onto John F. Fitzgerald Surface Road and its northern sidewalk, and onto the portion of the Greenway adjacent to the site. New shadow from the Project will extend beyond the as-of-right alternative onto a small additional portion of the Greenway, however, most of the additional shadow from the Project will be limited to the I-93 ramp. No new shadow will be cast onto nearby bus stops or other open spaces.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast onto Cross Street and its sidewalks, onto a portion of Commercial Street and its sidewalks, and onto the portion of the Greenway adjacent to the site. New shadow from the Project will extend slightly beyond the as-of-right alternative onto a small additional portion of Commercial Street and its sidewalks. No new shadow will be cast onto nearby bus stops or other open spaces.

At 6:00 p.m., most of the area is under existing shadow. Both the as-of-right alternative and the Project do not cast new shadows.

### *3.2.5 Winter Solstice (December 21)*

The winter solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season, causing the shadows in urban areas to elongate and be cast onto large portions of the surrounding area.

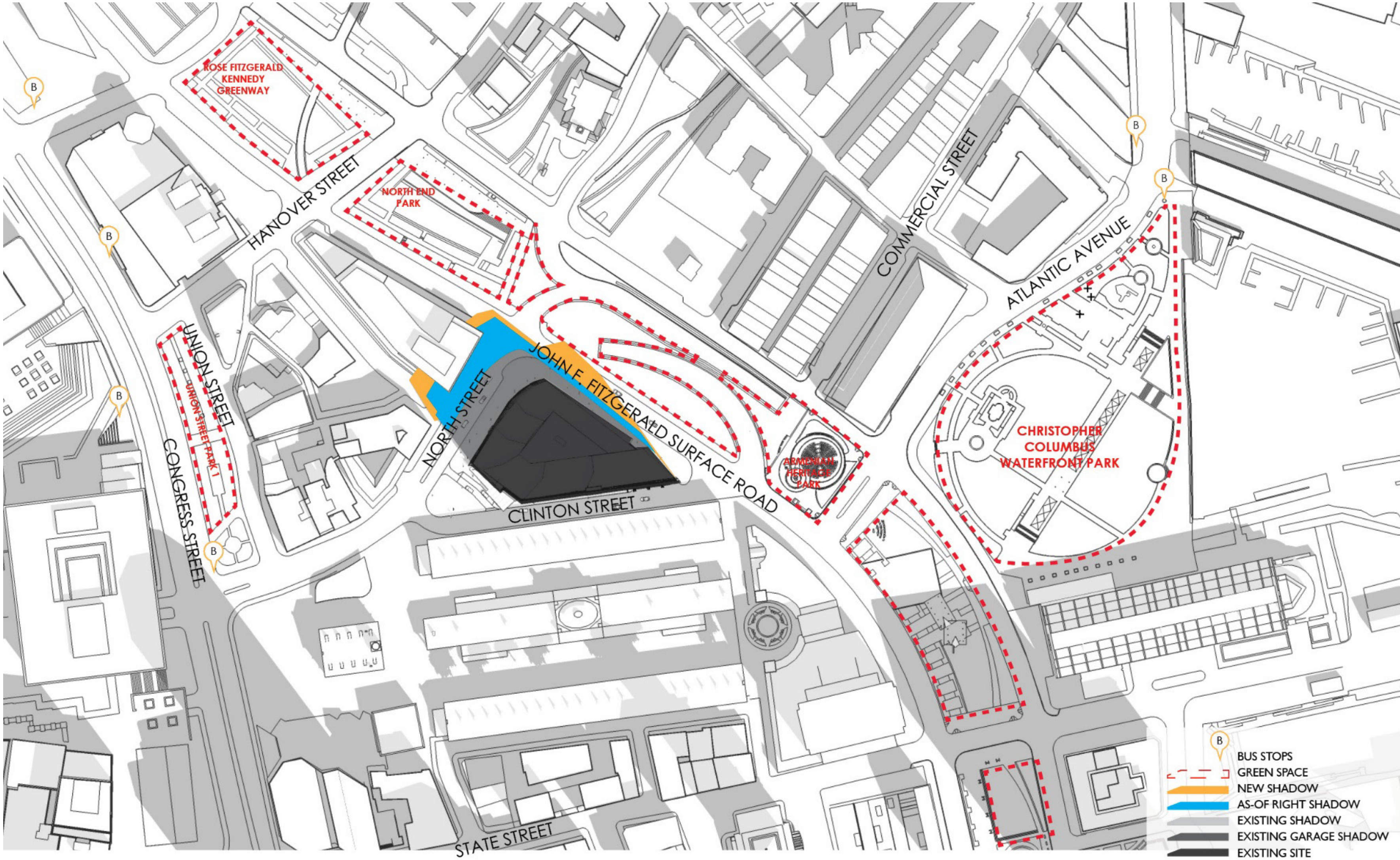
At 9:00 a.m., new shadow from the as-of-right alternative and the Project will be cast to the northwest onto Hanover Street's eastern sidewalk, and onto the North End Park. New shadow from the Project will extend beyond the as-of-right alternative onto Hanover Street and its western sidewalk, onto Cross Street and its sidewalks, onto an additional portion of the North End Park, and onto a small additional portion of the Greenway to the west of Hanover Street. No new shadow will be cast onto nearby bus stops or other open spaces.

At 12:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the north onto a portion of North Street and its western sidewalk, onto John F. Fitzgerald Surface Road and its sidewalks, onto the portion of the Greenway adjacent to the site, and onto a portion of the North End Park. New shadow from the Project will extend beyond the as-of-right alternative onto Cross Street and its sidewalks, and onto a small additional portion of the North End Park. No new shadow will be cast onto nearby bus stops or other open spaces.

At 3:00 p.m., new shadow from the as-of-right alternative and the Project will be cast to the northeast and will be limited to a parking lot. No new shadow will be cast onto nearby bus stops or open spaces.

### *3.2.6 Conclusions*

Shadow impacts from the Project were compared to the as-of-right alternative in accordance with the Greenway District Planning Study Use and Development Guidelines. Because a portion of the proposed Project is taller than the as-of-right alternative, the shadow impacts from the Project will be more than the as-of-right alternative. New shadow from both the as-of-right alternative and the Project will generally be limited to the immediately surrounding streets and sidewalks. Of the 14 time periods studied, no new shadow is cast onto any bus stops in the vicinity of the Project. During five of the time periods studied, no new shadow is cast onto public open space by the as-of-right alternative or the Project. During two of the time periods studied, new shadow from the Project just reaches the edge of the Greenway adjacent to the site (June 21 at 12:00 p.m., and September 21 at 9:00 a.m.), and during two time periods, all Project shadows on the Greenway also occur in the as-of-right alternative (March 21 at 3:00 p.m. and September 21 at 3:00 p.m.). The Project will cast shadow onto the Greenway during five other time periods (March 21 at 12:00 p.m., June 21 at 3:00 p.m., September 21 at 12:00 p.m., and December 21 at 9:00 a.m. and 12:00 p.m.).

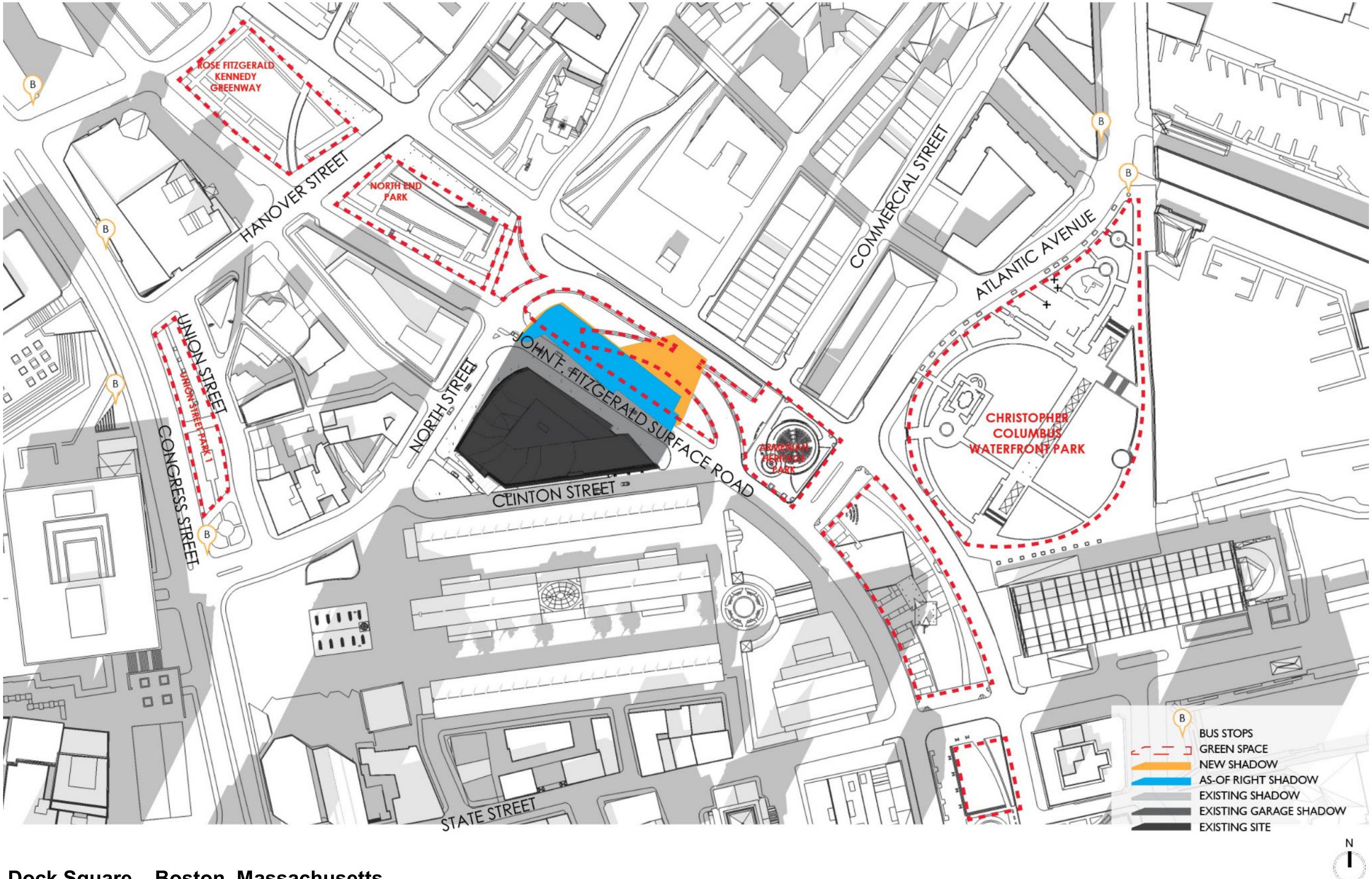



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-1**

*Shadow Study: March 21, 9:00 a.m.*

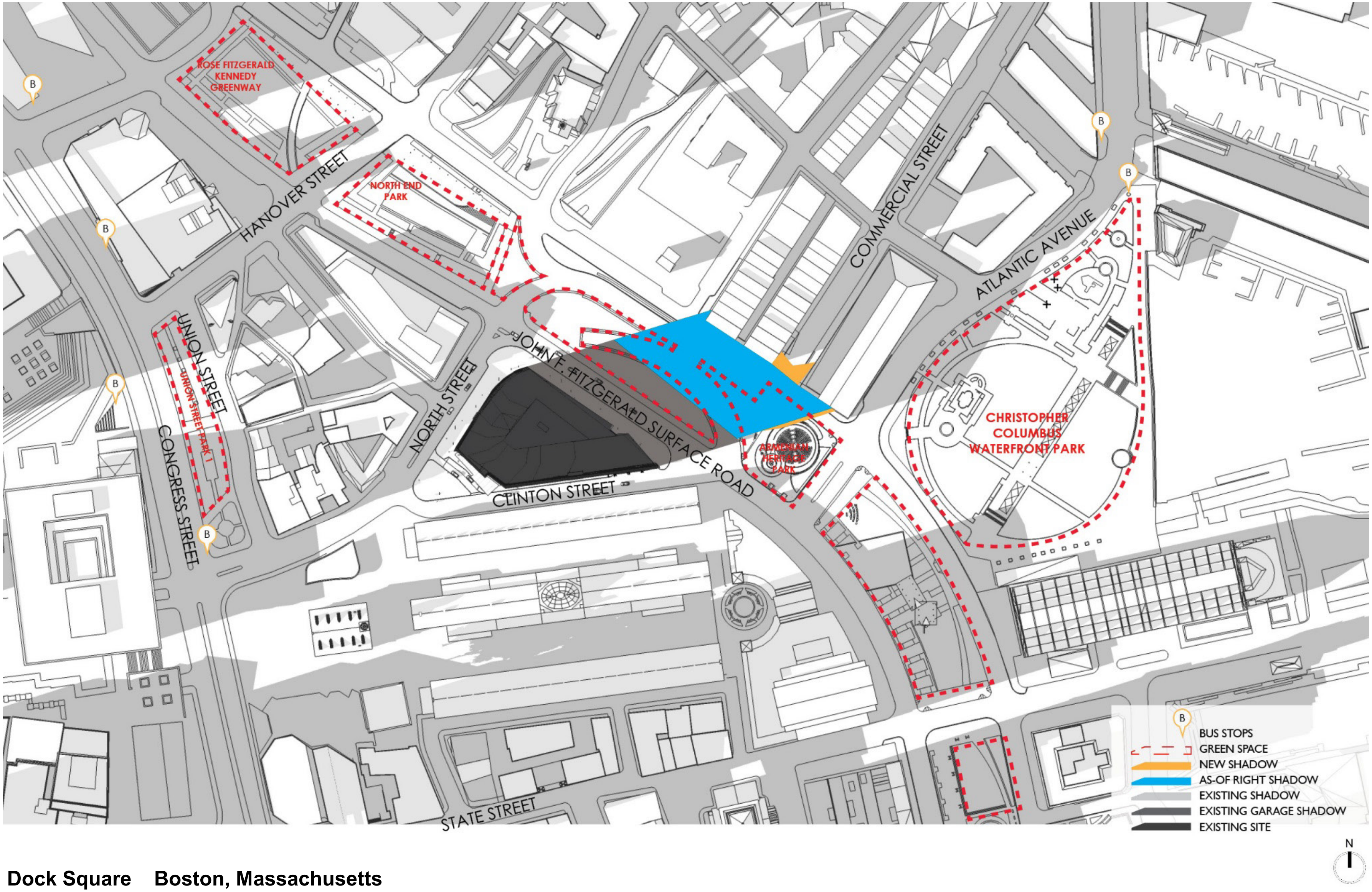



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-2**

*Shadow Study: March 21, 12:00 p.m.*

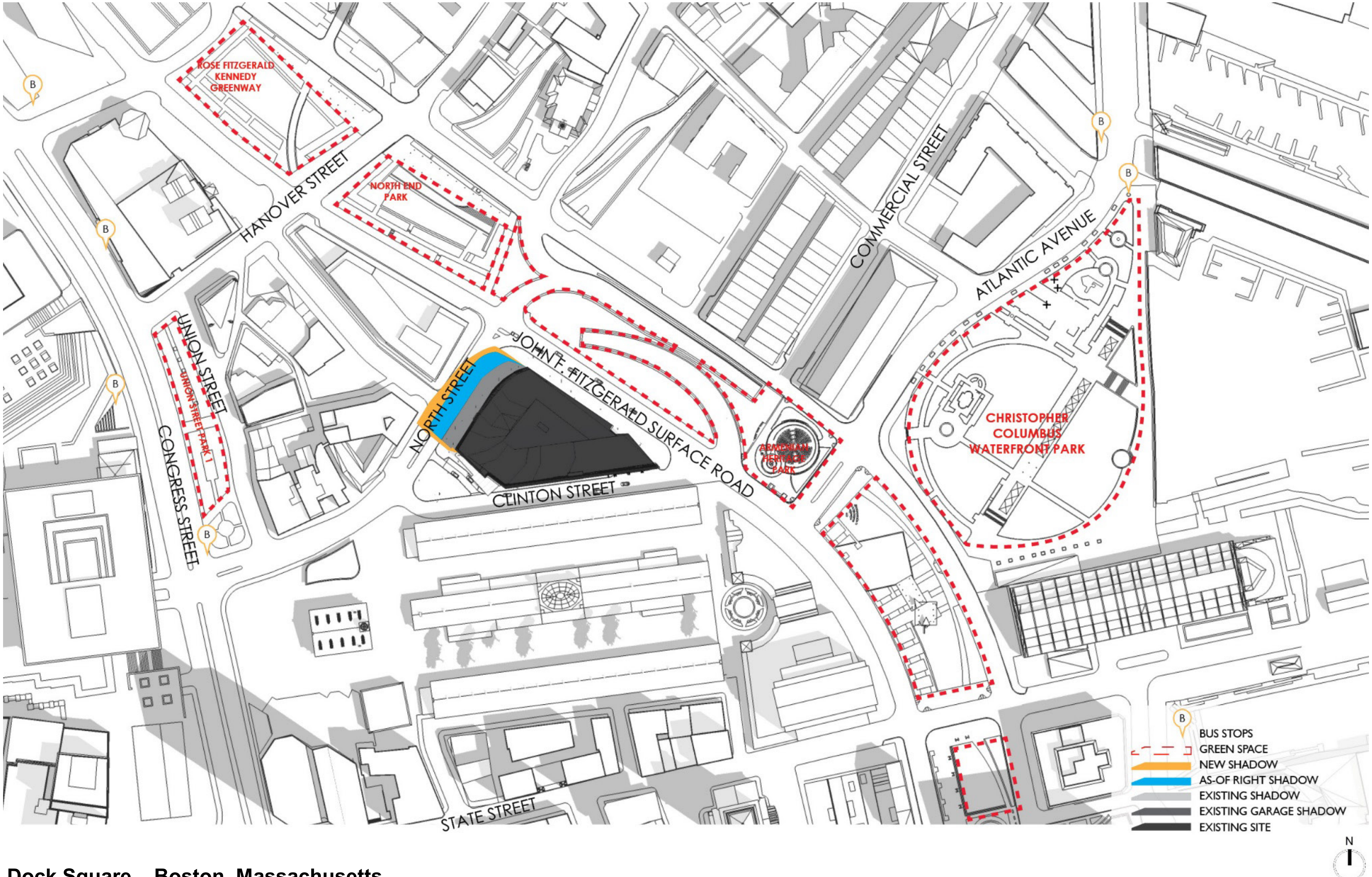



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-3**

*Shadow Study: March 21, 3:00 p.m.*

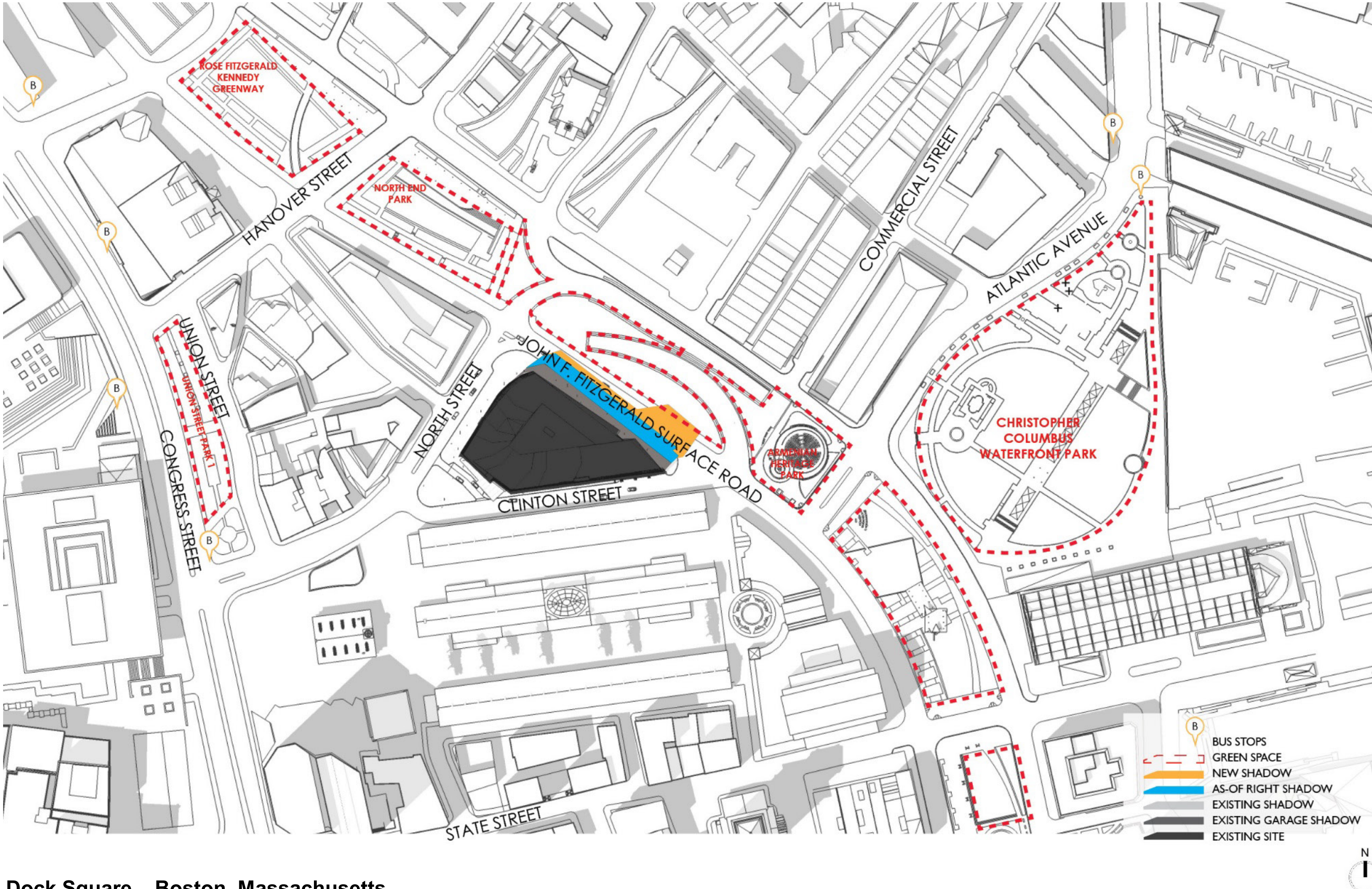



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-4**

*Shadow Study: June 21, 9:00 a.m.*

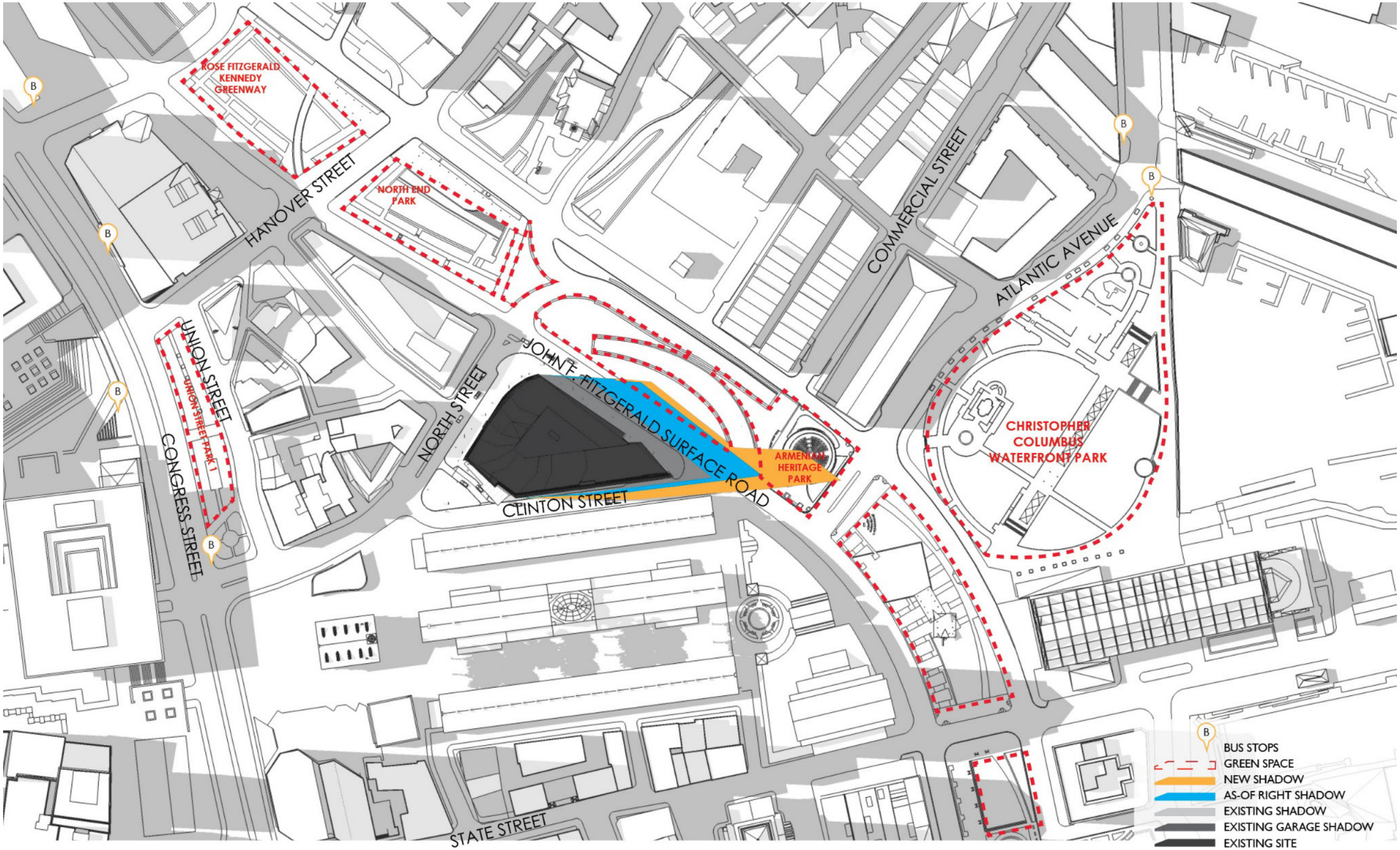



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-5**

*Shadow Study: June 21, 12:00 p.m.*

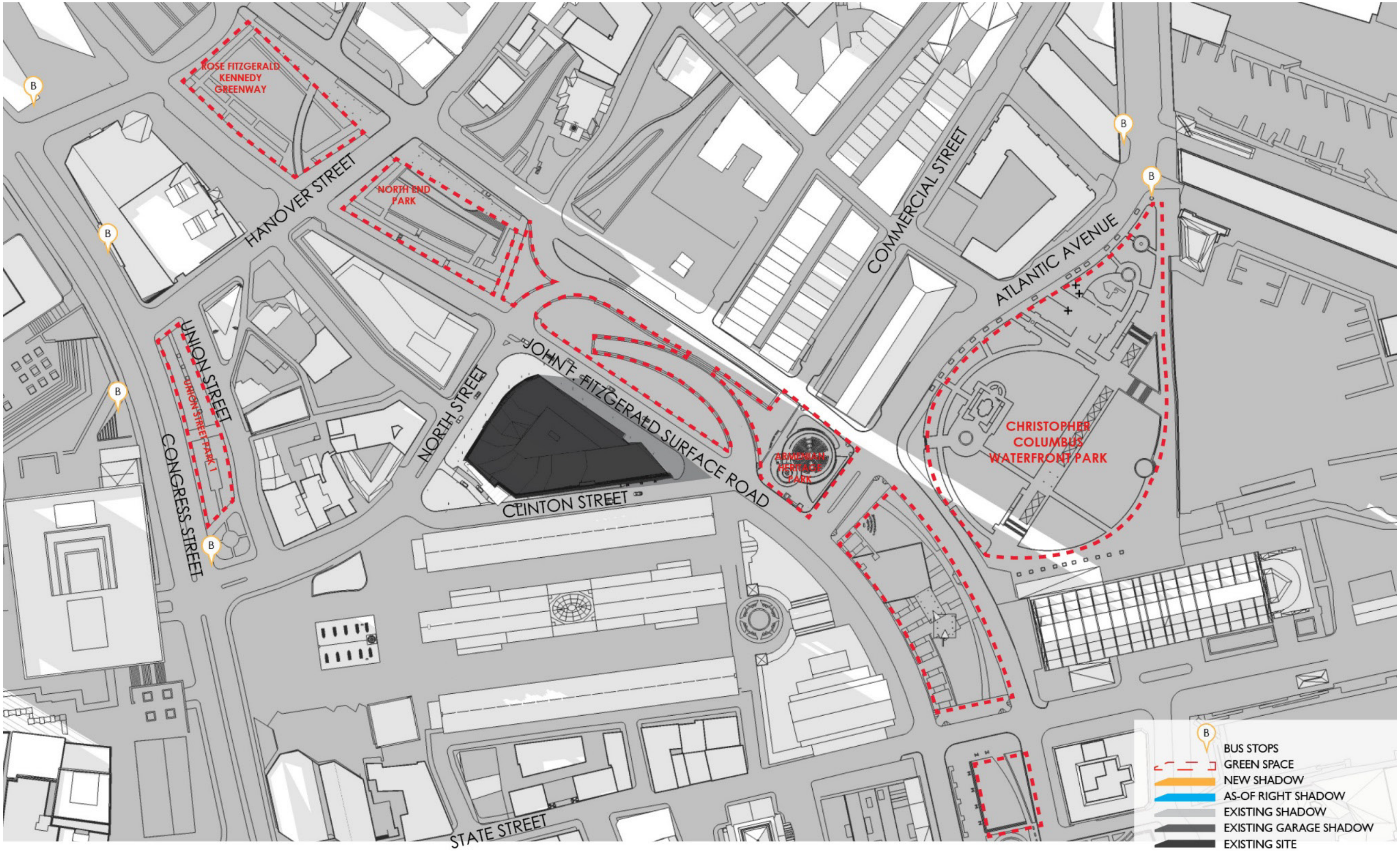



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-6**

*Shadow Study: June 21, 3:00 p.m.*

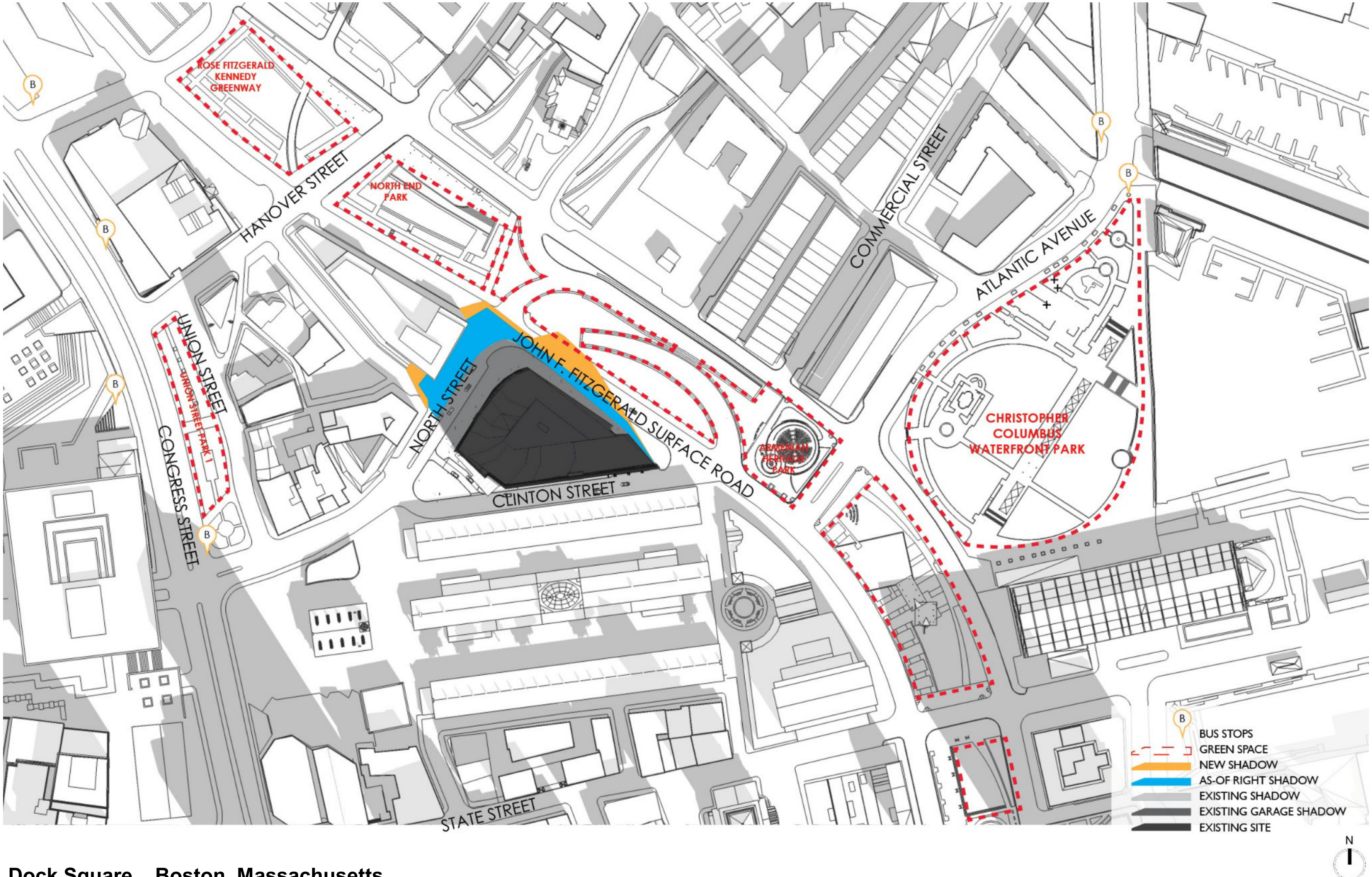



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-7**

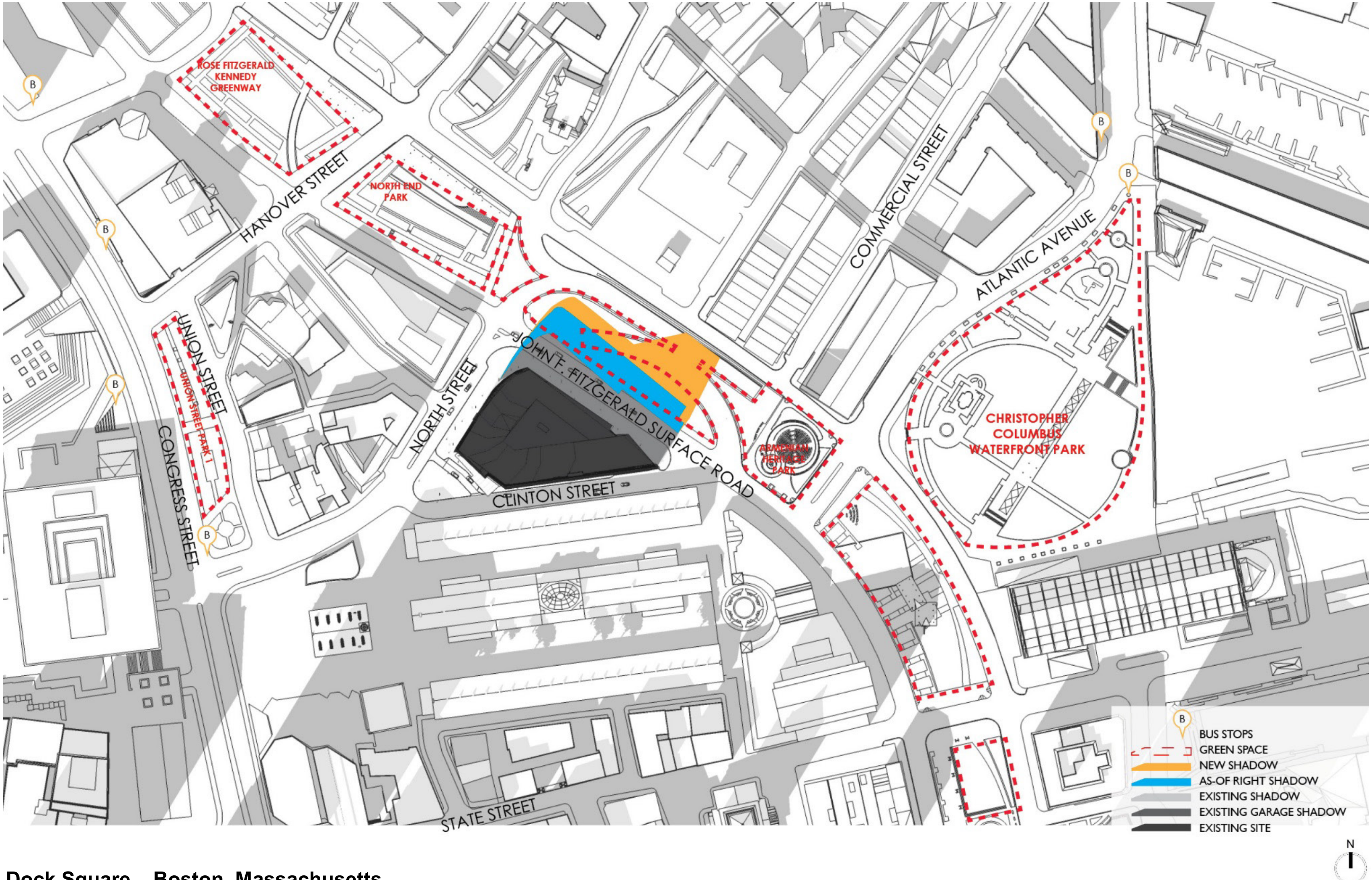
*Shadow Study: June 21, 6:00 p.m.*




**Dock Square Boston, Massachusetts**

**Figure 3.2-8**

*Shadow Study: September 21, 9:00 a.m.*

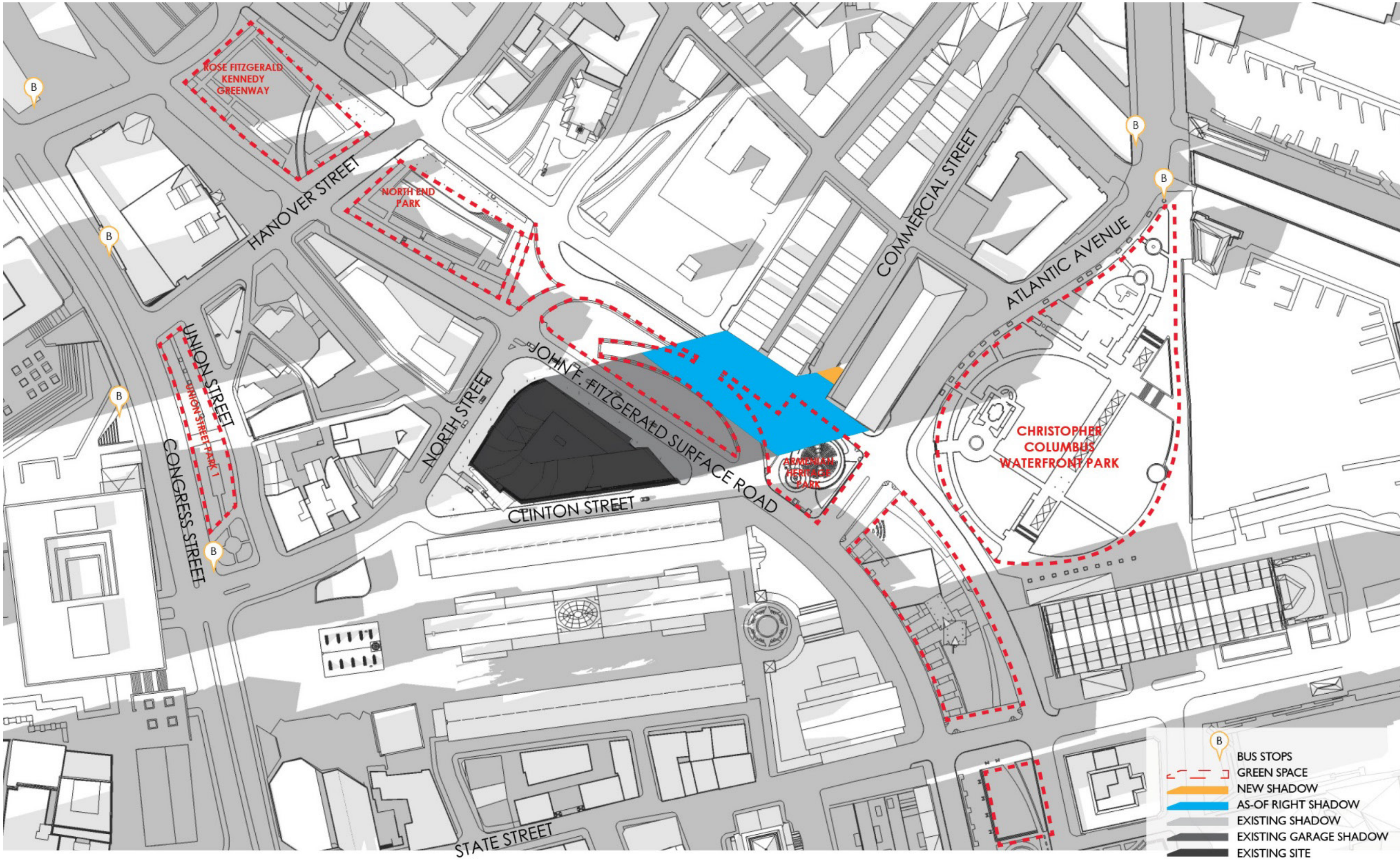



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-9**

*Shadow Study: September 21, 12:00 p.m.*

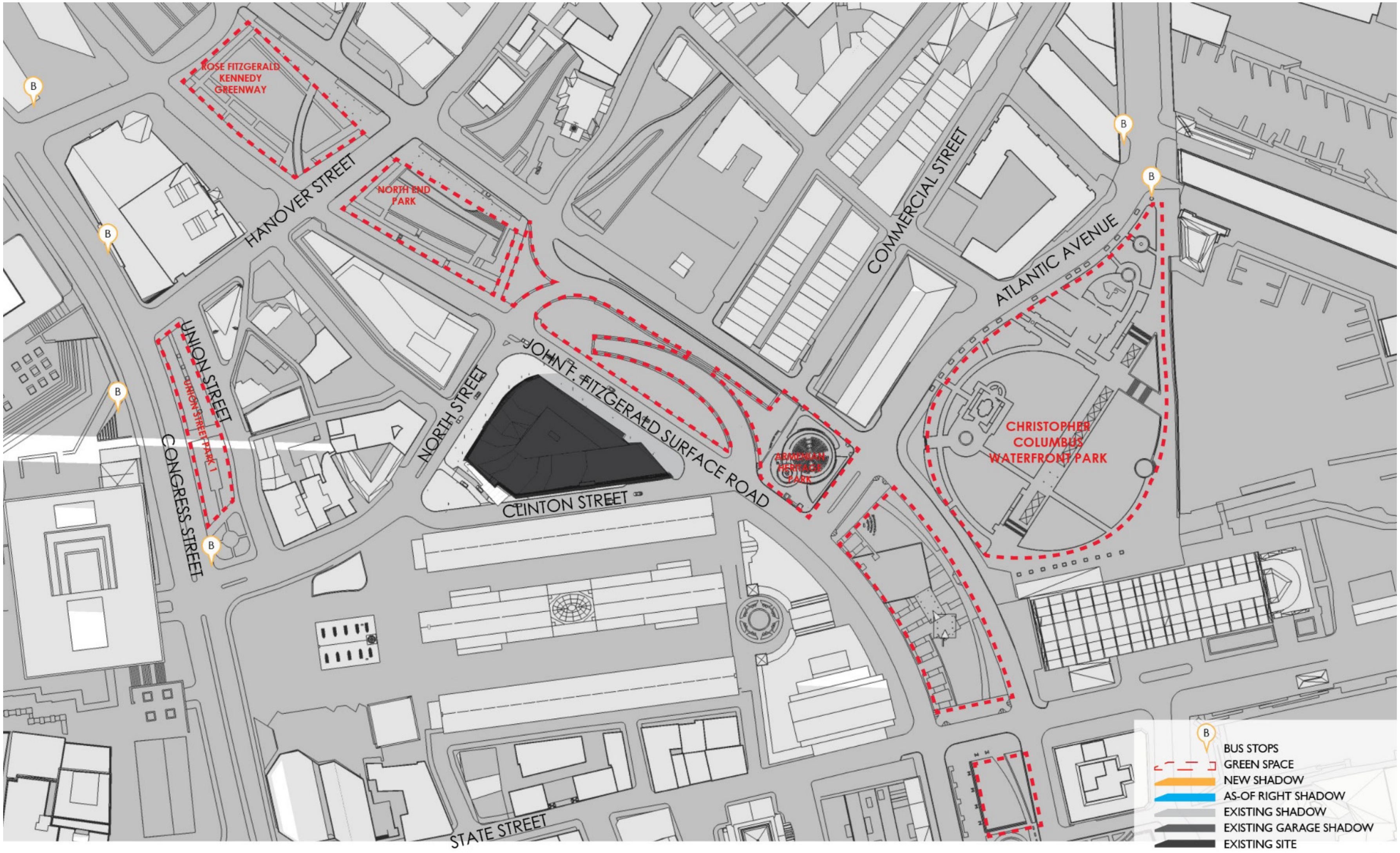



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-10**

*Shadow Study: September 21, 3:00 p.m.*

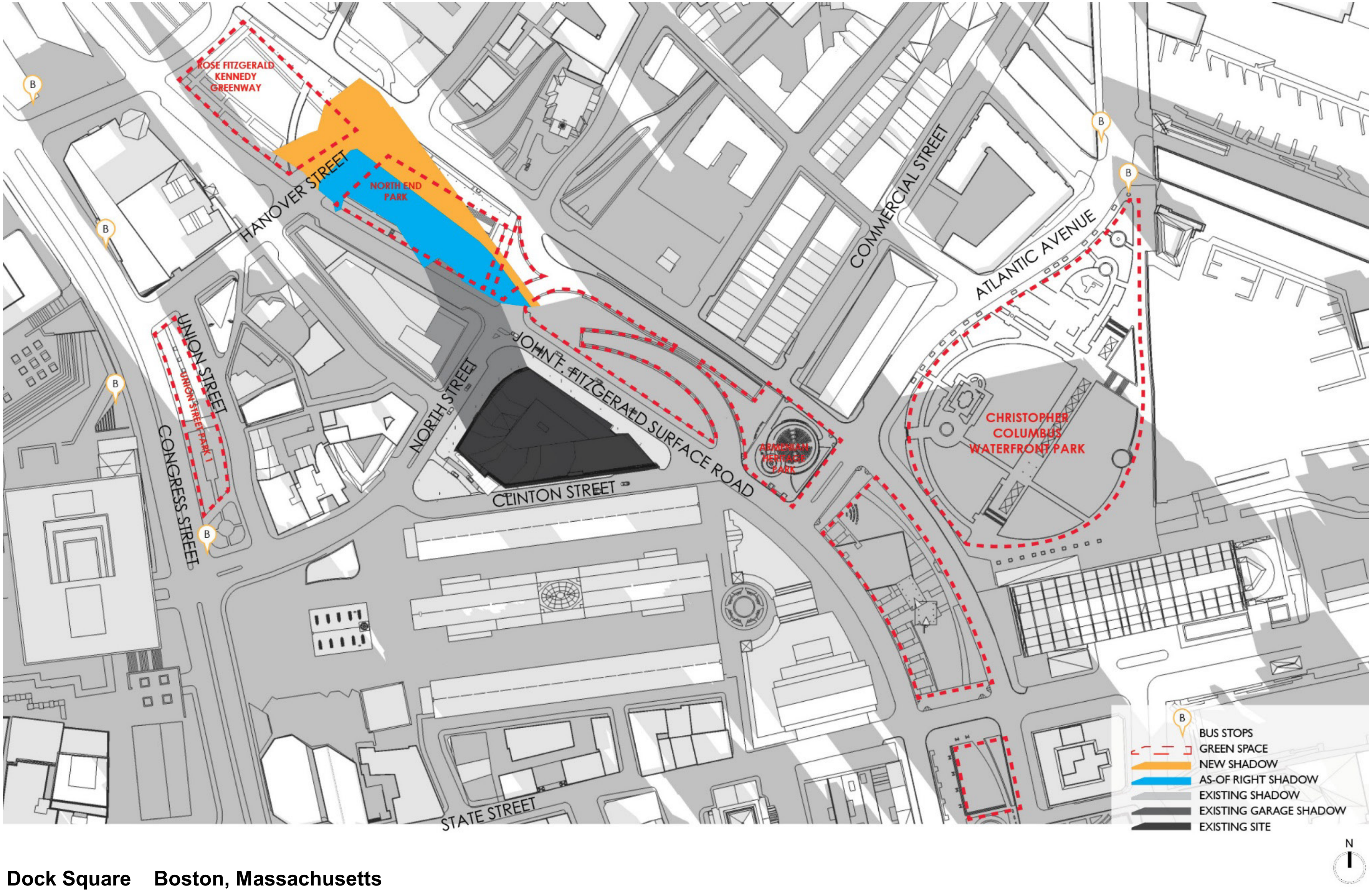



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-11**

*Shadow Study: September 21, 6:00 p.m.*

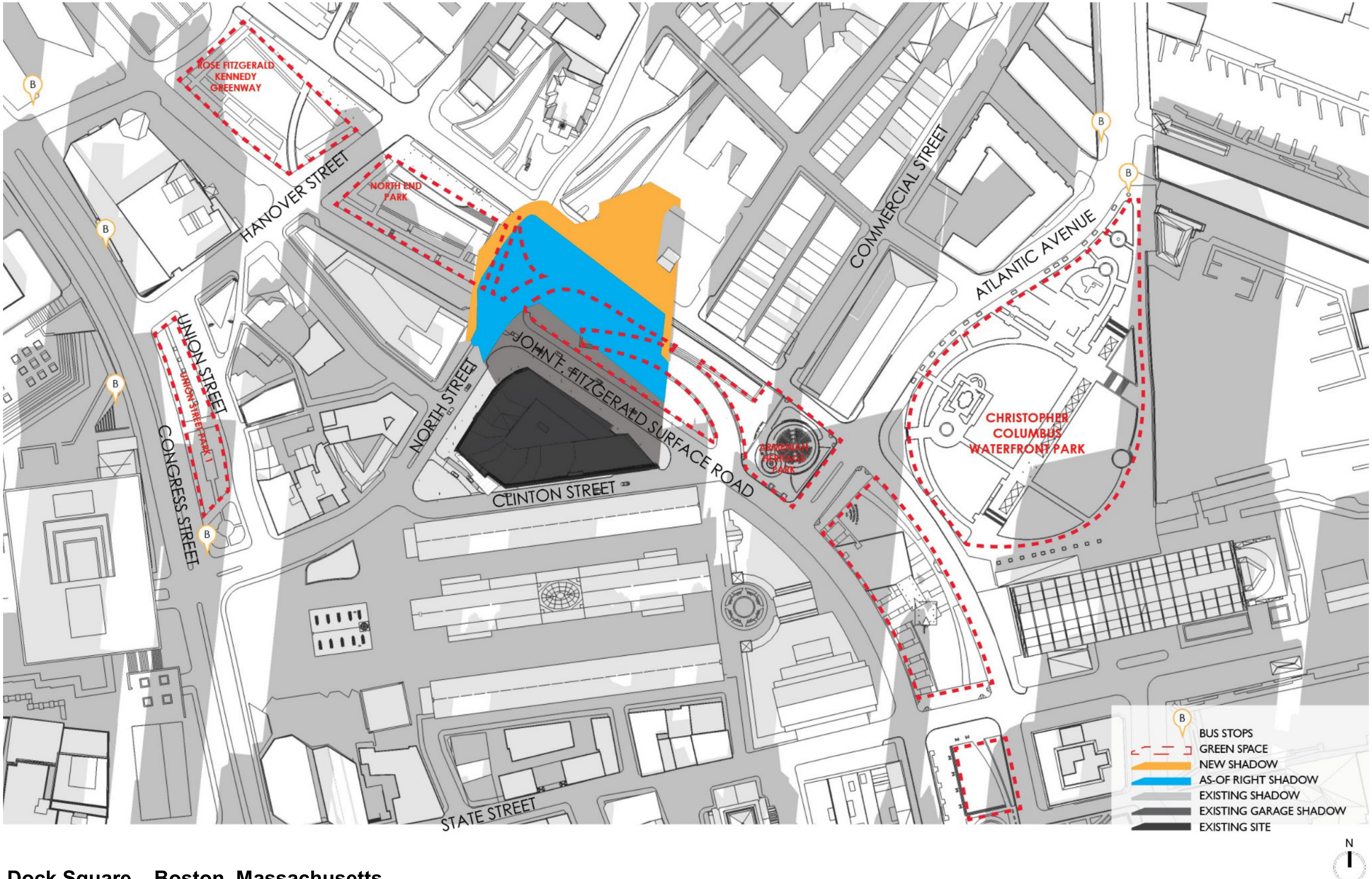



**Dock Square Boston, Massachusetts**

Stantec

**Figure 3.2-12**

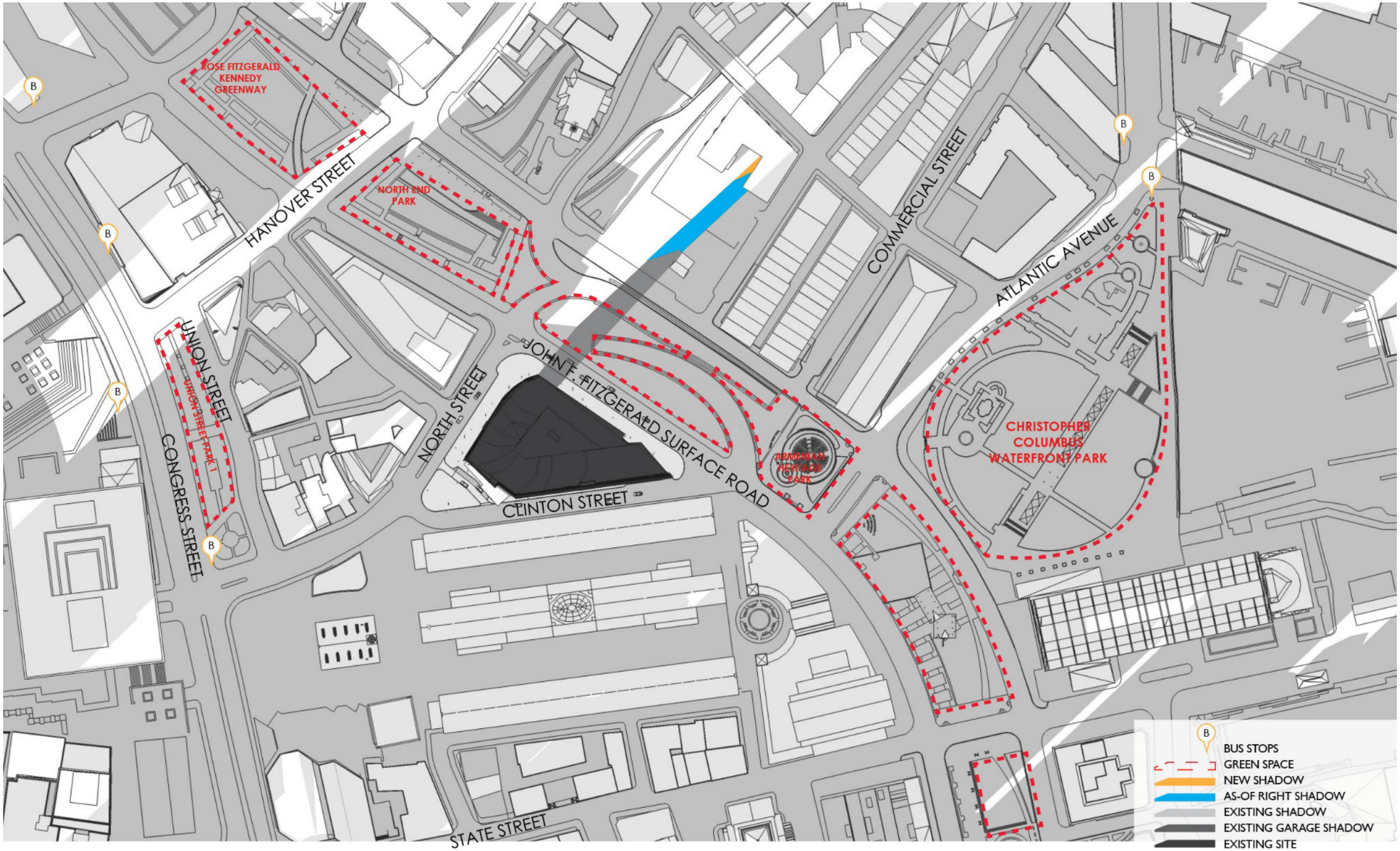
*Shadow Study: December 21, 9:00 a.m.*




**Dock Square Boston, Massachusetts**

**Figure 3.2-13**

*Shadow Study: December 21, 12:00 p.m.*




**Dock Square Boston, Massachusetts**

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**Figure 3.2-14**

*Shadow Study: December 21, 3:00 p.m.*

## 3.3 Daylight Analysis

### *3.3.1 Introduction*

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site. The daylight analysis for the Project considers the existing and proposed conditions, as well as daylight obstruction values of the surrounding area.

The proposed Project will construct an up to ten-story addition to the existing seven-story parking garage on the site, which will increase the daylight obstruction on the site. However, the resulting conditions will be similar to the daylight obstruction values of the context points in the area.

### *3.3.2 Methodology*

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[2]. This program measures the percentage of sky-dome that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares three conditions: Existing Conditions; Proposed Conditions; and the context of the area.

Three viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions. Three area context points were considered to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 3.3-1.

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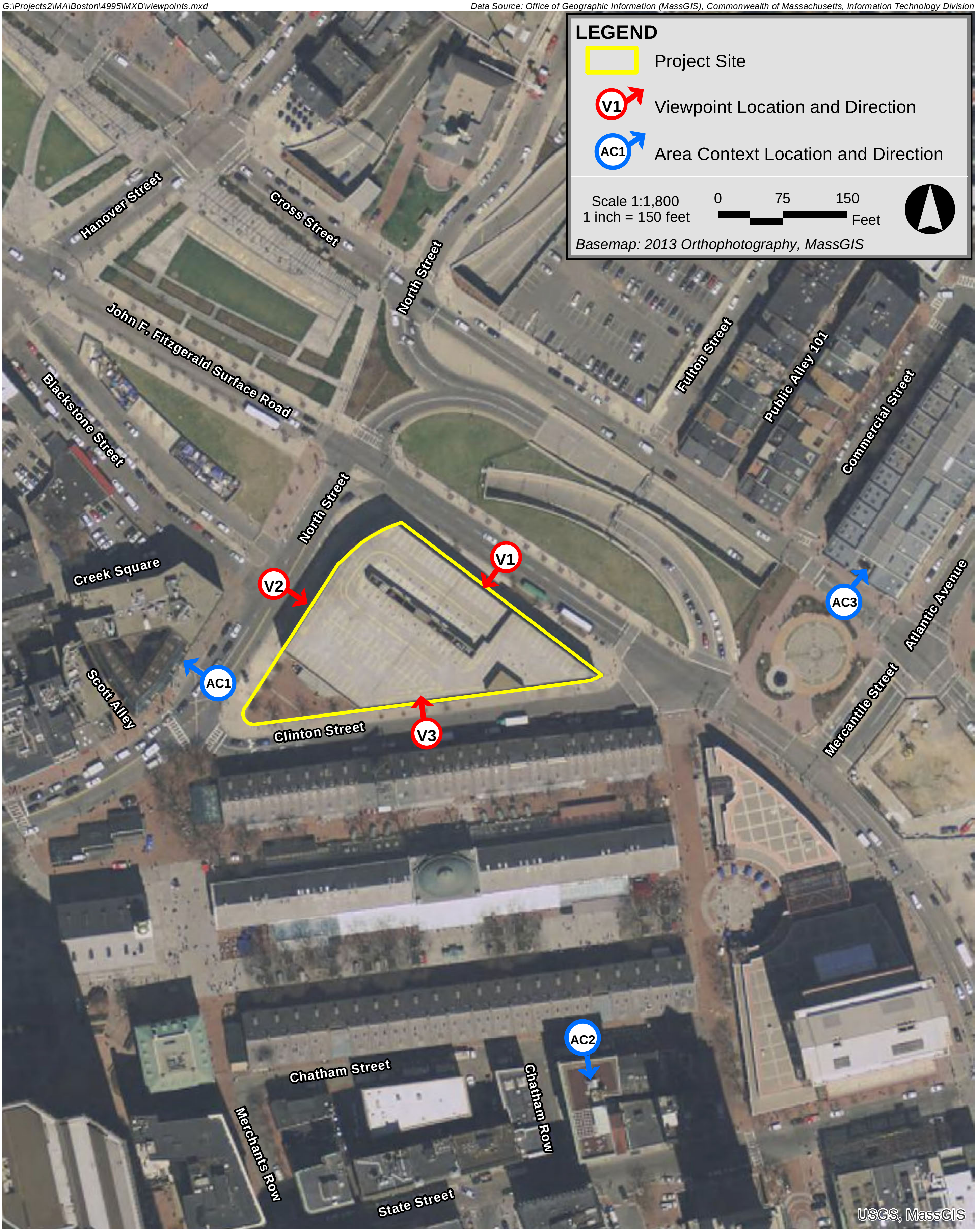
[2] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.




Dock Square Boston, Massachusetts

Figure 3.3-1
*Viewpoint and Area Context Locations*

- **Viewpoint 1:** View from the center of John F. Fitzgerald Surface Road facing southwest towards the Project site.

- **Viewpoint 2:** View from the center of North Street facing southeast toward the Project site.

- **Viewpoint 3:** View from the center of Clinton Street facing northwest toward the Project site.

- **Area Context Viewpoint AC1:** View from North Street facing northwest toward 54-68 Blackstone Street.

- **Area Context Viewpoint AC2:** View from Chatham Street facing southeast toward 148 State Street.

- **Area Context Viewpoint AC3:** View from Cross Street facing northeast toward 71-87 Commercial Street.

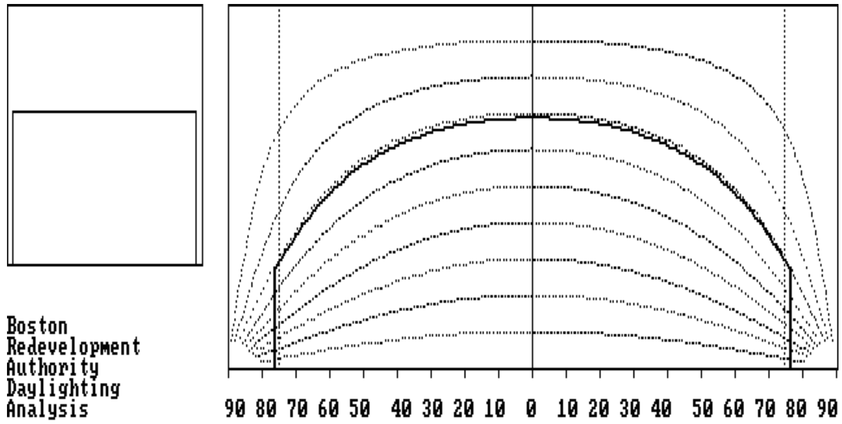
### *3.3.3 Results*

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-4 illustrate the BRADA results for each analysis.

**Table 3.3-1 Daylight Analysis Results**

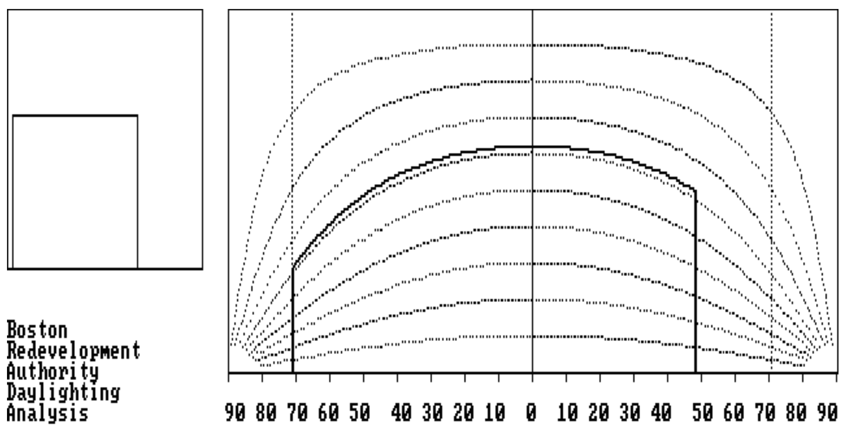
| Viewpoint Locations | | Existing Conditions | Proposed Conditions |
|---|---|---|---|
| Viewpoint 1 | View from the center of John F. Fitzgerald Surface Road facing southwest towards the Project site. | 69.7% | 86.1% |
| Viewpoint 2 | View from the center of North Street facing southeast toward the Project site. | 52.5% | 70.4% |
| Viewpoint 3 | View from the center of Clinton Street facing northwest toward the Project site. | 75.9% | 88.3% |
| Area Context Points | | | |
| AC1 | View from North Street facing northwest toward 54-68 Blackstone Street. | 59.3% | N/A |
| AC2 | View from Chatham Street facing southeast toward 148 State Street. | 92.9% | N/A |
| AC3 | View from Cross Street facing northeast toward 71-87 Commercial Street. | 83.5% | N/A |

Viewpoint 1: View from the center of John F. Fitzgerald Surface Road facing southwest towards the Project site



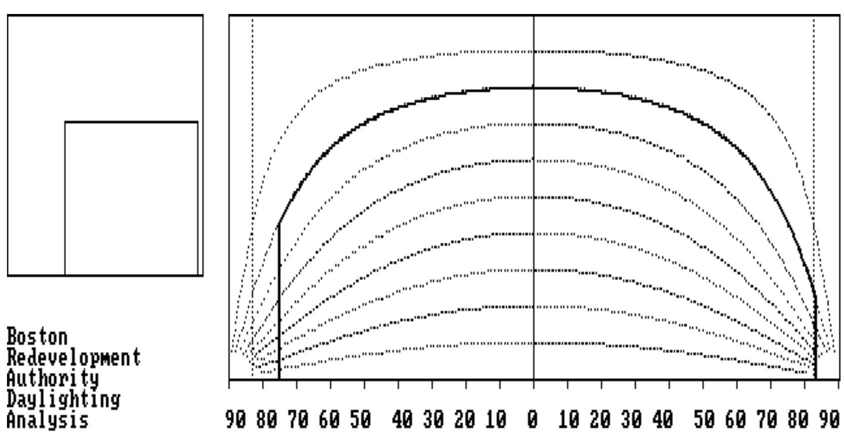

Obstruction of daylight by the building is 69.7 %

Viewpoint 2: View from the center of North Street facing southeast toward the Project site



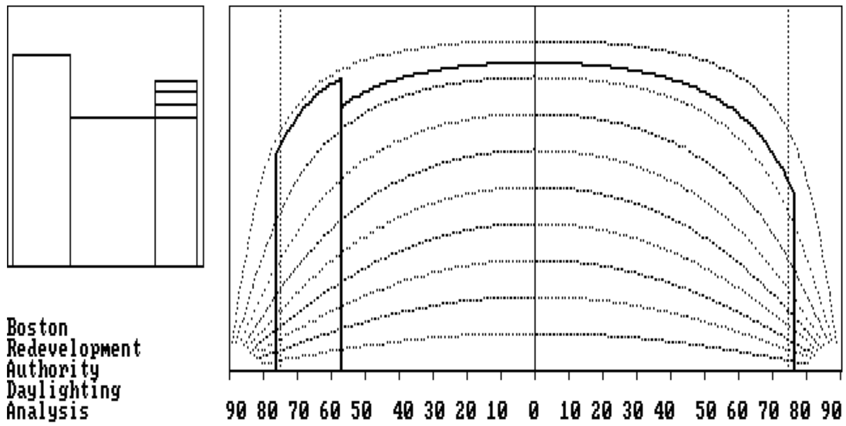

Obstruction of daylight by the building is 52.5 %

Viewpoint 3: View from the center of Clinton Street facing northwest toward the Project site




Obstruction of daylight by the building is 75.9 %

Viewpoint 1: View from the center of John F. Fitzgerald Surface Road facing southwest towards the Project site

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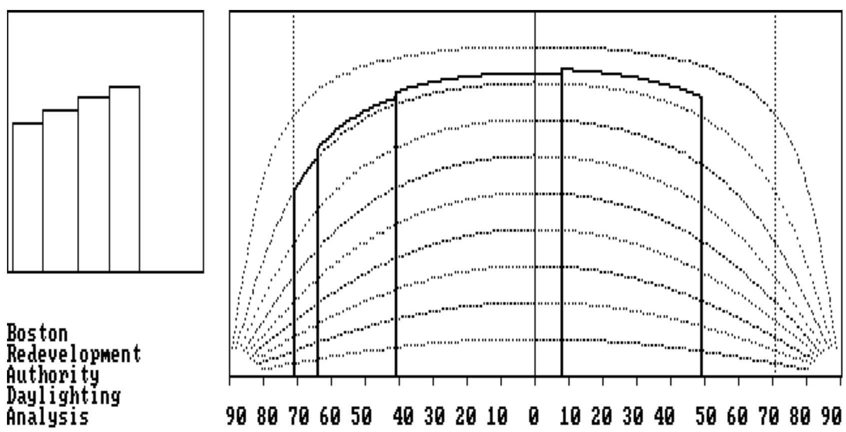
Obstruction of daylight by the building is 86.1 %

Viewpoint 2: View from the center of North Street facing southeast toward the Project site

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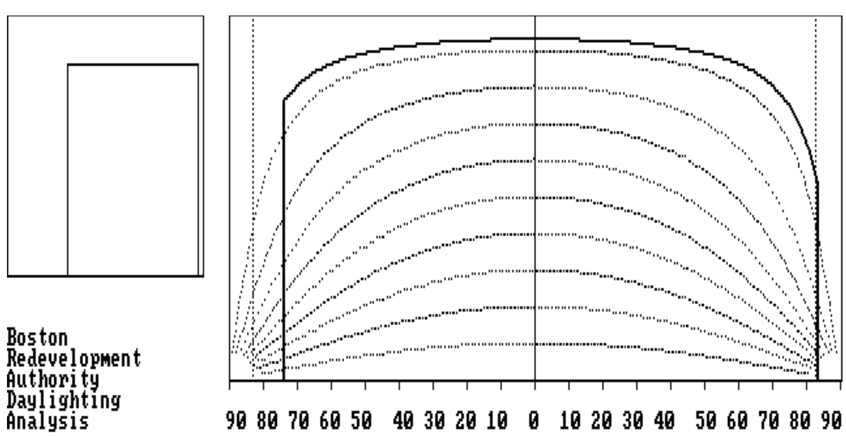
Obstruction of daylight by the building is 70.4 %

Viewpoint 3: View from the center of Clinton Street facing northwest toward the Project site

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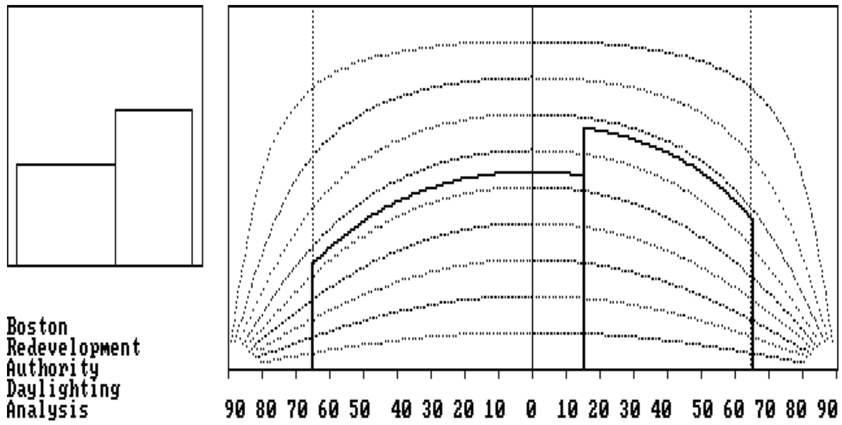
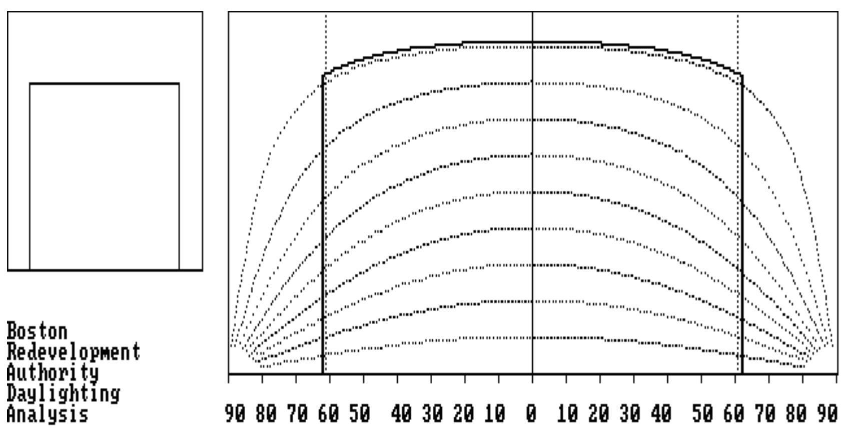
Obstruction of daylight by the building is 88.3 %

Area Context Viewpoint A1: View from North Street facing northwest toward 54-68 Blackstone Street



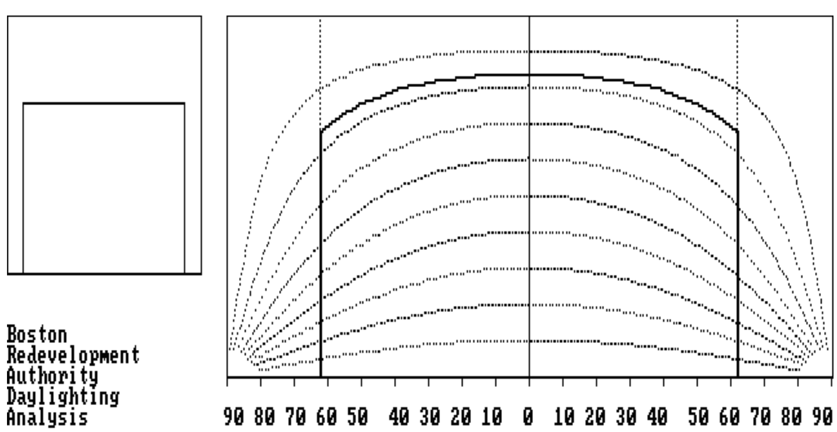

Obstruction of daylight by the building is 59.3 %

Area Context Viewpoint AC2: View from Chatham Street facing southeast toward 148 State Street




Obstruction of daylight by the building is 92.9 %

Area Context Viewpoint AC3: View from Cross Street facing northeast toward 71-87 Commercial Street




Obstruction of daylight by the building is 83.5 %

*John F. Fitzgerald Surface Road – Viewpoint 1*

John F. Fitzgerald Surface Road runs along the northeastern edge of the Project site. Viewpoint 1 was taken from the center of John F. Fitzgerald Surface Road facing southwest toward the Project site. The development of the Project will increase the daylight obstruction from 69.7% to 86.1%. While this is an increase of existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

*North Street – Viewpoint 2*

North Street runs along the northwestern edge of the Project site. Viewpoint 2 was taken from the center of North Street facing southeast toward the Project site. The development of the Project will increase the daylight obstruction from 52.5% to 70.4%. While this is an increase of existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

*Clinton Street – Viewpoint 3*

Clinton Street runs along the southeastern edge of the Project site. Viewpoint 2 was taken from the center of Clinton Street facing northwest toward the Project site. The development of the Project will increase the daylight obstruction from 75.9% to 88.3%. While this is an increase of existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

*Area Context Viewpoints*

The Project area consists of low to mid-rise commercial buildings, however, some of these buildings occupy large blocks with no setbacks from the street. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 59.3% for AC1 to 92.9% for AC2. Daylight obstruction values for the Project are generally consistent with Area Context values.

### *3.3.4 Conclusions*

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting daylight obstruction values will be similar to daylight obstruction values within the surrounding area. The greatest increase in obstruction over existing conditions will occur at the viewpoint from the center of John F. Fitzgerald Surface Road, which is rarely crossed by pedestrians.

## 3.4 Solar Glare

The Project materials are still being studied and glazing of the windows will be determined as the design progresses. Due to the type of potential glass and glazing used, solar glare impacts are not currently anticipated.

## 3.5 Air Quality Analysis

### *3.5.1 Introduction*

The BPDA requires that proposed projects evaluate the air quality in the local area, and assess any adverse air quality impacts attributable to a project.

The Project does not generate enough traffic to require a mesoscale vehicle emissions quantification analysis. However, the Project creates new trips through local intersections operating at LOS D or worse. Therefore, a microscale analysis of carbon monoxide has been completed to provide information on the Project's impact to air quality from mobile sources.

Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program, as required. It is expected that all stationary sources will be small, and any impacts from stationary sources would be minimal.

### *3.5.2 National Ambient Air Quality Standards and Background Concentrations*

Background air quality concentrations and federal air quality standards were utilized to conduct the above air quality impact analyses. Federal National Ambient Air Quality Standards (NAAQS) were developed by the U.S. Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The modeling methodologies were developed in accordance with the latest MassDEP modeling policies and federal modeling guidelines.[3] The following sections outline the NAAQS standards and detail the sources of background air quality data.

#### 3.5.2.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter (PM) (PM-10 and PM-2.5), carbon monoxide (CO),

[3] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

ozone ($O_3$), and lead (Pb). The NAAQS are listed in Table 3.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS (differences are highlighted in **bold** in Table 3.5-1).

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards were applied when comparing to the modeling results for this Project.

The NAAQS also reflect various durations of exposure. The non-probabilistic short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

**Table 3.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards**

| Pollutant | Averaging Period | NAAQS ($\mu g/m^3$) | | MAAQS ($\mu g/m^3$) | |
|---|---|---|---|---|---|
| | | Primary | Secondary | Primary | Secondary |
| $NO_2$ | Annual (1) | 100 | Same | 100 | Same |
| | 1-hour (2) | **188** | None | **None** | None |
| $SO_2$ | Annual (1)(9) | 80 | None | 80 | None |
| | 24-hour (3)(9) | 365 | None | 365 | None |
| | 3-hour (3) | None | 1300 | None | 1300 |
| | 1-hour (4) | **196** | None | **None** | None |
| PM-2.5 | Annual (1) | **12** | **15** | **None** | **None** |
| | 24-hour (5) | **35** | **Same** | **None** | **None** |
| PM-10 | Annual (1)(6) | **None** | None | **50** | Same |
| | 24-hour (3)(7) | 150 | Same | 150 | Same |
| CO | 8-hour (3) | 10,000 | Same | 10,000 | Same |
| | 1-hour (3) | 40,000 | Same | 40,000 | Same |
| Ozone | 8-hour (8) | **147** | Same | **235** | Same |
| Pb | 3-month (1) | 1.5 | Same | 1.5 | Same |

(1) Not to be exceeded.
(2) 98th percentile of one-hour daily maximum concentrations, averaged over three years.
(3) Not to be exceeded more than once per year.
(4) 99th percentile of one-hour daily maximum concentrations, averaged over three years.
(5) 98th percentile, averaged over three years.
(6) EPA revoked the annual PM-10 NAAQS in 2006.
(7) Not to be exceeded more than once per year on average over three years.
(8) Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.
(9) EPA revoked the annual and 24-hour $SO_2$ NAAQS in 2010. However, they remain in effect until one year after the area's initial attainment designation, unless designated as "nonattainment".

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04

### 3.5.2.2 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP to EPA was obtained for 2014 to 2016. Data for the pollutant and averaging time combinations were obtained from the EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and $SO_2$ short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. To attain the one-hour $NO_2$ standard, the three-year average of the 98$^{th}$ percentile of the maximum daily one-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is very near to the site, at 174 North Street in Boston, roughly 0.2 miles north-northeast. This site samples for PM-2.5 only. The next closest site is at Kenmore Square, roughly 2.2 miles west-southwest of the Project location. However, this site only samples for PM-10, $NO_2$ and $SO_2$. Finally, the remaining pollutants are measured at Harrison Avenue in Boston, roughly 2.6 miles south-southwest of the Project site. A summary of the background air quality concentrations is presented in Table 3.5-2.

**Table 3.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels**

| Pollutant | Averaging Time | 2014 | 2015 | 2016 | Background Concentration ($\mu g/m^3$) | NAAQS | Percent of NAAQS |
|---|---|---|---|---|---|---|---|
| $SO_2$ (1)(6)(7) | 1-Hour (5) | 25.4 | 14.4 | 10.7 | 16.9 | 196.0 | 9% |
| | 3-Hour (6) | 24.6 | 11.5 | 10.0 | 24.6 | 1300.0 | 2% |
| | 24-Hour | 13.1 | 7.6 | 5.2 | 13.1 | 365.0 | 4% |
| | Annual | 2.5 | 1.3 | 1.1 | 2.5 | 80.0 | 3% |
| PM-10 | 24-Hour | 53.0 | 30.0 | 30.0 | 53.0 | 150.0 | 35% |
| | Annual | 14.9 | 14.2 | 14.1 | 14.9 | 50.0 | 30% |
| PM-2.5 | 24-Hour (5) | 14.4 | 16.7 | 14.7 | 15.2 | 35.0 | 44% |
| | Annual (5) | 6.9 | 7.3 | 7.7 | 7.3 | 12.0 | 61% |
| $NO_2$ (3)(7) | 1-Hour (5) | 92.1 | 105.3 | 88.4 | 95.3 | 188.0 | 51% |
| | Annual | 32.3 | 32.5 | 28.3 | 32.5 | 100.0 | 33% |

Table 3.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels (Continued)

| Pollutant | Averaging Time | 2014 | 2015 | 2016 | Background Concentration ($\mu g/m^3$) | NAAQS | Percent of NAAQS |
|---|---|---|---|---|---|---|---|
| CO [2][7] | 1-Hour | 1489.8 | 1604.4 | 2489.1 | 2489.1 | 40000.0 | 6% |
| | 8-Hour | 1031.4 | 1031.4 | 2062.8 | 2062.8 | 10000.0 | 21% |
| Ozone [4] | 8-Hour | 106.0 | 109.9 | 113.9 | 113.9 | 147.0 | 77% |
| Lead | Rolling 3-Month | 0.014 | 0.016 | 0.017 | 0.017 | 0.15 | 12% |

Notes:
From 2014-2016 EPA's AirData Website
(1) $SO_2$ reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
(2) CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
(3) $NO_2$ reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
(4) $O_3$ reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
(7) CO monitor at Kenmore Square was deactivated in January 2015. Harrison Avenue monitor used for 2015 and 2016.

Air quality in the vicinity of the Project site is generally good, with all local background concentrations found to be well below the NAAQS.

### *3.5.3 Mobile Sources*

Mobile sources of air pollution include emissions from gasoline, diesel, and natural gas fueled vehicle traffic. Emissions from mobile sources have continually decreased as engine technology and efficiency have been improved.

#### 3.5.3.1 Methodology

The BPDA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location. The microscale analysis involves modeling of CO emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period, and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations. Baseline (2017) and future year (2024) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections. The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[4]

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 2.2 ppm (one-hour) and 1.8 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

Modeling assumptions and backup data for results presented in this section are provided in Appendix E.

*Intersection Selection*

Three signalized intersections included in the traffic study meet the above conditions described at the beginning of this section (see Chapter 2). The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The intersections found to meet the criteria are:

- Congress Street and North Street,
- North Street and Union Street, and
- North Street and Clinton Street.

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2017 Existing Condition and the 2024 No-Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

[4] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

*Emissions Calculations (MOVES)*

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the existing (2017) and future year (2024) are provided by MassDEP.

All link types for the modeled intersections were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (Synchro) reports. A speed of 25 mph is used for all free-flow traffic, consistent with the City of Boston speed limit. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[5]

Winter CO emission factors are typically higher than summer. Therefore, January weekday emission factors were conservatively used in the microscale analysis.

*Receptors and Meteorology Inputs*

Sets of up to 115 receptors were placed in the vicinity of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersections. The roadway links and receptor locations of the modeled intersections are presented in Figures 3.5-1 through 3.5-3.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[6], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected.[7]

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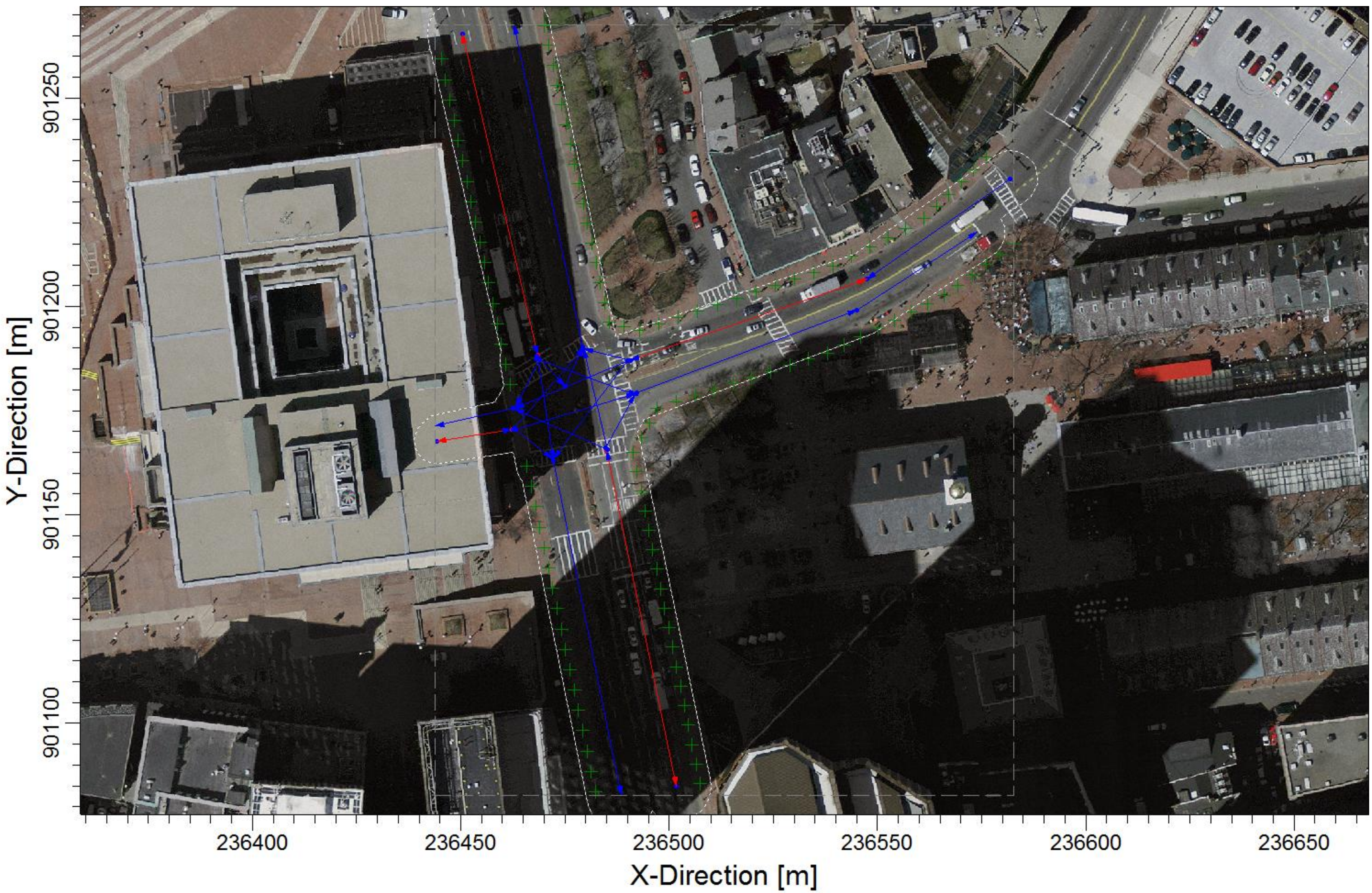
5 U.S. EPA, 2010. Using MOVES in Project-Level Carbon Monoxide Analyses. EPA-420-B-10-041

6 U.S. EPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersections.* EPA-454/R-92-005, November 1992.

7 U.S. EPA, *User's Guide for CAL3QHC Version 2: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA –454/R-92-006 (Revised), September 1995.

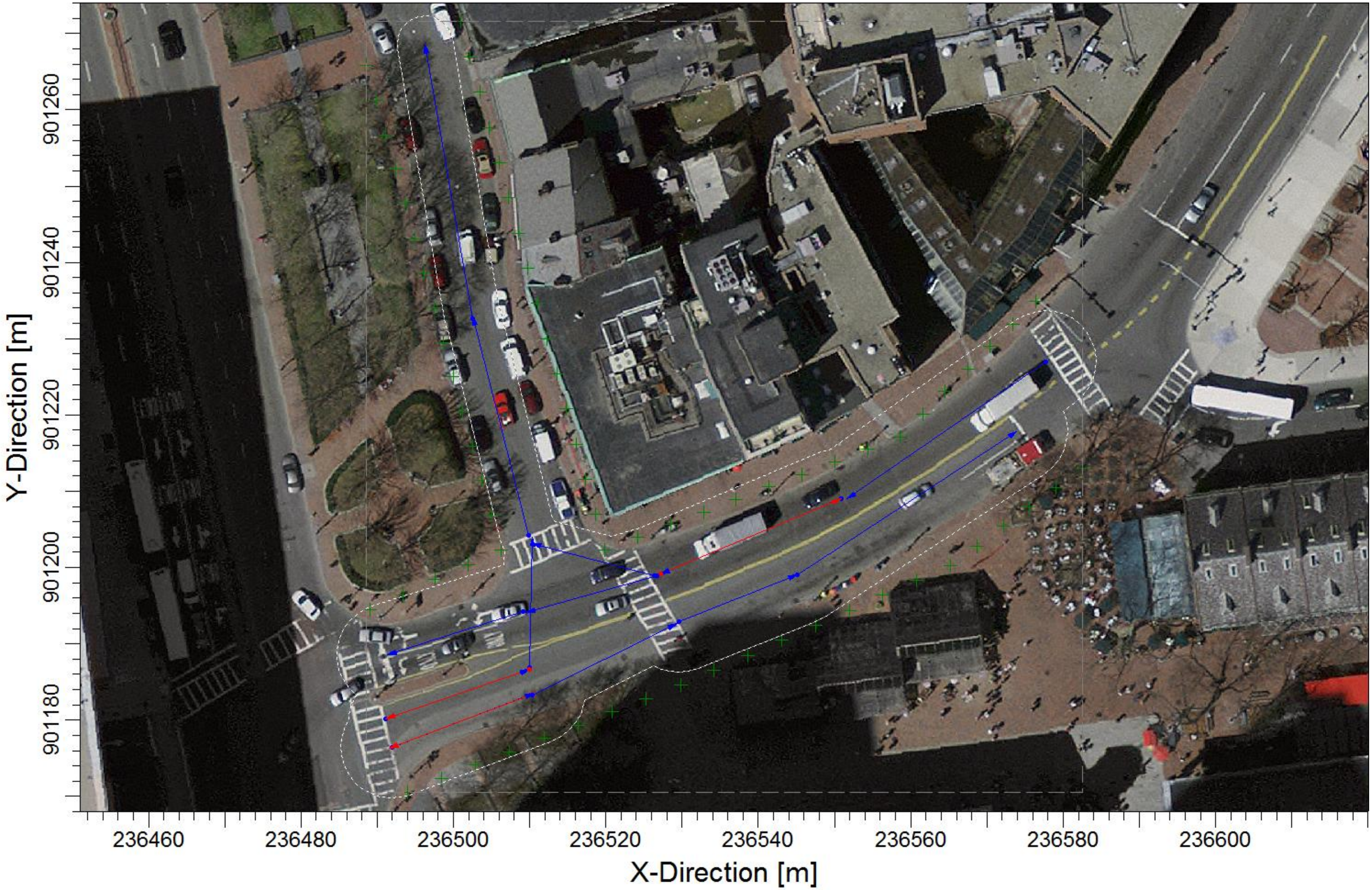



Dock Square    Boston, Massachusetts

Epsilon ASSOCIATES INC.

**Figure 3.5-1**

*Intersection of Congress Street and North Street*




**Dock Square Boston, Massachusetts**

Epsilon ASSOCIATES INC.

**Figure 3.5-2**

*Intersection of North Street and Union Street*

*Impact Calculations (CAL3QHC)*

The CAL3QHC model predicts one-hour concentrations using queue-links at signalized intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.9 to estimate eight-hour concentrations.[8] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 2.2 ppm (2,489 $\mu g/m^3$) for one-hour and 1.8 ppm (2,062 $\mu g/m^3$) for eight-hour CO.

### 3.5.3.2 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-6 for the 2017 and 2024 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[9]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.3 ppm) plus background (2.2 ppm) is 2.5 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.3 ppm) plus background (1.8 ppm) is 2.1 ppm. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

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8 U.S. EPA, AERSCREEN User's Guide; EPA-454/B-11-001, March 2011.

9 U.S. EPA, AERSCREEN User's Guide; EPA-454/B-11-001, March 2011.

## Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2017)

| Intersection | Peak | CAL3QHC Modeled CO Impacts (ppm) | Monitored Background Concentration (ppm) | Total CO Impacts (ppm) | NAAQS (ppm) |
|---|---|---|---|---|---|
| **1-Hour** | | | | | |
| Congress Street and North Street | AM | 0.3 | 2.2 | 2.5 | 35 |
| | PM | 0.3 | 2.2 | 2.5 | 35 |
| North Street and Union Street | AM | 0.3 | 2.2 | 2.5 | 35 |
| | PM | 0.2 | 2.2 | 2.4 | 35 |
| North Street and Clinton Street | AM | 0.2 | 2.2 | 2.4 | 35 |
| | PM | 0.1 | 2.2 | 2.3 | 35 |
| **8-Hour** | | | | | |
| Congress Street and North Street | AM | 0.3 | 1.8 | 2.1 | 9 |
| | PM | 0.3 | 1.8 | 2.1 | 9 |
| North Street and Union Street | AM | 0.3 | 1.8 | 2.1 | 9 |
| | PM | 0.2 | 1.8 | 2.0 | 9 |
| North Street and Clinton Street | AM | 0.2 | 1.8 | 2.0 | 9 |
| | PM | 0.1 | 1.8 | 1.9 | 9 |

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

## Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2024)

| Intersection | Peak | CAL3QHC Modeled CO Impacts (ppm) | Monitored Background Concentration (ppm) | Total CO Impacts (ppm) | NAAQS (ppm) |
|---|---|---|---|---|---|
| **1-Hour** | | | | | |
| Congress Street and North Street | AM | 0.2 | 2.2 | 2.4 | 35 |
| | PM | 0.2 | 2.2 | 2.4 | 35 |
| North Street and Union Street | AM | 0.2 | 2.2 | 2.4 | 35 |
| | PM | 0.2 | 2.2 | 2.4 | 35 |
| North Street and Clinton Street | AM | 0.1 | 2.2 | 2.3 | 35 |
| | PM | 0.1 | 2.2 | 2.3 | 35 |
| **8-Hour** | | | | | |
| Congress Street and North Street | AM | 0.2 | 1.8 | 2.0 | 9 |
| | PM | 0.2 | 1.8 | 2.0 | 9 |
| North Street and Union Street | AM | 0.2 | 1.8 | 2.0 | 9 |
| | PM | 0.2 | 1.8 | 2.0 | 9 |
| North Street and Clinton Street | AM | 0.1 | 1.8 | 1.9 | 9 |
| | PM | 0.1 | 1.8 | 1.9 | 9 |

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.


Dock Square Boston, Massachusetts

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**Figure 3.5-3**

*Intersection of North Street and Clinton Street*

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2024)

| Intersection | Peak | CAL3QHC Modeled CO Impacts (ppm) | Monitored Background Concentration (ppm) | Total CO Impacts (ppm) | NAAQS (ppm) |
|---|---|---|---|---|---|
| **1-Hour** | | | | | |
| Congress Street and North Street | AM | 0.2 | 2.2 | 2.4 | 35 |
| | PM | 0.2 | 2.2 | 2.4 | 35 |
| North Street and Union Street | AM | 0.2 | 2.2 | 2.4 | 35 |
| | PM | 0.2 | 2.2 | 2.4 | 35 |
| North Street and Clinton Street | AM | 0.1 | 2.2 | 2.3 | 35 |
| | PM | 0.1 | 2.2 | 2.3 | 35 |
| **8-Hour** | | | | | |
| Congress Street and North Street | AM | 0.2 | 1.8 | 2.0 | 9 |
| | PM | 0.2 | 1.8 | 2.0 | 9 |
| North Street and Union Street | AM | 0.2 | 1.8 | 2.0 | 9 |
| | PM | 0.2 | 1.8 | 2.0 | 9 |
| North Street and Clinton Street | AM | 0.1 | 1.8 | 1.9 | 9 |
| | PM | 0.1 | 1.8 | 1.9 | 9 |

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

#### 3.5.3.3 Conclusions

Results of the microscale analysis show that all predicted CO concentrations are well below the one-hour and eight-hour NAAQS. Therefore, it can be concluded that there are no anticipated adverse air quality impacts resulting from increased traffic in the area.

## 3.6 Stormwater/Water Quality

Please see Section 7.4.

## 3.7 Flood Hazard Zones/ Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0081J indicates the FEMA Flood Zone Designations for the site area. The map shows that a portion of the Project is located in a Zone AE "Areas with a 1% annual chance of flooding". Chapter 4 includes a discussion of how the Project will be designed to account for the site's location proximate to the harbor.

The site does not contain wetlands.

## 3.8 Geotechnical Impacts

The proposed Project includes a vertical addition to the existing garage, and the existing foundation will require improvements in order to support the addition. Soil borings to determine the generalized subsurface conditions at the Project site have not yet been conducted, but as the design of the Project proceeds, it is anticipated that they will be conducted, prior to determining the appropriate foundation approach. It is also anticipated that the foundation design and construction will be conducted to limit potential adverse impacts.

The Project site is not located in the Groundwater Conservation Overlay District (GCOD) and will therefore not need to comply with the requirements of Article 32 of the City of Boston Zoning Code.

## 3.9 Solid and Hazardous Waste

### *3.9.1 Hazardous Waste*

If soil disposal is required, the Proponent will obtain site specific information regarding environmental conditions of excavated soils to evaluate for the presence of oil and hazardous materials. Foundation construction for the new building may generate soil requiring off-site transport. Chemical testing of the material will be required by receiving facilities to identify chemical constituents and any contaminants present. Chemical testing of the material will be conducted prior to construction in accordance with facility requirements.

Any material leaving the site will be required to be legally transported in accordance with local, state and federal requirements. In addition, any regulated soil conditions related to oil and hazardous materials will be managed in accordance with appropriate Massachusetts MassDEP regulatory requirements.

### *3.9.2 Operation Solid and Hazardous Waste Generation*

The Project will generate solid waste typical of residential and restaurant uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. The Project will generate approximately 240 tons of solid waste per year.

With the exception of household hazardous wastes typical of residential and restaurant developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials.

### *3.9.3 Recycling*

A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills. The recycling program will be fully developed in accordance with LEED standards as described in Chapter 4.

## 3.10 Noise Impacts

### *3.10.1 Introduction*

A sound level assessment was conducted that included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project, computer modeling to predict operational sound levels from proposed mechanical equipment, and a comparison of future Project sound levels to applicable City of Boston Zoning District Noise Standards.

This analysis, which is consistent with BPDA requirements for noise studies, indicates that with appropriate noise controls, predicted sound levels from the Project will comply with local noise regulations.

### *3.10.2 Noise Terminology*

There are several ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level measurement terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-dB increase (53 dB), which is equal to doubling in sound energy but not equal to a doubling in quantity (100 dB). Thus, every three-dB change in sound level represents a doubling or halving of sound energy. Relative to this characteristic, a change in sound levels of less than three dB is imperceptible to the human ear.

Another property of decibels is that if one source of noise is 10 dB (or more) louder than another source, then the total sound level is simply the sound level of the higher-level source. For example, a sound source at 60 dB plus another sound source at 47 dB is equal to 60 dB.

A sound level meter (SLM) that is used to measure noise is a standardized instrument.[10] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. The most commonly used weighting network is the A-weighting (there are also C-, and Z-weighting networks) because it most closely approximates how the human ear responds to sound at various frequencies, described in Hertz (Hz). The A-weighting network is the accepted scale used for community sound level measurements, and sounds are frequently reported as detected with a sound level meter with this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. A-weighted sound levels are reported in decibels designated as "dBA".

Because the sounds in the environment vary with time, many different sound metrics may be used to quantify them. There are two typical methods used for describing variable sounds. These are exceedance levels and equivalent levels, both of which are derived from a large number of moment-to-moment A-weighted sound pressure level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated $L_n$, where "n" can have a value between 0 and 100 in terms of percentage. Equivalent levels are designated $L_{eq}$ and quantify a hypothetical steady sound that would have the same energy as the actual fluctuating sound observed. The several sound level metrics that are commonly reported in community noise monitoring and are presented in this report are described below.

- $L_{90}$ is the sound level in dBA exceeded 90 percent of the time during a measurement period. The $L_{90}$ is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.

- L50 is the median sound level, the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L10 is the sound level in dBA exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L10 is sometimes called the intrusive sound level because it is caused by occasional louder noises like those from passing motor vehicles.

- Lmax is the maximum instantaneous sound level observed over a given period.

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[10] *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983, published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

- Leq is a sound pressure level commonly A-weighted and presented in dBA. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with time-averaged mean square sound pressure values, the Leq is primarily controlled by loud noises if there are fluctuating sound levels.

- In the design of noise controls, which do not function quite like the human ear, it is important to understand the frequency spectrum of the noise source of interest. The spectra of noises are usually stated in terms of octave-band sound pressure levels, in dB, with the frequency bands being those established by standard (American National Standards Institute [ANSI] S1.11, 1986). To facilitate the noise control design process, the estimates of noise levels in this analysis are also presented in terms of octave-band sound pressure levels. Octave-band measurements and modeling are used in assessing compliance with the City of Boston noise regulations.

### *3.10.3 Noise Regulations and Criteria*

The City of Boston has both a noise ordinance and noise regulations. Chapter 16 §26 of the Boston Municipal Code sets the general standard for noise that is unreasonable or excessive: louder than 50 decibels between the hours of 11:00 p.m. and 7:00 a.m., or louder than 70 decibels at all other hours. The Boston Air Pollution Control Commission (BAPCC) has adopted regulations based on the city's ordinance - "Regulations for the Control of Noise in the City of Boston", which distinguish among residential, business, and industrial districts in the City. In particular, BAPCC Regulation 2 is applicable to the sounds from the Project and is considered in this noise study.

Table 3.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the BAPCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

Table 3.10-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

| Octave-band Center | Residential Zoning District | | Residential Industrial Zoning District | | Business Zoning District | Industrial Zoning District |
|---|---|---|---|---|---|---|
| Frequency (Hz) | Daytime (dB) | All Other Times (dB) | Daytime (dB) | All Other Times (dB) | Anytime (dB) | Anytime (dB) |
| 32 | 76 | 68 | 79 | 72 | 79 | 83 |
| 63 | 75 | 67 | 78 | 71 | 78 | 82 |
| 125 | 69 | 61 | 73 | 65 | 73 | 77 |
| 250 | 62 | 52 | 68 | 57 | 68 | 73 |
| 500 | 56 | 46 | 62 | 51 | 62 | 67 |
| 1000 | 50 | 40 | 56 | 45 | 56 | 61 |
| 2000 | 45 | 33 | 51 | 39 | 51 | 57 |
| 4000 | 40 | 28 | 47 | 34 | 47 | 53 |
| 8000 | 38 | 26 | 44 | 32 | 44 | 50 |
| A-Weighted (dBA) | **60** | **50** | **65** | **55** | **65** | **70** |

Notes:

1. Noise standards from Regulation 2.5 "Zoning District Noise Standards", City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
2. All standards apply at the property line of the receiving property.
3. dB and dBA based on a reference pressure of 20 micropascals.
4. Daytime refers to the period between 7:00 a.m. and 6:00 p.m. daily, except Sunday.

### *3.10.4 Existing Conditions*

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources around the site include: vehicular and truck traffic along local streets, pedestrian traffic, mechanical noise from surrounding buildings, overhead planes, daytime construction activity and equipment operation, garage exit alarms, wind, music from surrounding building, and the general city soundscape.

### *3.10.5 Noise Monitoring Methodology*

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Therefore, daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Thursday, December 14, 2017 during the daytime (1:30 p.m. to 3:00 p.m.) and on Friday, December 15, 2017 during nighttime hours (12:00 a.m. to 1:30 a.m.). All measurements were 20 minutes in duration.

Sound levels were measured at publicly accessible locations at a height of five feet (1.5 meters) above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity measurements were made using a General Tools digital psychrometer. Unofficial observations about meteorology or land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project site.

### *3.10.6 Noise Monitoring Locations*

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project area. Three noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 3.10-1 and described below.

- ♦ **Location 1** is located on the southern sidewalk of Clinton Street, across from the Dock Square Parking Garage lobby entrance. This location is representative of the closest commercial receptors to the south of the Project.

- ♦ **Location 2** is located on the western sidewalk of North Street outside of the Bostonian Hotel. This location represents the closest residential receptors to the north and west of the Project.

- ♦ **Location 3** is located along the eastern sidewalk of Cross Street, near the corner of Fulton Street and north of Public Alley 101. This location is representative of the closest residential receptors to the east of the Project.

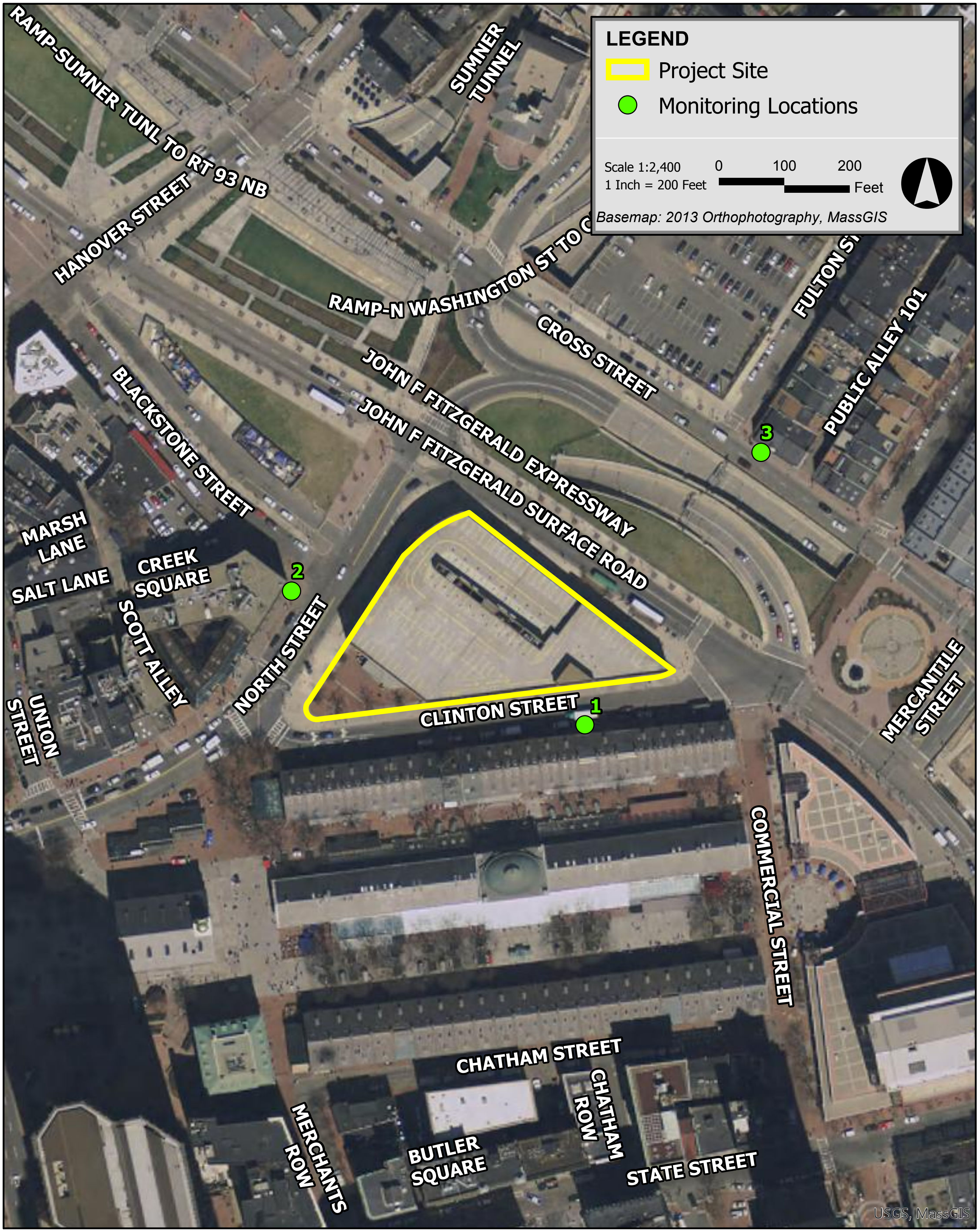
### *3.10.7 Noise Monitoring Equipment*

A Larson Davis Model 831 sound level meter equipped with a PCB PRM831 preamplifier, a PCB 377B20 half-inch microphone, and manufacturer-provided windscreen was used to collect background sound pressure level data. This instrumentation meets the "Type 1 - Precision" requirements set forth in ANSI S1.4 for acoustical measuring devices. The measurement equipment was calibrated in the field before and after the surveys with a Larson Davis CAL200 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. Statistical descriptors (e.g., $L_{eq}$, $L_{90}$, etc.) were measured for each 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

### *3.10.8 Measured Background Sound Levels*

Baseline noise monitoring results are presented in Table 3.10-2 and summarized below:

- ♦ The daytime residual background ($L_{90}$) measurements ranged from 59 to 61 dBA;
- ♦ The nighttime residual background ($L_{90}$) measurements ranged from 52 to 55 dBA;
- ♦ The daytime equivalent level ($L_{eq}$) measurements ranged from 66 to 71 dBA;
- ♦ The nighttime equivalent level ($L_{eq}$) measurements ranged from 59 to 71 dBA.




Dock Square Boston, Massachusetts

Epsilon ASSOCIATES INC.

**Figure 3.10-1**
*Sound Monitoring Locations*

Table 3.10-2 Summary of Measured Background Noise Levels – December 14, 2017 (Daytime) & December 15, 2017 (Nighttime)

| Location | Period | Start Time | $LA_{eq}$ | $LA_{max}$ | $LA_{10}$ | $LA_{50}$ | $LA_{90}$ | $L_{90}$ Sound Pressure Level by Octave-Band Center Frequency (Hz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | **31.5** | **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | **8000** | **16000** |
| | | | dBA | dBA | dBA | dBA | dBA | dB | dB | dB | dB | dB | dB | dB | dB | dB | dB |
| 1 | Day | 1:27 PM | 67 | 85 | 69 | 63 | 59 | 70 | 65 | 63 | 60 | 57 | 55 | 49 | 43 | 36 | 30 |
| 2 | Day | 1:53 PM | 66 | 83 | 69 | 64 | 61 | 70 | 67 | 64 | 60 | 58 | 57 | 51 | 44 | 40 | 31 |
| 3 | Day | 2:21 PM | 71 | 84 | 75 | 67 | 61 | 69 | 67 | 63 | 59 | 56 | 58 | 51 | 40 | 34 | 29 |
| 1 | Night | 12:37 AM | 59 | 72 | 62 | 56 | 55 | 62 | 61 | 58 | 56 | 52 | 50 | 42 | 32 | 26 | 26 |
| 2 | Night | 12:12 AM | 62 | 80 | 66 | 58 | 55 | 64 | 63 | 58 | 54 | 52 | 51 | 45 | 36 | 30 | 27 |
| 3 | Night | 1:06 AM | 71 | 92 | 73 | 59 | 52 | 60 | 61 | 56 | 52 | 48 | 47 | 40 | 29 | 25 | 26 |

Note: Sound pressure levels are rounded to the nearest whole decibel.

## Weather Conditions:

| | Date | Temp | RH | Sky | Wind |
|---|---|---|---|---|---|
| **Daytime** | Thursday, December 14, 2017 | 29 °F | 25% | Clear | N @ 1-3 mph |
| **Nighttime** | Friday, December 15, 2017 | 21 °F | 39% | Clear | N @ 0-2 mph |

## Monitoring Equipment Used:

| | Manufacturer | Model | S/N |
|---|---|---|---|
| Sound Level Meter | Larson Davis | LD831 | 3753 |
| Microphone | Larson Davis | 377B20 | 142956 |
| Preamp | Larson Davis | PRM831 | 29564 |
| Calibrator | Larson Davis | Cal200 | 2853 |

### *3.10.9 Future Conditions – Overview of Potential Project Noise Sources*

The primary sources of continuous sound exterior to the Project will consist of ventilation, heating, cooling, and emergency power noise sources. Multiple noise sources will be located on the rooftop, and intake louvers will be located on the façades of the building between the first and second floors. Louvers will also be located along the sides of the planned enclosed mechanical penthouse.

Table 3.10-3 provides an anticipated list of the major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 3.10-4. Sound power level data were provided by the respective manufacturer of each piece of equipment, or by calculations based on equipment size and capacity.

The Project includes select noise-control measures that are necessary to achieve compliance with the applicable noise regulations. As the design progresses, specifications for mechanical equipment may change; however, appropriate measures will be taken to ensure compliance with the City Noise Standards. The emergency generator sound levels will be controlled using an enclosure. To further limit impacts from the standby generator, required periodic, routine testing will be conducted during daytime hours, when background sound levels are highest.

**Table 3.10-3 Modeled Noise Sources**

| Noise Source | Quantity | Approximate Location & Elevation | Size/Capacity |
|---|---|---|---|
| Cooling Tower | 2 | Upper roof | 108,900 CFM |
| Energy Recovery Unit | 1 | Upper roof | 6,000 CFM |
| Vault Intake & Exhaust Fan | 1 | Ground Level South Facade | 12,000 CFM |
| Kitchen Hood Exhaust Fan | 1 | Upper roof | 8,000 CFM |
| Penthouse Mechanical Space | 2 | Penthouse Louver (north façade) | NA |
| Emergency Generator (Package) | 1 | Upper roof | 500 kW |

## Table 3.10-4 Modeled Sound Power Levels per Noise Source

| Noise Source | Broad-band (dBA) | Sound Level (dB) per Octave-Band Center Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Cooling Tower | 94 | 102[1] | 102 | 101 | 95 | 90 | 89 | 82 | 77 | 72 |
| Energy Recovery Unit | 85 | 86[1] | 86 | 91 | 86 | 83 | 80 | 75 | 71 | 65 |
| Vault Intake & Exhaust Fan | 85 | 81[1] | 81 | 84 | 86 | 84 | 80 | 76 | 71 | 67 |
| Kitchen Hood Exhaust Fan | 77 | 81[1] | 81 | 89 | 75 | 72 | 71 | 67 | 63 | 60 |
| Penthouse Mechanical Space | 88 | 90[1] | 90 | 93 | 89 | 86 | 82 | 77 | 70 | 63 |
| Emergency Generator (Package)[2] | 101 | 117[1] | 117 | 103 | 103 | 95 | 92 | 92 | 86 | 92 |

Notes: Sound power levels assumes equipment operating at maximum load.

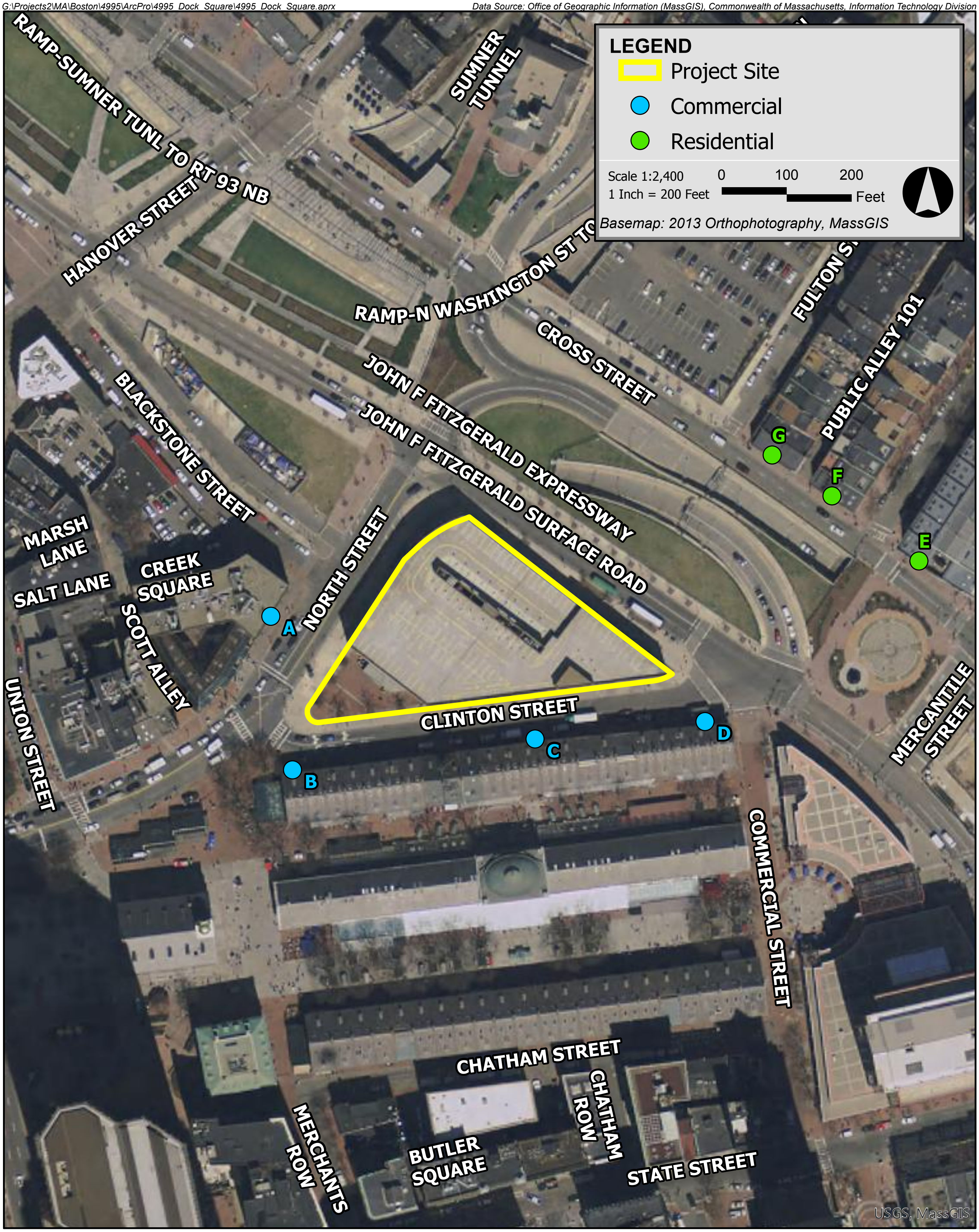
1. No data provided by manufacturer. Octave-band sound level assumed to be equal to the 63 Hz band level.
2. Assumes genset is in standard Level 1 Canopy enclosure.

### *3.10.10 Noise Modeling Methodology*

The noise impacts associated with the Project were predicted at the nearest and most representative receptors using the CadnaA noise calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). The benefits of this software are a refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections, drop-off with distance, and atmospheric absorption. The CadnaA software allows for octave-band calculation of noise from multiple noise sources, as well as computation of diffraction around building edges.

### *3.10.11 Future Sound Levels – Nighttime*

The analysis of sound levels at night included all the mechanical equipment operating at max loads except the emergency generator to simulate worst-case nighttime operation conditions at nearby receptors. Seven modeling locations were included in the analysis. Modeling receptor A is a commercial location on North Street, and is near monitoring location 2. Modeling locations B, C, and D are commercial areas to the south of the Project on Clinton Street, and are near monitoring location 1. Modeling locations E, F and G are residential areas northeast of the Project, and are near monitoring location 3. The modeling receptors, which correspond to commercial and residential uses in the community, are depicted in Figure 3.10-2. The predicted exterior Project-only sound levels range from 35 to 55 dBA at nearby receptors. The City of Boston Residential and Business limits have been applied to the appropriate locations. Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at all modeling locations. The evaluation is presented in Table 3.10-5.




Dock Square Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.10-2
*Sound Modeling Locations*

Table 3.10-5 Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

| Modeling Location ID | Zoning / Land Use | Broadband (dBA) | Sound Level (dB) per Octave-Band Center Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| A | Business | 36 | 48 | 45 | 41 | 32 | 26 | 33 | 28 | 20 | 7 |
| B | Business | 42 | 51 | 49 | 46 | 43 | 40 | 36 | 32 | 24 | 13 |
| C | Business | 55 | 54 | 53 | 54 | 56 | 54 | 50 | 46 | 40 | 35 |
| D | Business | 45 | 51 | 49 | 47 | 46 | 43 | 40 | 35 | 29 | 19 |
| E | Residential | 35 | 46 | 44 | 42 | 36 | 33 | 30 | 23 | 17 | 0 |
| F | Residential | 36 | 47 | 45 | 43 | 37 | 33 | 31 | 26 | 16 | 0 |
| G | Residential | 37 | 48 | 46 | 44 | 38 | 34 | 32 | 26 | 17 | 0 |
| **City of Boston Limits** | **Residential/Institutional** | **50** | **68** | **67** | **61** | **52** | **46** | **40** | **33** | **28** | **26** |
| | **Business** | **65** | **79** | **78** | **73** | **68** | **62** | **56** | **51** | **47** | **44** |

### *3.10.12 Future Sound Levels – Daytime*

As previously noted, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of power from the electrical grid. A second analysis combined noise from the Project's mechanical equipment and its emergency generator to reflect worst-case conditions during a period of equipment testing. The sound levels were calculated at the same receptors as in the nighttime analysis and then evaluated against daytime limits. The predicted exterior Project-only daytime sound levels range from 39 to 55 dBA at nearby receptors. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeled locations. This evaluation is presented in Table 3.10-6.

Table 3.10-6 Comparison of Future Predicted Project-Only Daytime Sound Levels to City Noise Standards

| Modeling Location ID | Zoning / Land Use | Broadband (dBA) | Sound Level (dB) per Octave-Band Center Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| A | Business | 37 | 56 | 52 | 41 | 34 | 27 | 33 | 28 | 21 | 8 |
| B | Business | 42 | 58 | 56 | 47 | 44 | 41 | 36 | 32 | 25 | 14 |
| C | Business | 55 | 61 | 58 | 55 | 56 | 54 | 50 | 46 | 40 | 35 |
| D | Business | 46 | 62 | 59 | 48 | 46 | 43 | 40 | 36 | 29 | 20 |
| E | Residential | 39 | 62 | 60 | 46 | 42 | 35 | 31 | 25 | 18 | 5 |
| F | Residential | 42 | 63 | 62 | 48 | 45 | 37 | 33 | 28 | 18 | 8 |
| G | Residential | 44 | 64 | 64 | 50 | 47 | 39 | 35 | 31 | 20 | 12 |
| **City of Boston Limits** | **Residential/Institutional** | **60** | **76** | **75** | **69** | **62** | **56** | **50** | **45** | **40** | **38** |
| | **Business** | **65** | **79** | **78** | **73** | **68** | **62** | **56** | **51** | **47** | **44** |

### *3.10.13 Conclusions*

Baseline noise levels were measured in the vicinity of the Project during the day and at night. At these and additional locations, future Project-only sound levels were calculated based on information provided on the expected mechanical equipment. Project-only sound levels were compared to applicable limits.

Predicted mechanical equipment noise levels from the proposed Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, will be at or below the octave-band requirements of the City Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain below 50 dBA at residences; therefore, within the nighttime residential zoning limits for the City of Boston at the nearest residential receptors. The results indicate that the Project can operate without substantial impact on the existing acoustical environment.

At this time, while the mechanical equipment and noise controls have been refined, they are still conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave-band limits of the City Noise Standards.

## 3.11 Construction Impacts

### *3.11.1 Introduction*

A Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department (BTD), once final plans are developed and the construction schedule is fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

Proper pre-planning with the City and neighborhood will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed. Techniques such as barricades, walkways and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number and address of a contact person to communicate with on issues related to the construction.

The Proponent intends to follow the guidelines of the City of Boston and the MassDEP, which direct the evaluation and mitigation of construction impacts.

### *3.11.2 Construction Methodology/Public Safety*

Construction methodologies that ensure public safety and protect nearby tenants will be employed. Techniques such as barricades and signage will be used. Construction management and scheduling will minimize impacts on the surrounding environment and will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and the control of noise and dust.

As the design of the Project progresses, the Proponent will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. Secure fencing, signage, and covered walkways may be employed to ensure the safety and efficiency of all pedestrian and vehicular traffic flows. In addition, sidewalk areas and walkways near construction activities will be well marked and lighted to protect pedestrians and ensure their safety. Public safety for pedestrians on abutting sidewalks will also include covered pedestrian walkways when appropriate. If required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. These measures will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work.

### *3.11.3 Construction Schedule*

The Proponent anticipates that the Project will commence construction in second quarter of 2019 and last for approximately 24 months.

Typical construction hours will be from 7:00 am to 6:00 pm, Monday through Friday, with most shifts ordinarily ending at 3:30 pm. No substantial sound-generating activity will occur before 7:00 am. If longer hours, additional shifts, or Saturday work is required, the construction manager will place a work permit request to the Boston Air Pollution Control Commission and BTD in advance. Notification should occur during normal business hours, Monday through Friday. It is noted that some activities such as finishing activities could run beyond 6:00 pm to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

### *3.11.4 Construction Staging/Access*

Access to the site and construction staging areas will be provided in the CMP.

Although specific construction and staging details have not been finalized, the Proponent and its construction management consultant will work to ensure that staging areas will be located to minimize impacts to pedestrian and vehicular flow. Secure fencing and barricades will be used to isolate construction areas from pedestrian traffic adjacent to the site. Construction procedures will be designed to meet all Occupational Safety and Health Administration (OSHA) safety standards for specific site construction activities.

### *3.11.5 Construction Mitigation*

The Proponent will follow City and MassDEP guidelines which will direct the evaluation and mitigation of construction impacts. As part of this process, the Proponent and construction team will evaluate the Commonwealth's Clean Air Construction Initiative.

A CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community. The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets.

"Don't Dump - Drains to Boston Harbor" plaques will be installed at storm drains that are replaced or installed as part of the Project.

### *3.11.6 Construction Employment and Worker Transportation*

The number of workers required during the construction period will vary. It is anticipated that approximately 250 construction jobs will be created over the length of construction. The Proponent will make best efforts to have at least 51% of the total employee work hours be for Boston residents, at least 40% of total employee work hours be for minorities and at least 12% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

To reduce vehicle trips to and from the construction site, minimal construction worker parking will be available at the site and all workers will be strongly encouraged to use public transportation and ridesharing options. The general contractors will work aggressively to ensure that construction workers are well informed of the public transportation options serving the area. Space on-site will be made available for workers' supplies and tools, so they do not have to be brought to the site each day.

### *3.11.7 Construction Truck Routes and Deliveries*

Truck traffic will vary throughout the construction period, depending on the activity. The construction team will manage deliveries to the site during morning and afternoon peak hours in a manner that minimizes disruption to traffic flow on adjacent streets. Construction truck routes to and from the site for contractor personnel, supplies, materials, and removal of excavations required for the development will be coordinated with BTD. Traffic logistics and routing will be planned to minimize community impacts. Truck access during construction will be determined by the BTD as part of the CMP. These routes will be mandated as a part of all subcontractors' contracts for the development. The construction team will provide subcontractors and vendors with Construction Vehicle & Delivery Truck Route Brochures in advance of construction activity.

"No Idling" signs will be included at the loading, delivery, pick-up and drop-off areas.

### *3.11.8 Construction Air Quality*

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for several strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to this Article 80 approval. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;

- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

### *3.11.9 Construction Noise*

The Proponent is committed to mitigating noise impacts from the construction of the Project. Increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities.

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;
- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

### *3.11.10 Construction Vibration*

All means and methods for performing work at the site will be evaluated for potential vibration impacts on adjoining property, utilities, and adjacent existing structures. Acceptable vibration criteria will be established prior to construction, and vibration will be monitored, if required, during construction to ensure compliance with the agreed-upon standard.

### *3.11.11 Construction Waste*

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

### *3.11.12 Protection of Utilities*

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be in accordance with the MWRA, BWSC, Boston Public Works, Dig Safe, and the governing utility company requirements. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its site plan review process.

### *3.11.13 Rodent Control*

A rodent extermination certificate will be filed with each building permit application for the Project. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work for each phase of the Project, in compliance with the City's requirements.

### *3.11.14 Wildlife Habitat*

The Project Site is in an established urban neighborhood. There are no wildlife habitats in or adjacent to the Project Site.

# Chapter 4.0

## Sustainable Design and Climate Change Resilience

# 4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

## 4.1 Sustainable Design

To measure the results of their sustainability initiatives and to comply with Article 37, the Proponent intends to use the framework of the Leadership in Energy and Environmental Design (LEED) rating system promulgated by the US Green Building Council (USGBC). The Project will use LEED for New Construction (LEED v4 for BD+C) as the rating system to demonstrate compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and Design Process, and Regional Priority Credits.

A LEED checklist for the Project is included at the end of this section, and the narrative below outlines how the Project intends to achieve the prerequisites and credits for each credit category. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. At present, 47 points have been targeted. Additional credits, identified as "Maybe" on the checklist, will be evaluated as the design progresses.

*Integrative Process*

Integrative Process: Beginning in pre-design and continuing throughout the design phases, the Project team will identify and use opportunities to achieve synergies across disciplines and building systems. The analyses will inform the Proponent's Project requirements, basis of design, design documents, and construction documents.

*Location and Transportation*

Sensitive Land Protection: The Project site is a previously developed site.

High Priority Site: The Project site is located within a Federal Empowerment Zone, meeting the criteria for Option 2.

Surrounding Density and Diverse Uses: The site is within a ½ mile of at least 8 basic services, including restaurants, community retail, community spaces, and food retail. The area around the site is also densely developed.

Access to Quality Transit: The Project site is located within ½ mile of MBTA Green Line at Government Center, the Blue Line at Aquarium Station, and the Green and Orange lines as well as numerous bus lines at Haymarket Station.

Bicycle Facilities: All Project entrances are connected by an existing bike route along Commonwealth Avenue which connects to at least 10 diverse uses within three miles of the site. The Project will also include at least one bicycle storage space per unit, as well as short term bicycle racks for visitors.

Green Vehicles: The Proponent will provide preferred parking for green vehicles totaling 5% of the total spaces, and will provide electric vehicle charging equipment in an additional 2% of parking spaces.

*Sustainable Sites*

Construction Activity Pollution Prevention (Prerequisite): An Erosion and Sedimentation Control Plan will be established to control erosion, waterway sedimentation and airborne dust generation during construction.

Environmental Site Assessment: The team will complete and document an assessment of the following information:

1. Topography – contours and sloping,
2. Hydrology – flood hazards and existing water bodies,
3. Climate – solar exposure and sun angles,
4. Vegetation – vegetation types and greenfield spaces,
5. Soils – soils delineation, prime farmland, and disturbed soils,
6. Human Use – enhanced views, availability of transportation, and future building potential, and
7. Human Health Effects – population assessment, physical fitness, and existing air pollution sources.

Rainwater Management: The Project will pursue Option 1, Path 3 for zero lot line projects. In a manner best replicating natural site hydrology, runoff quotas will meet or exceed the 85th percentile of regional/local (most stringent) rainfall events.

Heat Island Reduction: The building will utilize high albedo materials for all hardscapes, including both non-roof and roof installations. All installed materials will meet LEED requirements for either initial or three-year Solar Reflectance Index values.

*Water Efficiency*

Outdoor Water Use Reduction (Prerequisite): The Project's landscape will be designed to reduce water usage by at least 30%, calculated from the site's baseline peak watering month.

Indoor Water Use Reduction (Prerequisite): The building will achieve a minimum reduction of 20% of water consumption from the baseline.

Building-Level Water Metering (Prerequisite): A water meter will be installed for the building.

Outdoor Water Use Reduction: The Project will pursue Option 1: No Irrigation Required. The landscaping will not require a permanent irrigation system beyond a maximum two-year establishment period.

Indoor Water Use Reduction: An additional reduction to 30% will be achieved through the use of efficient fixtures.

Cooling Tower Water Use: A one-time, potable water analysis will be conducted. The design will maximize the number of water cycles, and at least 20% of the water used will be from non-potable sources.

Water Metering: The Proponent will measure at least two of the following water flows: irrigation, indoor plumbing fixtures, domestic hot water, boiler, or reclaimed water.

### *Energy and Atmosphere*

Fundamental Commissioning and Verification (Prerequisite): The team will include an experienced Commissioning (Cx) Agent - this person will be hired before the end of the design development phase and will provide review services for the project Basis of Design and Owner's Project Requirements as well as a thorough review of both the Design Development and Construction Documents plan and specification set, observation of all start-up testing and balancing procedures, and confirmation of installation and operation according to the design parameters.

Minimum Energy Performance (Prerequisite): Through a Whole Building Energy Simulation, the Proponent will demonstrate at least a 5% improvement in the proposed building performance rating, compared with the baseline building performance rating. The baseline building performance rating will be calculated according to Appendix G of ASHRAE 90.1-2010 using a computer simulation model for the whole building project.

Building-Level Energy Metering (Prerequisite): Energy meters will be installed to measure total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass).

Fundamental Refrigerant Management (Prerequisite): It is the intent of this Project to use zero CFC-based refrigerants in the building heating, ventilating, air conditioning and refrigeration equipment.

Enhanced Commissioning: The team will fulfill the requirements in the Fundamental Commissioning and Verification Prerequisite as they apply to the building's thermal envelope.

Optimize Energy Performance: The Project will strive to optimize energy performance and realize energy cost savings of 10% compared with ASHRAE 90.1-2010. Energy conservation measures will be determined via an integrative approach investigating the overlapping of architectural and engineering systems to reduce energy cost. Energy conservation measures are expected to include green roofs, reflective roofs, efficient lighting and HVAC systems, heat recovery systems, and enhanced glazing and insulation.

Enhanced Refrigerant Management: It is the intent of this Project to use zero CFC-based refrigerants in the building heating, ventilating, air conditioning and refrigeration equipment. In addition, the Project will only use refrigerants with an ozone depletion potential equal to zero and a global warming potential of less than 50.

### *Materials and Resources*

Storage and Collection of Recyclables (Prerequisite): An easily accessible area will be provided for the collection and storage of materials for recycling for the entire building. Materials will include paper, corrugated cardboard, glass, plastics and metals. Appropriate measures will be taken for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste

Construction and Demolition Waste Management Planning (Prerequisite): The construction team will institute a Construction Waste Management Plan, which will establish waste diversion goals for five materials.

Construction and Demolition Waste Management: The Project team intends to divert at least 75 percent of waste with at least four material streams.

### *Indoor Environmental Quality*

Minimum Indoor Air Quality Performance (Prerequisite): The team will ensure that all ventilation systems meet the minimum requirements of Sections 4 through 7 of the ASHRAE 62.1-2007 standard for Acceptable Indoor Air Quality.

Environmental Tobacco Smoke Control (Prerequisite): Smoking will be prohibited inside the building and within 25-feet of all entries, outdoor air intakes, and operable windows; these prohibitions will be incited in all leasing agreements and will be displayed via on-site signage.

Enhanced Indoor Air Quality Strategies: Permanent entryway systems will be installed at least ten feet long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entrances. Additionally, spaces where air quality hazards might be stored (janitor's closets, print rooms, etc.) will have separate exhaust, negative pressurization, provide self-closing doors, and either floor-to-deck partitions or a hard-lid ceiling. Outdoor air ventilation systems will use MERV 13 or higher filtration media.

Low Emitting Materials: The team will specify low-emitting materials for paints, coatings, flooring, adhesives, and sealants.

Construction Indoor Air Quality Management Plan: The Proponent will develop and implement an IAQ management plan for the construction and pre-occupancy phase of the building.

Thermal Comfort Controls: All HVAC systems will be designed in compliance with ASHRAE 55-2010 (with errata). Thermal comfort controls will be provided for a minimum of 50% of individual occupant spaces with group thermal comfort controls for all shared multi-occupant spaces.

Interior Lighting: The Project will provide individual lighting controls for at least 90% of individual occupant spaces, and all shared spaces will include controls for adjustment per group needs. The Project will also apply at least four additional strategies as outlined in Option 2.

*Innovation in Design*

LEED Accredited Professional: A LEED Accredited Professional is part of the team.

*Regional Priority*

The Project anticipates receiving a Regional Priority Credit for Rainwater Management.

## 4.2 Climate Change Resilience

### *4.2.1 Introduction*

Climate change conditions considered by the Project team include sea level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate-related conditions projected 50 years into the future. A copy of the completed Checklist is included in Appendix F. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

### 4.2.2 *Extreme Heat Events*

The *Climate Ready Boston* report predicts that in Boston, there may be between 25 to 90 days with temperatures over 90 degrees by 2070, compared to an average of 11 days per year over 90 degrees between 1971 to 2000. The Project design will include measures to adapt to these conditions, including installing high performance HVAC equipment, a high-performance building envelope, and including operable windows where possible. New street trees and landscaping both at the street level, and a series of rooftop terraces, will reduce the urban heat island effect.

### 4.2.3 *Sea Level Rise and Future Storms*

According to Climate Ready Boston, by 2030 sea level may be as much as eight inches higher than it was in 2000, and could be as high as seven feet higher by 2100. As described in "Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery" by MassDOT (MassDOT Report), "one of the challenges presented by the wide range of SLR projections is the inability to assign likelihood to any particular [SLR] scenario."[1] To be conservative, in the year 2070, SLR could be as high as approximately four feet.

Combined with storm surge at an inopportune tide, flooding in this future scenario would be possible at the Project Site.[2] The storms in the Boston area that could create these flood conditions would be Nor'easters and tropical storms. In 2017, hurricanes occur less frequently than Nor'easters; however, in the future according to the MassDOT Report, it is anticipated that there will be roughly the same number of tropical storms impacting the Boston area as Nor'easters. In addition, the intensity of storms is anticipated to increase. The risks of each type of storm differ: hurricanes are typically shorter in duration, but are more intense and create a larger storm surge; Nor'easters are longer in duration, but created a smaller storm surge. For this reason, a hurricane would need to impact Boston within a short window to create flooding as shown in the MassDOT Report, while Nor'easters are more likely to create flooding given that they have a higher probability of impacting the area during the rising tide and high tide.

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1 Massachusetts Department of Transportation, et al. "MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery." November 2015.

2 The MassDOT Report, funded by the Federal Highway Administration, studied the impact of sea level rise and future storm impacts related to climate change on the Central Artery in Boston. As part of this project, a hydrodynamic model was developed for Boston Harbor, including inland areas that cover portions of Boston, including the Project site. The report states that the model is able to provide site-specific information about the risk of potential future flooding in the years 2030, 2070 and 2100 related to storm events, in particular Nor'easters and tropical cyclones (i.e., hurricanes).

According to the BPDA Sea Level Rise Flood Hazard Area Map, the Sea Level Rise – Base Flood Elevation for the site is 19.5 feet Boston City Base (BCB). This is calculation based on a 1% annual chance of flooding with 40 inches on sea level rise. The first-floor elevation of the existing parking garage is at 15.65 ft BCB, making the site vulnerable to sea level rise, storm surge, and stormwater flooding. Because the Project consists of construction an addition on the existing building, raising the first-floor elevation or designing higher ceiling heights is not feasible. However, the Project will take measures to minimize the impact of potential flooding at the site, including the following:

- Existing ground floor spaces will be upgraded utilizing water-resistant materials;
- Backup power supply and fuel sources will be located above the Sea Level Rise Base Flood Elevation;
- Lobbies will be designed with non-absorptive materials so that in the event of flooding, the building can recover quickly; andBackflow prevention will be included in the design to protect drains and waste conveyance systems, and utility access routes will be protected.

### *4.2.4 Drought Conditions*

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials and high efficiency irrigation systems will be installed. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

# LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Dock Square

Date: 12/01/2017

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 1 | | | Credit | Integrative Process | 1 |

| 14 | 0 | 2 | | **Location and Transportation** | **16** |
|---|---|---|---|---|---|
| | | n/a | Credit | LEED for Neighborhood Development Location | 16 |
| 1 | | | Credit | Sensitive Land Protection | 1 |
| 1 | | 1 | Credit | High Priority Site | 2 |
| 5 | | | Credit | Surrounding Density and Diverse Uses | 5 |
| 5 | | | Credit | Access to Quality Transit | 5 |
| 1 | | | Credit | Bicycle Facilities | 1 |
| | | 1 | Credit | Reduced Parking Footprint | 1 |
| 1 | | | Credit | Green Vehicles | 1 |

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

| 7 | 4 | 0 | | **Water Efficiency** | **11** |
|---|---|---|---|---|---|
| Y | | | Prereq | Outdoor Water Use Reduction | Required |
| Y | | | Prereq | Indoor Water Use Reduction | Required |
| Y | | | Prereq | Building-Level Water Metering | Required |
| 2 | | | Credit | Outdoor Water Use Reduction | 2 |
| 2 | 4 | | Credit | Indoor Water Use Reduction | 6 |
| 2 | | | Credit | Cooling Tower Water Use | 2 |
| 1 | | | Credit | Water Metering | 1 |

| 6 | 25 | 2 | | **Energy and Atmosphere** | **33** |
|---|---|---|---|---|---|
| Y | | | Prereq | Fundamental Commissioning and Verification | Required |
| Y | | | Prereq | Minimum Energy Performance | Required |
| Y | | | Prereq | Building-Level Energy Metering | Required |
| Y | | | Prereq | Fundamental Refrigerant Management | Required |
| 2 | 4 | | Credit | Enhanced Commissioning | 6 |
| 3 | 15 | | Credit | Optimize Energy Performance | 18 |
| | 1 | | Credit | Advanced Energy Metering | 1 |
| | 1 | 1 | Credit | Demand Response | 2 |
| | 2 | 1 | Credit | Renewable Energy Production | 3 |
| 1 | | | Credit | Enhanced Refrigerant Management | 1 |
| | 2 | | Credit | Green Power and Carbon Offsets | 2 |

| 2 | 9 | 2 | | **Materials and Resources** | **13** |
|---|---|---|---|---|---|
| Y | | | Prereq | Storage and Collection of Recyclables | Required |
| Y | | | Prereq | Construction and Demolition Waste Management Planning | Required |
| | 3 | 2 | Credit | Building Life-Cycle Impact Reduction | 5 |
| | 2 | | Credit | Building Product Disclosure and Optimization - Environmental Product Declarations | 2 |
| | 2 | | Credit | Building Product Disclosure and Optimization - Sourcing of Raw Materials | 2 |
| | 2 | | Credit | Building Product Disclosure and Optimization - Material Ingredients | 2 |
| 2 | | | Credit | Construction and Demolition Waste Management | 2 |

| 9 | 7 | 0 | | **Indoor Environmental Quality** | **16** |
|---|---|---|---|---|---|
| Y | | | Prereq | Minimum Indoor Air Quality Performance | Required |
| Y | | | Prereq | Environmental Tobacco Smoke Control | Required |
| 2 | | | Credit | Enhanced Indoor Air Quality Strategies | 2 |
| 3 | | | Credit | Low-Emitting Materials | 3 |
| 1 | | | Credit | Construction Indoor Air Quality Management Plan | 1 |
| | 2 | | Credit | Indoor Air Quality Assessment | 2 |
| 1 | | | Credit | Thermal Comfort | 1 |
| 2 | | | Credit | Interior Lighting | 2 |
| | 3 | | Credit | Daylight | 3 |
| | 1 | | Credit | Quality Views | 1 |
| | 1 | | Credit | Acoustic Performance | 1 |

| 1 | 5 | 0 | | **Innovation** | **6** |
|---|---|---|---|---|---|
| | 5 | | Credit | Innovation | 5 |
| 1 | | | Credit | LEED Accredited Professional | 1 |

| 1 | 3 | 0 | | **Regional Priority** | **4** |
|---|---|---|---|---|---|
| 1 | | | Credit | Rainwater Management | 1 |
| | 1 | | Credit | Indoor Water Use Reduction 40% | 1 |
| | 1 | | Credit | Optimize Energy 20% | 1 |
| | 1 | | Credit | Renewables 3% | 1 |

| 47 | 57 | 6 | **TOTALS** | Possible Points: | **110** |
|---|---|---|---|---|---|

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

# Chapter 5.0

## Urban Design

# 5.0 URBAN DESIGN

## 5.1 Neighborhood Context

The Project site is located in downtown Boston adjacent to Faneuil Hall Marketplace, and in close proximity to the North End. The site is also nearby the Rose Fitzgerald Kennedy Greenway, which has replaced the elevated Central Artery Highway as a result of the Central Artery/Tunnel Project (CA/T). The realization of the Greenway is an important achievement in both the life and history of the City of Boston. In addition to actively reconnecting the torn historic fabric of the City, the Greenway has increased pedestrian activity in the area. However, the current use and function at the Project site creates an inactive edge in an otherwise active corridor. The Project design and function will invigorate the site itself and enhance the experience of the surrounding area.

## 5.2 Massing and Design

The shape of the building was determined with consideration of both its shadow impact on the Greenway and its visual impact on Dock Square and Merchants Row. The lowest portion of the garage addition faces John F. Fitzgerald Surface Road, along the site's northeasterly edge, and continues upward in a counterclockwise direction to its highest point along Clinton Street, the site's southerly edge. This design minimizes shadows on North End Park, a highly utilized public space for the North End community and the City. The highest point of the building is capped at a similar height as the 200 State Street building located southeasterly of the Project site, which rises to a height of 200 feet (see Figure 5-1). With the tallest portion of the addition running parallel to the North Market building of Faneuil Hall Marketplace, directly across Clinton Street from the site, the resulting massing is not only a unique shape visible from the Greenway, but also a perfect fit for its urban context. In addition, the stair-like roofline of the vertical addition allows for a series of terraces cascading down towards the Greenway, (see Figure 5-2).

The existing garage brick façade will be re-clad along its entire perimeter. The new garage façade will be composed of a combination of terra-cotta louvers and perforated metal panels, organized in a vertical grid pattern to reduce the scale of the existing garage facade. LED light strips will be embedded within the grid to illuminate the façade with ambient lighting (see Figure 5-3). The residential addition above the garage will be skinned throughout with glass, curtainwall facades. Subtle surface undulations will be included to add interest to the glass surfaces, and to allow for unit balconies (see Figure 5-4). The goal of the overall façade composition is to create a warm-colored building base that fits into the context of the historical neighborhood, and a contrasting sleek and prism-like top that becomes a recognizable addition to the Boston skyline.

The existing brick-paved plaza, at the westerly corner of the Project site, is currently underused in part because of its varying grades, with steps down from the adjacent public sidewalks. The Project will create a uniform grade for the plaza, and add plantings, tables, and chairs to make it more welcoming and usable to the public.


**Dock Square  Boston, Massachusetts**

Stantec

**Figure 5-1**

*Aerial facing Southeast*

**Dock Square**    **Boston, Massachusetts**

Stantec

**Figure 5-2**

*Aerial View*


**Dock Square Boston, Massachusetts**

**Figure 5-3**

*View from John F. Fitzgerald Surface Road*

Dock Square    Boston, Massachusetts

Figure 5-4

*Rendering of the Residential Addition*

# Chapter 6.0

## Historic and Archaeological Resources

# 6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section identifies the historic and archaeological resources within and in the vicinity of the Project site and discusses potential Project-related impacts.

## 6.1 Project Description

The project site is located at 20 Clinton Street in downtown Boston, and comprises a triangular parcel bounded by the John F. Fitzgerald Surface Road to the northeast, North Street to the west and Clinton Street to the south. The site currently consists of a seven-story brick building constructed in 1979 containing the Dock Square Parking Garage, with a total of 698 public parking spaces, and ground level retail space of approximately 15,000 sf, currently occupied by the Hard Rock Café. Additionally, the site contains a small plaza to the west of the building.

The proposed Project will reduce the current 698 publicly available garage parking spaces to 682 spaces, maintain approximately 8,000 sf of retail space, and will include the construction of 195 new residential units above the existing garage. The residential units will be located on floors 8 to 17 and consist of a mix of studios, and one- to four-bedroom units. Of the approximately 682 spaces, approximately 280 would be provided via valet parking services and/or automated mechanical lifts. Primary access to the parking garage will be provided via the existing Dock Square Parking Garage entrance along Clinton Street. Additionally, a residential pick-up/drop-off area will be provided to the west of the building connecting Clinton Street and North Street. Pedestrian access to the site will be provided along Clinton Street and at the pick-up/drop-off area to the west of the building.

## 6.2 Historic Resources in the Project Vicinity

The Project site includes the seven-story brick Dock Square Parking Garage constructed in 1979. The building is included in the Massachusetts Historical Commission's Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) (BOS.1658). The concrete constructed parking garage faced with red brick was designed by the local architectural firm of Desmond and Lord and built by Peabody Construction Company.

The Project site is in the vicinity of numerous properties and districts included on the State and National Registers of Historic Places, as well as properties included in the Inventory. In the immediate vicinity, the Blackstone Block Historic District, a National Register historic district and a Boston Local Landmark, is located to the northwest across North Street and Quincy Market, a National Historic Landmark, is located to the south across Clinton Street. Additional National Register listed historic districts in the vicinity of the Project site include: Fulton-Commercial Streets District in the North End, and the Custom House District, about two blocks southeast of the site. Several individual National Register-listed properties are located within a one-quarter mile of the Project site. Table 6-1 lists historic resources within a quarter mile radius of the Project site; the locations of these resources are depicted on Figure 6-1.

### Table 6-1 Historic Resources in the Vicinity of the Project

| Existing Map Key | Historic Resource | Address | Designation* |
|---|---|---|---|
| **State and National Register-Listed Properties** | | | |
| A | Boston Police Station Number One - Traffic Tunnel Administration Building and Boston Printing Dept. Building | 128,150 North Street and 130-140 Richmond Street | NRDIS |
| B | Blackstone Block Historic District | Union, Hanover, Blackstone and North Streets | NRDIS, LL |
| C | Custom House District | Between Kilby Street, JFK Expressway, High and Batterymarch streets, Merchants Road, South Market and State Streets | NRDIS |
| D | Long Wharf and Custom House Block | East of Atlantic Avenue and base of State Street | NHL, NRDIS |
| E | Quincy Market | North and South Market Streets | NHL,NRDIS |
| F | Sears' Crescent and Sears' Block | 38-68 and 70-72 Cornhill | NRIND |
| G | Fulton-Commercial Streets District | North End, Fulton, Commercial, Mercantile, Lewis, and Richmond Streets | NRDIS |
| 1 | Monks Building - National Shawmut Bank Building | 33-59 Congress Street | NRDOE |
| 2 | Old Colony Trust Company | 17-19 Court Street | NRDOE |
| 3 | The Ames Building | 1 Court Street | NRIND, LL |
| 4 | Old Colony Trust Company Building | 17 Court Street | NRDOE |
| 5 | Faneuil Hall | 1 Dock Square | NHL, NRDIS, NRIND, PR, LL |
| 6 | Codman Building (10 Liberty Square Building) | 51-57 Kilby Street | NRIND |
| 7 | Samuel Appleton Building | 110-114 Milk Street | NRDOE |
| 8 | Second Brazer Building | 25-29 State Street | NRIND, LL |
| 9 | Old State House | State Street | NHL, NRDIS, NRIND, PR, LL |
| 10 | Winthrop Building | 276-278 Washington Street | NRIND |
| 11 | Mariners House | 11 North Square | NRIND |

Table 6-1 Historic Resources in the Vicinity of the Project (Continued)

| Existing Map Key | Historic Resource | Address | Designation* |
|---|---|---|---|
| 12 | Robert Howard – Paul Revere House | 19 North Square | NHL, NRDIS, NRIND |
| 13 | Moses Pierce – Nathaniel Hichborn House | 29 North Square | NHL, NRDIS, NRIND |
| 14 | Market Place Center | 200 State Street | NRDIS |
| 15 | National Shawmut Bank Building | 20-42 Water Street | NRDOE |

*Designation Legend

| | |
|---|---|
| NRIND | Individually listed in the National Register of Historic Places |
| NRDIS | National Register of Historic Places historic district |
| NRDOE | Determined eligible for inclusion in the National Register of Historic Places |
| NHL | National Historic Landmark |
| LL | Local Landmark |
| PR | Preservation Restriction |

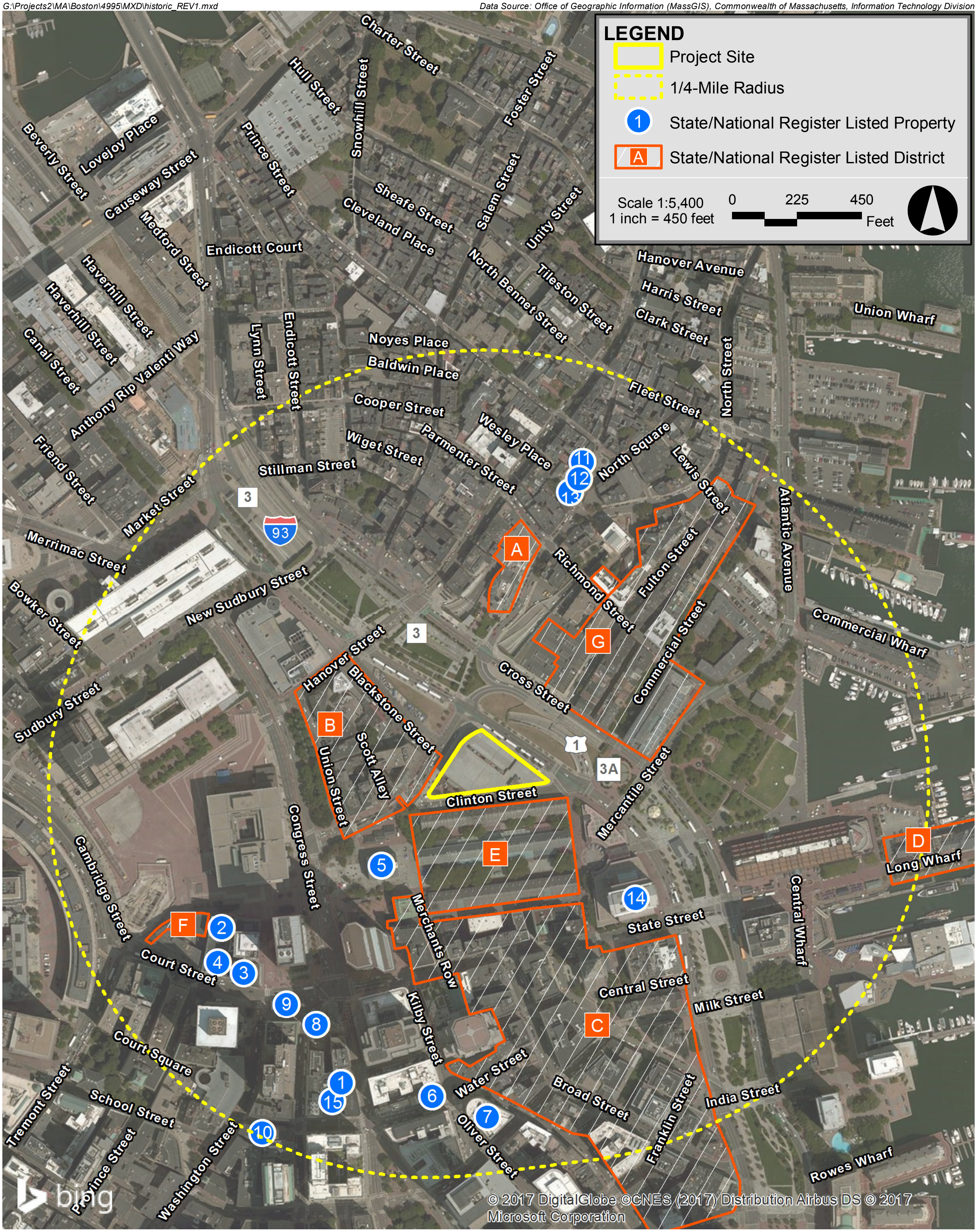
## 6.3 Archaeological Resources

A review of Massachusetts Historical Commission's online archaeological base maps was conducted on January 2, 2018. The Project site consists of a previously developed urban parcel. One archaeological site included in the Inventory has been identified within the vicinity of the Project site. Due to extensive previous development activities and disturbances, it is not anticipated that significant archaeological resources remain within the Project site. No impacts to archaeological resources are anticipated as a result of the Project.

## 6.4 Potential Impacts to Historic Resources

### *6.4.1 Design and Visual Impacts*

As described in Chapter 5, the Project was designed with consideration of both its potential shadow impact on the Greenway and its visual impact on Faneuil Hall and Quincy Market. The lowest portion of the proposed vertical addition is located along the site's northeasterly edge, facing the Greenway, and then steps upward in a counter-clockwise direction to the highest point along the site's southerly edge, facing Clinton Street. This roofline minimizes shadows on North End Park, a highly utilized public space for the North End community and the City. The highest point of the building is capped at a similar height as the 200 State Street building located southeasterly of the Project site, which rises to a height of 200 feet. With the tallest portion of the addition running parallel to the North Market Building of Faneuil Hall Marketplace, the resulting massing is not only a unique shape visible along the Greenway, but also fits within its urban context.




**Dock Square Boston, Massachusetts**

Epsilon ASSOCIATES INC.

**Figure 6-1**
*Historic Resources*

Given its proximity to the Blackstone Block Historic District and Quincy Market, the Project will be visible from, and has the potential to affect views of historic properties within these districts. However, the Project is not expected to introduce new elements that are visually incompatible to the adjacent districts. As envisioned, the Project's design will transform a brick-veneered parking garage into a mixed-use building, clad with high-quality materials, and softened with rooftop green space. The existing garage brick façade will be re-clad along its entire perimeter. The new garage façade will be composed of a combination of terra-cotta louvers and perforated metal panels, organized in a vertical grid pattern to reduce the scale of the existing garage facade. The residential addition above the garage will be skinned throughout with glass curtainwall facades. Subtle surface undulations will be included to add interest to the glass surfaces, and to allow for unit balconies (see Figure 5-4). The goal of the overall façade composition is to create a warm-colored building base that fits in the context of the historical neighborhood.

### *6.4.2 Shadow Impacts*

As described in greater detail in Section 3.2, shadow studies were conducted to investigate potential shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

As illustrated in the shadow study diagrams (Figures 3.2-1 to 3.2-14), during isolated time periods the Project will cast minimal net new shadow primarily on areas north of the Project site, including limited areas of the Fulton-Commercial Streets District. Specifically, during four of the time periods studied (March 21 at 3:00 p.m., September 21 at 3:00 p.m., and December 21 at 12:00 and 3:00 p.m.), new shadow may be cast on a portion of the southern edge of the Fulton-Commercial Streets District, only slightly more shadow than what is allowable by right. However, none of the shadow impacts resulting from the Project will adversely impact the character-defining features of the Fulton-Commercial Streets District that make it eligible for inclusion in the National Register.

### *6.4.3 Wind Impacts to Historic Resources*

The Project entails new construction which will result in localized changes in wind conditions. Wind comfort conditions at most areas around the proposed development are predicted to be suitable for sitting or walking. However, uncomfortable wind conditions are expected to occur at the northern corner of the proposed development at the intersection of John F. Fitzgerald Surface Road and North Street. Additionally, uncomfortable wind conditions are expected to remain at the western corner of Cross Street and Mercantile where uncomfortable wind conditions currently exist. The Project is unlikely to affect the setting of nearby historic properties.

## 6.5 Status of Project Reviews with Historical Agencies

### *6.5.1 Boston Landmarks Commission*

The submission of this PNF initiates review of the Project by the Boston Landmarks Commission (BLC) under the City's Article 80 Review process. The Proponent is committed to working closely with BLC staff as the design for the Project advances.

### *6.5.2 Massachusetts Historical Commission*

The Massachusetts Historical Commission (MHC) has review authority over projects requiring state or federal licensing, permitting and/or approvals, or utilize state or federal funding. In the event that state or federal licenses, permits or approvals are required for the Project, or if state or federal funding is pursued, the MHC review process will be initiated through the filing of an MHC Project Notification Form. Currently, it is not anticipated that the project will require review by the MHC.

# Chapter 7.0

Infrastructure

# 7.0 INFRASTRUCTURE

## 7.1 Introduction

This Chapter outlines the existing utilities surrounding the Project site, the connections required to provide service to the Project, and any impacts on the existing utility systems that may result from the construction of the Project. The following utility systems are discussed herein:

- Sewer
- Domestic water
- Fire protection
- Drainage
- Natural gas
- Electricity
- Telecommunications

The approximately 1.2-acre Project site is bounded by Clinton Street to the south, John F. Fitzgerald Surface Road to the northeast, and North Street to the west. The Project site also faces the Rose Fitzgerald Kennedy Greenway, across John F. Fitzgerald Surface Road. The Project includes the development of a ten-story residential addition atop the existing, seven-story Dock Square Garage.

## 7.2 Wastewater

### *7.2.1 Existing Sewer System*

The Boston Water and Sewer Commission (BWSC) owns and maintains the sewer system that services the City of Boston. The BWSC sewer system connects to the Massachusetts Water Resources Authority (MWRA) interceptors for conveyance, treatment, and disposal through the MWRA Deer Island Wastewater Treatment Plant. There are existing BWSC sanitary sewer mains near the Project site.

There are BWSC sanitary sewer mains are located in North Street, Clinton Street, and John F. Fitzgerald Surface Road adjacent to the Project site. There is a 15-inch BWSC sanitary sewer line on North Street which flows northwest to Blackstone Street. The 18-inch sanitary sewer main in Blackstone Street increases to a 36-inch sanitary main. The 36-inch sanitary sewer main flows into a 30-inch by 36-inch combined sewer main in Hanover Street which flows northerly. The 30-inch by 36-inch combined sewer main flows to a 66-inch combined sewer main in Cross Street which flows easterly. The 66-inch combined sewer main continues flowing easterly to the Massachusetts Department of Public Works interceptor in Fulton Street. The combined sewer ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal, or during times of high flow, discharges to the Inner Boston Harbor.

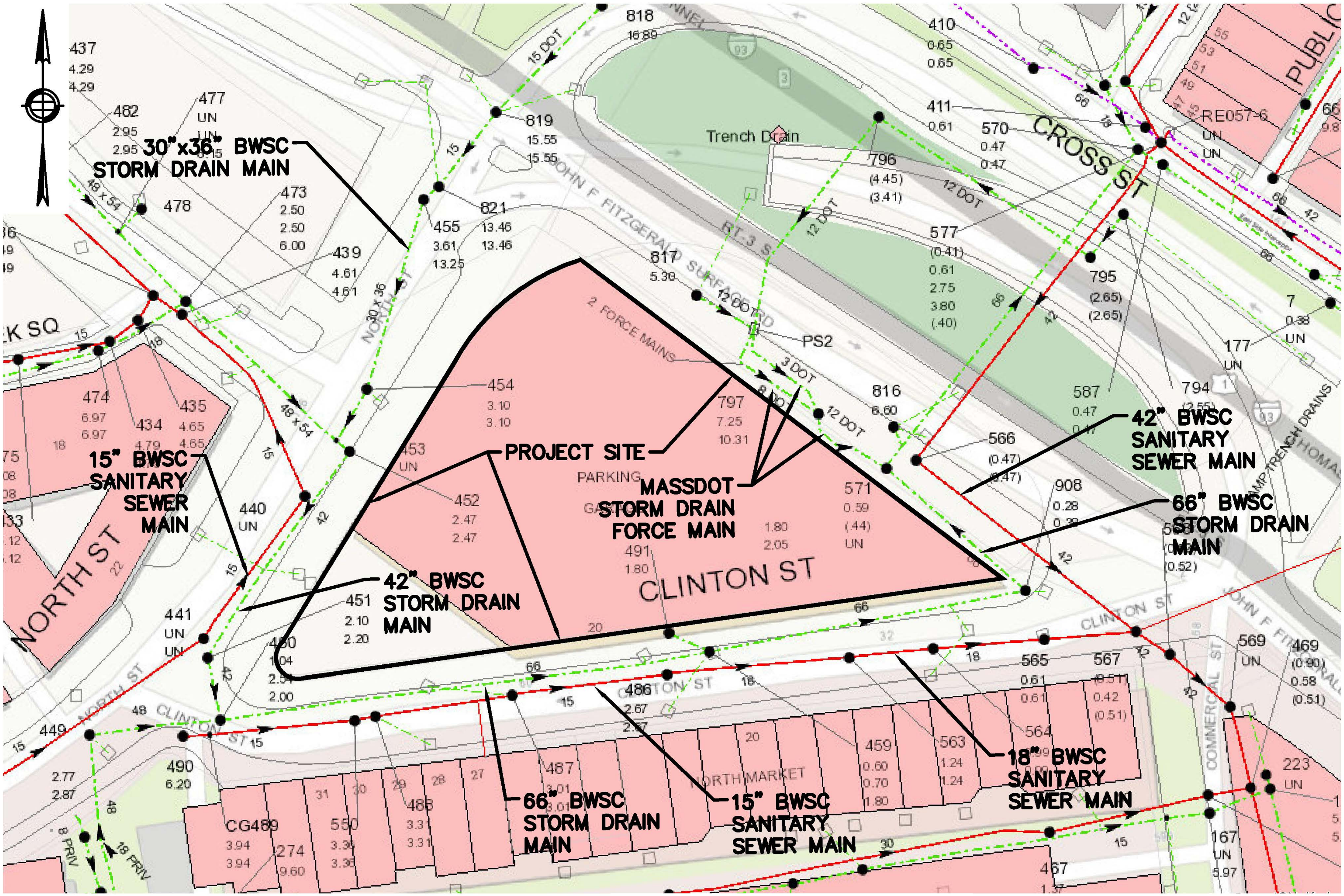
There is a 15-inch BWSC sanitary sewer main in Clinton Street which flows easterly and increases to an 18-inch sanitary sewer main. There is also a 42-inch BWSC sanitary sewer main in John F. Fitzgerald Surface Road. The 18-inch sanitary sewer main flows into the same 42-inch sanitary sewer main in John F. Fitzgerald Surface Road and eventually flows to the 72-inch New East Side Interceptor on Essex Street. The combined sewer ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal, or during times of high flow, discharges to the Inner Boston Harbor. The existing BWSC sewer system is shown in Figure 7-1.

### *7.2.2 Project Generated Sanitary Sewer Flow*

The Project's sewage generation rates were estimated using Massachusetts Department of Environmental Protection (MassDEP) standards published in 310 CMR 15.20. 310 CMR 15.20 lists typical sewage generation values for the proposed building use. Typical generation values are conservative values for estimating the sewage flows from new construction. 310 CMR 15.20 sewage generation values are used to evaluate new sewage flows, to estimate existing sewer flows, and to determine an increase in flows to existing connections. The existing building produces approximately 17,990 gallons per day (gpd) in sewer flows. The Project is expected to produce approximately 38,340 gpd, or a net increase of 20,350 gpd. Table 7-1 presents the increased sewage generation in gallons per day (GPD) due to the Project.

**Table 7-1 Estimated Sewage Flows**

| Proposed Use – Building A | Units/Size | Design Flow Rate (GPD/unit) | Proposed Sanitary Flows (GPD) |
|---|---|---|---|
| Residential | 269 Bedrooms | 110/bedroom | 29,590 |
| Restaurant | 250 Seats | 35/seat | 8,750 |
| TOTAL PROPOSED SANITARY FLOW | | | 38,340 |
| **Existing Use** | **Units/Size** | **Design Flow Rate (GPD/unit)** | **Existing Sanitary Flows (GPD)** |
| Restaurant | 514 Seats | 35/seat | 17,990 |
| TOTAL EXISTING SANITARY FLOW | | | 17,990 |
| TOTAL INCREASE IN SEWER FLOWS | | | 20,350 |




**Dock Square** **Boston, Massachusetts**

SCALE:
1"=100'

**Figure 7-1**

*Existing Sewer and Storm Systems*

Nitsch Engineering

### 7.2.3 *Sewage Capacity & Impacts*

The Project's impact on the existing BWSC systems in North Street, Clinton Street, and John F. Fitzgerald Surface Road were analyzed. The existing sewer system capacity calculations are presented in Table 7-2.

**Table 7-2 Sewer Hydraulic Capacity Analysis**

| Manhole (BWSC Number)[2] | Slope (%)[1] | Diameter (inches) | Manning's Number | Flow Capacity (cfs)[3] | Flow Capacity (MGD) |
|---|---|---|---|---|---|
| Clinton Street | | | | | |
| 490 to 550 | 2.2% | 15 | 0.013 | 9.52 | 6.15 |
| 550 to 488 | 0.3% | 15 | 0.013 | 3.63 | 2.35 |
| 488 to 487 | 0.3% | 15 | 0.013 | 3.46 | 2.23 |
| 487 to 486 | 0.3% | 15 | 0.013 | 3.46 | 2.23 |
| 486 to 563 | 1.0% | 18 | 0.013 | 10.68 | 6.90 |
| 563 to 564 | 0.4% | 18 | 0.013 | 6.56 | 4.24 |
| 564 to 565 | 0.5% | 18 | 0.013 | 7.05 | 4.56 |
| 565 t0 567 | 3.2% | 18 | 0.013 | 18.84 | 12.18 |
| | | | Minimum Flow Analyzed: | 3.46 | 2.23 |
| North Street | | | | | |
| 442 to 441 | 0.2% | 15 | 0.013 | 2.85 | 1.84 |
| 441 to 440 | 0.2% | 15 | 0.013 | 2.92 | 1.89 |
| | | | Minimum Flow Analyzed: | 2.85 | 1.84 |
| John F. Fitzgerald Surface Road | | | | | |
| 566 to 567 | 0.0% | 42 | 0.013 | 13.83 | 8.94 |
| | | | Minimum Flow Analyzed: | 13.83 | 8.94 |

1. Slopes was calculated with inverts from BWSC GIS Sewer Maps.
2. BWSC sewer manhole numbers are from BWSC GIS Sewer Maps.
3. Flow calculations based on Manning's Equation.

Table 7-2 indicates the hydraulic capacity of the sanitary sewer in North Street, Clinton Street and John F. Fitzgerald Surface Road. The minimum hydraulic capacity of the sewer is 2.23 million gallons per day (MGD) or 3.46 cubic feet per second (cfs) for the 15-inch system in Clinton Street, 8.94 MGD or 13.83 cfs for the 42-inch system on John F. Fitzgerald Surface Road, and 1.84 MGD or 2.85 cfs for the 15-inch system on North Street. Based on an estimated average net increase in daily flow for the Project of 20,350 GPD or 0.020 MGD; and with a factor of safety of 10 (total estimate = 0.020 MGD x 10 = 0.20 MGD), no capacity problems are expected within the sewer mains adjacent to the site. The connections to the BWSC sewer mains will be evaluated throughout the design process.

### *7.2.4 Proposed Conditions*

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the BWSC sanitary sewer system. As noted above, the Project is expected to generate an increase in wastewater flows from the site of approximately 20,350 gallons per day compared to the current flows from the existing uses at the Project site. Approval for the net increase in sanitary flow will be sought from BWSC.

The sanitary sewer services for the Project will connect to the existing sanitary sewer mains located in North Street, Clinton Street, and/or John F. Fitzgerald Surface Road.

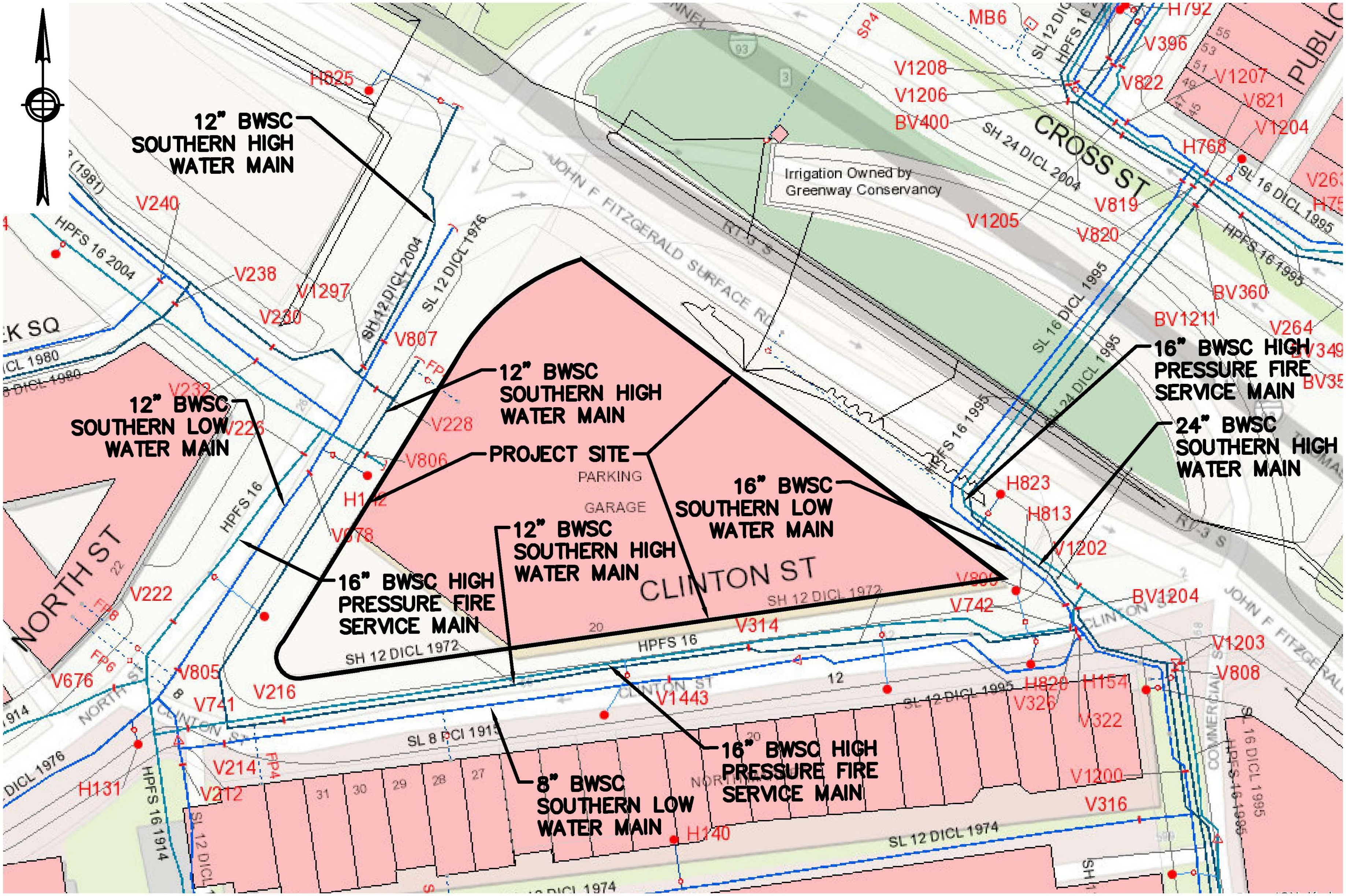
Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the Project. This process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

## 7.3 Water Supply

### *7.3.1 Existing Water Infrastructure*

Water for the Project will be provided by BWSC. BWSC is supplied water by the Massachusetts Water Resources Authority (MWRA) system. There are five water systems within the City of Boston, and these provide service to portions of the City based on ground surface elevation. The five systems are the southern low (SL), southern high (SH), southern extra high (SEH), northern low (NL), and northern high (NH). Water mains are labeled by their system, pipe size, year installed, pipe material, and year cement lined (CL), if applicable.

There is a 16-inch BWSC High Pressure Fire Service (HDFS16) main, an 8-inch BWSC Southern Low main (SL8 PCI 1915), and a 12-inch BWSC Southern High main (SH12 DICL 1972) in Clinton Street. There is a 16-inch BWSC High Pressure Fire Service (HPFS16 1995), 16-inch BWSC Southern Low main (SL16 DICL 1995) and a 24"-BWSC Southern High main (SH24 DICL 1995) in John F. Fitzgerald Surface Road which run across through the Greenway to Cross Street. There is a 16-inch High Pressure Fire Service main (HDFS16), a 12-inch Southern High main (SH12 DICL 2004), a 12-inch Southern High main (SH 12 DICL 1976), and a 12-inch Southern Low main (SL12 DICL 1976) on North Street. There are also irrigation lines owned by the Rose Fitzgerald Kennedy Greenway Conservancy on a parcel in the median between John F. Fitzgerald Surface Road and Cross Street. The existing water system is illustrated in Figure 7-2.




Dock Square Boston, Massachusetts

SCALE:
1"=100'

Nitsch Engineering

**Figure 7-2**

*Existing Water System*

### *7.3.2 Anticipated Water Consumption*

The Project's water demand estimate for domestic water service is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 310 CMR 15.20 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is 42,174 gpd, which is a net increase of 22,385 gpd compared to the existing condition. The water for the Project will be supplied by the BWSC systems in North Street, Clinton Street and/or John F. Fitzgerald Surface Road.

### *7.3.3 Existing Water Capacity & Impacts*

BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the Project site was requested by the Proponent. However, hydrant flow data was not available near the Project site. As the design progresses, the Proponent will request hydrant flows be conducted by BWSC adjacent to the Project, as hydrant flow test data must be less than one-year old when used for design.

Regardless, water capacity problems are not anticipated within the BWSC water system as a result of the Project's construction.

Efforts to reduce water consumption will be made. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

New water services will be installed in accordance with the latest local, state, and federal codes and standards. Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units(MTU's) as part of the BWSC's Automatic Meter Reading (AMR) system.

### *7.3.4 Proposed Water Service*

The domestic water and fire protection services for the Project will connect to the existing BWSC water mains in North Street, Clinton Street and/or John F. Fitzgerald Surface Road.

The domestic water and fire protection service connections required for the Project will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review Process. This review will include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and siamese connections that conform to BWSC and Boston Fire Department requirements.

## 7.4 Stormwater Drainage System

### *7.4.1 Existing Storm Drainage System*

There are existing BWSC and Massachusetts Department of Transportation (MassDOT) storm drain mains in North Street, Clinton Street, and John F. Fitzgerald Surface Road. There is a 30-inch x 36-inch storm drain main in North Street which increases to a 66-inch storm drain main that flows to the 66-inch storm drain main in Clinton Street. The 66-inch storm drain main in Clinton Street flows easterly to the 66-inch storm drain main in John F. Fitzgerald Surface Road, which flows northerly, and then continues flowing across the Rose Fitzgerald Kennedy Greenway. There is a 12-inch storm drain force main owned by MassDOT in John F. Fitzgerald Surface Road, which flows to the 66-inch BWSC owned storm drain main. In turn, this 66-inch storm drain main flowing across the Greenway to an 84-inch storm drain outfall, SDO-058, near Christopher Columbus Waterfront Park, discharging to the Inner Boston Harbor. The existing storm drain system is illustrated in Figure 7-1.

Stormwater runoff from the adjacent sidewalk and paved pedestrian areas sheet flows to catch basins, which connect to the storm drain systems in North Street, Clinton Street, and John F. Fitzgerald Surface Road. Stormwater from the existing parking garage appears to be collected internally. Record plans do not indicate where stormwater is collected on the building roof floors.

### *7.4.2 Proposed Storm Drainage System*

The existing site is approximately 100-percent impervious cover. The amount of impervious area may remain 100-percent impervious in the proposed condition, although the Project will evaluate implementing some green roof space, which would help reduce impervious cover to the greatest extent possible. The Project will be designed to meet or reduce stormwater runoff peak rates and volumes, and to minimize the loss of annual stormwater recharge to groundwater through the use of on-site infiltration measures to the greatest extent practicable.

The Project will be designed to capture and recharge one-inch stormwater from the impervious site areas. The Project's design will include a private closed drainage system that will be adequately sized for the Project's expected stormwater flows, and will direct stormwater to the on-site infiltration system for groundwater recharge prior to overflow to the BWSC systems. Overflow connections to the BWSC storm drain mains will be provided for greater stormwater flows. The on-site infiltration systems will strive to infiltrate one-inch of stormwater runoff from impervious areas to the greatest extent practicable, to meet the BWSC stormwater quality and stormwater recharge requirements. The Project may require an interior stormwater tank with recharge wells due to site constraints.

Improvements to the BWSC infrastructure and the existing private storm drain systems will be evaluated as part of the BWSC Site Plan Review Process.

### *7.4.3 Water Quality Impact*

The Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

The constructed Project will improve the quality of stormwater leaving the site. The existing site does not appear to provide stormwater treatment or storage. In contrast, the Project will be designed to, at minimum, meet the existing rates and volumes of stormwater from the existing site. The proposed design will treat stormwater by collecting it at the building roof, and directing it to a recharge system for storage prior to overflowing to BWSC infrastructure.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described below.

### *7.4.4 DEP Stormwater Management Policy Standards*

In March 1997, Massachusetts Department of Environmental Protection adopted a new Stormwater Management Policy to address non-point source pollution. That year, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for Projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design.

A description of the Project's anticipated compliance with the Standards is outlined below:

*Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

Compliance: The Project will comply with this Standard. The Project will not propose new stormwater conveyances, and no new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Project.

*Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.*

Compliance: The Project will comply with this Standard to the maximum extent practicable. The existing peak discharge rate will be met or will be decreased as a result of the improvements associated with the Project.

*Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmental sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

Compliance: The Project will comply with this standard to the maximum extent practicable.

*Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:*

*a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*

*b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*

*c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Compliance: The Project will comply with this standard. The stormwater system shall be designed to capture and infiltrate 1-inch of stormwater from the impervious site's areas to the greatest extent practicable.

*Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely* *protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

Compliance: The Project will comply with this standard. The proposed design will include source control, pollution prevention and pretreatment practices, as necessary.

*Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

Compliance: Not Applicable. The proposed Project is not within an outstanding resource area.

*Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

Compliance: The Project will comply with this standard to the maximum extent practicable.

*Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

Compliance: The Project will comply with this standard. A plan to control temporary construction-related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbing activities will be developed and implemented.

*Standard #9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Compliance: The Project will comply with this standard. An O&M Plan including long-term Best Management Practices (BMP) operation requirements will be prepared for the Proposed Project and will assure proper maintenance and functioning of the stormwater management system.

*Standard #10: All illicit discharges to the stormwater management system are prohibited.*

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Proposed Project.

## 7.5 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with BWSC, Boston Public Works Department, the Dig-Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Project.

## 7.6 Proposed Energy Usage and Impacts

Eversource owns the electrical system in the vicinity of the Project site. It is expected that adequate service is available in the existing electrical systems in the surrounding streets to serve the Project. The Proponent will work with Eversource to confirm adequate system capacity as the design is finalized.

## 7.7 Telecommunications Systems

The Proponent will select private telecommunications companies to provide telephone, cable, and data services. There are several potential candidates with substantial downtown Boston networks capable of providing service. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals.

## 7.8 Gas Systems

National Grid has gas services in the vicinity of the Project site. The Proponent will work with National Grid to confirm adequate system capacity as design is finalized.

# Chapter 8.0

## Coordination with other Governmental Agencies

# 8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

## 8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board, and will be designated to comply with the standards of the Americans with Disabilities Act. The Accessibility Checklist is provided in Appendix G.

## 8.2 Massachusetts Environmental Policy Act (MEPA)

The Massachusetts Environmental Protection Act (MEPA [MGL c. 30, §§ 62-62H; 301 CMR 11.00]) applies to: (a) projects undertaken by a state agency; (b) those aspects of a project that are within the subject matter of any required state permit; (c) projects involving state financial assistance; and (d) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR § 11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA regulations. There is no state action anticipated in connection with the Project, nor will the Project exceed any of the review thresholds.

## 8.3 Massachusetts Historical Commission

The Proponent does not anticipate that the Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

## 8.4 Boston Civic Design Commission

The Boston Civic Design Commission (BCDC) must review any project exceeding 100,000 sf of gross floor area (GFA), or any project determined by BCDC to be of "special urban design significance." (Boston Zoning Code sec. 28-5.) As noted above, the Project will extend the GFA of the existing building by more than 100,000 sf, and it may also be of special urban design significance, and so it requires schematic design review by BCDC. The Proponent looks forward to working with the BCDC regarding the design of the Project.

## 8.5 Boston Zoning Commission

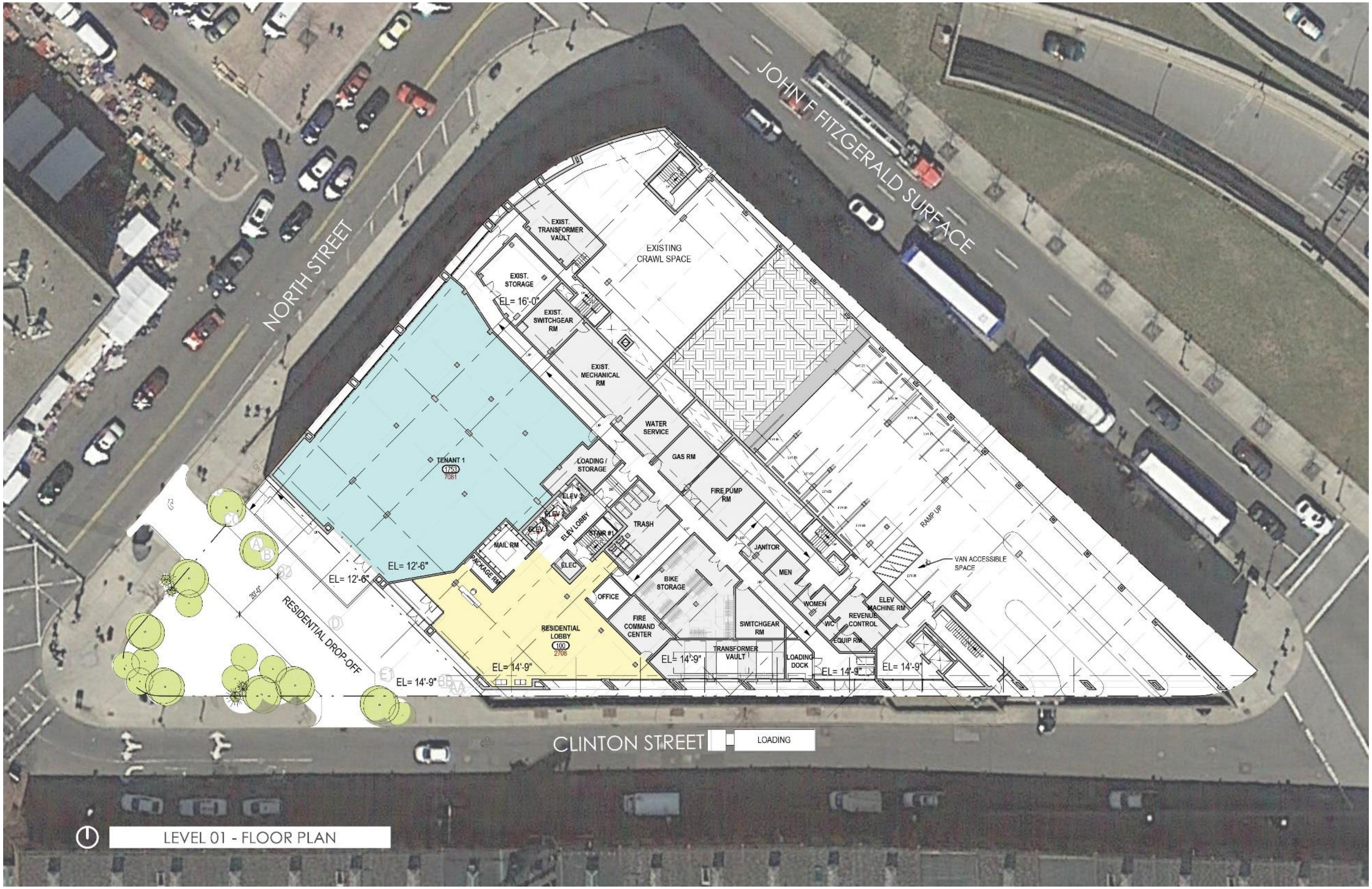
The Project is located within a subarea ("PDA III") of the Government Center/Markets District within which a Planned Development Area (PDA) may be designated. (Boston Zoning Map; Boston Zoning Code sec. 45-9.1.) The Proponent will seek zoning relief for the Project through a PDA Development Plan, which, upon is approval by the BPDA Board, must be approved by the Boston Zoning Commission. (Id. sec. 3-1A.a.)

## 8.6 Boston Water and Sewer Commission

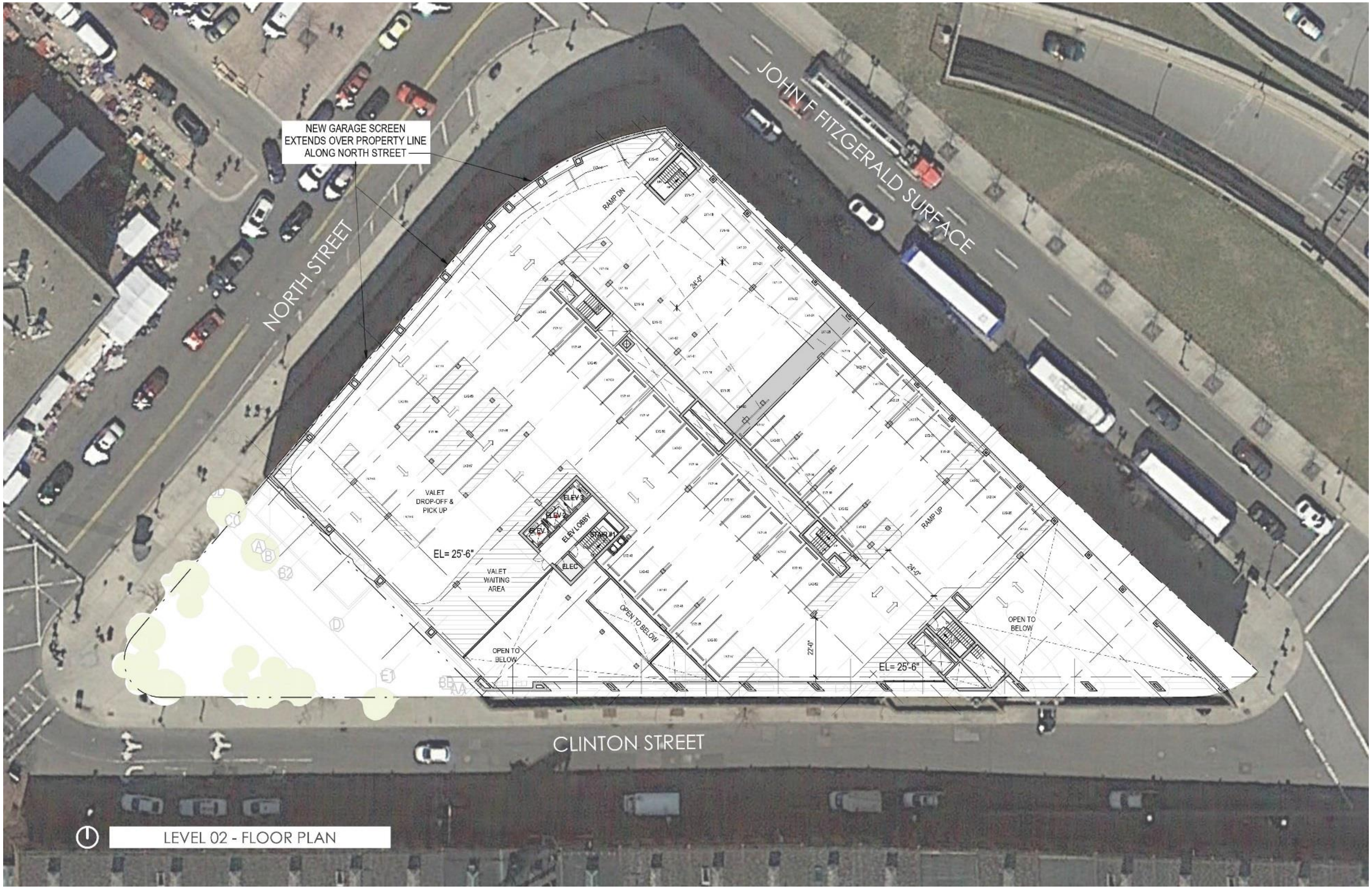
BWSC approval of the Project is required due to the proposed improvements. The Project will be reviewed and approved by the BWSC through the BWSC's Site Plan Approval process. Once approved, the general contractor for that component will coordinate obtaining and executing the General Service Application (GSA) with the BWSC for any proposed improvements.

# Appendix A

## Floor Plans and Elevations



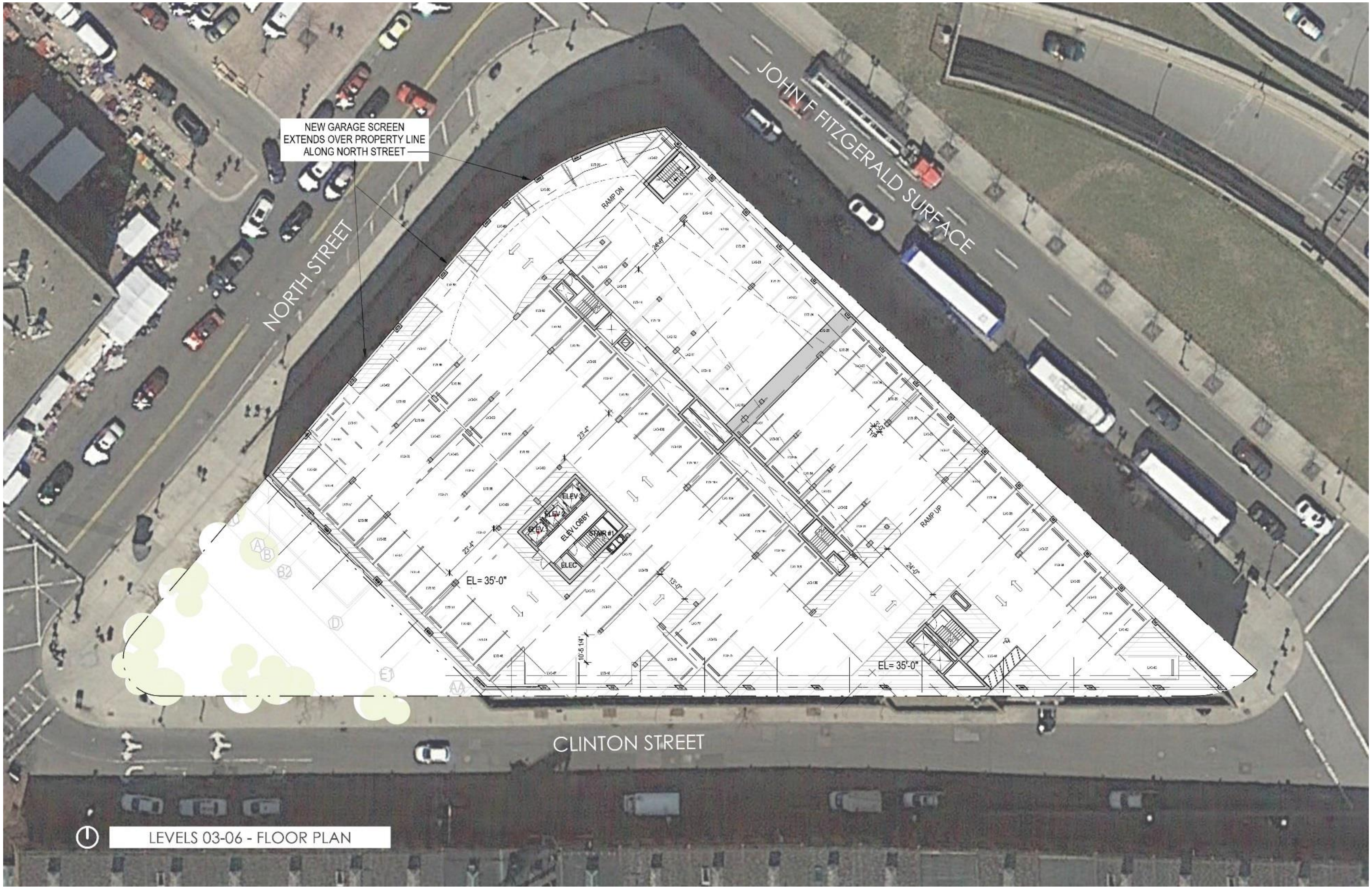

**Dock Square    Boston, Massachusetts**



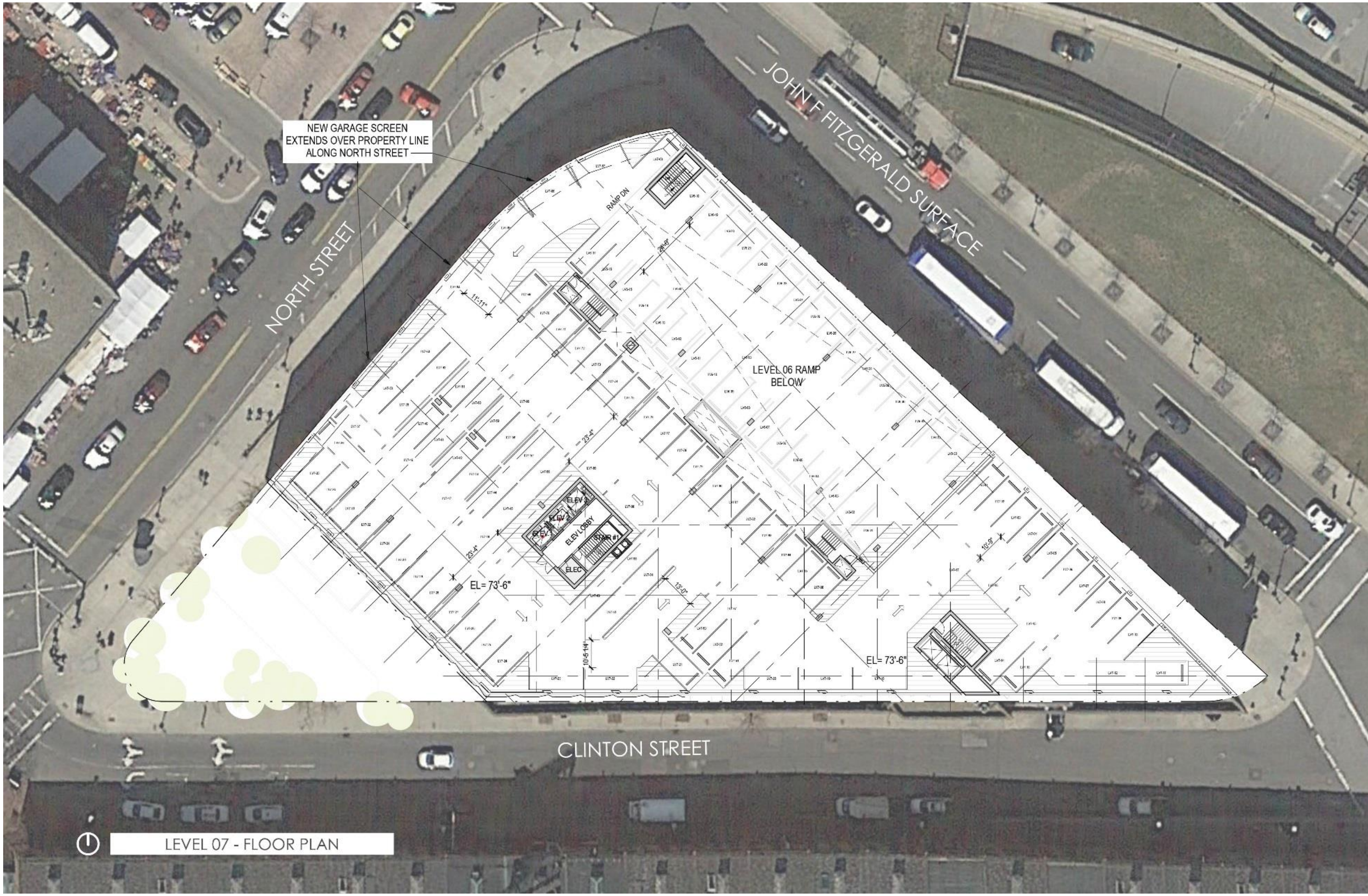

**Dock Square Boston, Massachusetts**

Stantec

*Level Two Floor Plan*

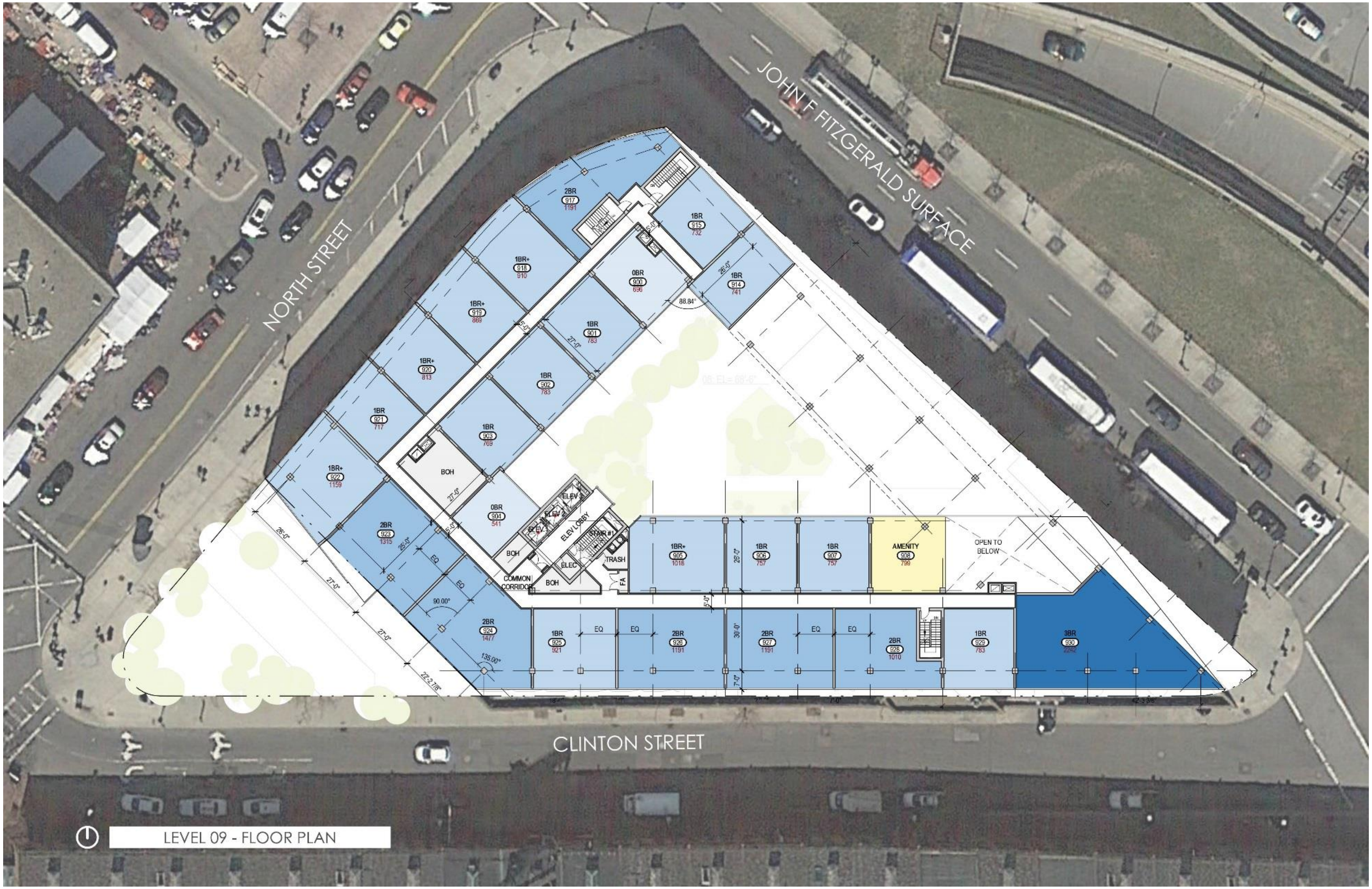



**Dock Square Boston, Massachusetts**

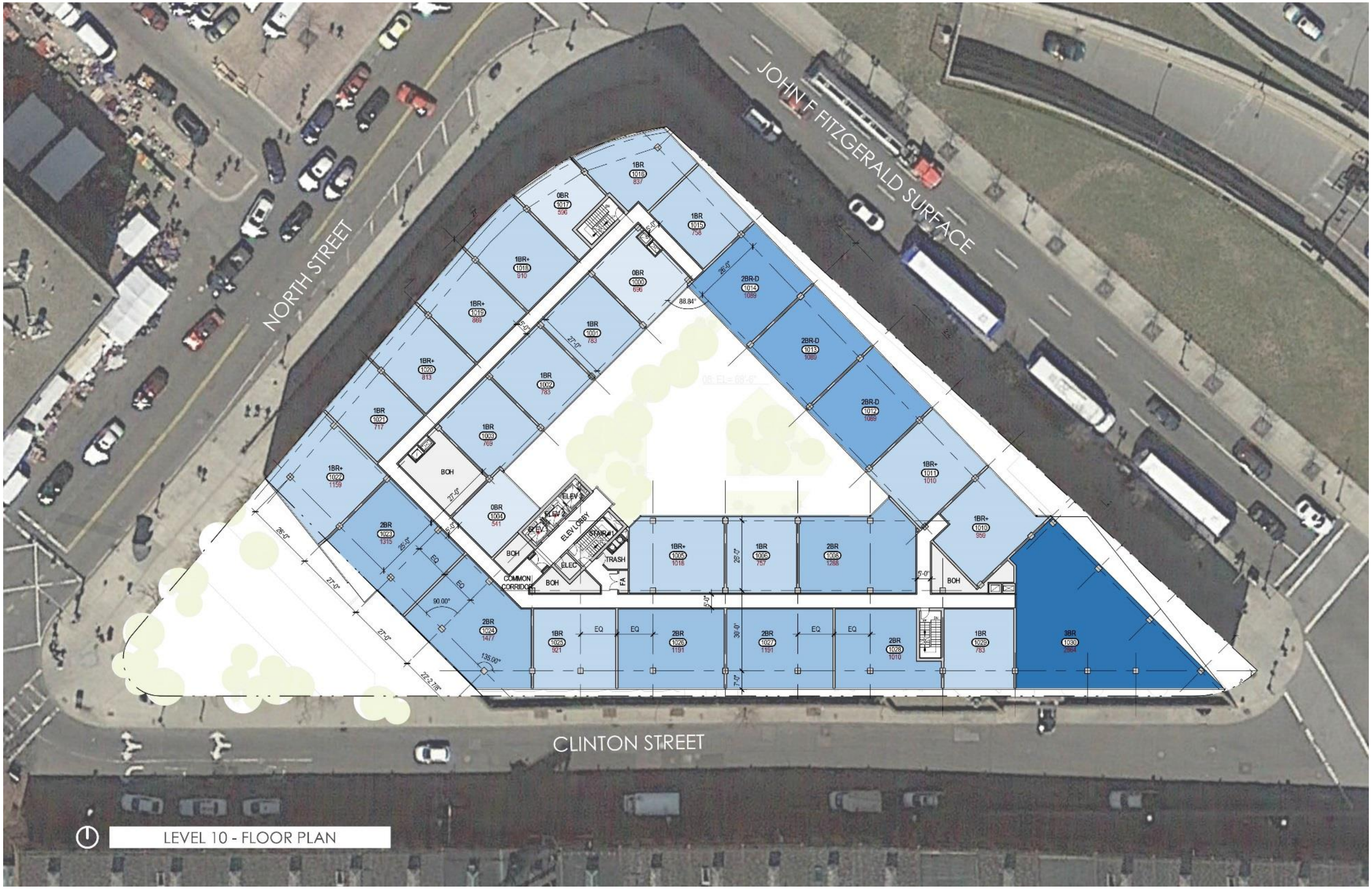



**Dock Square Boston, Massachusetts**

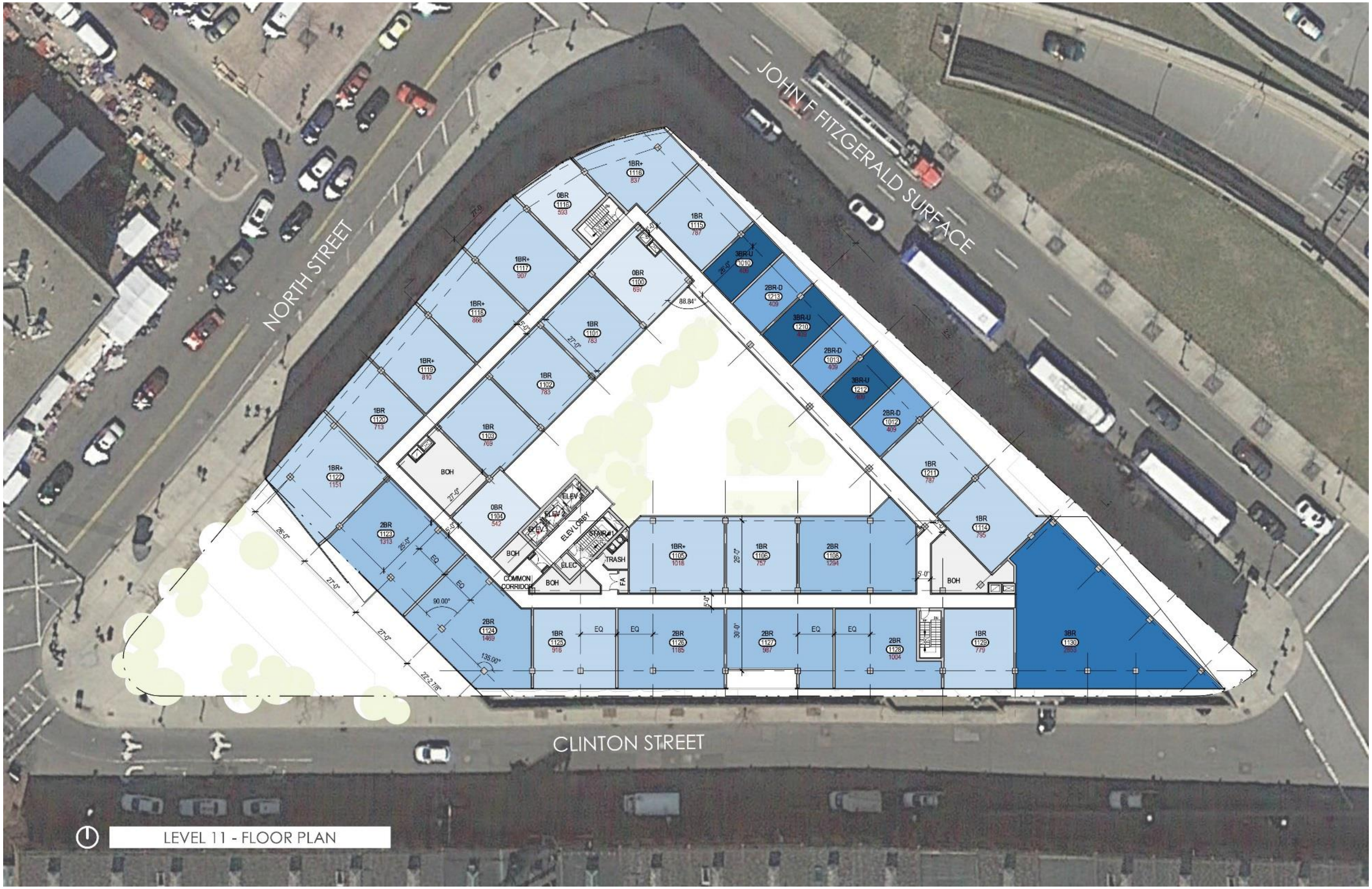

**Dock Square    Boston, Massachusetts**




**Dock Square Boston, Massachusetts**




**Dock Square Boston, Massachusetts**



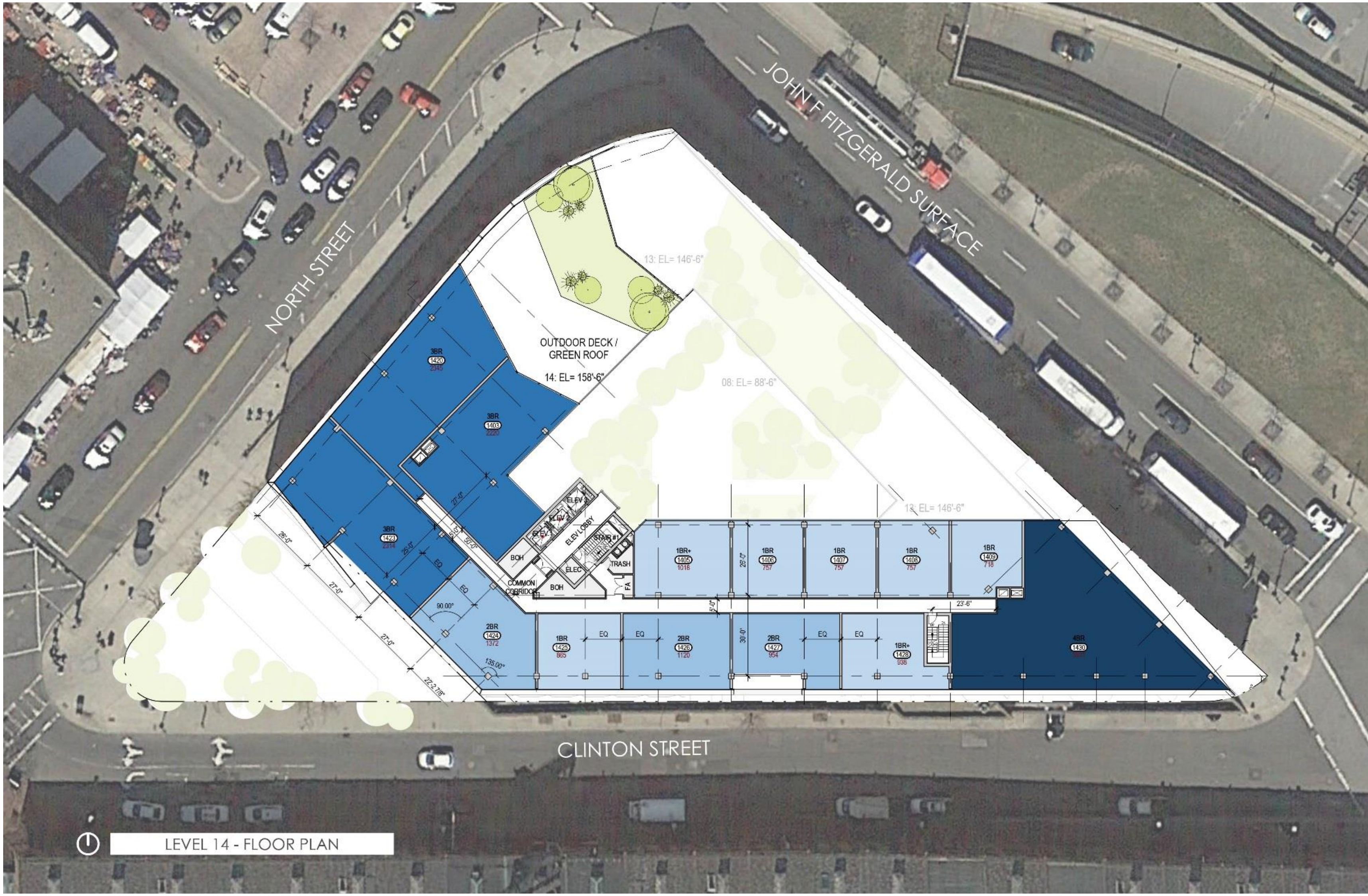

**Dock Square    Boston, Massachusetts**


**Dock Square Boston, Massachusetts**

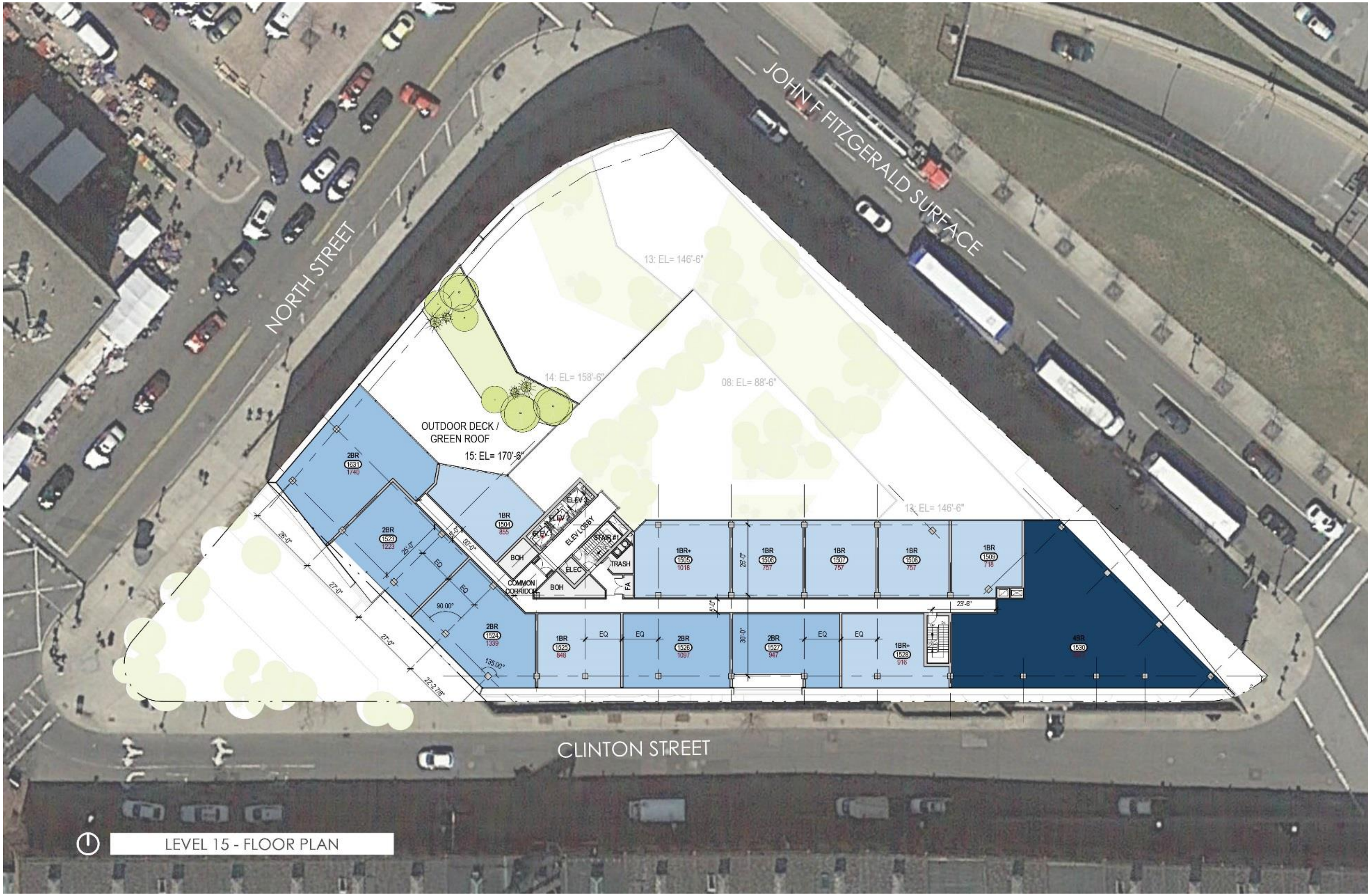
Stantec

*Level 12 Floor Plan*


**Dock Square    Boston, Massachusetts**

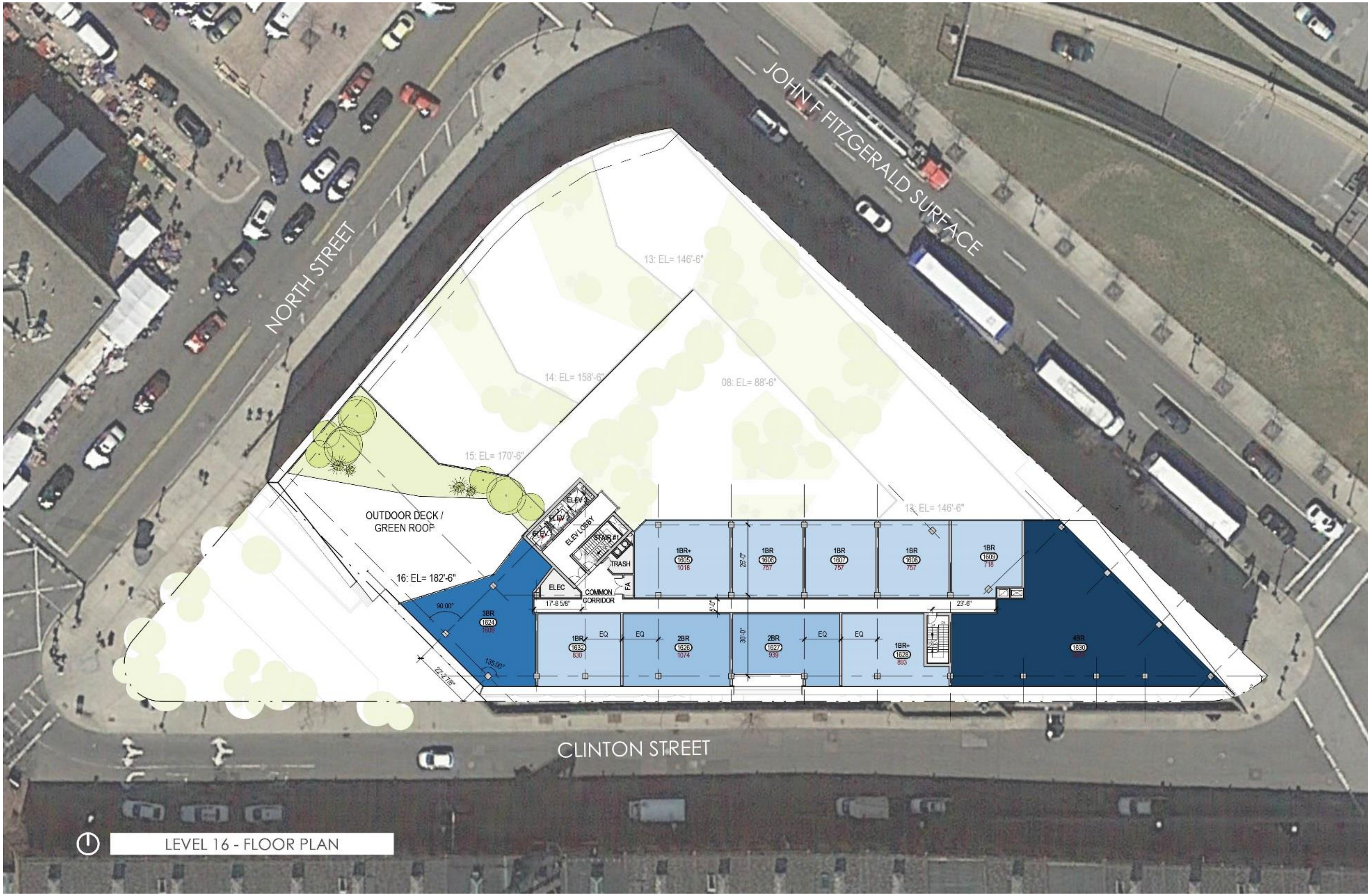



**Dock Square Boston, Massachusetts**



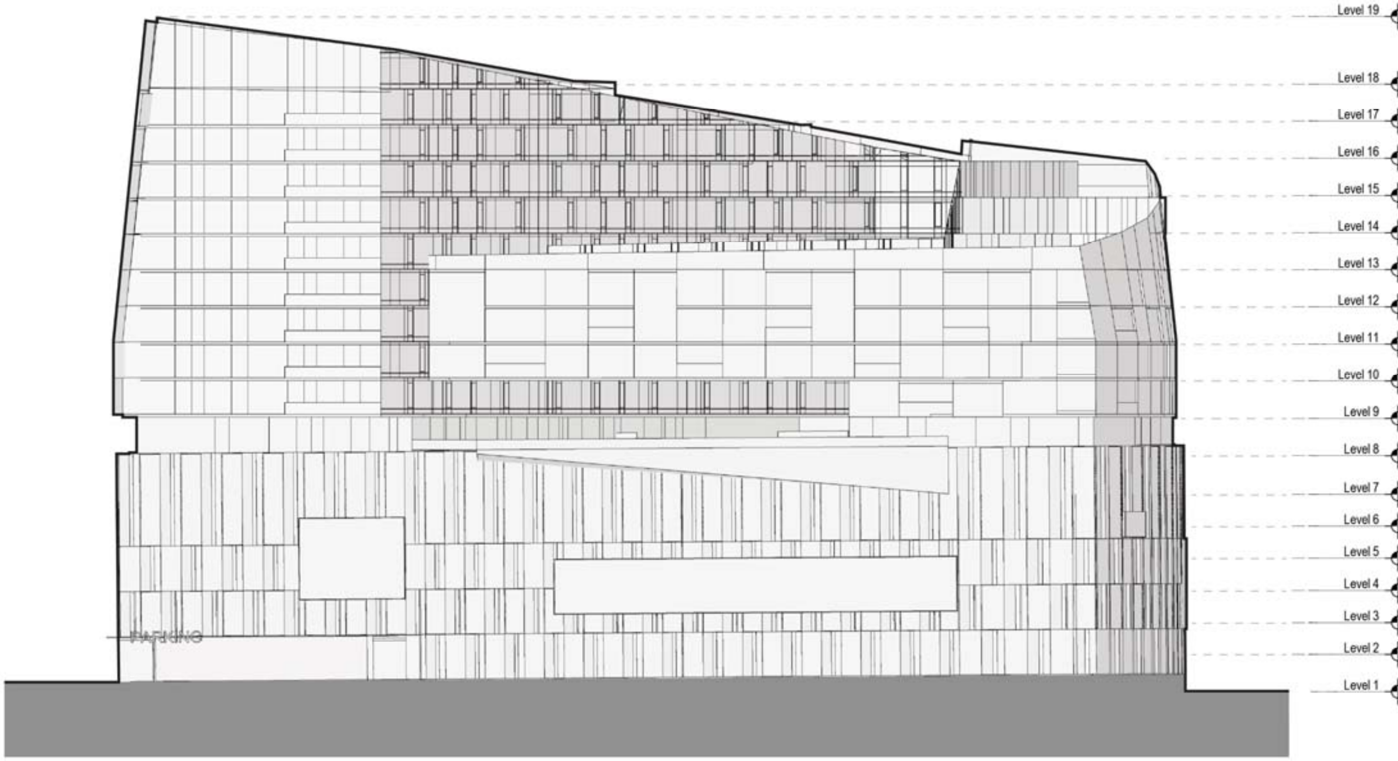

**Dock Square Boston, Massachusetts**

Level 15 Floor Plan

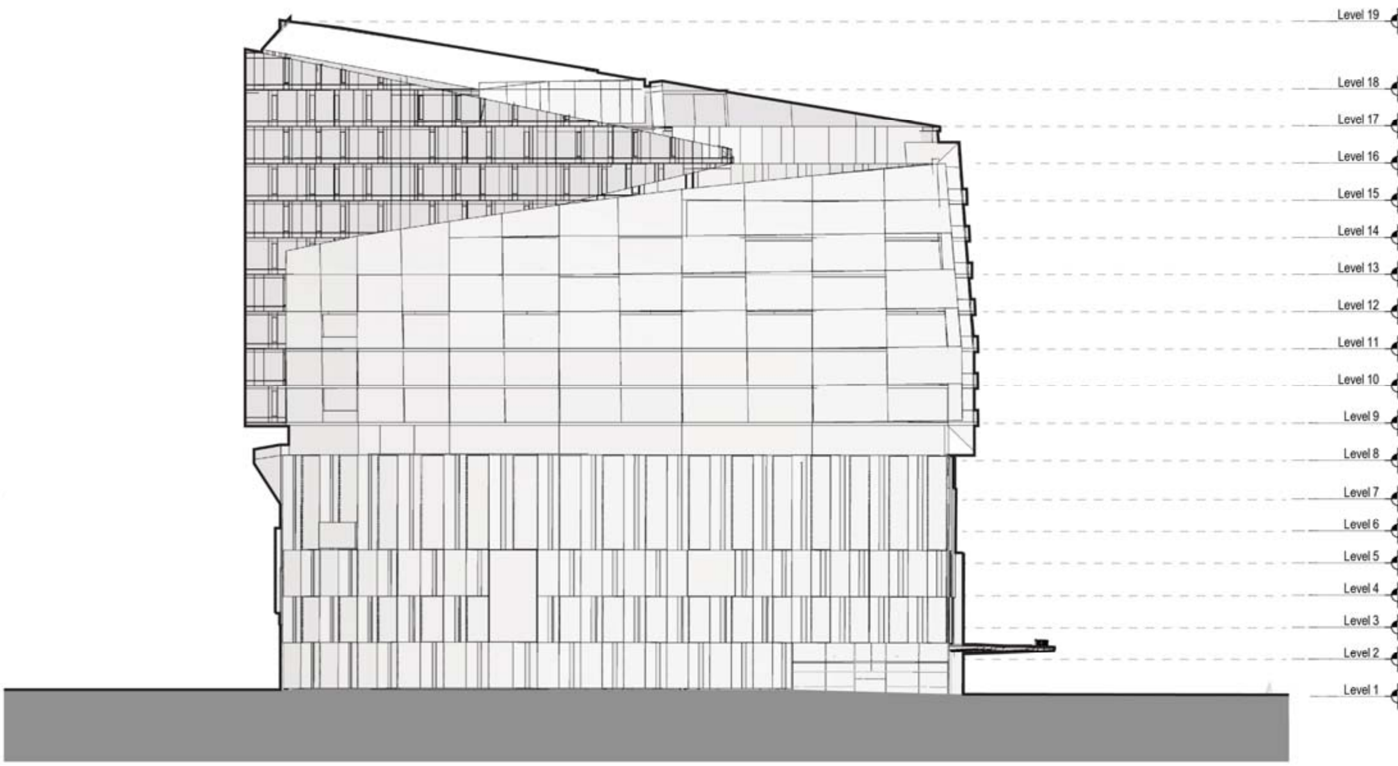



**Dock Square    Boston, Massachusetts**

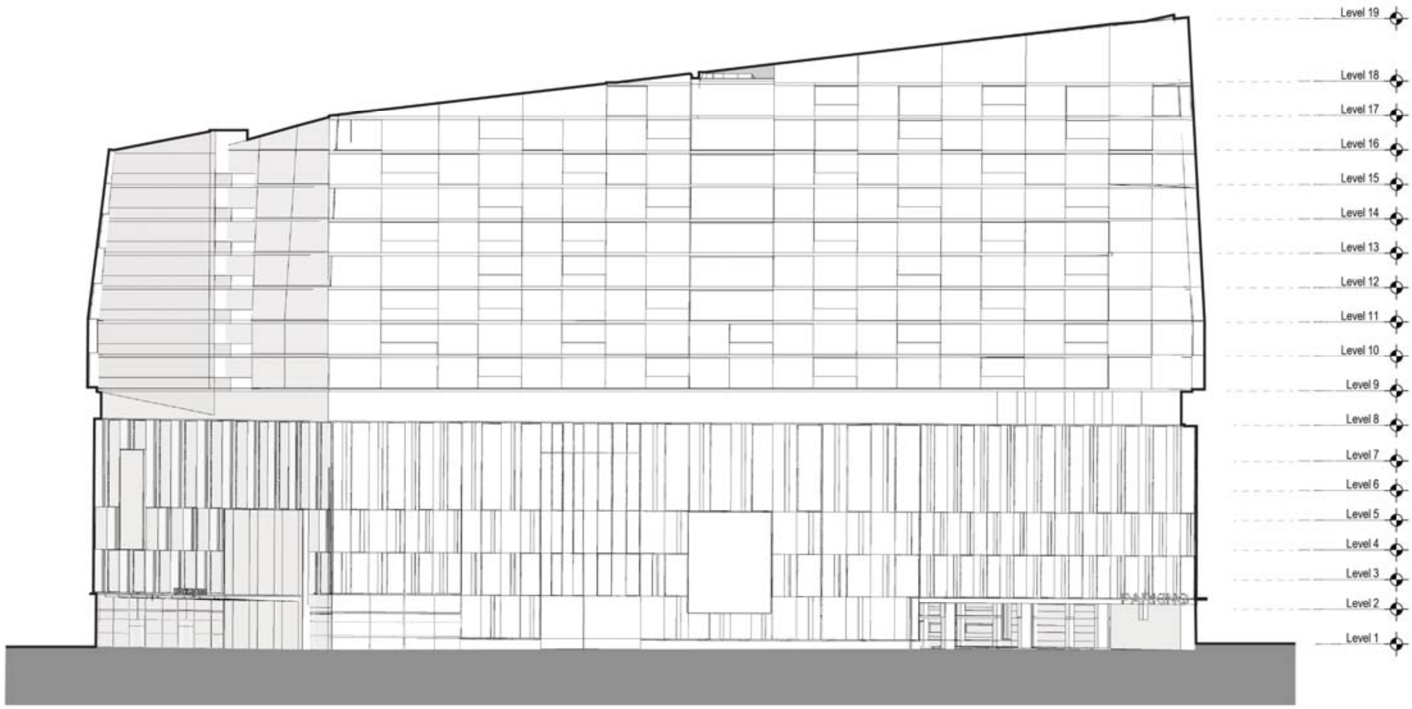

**Dock Square Boston, Massachusetts**



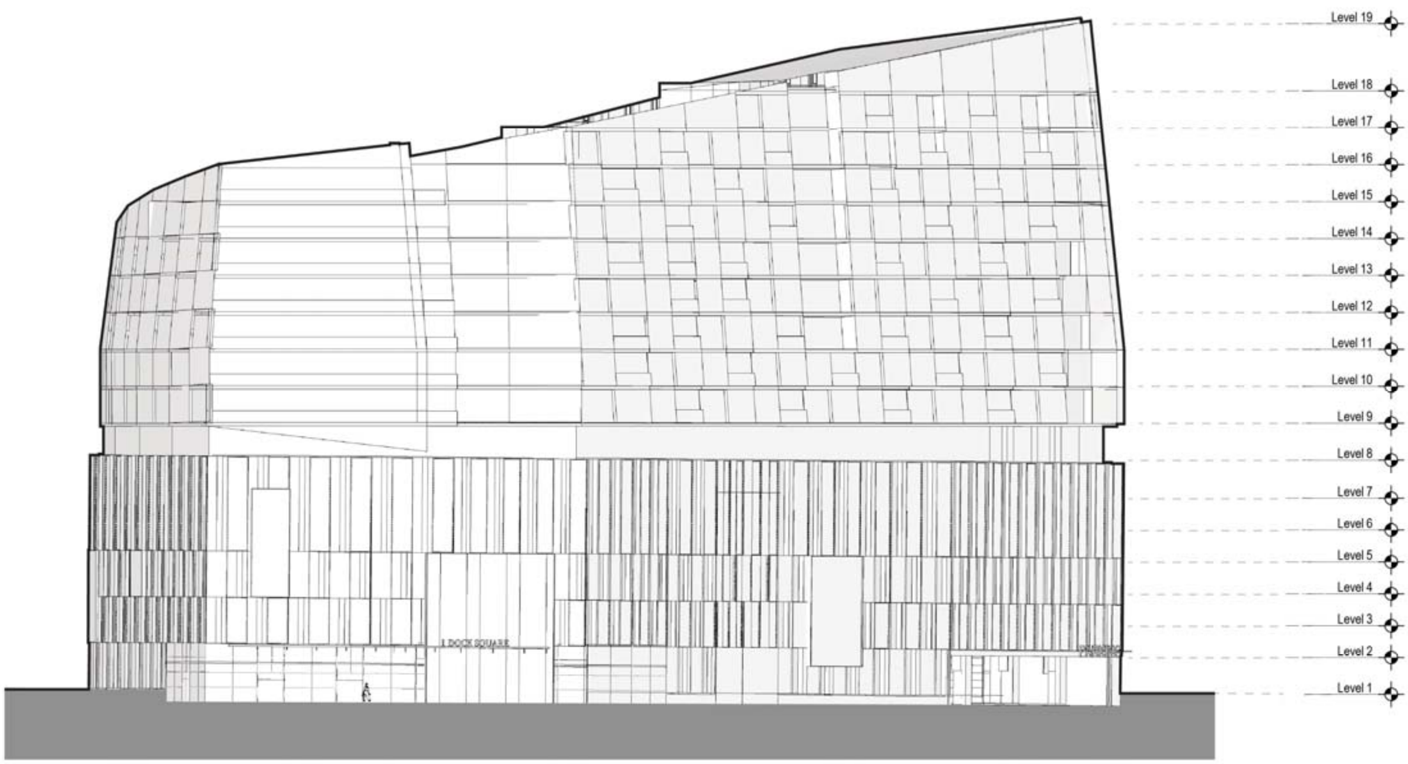

Northeast Elevation – John F. Fitzgerald Surface Road




Northwest Elevation – North Street




South Elevation – Clinton Street




Southwest Elevation – Clinton Street and John F. Fitzgerald Surface Road

# Appendix B

Site Survey

Surveyor's Certificate

*The undersigned, being a registered surveyor of the Commonwealth of Massachusetts certifies to [Name of Insured], [Name of Lender], [Name of Insurer], First American Title Insurance Company, and Madison Title Agency, LLC as follows:*

*1. This map or plat and the survey on which it is based were made in accordance with the "Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys," jointly established and adopted by ALTA and NSPS in 2016 and includes Items 1, 2, 3, 4, 6(b), 7(a), 7(b)(1), 8, 9, 10(a), 11, 13, 14, 16, 17, 18, 19, and 20 ($1 million Professional Liability Insurance) of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA and NSPS in effect on the date of this certification, the undersigned further certifies in the undersigned's professional opinion, as a land surveyor registered in the Commonwealth of Massachusetts the Relative Positional Precision of this survey does not exceed that which is specified therein. The field work was completed on July 14, 2017.*

*2. The survey was made on the ground by an instrument survey on July 14, 2017 by me or under my supervision and correctly shows the metes and bounds description and the land area of the subject property, the location and type of all buildings, structures and other improvements (including sidewalks, curbs parking areas and spaces and fences) situated on the subject property and any other matters situated on the subject property.*

*3. There are no party walls and no observable, above–ground encroachments (a) by the improvements on the subject property upon adjoining properties, streets, alleys, easements or rights–of–way or (b) by the improvements on any adjoining properties, streets or alleys upon the subject property except two wall hydrants on the northwesterly boundary and a parking sign near the southeast corner.*

*4. The location of each easement, right–of–way, servitude and other matter (above or below ground) affecting the subject property and (a) listed in the title insurance commitment ("Title Commitment") File No. 17–00057 dated July 6, 2017, issued by First American Title Insurance Company with respect to the subject property or (b) apparent from a visual inspection has been shown on the survey, together with appropriate recording references, to the extent that such matters can be located has been plotted on the survey. If the easement has not been plotted, there is a statement as to why not, as well as whether the item affects the property and if so, what portion. The property shown on the survey is the property described in the Title Commitment.*

*5. The location of all improvements on the subject property is in accord with minimum setback, side yard and rear yard lines, provisions and restrictions of record affecting the Property referenced in the Title Commitment.*

*6. The Property has direct access to and from a publicly used and maintained street or highway.*

*7. Municipal water, municipal storm sewer and municipal sanitary sewer facilities and telephone, gas and electric services of public utilities are available at the boundary of the property in the locations indicated hereon.*

*8. The subject property does not serve any adjoining property for visible subsurface drainage structures, visible water courses, utilities, structural support or ingress or egress.*

*9. As shown on the survey, a portion of the property shown on the survey lies within a Special Flood Hazard Area, as described on the Flood Insurance Rate Map as defined by the Federal Emergency Management Agency. If applicable, the survey correctly delineates the portion of the property located in a Special Flood Hazard Area and indicates the zone designation of any area shown as being within a Special Flood Hazard Area.*

*10. Except as shown on the survey, there are no wetlands located on the property.*

*11. The parties listed above and their successors and assigns are entitled to rely on the survey and this certificate as being true and accurate.*

*Registration No 35393*
*within the Commonwealth of Massachusetts*

*Date of Survey:*____________

*Date of Last Revision:*____________

*EXCEPTIONS*

*FIRST AMERICAN TITLE INSURANCE COMPANY*
*FILE No: 17–00056*
*DATED: JULY 6, 2017*

*SPECIFIC EXCEPTIONS*

*8. Restrictions and conditions as set forth or referred to in Deed (including but not limited to Land Disposition agreement by and between The Boston Redevelopment Authority and James F. Sullivan, Trustee of DS Parking Trust dated July 29, 1979, filed with the Suffolk County Registry of Deeds Land Court Division as Document Number 346096 and recorded with said Deeds at Book 9224, Page 213, and Downtown Waterfront–Faneuil Hall Urban Renewal Plan dated June 8, 1964 recorded with said Deeds in Book 7948, Page 527) from Boston Redevelopment Authority to James F. Sullivan, Trustee of DS Parking Trust, filed on August 6, 1979 as Land Court Document Number 346094 and recorded with said Deeds at Book 9224, Page 200 and noted on Certificate of Title No. 91791 at Book 454, Page 191; as affected by the Certificate of Completion dated July 3, 1980, filed as Land Court Document No. 350954 and recorded with said Deeds at Book 9475, Page 70; as further affected by Certificate of Vote by the Boston Redevelopment Authority dated April 6, 1981, recorded with said Deeds at Book 10350, Page 211 modifying the use restrictions set forth in the Deed. (NOT PLOTTABLE)*

9 *9. Conditions, terms, and obligations as set forth in Grant of Easement recorded with the Suffolk County Registry of Deeds at Book 9463, Page 291. (PLOTTED)*

10 *10. Taking of an easement by the Commonwealth of Massachusetts for the purpose of relocating electrical conduits and related appurtenances and for the purposes of constructing both a storm drain, and water main and related appurtenances dated April 21, 1993, recorded with the Suffolk County Registry of Deeds at Book 18219, Page 172. (PLOTTED)*

11 *11. Taking of an easement by the Commonwealth of Massachusetts for the purposes of relocating electrical conduits and related appurtenances dated February 9, 1994, recorded with the Suffolk County Registry of Deeds at Book 18906, Page 166. (PLOTTED)*

12 *12. Layout No. 6976 and Order of Taking by the Commonwealth of Massachusetts dated February 22, 1995, recorded with the Suffolk County Registry of Deeds at Book 19622, Page 331 for the purpose of taking an easement to construct and install a storm drain and related appurtenances and consists of the right to enter upon said land at any time to construct and install therein and to use, maintain, repair, and replace said storm drain and related appurtenances. (PLOTTED)*

13 *13. Order of Taking of an easement by the Commonwealth of Massachusetts Department of Highways for the purpose of installing a gas main and related appurtenance dated August 27, 1997 and recorded with the Suffolk County Registry of Deeds at Book 21708, Page 147. (PLOTTED)*

EXHIBIT A

The following described land known as Parcel E-8 in the Downtown Waterfront-Faneuil Hall urban Renewal Area, bounded, and descnbed as follows:

A certain parcel of land, containing approximately 51,027 square feet of land, shown on a Plan entitled, "Boston Redevelopment Authority, Downtown Waterfront-Faneuil Hall Project, Mass., R-77, Boston, Suffolk County, Massachusetts, Property Acquisition Plan, Parcel E-8, dated July 22, 1977" prepared by Schoenfeld Associates, Inc., Consulting Engineers, Boston, Mass., which plan is recorded with the Suffolk County Registry of Deeds in Book 9220, Page 181 and is bounded and described as follows:

Beginning at a point ninety-six (96) feet plus or minus in a northwesterly direction from the northeast comer of a brick building located between located between former North Market Street and Clinton Street, said point being the point of tangency of a curve having a radius of thirty-four and eighteen hundredths (34.18) feet;

Thence along a line having a bearing of S 82° 25′ 17″ W for a distance of three hundred eighty-five and sixty-two hundredths (385.62) feet to a point of curvature;

Thence along a curve having a radius of thirteen and seventy-nine hundredths (13.79) feet for a distance of thirty-one and thirty-nine hundredths (31.39) feet, to a point of tangency. The above line being a portion of the northerly street line of Clinton Street, at the intersection of North Street;

Thence along a line have a bearing of N32° 53′ 22″ E for a distance of one hundred ninety-seven and eleven hundredths (197.11) feet to a pint of curvature. The above line being a portion of the southerly street line of North Street;

Thence along a curve having a radius of one hundred sixteen and zero hundredths (116.00) feet, in a southeasterly direction, a distance of eighty-three and thirty-five hundredths (83.35) feet to a point;

Thence turning and running along a line have a bearing of S54° 59′ 00″ E for a distance of two hundred ninety-nine and forty-five hundredths (299.45) feet to a point on a curvature having a radius of thirty-four and eighteen hundredths (34.18) feet;

Thence along said curve in a westerly direction for a distance of twenty-six and eleven hundredths (26.11) feet to the point of beginning, said parcel of land located in Boston proper, Suffolk County, Massachusetts, containing a total of fifty-one thousand twenty-seven (51,027) square feet or 1.17 acres.

The above-described parcel includes a proposed "Open Area" of six thousand fifty-seven (6057) feet at the southwesterly portion of the parcel.

OPEN AREA

Starting at a point two hundred sixty-three and twenty-six hundredths (263.26) feet from the point of beginning of the complete parcel described before within these metes and bounds;

Thence along a line having a bearing of S82° 25′ 17″W for a distance of one hundred twenty-two and thirty six hundredths (122.36) feet to appoint of curvature of a curve having a radius of thirteen and seventy-nine hundredths (13.79) feet;

Thence along said curve for a distance of thirty-one and thirty-nine hundredths (31.39) feet to a point of tangency;

Thence along a line having a bearing of N32° 53′ 22″ E a distance of seventy-eight and twelve hundredths (78.12) feet;

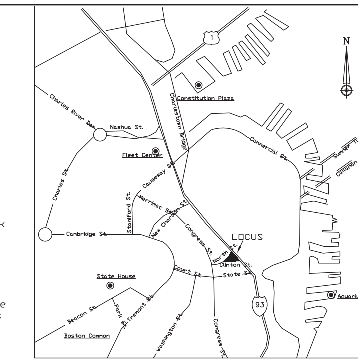
All the above three courses being a portion of the property lines described earlier in these metes and bounds;

Thence along a line having a bearing of S52° 34′ 43″ E for a distance of one hundred sixteen and seventeen hundredths (116.17) feet to the starting point.

There is included w1thin said parcel a certain portion of registered land shown as Lot 2 on Land Court Plan No. 15758-B filed with Certificate of Title No. 91791.

Together with the benefit of a grant of Easement recorded on June 20, 1980 inbook 9463, Page 291.

Subject to restriction for Open Area set forth in Deed from Boston Redevelopment Authority dated August 1, 1979 and recorded with said Registry inBook 9224, Page 200 and filed as Document 34609 as affected by Certificate of Vote of the Boston Redevelopment Authority dated April 6, 1981 recorded in Book 10350, Page 211.




VICINITY MAP-NOT TO SCALE

Easements filed with Commonwealth of Massachusetts Department of Highways Orders of Taking

| Easement No. | Record Book~Page | Purpose |
|---|---|---|
| 74-U-14 | 18219~172 | Telephone Conduit Const. & Maintenance |
| 74-U-33 | 18906~166 | Electric Conduit Const. & Maintenance |
| 74-TE-72 | 18906~166 | Temporary Esmt. for Highway & Utility Const. |
| 74-DMW-3-BWSC | 18219~172 | Storm Drain & Water Main Const. & Maintanence |
| 74-D-2 | 19622~331 | Storm Drain Construction & Maintanence |
| 75-U-15 | 21708~147-152 | Storm Drain Construction & Maintanence |

ZONING

Map 1H
Government Center/Markets District
(Supplemental to "Map 1, Boston Proper")
As amended
Effective: July 24, 2008
Public Notice: July 2, 2008
Map Key #3~Markets Protection Area
Floor Area Ratio: 4
Maximum Building Height: 65.0′
Existing: 61.0′ (to parapet)
Front, rear, side-yard setbacks: none

LEGEND

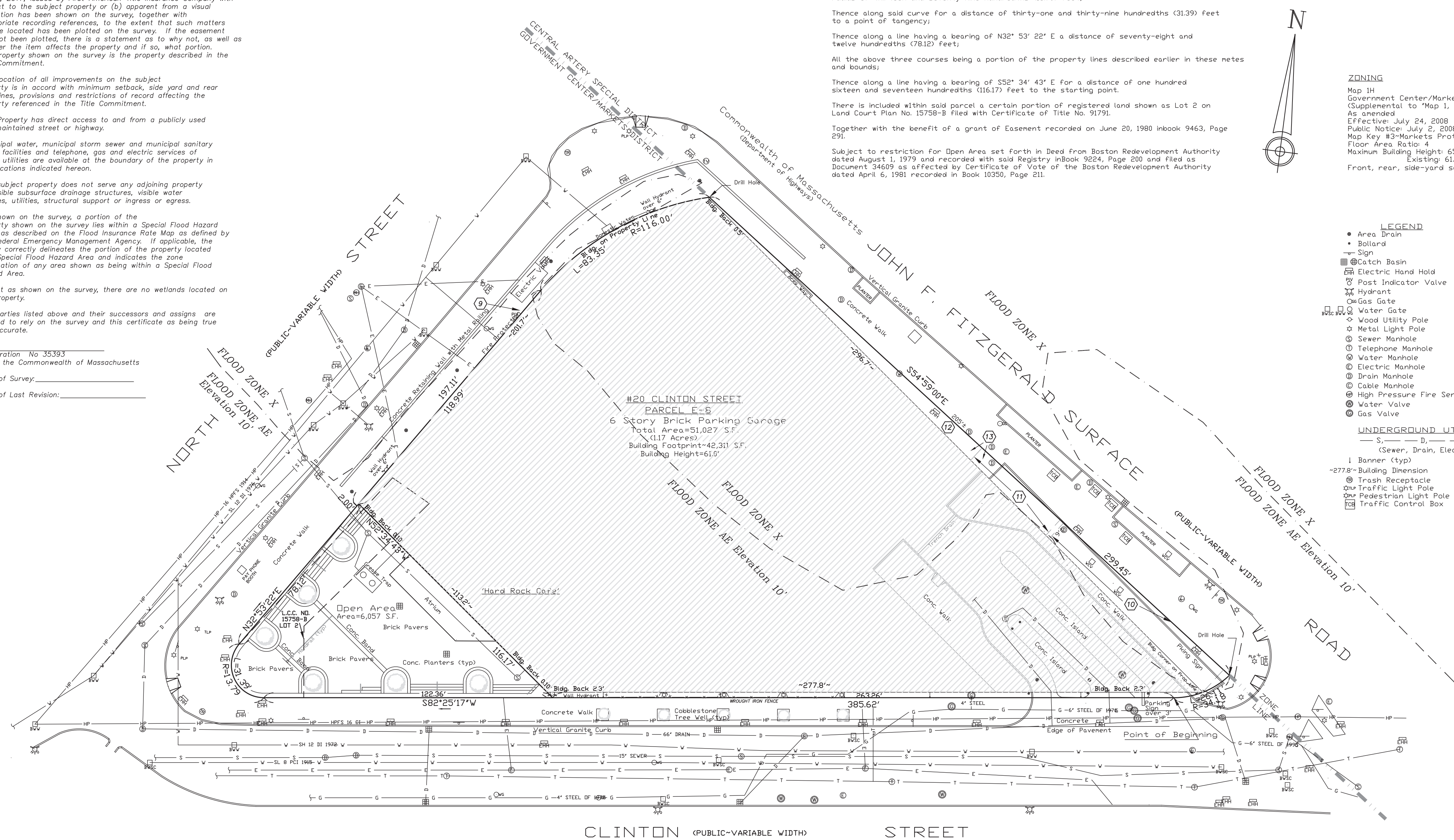
- Area Drain
- Bollard
- Sign
- Catch Basin
- Electric Hand Hold
- Post Indicator Valve
- Hydrant
- Gas Gate
- BWSC BWW WG Water Gate
- Wood Utility Pole
- Metal Light Pole
- Sewer Manhole
- Telephone Manhole
- Water Manhole
- Electric Manhole
- Drain Manhole
- Cable Manhole
- High Pressure Fire Service Manhole
- Water Valve
- Gas Valve

UNDERGROUND UTILITIES

S, D, E

(Sewer, Drain, Electric, Etc.)

- Banner (typ)
- ~277.8′~ Building Dimension
- Trash Receptacle
- TLP Traffic Light Pole
- PLP Pedestrian Light Pole
- TCB Traffic Control Box




CLINTON (PUBLIC-VARIABLE WIDTH) STREET

0 10 20 40 60 80

*1 INCH = 20 FT.*

Underground utilities shown are from field observations and record information and are not warranted to be exact it's size, location, or depth nor is it warranted that all underground pipes or structures are shown.

***PARKING SUMMARY:***
***698 TOTAL SPACES***
***WITH 14 BEING HANDICAPPED***

The property shown lies within ZONE X UNSHADED (area outside 0.2% annual chance floodplain) and ZONE AE (base flood elevation determined) as shown on FLOOD INSURANCE RATE MAP for the CITY OF BOSTON COMMUNITY 250286 PANEL NUMBER 81J WITH EFFECTIVE DATE OF MARCH 16, 2016


R.E. Cameron & Associates, Inc.
LAND SURVEYORS – CIVIL ENGINEERS
681 WASHINGTON STREET
NORWOOD, MA 02062
(781) 769–1777 Fax (781) 769–8644


| | |
|---|---|
| SCALE: 1"=20' | DATE: 5/13/02 |
| DRAWN BY: SLS | MATH: |
| JOB NUMBER: 833 | CHECKED BY: |
| COUNTY: SUFFOLK | |

TITLE:

***ALTA/NSPS LAND TITLE SURVEY DOCK SQUARE GARAGE #20 CLINTON STREET BOSTON, MASSACHUSETTS***

833ALT3

Revisions

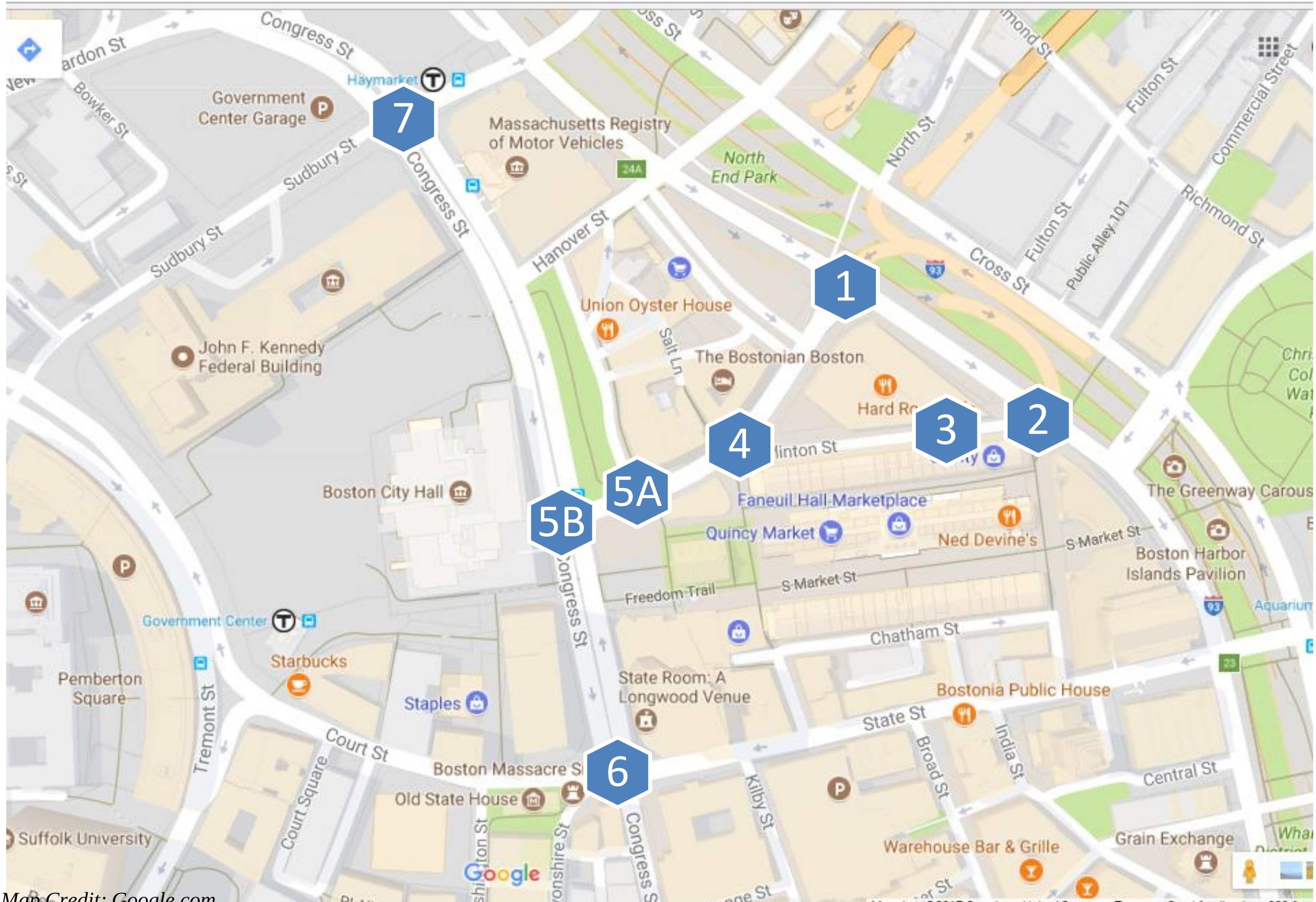
| No. | Date | Description |
|---|---|---|
| 1 | 5/24/12 | UPDATE |
| 2 | 7/14/17 | UPDATE |

SHEET NUMBER:

833

# Appendix C

Transportation




*Map Credit: Google.com*

| | | | | |
|---|---|---|---|---|
| **BOSTON** TRAFFIC DATA | BTD ID:140_043_HSH | Downtown Boston, MA | # of TMC's: 07 | Client: Howard Stein Hudson |
| | | Collect on November 16, 2017 | # of ATR's: 00 | Contact: Michael Littman |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 1
Location: Downtown Boston, MA
Street 1: Surface Road
Street 2: North Street/I-93 NB Off Ramp
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

## TOTAL (CARS & TRUCKS)

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 10 | 0 | 0 | 0 | 6 | 0 | 91 | 98 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 9 | 0 | 0 | 0 | 9 | 0 | 99 | 112 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 11 | 0 | 0 | 0 | 12 | 0 | 106 | 121 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 12 | 0 | 0 | 0 | 14 | 0 | 109 | 134 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 78 | 12 | 0 | 0 | 0 | 15 | 0 | 107 | 142 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 14 | 0 | 0 | 0 | 16 | 0 | 105 | 139 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 12 | 0 | 0 | 0 | 14 | 0 | 103 | 135 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 13 | 0 | 0 | 0 | 12 | 0 | 98 | 131 | 0 |

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 82 | 9 | 0 | 0 | 0 | 28 | 0 | 33 | 42 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 8 | 0 | 0 | 0 | 27 | 0 | 35 | 39 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 10 | 0 | 0 | 0 | 24 | 0 | 35 | 40 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 11 | 0 | 0 | 0 | 22 | 0 | 39 | 43 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 9 | 0 | 0 | 0 | 20 | 0 | 37 | 41 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 10 | 0 | 0 | 0 | 19 | 0 | 36 | 42 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 77 | 8 | 0 | 0 | 0 | 18 | 0 | 34 | 39 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 9 | 0 | 0 | 0 | 20 | 0 | 35 | 40 | 0 |

| AM PEAK HOUR 7:45 AM to 8:45 AM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **285** | **50** | **0** | **0** | **0** | **59** | **0** | **424** | **550** | **0** |
| ***PHF*** | **0.00** | | | | **0.93** | | | | **0.92** | | | | **0.98** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **4.2%** | **4.0%** | **0.0%** | **0.0%** | **0.0%** | **1.7%** | **0.0%** | **2.1%** | **0.7%** | **0.0%** |

| PM PEAK HOUR 4:00 PM to 5:00 PM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **310** | **38** | **0** | **0** | **0** | **101** | **0** | **142** | **164** | **0** |
| ***PHF*** | **0.00** | | | | **0.96** | | | | **0.90** | | | | **0.93** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **3.2%** | **5.3%** | **0.0%** | **0.0%** | **0.0%** | **1.0%** | **0.0%** | **1.4%** | **0.6%** | **0.0%** |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 1 |
| Location: | Downtown Boston, MA |
| Street 1: | Surface Road |
| Street 2: | North Street/I-93 NB Off Ramp |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

***TRUCKS***

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| AM PEAK HOUR 7:15 AM to 8:15 AM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **12** | **2** | **0** | **0** | **0** | **1** | **0** | **10** | **4** | **0** |
| ***PHF*** | **0.00** | | | | **0.70** | | | | **0.25** | | | | **0.70** | | | |

| PM PEAK HOUR 4:00 PM to 5:00 PM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | North Street Northeastbound | | | | I-93 Northbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **2** | **0** | **0** | **0** | **1** | **0** | **2** | **1** | **0** |
| ***PHF*** | **0.00** | | | | **0.75** | | | | **0.25** | | | | **0.75** | | | |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 1
Location: Downtown Boston, MA
Street 1: Surface Road
Street 2: North Street/I-93 NB Off Ramp
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F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## *PEDESTRIANS & BICYCLES*

| | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | North Street Northeastbound | | | | | I-93 Northbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 0 | 0 | 0 | | 0 | 4 | 0 | 10 | | 0 | 0 | 0 | 15 | | 0 | 0 | 0 | 1 | |
| 7:15 AM | 0 | 0 | 0 | 0 | | 0 | 8 | 0 | 12 | | 0 | 0 | 0 | 19 | | 0 | 0 | 0 | 3 | |
| 7:30 AM | 0 | 0 | 0 | 0 | | 0 | 12 | 0 | 18 | | 0 | 0 | 0 | 17 | | 0 | 0 | 0 | 4 | |
| 7:45 AM | 0 | 0 | 0 | 0 | | 0 | 11 | 1 | 24 | | 0 | 0 | 0 | 28 | | 0 | 0 | 0 | 2 | |
| 8:00 AM | 0 | 0 | 0 | 0 | | 0 | 12 | 0 | 35 | | 0 | 0 | 0 | 32 | | 0 | 0 | 0 | 5 | |
| 8:15 AM | 0 | 0 | 0 | 0 | | 0 | 9 | 1 | 31 | | 0 | 0 | 0 | 30 | | 0 | 0 | 0 | 6 | |
| 8:30 AM | 0 | 0 | 0 | 0 | | 0 | 8 | 0 | 37 | | 0 | 0 | 1 | 38 | | 0 | 0 | 0 | 4 | |
| 8:45 AM | 0 | 0 | 0 | 0 | | 0 | 7 | 0 | 34 | | 0 | 0 | 0 | 32 | | 0 | 0 | 0 | 3 | |

| | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | North Street Northeastbound | | | | | I-93 Northbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 42 | | 0 | 0 | 0 | 45 | | 0 | 0 | 0 | 4 | |
| 4:15 PM | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 58 | | 0 | 0 | 0 | 68 | | 0 | 0 | 0 | 7 | |
| 4:30 PM | 0 | 0 | 0 | 0 | | 0 | 2 | 1 | 72 | | 0 | 0 | 0 | 75 | | 0 | 0 | 0 | 6 | |
| 4:45 PM | 0 | 0 | 0 | 0 | | 0 | 3 | 0 | 85 | | 0 | 0 | 0 | 82 | | 0 | 0 | 0 | 8 | |
| 5:00 PM | 0 | 0 | 0 | 0 | | 0 | 4 | 0 | 78 | | 0 | 0 | 0 | 86 | | 0 | 0 | 0 | 5 | |
| 5:15 PM | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 84 | | 0 | 0 | 0 | 80 | | 0 | 0 | 0 | 7 | |
| 5:30 PM | 0 | 0 | 0 | 0 | | 0 | 4 | 0 | 82 | | 0 | 0 | 0 | 76 | | 0 | 0 | 0 | 4 | |
| 5:45 PM | 0 | 0 | 0 | 0 | | 0 | 3 | 0 | 75 | | 0 | 0 | 0 | 78 | | 0 | 0 | 0 | 5 | |

| AM PEAK HOUR[1] 7:45 AM to 8:45 AM | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | North Street Northeastbound | | | | | I-93 Northbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 0 | | 0 | 40 | 2 | 127 | | 0 | 0 | 1 | 128 | | 0 | 0 | 0 | 17 | |

| PM PEAK HOUR[1] 4:00 PM to 5:00 PM | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | North Street Northeastbound | | | | | I-93 Northbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 0 | | 0 | 8 | 1 | 257 | | 0 | 0 | 0 | 270 | | 0 | 0 | 0 | 25 | |

[1] *Peak hours corresponds to vehicular peak hours.*

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 2
Location: Downtown Boston, MA
Street 1: Surface Road
Street 2: Clinton Street/I-93 SB Off Ramp
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F


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## *TOTAL (CARS & TRUCKS)*

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 19 | 0 | 0 | 0 | 0 | 0 | 122 | 34 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 141 | 23 | 0 | 0 | 0 | 0 | 0 | 126 | 41 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 151 | 27 | 0 | 0 | 0 | 0 | 0 | 125 | 46 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 31 | 0 | 0 | 0 | 0 | 0 | 128 | 49 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 167 | 33 | 0 | 0 | 0 | 0 | 0 | 126 | 51 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 32 | 0 | 0 | 0 | 0 | 0 | 129 | 50 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 152 | 31 | 0 | 0 | 0 | 0 | 0 | 127 | 48 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 147 | 26 | 0 | 0 | 0 | 0 | 0 | 119 | 43 | 0 |

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 129 | 14 | 0 | 0 | 0 | 0 | 0 | 55 | 11 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 16 | 0 | 0 | 0 | 0 | 0 | 62 | 14 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 118 | 17 | 0 | 0 | 0 | 0 | 0 | 67 | 16 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 114 | 19 | 0 | 0 | 0 | 0 | 0 | 75 | 20 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 20 | 0 | 0 | 0 | 0 | 0 | 81 | 24 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 21 | 0 | 0 | 0 | 0 | 0 | 80 | 23 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 18 | 0 | 0 | 0 | 0 | 0 | 75 | 21 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 108 | 15 | 0 | 0 | 0 | 0 | 0 | 72 | 18 | 0 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **641** | **127** | **0** | **0** | **0** | **0** | **0** | **510** | **198** | **0** |
| ***PHF*** | **0.00** | | | | **0.96** | | | | **0.00** | | | | **0.99** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **3.1%** | **1.6%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **3.7%** | **0.5%** | **0.0%** |

| **PM PEAK HOUR** 4:45 PM to 5:45 PM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **443** | **78** | **0** | **0** | **0** | **0** | **0** | **311** | **88** | **0** |
| ***PHF*** | **0.00** | | | | **0.98** | | | | **0.00** | | | | **0.95** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **2.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **3.5%** | **0.0%** | **0.0%** |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 2 |
| Location: | Downtown Boston, MA |
| Street 1: | Surface Road |
| Street 2: | Clinton Street/I-93 SB Off Ramp |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

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***TRUCKS***

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |

| | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |

| **AM PEAK HOUR** 7:00 AM to 8:00 AM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **22** | **1** | **0** | **0** | **0** | **0** | **0** | **23** | **1** | **0** |
| ***PHF*** | **0.00** | | | | **0.82** | | | | **0.00** | | | | **0.86** | | | |

| **PM PEAK HOUR** 4:15 PM to 5:15 PM | Surface Road Northwestbound | | | | Surface Road Southeastbound | | | | Clinton Street Eastbound | | | | I-93 Southbound Off Ramp Southwestbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **11** | **1** | **0** | **0** | **0** | **0** | **0** | **12** | **1** | **0** |
| ***PHF*** | **0.00** | | | | **0.75** | | | | **0.00** | | | | **0.81** | | | |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 2
Location: Downtown Boston, MA
Street 1: Surface Road
Street 2: Clinton Street/I-93 SB Off Ramp
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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## *PEDESTRIANS & BICYCLES*

| | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | Clinton Street Eastbound | | | | | I-93 Southbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 0 | 0 | 2 | | 0 | 3 | 0 | 0 | | 0 | 0 | 0 | 9 | | 0 | 0 | 0 | 4 | |
| 7:15 AM | 0 | 0 | 0 | 3 | | 0 | 7 | 0 | 0 | | 0 | 0 | 0 | 10 | | 0 | 0 | 0 | 3 | |
| 7:30 AM | 0 | 0 | 0 | 6 | | 0 | 14 | 0 | 1 | | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 5 | |
| 7:45 AM | 0 | 0 | 0 | 8 | | 0 | 11 | 0 | 2 | | 0 | 0 | 0 | 9 | | 0 | 0 | 0 | 6 | |
| 8:00 AM | 0 | 0 | 0 | 5 | | 0 | 12 | 0 | 0 | | 0 | 0 | 0 | 13 | | 0 | 0 | 0 | 4 | |
| 8:15 AM | 0 | 0 | 0 | 7 | | 0 | 8 | 0 | 1 | | 0 | 0 | 0 | 15 | | 0 | 0 | 0 | 5 | |
| 8:30 AM | 0 | 0 | 0 | 6 | | 0 | 9 | 0 | 1 | | 0 | 0 | 0 | 11 | | 0 | 0 | 0 | 3 | |
| 8:45 AM | 0 | 0 | 0 | 5 | | 0 | 7 | 0 | 0 | | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 4 | |

| | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | Clinton Street Eastbound | | | | | I-93 Southbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 3 | | 0 | 2 | 0 | 4 | | 0 | 0 | 0 | 42 | | 0 | 0 | 0 | 3 | |
| 4:15 PM | 0 | 0 | 0 | 4 | | 0 | 1 | 0 | 3 | | 0 | 0 | 0 | 78 | | 0 | 0 | 0 | 5 | |
| 4:30 PM | 0 | 0 | 0 | 3 | | 0 | 2 | 0 | 8 | | 0 | 0 | 0 | 83 | | 0 | 0 | 0 | 7 | |
| 4:45 PM | 0 | 0 | 0 | 3 | | 0 | 4 | 0 | 11 | | 0 | 0 | 0 | 86 | | 0 | 0 | 0 | 6 | |
| 5:00 PM | 0 | 0 | 0 | 5 | | 0 | 3 | 0 | 10 | | 0 | 0 | 0 | 92 | | 0 | 0 | 0 | 8 | |
| 5:15 PM | 0 | 0 | 0 | 4 | | 0 | 2 | 0 | 12 | | 0 | 0 | 0 | 88 | | 0 | 0 | 0 | 10 | |
| 5:30 PM | 0 | 0 | 0 | 3 | | 0 | 3 | 0 | 15 | | 0 | 0 | 0 | 85 | | 0 | 0 | 0 | 8 | |
| 5:45 PM | 0 | 0 | 0 | 4 | | 0 | 4 | 0 | 13 | | 0 | 0 | 0 | 82 | | 0 | 0 | 0 | 7 | |

| AM PEAK HOUR[1] 7:45 AM to 8:45 AM | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | Clinton Street Eastbound | | | | | I-93 Southbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 26 | | 0 | 40 | 0 | 4 | | 0 | 0 | 0 | 48 | | 0 | 0 | 0 | 18 | |

| PM PEAK HOUR[1] 4:45 PM to 5:45 PM | Surface Road Northwestbound | | | | | Surface Road Southeastbound | | | | | Clinton Street Eastbound | | | | | I-93 Southbound Off Ramp Southwestbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 15 | | 0 | 12 | 0 | 48 | | 0 | 0 | 0 | 351 | | 0 | 0 | 0 | 32 | |

[1] *Peak hours corresponds to vehicular peak hours.*

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 3
Location: Downtown Boston, MA
Street 1: Clinton Street
Street 2: Dock Square Parking Garage
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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## *TOTAL (CARS & TRUCKS)*

| | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 26 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 31 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 34 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 38 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 40 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 39 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 36 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 37 |

| | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 8 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 9 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 7 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 6 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 6 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 4 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 5 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 4 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **9** | **0** | **0** | **0** | **0** | **0** | **0** | **172** | **153** |
| ***PHF*** | **0.00** | | | | **0.75** | | | | **0.00** | | | | **0.97** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.7%** | **0.0%** |

| **PM PEAK HOUR** 5:00 PM to 6:00 PM | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **78** | **0** | **0** | **0** | **0** | **0** | **0** | **141** | **19** |
| ***PHF*** | **0.00** | | | | **0.85** | | | | **0.00** | | | | **0.91** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 3
Location: Downtown Boston, MA
Street 1: Clinton Street
Street 2: Dock Square Parking Garage
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F


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## *TRUCKS*

| | | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:30 AM to 8:30 AM | | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** |
| ***PHF*** | **0.00** | | | | **0.00** | | | | **0.00** | | | | **0.75** | | | |

| **PM PEAK HOUR** 4:00 PM to 5:00 PM | | Northbound | | | | Dock Square Parking Garage Southbound | | | | Clinton Street Eastbound | | | | Clinton Street Westbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** |
| ***PHF*** | **0.00** | | | | **0.00** | | | | **0.00** | | | | **0.50** | | | |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 3
Location: Downtown Boston, MA
Street 1: Clinton Street
Street 2: Dock Square Parking Garage
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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Office: 978-746-1259
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## *PEDESTRIANS & BICYCLES*

| | Northbound | | | | | Dock Square Parking Garage Southbound | | | | | Clinton Street Eastbound | | | | | Clinton Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 1 | |
| 7:15 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 3 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 2 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 2 | |
| 7:45 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 4 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 2 | |
| 8:00 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 5 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 4 | |
| 8:15 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 8 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 1 | |
| 8:30 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 6 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 3 | |
| 8:45 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 9 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 2 | |

| | Northbound | | | | | Dock Square Parking Garage Southbound | | | | | Clinton Street Eastbound | | | | | Clinton Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 8 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 2 | |
| 4:15 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 1 | |
| 4:30 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 15 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 2 | |
| 4:45 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 13 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 1 | |
| 5:00 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 16 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 2 | |
| 5:15 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 14 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 6 | |
| 5:30 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 18 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 7 | |
| 5:45 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 15 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 3 | |

| **AM PEAK HOUR**[1] | Northbound | | | | | Dock Square Parking Garage Southbound | | | | | Clinton Street Eastbound | | | | | Clinton Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:45 AM to | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 8:45 AM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 23 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 10 | |

| **PM PEAK HOUR**[1] | Northbound | | | | | Dock Square Parking Garage Southbound | | | | | Clinton Street Eastbound | | | | | Clinton Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5:00 PM to | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 6:00 PM | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 63 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 18 | |

[1] *Peak hours corresponds to vehicular peak hours.*

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 4 |
| Location: | Downtown Boston, MA |
| Street 1: | North Street |
| Street 2: | Clinton Street / Hotel Driveway |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

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## *TOTAL (CARS & TRUCKS)*

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 5 | 0 | 0 | 0 | 103 | 5 | 0 | 0 | 0 | 4 | 0 | 32 | 0 | 1 |
| 7:15 AM | 0 | 1 | 6 | 0 | 0 | 0 | 117 | 4 | 0 | 2 | 0 | 3 | 0 | 35 | 1 | 1 |
| 7:30 AM | 0 | 2 | 11 | 0 | 0 | 0 | 129 | 3 | 0 | 0 | 0 | 3 | 0 | 36 | 1 | 2 |
| 7:45 AM | 0 | 3 | 10 | 0 | 0 | 0 | 144 | 2 | 0 | 1 | 0 | 4 | 0 | 33 | 0 | 3 |
| 8:00 AM | 0 | 3 | 11 | 0 | 0 | 0 | 153 | 1 | 0 | 0 | 0 | 3 | 0 | 32 | 0 | 4 |
| 8:15 AM | 0 | 2 | 10 | 0 | 0 | 0 | 150 | 3 | 0 | 1 | 0 | 4 | 0 | 29 | 0 | 5 |
| 8:30 AM | 0 | 1 | 8 | 0 | 0 | 0 | 145 | 2 | 0 | 1 | 0 | 4 | 0 | 30 | 1 | 5 |
| 8:45 AM | 0 | 2 | 9 | 0 | 0 | 0 | 142 | 2 | 0 | 0 | 0 | 3 | 0 | 27 | 1 | 4 |

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 1 | 23 | 0 | 0 | 0 | 45 | 4 | 0 | 1 | 0 | 3 | 0 | 24 | 1 | 4 |
| 4:15 PM | 0 | 2 | 19 | 0 | 0 | 0 | 43 | 4 | 0 | 2 | 0 | 5 | 0 | 26 | 1 | 6 |
| 4:30 PM | 0 | 2 | 16 | 0 | 0 | 0 | 47 | 3 | 0 | 0 | 0 | 4 | 0 | 35 | 0 | 8 |
| 4:45 PM | 0 | 2 | 14 | 0 | 0 | 0 | 50 | 4 | 0 | 1 | 0 | 6 | 0 | 42 | 0 | 7 |
| 5:00 PM | 0 | 1 | 11 | 0 | 0 | 0 | 48 | 3 | 0 | 1 | 0 | 5 | 0 | 50 | 1 | 8 |
| 5:15 PM | 0 | 2 | 8 | 0 | 0 | 0 | 47 | 5 | 0 | 2 | 0 | 5 | 0 | 56 | 0 | 9 |
| 5:30 PM | 0 | 1 | 10 | 0 | 0 | 0 | 45 | 2 | 0 | 1 | 0 | 4 | 0 | 55 | 1 | 7 |
| 5:45 PM | 0 | 1 | 13 | 0 | 0 | 0 | 43 | 3 | 0 | 1 | 0 | 5 | 0 | 53 | 1 | 6 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **9** | **39** | **0** | **0** | **0** | **592** | **8** | **0** | **3** | **0** | **15** | **0** | **124** | **1** | **17** |
| ***PHF*** | **0.86** | | | | **0.97** | | | | **0.90** | | | | **0.99** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **2.6%** | **0.0%** | **0.0%** | **0.0%** | **1.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **2.4%** | **0.0%** | **0.0%** |

| **PM PEAK HOUR** 4:45 PM to 5:45 PM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **6** | **43** | **0** | **0** | **0** | **190** | **14** | **0** | **5** | **0** | **20** | **0** | **203** | **2** | **31** |
| ***PHF*** | **0.77** | | | | **0.94** | | | | **0.89** | | | | **0.91** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.6%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.5%** | **0.0%** | **0.0%** |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 4
Location: Downtown Boston, MA
Street 1: North Street
Street 2: Clinton Street / Hotel Driveway
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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TRAFFIC DATA
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## *TRUCKS*

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **1** | **0** | **0** | **0** | **6** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **0** |
| ***PHF*** | **0.25** | | | | **0.75** | | | | **0.00** | | | | **0.75** | | | |

| **PM PEAK HOUR** 4:00 PM to 5:00 PM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** |
| ***PHF*** | **0.25** | | | | **0.75** | | | | **0.00** | | | | **0.50** | | | |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 4
Location: Downtown Boston, MA
Street 1: North Street
Street 2: Clinton Street / Hotel Driveway
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F


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## *PEDESTRIANS & BICYCLES*

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 6 |
| 7:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 5 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 8 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 10 |
| 8:15 AM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 12 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 11 |
| 8:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 14 |

| | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED |
| 4:00 PM | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 7 |
| 4:15 PM | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 9 |
| 4:30 PM | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 8 |
| 4:45 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 11 |
| 5:00 PM | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 9 |
| 5:15 PM | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 29 | 0 | 0 | 0 | 12 |
| 5:30 PM | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 14 |
| 5:45 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 13 |

| **AM PEAK HOUR**[1] 7:45 AM to 8:45 AM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED |
| | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 41 |

| **PM PEAK HOUR**[1] 4:45 PM to 5:45 PM | North Street Northeastbound | | | | North Street Southwestbound | | | | Hotel Driveway Eastbound | | | | Clinton Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED | Left | Thru | Right | PED |
| | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 93 | 0 | 0 | 0 | 46 |

[1] *Peak hours corresponds to vehicular peak hours.*

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 5A |
| Location: | Downtown Boston, MA |
| Street 1: | North Street |
| Street 2: | Union Street/ Driveway |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |


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## TOTAL (CARS & TRUCKS)

| | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 0 | 0 | 137 | 2 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 0 | 0 | 0 | 152 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 13 | 0 | 0 | 0 | 165 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 13 | 0 | 0 | 0 | 178 | 3 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 14 | 1 | 0 | 0 | 185 | 3 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 0 | 0 | 0 | 181 | 2 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 0 | 0 | 0 | 177 | 2 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 11 | 0 | 0 | 0 | 169 | 3 |

| | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 24 | 0 | 0 | 0 | 68 | 6 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 21 | 0 | 0 | 0 | 62 | 12 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 18 | 0 | 0 | 0 | 69 | 17 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 16 | 0 | 0 | 0 | 79 | 19 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 12 | 0 | 0 | 0 | 81 | 21 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 12 | 10 | 0 | 0 | 0 | 88 | 20 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 11 | 0 | 0 | 0 | 87 | 18 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 14 | 0 | 0 | 0 | 85 | 16 |

| AM PEAK HOUR 7:45 AM to 8:45 AM | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **10** | **48** | **1** | **0** | **0** | **721** | **10** |
| ***PHF*** | **0.25** | | | | **0.00** | | | | **0.83** | | | | **0.97** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **2.1%** | **0.0%** | **0.0%** | **0.0%** | **1.2%** | **0.0%** |

| PM PEAK HOUR 4:45 PM to 5:45 PM | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **43** | **49** | **0** | **0** | **0** | **335** | **78** |
| ***PHF*** | **0.00** | | | | **0.00** | | | | **0.89** | | | | **0.96** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.2%** | **0.0%** |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 5A
Location: Downtown Boston, MA
Street 1: North Street
Street 2: Union Street/ Driveway
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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## TRUCKS

| | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| AM PEAK HOUR 7:45 AM to 8:45 AM | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **9** | **0** |
| ***PHF*** | **0.00** | | | | **0.00** | | | | **0.25** | | | | **0.75** | | | |

| PM PEAK HOUR 4:30 PM to 5:30 PM | Driveway Northbound | | | | Union Street Southbound | | | | North Street Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **5** | **0** |
| ***PHF*** | **0.00** | | | | **0.00** | | | | **0.25** | | | | **0.63** | | | |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 5A |
| Location: | Downtown Boston, MA |
| Street 1: | North Street |
| Street 2: | Union Street/ Driveway |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

BOSTON TRAFFIC DATA
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## *PEDESTRIANS & BICYCLES*

| | Driveway Northbound | | | | | Union Street Southbound | | | | | North Street Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 0 | 0 | 6 | | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 24 | |
| 7:15 AM | 0 | 0 | 0 | 8 | | 0 | 0 | 0 | 15 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 35 | |
| 7:30 AM | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 14 | | 0 | 0 | 0 | 2 | | 0 | 0 | 0 | 46 | |
| 7:45 AM | 0 | 0 | 0 | 10 | | 0 | 0 | 0 | 18 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 58 | |
| 8:00 AM | 0 | 0 | 0 | 14 | | 0 | 0 | 0 | 22 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 68 | |
| 8:15 AM | 0 | 0 | 0 | 16 | | 0 | 0 | 0 | 28 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 72 | |
| 8:30 AM | 0 | 0 | 0 | 20 | | 0 | 0 | 0 | 32 | | 0 | 0 | 0 | 1 | | 0 | 0 | 0 | 75 | |
| 8:45 AM | 0 | 0 | 0 | 18 | | 0 | 0 | 0 | 26 | | 0 | 0 | 0 | 2 | | 0 | 0 | 0 | 70 | |

| | Driveway Northbound | | | | | Union Street Southbound | | | | | North Street Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 28 | | 0 | 0 | 0 | 65 | | 0 | 0 | 0 | 5 | | 0 | 0 | 0 | 98 | |
| 4:15 PM | 0 | 0 | 0 | 32 | | 0 | 0 | 0 | 70 | | 0 | 0 | 0 | 8 | | 0 | 0 | 0 | 118 | |
| 4:30 PM | 0 | 0 | 0 | 25 | | 0 | 0 | 0 | 72 | | 0 | 0 | 0 | 10 | | 0 | 0 | 0 | 134 | |
| 4:45 PM | 0 | 0 | 0 | 30 | | 0 | 0 | 0 | 68 | | 0 | 0 | 0 | 6 | | 0 | 0 | 0 | 158 | |
| 5:00 PM | 0 | 0 | 0 | 45 | | 0 | 0 | 0 | 75 | | 0 | 0 | 0 | 8 | | 0 | 0 | 0 | 192 | |
| 5:15 PM | 0 | 0 | 0 | 42 | | 0 | 0 | 0 | 78 | | 0 | 0 | 0 | 7 | | 0 | 0 | 0 | 225 | |
| 5:30 PM | 0 | 0 | 0 | 48 | | 0 | 0 | 0 | 82 | | 0 | 0 | 0 | 10 | | 0 | 0 | 0 | 218 | |
| 5:45 PM | 0 | 0 | 0 | 44 | | 0 | 0 | 0 | 76 | | 0 | 0 | 0 | 12 | | 0 | 0 | 0 | 236 | |

| **AM PEAK HOUR**[1] 7:45 AM to 8:45 AM | Driveway Northbound | | | | | Union Street Southbound | | | | | North Street Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 60 | | 0 | 0 | 0 | 100 | | 0 | 0 | 0 | 2 | | 0 | 0 | 0 | 273 | |

| **PM PEAK HOUR**[1] 4:45 PM to 5:45 PM | Driveway Northbound | | | | | Union Street Southbound | | | | | North Street Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 0 | 0 | 165 | | 0 | 0 | 0 | 303 | | 0 | 0 | 0 | 31 | | 0 | 0 | 0 | 793 | |

[1] *Peak hours corresponds to vehicular peak hours.*

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 5B
Location: Downtown Boston, MA
Street 1: Congress Street/ North Street
Street 2: City Hall Square Driveway
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F


BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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## *TOTAL (CARS & TRUCKS)*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 53 | 4 | 0 | 3 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 2 | 56 |
| 7:15 AM | 0 | 0 | 58 | 5 | 0 | 5 | 78 | 0 | 0 | 0 | 0 | 2 | 0 | 90 | 1 | 61 |
| 7:30 AM | 0 | 0 | 61 | 11 | 1 | 4 | 80 | 0 | 0 | 0 | 1 | 0 | 0 | 98 | 0 | 67 |
| 7:45 AM | 1 | 0 | 65 | 13 | 2 | 3 | 79 | 0 | 0 | 1 | 0 | 0 | 0 | 105 | 0 | 73 |
| 8:00 AM | 0 | 1 | 67 | 14 | 0 | 3 | 73 | 1 | 0 | 0 | 0 | 1 | 0 | 112 | 0 | 74 |
| 8:15 AM | 0 | 0 | 64 | 12 | 1 | 2 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 109 | 1 | 72 |
| 8:30 AM | 0 | 0 | 65 | 8 | 1 | 3 | 63 | 0 | 0 | 3 | 0 | 2 | 0 | 105 | 1 | 70 |
| 8:45 AM | 0 | 0 | 63 | 11 | 0 | 2 | 61 | 1 | 0 | 0 | 0 | 0 | 0 | 102 | 0 | 67 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 1 | 0 | 95 | 25 | 0 | 9 | 112 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 1 | 27 |
| 4:15 PM | 0 | 1 | 104 | 19 | 1 | 10 | 116 | 0 | 0 | 1 | 0 | 0 | 0 | 62 | 1 | 29 |
| 4:30 PM | 0 | 0 | 108 | 16 | 0 | 11 | 120 | 1 | 0 | 0 | 0 | 1 | 0 | 64 | 0 | 35 |
| 4:45 PM | 0 | 1 | 114 | 13 | 1 | 12 | 119 | 0 | 0 | 0 | 1 | 0 | 0 | 72 | 1 | 31 |
| 5:00 PM | 1 | 0 | 116 | 12 | 0 | 11 | 124 | 0 | 0 | 0 | 0 | 1 | 0 | 77 | 0 | 34 |
| 5:15 PM | 0 | 0 | 109 | 13 | 0 | 9 | 125 | 0 | 0 | 1 | 0 | 0 | 0 | 76 | 0 | 32 |
| 5:30 PM | 0 | 0 | 112 | 11 | 0 | 10 | 123 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 38 |
| 5:45 PM | 0 | 0 | 107 | 15 | 0 | 8 | 121 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 0 | 33 |

| **AM PEAK HOUR** 7:30 AM to 8:30 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **1** | **1** | **257** | **50** | **4** | **12** | **296** | **1** | **0** | **1** | **1** | **1** | **0** | **424** | **1** | **286** |
| ***PHF*** | **0.94** | | | | **0.92** | | | | **0.75** | | | | **0.96** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **5.1%** | **0.0%** | **0.0%** | **8.3%** | **5.1%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.2%** | **0.0%** | **1.0%** |

| **PM PEAK HOUR** 4:45 PM to 5:45 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **1** | **1** | **451** | **49** | **1** | **42** | **491** | **0** | **0** | **1** | **1** | **1** | **0** | **297** | **1** | **135** |
| ***PHF*** | **0.97** | | | | **0.99** | | | | **0.75** | | | | **0.98** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.9%** | **0.0%** | **0.0%** | **0.0%** | **0.4%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.7%** | **0.0%** | **1.5%** |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 5B
Location: Downtown Boston, MA
Street 1: Congress Street/ North Street
Street 2: City Hall Square Driveway
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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## *TRUCKS*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 7:30 AM | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |
| 8:00 AM | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 8:15 AM | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |
| 8:30 AM | 0 | 0 | 4 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4:45 PM | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5:00 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 5:30 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **15** | **0** | **0** | **1** | **14** | **0** | **0** | **0** | **0** | **0** | **0** | **6** | **0** | **3** |
| ***PHF*** | **0.94** | | | | **0.75** | | | | **0.00** | | | | **0.75** | | | |

| **PM PEAK HOUR** 4:30 PM to 5:30 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | City Hall Square Driveway Eastbound | | | | North Street Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **3** | **0** | **0** | **1** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **2** |
| ***PHF*** | **0.38** | | | | **0.42** | | | | **0.00** | | | | **0.63** | | | |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 5B |
| Location: | Downtown Boston, MA |
| Street 1: | Congress Street/ North Street |
| Street 2: | City Hall Square Driveway |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

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## *PEDESTRIANS & BICYCLES*

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | City Hall Square Driveway Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 1 | 0 | 45 | | 0 | 2 | 0 | 54 | | 0 | 0 | 0 | 128 | | 0 | 0 | 0 | 235 | |
| 7:15 AM | 0 | 0 | 0 | 52 | | 0 | 3 | 0 | 64 | | 0 | 0 | 0 | 135 | | 0 | 0 | 0 | 268 | |
| 7:30 AM | 0 | 1 | 0 | 60 | | 0 | 3 | 0 | 66 | | 0 | 0 | 0 | 146 | | 0 | 0 | 0 | 284 | |
| 7:45 AM | 0 | 2 | 0 | 64 | | 0 | 1 | 0 | 68 | | 0 | 0 | 0 | 155 | | 0 | 0 | 0 | 278 | |
| 8:00 AM | 0 | 1 | 0 | 56 | | 0 | 0 | 0 | 72 | | 0 | 0 | 0 | 148 | | 0 | 0 | 0 | 285 | |
| 8:15 AM | 0 | 1 | 0 | 62 | | 0 | 1 | 0 | 65 | | 0 | 0 | 0 | 162 | | 0 | 0 | 0 | 270 | |
| 8:30 AM | 0 | 0 | 0 | 68 | | 0 | 2 | 0 | 60 | | 0 | 0 | 0 | 154 | | 0 | 0 | 0 | 265 | |
| 8:45 AM | 0 | 2 | 0 | 65 | | 0 | 1 | 0 | 56 | | 0 | 0 | 0 | 168 | | 0 | 0 | 0 | 258 | |

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | City Hall Square Driveway Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 45 | | 0 | 1 | 0 | 52 | | 0 | 0 | 0 | 86 | | 0 | 0 | 0 | 145 | |
| 4:15 PM | 0 | 1 | 0 | 54 | | 0 | 0 | 0 | 65 | | 0 | 0 | 0 | 92 | | 0 | 0 | 0 | 158 | |
| 4:30 PM | 0 | 1 | 0 | 62 | | 0 | 1 | 0 | 68 | | 0 | 0 | 0 | 104 | | 0 | 0 | 0 | 168 | |
| 4:45 PM | 0 | 0 | 0 | 65 | | 0 | 1 | 0 | 62 | | 0 | 0 | 0 | 98 | | 0 | 0 | 0 | 175 | |
| 5:00 PM | 0 | 1 | 0 | 56 | | 0 | 0 | 0 | 58 | | 0 | 0 | 0 | 112 | | 0 | 0 | 0 | 170 | |
| 5:15 PM | 0 | 0 | 0 | 52 | | 0 | 1 | 0 | 60 | | 0 | 0 | 0 | 115 | | 0 | 0 | 0 | 182 | |
| 5:30 PM | 0 | 0 | 0 | 64 | | 0 | 0 | 0 | 65 | | 0 | 0 | 0 | 104 | | 0 | 0 | 0 | 195 | |
| 5:45 PM | 0 | 0 | 0 | 68 | | 0 | 0 | 0 | 62 | | 0 | 0 | 0 | 96 | | 0 | 0 | 0 | 188 | |

| AM PEAK HOUR[1] 7:30 AM to 8:30 AM | Congress Street Northbound | | | | | Congress Street Southbound | | | | | City Hall Square Driveway Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 5 | 0 | 242 | | 0 | 5 | 0 | 271 | | 0 | 0 | 0 | 611 | | 0 | 0 | 0 | 1117 | |

| PM PEAK HOUR[1] 4:45 PM to 5:45 PM | Congress Street Northbound | | | | | Congress Street Southbound | | | | | City Hall Square Driveway Eastbound | | | | | North Street Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 1 | 0 | 237 | | 0 | 2 | 0 | 245 | | 0 | 0 | 0 | 429 | | 0 | 0 | 0 | 722 | |

[1] *Peak hours corresponds to vehicular peak hours.*

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 6 |
| Location: | Downtown Boston, MA |
| Street 1: | Congress Street |
| Street 2: | State Street / Devonshire Street |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |


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Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com


## *TOTAL (CARS & TRUCKS)*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| 7:00 AM | 0 | 1 | 34 | 0 | 0 | 74 | 17 | 66 | 0 | 0 | 0 | 0 | 9 | 9 | 59 | 24 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 37 | 0 | 0 | 83 | 18 | 69 | 0 | 0 | 0 | 0 | 10 | 8 | 62 | 26 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 47 | 0 | 0 | 93 | 21 | 64 | 0 | 0 | 0 | 0 | 11 | 10 | 63 | 25 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 56 | 0 | 0 | 104 | 23 | 56 | 0 | 0 | 0 | 0 | 13 | 9 | 59 | 23 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 2 | 63 | 0 | 0 | 113 | 22 | 50 | 0 | 0 | 0 | 0 | 14 | 8 | 61 | 20 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 2 | 61 | 0 | 0 | 109 | 21 | 42 | 0 | 0 | 0 | 0 | 13 | 9 | 57 | 17 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 59 | 0 | 0 | 104 | 20 | 44 | 0 | 0 | 0 | 0 | 12 | 7 | 59 | 18 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 1 | 55 | 0 | 0 | 99 | 19 | 45 | 0 | 0 | 0 | 0 | 13 | 6 | 60 | 19 | 0 | 0 | 0 | 0 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| 4:00 PM | 0 | 0 | 89 | 0 | 0 | 102 | 17 | 55 | 0 | 0 | 0 | 0 | 28 | 14 | 78 | 32 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 90 | 0 | 0 | 105 | 16 | 57 | 0 | 0 | 0 | 0 | 27 | 15 | 82 | 34 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 1 | 91 | 0 | 0 | 106 | 19 | 59 | 0 | 0 | 0 | 0 | 25 | 17 | 81 | 37 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 94 | 0 | 0 | 115 | 21 | 55 | 0 | 0 | 0 | 0 | 24 | 16 | 78 | 36 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 92 | 0 | 0 | 118 | 24 | 57 | 0 | 0 | 0 | 0 | 22 | 15 | 77 | 35 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 1 | 88 | 0 | 0 | 122 | 26 | 53 | 0 | 0 | 0 | 0 | 23 | 16 | 75 | 34 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 87 | 0 | 0 | 115 | 25 | 55 | 0 | 0 | 0 | 0 | 21 | 14 | 74 | 36 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 89 | 0 | 0 | 116 | 23 | 51 | 0 | 0 | 0 | 0 | 22 | 13 | 71 | 32 | 0 | 0 | 0 | 0 |

| AM PEAK HOUR 7:30 AM to 8:30 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| | **1** | **5** | **227** | **0** | **0** | **419** | **87** | **212** | **0** | **0** | **0** | **0** | **51** | **36** | **240** | **85** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.90** | | | | **0.97** | | | | **0.00** | | | | **0.94** | | | | **0.00** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **5.7%** | **0.0%** | **0.0%** | **4.1%** | **2.3%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **2.8%** | **1.7%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** |

| PM PEAK HOUR 4:30 PM to 5:30 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| | **0** | **2** | **365** | **0** | **0** | **461** | **90** | **224** | **0** | **0** | **0** | **0** | **94** | **64** | **311** | **142** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.98** | | | | **0.96** | | | | **0.00** | | | | **0.95** | | | | **0.00** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **0.8%** | **0.0%** | **0.0%** | **1.3%** | **1.1%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.6%** | **0.3%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 6 |
| Location: | Downtown Boston, MA |
| Street 1: | Congress Street |
| Street 2: | State Street / Devonshire Street |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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## *TRUCKS*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| 7:00 AM | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 3 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 4 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 4 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:45 AM to 8:45 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| | **0** | **0** | **15** | **0** | **0** | **20** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **3** | **0** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.94** | | | | **0.88** | | | | **0.00** | | | | **0.50** | | | | **0.00** | | | |

| **PM PEAK HOUR** 4:00 PM to 5:00 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | State Street Eastbound | | | | State Street Westbound | | | | Devonshire Street Northeastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hard Left | Left | Thru | Right | Left | Thru | Soft Right | Right | Left | Thru | Right | Hard | Left | Soft Left | Thru | Right | Hard Left | Left | Right | Hard |
| | **0** | **0** | **3** | **0** | **0** | **6** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.38** | | | | **0.58** | | | | **0.00** | | | | **0.50** | | | | **0.00** | | | |

| | |
|---|---|
| Client: | Michael Littman |
| Project #: | 140_043_HSH_Downtown Boston |
| BTD #: | Location 6 |
| Location: | Downtown Boston, MA |
| Street 1: | Congress Street |
| Street 2: | State Street / Devonshire Street |
| Count Date: | 11/16/2017 |
| Day of Week: | Thursday |
| Weather: | Cloudy & Rain, 50°F |


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***PEDESTRIANS & BICYCLES***

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | State Street Eastbound | | | | | State Street Westbound | | | | | Devonshire Street Northeastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | PED | Left | Thru | Soft Right | Right | PED | Left | Thru | Right | Hard | PED | Left | Soft Left | Thru | Right | PED | Hard Left | Left | Right | Hard | PED |
| 7:00 AM | 0 | 0 | 1 | 0 | 65 | 0 | 2 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 60 |
| 7:15 AM | 0 | 0 | 1 | 0 | 78 | 0 | 3 | 0 | 0 | 48 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 86 | 0 | 0 | 0 | 0 | 72 |
| 7:30 AM | 0 | 0 | 0 | 0 | 95 | 0 | 2 | 0 | 0 | 62 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 92 | 0 | 0 | 0 | 0 | 88 |
| 7:45 AM | 0 | 0 | 1 | 0 | 116 | 0 | 1 | 0 | 1 | 68 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 1 | 0 | 105 | 0 | 0 | 0 | 0 | 115 |
| 8:00 AM | 0 | 0 | 0 | 0 | 128 | 0 | 1 | 0 | 0 | 78 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 118 | 0 | 0 | 0 | 0 | 122 |
| 8:15 AM | 0 | 0 | 1 | 0 | 125 | 0 | 2 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 1 | 0 | 125 | 0 | 0 | 0 | 0 | 130 |
| 8:30 AM | 0 | 0 | 0 | 0 | 115 | 0 | 1 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 | 122 | 0 | 0 | 0 | 0 | 125 |
| 8:45 AM | 0 | 0 | 1 | 0 | 122 | 0 | 1 | 0 | 0 | 92 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 128 | 0 | 0 | 0 | 0 | 116 |

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | State Street Eastbound | | | | | State Street Westbound | | | | | Devonshire Street Northeastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Hard Left | Left | Thru | Right | PED | Left | Thru | Soft Right | Right | PED | Left | Thru | Right | Hard | PED | Left | Soft Left | Thru | Right | PED | Hard Left | Left | Right | Hard | PED |
| 4:00 PM | 0 | 0 | 1 | 0 | 98 | 0 | 1 | 0 | 0 | 125 | 0 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 95 |
| 4:15 PM | 0 | 0 | 0 | 0 | 125 | 0 | 0 | 0 | 0 | 148 | 0 | 0 | 0 | 0 | 88 | 0 | 0 | 0 | 0 | 1125 | 0 | 0 | 0 | 0 | 122 |
| 4:30 PM | 0 | 0 | 1 | 0 | 194 | 0 | 1 | 0 | 0 | 185 | 0 | 0 | 0 | 0 | 102 | 0 | 0 | 1 | 0 | 148 | 0 | 0 | 0 | 0 | 195 |
| 4:45 PM | 0 | 0 | 0 | 0 | 230 | 0 | 0 | 0 | 0 | 208 | 0 | 0 | 0 | 0 | 145 | 0 | 0 | 0 | 0 | 205 | 0 | 0 | 0 | 0 | 235 |
| 5:00 PM | 0 | 0 | 0 | 0 | 255 | 0 | 1 | 0 | 0 | 232 | 0 | 0 | 0 | 0 | 185 | 0 | 0 | 0 | 0 | 224 | 0 | 0 | 0 | 0 | 262 |
| 5:15 PM | 0 | 0 | 1 | 0 | 262 | 0 | 1 | 0 | 0 | 240 | 0 | 0 | 0 | 0 | 195 | 0 | 0 | 0 | 0 | 215 | 0 | 0 | 0 | 0 | 270 |
| 5:30 PM | 0 | 0 | 0 | 0 | 268 | 0 | 0 | 0 | 0 | 245 | 0 | 0 | 0 | 0 | 186 | 0 | 0 | 0 | 0 | 225 | 0 | 0 | 0 | 0 | 265 |
| 5:45 PM | 0 | 0 | 0 | 0 | 260 | 0 | 0 | 0 | 0 | 238 | 0 | 0 | 0 | 0 | 190 | 0 | 0 | 0 | 0 | 228 | 0 | 0 | 0 | 0 | 272 |

| **AM PEAK HOUR**[1] | Congress Street Northbound | | | | | Congress Street Southbound | | | | | State Street Eastbound | | | | | State Street Westbound | | | | | Devonshire Street Northeastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:30 AM to | Hard Left | Left | Thru | Right | PED | Left | Thru | Soft Right | Right | PED | Left | Thru | Right | Hard | PED | Left | Soft Left | Thru | Right | PED | Hard Left | Left | Right | Hard | PED |
| 8:30 AM | 0 | 0 | 2 | 0 | 464 | 0 | 6 | 0 | 1 | 298 | 0 | 0 | 0 | 0 | 147 | 0 | 0 | 2 | 0 | 440 | 0 | 0 | 0 | 0 | 455 |

| **PM PEAK HOUR**[1] | Congress Street Northbound | | | | | Congress Street Southbound | | | | | State Street Eastbound | | | | | State Street Westbound | | | | | Devonshire Street Northeastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:30 PM to | Hard Left | Left | Thru | Right | PED | Left | Thru | Soft Right | Right | PED | Left | Thru | Right | Hard | PED | Left | Soft Left | Thru | Right | PED | Hard Left | Left | Right | Hard | PED |
| 5:30 PM | 0 | 0 | 2 | 0 | 941 | 0 | 3 | 0 | 0 | 865 | 0 | 0 | 0 | 0 | 627 | 0 | 0 | 1 | 0 | 792 | 0 | 0 | 0 | 0 | 962 |

[1] *Peak hours corresponds to vehicular peak hours.*

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 7
Location: Downtown Boston, MA
Street 1: Congress Street
Street 2: Sudbury Street/Haymarket Square
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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## *TOTAL (CARS & TRUCKS)*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 1 | 0 | 94 | 14 | 1 | 16 | 52 | 0 | 0 | 14 | 21 | 24 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 99 | 20 | 0 | 20 | 57 | 0 | 0 | 15 | 23 | 26 | 0 | 0 | 0 | 0 |
| 7:30 AM | 1 | 0 | 103 | 25 | 1 | 24 | 59 | 0 | 0 | 16 | 24 | 25 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 109 | 32 | 0 | 27 | 57 | 0 | 0 | 18 | 26 | 27 | 0 | 0 | 0 | 0 |
| 8:00 AM | 1 | 0 | 104 | 38 | 2 | 29 | 49 | 0 | 0 | 17 | 27 | 28 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 101 | 36 | 0 | 28 | 36 | 0 | 0 | 16 | 26 | 30 | 0 | 0 | 0 | 0 |
| 8:30 AM | 1 | 0 | 103 | 33 | 1 | 26 | 39 | 0 | 0 | 15 | 23 | 26 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 99 | 31 | 0 | 24 | 37 | 0 | 0 | 14 | 21 | 27 | 0 | 0 | 0 | 0 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 2 | 0 | 80 | 40 | 1 | 23 | 95 | 0 | 0 | 33 | 52 | 24 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 91 | 44 | 0 | 28 | 105 | 0 | 0 | 31 | 51 | 22 | 0 | 0 | 0 | 0 |
| 4:30 PM | 1 | 0 | 96 | 46 | 2 | 31 | 107 | 0 | 0 | 32 | 49 | 23 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 99 | 50 | 1 | 34 | 109 | 0 | 0 | 35 | 46 | 24 | 0 | 0 | 0 | 0 |
| 5:00 PM | 1 | 0 | 97 | 52 | 0 | 35 | 114 | 0 | 0 | 34 | 47 | 22 | 0 | 0 | 0 | 0 |
| 5:15 PM | 1 | 0 | 94 | 51 | 0 | 36 | 111 | 0 | 0 | 36 | 48 | 25 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 102 | 48 | 1 | 33 | 108 | 0 | 0 | 33 | 45 | 23 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 95 | 45 | 0 | 34 | 104 | 0 | 0 | 34 | 43 | 22 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:30 AM to 8:30 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **3** | **0** | **417** | **131** | **3** | **108** | **201** | **0** | **0** | **67** | **103** | **110** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.96** | | | | **0.93** | | | | **0.97** | | | | **0.00** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **3.6%** | **0.8%** | **0.0%** | **1.9%** | **7.5%** | **0.0%** | **0.0%** | **3.0%** | **1.9%** | **0.9%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** |

| **PM PEAK HOUR** 4:45 PM to 5:45 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **2** | **0** | **392** | **201** | **2** | **138** | **442** | **0** | **0** | **138** | **186** | **94** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.99** | | | | **0.98** | | | | **0.96** | | | | **0.00** | | | |
| ***HV %*** | **0.0%** | **0.0%** | **1.0%** | **1.0%** | **0.0%** | **1.4%** | **0.5%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** | **1.1%** | **0.0%** | **0.0%** | **0.0%** | **0.0%** |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 7
Location: Downtown Boston, MA
Street 1: Congress Street
Street 2: Sudbury Street/Haymarket Square
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

## *TRUCKS*

| | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 7:00 AM | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 4 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 2 | 0 | 0 | 1 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 4 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 4 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 3 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| **AM PEAK HOUR** 7:15 AM to 8:15 AM | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **15** | **2** | **0** | **1** | **16** | **0** | **0** | **1** | **3** | **1** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.85** | | | | **0.71** | | | | **0.63** | | | | **0.00** | | | |

| **PM PEAK HOUR** 4:15 PM to 5:15 PM | Congress Street Northbound | | | | Congress Street Southbound | | | | Sudbury Street Eastbound | | | | Haymarket Square Westbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right | U-Turn | Left | Thru | Right |
| | **0** | **0** | **5** | **1** | **0** | **2** | **4** | **0** | **0** | **1** | **1** | **1** | **0** | **0** | **0** | **0** |
| ***PHF*** | **0.75** | | | | **0.50** | | | | **0.75** | | | | **0.00** | | | |

Client: Michael Littman
Project #: 140_043_HSH_Downtown Boston
BTD #: Location 7
Location: Downtown Boston, MA
Street 1: Congress Street
Street 2: Sudbury Street/Haymarket Square
Count Date: 11/16/2017
Day of Week: Thursday
Weather: Cloudy & Rain, 50°F

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## *PEDESTRIANS & BICYCLES*

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | Sudbury Street Eastbound | | | | | Haymarket Square Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 7:00 AM | 0 | 1 | 0 | 38 | | 0 | 3 | 0 | 32 | | 0 | 0 | 0 | 86 | | 0 | 0 | 0 | 95 | |
| 7:15 AM | 0 | 0 | 0 | 45 | | 0 | 2 | 0 | 40 | | 0 | 0 | 0 | 88 | | 0 | 0 | 0 | 92 | |
| 7:30 AM | 0 | 1 | 0 | 42 | | 0 | 3 | 0 | 45 | | 0 | 0 | 0 | 95 | | 0 | 0 | 0 | 98 | |
| 7:45 AM | 0 | 1 | 0 | 50 | | 0 | 1 | 0 | 48 | | 0 | 0 | 0 | 94 | | 0 | 0 | 0 | 104 | |
| 8:00 AM | 0 | 2 | 0 | 46 | | 0 | 1 | 0 | 42 | | 0 | 0 | 0 | 102 | | 0 | 0 | 0 | 96 | |
| 8:15 AM | 0 | 0 | 0 | 52 | | 0 | 2 | 0 | 45 | | 0 | 0 | 0 | 98 | | 0 | 0 | 0 | 108 | |
| 8:30 AM | 0 | 1 | 0 | 55 | | 0 | 1 | 0 | 48 | | 0 | 0 | 0 | 104 | | 0 | 0 | 0 | 115 | |
| 8:45 AM | 0 | 2 | 0 | 58 | | 0 | 0 | 0 | 52 | | 0 | 0 | 0 | 108 | | 0 | 0 | 0 | 112 | |

| | Congress Street Northbound | | | | | Congress Street Southbound | | | | | Sudbury Street Eastbound | | | | | Haymarket Square Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| 4:00 PM | 0 | 0 | 0 | 45 | | 0 | 1 | 0 | 36 | | 0 | 0 | 0 | 96 | | 0 | 0 | 0 | 85 | |
| 4:15 PM | 0 | 1 | 0 | 48 | | 0 | 1 | 0 | 42 | | 0 | 0 | 0 | 112 | | 0 | 0 | 0 | 125 | |
| 4:30 PM | 0 | 0 | 0 | 54 | | 0 | 0 | 0 | 46 | | 0 | 0 | 0 | 148 | | 0 | 0 | 0 | 145 | |
| 4:45 PM | 0 | 1 | 0 | 56 | | 0 | 1 | 0 | 48 | | 0 | 0 | 0 | 160 | | 0 | 0 | 0 | 168 | |
| 5:00 PM | 0 | 0 | 0 | 52 | | 0 | 0 | 0 | 45 | | 0 | 0 | 0 | 172 | | 0 | 0 | 0 | 186 | |
| 5:15 PM | 0 | 0 | 0 | 47 | | 0 | 1 | 0 | 42 | | 0 | 0 | 0 | 168 | | 0 | 0 | 0 | 174 | |
| 5:30 PM | 0 | 1 | 0 | 55 | | 0 | 0 | 0 | 50 | | 0 | 0 | 0 | 174 | | 0 | 0 | 0 | 180 | |
| 5:45 PM | 0 | 0 | 0 | 64 | | 0 | 0 | 0 | 54 | | 0 | 0 | 0 | 178 | | 0 | 0 | 0 | 188 | |

| **AM PEAK HOUR**[1] 7:30 AM to 8:30 AM | Congress Street Northbound | | | | | Congress Street Southbound | | | | | Sudbury Street Eastbound | | | | | Haymarket Square Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 4 | 0 | 190 | | 0 | 7 | 0 | 180 | | 0 | 0 | 0 | 389 | | 0 | 0 | 0 | 406 | |

| **PM PEAK HOUR**[1] 4:45 PM to 5:45 PM | Congress Street Northbound | | | | | Congress Street Southbound | | | | | Sudbury Street Eastbound | | | | | Haymarket Square Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | | Left | Thru | Right | PED | |
| | 0 | 2 | 0 | 210 | | 0 | 2 | 0 | 185 | | 0 | 0 | 0 | 674 | | 0 | 0 | 0 | 708 | |

[1] *Peak hours corresponds to vehicular peak hours.*

*MASSACHUSETTS HIGHWAY DEPARTMENT - STATEWIDE TRAFFIC DATA COLLECTION*

**2011 WEEKDAY SEASONAL FACTORS ***

* Note: These are weekday factors. The average of the factors for the year will not equal 1, as weekend data are not considered.

| FACTOR GROUP | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GROUP **1** - WEST INTERSTATE | 0.98 | 0.93 | 0.90 | 0.89 | 0.90 | 0.88 | 0.91 | 0.90 | 0.89 | 0.89 | 0.93 | 0.95 |
| Use group 2 for R5, R6, & R0<br>GROUP **2** - **RURAL MAJOR COLLECTOR (R-5)** | 1.12 | 1.12 | 1.07 | 0.99 | 0.91 | 0.90 | 0.86 | 0.86 | 0.92 | 0.93 | 1.01 | 1.05 |
| GROUP **3A** - RECREATIONAL **(1-4) See below | 1.26 | 1.25 | 1.20 | 1.06 | 0.96 | 0.89 | 0.76 | 0.76 | 0.92 | 0.99 | 1.08 | 1.14 |
| GROUP **3B** - RECREATIONAL ***(5) See below | 1.22 | 1.26 | 1.22 | 1.06 | 0.96 | 0.90 | 0.72 | 0.74 | 0.97 | 1.02 | 1.14 | 1.15 |
| GROUP **4** - I-495 INTERSTATE | 1.02 | 1.00 | 1.00 | 0.96 | 0.92 | 0.89 | 0.85 | 0.83 | 0.93 | 0.96 | 1.01 | 1.03 |
| GROUP **5** - EAST INTERSTATE | 1.04 | 1.00 | 0.96 | 0.93 | 0.92 | 0.91 | 0.91 | 0.89 | 0.93 | 0.93 | 0.96 | 1.01 |
| GROUP **6**: Use group 6 for U2, U3, U5, U6, U0, R2, & R3<br>**URBAN ARTERIALS, COLLECTORS & RURAL ARTERIALS (R-2, R-3)** | 1.03 | 1.01 | 0.96 | 0.92 | 0.91 | 0.90 | 0.92 | 0.92 | 0.93 | 0.92 | 0.97 | 0.97 |
| GROUP **7** - I-84 PROXIMITY (STA. 17, 3921) | 1.24 | 1.24 | 1.15 | 1.04 | 0.99 | 1.00 | 0.93 | 0.89 | 1.05 | 1.05 | 1.05 | 1.12 |
| GROUP **8** - I-295 PROXIMITY (STA. 6590) | 1.00 | 0.99 | 0.95 | 0.92 | 0.94 | 0.91 | 0.93 | 0.92 | 0.95 | 0.94 | 0.97 | 0.95 |
| GROUP **9** - I-195 PROXIMITY (STA. 7) | 1.13 | 1.05 | 1.03 | 0.95 | 0.89 | 0.87 | 0.86 | 0.79 | 0.88 | 0.91 | 0.99 | 1.03 |

***RECREATIONAL: (ALL YEARS)***

****GROUP 3A:**

1. CAPE COD (ALL TOWNS)
2. PLYMOUTH(SOUTH OF RTE.3A)
   7014, 7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108,7178
3. MARTHA'S VINEYARD
4. NANTUCKET

*****GROUP 3B:**

5. PERMANENTS 2 & 189
   1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,
   1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,
   1105,1106,1107,1108,1113,1114,1116,2196,2197,2198

**2011 AXLE CORRECTION FACTORS**

| ROAD INVENTORY FUNCTIONAL CLASSIFICATION | AXLE CORRECTION FACTOR |
|---|---|
| **RURAL** | |
| 1 | 0.95 |
| 2 | 0.97 |
| 3 | 0.98 |
| 0,5,6 | 0.98 |
| **URBAN** | |
| 1 | 0.96 |
| 2,3 | 0.98 |
| 5 | 0.98 |
| 0,6 | 0.99 |
| I-84 | 0.90 |

**ROUND OFF**

0 - 999............10
> 1,000..........100

**Apply I-84 factor to stations:**

**3290, 3921, 3929**

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 59 | 424 | 550 | 0 | 0 | 0 | 0 | 0 | 285 | 50 |
| Future Volume (vph) | 0 | 0 | 59 | 424 | 550 | 0 | 0 | 0 | 0 | 0 | 285 | 50 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.96 | |
| Frt | | | 0.865 | | | | | | | | 0.977 | |
| Flt Protected | | | | | 0.979 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1450 | 0 | 3136 | 0 | 0 | 0 | 0 | 0 | 2933 | 0 |
| Flt Permitted | | | | | 0.979 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1450 | 0 | 3136 | 0 | 0 | 0 | 0 | 0 | 2933 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 19 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 253 | | | 177 | | | 455 | | | 464 | |
| Travel Time (s) | | 6.9 | | | 4.8 | | | 12.4 | | | 12.7 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 128 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 67 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.98 | 0.98 | 0.98 | 0.92 | 0.92 | 0.92 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles (%) | 0% | 0% | 2% | 2% | 1% | 0% | 2% | 2% | 2% | 0% | 4% | 4% |
| Adj. Flow (vph) | 0 | 0 | 64 | 433 | 561 | 0 | 0 | 0 | 0 | 0 | 306 | 54 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 64 | 0 | 994 | 0 | 0 | 0 | 0 | 0 | 360 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 73.0 | 73.0 | 73.0 | | | | | | 37.0 | |
| Total Split (%) | | | 66.4% | 66.4% | 66.4% | | | | | | 33.6% | |
| Maximum Green (s) | | | 64.0 | 64.0 | 64.0 | | | | | | 32.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 0 | |
| Act Effct Green (s) | | | 69.0 | | 69.0 | | | | | | 33.0 | |
| Actuated g/C Ratio | | | 0.63 | | 0.63 | | | | | | 0.30 | |
| v/c Ratio | | | 0.07 | | 0.51 | | | | | | 0.40 | |
| Control Delay | | | 1.7 | | 12.3 | | | | | | 13.1 | |
| Queue Delay | | | 0.0 | | 0.1 | | | | | | 0.0 | |
| Total Delay | | | 1.7 | | 12.4 | | | | | | 13.1 | |
| LOS | | | A | | B | | | | | | B | |
| Approach Delay | | 1.7 | | | 12.4 | | | | | | 13.1 | |
| Approach LOS | | A | | | B | | | | | | B | |
| Queue Length 50th (ft) | | | 5 | | 186 | | | | | | 48 | |
| Queue Length 95th (ft) | | | 6 | | 236 | | | | | | 73 | |
| Internal Link Dist (ft) | | 173 | | | 97 | | | 375 | | | 384 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 909 | | 1967 | | | | | | 893 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 150 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.07 | | 0.55 | | | | | | 0.40 | |

| Intersection Summary | | |
|---|---|---|
| Area Type: | CBD | |
| Cycle Length: 110 | | |
| Actuated Cycle Length: 110 | | |
| Offset: 104 (95%), Referenced to phase 1:WBTL, Start of Green | | |
| Natural Cycle: 50 | | |
| Control Type: Actuated-Coordinated | | |
| Maximum v/c Ratio: 0.51 | | |
| Intersection Signal Delay: 12.1 | | Intersection LOS: B |
| Intersection Capacity Utilization 64.7% | | ICU Level of Service C |
| Analysis Period (min) 15 | | |

Splits and Phases: 7000: Surface Road & North Street/I-93 NB Off-Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 510 | 198 | 0 | 0 | 0 | 0 | 0 | 641 | 127 | |
| Future Volume (vph) | 0 | 0 | 0 | 510 | 198 | 0 | 0 | 0 | 0 | 0 | 641 | 127 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | | | | | | | | 0.98 | | |
| Frt | | | | | | | | | | | 0.975 | | |
| Flt Protected | | | | 0.950 | 0.978 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1583 | 1759 | 0 | 0 | 0 | 0 | 0 | 4347 | 0 | |
| Flt Permitted | | | | 0.950 | 0.978 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1583 | 1759 | 0 | 0 | 0 | 0 | 0 | 4347 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 37 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 231 | | | 88 | | | 185 | | | 455 | | |
| Travel Time (s) | | 6.3 | | | 2.4 | | | 5.0 | | | 12.4 | | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 67 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.99 | 0.99 | 0.99 | 0.92 | 0.92 | 0.92 | 0.96 | 0.96 | 0.96 | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 1% | 0% | 2% | 2% | 2% | 0% | 3% | 2% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 515 | 200 | 0 | 0 | 0 | 0 | 0 | 668 | 132 | |
| Shared Lane Traffic (%) | | | | 32% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 350 | 365 | 0 | 0 | 0 | 0 | 0 | 800 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 51.0 | 51.0 | | | | | | 35.0 | | 24.0 |
| Total Split (%) | | | | 46.4% | 46.4% | | | | | | 31.8% | | 22% |
| Maximum Green (s) | | | | 46.0 | 46.0 | | | | | | 29.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 0 |
| Act Effct Green (s) | | | | 48.0 | 48.0 | | | | | | 31.0 | | |
| Actuated g/C Ratio | | | | 0.44 | 0.44 | | | | | | 0.28 | | |
| v/c Ratio | | | | 0.51 | 0.48 | | | | | | 0.64 | | |
| Control Delay | | | | 25.7 | 24.6 | | | | | | 31.9 | | |
| Queue Delay | | | | 0.9 | 0.7 | | | | | | 0.0 | | |
| Total Delay | | | | 26.5 | 25.3 | | | | | | 31.9 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 25.9 | | | | | | 31.9 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 184 | 188 | | | | | | 154 | | |
| Queue Length 95th (ft) | | | | 276 | 278 | | | | | | 197 | | |
| Internal Link Dist (ft) | | 151 | | | 8 | | | 105 | | | 375 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 690 | 767 | | | | | | 1251 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 139 | 154 | | | | | | 3 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.64 | 0.60 | | | | | | 0.64 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 4 (4%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 45.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1960: Surface Road & Clinton Street/I-93 SB Off-Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 9 | 39 | 0 | 0 | 592 | 8 | 124 | 1 | 17 | 3 | 0 | 15 |
| Future Volume (vph) | 9 | 39 | 0 | 0 | 592 | 8 | 124 | 1 | 17 | 3 | 0 | 15 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | 0.99 | | | 1.00 | | | 0.99 | | 0.99 | | 0.98 |
| Frt | | | | | 0.998 | | | 0.964 | | | | 0.850 |
| Flt Protected | | 0.991 | | | | | 0.950 | 0.964 | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1654 | 0 | 0 | 3203 | 0 | 1513 | 1480 | 0 | 1624 | 0 | 1454 |
| Flt Permitted | | 0.900 | | | | | 0.950 | 0.964 | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1491 | 0 | 0 | 3203 | 0 | 1513 | 1480 | 0 | 1605 | 0 | 1428 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | | | 2 | | | | | | | 79 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | |
| Link Distance (ft) | | 280 | | | 253 | | | 342 | | | 110 | |
| Travel Time (s) | | 7.6 | | | 6.9 | | | 9.3 | | | 2.5 | |
| Confl. Peds. (#/hr) | 31 | | | | | 31 | | | | 4 | | 3 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Peak Hour Factor | 0.92 | 0.86 | 0.86 | 0.97 | 0.97 | 0.92 | 0.99 | 0.92 | 0.99 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 1% | 0% | 2% | 0% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 10 | 45 | 0 | 0 | 610 | 9 | 125 | 1 | 17 | 3 | 0 | 16 |
| Shared Lane Traffic (%) | | | | | | | 42% | | | | | |
| Lane Group Flow (vph) | 0 | 55 | 0 | 0 | 619 | 0 | 72 | 71 | 0 | 3 | 0 | 16 |
| Turn Type | Perm | NA | | | NA | | Split | NA | | Prot | | Perm |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | 2 | | |
| Permitted Phases | 1 | | | | | | | | | | | 2 |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 2 | | 2 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 7.0 | | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 21.0 | | 21.0 |
| Total Split (s) | 59.0 | 59.0 | | | 59.0 | | 30.0 | 30.0 | | 21.0 | | 21.0 |
| Total Split (%) | 53.6% | 53.6% | | | 53.6% | | 27.3% | 27.3% | | 19.1% | | 19.1% |
| Maximum Green (s) | 54.0 | 54.0 | | | 54.0 | | 24.0 | 24.0 | | 17.0 | | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 4.0 | | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 0.0 | | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 4.0 | | 4.0 |
| Lead/Lag | Lead | Lead | | | Lead | | | | | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Ped | | Ped |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | 10.0 | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | 0 | | 0 |
| Act Effct Green (s) | | 54.0 | | | 54.0 | | 24.0 | 24.0 | | 17.0 | | 17.0 |
| Actuated g/C Ratio | | 0.49 | | | 0.49 | | 0.22 | 0.22 | | 0.15 | | 0.15 |
| v/c Ratio | | 0.08 | | | 0.39 | | 0.22 | 0.22 | | 0.01 | | 0.06 |
| Control Delay | | 38.5 | | | 10.9 | | 36.2 | 36.2 | | 39.7 | | 0.4 |
| Queue Delay | | 0.0 | | | 0.5 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Delay | | 38.5 | | | 11.4 | | 36.2 | 36.2 | | 39.7 | | 0.4 |
| LOS | | D | | | B | | D | D | | D | | A |
| Approach Delay | | 38.5 | | | 11.4 | | | 36.2 | | | 6.6 | |
| Approach LOS | | D | | | B | | | D | | | A | |
| Queue Length 50th (ft) | | 38 | | | 151 | | 48 | 48 | | 2 | | 0 |
| Queue Length 95th (ft) | | 75 | | | 195 | | m81 | m80 | | 10 | | 0 |
| Internal Link Dist (ft) | | 200 | | | 173 | | | 262 | | | 30 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | 731 | | | 1573 | | 330 | 322 | | 250 | | 287 |
| Starvation Cap Reductn | | 0 | | | 516 | | 0 | 0 | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.08 | | | 0.59 | | 0.22 | 0.22 | | 0.01 | | 0.06 |

**Intersection Summary**

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 17.3 — Intersection LOS: B
Intersection Capacity Utilization 53.3% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

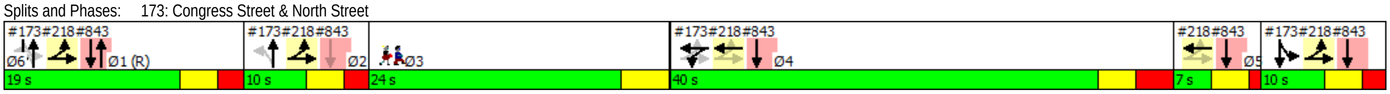
Splits and Phases: 4108: Clinton Street/Hotel Driveway & North Street

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 430 | 1 | 290 | 1 | 261 | 46 | 11 | 299 | 1 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 430 | 1 | 290 | 1 | 261 | 46 | 11 | 299 | 1 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | | | | |
| Ped Bike Factor | | | | | 0.98 | | | 0.92 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.873 | | | 0.978 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.992 | | | | | | 0.998 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1528 | 1372 | 0 | 0 | 4026 | 0 | 0 | 4433 | 0 | | | | |
| Flt Permitted | | 0.931 | | 0.950 | 0.992 | | | 0.939 | | | 0.925 | | | | | |
| Satd. Flow (perm) | 0 | 1520 | 0 | 1528 | 1372 | 0 | 0 | 3780 | 0 | 0 | 4061 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 260 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 30 | | | 30 | | | | | |
| Link Distance (ft) | | 253 | | | 141 | | | 146 | | | 482 | | | | | |
| Travel Time (s) | | 5.8 | | | 3.8 | | | 3.3 | | | 11.0 | | | | | |
| Confl. Peds. (#/hr) | | | | | | | | | 1117 | 1117 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 8 | | | | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.96 | 0.92 | 0.96 | 0.92 | 0.94 | 0.94 | 0.92 | 0.92 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 1% | 0% | 1% | 0% | 5% | 0% | 8% | 5% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 448 | 1 | 302 | 1 | 278 | 49 | 12 | 325 | 1 | | | | |
| Shared Lane Traffic (%) | | | | 12% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 394 | 357 | 0 | 0 | 328 | 0 | 0 | 338 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 7.0 |
| Total Split (s) | 40.0 | 40.0 | | 40.0 | 40.0 | | | | | 10.0 | | | 19.0 | 10.0 | 24.0 | 7.0 |
| Total Split (%) | 36.4% | 36.4% | | 36.4% | 36.4% | | | | | 9.1% | | | 17% | 9% | 22% | 6% |
| Maximum Green (s) | 34.0 | 34.0 | | 34.0 | 34.0 | | | | | 5.0 | | | 14.0 | 5.0 | 20.0 | 3.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 6.0 | | 6.0 | 6.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 34.0 | | 34.0 | 34.0 | | | 24.0 | | | 19.0 | | | | | |
| Actuated g/C Ratio | | 0.31 | | 0.31 | 0.31 | | | 0.22 | | | 0.17 | | | | | |
| v/c Ratio | | 0.01 | | 0.83 | 0.59 | | | 0.40 | | | 0.47 | | | | | |
| Control Delay | | 23.7 | | 21.3 | 5.8 | | | 1.5 | | | 40.4 | | | | | |
| Queue Delay | | 0.0 | | 0.0 | 3.0 | | | 0.7 | | | 0.0 | | | | | |
| Total Delay | | 23.7 | | 21.3 | 8.8 | | | 2.2 | | | 40.4 | | | | | |
| LOS | | C | | C | A | | | A | | | D | | | | | |
| Approach Delay | | 23.7 | | | 15.3 | | | 2.2 | | | 40.4 | | | | | |
| Approach LOS | | C | | | B | | | A | | | D | | | | | |
| Queue Length 50th (ft) | | 1 | | 26 | 8 | | | 0 | | | 74 | | | | | |
| Queue Length 95th (ft) | | 8 | | #413 | 61 | | | 4 | | | 104 | | | | | |
| Internal Link Dist (ft) | | 173 | | | 61 | | | 66 | | | 402 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 470 | | 472 | 603 | | | 824 | | | 718 | | | | | |
| Starvation Cap Reductn | | 0 | | 0 | 150 | | | 230 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 0.83 | 0.79 | | | 0.55 | | | 0.47 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.3 — Intersection LOS: B
Intersection Capacity Utilization 54.4% — ICU Level of Service A
Analysis Period (min) 15
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & North Street

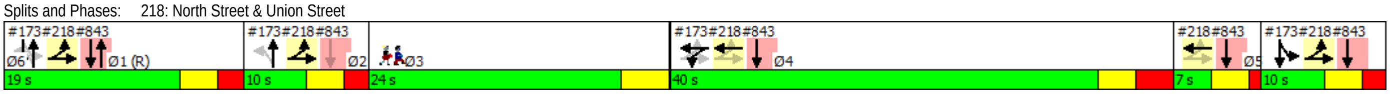


| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 10 | 48 | 721 | 10 | 0 | 0 | | | | | | |
| Future Volume (vph) | 10 | 48 | 721 | 10 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Frt | | | 0.998 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1624 | 1676 | 3211 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.238 | | | | | | | | | | | |
| Satd. Flow (perm) | 407 | 1676 | 3211 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 1 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 280 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 7.6 | | 4.9 | | | | | | | |
| Peak Hour Factor | 0.83 | 0.83 | 0.97 | 0.97 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 0% | 2% | 1% | 0% | 2% | 2% | | | | | | |
| Adj. Flow (vph) | 12 | 58 | 743 | 10 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 12 | 58 | 753 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | | | | | 19.0 | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | | | | | 17% | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | | | | | 14.0 | 5.0 | 20.0 | 34.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 41.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.37 | | | | | | | | | |
| v/c Ratio | 0.02 | 0.05 | 0.63 | | | | | | | | | |
| Control Delay | 0.5 | 0.5 | 16.4 | | | | | | | | | |
| Queue Delay | 0.3 | 1.5 | 0.6 | | | | | | | | | |
| Total Delay | 0.8 | 2.1 | 17.0 | | | | | | | | | |
| LOS | A | A | B | | | | | | | | | |
| Approach Delay | | 1.8 | 17.0 | | | | | | | | | |
| Approach LOS | | A | B | | | | | | | | | |
| Queue Length 50th (ft) | 0 | 1 | 105 | | | | | | | | | |
| Queue Length 95th (ft) | m1 | 2 | 126 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 200 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 657 | 1234 | 1197 | | | | | | | | | |
| Starvation Cap Reductn | 500 | 1061 | 154 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 16 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.08 | 0.34 | 0.72 | | | | | | | | | |

| Intersection Summary | |
|---|---|
| Area Type: CBD | |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green | |
| Natural Cycle: 90 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.83 | |
| Intersection Signal Delay: 15.7 | Intersection LOS: B |
| Intersection Capacity Utilization 27.5% | ICU Level of Service A |
| Analysis Period (min) 15 | |

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

Splits and Phases: 218: North Street & Union Street

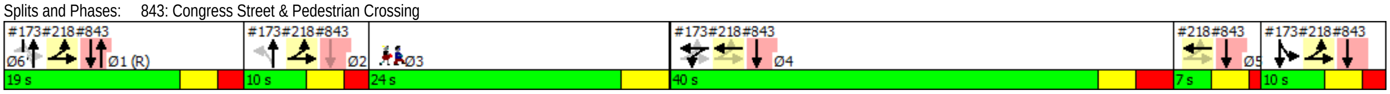


| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 308 | 0 | 0 | 730 | | | | | |
| Future Volume (vph) | 0 | 0 | 308 | 0 | 0 | 730 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4298 | 0 | 0 | 4446 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4298 | 0 | 0 | 4446 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 30 | | | 30 | | | | | |
| Link Distance (ft) | 182 | | 362 | | | 146 | | | | | |
| Travel Time (s) | 5.0 | | 8.2 | | | 3.3 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 5% | 0% | 0% | 5% | | | | | |
| Adj. Flow (vph) | 0 | 0 | 335 | 0 | 0 | 793 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 335 | 0 | 0 | 793 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | 19.0 | | | | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | 17.3% | | | | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | 14.0 | | | | 5.0 | 20.0 | 34.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 14.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.13 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.61 | | | 0.24 | | | | | |
| Control Delay | | | 27.7 | | | 0.3 | | | | | |
| Queue Delay | | | 0.0 | | | 0.5 | | | | | |
| Total Delay | | | 27.7 | | | 0.8 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 27.7 | | | 0.8 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 37 | | | 1 | | | | | |
| Queue Length 95th (ft) | | | 88 | | | m1 | | | | | |
| Internal Link Dist (ft) | 102 | | 282 | | | 66 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 547 | | | 3273 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 1919 | | | | | |
| Spillback Cap Reductn | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.61 | | | 0.59 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 19.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 843: Congress Street & Pedestrian Crossing



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 67 | 103 | 110 | 0 | 0 | 0 | 0 | 417 | 131 | 108 | 201 | 0 | |
| Future Volume (vph) | 67 | 103 | 110 | 0 | 0 | 0 | 0 | 417 | 131 | 108 | 201 | 0 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 | |
| Storage Length (ft) | 85 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 | |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 | |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 1.00 | |
| Ped Bike Factor | 0.67 | | 0.65 | | | | | 0.91 | | | | | |
| Frt | | | 0.850 | | | | | 0.964 | | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | | |
| Satd. Flow (prot) | 1577 | 3079 | 1343 | 0 | 0 | 0 | 0 | 3829 | 0 | 1486 | 4178 | 0 | |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | | |
| Satd. Flow (perm) | 1062 | 3079 | 869 | 0 | 0 | 0 | 0 | 3829 | 0 | 1486 | 4178 | 0 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | 114 | | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 30 | | | 30 | | |
| Link Distance (ft) | | 473 | | | 306 | | | 420 | | | 378 | | |
| Travel Time (s) | | 12.9 | | | 8.3 | | | 9.5 | | | 8.6 | | |
| Confl. Peds. (#/hr) | 180 | | 190 | | | | | | 406 | | | | |
| Confl. Bikes (#/hr) | | | 28 | | | | | | 17 | | | | |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.92 | 0.92 | 0.92 | 0.96 | 0.96 | 0.96 | 0.93 | 0.93 | 0.93 | |
| Heavy Vehicles (%) | 3% | 2% | 1% | 2% | 2% | 2% | 0% | 4% | 1% | 2% | 8% | 0% | |
| Adj. Flow (vph) | 69 | 106 | 113 | 0 | 0 | 0 | 0 | 434 | 136 | 116 | 216 | 0 | |
| Shared Lane Traffic (%) | | | | | | | | | | | | | |
| Lane Group Flow (vph) | 69 | 106 | 113 | 0 | 0 | 0 | 0 | 570 | 0 | 116 | 216 | 0 | |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | | 2 |
| Permitted Phases | | | 5 | | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | | 2.0 |
| Minimum Split (s) | 23.0 | 23.0 | 23.0 | | | | | 30.0 | | 14.0 | | | 26.0 |
| Total Split (s) | 25.0 | 25.0 | 25.0 | | | | | 51.0 | | 18.0 | | | 26.0 |
| Total Split (%) | 20.8% | 20.8% | 20.8% | | | | | 42.5% | | 15.0% | | | 22% |
| Maximum Green (s) | 18.5 | 18.5 | 18.5 | | | | | 45.5 | | 12.0 | | | 22.0 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | | | | 3.5 | | 3.0 | | | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | | 1.0 |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | | |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | | | | 3.5 | | 4.0 | | | |
| Lead/Lag | Lag | Lag | Lag | | | | | | | | | | Lead |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | | 2.0 |
| Recall Mode | Max | Max | Max | | | | | C-Max | | Max | | | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | | | | 7.0 |
| Flash Dont Walk (s) | 8.0 | 8.0 | 8.0 | | | | | 15.0 | | | | | 15.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | | | | 0 | | | | | 0 |
| Act Effct Green (s) | 20.5 | 20.5 | 20.5 | | | | | 47.5 | | 14.0 | 65.5 | | |
| Actuated g/C Ratio | 0.17 | 0.17 | 0.17 | | | | | 0.40 | | 0.12 | 0.55 | | |
| v/c Ratio | 0.26 | 0.20 | 0.47 | | | | | 0.38 | | 0.67 | 0.09 | | |
| Control Delay | 46.1 | 43.9 | 14.6 | | | | | 26.3 | | 65.2 | 14.2 | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 | 0.0 | | |
| Total Delay | 46.1 | 43.9 | 14.6 | | | | | 26.4 | | 65.2 | 14.2 | | |
| LOS | D | D | B | | | | | C | | E | B | | |
| Approach Delay | | 32.9 | | | | | | 26.4 | | | 32.0 | | |
| Approach LOS | | C | | | | | | C | | | C | | |
| Queue Length 50th (ft) | 47 | 37 | 0 | | | | | 110 | | 92 | 34 | | |
| Queue Length 95th (ft) | 92 | 64 | 55 | | | | | 146 | | m111 | m42 | | |
| Internal Link Dist (ft) | | 393 | | | 226 | | | 340 | | | 298 | | |
| Turn Bay Length (ft) | 85 | | | | | | | | | 100 | | | |
| Base Capacity (vph) | 269 | 525 | 242 | | | | | 1515 | | 173 | 2280 | | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 53 | | 0 | 0 | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | | |
| Reduced v/c Ratio | 0.26 | 0.20 | 0.47 | | | | | 0.39 | | 0.67 | 0.09 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 29.5 — Intersection LOS: C
Intersection Capacity Utilization 47.9% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

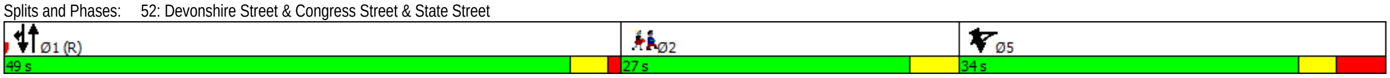
Splits and Phases: 1685: Congress Street & New Sudbury Street

| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 51 | 36 | 240 | 84 | 224 | 426 | 88 | 216 | |
| Future Volume (vph) | 51 | 36 | 240 | 84 | 224 | 426 | 88 | 216 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Ped Bike Factor | 0.64 | | 0.92 | | | 1.00 | | | |
| Frt | | | 0.965 | | | 0.969 | | 0.850 | |
| Flt Protected | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (prot) | 1570 | 0 | 2742 | 0 | 2861 | 2806 | 0 | 1279 | |
| Flt Permitted | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (perm) | 1009 | 0 | 2742 | 0 | 2861 | 2806 | 0 | 1279 | |
| Right Turn on Red | | | | Yes | | | | No | |
| Satd. Flow (RTOR) | | | 36 | | | | | | |
| Link Speed (mph) | | | 25 | | 30 | 30 | | | |
| Link Distance (ft) | | | 178 | | 488 | 362 | | | |
| Travel Time (s) | | | 4.9 | | 11.1 | 8.2 | | | |
| Confl. Peds. (#/hr) | 464 | | | 298 | | | | | |
| Confl. Bikes (#/hr) | | | | 12 | | | 6 | 5 | |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.90 | 0.97 | 0.97 | 0.97 | |
| Heavy Vehicles (%) | 0% | 3% | 2% | 0% | 6% | 4% | 2% | 0% | |
| Adj. Flow (vph) | 54 | 38 | 255 | 89 | 249 | 439 | 91 | 223 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 54 | 0 | 382 | 0 | 249 | 552 | 0 | 201 | |
| Turn Type | Split | Split | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | 5 | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 49.0 | 49.0 | | 49.0 | 27.0 |
| Total Split (%) | 30.9% | 30.9% | 30.9% | | 44.5% | 44.5% | | 44.5% | 25% |
| Maximum Green (s) | 27.0 | 27.0 | 27.0 | | 45.0 | 45.0 | | 45.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | -3.0 | | -3.0 | | -1.0 | -1.0 | | -1.0 | |
| Total Lost Time (s) | 4.0 | | 4.0 | | 3.0 | 3.0 | | 3.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 30.0 | | 30.0 | | 46.0 | 46.0 | | 46.0 | |
| Actuated g/C Ratio | 0.27 | | 0.27 | | 0.42 | 0.42 | | 0.42 | |
| v/c Ratio | 0.13 | | 0.49 | | 0.21 | 0.47 | | 0.38 | |
| Control Delay | 31.2 | | 32.8 | | 12.8 | 15.9 | | 15.8 | |
| Queue Delay | 0.0 | | 0.3 | | 0.0 | 0.4 | | 0.0 | |
| Total Delay | 31.2 | | 33.2 | | 12.8 | 16.4 | | 15.8 | |
| LOS | C | | C | | B | B | | B | |
| Approach Delay | | | 32.9 | | 12.8 | 16.2 | | | |
| Approach LOS | | | C | | B | B | | | |
| Queue Length 50th (ft) | 29 | | 107 | | 32 | 134 | | 96 | |
| Queue Length 95th (ft) | 61 | | 156 | | 45 | 167 | | 143 | |
| Internal Link Dist (ft) | | | 98 | | 408 | 282 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 428 | | 774 | | 1196 | 1173 | | 534 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 247 | | 0 | |
| Spillback Cap Reductn | 0 | | 94 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.13 | | 0.56 | | 0.21 | 0.60 | | 0.38 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 58 (53%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 20.7 Intersection LOS: C
Intersection Capacity Utilization 47.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 52: Devonshire Street & Congress Street & State Street



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 172 | 153 | 0 | 9 |
| Future Volume (Veh/h) | 0 | 0 | 172 | 153 | 0 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.97 | 0.97 | 0.75 | 0.75 |
| Hourly flow rate (vph) | 0 | 0 | 177 | 158 | 0 | 12 |
| Pedestrians | | | | | 23 | |
| Lane Width (ft) | | | | | 12.0 | |
| Walking Speed (ft/s) | | | | | 4.0 | |
| Percent Blockage | | | | | 2 | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 342 | 231 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 358 | | | | 279 | 279 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 358 | | | | 279 | 279 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 98 |
| cM capacity (veh/h) | 1178 | | | | 701 | 750 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 335 | 12 |
| Volume Left | 0 | 0 |
| Volume Right | 158 | 12 |
| cSH | 1700 | 750 |
| Volume to Capacity | 0.20 | 0.02 |
| Queue Length 95th (ft) | 0 | 1 |
| Control Delay (s) | 0.0 | 9.9 |
| Lane LOS | | A |
| Approach Delay (s) | 0.0 | 9.9 |
| Approach LOS | | A |

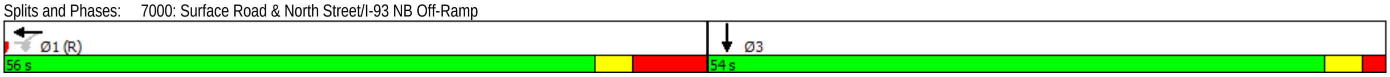
| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 29.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 79 | 142 | 183 | 0 | 0 | 0 | 0 | 0 | 310 | 42 |
| Future Volume (vph) | 0 | 0 | 79 | 142 | 183 | 0 | 0 | 0 | 0 | 0 | 310 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.96 | |
| Frt | | | 0.865 | | | | | | | | 0.982 | |
| Flt Protected | | | | | 0.979 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1465 | 0 | 3149 | 0 | 0 | 0 | 0 | 0 | 2963 | 0 |
| Flt Permitted | | | | | 0.979 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1465 | 0 | 3149 | 0 | 0 | 0 | 0 | 0 | 2963 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 18 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 253 | | | 177 | | | 455 | | | 464 | |
| Travel Time (s) | | 6.9 | | | 4.8 | | | 12.4 | | | 12.7 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 270 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 20 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.92 | 0.96 | 0.96 | 0.96 |
| Heavy Vehicles (%) | 0% | 0% | 1% | 1% | 1% | 0% | 2% | 2% | 2% | 0% | 3% | 5% |
| Adj. Flow (vph) | 0 | 0 | 88 | 153 | 197 | 0 | 0 | 0 | 0 | 0 | 323 | 44 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 88 | 0 | 350 | 0 | 0 | 0 | 0 | 0 | 367 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 56.0 | 56.0 | 56.0 | | | | | | 54.0 | |
| Total Split (%) | | | 50.9% | 50.9% | 50.9% | | | | | | 49.1% | |
| Maximum Green (s) | | | 47.0 | 47.0 | 47.0 | | | | | | 49.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 50 | |
| Act Effct Green (s) | | | 52.0 | | 52.0 | | | | | | 50.0 | |
| Actuated g/C Ratio | | | 0.47 | | 0.47 | | | | | | 0.45 | |
| v/c Ratio | | | 0.13 | | 0.24 | | | | | | 0.27 | |
| Control Delay | | | 16.9 | | 17.7 | | | | | | 16.1 | |
| Queue Delay | | | 0.0 | | 0.0 | | | | | | 0.0 | |
| Total Delay | | | 16.9 | | 17.7 | | | | | | 16.1 | |
| LOS | | | B | | B | | | | | | B | |
| Approach Delay | | 16.9 | | | 17.7 | | | | | | 16.1 | |
| Approach LOS | | B | | | B | | | | | | B | |
| Queue Length 50th (ft) | | | 34 | | 74 | | | | | | 94 | |
| Queue Length 95th (ft) | | | 64 | | 105 | | | | | | 145 | |
| Internal Link Dist (ft) | | 173 | | | 97 | | | 375 | | | 384 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 692 | | 1488 | | | | | | 1356 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.13 | | 0.24 | | | | | | 0.27 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.27
Intersection Signal Delay: 16.9 Intersection LOS: B
Intersection Capacity Utilization 44.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 7000: Surface Road & North Street/I-93 NB Off-Ramp



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 311 | 88 | 0 | 0 | 0 | 0 | 0 | 453 | 78 | |
| Future Volume (vph) | 0 | 0 | 0 | 311 | 88 | 0 | 0 | 0 | 0 | 0 | 453 | 78 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | | | | | | | | 0.99 | | |
| Frt | | | | | | | | | | | 0.978 | | |
| Flt Protected | | | | 0.950 | 0.973 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1583 | 1752 | 0 | 0 | 0 | 0 | 0 | 4464 | 0 | |
| Flt Permitted | | | | 0.950 | 0.973 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1583 | 1752 | 0 | 0 | 0 | 0 | 0 | 4464 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 35 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 242 | | | 88 | | | 185 | | | 455 | | |
| Travel Time (s) | | 6.6 | | | 2.4 | | | 5.0 | | | 12.4 | | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 18 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.98 | 0.98 | 0.98 | |
| Heavy Vehicles (%) | 2% | 2% | 2% | 4% | 0% | 0% | 2% | 2% | 2% | 0% | 2% | 0% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 327 | 93 | 0 | 0 | 0 | 0 | 0 | 462 | 80 | |
| Shared Lane Traffic (%) | | | | 36% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 209 | 211 | 0 | 0 | 0 | 0 | 0 | 542 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 42.0 | 42.0 | | | | | | 44.0 | | 24.0 |
| Total Split (%) | | | | 38.2% | 38.2% | | | | | | 40.0% | | 22% |
| Maximum Green (s) | | | | 37.0 | 37.0 | | | | | | 38.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 0 |
| Act Effct Green (s) | | | | 39.0 | 39.0 | | | | | | 40.0 | | |
| Actuated g/C Ratio | | | | 0.35 | 0.35 | | | | | | 0.36 | | |
| v/c Ratio | | | | 0.37 | 0.34 | | | | | | 0.33 | | |
| Control Delay | | | | 28.8 | 28.0 | | | | | | 24.3 | | |
| Queue Delay | | | | 3.1 | 2.1 | | | | | | 0.0 | | |
| Total Delay | | | | 31.9 | 30.1 | | | | | | 24.3 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 31.0 | | | | | | 24.3 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 114 | 113 | | | | | | 91 | | |
| Queue Length 95th (ft) | | | | 184 | 181 | | | | | | 117 | | |
| Internal Link Dist (ft) | | 162 | | | 8 | | | 105 | | | 375 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 561 | 621 | | | | | | 1645 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 254 | 282 | | | | | | 34 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.68 | 0.62 | | | | | | 0.34 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 1 (1%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 27.2 Intersection LOS: C
Intersection Capacity Utilization 30.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1960: Surface Road & Clinton Street/I-93 SB Off-Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 6 | 43 | 0 | 0 | 211 | 14 | 225 | 2 | 31 | 5 | 0 | 20 |
| Future Volume (vph) | 6 | 43 | 0 | 0 | 211 | 14 | 225 | 2 | 31 | 5 | 0 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | 0.97 | | | 0.97 | | | 0.99 | | 0.96 | | 0.96 |
| Frt | | | | | 0.991 | | | 0.964 | | | | 0.850 |
| Flt Protected | | 0.994 | | | | | 0.950 | 0.964 | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1700 | 0 | 0 | 3081 | 0 | 1528 | 1491 | 0 | 1624 | 0 | 1454 |
| Flt Permitted | | 0.968 | | | | | 0.950 | 0.964 | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1604 | 0 | 0 | 3081 | 0 | 1528 | 1491 | 0 | 1554 | 0 | 1388 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | | | 8 | | | | | | | 87 |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | |
| Link Distance (ft) | | 280 | | | 253 | | | 326 | | | 192 | |
| Travel Time (s) | | 7.6 | | | 6.9 | | | 8.9 | | | 4.4 | |
| Confl. Peds. (#/hr) | 93 | | | | | 93 | | | | 18 | | 19 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Peak Hour Factor | 0.92 | 0.77 | 0.77 | 0.94 | 0.94 | 0.92 | 0.91 | 0.92 | 0.91 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 7 | 56 | 0 | 0 | 224 | 15 | 247 | 2 | 34 | 5 | 0 | 22 |
| Shared Lane Traffic (%) | | | | | | | 42% | | | | | |
| Lane Group Flow (vph) | 0 | 63 | 0 | 0 | 239 | 0 | 143 | 140 | 0 | 5 | 0 | 22 |
| Turn Type | Perm | NA | | | NA | | Split | NA | | Prot | | Perm |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | 2 | | |
| Permitted Phases | 1 | | | | | | | | | | | 2 |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 2 | | 2 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 7.0 | | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 21.0 | | 21.0 |
| Total Split (s) | 43.0 | 43.0 | | | 43.0 | | 36.0 | 36.0 | | 21.0 | | 21.0 |
| Total Split (%) | 43.0% | 43.0% | | | 43.0% | | 36.0% | 36.0% | | 21.0% | | 21.0% |
| Maximum Green (s) | 38.0 | 38.0 | | | 38.0 | | 30.0 | 30.0 | | 17.0 | | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 4.0 | | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 0.0 | | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 4.0 | | 4.0 |
| Lead/Lag | Lead | Lead | | | Lead | | | | | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Ped | | Ped |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | 10.0 | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | 0 | | 0 |
| Act Effct Green (s) | | 38.0 | | | 38.0 | | 30.0 | 30.0 | | 17.0 | | 17.0 |
| Actuated g/C Ratio | | 0.38 | | | 0.38 | | 0.30 | 0.30 | | 0.17 | | 0.17 |
| v/c Ratio | | 0.10 | | | 0.20 | | 0.31 | 0.31 | | 0.02 | | 0.07 |
| Control Delay | | 20.7 | | | 20.7 | | 29.1 | 29.5 | | 35.0 | | 0.5 |
| Queue Delay | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Delay | | 20.7 | | | 20.7 | | 29.1 | 29.5 | | 35.0 | | 0.5 |
| LOS | | C | | | C | | C | C | | C | | A |
| Approach Delay | | 20.7 | | | 20.7 | | | 29.3 | | | 6.8 | |
| Approach LOS | | C | | | C | | | C | | | A | |
| Queue Length 50th (ft) | | 26 | | | 51 | | 66 | 72 | | 3 | | 0 |
| Queue Length 95th (ft) | | 46 | | | 79 | | 103 | 128 | | 13 | | 0 |
| Internal Link Dist (ft) | | 200 | | | 173 | | | 246 | | | 112 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | 609 | | | 1175 | | 458 | 447 | | 276 | | 308 |
| Starvation Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 |
| Reduced v/c Ratio | | 0.10 | | | 0.20 | | 0.31 | 0.31 | | 0.02 | | 0.07 |

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.31
Intersection Signal Delay: 24.0 Intersection LOS: C
Intersection Capacity Utilization 53.9% ICU Level of Service A
Analysis Period (min) 15

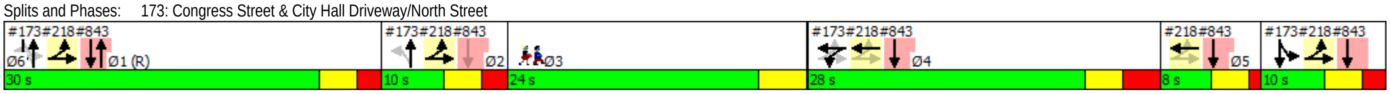
Splits and Phases: 4108: Clinton Street/Hotel Driveway & North Street

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 259 | 1 | 118 | 1 | 451 | 49 | 42 | 494 | 0 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 259 | 1 | 118 | 1 | 451 | 49 | 42 | 494 | 0 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1700 | 1700 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | | | | |
| Ped Bike Factor | | | | | 0.98 | | | 0.96 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.903 | | | 0.985 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.983 | | | | | | 0.996 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1528 | 1392 | 0 | 0 | 4386 | 0 | 0 | 4160 | 0 | | | | |
| Flt Permitted | | 0.930 | | 0.950 | 0.983 | | | 0.939 | | | 0.861 | | | | | |
| Satd. Flow (perm) | 0 | 1519 | 0 | 1528 | 1392 | 0 | 0 | 4118 | 0 | 0 | 3545 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 76 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 25 | | | 25 | | | | | |
| Link Distance (ft) | | 217 | | | 141 | | | 126 | | | 482 | | | | | |
| Travel Time (s) | | 4.9 | | | 3.8 | | | 3.4 | | | 13.1 | | | | | |
| Confl. Peds. (#/hr) | | | | | | | | | 722 | 722 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 15 | | | 2 | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.99 | 0.99 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 1% | 0% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 282 | 1 | 128 | 1 | 465 | 51 | 42 | 499 | 0 | | | | |
| Shared Lane Traffic (%) | | | | 24% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 214 | 197 | 0 | 0 | 517 | 0 | 0 | 541 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 8.0 |
| Total Split (s) | 28.0 | 28.0 | | 28.0 | 28.0 | | | | | 10.0 | | | 30.0 | 10.0 | 24.0 | 8.0 |
| Total Split (%) | 25.5% | 25.5% | | 25.5% | 25.5% | | | | | 9.1% | | | 27% | 9% | 22% | 7% |
| Maximum Green (s) | 22.0 | 22.0 | | 22.0 | 22.0 | | | | | 5.0 | | | 25.0 | 5.0 | 20.0 | 4.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 6.0 | | 6.0 | 6.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 22.0 | | 22.0 | 22.0 | | | 35.0 | | | 30.0 | | | | | |
| Actuated g/C Ratio | | 0.20 | | 0.20 | 0.20 | | | 0.32 | | | 0.27 | | | | | |
| v/c Ratio | | 0.01 | | 0.70 | 0.58 | | | 0.39 | | | 0.54 | | | | | |
| Control Delay | | 31.7 | | 24.4 | 9.5 | | | 0.9 | | | 64.3 | | | | | |
| Queue Delay | | 0.0 | | 1.1 | 1.9 | | | 0.3 | | | 0.0 | | | | | |
| Total Delay | | 31.7 | | 25.5 | 11.4 | | | 1.2 | | | 64.3 | | | | | |
| LOS | | C | | C | B | | | A | | | E | | | | | |
| Approach Delay | | 31.7 | | | 18.8 | | | 1.2 | | | 64.3 | | | | | |
| Approach LOS | | C | | | B | | | A | | | E | | | | | |
| Queue Length 50th (ft) | | 1 | | 28 | 5 | | | 1 | | | 151 | | | | | |
| Queue Length 95th (ft) | | 9 | | #62 | 28 | | | 0 | | | 191 | | | | | |
| Internal Link Dist (ft) | | 137 | | | 61 | | | 46 | | | 402 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 304 | | 305 | 339 | | | 1310 | | | 994 | | | | | |
| Starvation Cap Reductn | | 0 | | 17 | 54 | | | 277 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 0.74 | 0.69 | | | 0.50 | | | 0.54 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 29.4 Intersection LOS: C
Intersection Capacity Utilization 56.9% ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & City Hall Driveway/North Street

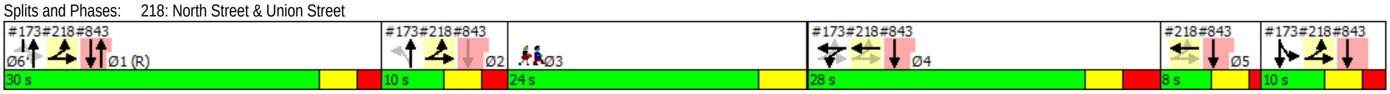


| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 43 | 49 | 378 | 78 | 0 | 0 | | | | | | |
| Future Volume (vph) | 43 | 49 | 378 | 78 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Frt | | | 0.974 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1624 | 1710 | 3138 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.359 | | | | | | | | | | | |
| Satd. Flow (perm) | 614 | 1710 | 3138 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 22 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 280 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 7.6 | | 4.9 | | | | | | | |
| Peak Hour Factor | 0.98 | 0.98 | 0.96 | 0.96 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 0% | 0% | 1% | 0% | 2% | 2% | | | | | | |
| Adj. Flow (vph) | 44 | 50 | 394 | 81 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 50 | 475 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | | | | | 30.0 | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | | | | | 27% | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | | | | | 25.0 | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 30.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.27 | | | | | | | | | |
| v/c Ratio | 0.05 | 0.04 | 0.55 | | | | | | | | | |
| Control Delay | 0.1 | 0.1 | 35.3 | | | | | | | | | |
| Queue Delay | 0.6 | 1.3 | 2.7 | | | | | | | | | |
| Total Delay | 0.7 | 1.3 | 37.9 | | | | | | | | | |
| LOS | A | A | D | | | | | | | | | |
| Approach Delay | | 1.0 | 37.9 | | | | | | | | | |
| Approach LOS | | A | D | | | | | | | | | |
| Queue Length 50th (ft) | 0 | 0 | 143 | | | | | | | | | |
| Queue Length 95th (ft) | m0 | m0 | 197 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 200 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 837 | 1259 | 871 | | | | | | | | | |
| Starvation Cap Reductn | 613 | 1087 | 274 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 4 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.20 | 0.29 | 0.80 | | | | | | | | | |

| Intersection Summary | |
|---|---|
| Area Type: CBD | |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.70 | |
| Intersection Signal Delay: 31.8 | Intersection LOS: C |
| Intersection Capacity Utilization 29.4% | ICU Level of Service A |
| Analysis Period (min) 15 | |

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

Splits and Phases: 218: North Street & Union Street

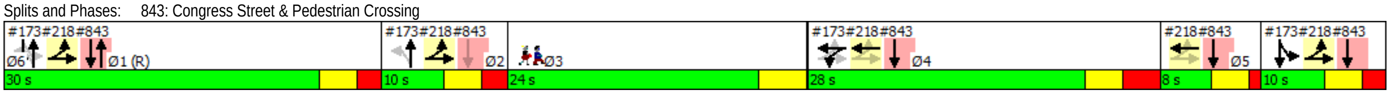


| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 501 | 0 | 0 | 754 | | | | | |
| Future Volume (vph) | 0 | 0 | 501 | 0 | 0 | 754 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4468 | 0 | 0 | 4668 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4468 | 0 | 0 | 4668 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 25 | | | 25 | | | | | |
| Link Distance (ft) | 182 | | 381 | | | 126 | | | | | |
| Travel Time (s) | 5.0 | | 10.4 | | | 3.4 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Heavy Vehicles (%) | 2% | 2% | 1% | 0% | 0% | 0% | | | | | |
| Adj. Flow (vph) | 0 | 0 | 545 | 0 | 0 | 820 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 545 | 0 | 0 | 820 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | 30.0 | | | | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | 27.3% | | | | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | 25.0 | | | | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 25.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.23 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.54 | | | 0.24 | | | | | |
| Control Delay | | | 28.2 | | | 0.4 | | | | | |
| Queue Delay | | | 0.0 | | | 0.5 | | | | | |
| Total Delay | | | 28.2 | | | 0.8 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 28.2 | | | 0.8 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 78 | | | 2 | | | | | |
| Queue Length 95th (ft) | | | 106 | | | 4 | | | | | |
| Internal Link Dist (ft) | 102 | | 301 | | | 46 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 1015 | | | 3437 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 2013 | | | | | |
| Spillback Cap Reductn | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.54 | | | 0.58 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 20.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 843: Congress Street & Pedestrian Crossing



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑↑ | ↱ | | | | | ↑↑↑↱ | | ↰ | ↑↑↑ | | |
| Traffic Volume (vph) | 138 | 186 | 94 | 0 | 0 | 0 | 0 | 392 | 201 | 138 | 442 | 0 | |
| Future Volume (vph) | 138 | 186 | 94 | 0 | 0 | 0 | 0 | 392 | 201 | 138 | 442 | 0 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1600 | 1600 | 1600 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 | |
| Storage Length (ft) | 85 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 | |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 | |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 1.00 | |
| Ped Bike Factor | 0.68 | | 0.66 | | | | | 0.85 | | | | | |
| Frt | | | 0.850 | | | | | 0.949 | | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | | |
| Satd. Flow (prot) | 1624 | 3141 | 1343 | 0 | 0 | 0 | 0 | 3029 | 0 | 1501 | 4468 | 0 | |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | | |
| Satd. Flow (perm) | 1102 | 3141 | 886 | 0 | 0 | 0 | 0 | 3029 | 0 | 1501 | 4468 | 0 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | 124 | | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 473 | | | 306 | | | 420 | | | 378 | | |
| Travel Time (s) | | 12.9 | | | 8.3 | | | 11.5 | | | 10.3 | | |
| Confl. Peds. (#/hr) | 185 | | 210 | | | | | | 708 | | | | |
| Confl. Bikes (#/hr) | | | 5 | | | | | | 2 | | | | |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.92 | 0.92 | 0.92 | 0.99 | 0.99 | 0.99 | 0.98 | 0.98 | 0.98 | |
| Heavy Vehicles (%) | 0% | 0% | 1% | 2% | 2% | 2% | 0% | 1% | 0% | 1% | 1% | 0% | |
| Adj. Flow (vph) | 144 | 194 | 98 | 0 | 0 | 0 | 0 | 396 | 203 | 141 | 451 | 0 | |
| Shared Lane Traffic (%) | | | | | | | | | | | | | |
| Lane Group Flow (vph) | 144 | 194 | 98 | 0 | 0 | 0 | 0 | 599 | 0 | 141 | 451 | 0 | |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | | 2 |
| Permitted Phases | | | 5 | | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | | 2.0 |
| Minimum Split (s) | 23.0 | 23.0 | 23.0 | | | | | 30.0 | | 14.0 | | | 26.0 |
| Total Split (s) | 26.0 | 26.0 | 26.0 | | | | | 42.0 | | 16.0 | | | 26.0 |
| Total Split (%) | 23.6% | 23.6% | 23.6% | | | | | 38.2% | | 14.5% | | | 24% |
| Maximum Green (s) | 19.5 | 19.5 | 19.5 | | | | | 36.5 | | 10.0 | | | 22.0 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | | | | | 3.5 | | 3.0 | | | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | | 1.0 |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | | |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | | | | | 3.5 | | 4.0 | | | |
| Lead/Lag | Lag | Lag | Lag | | | | | | | | | | Lead |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | | 2.0 |
| Recall Mode | Ped | Ped | Ped | | | | | C-Max | | Max | | | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | | | | 7.0 |
| Flash Dont Walk (s) | 8.0 | 8.0 | 8.0 | | | | | 15.0 | | | | | 15.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | | | | 0 | | | | | 0 |
| Act Effct Green (s) | 18.2 | 18.2 | 18.2 | | | | | 41.8 | | 12.0 | 57.8 | | |
| Actuated g/C Ratio | 0.17 | 0.17 | 0.17 | | | | | 0.38 | | 0.11 | 0.53 | | |
| v/c Ratio | 0.54 | 0.37 | 0.39 | | | | | 0.52 | | 0.87 | 0.19 | | |
| Control Delay | 49.7 | 42.7 | 8.5 | | | | | 11.1 | | 77.1 | 11.4 | | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.1 | | 1.2 | 0.0 | | |
| Total Delay | 49.7 | 42.7 | 8.5 | | | | | 11.2 | | 78.3 | 11.4 | | |
| LOS | D | D | A | | | | | B | | E | B | | |
| Approach Delay | | 37.4 | | | | | | 11.2 | | | 27.3 | | |
| Approach LOS | | D | | | | | | B | | | C | | |
| Queue Length 50th (ft) | 95 | 65 | 0 | | | | | 42 | | 101 | 56 | | |
| Queue Length 95th (ft) | 154 | 97 | 29 | | | | | 61 | | m0 | m68 | | |
| Internal Link Dist (ft) | | 393 | | | 226 | | | 340 | | | 298 | | |
| Turn Bay Length (ft) | 85 | | | | | | | | | 100 | | | |
| Base Capacity (vph) | 317 | 613 | 272 | | | | | 1151 | | 163 | 2347 | | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 39 | | 2 | 0 | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | | |
| Reduced v/c Ratio | 0.45 | 0.32 | 0.36 | | | | | 0.54 | | 0.88 | 0.19 | | |

Intersection Summary

| | |
|---|---|
| Area Type: | CBD |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green | |
| Natural Cycle: 95 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.87 | |
| Intersection Signal Delay: 24.1 | Intersection LOS: C |
| Intersection Capacity Utilization 51.1% | ICU Level of Service A |
| Analysis Period (min) 15 | |
| m Volume for 95th percentile queue is metered by upstream signal. | |

Splits and Phases: 1685: Congress Street/Merrimac Street & New Sudbury Street

| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 94 | 64 | 311 | 140 | 361 | 448 | 88 | 218 | |
| Future Volume (vph) | 94 | 64 | 311 | 140 | 361 | 448 | 88 | 218 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Ped Bike Factor | 0.52 | | 0.87 | | | 1.00 | | | |
| Frt | | | 0.959 | | | 0.970 | | 0.850 | |
| Flt Protected | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (prot) | 1570 | 0 | 2613 | 0 | 3002 | 2882 | 0 | 1279 | |
| Flt Permitted | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (perm) | 818 | 0 | 2613 | 0 | 3002 | 2882 | 0 | 1279 | |
| Right Turn on Red | | | | Yes | | | | No | |
| Satd. Flow (RTOR) | | | 49 | | | | | | |
| Link Speed (mph) | | | 25 | | 25 | 25 | | | |
| Link Distance (ft) | | | 178 | | 488 | 381 | | | |
| Travel Time (s) | | | 4.9 | | 13.3 | 10.4 | | | |
| Confl. Peds. (#/hr) | 941 | | | 865 | | | | | |
| Confl. Bikes (#/hr) | | | | 13 | | | 2 | 3 | |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.98 | 0.96 | 0.96 | 0.96 | |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 1% | 1% | 1% | 0% | |
| Adj. Flow (vph) | 99 | 67 | 327 | 147 | 368 | 467 | 92 | 227 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 99 | 0 | 541 | 0 | 368 | 582 | 0 | 204 | |
| Turn Type | Split | Split | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | 5 | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 36.0 | 36.0 | 36.0 | | 47.0 | 47.0 | | 47.0 | 27.0 |
| Total Split (%) | 32.7% | 32.7% | 32.7% | | 42.7% | 42.7% | | 42.7% | 25% |
| Maximum Green (s) | 29.0 | 29.0 | 29.0 | | 43.0 | 43.0 | | 43.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | -3.0 | | -3.0 | | -1.0 | -1.0 | | -1.0 | |
| Total Lost Time (s) | 4.0 | | 4.0 | | 3.0 | 3.0 | | 3.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 32.0 | | 32.0 | | 44.0 | 44.0 | | 44.0 | |
| Actuated g/C Ratio | 0.29 | | 0.29 | | 0.40 | 0.40 | | 0.40 | |
| v/c Ratio | 0.22 | | 0.68 | | 0.31 | 0.51 | | 0.40 | |
| Control Delay | 31.1 | | 36.3 | | 19.8 | 9.0 | | 9.4 | |
| Queue Delay | 0.0 | | 0.0 | | 0.0 | 0.3 | | 0.0 | |
| Total Delay | 31.1 | | 36.3 | | 19.8 | 9.3 | | 9.4 | |
| LOS | C | | D | | B | A | | A | |
| Approach Delay | | | 35.5 | | 19.8 | 9.3 | | | |
| Approach LOS | | | D | | B | A | | | |
| Queue Length 50th (ft) | 53 | | 162 | | 56 | 88 | | 61 | |
| Queue Length 95th (ft) | 98 | | 224 | | 80 | 111 | | 93 | |
| Internal Link Dist (ft) | | | 98 | | 408 | 301 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 456 | | 794 | | 1200 | 1152 | | 511 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 162 | | 0 | |
| Spillback Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.22 | | 0.68 | | 0.31 | 0.59 | | 0.40 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 43 (39%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 20.8 Intersection LOS: C
Intersection Capacity Utilization 47.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 52: Devonshire Street & Congress Street & State Street

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 147 | 19 | 0 | 78 |
| Future Volume (Veh/h) | 0 | 0 | 147 | 19 | 0 | 78 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.91 | 0.91 | 0.85 | 0.85 |
| Hourly flow rate (vph) | 0 | 0 | 162 | 21 | 0 | 92 |
| Pedestrians | | | | | 63 | |
| Lane Width (ft) | | | | | 12.0 | |
| Walking Speed (ft/s) | | | | | 4.0 | |
| Percent Blockage | | | | | 5 | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 326 | 242 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 246 | | | | 236 | 236 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 246 | | | | 236 | 236 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 88 |
| cM capacity (veh/h) | 1251 | | | | 717 | 766 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 183 | 92 |
| Volume Left | 0 | 0 |
| Volume Right | 21 | 92 |
| cSH | 1700 | 766 |
| Volume to Capacity | 0.11 | 0.12 |
| Queue Length 95th (ft) | 0 | 10 |
| Control Delay (s) | 0.0 | 10.3 |
| Lane LOS | | B |
| Approach Delay (s) | 0.0 | 10.3 |
| Approach LOS | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.5 | | |
| Intersection Capacity Utilization | 24.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 62 | 454 | 541 | 0 | 0 | 0 | 0 | 0 | 350 | 60 |
| Future Volume (vph) | 0 | 0 | 62 | 454 | 541 | 0 | 0 | 0 | 0 | 0 | 350 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.95 | |
| Frt | | | 0.865 | | | | | | | | 0.978 | |
| Flt Protected | | | | | 0.978 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1321 | 0 | 3115 | 0 | 0 | 0 | 0 | 0 | 2803 | 0 |
| Flt Permitted | | | | | 0.978 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1321 | 0 | 3115 | 0 | 0 | 0 | 0 | 0 | 2803 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 18 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 373 | | | 108 | | | 468 | | | 470 | |
| Travel Time (s) | | 10.2 | | | 2.9 | | | 12.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 251 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 95 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.92 | 0.96 | 0.96 | 0.96 |
| Heavy Vehicles (%) | 0% | 0% | 12% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 7% | 9% |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Adj. Flow (vph) | 0 | 0 | 78 | 488 | 582 | 0 | 0 | 0 | 0 | 0 | 365 | 63 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 78 | 0 | 1070 | 0 | 0 | 0 | 0 | 0 | 428 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 73.0 | 73.0 | 73.0 | | | | | | 37.0 | |
| Total Split (%) | | | 66.4% | 66.4% | 66.4% | | | | | | 33.6% | |
| Maximum Green (s) | | | 64.0 | 64.0 | 64.0 | | | | | | 32.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 0 | |
| Act Effct Green (s) | | | 69.0 | | 69.0 | | | | | | 33.0 | |
| Actuated g/C Ratio | | | 0.63 | | 0.63 | | | | | | 0.30 | |
| v/c Ratio | | | 0.09 | | 0.55 | | | | | | 0.50 | |
| Control Delay | | | 5.4 | | 13.0 | | | | | | 15.2 | |
| Queue Delay | | | 0.0 | | 0.0 | | | | | | 0.0 | |
| Total Delay | | | 5.4 | | 13.0 | | | | | | 15.2 | |
| LOS | | | A | | B | | | | | | B | |
| Approach Delay | | 5.4 | | | 13.0 | | | | | | 15.2 | |
| Approach LOS | | A | | | B | | | | | | B | |
| Queue Length 50th (ft) | | | 24 | | 208 | | | | | | 56 | |
| Queue Length 95th (ft) | | | 32 | | 264 | | | | | | 82 | |
| Internal Link Dist (ft) | | 293 | | | 28 | | | 388 | | | 390 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 828 | | 1953 | | | | | | 853 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.09 | | 0.55 | | | | | | 0.50 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 104 (95%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 65.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 7000: Surface Street & North Street/I-93 Off Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 553 | 321 | 0 | 0 | 0 | 0 | 0 | 714 | 153 | |
| Future Volume (vph) | 0 | 0 | 0 | 553 | 321 | 0 | 0 | 0 | 0 | 0 | 714 | 153 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | 0.71 | 0.90 | | | | | | 0.91 | | |
| Frt | | | | | | | | | | | 0.974 | | |
| Flt Protected | | | | 0.950 | 0.983 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1598 | 1713 | 0 | 0 | 0 | 0 | 0 | 3951 | 0 | |
| Flt Permitted | | | | 0.950 | 0.983 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1128 | 1542 | 0 | 0 | 0 | 0 | 0 | 3951 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 42 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 178 | | | 328 | | | 196 | | | 468 | | |
| Travel Time (s) | | 4.9 | | | 8.9 | | | 5.3 | | | 12.8 | | |
| Confl. Peds. (#/hr) | | | | 116 | | | | | | | | 147 | |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | 83 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.95 | 0.95 | 0.95 | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 3% | 7% | 0% | 0% | 0% | 0% | 0% | 4% | 7% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 608 | 353 | 0 | 0 | 0 | 0 | 0 | 752 | 161 | |
| Shared Lane Traffic (%) | | | | 30% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 426 | 535 | 0 | 0 | 0 | 0 | 0 | 913 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 51.0 | 51.0 | | | | | | 35.0 | | 24.0 |
| Total Split (%) | | | | 46.4% | 46.4% | | | | | | 31.8% | | 22% |
| Maximum Green (s) | | | | 46.0 | 46.0 | | | | | | 29.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 455 |
| Act Effct Green (s) | | | | 48.0 | 48.0 | | | | | | 31.0 | | |
| Actuated g/C Ratio | | | | 0.44 | 0.44 | | | | | | 0.28 | | |
| v/c Ratio | | | | 0.61 | 0.72 | | | | | | 0.80 | | |
| Control Delay | | | | 28.5 | 32.0 | | | | | | 32.5 | | |
| Queue Delay | | | | 0.0 | 0.0 | | | | | | 0.0 | | |
| Total Delay | | | | 28.5 | 32.0 | | | | | | 32.5 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 30.4 | | | | | | 32.5 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 237 | 318 | | | | | | 193 | | |
| Queue Length 95th (ft) | | | | 350 | 460 | | | | | | 243 | | |
| Internal Link Dist (ft) | | 98 | | | 248 | | | 116 | | | 388 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 697 | 747 | | | | | | 1143 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.61 | 0.72 | | | | | | 0.80 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 4 (4%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 31.5 Intersection LOS: C
Intersection Capacity Utilization 53.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1960: Surface Street & Clinton Street/I-93 Off Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 26 | 41 | 0 | 0 | 592 | 8 | 244 | 1 | 18 | 3 | 0 | 15 | |
| Future Volume (vph) | 26 | 41 | 0 | 0 | 592 | 8 | 244 | 1 | 18 | 3 | 0 | 15 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Ped Bike Factor | | 0.94 | | | 0.99 | | | 0.99 | | 0.97 | | 0.69 | |
| Frt | | | | | 0.998 | | | 0.980 | | | | 0.850 | |
| Flt Protected | | 0.981 | | | | | 0.950 | 0.959 | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1415 | 0 | 0 | 2966 | 0 | 1251 | 1356 | 0 | 1624 | 0 | 1454 | |
| Flt Permitted | | 0.744 | | | | | 0.950 | 0.959 | | 0.570 | | | |
| Satd. Flow (perm) | 0 | 1005 | 0 | 0 | 2966 | 0 | 1251 | 1356 | 0 | 950 | 0 | 998 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | | | 2 | | | | | | | 60 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | | |
| Link Distance (ft) | | 241 | | | 373 | | | 426 | | | 110 | | |
| Travel Time (s) | | 6.6 | | | 10.2 | | | 11.6 | | | 2.5 | | |
| Confl. Peds. (#/hr) | 248 | | | | | 248 | | | 15 | 15 | | 246 | |
| Confl. Bikes (#/hr) | | | 3 | | | 5 | | | 1 | | | | |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.91 | 0.91 | 0.91 | 0.81 | 0.81 | 0.81 | 0.56 | 0.56 | 0.56 | |
| Heavy Vehicles (%) | 0% | 11% | 0% | 0% | 3% | 0% | 11% | 0% | 17% | 0% | 0% | 0% | |
| Parking (#/hr) | | 0 | | | 0 | | 0 | | 0 | | | | |
| Adj. Flow (vph) | 30 | 47 | 0 | 0 | 651 | 9 | 301 | 1 | 22 | 5 | 0 | 27 | |
| Shared Lane Traffic (%) | | | | | | | 46% | | | | | | |
| Lane Group Flow (vph) | 0 | 77 | 0 | 0 | 660 | 0 | 163 | 161 | 0 | 5 | 0 | 27 | |
| Turn Type | Perm | NA | | | NA | | Split | NA | | D.Pm | | Perm | |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | | | | 2 |
| Permitted Phases | 1 | | | | | | | | | 3 | | 3 | |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 3 | | 3 | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 9.0 | | 9.0 | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 16.0 | | 16.0 | 21.0 |
| Total Split (s) | 59.0 | 59.0 | | | 59.0 | | 30.0 | 30.0 | | 30.0 | | 30.0 | 21.0 |
| Total Split (%) | 53.6% | 53.6% | | | 53.6% | | 27.3% | 27.3% | | 27.3% | | 27.3% | 19% |
| Maximum Green (s) | 54.0 | 54.0 | | | 54.0 | | 24.0 | 24.0 | | 24.0 | | 24.0 | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 | |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 6.0 | | 6.0 | |
| Lead/Lag | Lead | Lead | | | Lead | | | | | | | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Max | | Max | None |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | | | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | | | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | | | | 0 |
| Act Effct Green (s) | | 75.0 | | | 75.0 | | 24.0 | 24.0 | | 24.0 | | 24.0 | |
| Actuated g/C Ratio | | 0.68 | | | 0.68 | | 0.22 | 0.22 | | 0.22 | | 0.22 | |
| v/c Ratio | | 0.11 | | | 0.33 | | 0.60 | 0.55 | | 0.02 | | 0.10 | |
| Control Delay | | 8.5 | | | 5.6 | | 39.2 | 35.6 | | 34.3 | | 1.9 | |
| Queue Delay | | 0.0 | | | 0.3 | | 74.6 | 73.5 | | 0.0 | | 0.9 | |
| Total Delay | | 8.5 | | | 6.0 | | 113.8 | 109.2 | | 34.3 | | 2.9 | |
| LOS | | A | | | A | | F | F | | C | | A | |
| Approach Delay | | 8.5 | | | 6.0 | | | 111.5 | | | 7.8 | | |
| Approach LOS | | A | | | A | | | F | | | A | | |
| Queue Length 50th (ft) | | 12 | | | 110 | | 105 | 98 | | 3 | | 0 | |
| Queue Length 95th (ft) | | 35 | | | 122 | | m138 | m129 | | 8 | | 0 | |
| Internal Link Dist (ft) | | 161 | | | 293 | | | 346 | | | 30 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | 685 | | | 2022 | | 272 | 295 | | 207 | | 264 | |
| Starvation Cap Reductn | | 0 | | | 765 | | 0 | 0 | | 0 | | 0 | |
| Spillback Cap Reductn | | 0 | | | 89 | | 166 | 180 | | 0 | | 137 | |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Reduced v/c Ratio | | 0.11 | | | 0.53 | | 1.54 | 1.40 | | 0.02 | | 0.21 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 37.5 Intersection LOS: D
Intersection Capacity Utilization 52.2% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

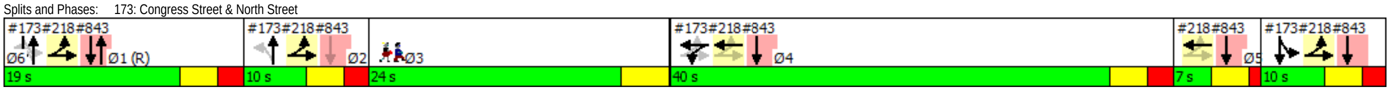
Splits and Phases: 4108: Clinton Street/Millenium Hotel Driveway & North Street

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 460 | 1 | 380 | 1 | 297 | 50 | 11 | 323 | 1 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 460 | 1 | 380 | 1 | 297 | 50 | 11 | 323 | 1 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1700 | 1700 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | | | | |
| Ped Bike Factor | | | | 0.71 | 0.79 | | | 0.92 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.867 | | | 0.979 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.995 | | | | | | 0.998 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1513 | 1088 | 0 | 0 | 3833 | 0 | 0 | 3836 | 0 | | | | |
| Flt Permitted | | 0.931 | | 0.950 | 0.995 | | | 0.939 | | | 0.925 | | | | | |
| Satd. Flow (perm) | 0 | 1520 | 0 | 1070 | 1053 | 0 | 0 | 3599 | 0 | 0 | 3519 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 385 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 25 | | | 25 | | | | | |
| Link Distance (ft) | | 116 | | | 141 | | | 126 | | | 445 | | | | | |
| Travel Time (s) | | 2.6 | | | 3.8 | | | 3.4 | | | 12.1 | | | | | |
| Confl. Peds. (#/hr) | | | | 312 | | 212 | | | 1204 | 1204 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 7 | | | 7 | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.93 | 0.92 | 0.93 | 0.92 | 0.94 | 0.94 | 0.93 | 0.93 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 2% | 0% | 5% | 0% | 9% | 16% | 0% | 9% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 495 | 1 | 409 | 1 | 316 | 53 | 12 | 347 | 1 | | | | |
| Shared Lane Traffic (%) | | | | 10% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 445 | 460 | 0 | 0 | 370 | 0 | 0 | 360 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 7.0 |
| Total Split (s) | 40.0 | 40.0 | | 40.0 | 40.0 | | | | | 10.0 | | | 19.0 | 10.0 | 24.0 | 7.0 |
| Total Split (%) | 36.4% | 36.4% | | 36.4% | 36.4% | | | | | 9.1% | | | 17% | 9% | 22% | 6% |
| Maximum Green (s) | 35.0 | 35.0 | | 35.0 | 35.0 | | | | | 5.0 | | | 14.0 | 5.0 | 20.0 | 3.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 5.0 | | 5.0 | 5.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 35.0 | | 35.0 | 35.0 | | | 24.0 | | | 19.0 | | | | | |
| Actuated g/C Ratio | | 0.32 | | 0.32 | 0.32 | | | 0.22 | | | 0.17 | | | | | |
| v/c Ratio | | 0.01 | | 0.93 | 0.76 | | | 0.47 | | | 0.58 | | | | | |
| Control Delay | | 23.0 | | 30.7 | 18.7 | | | 2.6 | | | 42.0 | | | | | |
| Queue Delay | | 0.0 | | 2.1 | 54.5 | | | 1.3 | | | 0.0 | | | | | |
| Total Delay | | 23.0 | | 32.8 | 73.2 | | | 3.9 | | | 42.0 | | | | | |
| LOS | | C | | C | E | | | A | | | D | | | | | |
| Approach Delay | | 23.0 | | | 53.3 | | | 3.9 | | | 42.0 | | | | | |
| Approach LOS | | C | | | D | | | A | | | D | | | | | |
| Queue Length 50th (ft) | | 1 | | 23 | 116 | | | 8 | | | 80 | | | | | |
| Queue Length 95th (ft) | | 8 | | m#470 | m188 | | | 15 | | | 113 | | | | | |
| Internal Link Dist (ft) | | 36 | | | 61 | | | 46 | | | 365 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 484 | | 481 | 608 | | | 785 | | | 622 | | | | | |
| Starvation Cap Reductn | | 0 | | 9 | 224 | | | 229 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 0.94 | 1.20 | | | 0.67 | | | 0.58 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 39.6 Intersection LOS: D
Intersection Capacity Utilization 63.5% ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & North Street

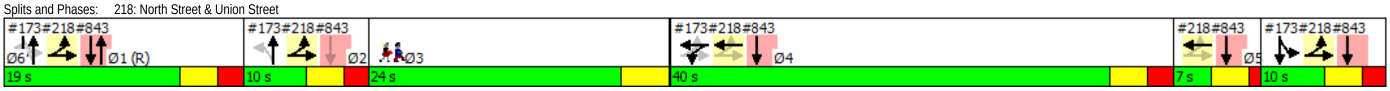


| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 11 | 51 | 842 | 27 | 0 | 0 | | | | | | |
| Future Volume (vph) | 11 | 51 | 842 | 27 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Ped Bike Factor | 0.97 | | 0.99 | | | | | | | | | |
| Frt | | | 0.995 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1354 | 1555 | 3105 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.158 | | | | | | | | | | | |
| Satd. Flow (perm) | 219 | 1555 | 3105 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 3 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 241 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 6.6 | | 4.9 | | | | | | | |
| Confl. Peds. (#/hr) | 154 | | | 154 | | | | | | | | |
| Confl. Bikes (#/hr) | | | | 3 | | 4 | | | | | | |
| Peak Hour Factor | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 20% | 10% | 3% | 17% | 0% | 0% | | | | | | |
| Parking (#/hr) | | | | 0 | | | | | | | | |
| Adj. Flow (vph) | 14 | 67 | 915 | 29 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 14 | 67 | 944 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | | | | | 19.0 | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | | | | | 17% | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | | | | | 14.0 | 5.0 | 20.0 | 35.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 2.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 42.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.38 | | | | | | | | | |
| v/c Ratio | 0.03 | 0.06 | 0.80 | | | | | | | | | |
| Control Delay | 0.9 | 0.8 | 25.6 | | | | | | | | | |
| Queue Delay | 0.3 | 1.8 | 47.9 | | | | | | | | | |
| Total Delay | 1.2 | 2.6 | 73.5 | | | | | | | | | |
| LOS | A | A | E | | | | | | | | | |
| Approach Delay | | 2.4 | 73.5 | | | | | | | | | |
| Approach LOS | | A | E | | | | | | | | | |
| Queue Length 50th (ft) | 1 | 2 | 258 | | | | | | | | | |
| Queue Length 95th (ft) | m1 | 3 | 417 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 161 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 502 | 1145 | 1187 | | | | | | | | | |
| Starvation Cap Reductn | 344 | 966 | 326 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 165 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.09 | 0.37 | 1.10 | | | | | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 67.9 — Intersection LOS: E
Intersection Capacity Utilization 31.2% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 218: North Street & Union Street

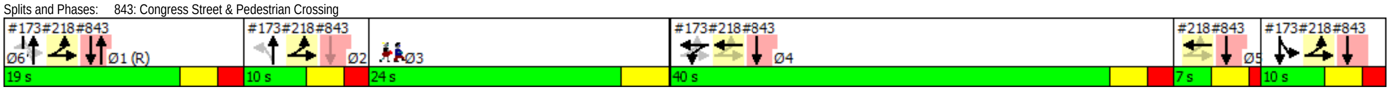


| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 348 | 0 | 0 | 774 | | | | | |
| Future Volume (vph) | 0 | 0 | 348 | 0 | 0 | 774 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 25 | | | 25 | | | | | |
| Link Distance (ft) | 500 | | 431 | | | 126 | | | | | |
| Travel Time (s) | 13.6 | | 11.8 | | | 3.4 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Adj. Flow (vph) | 0 | 0 | 378 | 0 | 0 | 841 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 378 | 0 | 0 | 841 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | 19.0 | | | | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | 17.3% | | | | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | 14.0 | | | | 5.0 | 20.0 | 35.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 2.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 14.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.13 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.66 | | | 0.24 | | | | | |
| Control Delay | | | 32.2 | | | 0.2 | | | | | |
| Queue Delay | | | 0.2 | | | 1.0 | | | | | |
| Total Delay | | | 32.4 | | | 1.2 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 32.4 | | | 1.2 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 49 | | | 0 | | | | | |
| Queue Length 95th (ft) | | | 65 | | | m2 | | | | | |
| Internal Link Dist (ft) | 420 | | 351 | | | 46 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 574 | | | 3437 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 2237 | | | | | |
| Spillback Cap Reductn | | | 15 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.68 | | | 0.70 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 10.9 Intersection LOS: B
Intersection Capacity Utilization 20.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 843: Congress Street & Pedestrian Crossing

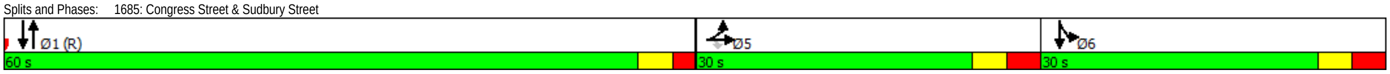


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑↑ | ↱ | | | | | ↑↑↑↱ | | ↰↰ | ↑↑ | |
| Traffic Volume (vph) | 44 | 150 | 121 | 0 | 0 | 0 | 0 | 721 | 141 | 112 | 218 | 0 |
| Future Volume (vph) | 44 | 150 | 121 | 0 | 0 | 0 | 0 | 721 | 141 | 112 | 218 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 |
| Ped Bike Factor | 0.61 | | 0.58 | | | | | 0.93 | | 0.88 | | |
| Frt | | | 0.850 | | | | | 0.975 | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (prot) | 1392 | 2815 | 1304 | 0 | 0 | 0 | 0 | 3806 | 0 | 2828 | 2908 | 0 |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (perm) | 843 | 2815 | 759 | 0 | 0 | 0 | 0 | 3806 | 0 | 2485 | 2908 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | 136 | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 153 | | | 161 | | | 386 | | | 468 | |
| Travel Time (s) | | 4.2 | | | 4.4 | | | 10.5 | | | 12.8 | |
| Confl. Peds. (#/hr) | 430 | | 475 | | | | | | 674 | 674 | | |
| Confl. Bikes (#/hr) | | | 11 | | | | | | 12 | | | 59 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.92 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles (%) | 5% | 6% | 4% | 0% | 0% | 0% | 0% | 6% | 14% | 4% | 8% | 0% |
| Parking (#/hr) | 0 | 0 | | | | | | | | | | |
| Adj. Flow (vph) | 49 | 169 | 136 | 0 | 0 | 0 | 0 | 767 | 150 | 127 | 248 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 49 | 169 | 136 | 0 | 0 | 0 | 0 | 917 | 0 | 127 | 248 | 0 |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | |
| Permitted Phases | | | 5 | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | |
| Minimum Split (s) | 26.0 | 26.0 | 26.0 | | | | | 30.0 | | 26.0 | | |
| Total Split (s) | 30.0 | 30.0 | 30.0 | | | | | 60.0 | | 30.0 | | |
| Total Split (%) | 25.0% | 25.0% | 25.0% | | | | | 50.0% | | 25.0% | | |
| Maximum Green (s) | 24.0 | 24.0 | 24.0 | | | | | 55.0 | | 24.0 | | |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | | | | 3.0 | | 3.0 | | |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | |
| Total Lost Time (s) | 4.0 | 4.0 | 4.0 | | | | | 3.0 | | 4.0 | | |
| Lead/Lag | Lead | Lead | Lead | | | | | | | Lag | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | |
| Recall Mode | Max | Max | Max | | | | | C-Max | | Max | | |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | 7.0 | | |
| Flash Dont Walk (s) | 13.0 | 13.0 | 13.0 | | | | | 18.0 | | 13.0 | | |
| Pedestrian Calls (#/hr) | 500 | 500 | 500 | | | | | 500 | | 500 | | |
| Act Effct Green (s) | 26.0 | 26.0 | 26.0 | | | | | 57.0 | | 26.0 | 87.0 | |
| Actuated g/C Ratio | 0.22 | 0.22 | 0.22 | | | | | 0.48 | | 0.22 | 0.72 | |
| v/c Ratio | 0.16 | 0.28 | 0.50 | | | | | 0.51 | | 0.21 | 0.12 | |
| Control Delay | 40.0 | 40.6 | 13.6 | | | | | 23.0 | | 37.8 | 6.0 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.8 | | 0.0 | 0.0 | |
| Total Delay | 40.0 | 40.6 | 13.6 | | | | | 23.8 | | 37.8 | 6.0 | |
| LOS | D | D | B | | | | | C | | D | A | |
| Approach Delay | | 30.2 | | | | | | 23.8 | | | 16.8 | |
| Approach LOS | | C | | | | | | C | | | B | |
| Queue Length 50th (ft) | 31 | 57 | 0 | | | | | 175 | | 41 | 41 | |
| Queue Length 95th (ft) | 66 | 90 | 59 | | | | | 216 | | m49 | m42 | |
| Internal Link Dist (ft) | | 73 | | | 81 | | | 306 | | | 388 | |
| Turn Bay Length (ft) | | | | | | | | | | 100 | | |
| Base Capacity (vph) | 301 | 609 | 270 | | | | | 1807 | | 612 | 2108 | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 538 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.16 | 0.28 | 0.50 | | | | | 0.72 | | 0.21 | 0.12 | |

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 23.6 Intersection LOS: C
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1685: Congress Street & Sudbury Street

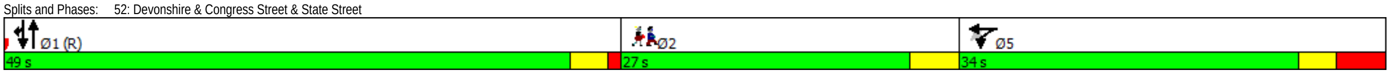


| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 54 | 38 | 250 | 87 | 261 | 457 | 103 | 224 | |
| Future Volume (vph) | 54 | 38 | 250 | 87 | 261 | 457 | 103 | 224 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Frt | | | 0.965 | | | 0.968 | | 0.850 | |
| Flt Protected | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (prot) | 1624 | 0 | 3120 | 0 | 3249 | 3013 | 0 | 1323 | |
| Flt Permitted | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (perm) | 1624 | 0 | 3120 | 0 | 3249 | 3013 | 0 | 1323 | |
| Right Turn on Red | | | | Yes | | | | No | |
| Satd. Flow (RTOR) | | | 34 | | | | | | |
| Link Speed (mph) | | | 30 | | 25 | 25 | | | |
| Link Distance (ft) | | | 709 | | 126 | 431 | | | |
| Travel Time (s) | | | 16.1 | | 3.4 | 11.8 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 59 | 41 | 272 | 95 | 284 | 497 | 112 | 243 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 59 | 0 | 408 | 0 | 284 | 633 | 0 | 219 | |
| Turn Type | Split | Perm | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | 5 | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 49.0 | 49.0 | | 49.0 | 27.0 |
| Total Split (%) | 30.9% | 30.9% | 30.9% | | 44.5% | 44.5% | | 44.5% | 25% |
| Maximum Green (s) | 27.0 | 27.0 | 27.0 | | 45.0 | 45.0 | | 45.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Lost Time (s) | 7.0 | | 7.0 | | 4.0 | 4.0 | | 4.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 27.0 | | 27.0 | | 45.0 | 45.0 | | 45.0 | |
| Actuated g/C Ratio | 0.25 | | 0.25 | | 0.41 | 0.41 | | 0.41 | |
| v/c Ratio | 0.15 | | 0.52 | | 0.21 | 0.51 | | 0.40 | |
| Control Delay | 33.8 | | 35.4 | | 21.6 | 13.6 | | 13.5 | |
| Queue Delay | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 33.8 | | 35.4 | | 21.6 | 13.6 | | 13.5 | |
| LOS | C | | D | | C | B | | B | |
| Approach Delay | | | 35.2 | | 21.6 | 13.6 | | | |
| Approach LOS | | | D | | C | B | | | |
| Queue Length 50th (ft) | 33 | | 120 | | 67 | 152 | | 105 | |
| Queue Length 95th (ft) | 68 | | 170 | | 98 | 189 | | 156 | |
| Internal Link Dist (ft) | | | 629 | | 46 | 351 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 398 | | 791 | | 1329 | 1232 | | 541 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Spillback Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.15 | | 0.52 | | 0.21 | 0.51 | | 0.40 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 58 (53%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 41.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 52: Devonshire & Congress Street & State Street



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 287 | 174 | 0 | 26 |
| Future Volume (Veh/h) | 0 | 0 | 287 | 174 | 0 | 26 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 312 | 189 | 0 | 28 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 426 | 178 | | | |
| pX, platoon unblocked | 0.78 | | | | 0.78 | 0.78 |
| vC, conflicting volume | 501 | | | | 406 | 406 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 222 | | | | 101 | 101 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 96 |
| cM capacity (veh/h) | 1062 | | | | 705 | 750 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 501 | 28 |
| Volume Left | 0 | 0 |
| Volume Right | 189 | 28 |
| cSH | 1700 | 750 |
| Volume to Capacity | 0.29 | 0.04 |
| Queue Length 95th (ft) | 0 | 3 |
| Control Delay (s) | 0.0 | 10.0 |
| Lane LOS | | A |
| Approach Delay (s) | 0.0 | 10.0 |
| Approach LOS | | A |

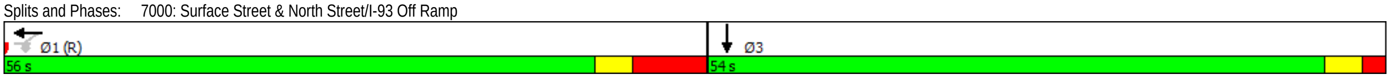
| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.5 | | |
| Intersection Capacity Utilization | 35.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 83 | 161 | 186 | 0 | 0 | 0 | 0 | 0 | 401 | 57 |
| Future Volume (vph) | 0 | 0 | 83 | 161 | 186 | 0 | 0 | 0 | 0 | 0 | 401 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.95 | |
| Frt | | | 0.865 | | | | | | | | 0.981 | |
| Flt Protected | | | | | 0.977 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1370 | 0 | 3098 | 0 | 0 | 0 | 0 | 0 | 2798 | 0 |
| Flt Permitted | | | | | 0.977 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1370 | 0 | 3098 | 0 | 0 | 0 | 0 | 0 | 2798 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 19 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 373 | | | 108 | | | 468 | | | 470 | |
| Travel Time (s) | | 10.2 | | | 2.9 | | | 12.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 466 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 19 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.73 | 0.73 | 0.73 | 0.92 | 0.92 | 0.92 | 0.86 | 0.86 | 0.86 |
| Heavy Vehicles (%) | 0% | 0% | 8% | 3% | 2% | 0% | 0% | 0% | 0% | 0% | 8% | 9% |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Adj. Flow (vph) | 0 | 0 | 99 | 221 | 255 | 0 | 0 | 0 | 0 | 0 | 466 | 66 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 99 | 0 | 476 | 0 | 0 | 0 | 0 | 0 | 532 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 56.0 | 56.0 | 56.0 | | | | | | 54.0 | |
| Total Split (%) | | | 50.9% | 50.9% | 50.9% | | | | | | 49.1% | |
| Maximum Green (s) | | | 47.0 | 47.0 | 47.0 | | | | | | 49.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 0 | |
| Act Effct Green (s) | | | 52.0 | | 52.0 | | | | | | 50.0 | |
| Actuated g/C Ratio | | | 0.47 | | 0.47 | | | | | | 0.45 | |
| v/c Ratio | | | 0.15 | | 0.33 | | | | | | 0.41 | |
| Control Delay | | | 9.3 | | 18.8 | | | | | | 20.0 | |
| Queue Delay | | | 0.0 | | 0.0 | | | | | | 0.0 | |
| Total Delay | | | 9.3 | | 18.8 | | | | | | 20.0 | |
| LOS | | | A | | B | | | | | | C | |
| Approach Delay | | 9.3 | | | 18.8 | | | | | | 20.0 | |
| Approach LOS | | A | | | B | | | | | | C | |
| Queue Length 50th (ft) | | | 35 | | 106 | | | | | | 173 | |
| Queue Length 95th (ft) | | | 56 | | 112 | | | | | | 216 | |
| Internal Link Dist (ft) | | 293 | | | 28 | | | 388 | | | 390 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 647 | | 1464 | | | | | | 1282 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.15 | | 0.33 | | | | | | 0.41 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 18.6 — Intersection LOS: B
Intersection Capacity Utilization 45.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 7000: Surface Street & North Street/I-93 Off Ramp



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 351 | 144 | 0 | 0 | 0 | 0 | 0 | 536 | 109 | |
| Future Volume (vph) | 0 | 0 | 0 | 351 | 144 | 0 | 0 | 0 | 0 | 0 | 536 | 109 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | 0.65 | 0.85 | | | | | | 0.87 | | |
| Frt | | | | | | | | | | | 0.975 | | |
| Flt Protected | | | | 0.950 | 0.979 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1583 | 1695 | 0 | 0 | 0 | 0 | 0 | 3726 | 0 | |
| Flt Permitted | | | | 0.950 | 0.979 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1029 | 1445 | 0 | 0 | 0 | 0 | 0 | 3726 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 39 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 205 | | | 407 | | | 164 | | | 468 | | |
| Travel Time (s) | | 5.6 | | | 11.1 | | | 4.5 | | | 12.8 | | |
| Confl. Peds. (#/hr) | | | | 217 | | | | | | | | 612 | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 4% | 8% | 0% | 0% | 0% | 0% | 0% | 5% | 11% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 373 | 153 | 0 | 0 | 0 | 0 | 0 | 589 | 120 | |
| Shared Lane Traffic (%) | | | | 30% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 261 | 265 | 0 | 0 | 0 | 0 | 0 | 709 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 51.0 | 51.0 | | | | | | 35.0 | | 24.0 |
| Total Split (%) | | | | 46.4% | 46.4% | | | | | | 31.8% | | 22% |
| Maximum Green (s) | | | | 46.0 | 46.0 | | | | | | 29.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 0 |
| Act Effct Green (s) | | | | 48.0 | 48.0 | | | | | | 31.0 | | |
| Actuated g/C Ratio | | | | 0.44 | 0.44 | | | | | | 0.28 | | |
| v/c Ratio | | | | 0.38 | 0.36 | | | | | | 0.66 | | |
| Control Delay | | | | 23.0 | 22.5 | | | | | | 29.3 | | |
| Queue Delay | | | | 0.0 | 0.0 | | | | | | 0.0 | | |
| Total Delay | | | | 23.0 | 22.5 | | | | | | 29.3 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 22.7 | | | | | | 29.3 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 128 | 128 | | | | | | 124 | | |
| Queue Length 95th (ft) | | | | 198 | 197 | | | | | | 158 | | |
| Internal Link Dist (ft) | | 125 | | | 327 | | | 84 | | | 388 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 690 | 739 | | | | | | 1078 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.38 | 0.36 | | | | | | 0.66 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 1 (1%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 26.5 Intersection LOS: C
Intersection Capacity Utilization 37.7% ICU Level of Service A
Analysis Period (min) 15

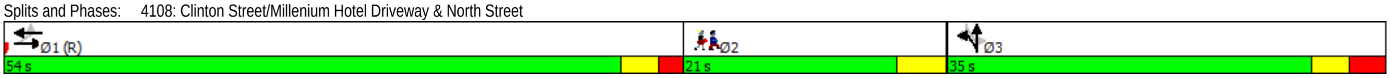
Splits and Phases: 1960: Surface Street & Clinton Street/I-93 Off Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰ | | | ↑↱ | | ↰ | ✥ | | ↰ | | ↱ | |
| Traffic Volume (vph) | 6 | 46 | 0 | 0 | 228 | 14 | 315 | 2 | 32 | 5 | 0 | 20 | |
| Future Volume (vph) | 6 | 46 | 0 | 0 | 228 | 14 | 315 | 2 | 32 | 5 | 0 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Ped Bike Factor | | 0.94 | | | 0.96 | | | 0.99 | | 0.96 | | 0.67 | |
| Frt | | | | | 0.991 | | | 0.972 | | | | 0.850 | |
| Flt Protected | | 0.994 | | | | | 0.950 | 0.961 | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1490 | 0 | 0 | 2847 | 0 | 1298 | 1401 | 0 | 1624 | 0 | 1454 | |
| Flt Permitted | | 0.963 | | | | | 0.950 | 0.961 | | 0.548 | | | |
| Satd. Flow (perm) | 0 | 1362 | 0 | 0 | 2847 | 0 | 1298 | 1401 | 0 | 897 | 0 | 974 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | | | 7 | | | | | | | 60 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | | |
| Link Distance (ft) | | 241 | | | 373 | | | 400 | | | 110 | | |
| Travel Time (s) | | 6.6 | | | 10.2 | | | 10.9 | | | 2.5 | | |
| Confl. Peds. (#/hr) | 349 | | | | | 349 | | | 31 | 31 | | 371 | |
| Confl. Bikes (#/hr) | | | 11 | | | 4 | | | | | | | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.84 | 0.84 | 0.84 | 0.92 | 0.92 | 0.92 | 0.67 | 0.67 | 0.67 | |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 3% | 0% | 7% | 0% | 6% | 0% | 0% | 0% | |
| Parking (#/hr) | | 0 | | | 0 | | 0 | | 0 | | | | |
| Adj. Flow (vph) | 7 | 51 | 0 | 0 | 271 | 17 | 342 | 2 | 35 | 7 | 0 | 30 | |
| Shared Lane Traffic (%) | | | | | | | 44% | | | | | | |
| Lane Group Flow (vph) | 0 | 58 | 0 | 0 | 288 | 0 | 192 | 187 | 0 | 7 | 0 | 30 | |
| Turn Type | Perm | NA | | | NA | | Split | NA | | D.Pm | | Perm | |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | | | | 2 |
| Permitted Phases | 1 | | | | | | | | | 3 | | 3 | |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 3 | | 3 | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 9.0 | | 9.0 | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 16.0 | | 16.0 | 21.0 |
| Total Split (s) | 54.0 | 54.0 | | | 54.0 | | 35.0 | 35.0 | | 35.0 | | 35.0 | 21.0 |
| Total Split (%) | 49.1% | 49.1% | | | 49.1% | | 31.8% | 31.8% | | 31.8% | | 31.8% | 19% |
| Maximum Green (s) | 49.0 | 49.0 | | | 49.0 | | 29.0 | 29.0 | | 29.0 | | 29.0 | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 | |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 6.0 | | 6.0 | |
| Lead/Lag | Lead | Lead | | | Lead | | | | | | | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Max | | Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | | | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | | | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | | | | 0 |
| Act Effct Green (s) | | 49.0 | | | 49.0 | | 29.0 | 29.0 | | 29.0 | | 29.0 | |
| Actuated g/C Ratio | | 0.45 | | | 0.45 | | 0.26 | 0.26 | | 0.26 | | 0.26 | |
| v/c Ratio | | 0.10 | | | 0.23 | | 0.56 | 0.51 | | 0.03 | | 0.10 | |
| Control Delay | | 42.1 | | | 11.5 | | 40.4 | 38.9 | | 30.8 | | 2.5 | |
| Queue Delay | | 0.0 | | | 0.1 | | 1.3 | 0.8 | | 0.0 | | 0.1 | |
| Total Delay | | 42.1 | | | 11.6 | | 41.7 | 39.7 | | 30.8 | | 2.6 | |
| LOS | | D | | | B | | D | D | | C | | A | |
| Approach Delay | | 42.1 | | | 11.6 | | | 40.7 | | | 7.9 | | |
| Approach LOS | | D | | | B | | | D | | | A | | |
| Queue Length 50th (ft) | | 41 | | | 30 | | 106 | 115 | | 4 | | 0 | |
| Queue Length 95th (ft) | | 83 | | | 40 | | 152 | 195 | | 11 | | 0 | |
| Internal Link Dist (ft) | | 161 | | | 293 | | | 320 | | | 30 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | 606 | | | 1272 | | 342 | 369 | | 236 | | 300 | |
| Starvation Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Spillback Cap Reductn | | 0 | | | 262 | | 45 | 48 | | 0 | | 40 | |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Reduced v/c Ratio | | 0.10 | | | 0.29 | | 0.65 | 0.58 | | 0.03 | | 0.12 | |

Intersection Summary

| | |
|---|---|
| Area Type: | CBD |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green | |
| Natural Cycle: 70 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.56 | |
| Intersection Signal Delay: 28.2 | Intersection LOS: C |
| Intersection Capacity Utilization 54.9% | ICU Level of Service A |
| Analysis Period (min) 15 | |

Splits and Phases: 4108: Clinton Street/Millenium Hotel Driveway & North Street



| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 97 | 68 | 325 | 145 | 407 | 485 | 102 | 226 | |
| Future Volume (vph) | 97 | 68 | 325 | 145 | 407 | 485 | 102 | 226 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Frt | | | 0.959 | | | 0.969 | | 0.850 | |
| Flt Protected | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (prot) | 1805 | 0 | 3441 | 0 | 3610 | 3351 | 0 | 1470 | |
| Flt Permitted | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (perm) | 1805 | 0 | 3441 | 0 | 3610 | 3351 | 0 | 1470 | |
| Right Turn on Red | | | | Yes | | | | Yes | |
| Satd. Flow (RTOR) | | | 47 | | | 4 | | 221 | |
| Link Speed (mph) | | | 30 | | 25 | 25 | | | |
| Link Distance (ft) | | | 758 | | 359 | 422 | | | |
| Travel Time (s) | | | 17.2 | | 9.8 | 11.5 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 105 | 74 | 353 | 158 | 442 | 527 | 111 | 246 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 105 | 0 | 585 | 0 | 442 | 663 | 0 | 221 | |
| Turn Type | Split | Perm | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | 5 | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 36.0 | 36.0 | 36.0 | | 47.0 | 47.0 | | 47.0 | 27.0 |
| Total Split (%) | 32.7% | 32.7% | 32.7% | | 42.7% | 42.7% | | 42.7% | 25% |
| Maximum Green (s) | 29.0 | 29.0 | 29.0 | | 43.0 | 43.0 | | 43.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Lost Time (s) | 7.0 | | 7.0 | | 4.0 | 4.0 | | 4.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 29.0 | | 29.0 | | 43.0 | 43.0 | | 43.0 | |
| Actuated g/C Ratio | 0.26 | | 0.26 | | 0.39 | 0.39 | | 0.39 | |
| v/c Ratio | 0.22 | | 0.62 | | 0.31 | 0.51 | | 0.31 | |
| Control Delay | 33.2 | | 36.0 | | 24.0 | 12.7 | | 3.8 | |
| Queue Delay | 0.0 | | 0.0 | | 0.0 | 0.3 | | 0.0 | |
| Total Delay | 33.2 | | 36.0 | | 24.0 | 13.0 | | 3.8 | |
| LOS | C | | D | | C | B | | A | |
| Approach Delay | | | 35.6 | | 24.0 | 10.7 | | | |
| Approach LOS | | | D | | C | B | | | |
| Queue Length 50th (ft) | 58 | | 176 | | 112 | 121 | | 26 | |
| Queue Length 95th (ft) | 105 | | 237 | | 153 | 151 | | 60 | |
| Internal Link Dist (ft) | | | 678 | | 279 | 342 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 475 | | 941 | | 1411 | 1312 | | 709 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 211 | | 0 | |
| Spillback Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.22 | | 0.62 | | 0.31 | 0.60 | | 0.31 | |

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 43 (39%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 43.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 52: Devonshire Street & Congress Street & State Street

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 280 | 1 | 174 | 1 | 498 | 53 | 43 | 532 | 0 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 280 | 1 | 174 | 1 | 498 | 53 | 43 | 532 | 0 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1700 | 1700 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 1.00 | | | | |
| Ped Bike Factor | | | | 0.67 | 0.76 | | | 0.96 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.880 | | | 0.986 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.990 | | | | | | 0.996 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1498 | 1113 | 0 | 0 | 4210 | 0 | 0 | 3899 | 0 | | | | |
| Flt Permitted | | 0.920 | | 0.950 | 0.990 | | | 0.939 | | | 0.843 | | | | | |
| Satd. Flow (perm) | 0 | 1502 | 0 | 1000 | 1041 | 0 | 0 | 3953 | 0 | 0 | 3253 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 166 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 25 | | | 25 | | | | | |
| Link Distance (ft) | | 197 | | | 141 | | | 126 | | | 439 | | | | | |
| Travel Time (s) | | 4.5 | | | 3.8 | | | 3.4 | | | 12.0 | | | | | |
| Confl. Peds. (#/hr) | | | | 314 | | 146 | | | 1133 | 1133 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 3 | | | 24 | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.81 | 0.92 | 0.81 | 0.92 | 0.91 | 0.91 | 0.96 | 0.96 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 3% | 0% | 4% | 0% | 5% | 0% | 3% | 7% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 346 | 1 | 215 | 1 | 547 | 58 | 45 | 554 | 0 | | | | |
| Shared Lane Traffic (%) | | | | 15% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 294 | 268 | 0 | 0 | 606 | 0 | 0 | 599 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 8.0 |
| Total Split (s) | 28.0 | 28.0 | | 28.0 | 28.0 | | | | | 10.0 | | | 30.0 | 10.0 | 24.0 | 8.0 |
| Total Split (%) | 25.5% | 25.5% | | 25.5% | 25.5% | | | | | 9.1% | | | 27% | 9% | 22% | 7% |
| Maximum Green (s) | 22.0 | 22.0 | | 22.0 | 22.0 | | | | | 5.0 | | | 25.0 | 5.0 | 20.0 | 4.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 6.0 | | 6.0 | 6.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 22.0 | | 22.0 | 22.0 | | | 35.0 | | | 30.0 | | | | | |
| Actuated g/C Ratio | | 0.20 | | 0.20 | 0.20 | | | 0.32 | | | 0.27 | | | | | |
| v/c Ratio | | 0.01 | | 0.98 | 0.75 | | | 0.48 | | | 0.65 | | | | | |
| Control Delay | | 31.7 | | 68.7 | 19.9 | | | 2.2 | | | 40.9 | | | | | |
| Queue Delay | | 0.0 | | 37.2 | 26.6 | | | 0.4 | | | 0.0 | | | | | |
| Total Delay | | 31.7 | | 105.9 | 46.5 | | | 2.7 | | | 40.9 | | | | | |
| LOS | | C | | F | D | | | A | | | D | | | | | |
| Approach Delay | | 31.7 | | | 77.6 | | | 2.7 | | | 40.9 | | | | | |
| Approach LOS | | C | | | E | | | A | | | D | | | | | |
| Queue Length 50th (ft) | | 1 | | 80 | 0 | | | 10 | | | 104 | | | | | |
| Queue Length 95th (ft) | | 9 | | m#302 | m81 | | | 12 | | | 149 | | | | | |
| Internal Link Dist (ft) | | 117 | | | 61 | | | 46 | | | 359 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 301 | | 299 | 355 | | | 1257 | | | 916 | | | | | |
| Starvation Cap Reductn | | 0 | | 45 | 88 | | | 262 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 1.16 | 1.00 | | | 0.61 | | | 0.65 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 39.5 — Intersection LOS: D
Intersection Capacity Utilization 64.4% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & North Street

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 46 | 52 | 454 | 110 | 0 | 0 | | | | | | |
| Future Volume (vph) | 46 | 52 | 454 | 110 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Ped Bike Factor | 0.90 | | 0.90 | | | | | | | | | |
| Frt | | | 0.971 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1624 | 1693 | 2691 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.236 | | | | | | | | | | | |
| Satd. Flow (perm) | 363 | 1693 | 2691 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 27 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 241 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 6.6 | | 4.9 | | | | | | | |
| Confl. Peds. (#/hr) | 331 | | | 331 | | | | | | | | |
| Confl. Bikes (#/hr) | | | | 4 | | | | | | | | |
| Peak Hour Factor | 0.86 | 0.86 | 0.91 | 0.91 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 0% | 1% | 5% | 6% | 0% | 0% | | | | | | |
| Parking (#/hr) | | | | 0 | | | | | | | | |
| Adj. Flow (vph) | 53 | 60 | 499 | 121 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 53 | 60 | 620 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | | | | | 30.0 | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | | | | | 27% | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | | | | | 25.0 | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 30.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.27 | | | | | | | | | |
| v/c Ratio | 0.07 | 0.05 | 0.82 | | | | | | | | | |
| Control Delay | 0.5 | 0.4 | 33.3 | | | | | | | | | |
| Queue Delay | 0.7 | 1.5 | 50.7 | | | | | | | | | |
| Total Delay | 1.2 | 1.9 | 84.0 | | | | | | | | | |
| LOS | A | A | F | | | | | | | | | |
| Approach Delay | | 1.6 | 84.0 | | | | | | | | | |
| Approach LOS | | A | F | | | | | | | | | |
| Queue Length 50th (ft) | 1 | 1 | 182 | | | | | | | | | |
| Queue Length 95th (ft) | m1 | m1 | #298 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 161 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 766 | 1246 | 753 | | | | | | | | | |
| Starvation Cap Reductn | 539 | 1068 | 198 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 71 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.23 | 0.34 | 1.12 | | | | | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 71.3 Intersection LOS: E
Intersection Capacity Utilization 34.6% ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

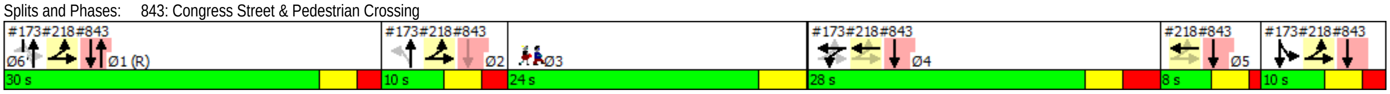
Splits and Phases: 218: North Street & Union Street

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | ↑↑↑ | | | ↑↑↑ | | | | | |
| Traffic Volume (vph) | 0 | 0 | 552 | 0 | 0 | 805 | | | | | |
| Future Volume (vph) | 0 | 0 | 552 | 0 | 0 | 805 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 25 | | | 25 | | | | | |
| Link Distance (ft) | 564 | | 422 | | | 126 | | | | | |
| Travel Time (s) | 15.4 | | 11.5 | | | 3.4 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Adj. Flow (vph) | 0 | 0 | 600 | 0 | 0 | 875 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 600 | 0 | 0 | 875 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | 30.0 | | | | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | 27.3% | | | | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | 25.0 | | | | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 25.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.23 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.59 | | | 0.25 | | | | | |
| Control Delay | | | 21.2 | | | 0.2 | | | | | |
| Queue Delay | | | 0.2 | | | 1.0 | | | | | |
| Total Delay | | | 21.4 | | | 1.1 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 21.4 | | | 1.1 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 68 | | | 0 | | | | | |
| Queue Length 95th (ft) | | | 86 | | | m1 | | | | | |
| Internal Link Dist (ft) | 484 | | 342 | | | 46 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 1025 | | | 3437 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 2192 | | | | | |
| Spillback Cap Reductn | | | 69 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.63 | | | 0.70 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 9.4 — Intersection LOS: A
Intersection Capacity Utilization 21.4% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 843: Congress Street & Pedestrian Crossing

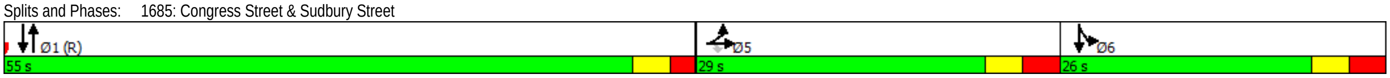


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 55 | 309 | 108 | 0 | 0 | 0 | 0 | 551 | 220 | 143 | 467 | 0 |
| Future Volume (vph) | 55 | 309 | 108 | 0 | 0 | 0 | 0 | 551 | 220 | 143 | 467 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 |
| Ped Bike Factor | 0.68 | | 0.61 | | | | | 0.88 | | 0.86 | | |
| Frt | | | 0.850 | | | | | 0.957 | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (prot) | 1392 | 2842 | 1280 | 0 | 0 | 0 | 0 | 3648 | 0 | 2884 | 2804 | 0 |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (perm) | 950 | 2842 | 781 | 0 | 0 | 0 | 0 | 3648 | 0 | 2485 | 2804 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | 117 | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 153 | | | 161 | | | 395 | | | 468 | |
| Travel Time (s) | | 4.2 | | | 4.4 | | | 10.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | 236 | | 435 | | | | | | 650 | 650 | | |
| Confl. Bikes (#/hr) | | | 5 | | | | | | 46 | | | 2 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.98 | 0.98 | 0.98 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles (%) | 5% | 5% | 6% | 0% | 0% | 0% | 0% | 3% | 7% | 2% | 12% | 0% |
| Parking (#/hr) | 0 | 0 | | | | | | | | | | |
| Adj. Flow (vph) | 60 | 336 | 117 | 0 | 0 | 0 | 0 | 562 | 224 | 154 | 502 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 60 | 336 | 117 | 0 | 0 | 0 | 0 | 786 | 0 | 154 | 502 | 0 |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | |
| Permitted Phases | | | 5 | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | |
| Minimum Split (s) | 26.0 | 26.0 | 26.0 | | | | | 30.0 | | 26.0 | | |
| Total Split (s) | 29.0 | 29.0 | 29.0 | | | | | 55.0 | | 26.0 | | |
| Total Split (%) | 26.4% | 26.4% | 26.4% | | | | | 50.0% | | 23.6% | | |
| Maximum Green (s) | 23.0 | 23.0 | 23.0 | | | | | 50.0 | | 20.0 | | |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | | | | 3.0 | | 3.0 | | |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | |
| Total Lost Time (s) | 4.0 | 4.0 | 4.0 | | | | | 3.0 | | 4.0 | | |
| Lead/Lag | Lead | Lead | Lead | | | | | | | Lag | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | |
| Recall Mode | Max | Max | Max | | | | | C-Max | | Max | | |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | 7.0 | | |
| Flash Dont Walk (s) | 13.0 | 13.0 | 13.0 | | | | | 18.0 | | 13.0 | | |
| Pedestrian Calls (#/hr) | 500 | 500 | 500 | | | | | 500 | | 500 | | |
| Act Effct Green (s) | 25.0 | 25.0 | 25.0 | | | | | 52.0 | | 22.0 | 78.0 | |
| Actuated g/C Ratio | 0.23 | 0.23 | 0.23 | | | | | 0.47 | | 0.20 | 0.71 | |
| v/c Ratio | 0.19 | 0.52 | 0.44 | | | | | 0.46 | | 0.27 | 0.25 | |
| Control Delay | 36.3 | 40.6 | 12.1 | | | | | 13.7 | | 39.1 | 9.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 4.1 | 0.0 | |
| Total Delay | 36.3 | 40.6 | 12.1 | | | | | 13.7 | | 43.2 | 9.8 | |
| LOS | D | D | B | | | | | B | | D | A | |
| Approach Delay | | 33.6 | | | | | | 13.7 | | | 17.7 | |
| Approach LOS | | C | | | | | | B | | | B | |
| Queue Length 50th (ft) | 34 | 110 | 0 | | | | | 79 | | 48 | 95 | |
| Queue Length 95th (ft) | 72 | 157 | 52 | | | | | 102 | | m55 | m103 | |
| Internal Link Dist (ft) | | 73 | | | 81 | | | 315 | | | 388 | |
| Turn Bay Length (ft) | | | | | | | | | | 100 | | |
| Base Capacity (vph) | 316 | 645 | 267 | | | | | 1724 | | 576 | 1988 | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 74 | | 344 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.19 | 0.52 | 0.44 | | | | | 0.48 | | 0.66 | 0.25 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 20.3 Intersection LOS: C
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1685: Congress Street & Sudbury Street



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 199 | 47 | 0 | 107 |
| Future Volume (Veh/h) | 0 | 0 | 199 | 47 | 0 | 107 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 216 | 51 | 0 | 116 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 400 | 205 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 267 | | | | 242 | 242 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 267 | | | | 242 | 242 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 86 |
| cM capacity (veh/h) | 1308 | | | | 751 | 802 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 267 | 116 |
| Volume Left | 0 | 0 |
| Volume Right | 51 | 116 |
| cSH | 1700 | 802 |
| Volume to Capacity | 0.16 | 0.14 |
| Queue Length 95th (ft) | 0 | 13 |
| Control Delay (s) | 0.0 | 10.2 |
| Lane LOS | | B |
| Approach Delay (s) | 0.0 | 10.2 |
| Approach LOS | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.1 | | |
| Intersection Capacity Utilization | 26.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 62 | 457 | 541 | 0 | 0 | 0 | 0 | 0 | 351 | 60 |
| Future Volume (vph) | 0 | 0 | 62 | 457 | 541 | 0 | 0 | 0 | 0 | 0 | 351 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.95 | |
| Frt | | | 0.865 | | | | | | | | 0.978 | |
| Flt Protected | | | | | 0.978 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1321 | 0 | 3115 | 0 | 0 | 0 | 0 | 0 | 2803 | 0 |
| Flt Permitted | | | | | 0.978 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1321 | 0 | 3115 | 0 | 0 | 0 | 0 | 0 | 2803 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 18 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 373 | | | 108 | | | 468 | | | 470 | |
| Travel Time (s) | | 10.2 | | | 2.9 | | | 12.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 251 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 95 |
| Peak Hour Factor | 0.80 | 0.80 | 0.80 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.92 | 0.96 | 0.96 | 0.96 |
| Heavy Vehicles (%) | 0% | 0% | 12% | 2% | 2% | 0% | 0% | 0% | 0% | 0% | 7% | 9% |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Adj. Flow (vph) | 0 | 0 | 78 | 491 | 582 | 0 | 0 | 0 | 0 | 0 | 366 | 63 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 78 | 0 | 1073 | 0 | 0 | 0 | 0 | 0 | 429 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 73.0 | 73.0 | 73.0 | | | | | | 37.0 | |
| Total Split (%) | | | 66.4% | 66.4% | 66.4% | | | | | | 33.6% | |
| Maximum Green (s) | | | 64.0 | 64.0 | 64.0 | | | | | | 32.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 0 | |
| Act Effct Green (s) | | | 69.0 | | 69.0 | | | | | | 33.0 | |
| Actuated g/C Ratio | | | 0.63 | | 0.63 | | | | | | 0.30 | |
| v/c Ratio | | | 0.09 | | 0.55 | | | | | | 0.50 | |
| Control Delay | | | 5.4 | | 13.0 | | | | | | 15.3 | |
| Queue Delay | | | 0.0 | | 0.0 | | | | | | 0.0 | |
| Total Delay | | | 5.4 | | 13.0 | | | | | | 15.3 | |
| LOS | | | A | | B | | | | | | B | |
| Approach Delay | | 5.4 | | | 13.0 | | | | | | 15.3 | |
| Approach LOS | | A | | | B | | | | | | B | |
| Queue Length 50th (ft) | | | 23 | | 209 | | | | | | 56 | |
| Queue Length 95th (ft) | | | 32 | | 265 | | | | | | 82 | |
| Internal Link Dist (ft) | | 293 | | | 28 | | | 388 | | | 390 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 828 | | 1953 | | | | | | 853 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.09 | | 0.55 | | | | | | 0.50 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 104 (95%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 65.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 7000: Surface Street & North Street/I-93 Off Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 553 | 325 | 0 | 0 | 0 | 0 | 0 | 714 | 157 | |
| Future Volume (vph) | 0 | 0 | 0 | 553 | 325 | 0 | 0 | 0 | 0 | 0 | 714 | 157 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | 0.71 | 0.90 | | | | | | 0.91 | | |
| Frt | | | | | | | | | | | 0.973 | | |
| Flt Protected | | | | 0.950 | 0.983 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1598 | 1713 | 0 | 0 | 0 | 0 | 0 | 3938 | 0 | |
| Flt Permitted | | | | 0.950 | 0.983 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1128 | 1543 | 0 | 0 | 0 | 0 | 0 | 3938 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 44 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 178 | | | 328 | | | 196 | | | 468 | | |
| Travel Time (s) | | 4.9 | | | 8.9 | | | 5.3 | | | 12.8 | | |
| Confl. Peds. (#/hr) | | | | 116 | | | | | | | | 147 | |
| Confl. Bikes (#/hr) | | | | | | 1 | | | | | | 83 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.92 | 0.92 | 0.92 | 0.95 | 0.95 | 0.95 | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 3% | 7% | 0% | 0% | 0% | 0% | 0% | 4% | 7% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 608 | 357 | 0 | 0 | 0 | 0 | 0 | 752 | 165 | |
| Shared Lane Traffic (%) | | | | 30% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 426 | 539 | 0 | 0 | 0 | 0 | 0 | 917 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 51.0 | 51.0 | | | | | | 35.0 | | 24.0 |
| Total Split (%) | | | | 46.4% | 46.4% | | | | | | 31.8% | | 22% |
| Maximum Green (s) | | | | 46.0 | 46.0 | | | | | | 29.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 455 |
| Act Effct Green (s) | | | | 48.0 | 48.0 | | | | | | 31.0 | | |
| Actuated g/C Ratio | | | | 0.44 | 0.44 | | | | | | 0.28 | | |
| v/c Ratio | | | | 0.61 | 0.72 | | | | | | 0.80 | | |
| Control Delay | | | | 28.5 | 32.3 | | | | | | 32.7 | | |
| Queue Delay | | | | 0.0 | 0.0 | | | | | | 0.0 | | |
| Total Delay | | | | 28.5 | 32.3 | | | | | | 32.7 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 30.6 | | | | | | 32.7 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 237 | 322 | | | | | | 193 | | |
| Queue Length 95th (ft) | | | | 350 | 463 | | | | | | 245 | | |
| Internal Link Dist (ft) | | 98 | | | 248 | | | 116 | | | 388 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 697 | 747 | | | | | | 1141 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.61 | 0.72 | | | | | | 0.80 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 4 (4%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 31.6 Intersection LOS: C
Intersection Capacity Utilization 53.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1960: Surface Street & Clinton Street/I-93 Off Ramp

Ø1 (R) 35 s | Ø2 24 s | Ø5 51 s

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 26 | 41 | 0 | 0 | 592 | 8 | 259 | 1 | 18 | 3 | 0 | 15 | |
| Future Volume (vph) | 26 | 41 | 0 | 0 | 592 | 8 | 259 | 1 | 18 | 3 | 0 | 15 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Ped Bike Factor | | 0.94 | | | 0.99 | | | 0.99 | | 0.97 | | 0.69 | |
| Frt | | | | | 0.998 | | | 0.981 | | | | 0.850 | |
| Flt Protected | | 0.981 | | | | | 0.950 | 0.959 | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1415 | 0 | 0 | 2966 | 0 | 1251 | 1358 | 0 | 1624 | 0 | 1454 | |
| Flt Permitted | | 0.744 | | | | | 0.950 | 0.959 | | 0.551 | | | |
| Satd. Flow (perm) | 0 | 1005 | 0 | 0 | 2966 | 0 | 1251 | 1358 | 0 | 918 | 0 | 998 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | | | 2 | | | | | | | 60 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | | |
| Link Distance (ft) | | 241 | | | 373 | | | 426 | | | 110 | | |
| Travel Time (s) | | 6.6 | | | 10.2 | | | 11.6 | | | 2.5 | | |
| Confl. Peds. (#/hr) | 248 | | | | | 248 | | | 15 | 15 | | 246 | |
| Confl. Bikes (#/hr) | | | 3 | | | 5 | | | 1 | | | | |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.91 | 0.91 | 0.91 | 0.81 | 0.81 | 0.81 | 0.56 | 0.56 | 0.56 | |
| Heavy Vehicles (%) | 0% | 11% | 0% | 0% | 3% | 0% | 11% | 0% | 17% | 0% | 0% | 0% | |
| Parking (#/hr) | | 0 | | | 0 | | 0 | | 0 | | | | |
| Adj. Flow (vph) | 30 | 47 | 0 | 0 | 651 | 9 | 320 | 1 | 22 | 5 | 0 | 27 | |
| Shared Lane Traffic (%) | | | | | | | 46% | | | | | | |
| Lane Group Flow (vph) | 0 | 77 | 0 | 0 | 660 | 0 | 173 | 170 | 0 | 5 | 0 | 27 | |
| Turn Type | Perm | NA | | | NA | | Split | NA | | D.Pm | | Perm | |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | | | | 2 |
| Permitted Phases | 1 | | | | | | | | | 3 | | 3 | |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 3 | | 3 | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 9.0 | | 9.0 | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 16.0 | | 16.0 | 21.0 |
| Total Split (s) | 59.0 | 59.0 | | | 59.0 | | 30.0 | 30.0 | | 30.0 | | 30.0 | 21.0 |
| Total Split (%) | 53.6% | 53.6% | | | 53.6% | | 27.3% | 27.3% | | 27.3% | | 27.3% | 19% |
| Maximum Green (s) | 54.0 | 54.0 | | | 54.0 | | 24.0 | 24.0 | | 24.0 | | 24.0 | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 | |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 6.0 | | 6.0 | |
| Lead/Lag | Lead | Lead | | | Lead | | | | | | | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Max | | Max | None |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | | | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | | | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | | | | 0 |
| Act Effct Green (s) | | 75.0 | | | 75.0 | | 24.0 | 24.0 | | 24.0 | | 24.0 | |
| Actuated g/C Ratio | | 0.68 | | | 0.68 | | 0.22 | 0.22 | | 0.22 | | 0.22 | |
| v/c Ratio | | 0.11 | | | 0.33 | | 0.64 | 0.57 | | 0.03 | | 0.10 | |
| Control Delay | | 8.5 | | | 5.6 | | 41.6 | 36.6 | | 34.3 | | 1.9 | |
| Queue Delay | | 0.0 | | | 0.3 | | 74.1 | 73.1 | | 0.0 | | 0.9 | |
| Total Delay | | 8.5 | | | 6.0 | | 115.7 | 109.7 | | 34.3 | | 2.9 | |
| LOS | | A | | | A | | F | F | | C | | A | |
| Approach Delay | | 8.5 | | | 6.0 | | | 112.7 | | | 7.8 | | |
| Approach LOS | | A | | | A | | | F | | | A | | |
| Queue Length 50th (ft) | | 12 | | | 110 | | 113 | 107 | | 3 | | 0 | |
| Queue Length 95th (ft) | | 35 | | | 121 | | m150 | m138 | | 8 | | 0 | |
| Internal Link Dist (ft) | | 161 | | | 293 | | | 346 | | | 30 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | 685 | | | 2022 | | 272 | 296 | | 200 | | 264 | |
| Starvation Cap Reductn | | 0 | | | 766 | | 0 | 0 | | 0 | | 0 | |
| Spillback Cap Reductn | | 0 | | | 89 | | 166 | 180 | | 0 | | 137 | |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Reduced v/c Ratio | | 0.11 | | | 0.53 | | 1.63 | 1.47 | | 0.03 | | 0.21 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 39.1 Intersection LOS: D
Intersection Capacity Utilization 52.6% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

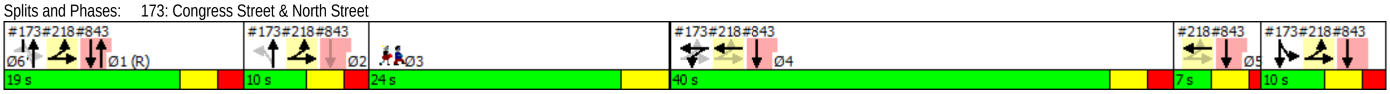
Splits and Phases: 4108: Clinton Street/Millenium Hotel Driveway & North Street

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 467 | 1 | 388 | 1 | 297 | 50 | 11 | 323 | 1 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 467 | 1 | 388 | 1 | 297 | 50 | 11 | 323 | 1 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1700 | 1700 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | | | | |
| Ped Bike Factor | | | | 0.71 | 0.79 | | | 0.92 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.866 | | | 0.979 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.995 | | | | | | 0.998 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1513 | 1086 | 0 | 0 | 3833 | 0 | 0 | 3836 | 0 | | | | |
| Flt Permitted | | 0.930 | | 0.950 | 0.995 | | | 0.939 | | | 0.925 | | | | | |
| Satd. Flow (perm) | 0 | 1519 | 0 | 1070 | 1052 | 0 | 0 | 3599 | 0 | 0 | 3519 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 392 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 25 | | | 25 | | | | | |
| Link Distance (ft) | | 116 | | | 141 | | | 126 | | | 445 | | | | | |
| Travel Time (s) | | 2.6 | | | 3.8 | | | 3.4 | | | 12.1 | | | | | |
| Confl. Peds. (#/hr) | | | | 312 | | 212 | | | 1204 | 1204 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 7 | | | 7 | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.93 | 0.92 | 0.93 | 0.92 | 0.94 | 0.94 | 0.93 | 0.93 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 2% | 0% | 5% | 0% | 9% | 16% | 0% | 9% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 502 | 1 | 417 | 1 | 316 | 53 | 12 | 347 | 1 | | | | |
| Shared Lane Traffic (%) | | | | 10% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 452 | 468 | 0 | 0 | 370 | 0 | 0 | 360 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 7.0 |
| Total Split (s) | 40.0 | 40.0 | | 40.0 | 40.0 | | | | | 10.0 | | | 19.0 | 10.0 | 24.0 | 7.0 |
| Total Split (%) | 36.4% | 36.4% | | 36.4% | 36.4% | | | | | 9.1% | | | 17% | 9% | 22% | 6% |
| Maximum Green (s) | 35.0 | 35.0 | | 35.0 | 35.0 | | | | | 5.0 | | | 14.0 | 5.0 | 20.0 | 3.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 5.0 | | 5.0 | 5.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 35.0 | | 35.0 | 35.0 | | | 24.0 | | | 19.0 | | | | | |
| Actuated g/C Ratio | | 0.32 | | 0.32 | 0.32 | | | 0.22 | | | 0.17 | | | | | |
| v/c Ratio | | 0.01 | | 0.94 | 0.76 | | | 0.47 | | | 0.58 | | | | | |
| Control Delay | | 23.0 | | 33.2 | 19.1 | | | 2.6 | | | 42.0 | | | | | |
| Queue Delay | | 0.0 | | 2.9 | 54.4 | | | 1.3 | | | 0.0 | | | | | |
| Total Delay | | 23.0 | | 36.1 | 73.4 | | | 3.9 | | | 42.0 | | | | | |
| LOS | | C | | D | E | | | A | | | D | | | | | |
| Approach Delay | | 23.0 | | | 55.1 | | | 3.9 | | | 42.0 | | | | | |
| Approach LOS | | C | | | E | | | A | | | D | | | | | |
| Queue Length 50th (ft) | | 1 | | 30 | 125 | | | 8 | | | 80 | | | | | |
| Queue Length 95th (ft) | | 8 | | m#468 | m185 | | | 15 | | | 113 | | | | | |
| Internal Link Dist (ft) | | 36 | | | 61 | | | 46 | | | 365 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 484 | | 481 | 612 | | | 785 | | | 622 | | | | | |
| Starvation Cap Reductn | | 0 | | 10 | 227 | | | 229 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 0.96 | 1.22 | | | 0.67 | | | 0.58 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 40.7 Intersection LOS: D
Intersection Capacity Utilization 64.0% ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & North Street

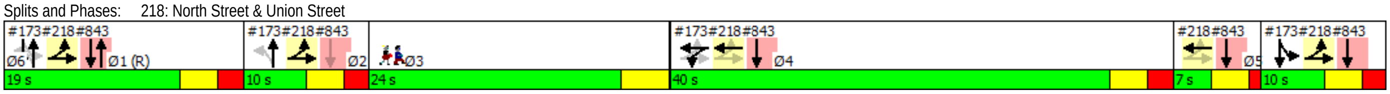


| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 11 | 51 | 857 | 27 | 0 | 0 | | | | | | |
| Future Volume (vph) | 11 | 51 | 857 | 27 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Ped Bike Factor | 0.98 | | 0.99 | | | | | | | | | |
| Frt | | | 0.995 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1354 | 1555 | 3105 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.151 | | | | | | | | | | | |
| Satd. Flow (perm) | 210 | 1555 | 3105 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 3 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 241 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 6.6 | | 4.9 | | | | | | | |
| Confl. Peds. (#/hr) | 154 | | | 154 | | | | | | | | |
| Confl. Bikes (#/hr) | | | | 3 | | 4 | | | | | | |
| Peak Hour Factor | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 20% | 10% | 3% | 17% | 0% | 0% | | | | | | |
| Parking (#/hr) | | | | 0 | | | | | | | | |
| Adj. Flow (vph) | 14 | 67 | 932 | 29 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 14 | 67 | 961 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | | | | | 19.0 | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | | | | | 17% | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | | | | | 14.0 | 5.0 | 20.0 | 35.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 2.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 42.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.38 | | | | | | | | | |
| v/c Ratio | 0.03 | 0.06 | 0.81 | | | | | | | | | |
| Control Delay | 0.9 | 0.8 | 26.4 | | | | | | | | | |
| Queue Delay | 0.3 | 1.8 | 49.2 | | | | | | | | | |
| Total Delay | 1.2 | 2.6 | 75.6 | | | | | | | | | |
| LOS | A | A | E | | | | | | | | | |
| Approach Delay | | 2.4 | 75.6 | | | | | | | | | |
| Approach LOS | | A | E | | | | | | | | | |
| Queue Length 50th (ft) | 1 | 2 | 347 | | | | | | | | | |
| Queue Length 95th (ft) | m1 | 3 | 426 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 161 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 498 | 1145 | 1187 | | | | | | | | | |
| Starvation Cap Reductn | 340 | 966 | 327 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 173 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.09 | 0.37 | 1.12 | | | | | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 69.9 Intersection LOS: E
Intersection Capacity Utilization 31.7% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 218: North Street & Union Street

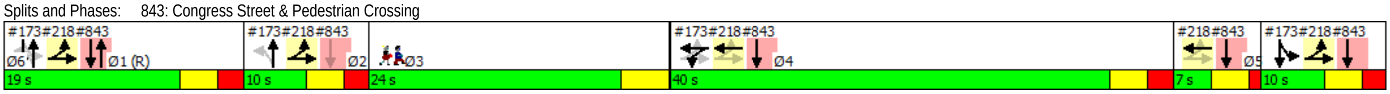


| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | ↑↑↑ | | | ↑↑↑ | | | | | |
| Traffic Volume (vph) | 0 | 0 | 348 | 0 | 0 | 781 | | | | | |
| Future Volume (vph) | 0 | 0 | 348 | 0 | 0 | 781 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 25 | | | 25 | | | | | |
| Link Distance (ft) | 500 | | 431 | | | 126 | | | | | |
| Travel Time (s) | 13.6 | | 11.8 | | | 3.4 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Adj. Flow (vph) | 0 | 0 | 378 | 0 | 0 | 849 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 378 | 0 | 0 | 849 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 7.0 | 10.0 |
| Total Split (s) | | | 19.0 | | | | 10.0 | 24.0 | 40.0 | 7.0 | 10.0 |
| Total Split (%) | | | 17.3% | | | | 9% | 22% | 36% | 6% | 9% |
| Maximum Green (s) | | | 14.0 | | | | 5.0 | 20.0 | 35.0 | 3.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 2.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 14.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.13 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.66 | | | 0.25 | | | | | |
| Control Delay | | | 32.2 | | | 0.2 | | | | | |
| Queue Delay | | | 0.2 | | | 1.0 | | | | | |
| Total Delay | | | 32.4 | | | 1.2 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 32.4 | | | 1.2 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 49 | | | 0 | | | | | |
| Queue Length 95th (ft) | | | 65 | | | m2 | | | | | |
| Internal Link Dist (ft) | 420 | | 351 | | | 46 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 574 | | | 3437 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 2236 | | | | | |
| Spillback Cap Reductn | | | 15 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.68 | | | 0.71 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 10.8 — Intersection LOS: B
Intersection Capacity Utilization 20.9% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 843: Congress Street & Pedestrian Crossing

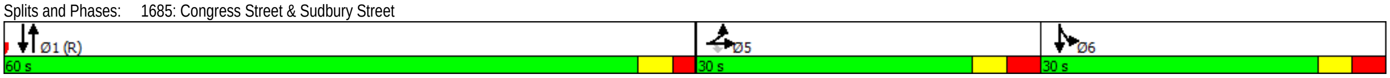


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 44 | 150 | 121 | 0 | 0 | 0 | 0 | 722 | 148 | 112 | 218 | 0 |
| Future Volume (vph) | 44 | 150 | 121 | 0 | 0 | 0 | 0 | 722 | 148 | 112 | 218 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 |
| Ped Bike Factor | 0.61 | | 0.58 | | | | | 0.93 | | 0.88 | | |
| Frt | | | 0.850 | | | | | 0.975 | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (prot) | 1392 | 2815 | 1304 | 0 | 0 | 0 | 0 | 3793 | 0 | 2828 | 2908 | 0 |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (perm) | 843 | 2815 | 759 | 0 | 0 | 0 | 0 | 3793 | 0 | 2489 | 2908 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | 136 | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 153 | | | 161 | | | 386 | | | 468 | |
| Travel Time (s) | | 4.2 | | | 4.4 | | | 10.5 | | | 12.8 | |
| Confl. Peds. (#/hr) | 430 | | 475 | | | | | | 674 | 674 | | |
| Confl. Bikes (#/hr) | | | 11 | | | | | | 12 | | | 59 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.92 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles (%) | 5% | 6% | 4% | 0% | 0% | 0% | 0% | 6% | 14% | 4% | 8% | 0% |
| Parking (#/hr) | 0 | 0 | | | | | | | | | | |
| Adj. Flow (vph) | 49 | 169 | 136 | 0 | 0 | 0 | 0 | 768 | 157 | 127 | 248 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 49 | 169 | 136 | 0 | 0 | 0 | 0 | 925 | 0 | 127 | 248 | 0 |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | |
| Permitted Phases | | | 5 | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | |
| Minimum Split (s) | 26.0 | 26.0 | 26.0 | | | | | 30.0 | | 26.0 | | |
| Total Split (s) | 30.0 | 30.0 | 30.0 | | | | | 60.0 | | 30.0 | | |
| Total Split (%) | 25.0% | 25.0% | 25.0% | | | | | 50.0% | | 25.0% | | |
| Maximum Green (s) | 24.0 | 24.0 | 24.0 | | | | | 55.0 | | 24.0 | | |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | | | | 3.0 | | 3.0 | | |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | |
| Total Lost Time (s) | 4.0 | 4.0 | 4.0 | | | | | 3.0 | | 4.0 | | |
| Lead/Lag | Lead | Lead | Lead | | | | | | | Lag | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | |
| Recall Mode | Max | Max | Max | | | | | C-Max | | Max | | |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | 7.0 | | |
| Flash Dont Walk (s) | 13.0 | 13.0 | 13.0 | | | | | 18.0 | | 13.0 | | |
| Pedestrian Calls (#/hr) | 500 | 500 | 500 | | | | | 500 | | 500 | | |
| Act Effct Green (s) | 26.0 | 26.0 | 26.0 | | | | | 57.0 | | 26.0 | 87.0 | |
| Actuated g/C Ratio | 0.22 | 0.22 | 0.22 | | | | | 0.48 | | 0.22 | 0.72 | |
| v/c Ratio | 0.16 | 0.28 | 0.50 | | | | | 0.51 | | 0.21 | 0.12 | |
| Control Delay | 40.0 | 40.6 | 13.6 | | | | | 23.1 | | 37.8 | 6.0 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.8 | | 0.0 | 0.0 | |
| Total Delay | 40.0 | 40.6 | 13.6 | | | | | 24.0 | | 37.8 | 6.0 | |
| LOS | D | D | B | | | | | C | | D | A | |
| Approach Delay | | 30.2 | | | | | | 24.0 | | | 16.8 | |
| Approach LOS | | C | | | | | | C | | | B | |
| Queue Length 50th (ft) | 31 | 57 | 0 | | | | | 177 | | 41 | 41 | |
| Queue Length 95th (ft) | 66 | 90 | 59 | | | | | 218 | | m49 | m42 | |
| Internal Link Dist (ft) | | 73 | | | 81 | | | 306 | | | 388 | |
| Turn Bay Length (ft) | | | | | | | | | | 100 | | |
| Base Capacity (vph) | 301 | 609 | 270 | | | | | 1801 | | 612 | 2108 | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 531 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.16 | 0.28 | 0.50 | | | | | 0.73 | | 0.21 | 0.12 | |

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 23.7 Intersection LOS: C
Intersection Capacity Utilization 53.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1685: Congress Street & Sudbury Street

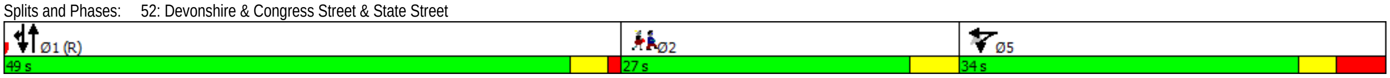


| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 54 | 38 | 250 | 87 | 261 | 463 | 103 | 225 | |
| Future Volume (vph) | 54 | 38 | 250 | 87 | 261 | 463 | 103 | 225 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Frt | | | 0.965 | | | 0.968 | | 0.850 | |
| Flt Protected | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (prot) | 1624 | 0 | 3120 | 0 | 3249 | 3013 | 0 | 1323 | |
| Flt Permitted | 0.950 | | 0.995 | | | | | | |
| Satd. Flow (perm) | 1624 | 0 | 3120 | 0 | 3249 | 3013 | 0 | 1323 | |
| Right Turn on Red | | | | Yes | | | | No | |
| Satd. Flow (RTOR) | | | 34 | | | | | | |
| Link Speed (mph) | | | 30 | | 25 | 25 | | | |
| Link Distance (ft) | | | 709 | | 126 | 431 | | | |
| Travel Time (s) | | | 16.1 | | 3.4 | 11.8 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 59 | 41 | 272 | 95 | 284 | 503 | 112 | 245 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 59 | 0 | 408 | 0 | 284 | 640 | 0 | 220 | |
| Turn Type | Split | Perm | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | 5 | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 49.0 | 49.0 | | 49.0 | 27.0 |
| Total Split (%) | 30.9% | 30.9% | 30.9% | | 44.5% | 44.5% | | 44.5% | 25% |
| Maximum Green (s) | 27.0 | 27.0 | 27.0 | | 45.0 | 45.0 | | 45.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Lost Time (s) | 7.0 | | 7.0 | | 4.0 | 4.0 | | 4.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 27.0 | | 27.0 | | 45.0 | 45.0 | | 45.0 | |
| Actuated g/C Ratio | 0.25 | | 0.25 | | 0.41 | 0.41 | | 0.41 | |
| v/c Ratio | 0.15 | | 0.52 | | 0.21 | 0.52 | | 0.41 | |
| Control Delay | 33.8 | | 35.4 | | 21.6 | 13.7 | | 13.6 | |
| Queue Delay | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 33.8 | | 35.4 | | 21.6 | 13.7 | | 13.6 | |
| LOS | C | | D | | C | B | | B | |
| Approach Delay | | | 35.2 | | 21.6 | 13.7 | | | |
| Approach LOS | | | D | | C | B | | | |
| Queue Length 50th (ft) | 33 | | 120 | | 67 | 154 | | 106 | |
| Queue Length 95th (ft) | 68 | | 170 | | 98 | 192 | | 157 | |
| Internal Link Dist (ft) | | | 629 | | 46 | 351 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 398 | | 791 | | 1329 | 1232 | | 541 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Spillback Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.15 | | 0.52 | | 0.21 | 0.52 | | 0.41 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 58 (53%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 21.3 Intersection LOS: C
Intersection Capacity Utilization 41.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 52: Devonshire & Congress Street & State Street



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 287 | 182 | 0 | 41 |
| Future Volume (Veh/h) | 0 | 0 | 287 | 182 | 0 | 41 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 312 | 198 | 0 | 45 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 426 | 178 | | | |
| pX, platoon unblocked | 0.78 | | | | 0.78 | 0.78 |
| vC, conflicting volume | 510 | | | | 411 | 411 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 227 | | | | 100 | 100 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 94 |
| cM capacity (veh/h) | 1052 | | | | 703 | 748 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 510 | 45 |
| Volume Left | 0 | 0 |
| Volume Right | 198 | 45 |
| cSH | 1700 | 748 |
| Volume to Capacity | 0.30 | 0.06 |
| Queue Length 95th (ft) | 0 | 5 |
| Control Delay (s) | 0.0 | 10.1 |
| Lane LOS | | B |
| Approach Delay (s) | 0.0 | 10.1 |
| Approach LOS | | B |

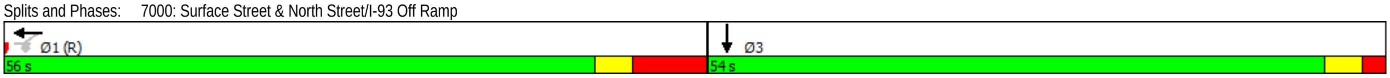
| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.8 | | |
| Intersection Capacity Utilization | 36.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 84 | 167 | 186 | 0 | 0 | 0 | 0 | 0 | 403 | 57 |
| Future Volume (vph) | 0 | 0 | 84 | 167 | 186 | 0 | 0 | 0 | 0 | 0 | 403 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 |
| Ped Bike Factor | | | | | | | | | | | 0.95 | |
| Frt | | | 0.865 | | | | | | | | 0.981 | |
| Flt Protected | | | | | 0.977 | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 1370 | 0 | 3098 | 0 | 0 | 0 | 0 | 0 | 2799 | 0 |
| Flt Permitted | | | | | 0.977 | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 1370 | 0 | 3098 | 0 | 0 | 0 | 0 | 0 | 2799 | 0 |
| Right Turn on Red | | | No | No | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | | | | | | 18 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 373 | | | 108 | | | 468 | | | 470 | |
| Travel Time (s) | | 10.2 | | | 2.9 | | | 12.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | | | | | | | | | | | | 466 |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 19 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.73 | 0.73 | 0.73 | 0.92 | 0.92 | 0.92 | 0.86 | 0.86 | 0.86 |
| Heavy Vehicles (%) | 0% | 0% | 8% | 3% | 2% | 0% | 0% | 0% | 0% | 0% | 8% | 9% |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Adj. Flow (vph) | 0 | 0 | 100 | 229 | 255 | 0 | 0 | 0 | 0 | 0 | 469 | 66 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 100 | 0 | 484 | 0 | 0 | 0 | 0 | 0 | 535 | 0 |
| Turn Type | | | Perm | Perm | NA | | | | | | NA | |
| Protected Phases | | | | | 1 | | | | | | 3 | |
| Permitted Phases | | | 1 | 1 | | | | | | | | |
| Detector Phase | | | 1 | 1 | 1 | | | | | | 3 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | 10.0 | 10.0 | 10.0 | | | | | | 10.0 | |
| Minimum Split (s) | | | 25.0 | 25.0 | 25.0 | | | | | | 25.0 | |
| Total Split (s) | | | 56.0 | 56.0 | 56.0 | | | | | | 54.0 | |
| Total Split (%) | | | 50.9% | 50.9% | 50.9% | | | | | | 49.1% | |
| Maximum Green (s) | | | 47.0 | 47.0 | 47.0 | | | | | | 49.0 | |
| Yellow Time (s) | | | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | |
| All-Red Time (s) | | | 6.0 | 6.0 | 6.0 | | | | | | 2.0 | |
| Lost Time Adjust (s) | | | -5.0 | | -5.0 | | | | | | -1.0 | |
| Total Lost Time (s) | | | 4.0 | | 4.0 | | | | | | 4.0 | |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | 2.0 | 2.0 | | | | | | 2.0 | |
| Recall Mode | | | C-Max | C-Max | C-Max | | | | | | Max | |
| Walk Time (s) | | | 7.0 | 7.0 | 7.0 | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | 5.0 | 5.0 | 5.0 | | | | | | 12.0 | |
| Pedestrian Calls (#/hr) | | | 0 | 0 | 0 | | | | | | 0 | |
| Act Effct Green (s) | | | 52.0 | | 52.0 | | | | | | 50.0 | |
| Actuated g/C Ratio | | | 0.47 | | 0.47 | | | | | | 0.45 | |
| v/c Ratio | | | 0.15 | | 0.33 | | | | | | 0.42 | |
| Control Delay | | | 9.1 | | 18.9 | | | | | | 20.2 | |
| Queue Delay | | | 0.0 | | 0.0 | | | | | | 0.0 | |
| Total Delay | | | 9.1 | | 18.9 | | | | | | 20.2 | |
| LOS | | | A | | B | | | | | | C | |
| Approach Delay | | 9.1 | | | 18.9 | | | | | | 20.2 | |
| Approach LOS | | A | | | B | | | | | | C | |
| Queue Length 50th (ft) | | | 34 | | 108 | | | | | | 174 | |
| Queue Length 95th (ft) | | | 55 | | 114 | | | | | | 217 | |
| Internal Link Dist (ft) | | 293 | | | 28 | | | 388 | | | 390 | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | | | 647 | | 1464 | | | | | | 1282 | |
| Starvation Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Spillback Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Storage Cap Reductn | | | 0 | | 0 | | | | | | 0 | |
| Reduced v/c Ratio | | | 0.15 | | 0.33 | | | | | | 0.42 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 18.6 Intersection LOS: B
Intersection Capacity Utilization 45.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 7000: Surface Street & North Street/I-93 Off Ramp



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 0 | 351 | 152 | 0 | 0 | 0 | 0 | 0 | 536 | 118 | |
| Future Volume (vph) | 0 | 0 | 0 | 351 | 152 | 0 | 0 | 0 | 0 | 0 | 536 | 118 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width (ft) | 12 | 12 | 12 | 14 | 16 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | |
| Ped Bike Factor | | | | 0.65 | 0.86 | | | | | | 0.86 | | |
| Frt | | | | | | | | | | | 0.973 | | |
| Flt Protected | | | | 0.950 | 0.980 | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 0 | 1583 | 1696 | 0 | 0 | 0 | 0 | 0 | 3677 | 0 | |
| Flt Permitted | | | | 0.950 | 0.980 | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 0 | 1029 | 1454 | 0 | 0 | 0 | 0 | 0 | 3677 | 0 | |
| Right Turn on Red | | | Yes | No | | Yes | | | Yes | | | Yes | |
| Satd. Flow (RTOR) | | | | | | | | | | | 45 | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | | |
| Link Distance (ft) | | 205 | | | 407 | | | 164 | | | 468 | | |
| Travel Time (s) | | 5.6 | | | 11.1 | | | 4.5 | | | 12.8 | | |
| Confl. Peds. (#/hr) | | | | 217 | | | | | | | | 612 | |
| Confl. Bikes (#/hr) | | | | | | | | | | | | 9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.94 | 0.94 | 0.94 | 0.92 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 4% | 8% | 0% | 0% | 0% | 0% | 0% | 5% | 11% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 373 | 162 | 0 | 0 | 0 | 0 | 0 | 589 | 130 | |
| Shared Lane Traffic (%) | | | | 30% | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 261 | 274 | 0 | 0 | 0 | 0 | 0 | 719 | 0 | |
| Turn Type | | | | Split | NA | | | | | | NA | | |
| Protected Phases | | | | 5 | 5 | | | | | | 1 | | 2 |
| Permitted Phases | | | | | | | | | | | | | |
| Detector Phase | | | | 5 | 5 | | | | | | 1 | | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | | | | 8.0 | 8.0 | | | | | | 8.0 | | 8.0 |
| Minimum Split (s) | | | | 19.0 | 19.0 | | | | | | 27.0 | | 24.0 |
| Total Split (s) | | | | 51.0 | 51.0 | | | | | | 35.0 | | 24.0 |
| Total Split (%) | | | | 46.4% | 46.4% | | | | | | 31.8% | | 22% |
| Maximum Green (s) | | | | 46.0 | 46.0 | | | | | | 29.0 | | 20.0 |
| Yellow Time (s) | | | | 3.0 | 3.0 | | | | | | 3.0 | | 4.0 |
| All-Red Time (s) | | | | 2.0 | 2.0 | | | | | | 3.0 | | 0.0 |
| Lost Time Adjust (s) | | | | -2.0 | -2.0 | | | | | | -2.0 | | |
| Total Lost Time (s) | | | | 3.0 | 3.0 | | | | | | 4.0 | | |
| Lead/Lag | | | | | | | | | | | Lead | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | 2.0 | 2.0 | | | | | | 2.0 | | 2.0 |
| Recall Mode | | | | Max | Max | | | | | | C-Max | | Ped |
| Walk Time (s) | | | | 7.0 | 7.0 | | | | | | 7.0 | | 7.0 |
| Flash Dont Walk (s) | | | | 6.0 | 6.0 | | | | | | 11.0 | | 13.0 |
| Pedestrian Calls (#/hr) | | | | 0 | 0 | | | | | | 0 | | 0 |
| Act Effct Green (s) | | | | 48.0 | 48.0 | | | | | | 31.0 | | |
| Actuated g/C Ratio | | | | 0.44 | 0.44 | | | | | | 0.28 | | |
| v/c Ratio | | | | 0.38 | 0.37 | | | | | | 0.67 | | |
| Control Delay | | | | 23.0 | 22.7 | | | | | | 29.2 | | |
| Queue Delay | | | | 0.0 | 0.0 | | | | | | 0.0 | | |
| Total Delay | | | | 23.0 | 22.7 | | | | | | 29.2 | | |
| LOS | | | | C | C | | | | | | C | | |
| Approach Delay | | | | | 22.8 | | | | | | 29.2 | | |
| Approach LOS | | | | | C | | | | | | C | | |
| Queue Length 50th (ft) | | | | 128 | 133 | | | | | | 123 | | |
| Queue Length 95th (ft) | | | | 198 | 205 | | | | | | 157 | | |
| Internal Link Dist (ft) | | 125 | | | 327 | | | 84 | | | 388 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | | | 690 | 740 | | | | | | 1068 | | |
| Starvation Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Spillback Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Storage Cap Reductn | | | | 0 | 0 | | | | | | 0 | | |
| Reduced v/c Ratio | | | | 0.38 | 0.37 | | | | | | 0.67 | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 1 (1%), Referenced to phase 1:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 26.5 Intersection LOS: C
Intersection Capacity Utilization 38.2% ICU Level of Service A
Analysis Period (min) 15

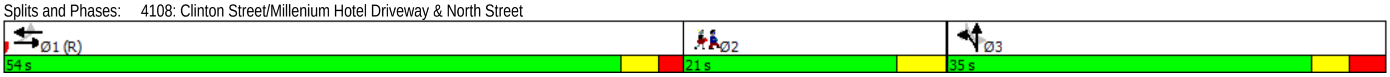
Splits and Phases: 1960: Surface Street & Clinton Street/I-93 Off Ramp

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 6 | 47 | 0 | 0 | 228 | 14 | 333 | 2 | 32 | 5 | 0 | 20 | |
| Future Volume (vph) | 6 | 47 | 0 | 0 | 228 | 14 | 333 | 2 | 32 | 5 | 0 | 20 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Ped Bike Factor | | 0.94 | | | 0.96 | | | 0.99 | | 0.96 | | 0.67 | |
| Frt | | | | | 0.991 | | | 0.973 | | | | 0.850 | |
| Flt Protected | | 0.994 | | | | | 0.950 | 0.961 | | 0.950 | | | |
| Satd. Flow (prot) | 0 | 1490 | 0 | 0 | 2847 | 0 | 1298 | 1403 | 0 | 1624 | 0 | 1454 | |
| Flt Permitted | | 0.964 | | | | | 0.950 | 0.961 | | 0.531 | | | |
| Satd. Flow (perm) | 0 | 1365 | 0 | 0 | 2847 | 0 | 1298 | 1403 | 0 | 870 | 0 | 974 | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | |
| Satd. Flow (RTOR) | | | | | 7 | | | | | | | 60 | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 30 | | |
| Link Distance (ft) | | 241 | | | 373 | | | 400 | | | 110 | | |
| Travel Time (s) | | 6.6 | | | 10.2 | | | 10.9 | | | 2.5 | | |
| Confl. Peds. (#/hr) | 349 | | | | | 349 | | | 31 | 31 | | 371 | |
| Confl. Bikes (#/hr) | | | 11 | | | 4 | | | | | | | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.84 | 0.84 | 0.84 | 0.92 | 0.92 | 0.92 | 0.67 | 0.67 | 0.67 | |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 3% | 0% | 7% | 0% | 6% | 0% | 0% | 0% | |
| Parking (#/hr) | | 0 | | | 0 | | 0 | | 0 | | | | |
| Adj. Flow (vph) | 7 | 52 | 0 | 0 | 271 | 17 | 362 | 2 | 35 | 7 | 0 | 30 | |
| Shared Lane Traffic (%) | | | | | | | 44% | | | | | | |
| Lane Group Flow (vph) | 0 | 59 | 0 | 0 | 288 | 0 | 203 | 196 | 0 | 7 | 0 | 30 | |
| Turn Type | Perm | NA | | | NA | | Split | NA | | D.Pm | | Perm | |
| Protected Phases | | 1 | | | 1 | | 3 | 3 | | | | | 2 |
| Permitted Phases | 1 | | | | | | | | | 3 | | 3 | |
| Detector Phase | 1 | 1 | | | 1 | | 3 | 3 | | 3 | | 3 | |
| Switch Phase | | | | | | | | | | | | | |
| Minimum Initial (s) | 23.0 | 23.0 | | | 23.0 | | 9.0 | 9.0 | | 9.0 | | 9.0 | 7.0 |
| Minimum Split (s) | 30.0 | 30.0 | | | 30.0 | | 16.0 | 16.0 | | 16.0 | | 16.0 | 21.0 |
| Total Split (s) | 54.0 | 54.0 | | | 54.0 | | 35.0 | 35.0 | | 35.0 | | 35.0 | 21.0 |
| Total Split (%) | 49.1% | 49.1% | | | 49.1% | | 31.8% | 31.8% | | 31.8% | | 31.8% | 19% |
| Maximum Green (s) | 49.0 | 49.0 | | | 49.0 | | 29.0 | 29.0 | | 29.0 | | 29.0 | 17.0 |
| Yellow Time (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | | | 2.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | 0.0 |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | | 0.0 | 0.0 | | 0.0 | | 0.0 | |
| Total Lost Time (s) | | 5.0 | | | 5.0 | | 6.0 | 6.0 | | 6.0 | | 6.0 | |
| Lead/Lag | Lead | Lead | | | Lead | | | | | | | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | | 2.0 | | 2.0 | 2.0 | | 2.0 | | 2.0 | 2.0 |
| Recall Mode | C-Max | C-Max | | | C-Max | | Max | Max | | Max | | Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | | | 7.0 | | | | | | | | 7.0 |
| Flash Dont Walk (s) | 5.0 | 5.0 | | | 5.0 | | | | | | | | 10.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | | | 0 | | | | | | | | 0 |
| Act Effct Green (s) | | 49.0 | | | 49.0 | | 29.0 | 29.0 | | 29.0 | | 29.0 | |
| Actuated g/C Ratio | | 0.45 | | | 0.45 | | 0.26 | 0.26 | | 0.26 | | 0.26 | |
| v/c Ratio | | 0.10 | | | 0.23 | | 0.59 | 0.53 | | 0.03 | | 0.10 | |
| Control Delay | | 42.2 | | | 11.5 | | 41.6 | 39.6 | | 30.8 | | 2.5 | |
| Queue Delay | | 0.0 | | | 0.1 | | 4.0 | 2.4 | | 0.0 | | 0.1 | |
| Total Delay | | 42.2 | | | 11.6 | | 45.6 | 42.0 | | 30.8 | | 2.7 | |
| LOS | | D | | | B | | D | D | | C | | A | |
| Approach Delay | | 42.2 | | | 11.6 | | | 43.8 | | | 8.0 | | |
| Approach LOS | | D | | | B | | | D | | | A | | |
| Queue Length 50th (ft) | | 43 | | | 30 | | 113 | 122 | | 4 | | 0 | |
| Queue Length 95th (ft) | | 84 | | | 40 | | m161 | m206 | | 11 | | 0 | |
| Internal Link Dist (ft) | | 161 | | | 293 | | | 320 | | | 30 | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | |
| Base Capacity (vph) | | 608 | | | 1272 | | 342 | 369 | | 229 | | 300 | |
| Starvation Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Spillback Cap Reductn | | 0 | | | 269 | | 77 | 84 | | 0 | | 67 | |
| Storage Cap Reductn | | 0 | | | 0 | | 0 | 0 | | 0 | | 0 | |
| Reduced v/c Ratio | | 0.10 | | | 0.29 | | 0.77 | 0.69 | | 0.03 | | 0.13 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 30.2 — Intersection LOS: C
Intersection Capacity Utilization 55.5% — ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4108: Clinton Street/Millenium Hotel Driveway & North Street

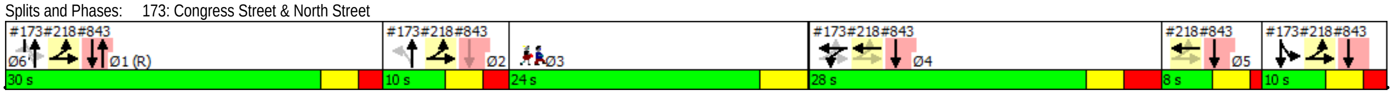


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | Ø1 | Ø2 | Ø3 | Ø5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 1 | 1 | 289 | 1 | 183 | 1 | 498 | 54 | 43 | 532 | 0 | | | | |
| Future Volume (vph) | 1 | 1 | 1 | 289 | 1 | 183 | 1 | 498 | 54 | 43 | 532 | 0 | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1700 | 1700 | 1900 | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 1.00 | | | | |
| Ped Bike Factor | | | | 0.67 | 0.76 | | | 0.96 | | | 0.99 | | | | | |
| Frt | | 0.955 | | | 0.878 | | | 0.985 | | | | | | | | |
| Flt Protected | | 0.984 | | 0.950 | 0.991 | | | | | | 0.996 | | | | | |
| Satd. Flow (prot) | 0 | 1607 | 0 | 1498 | 1108 | 0 | 0 | 4203 | 0 | 0 | 3899 | 0 | | | | |
| Flt Permitted | | 0.918 | | 0.950 | 0.991 | | | 0.939 | | | 0.842 | | | | | |
| Satd. Flow (perm) | 0 | 1499 | 0 | 1000 | 1041 | 0 | 0 | 3947 | 0 | 0 | 3249 | 0 | | | | |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes | | | | |
| Satd. Flow (RTOR) | | 1 | | | 181 | | | | | | | | | | | |
| Link Speed (mph) | | 30 | | | 25 | | | 25 | | | 25 | | | | | |
| Link Distance (ft) | | 197 | | | 141 | | | 126 | | | 439 | | | | | |
| Travel Time (s) | | 4.5 | | | 3.8 | | | 3.4 | | | 12.0 | | | | | |
| Confl. Peds. (#/hr) | | | | 314 | | 146 | | | 1133 | 1133 | | | | | | |
| Confl. Bikes (#/hr) | | | | | | 3 | | | 24 | | | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.81 | 0.92 | 0.81 | 0.92 | 0.91 | 0.91 | 0.96 | 0.96 | 0.92 | | | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 3% | 0% | 4% | 0% | 5% | 0% | 3% | 7% | 0% | | | | |
| Adj. Flow (vph) | 1 | 1 | 1 | 357 | 1 | 226 | 1 | 547 | 59 | 45 | 554 | 0 | | | | |
| Shared Lane Traffic (%) | | | | 14% | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 3 | 0 | 307 | 277 | 0 | 0 | 607 | 0 | 0 | 599 | 0 | | | | |
| Turn Type | D.Pm | NA | | Split | NA | | Perm | NA | | custom | NA | | | | | |
| Protected Phases | | | | 4! | 4 | | | 1 2 | | 6 | 1 6 | | 1 | 2 | 3 | 5 |
| Permitted Phases | 4 | 4! | | | | | 1 2 | | | 1 | | | | | | |
| Detector Phase | 4 | 4 | | 4 | 4 | | 1 2 | 1 2 | | 6 | 1 6 | | | | | |
| Switch Phase | | | | | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | | 8.0 | 8.0 | | | | | 4.0 | | | 7.0 | 3.0 | 7.0 | 3.0 |
| Minimum Split (s) | 15.0 | 15.0 | | 15.0 | 15.0 | | | | | 10.0 | | | 14.0 | 9.0 | 24.0 | 8.0 |
| Total Split (s) | 28.0 | 28.0 | | 28.0 | 28.0 | | | | | 10.0 | | | 30.0 | 10.0 | 24.0 | 8.0 |
| Total Split (%) | 25.5% | 25.5% | | 25.5% | 25.5% | | | | | 9.1% | | | 27% | 9% | 22% | 7% |
| Maximum Green (s) | 22.0 | 22.0 | | 22.0 | 22.0 | | | | | 5.0 | | | 25.0 | 5.0 | 20.0 | 4.0 |
| Yellow Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | | | 3.0 | 3.0 | 4.0 | 3.0 |
| All-Red Time (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | 2.0 | | | 2.0 | 2.0 | 0.0 | 1.0 |
| Lost Time Adjust (s) | | 0.0 | | 0.0 | 0.0 | | | | | | | | | | | |
| Total Lost Time (s) | | 6.0 | | 6.0 | 6.0 | | | | | | | | | | | |
| Lead/Lag | Lead | Lead | | Lead | Lead | | | | | | | | Lead | Lag | | Lag |
| Lead-Lag Optimize? | | | | | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | | 2.0 | 2.0 | | | | | 2.0 | | | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | Max | Max | | Max | Max | | | | | Max | | | C-Max | Max | Ped | Max |
| Walk Time (s) | | | | | | | | | | | | | | | 7.0 | |
| Flash Dont Walk (s) | | | | | | | | | | | | | | | 13.0 | |
| Pedestrian Calls (#/hr) | | | | | | | | | | | | | | | 0 | |
| Act Effct Green (s) | | 22.0 | | 22.0 | 22.0 | | | 35.0 | | | 30.0 | | | | | |
| Actuated g/C Ratio | | 0.20 | | 0.20 | 0.20 | | | 0.32 | | | 0.27 | | | | | |
| v/c Ratio | | 0.01 | | 1.03 | 0.76 | | | 0.48 | | | 0.65 | | | | | |
| Control Delay | | 31.7 | | 79.4 | 19.9 | | | 2.3 | | | 40.9 | | | | | |
| Queue Delay | | 0.0 | | 26.3 | 33.5 | | | 0.4 | | | 0.0 | | | | | |
| Total Delay | | 31.7 | | 105.7 | 53.4 | | | 2.7 | | | 40.9 | | | | | |
| LOS | | C | | F | D | | | A | | | D | | | | | |
| Approach Delay | | 31.7 | | | 80.9 | | | 2.7 | | | 40.9 | | | | | |
| Approach LOS | | C | | | F | | | A | | | D | | | | | |
| Queue Length 50th (ft) | | 1 | | ~95 | 24 | | | 10 | | | 104 | | | | | |
| Queue Length 95th (ft) | | 9 | | m#310 | m81 | | | 13 | | | 149 | | | | | |
| Internal Link Dist (ft) | | 117 | | | 61 | | | 46 | | | 359 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | | | | | |
| Base Capacity (vph) | | 300 | | 299 | 366 | | | 1255 | | | 915 | | | | | |
| Starvation Cap Reductn | | 0 | | 42 | 97 | | | 261 | | | 0 | | | | | |
| Spillback Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Storage Cap Reductn | | 0 | | 0 | 0 | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | 0.01 | | 1.19 | 1.03 | | | 0.61 | | | 0.65 | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 41.0 — Intersection LOS: D
Intersection Capacity Utilization 65.0% — ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 173: Congress Street & North Street



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR | Ø1 | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 46 | 52 | 473 | 110 | 0 | 0 | | | | | | |
| Future Volume (vph) | 46 | 52 | 473 | 110 | 0 | 0 | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | | | | | | |
| Ped Bike Factor | 0.90 | | 0.90 | | | | | | | | | |
| Frt | | | 0.972 | | | | | | | | | |
| Flt Protected | 0.950 | | | | | | | | | | | |
| Satd. Flow (prot) | 1624 | 1693 | 2704 | 0 | 0 | 0 | | | | | | |
| Flt Permitted | 0.220 | | | | | | | | | | | |
| Satd. Flow (perm) | 340 | 1693 | 2704 | 0 | 0 | 0 | | | | | | |
| Right Turn on Red | | | | Yes | | Yes | | | | | | |
| Satd. Flow (RTOR) | | | 25 | | | | | | | | | |
| Link Speed (mph) | | 25 | 25 | | 25 | | | | | | | |
| Link Distance (ft) | | 141 | 241 | | 180 | | | | | | | |
| Travel Time (s) | | 3.8 | 6.6 | | 4.9 | | | | | | | |
| Confl. Peds. (#/hr) | 331 | | | 331 | | | | | | | | |
| Confl. Bikes (#/hr) | | | | 4 | | | | | | | | |
| Peak Hour Factor | 0.86 | 0.86 | 0.91 | 0.91 | 0.92 | 0.92 | | | | | | |
| Heavy Vehicles (%) | 0% | 1% | 5% | 6% | 0% | 0% | | | | | | |
| Parking (#/hr) | | | | 0 | | | | | | | | |
| Adj. Flow (vph) | 53 | 60 | 520 | 121 | 0 | 0 | | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 53 | 60 | 641 | 0 | 0 | 0 | | | | | | |
| Turn Type | D.P+P | NA | NA | | | | | | | | | |
| Protected Phases | 1 2 6 | 1 2 6 | 4 5 | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | 4 5 | 4 5 | | | | | | | | | | |
| Detector Phase | 1 2 6 | 1 2 6 | 4 5 | | | | | | | | | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | | | | | | | 7.0 | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | | | | | 14.0 | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | | | | | 30.0 | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | | | | | 27% | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | | | | | 25.0 | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | | | | | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | | | | | 2.0 | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | | | | | | | | | | |
| Total Lost Time (s) | | | | | | | | | | | | |
| Lead/Lag | | | | | | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | | | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | | | | | C-Max | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | | 0 | | | |
| Act Effct Green (s) | 76.0 | 81.0 | 30.0 | | | | | | | | | |
| Actuated g/C Ratio | 0.69 | 0.74 | 0.27 | | | | | | | | | |
| v/c Ratio | 0.07 | 0.05 | 0.85 | | | | | | | | | |
| Control Delay | 0.5 | 0.4 | 35.4 | | | | | | | | | |
| Queue Delay | 0.7 | 1.5 | 50.1 | | | | | | | | | |
| Total Delay | 1.1 | 1.9 | 85.6 | | | | | | | | | |
| LOS | A | A | F | | | | | | | | | |
| Approach Delay | | 1.5 | 85.6 | | | | | | | | | |
| Approach LOS | | A | F | | | | | | | | | |
| Queue Length 50th (ft) | 1 | 1 | 197 | | | | | | | | | |
| Queue Length 95th (ft) | m1 | m1 | #314 | | | | | | | | | |
| Internal Link Dist (ft) | | 61 | 161 | | 100 | | | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | | |
| Base Capacity (vph) | 760 | 1246 | 755 | | | | | | | | | |
| Starvation Cap Reductn | 531 | 1068 | 201 | | | | | | | | | |
| Spillback Cap Reductn | 0 | 0 | 95 | | | | | | | | | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | | | | | |
| Reduced v/c Ratio | 0.23 | 0.34 | 1.16 | | | | | | | | | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 73.0 Intersection LOS: E
Intersection Capacity Utilization 35.1% ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 218: North Street & Union Street

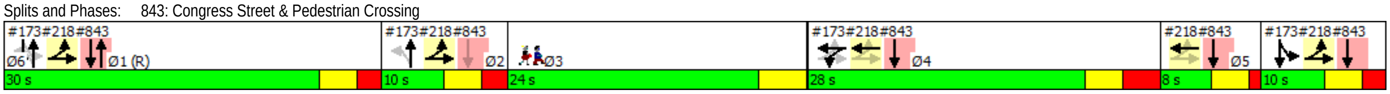
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 0 | 553 | 0 | 0 | 814 | | | | | |
| Future Volume (vph) | 0 | 0 | 553 | 0 | 0 | 814 | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | | | | | |
| Lane Width (ft) | 12 | 12 | 11 | 12 | 12 | 12 | | | | | |
| Lane Util. Factor | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | | | | | |
| Frt | | | | | | | | | | | |
| Flt Protected | | | | | | | | | | | |
| Satd. Flow (prot) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Flt Permitted | | | | | | | | | | | |
| Satd. Flow (perm) | 0 | 0 | 4513 | 0 | 0 | 4668 | | | | | |
| Right Turn on Red | | Yes | | Yes | | | | | | | |
| Satd. Flow (RTOR) | | | | | | | | | | | |
| Link Speed (mph) | 25 | | 25 | | | 25 | | | | | |
| Link Distance (ft) | 564 | | 422 | | | 126 | | | | | |
| Travel Time (s) | 15.4 | | 11.5 | | | 3.4 | | | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | | |
| Adj. Flow (vph) | 0 | 0 | 601 | 0 | 0 | 885 | | | | | |
| Shared Lane Traffic (%) | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 0 | 601 | 0 | 0 | 885 | | | | | |
| Turn Type | | | NA | | | NA | | | | | |
| Protected Phases | | | 1 | | | 1 4 5 6 | 2 | 3 | 4 | 5 | 6 |
| Permitted Phases | | | | | | 2 | | | | | |
| Detector Phase | | | 1 | | | 1 4 5 6 | | | | | |
| Switch Phase | | | | | | | | | | | |
| Minimum Initial (s) | | | 7.0 | | | | 3.0 | 7.0 | 8.0 | 3.0 | 4.0 |
| Minimum Split (s) | | | 14.0 | | | | 9.0 | 24.0 | 15.0 | 8.0 | 10.0 |
| Total Split (s) | | | 30.0 | | | | 10.0 | 24.0 | 28.0 | 8.0 | 10.0 |
| Total Split (%) | | | 27.3% | | | | 9% | 22% | 25% | 7% | 9% |
| Maximum Green (s) | | | 25.0 | | | | 5.0 | 20.0 | 22.0 | 4.0 | 5.0 |
| Yellow Time (s) | | | 3.0 | | | | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| All-Red Time (s) | | | 2.0 | | | | 2.0 | 0.0 | 3.0 | 1.0 | 2.0 |
| Lost Time Adjust (s) | | | 0.0 | | | | | | | | |
| Total Lost Time (s) | | | 5.0 | | | | | | | | |
| Lead/Lag | | | Lead | | | | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | |
| Vehicle Extension (s) | | | 2.0 | | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Recall Mode | | | C-Max | | | | Max | Ped | Max | Max | Max |
| Walk Time (s) | | | | | | | | 7.0 | | | |
| Flash Dont Walk (s) | | | | | | | | 13.0 | | | |
| Pedestrian Calls (#/hr) | | | | | | | | 0 | | | |
| Act Effct Green (s) | | | 25.0 | | | 81.0 | | | | | |
| Actuated g/C Ratio | | | 0.23 | | | 0.74 | | | | | |
| v/c Ratio | | | 0.59 | | | 0.26 | | | | | |
| Control Delay | | | 21.2 | | | 0.2 | | | | | |
| Queue Delay | | | 0.2 | | | 1.0 | | | | | |
| Total Delay | | | 21.4 | | | 1.2 | | | | | |
| LOS | | | C | | | A | | | | | |
| Approach Delay | | | 21.4 | | | 1.2 | | | | | |
| Approach LOS | | | C | | | A | | | | | |
| Queue Length 50th (ft) | | | 68 | | | 0 | | | | | |
| Queue Length 95th (ft) | | | 86 | | | m1 | | | | | |
| Internal Link Dist (ft) | 484 | | 342 | | | 46 | | | | | |
| Turn Bay Length (ft) | | | | | | | | | | | |
| Base Capacity (vph) | | | 1025 | | | 3437 | | | | | |
| Starvation Cap Reductn | | | 0 | | | 2196 | | | | | |
| Spillback Cap Reductn | | | 76 | | | 0 | | | | | |
| Storage Cap Reductn | | | 0 | | | 0 | | | | | |
| Reduced v/c Ratio | | | 0.63 | | | 0.71 | | | | | |

Intersection Summary

| | |
|---|---|
| Area Type: | CBD |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 50 (45%), Referenced to phase 1:NBSB, Start of Green | |
| Natural Cycle: 90 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 1.03 | |
| Intersection Signal Delay: 9.4 | Intersection LOS: A |
| Intersection Capacity Utilization 21.6% | ICU Level of Service A |
| Analysis Period (min) 15 | |

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

Splits and Phases: 843: Congress Street & Pedestrian Crossing

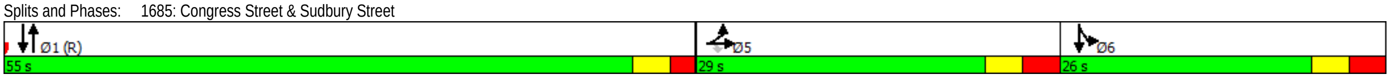


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 55 | 309 | 108 | 0 | 0 | 0 | 0 | 553 | 227 | 144 | 467 | 0 |
| Future Volume (vph) | 55 | 309 | 108 | 0 | 0 | 0 | 0 | 553 | 227 | 144 | 467 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 10 | 12 | 12 | 12 | 11 | 11 | 11 | 10 | 11 | 11 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 0 | | 0 | 100 | | 0 |
| Storage Lanes | 1 | | 1 | 0 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 |
| Ped Bike Factor | 0.68 | | 0.61 | | | | | 0.88 | | 0.86 | | |
| Frt | | | 0.850 | | | | | 0.956 | | | | |
| Flt Protected | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (prot) | 1392 | 2842 | 1280 | 0 | 0 | 0 | 0 | 3632 | 0 | 2884 | 2804 | 0 |
| Flt Permitted | 0.950 | | | | | | | | | 0.950 | | |
| Satd. Flow (perm) | 950 | 2842 | 781 | 0 | 0 | 0 | 0 | 3632 | 0 | 2491 | 2804 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | | 117 | | | | | | | | | |
| Link Speed (mph) | | 25 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 153 | | | 161 | | | 395 | | | 468 | |
| Travel Time (s) | | 4.2 | | | 4.4 | | | 10.8 | | | 12.8 | |
| Confl. Peds. (#/hr) | 236 | | 435 | | | | | | 650 | 650 | | |
| Confl. Bikes (#/hr) | | | 5 | | | | | | 46 | | | 2 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.98 | 0.98 | 0.98 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles (%) | 5% | 5% | 6% | 0% | 0% | 0% | 0% | 3% | 7% | 2% | 12% | 0% |
| Parking (#/hr) | 0 | 0 | | | | | | | | | | |
| Adj. Flow (vph) | 60 | 336 | 117 | 0 | 0 | 0 | 0 | 564 | 232 | 155 | 502 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 60 | 336 | 117 | 0 | 0 | 0 | 0 | 796 | 0 | 155 | 502 | 0 |
| Turn Type | Split | NA | Perm | | | | | NA | | Prot | NA | |
| Protected Phases | 5 | 5 | | | | | | 1 | | 6 | 1 6 | |
| Permitted Phases | | | 5 | | | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | | | | 1 | | 6 | 1 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 8.0 | 8.0 | 8.0 | | | | | 10.0 | | 7.0 | | |
| Minimum Split (s) | 26.0 | 26.0 | 26.0 | | | | | 30.0 | | 26.0 | | |
| Total Split (s) | 29.0 | 29.0 | 29.0 | | | | | 55.0 | | 26.0 | | |
| Total Split (%) | 26.4% | 26.4% | 26.4% | | | | | 50.0% | | 23.6% | | |
| Maximum Green (s) | 23.0 | 23.0 | 23.0 | | | | | 50.0 | | 20.0 | | |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | | | | 3.0 | | 3.0 | | |
| All-Red Time (s) | 3.0 | 3.0 | 3.0 | | | | | 2.0 | | 3.0 | | |
| Lost Time Adjust (s) | -2.0 | -2.0 | -2.0 | | | | | -2.0 | | -2.0 | | |
| Total Lost Time (s) | 4.0 | 4.0 | 4.0 | | | | | 3.0 | | 4.0 | | |
| Lead/Lag | Lead | Lead | Lead | | | | | | | Lag | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | | | | 2.0 | | 2.0 | | |
| Recall Mode | Max | Max | Max | | | | | C-Max | | Max | | |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | | | | 7.0 | | 7.0 | | |
| Flash Dont Walk (s) | 13.0 | 13.0 | 13.0 | | | | | 18.0 | | 13.0 | | |
| Pedestrian Calls (#/hr) | 500 | 500 | 500 | | | | | 500 | | 500 | | |
| Act Effct Green (s) | 25.0 | 25.0 | 25.0 | | | | | 52.0 | | 22.0 | 78.0 | |
| Actuated g/C Ratio | 0.23 | 0.23 | 0.23 | | | | | 0.47 | | 0.20 | 0.71 | |
| v/c Ratio | 0.19 | 0.52 | 0.44 | | | | | 0.46 | | 0.27 | 0.25 | |
| Control Delay | 36.3 | 40.6 | 12.1 | | | | | 13.8 | | 39.1 | 9.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 4.1 | 0.0 | |
| Total Delay | 36.3 | 40.6 | 12.1 | | | | | 13.9 | | 43.2 | 9.8 | |
| LOS | D | D | B | | | | | B | | D | A | |
| Approach Delay | | 33.6 | | | | | | 13.9 | | | 17.7 | |
| Approach LOS | | C | | | | | | B | | | B | |
| Queue Length 50th (ft) | 34 | 110 | 0 | | | | | 81 | | 48 | 95 | |
| Queue Length 95th (ft) | 72 | 157 | 52 | | | | | 103 | | m55 | m103 | |
| Internal Link Dist (ft) | | 73 | | | 81 | | | 315 | | | 388 | |
| Turn Bay Length (ft) | | | | | | | | | | 100 | | |
| Base Capacity (vph) | 316 | 645 | 267 | | | | | 1716 | | 576 | 1988 | |
| Starvation Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | | | | | 73 | | 342 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | | | | | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.19 | 0.52 | 0.44 | | | | | 0.48 | | 0.66 | 0.25 | |

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 20.3 Intersection LOS: C
Intersection Capacity Utilization 53.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1685: Congress Street & Sudbury Street



| Lane Group | WBL2 | WBL | WBT | WBR | NBT | SBT | SBR | SBR2 | Ø2 |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Traffic Volume (vph) | 97 | 68 | 325 | 145 | 408 | 492 | 102 | 228 | |
| Future Volume (vph) | 97 | 68 | 325 | 145 | 408 | 492 | 102 | 228 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.95 | 0.95 | 0.91 | 0.91 | 0.91 | |
| Frt | | | 0.959 | | | 0.970 | | 0.850 | |
| Flt Protected | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (prot) | 1805 | 0 | 3441 | 0 | 3610 | 3354 | 0 | 1470 | |
| Flt Permitted | 0.950 | | 0.994 | | | | | | |
| Satd. Flow (perm) | 1805 | 0 | 3441 | 0 | 3610 | 3354 | 0 | 1470 | |
| Right Turn on Red | | | | Yes | | | | Yes | |
| Satd. Flow (RTOR) | | | 47 | | | 4 | | 223 | |
| Link Speed (mph) | | | 30 | | 25 | 25 | | | |
| Link Distance (ft) | | | 758 | | 359 | 422 | | | |
| Travel Time (s) | | | 17.2 | | 9.8 | 11.5 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | |
| Adj. Flow (vph) | 105 | 74 | 353 | 158 | 443 | 535 | 111 | 248 | |
| Shared Lane Traffic (%) | | | | | | | | 10% | |
| Lane Group Flow (vph) | 105 | 0 | 585 | 0 | 443 | 671 | 0 | 223 | |
| Turn Type | Split | Perm | NA | | NA | NA | | Prot | |
| Protected Phases | 5 | | 5 | | 1 | 1 | | 1 | 2 |
| Permitted Phases | | 5 | | | | | | | |
| Detector Phase | 5 | 5 | 5 | | 1 | 1 | | 1 | |
| Switch Phase | | | | | | | | | |
| Minimum Initial (s) | 9.0 | 9.0 | 9.0 | | 10.0 | 10.0 | | 10.0 | 7.0 |
| Minimum Split (s) | 34.0 | 34.0 | 34.0 | | 23.0 | 23.0 | | 23.0 | 27.0 |
| Total Split (s) | 36.0 | 36.0 | 36.0 | | 47.0 | 47.0 | | 47.0 | 27.0 |
| Total Split (%) | 32.7% | 32.7% | 32.7% | | 42.7% | 42.7% | | 42.7% | 25% |
| Maximum Green (s) | 29.0 | 29.0 | 29.0 | | 43.0 | 43.0 | | 43.0 | 23.0 |
| Yellow Time (s) | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 4.0 |
| All-Red Time (s) | 4.0 | 4.0 | 4.0 | | 1.0 | 1.0 | | 1.0 | 0.0 |
| Lost Time Adjust (s) | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Total Lost Time (s) | 7.0 | | 7.0 | | 4.0 | 4.0 | | 4.0 | |
| Lead/Lag | | | | | Lead | Lead | | Lead | Lag |
| Lead-Lag Optimize? | | | | | | | | | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 |
| Recall Mode | Max | Max | Max | | C-Max | C-Max | | C-Max | Ped |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | 19.0 | 19.0 | 19.0 | | 10.0 | 10.0 | | 10.0 | 16.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 29.0 | | 29.0 | | 43.0 | 43.0 | | 43.0 | |
| Actuated g/C Ratio | 0.26 | | 0.26 | | 0.39 | 0.39 | | 0.39 | |
| v/c Ratio | 0.22 | | 0.62 | | 0.31 | 0.51 | | 0.31 | |
| Control Delay | 33.2 | | 36.0 | | 24.0 | 12.8 | | 3.9 | |
| Queue Delay | 0.0 | | 0.0 | | 0.0 | 0.3 | | 0.0 | |
| Total Delay | 33.2 | | 36.0 | | 24.0 | 13.1 | | 3.9 | |
| LOS | C | | D | | C | B | | A | |
| Approach Delay | | | 35.6 | | 24.0 | 10.8 | | | |
| Approach LOS | | | D | | C | B | | | |
| Queue Length 50th (ft) | 58 | | 176 | | 112 | 125 | | 26 | |
| Queue Length 95th (ft) | 105 | | 237 | | 153 | 155 | | 63 | |
| Internal Link Dist (ft) | | | 678 | | 279 | 342 | | | |
| Turn Bay Length (ft) | | | | | | | | | |
| Base Capacity (vph) | 475 | | 941 | | 1411 | 1313 | | 710 | |
| Starvation Cap Reductn | 0 | | 0 | | 0 | 208 | | 0 | |
| Spillback Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Storage Cap Reductn | 0 | | 0 | | 0 | 0 | | 0 | |
| Reduced v/c Ratio | 0.22 | | 0.62 | | 0.31 | 0.61 | | 0.31 | |

Intersection Summary

| | |
|---|---|
| Area Type: | Other |
| Cycle Length: 110 | |
| Actuated Cycle Length: 110 | |
| Offset: 43 (39%), Referenced to phase 1:NBSB, Start of Green | |
| Natural Cycle: 85 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.62 | |
| Intersection Signal Delay: 22.1 | Intersection LOS: C |
| Intersection Capacity Utilization 44.1% | ICU Level of Service A |
| Analysis Period (min) 15 | |

Splits and Phases: 52: Devonshire Street & Congress Street & State Street

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 199 | 64 | 0 | 125 |
| Future Volume (Veh/h) | 0 | 0 | 199 | 64 | 0 | 125 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 216 | 70 | 0 | 136 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | 400 | 205 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 286 | | | | 251 | 251 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 286 | | | | 251 | 251 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 83 |
| cM capacity (veh/h) | 1288 | | | | 742 | 793 |

| Direction, Lane # | WB 1 | SB 1 |
|---|---|---|
| Volume Total | 286 | 136 |
| Volume Left | 0 | 0 |
| Volume Right | 70 | 136 |
| cSH | 1700 | 793 |
| Volume to Capacity | 0.17 | 0.17 |
| Queue Length 95th (ft) | 0 | 15 |
| Control Delay (s) | 0.0 | 10.5 |
| Lane LOS | | B |
| Approach Delay (s) | 0.0 | 10.5 |
| Approach LOS | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.4 | | |
| Intersection Capacity Utilization | 28.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

**Dock Square Garage**

Trip Generation Assessment

HOWARD STEIN HUDSON

20-Dec-2017

XX HARD CODED TO BALANCE

| Land Use | Size | Category | Directional Split | Average Trip Rate | Unadjusted Vehicle Trips | Assumed National Vehicle Occupancy Rate[1] | Unadjusted Person-Trips | Transit Share[3] | Transit Person-Trips | Walk/Bike/ Other Share[3] | Walk/ Bike/ Other Trips | Auto Share[3] | Auto Person-Trips | Private Auto Person-Trips | Assumed Local Auto Occupancy Rate[4] | Total Adjusted Private Auto Trips |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Daily Peak Hour** | | | | | | | | | | | | | | | | |
| Multifamily Housing (High Rise)[5] | 195 | Total | | 4.450 | 868 | 1.13 | **980** | 30% | **294** | 42% | **412** | 28% | **274** | 274 | 1.13 | **242** |
| | units | In | 50% | 2.225 | 434 | 1.13 | **490** | 30% | **147** | 42% | **206** | 28% | **137** | 137 | 1.13 | **121** |
| | | Out | 50% | 2.225 | 434 | 1.13 | **490** | 30% | **147** | 42% | **206** | 28% | **137** | 137 | 1.13 | **121** |
| Shopping Center[6] | 7.753 | Total | | 37.750 | 292 | 1.78 | **520** | 20% | **104** | 59% | **306** | 21% | **110** | 110 | 1.78 | **62** |
| | KSF | In | 50% | 18.875 | 146 | 1.78 | **260** | 20% | **52** | 59% | **153** | 21% | **55** | 55 | 1.78 | **31** |
| | | Out | 50% | 18.875 | 146 | 1.78 | **260** | 20% | **52** | 59% | **153** | 21% | **55** | 55 | 1.78 | **31** |
| **Total** | | Total | | | **1,160** | | **1,500** | | **398** | | **718** | | **384** | **384** | | **304** |
| | | In | | | **580** | | **750** | | **199** | | **359** | | **192** | **192** | | **152** |
| | | Out | | | **580** | | **750** | | **199** | | **359** | | **192** | **192** | | **152** |
| **AM Peak Hour** | | | | | | | | | | | | | | | | |
| Multifamily Housing (High Rise)[5] | 195 | Total | | 0.310 | 61 | 1.13 | **69** | | **18** | | **28** | | **23** | 23 | 1.13 | **20** |
| | units | In | 24% | 0.074 | 15 | 1.13 | **17** | 52% | **9** | 7% | **1** | 41% | **7** | 7 | 1.13 | **6** |
| | | Out | 76% | 0.236 | 46 | 1.13 | **52** | 18% | **9** | 51% | **27** | 31% | **16** | 16 | 1.13 | **14** |
| Shopping Center[6] | 7.753 | Total | | 0.94 | 8 | 1.78 | **14** | | **5** | | **3** | | **6** | 6 | 1.78 | **3** |
| | KSF | In | 62% | 0.583 | 5 | 1.78 | **9** | 46% | **4** | 14% | **1** | 40% | **4** | 4 | 1.78 | **2** |
| | | Out | 38% | 0.357 | 3 | 1.78 | **5** | 10% | **1** | 58% | **2** | 32% | **2** | 2 | 1.78 | **1** |
| **Total** | | Total | | | **69** | | **83** | | **23** | | **31** | | **29** | **29** | | **23** |
| | | In | | | **20** | | **26** | | **13** | | **2** | | **11** | **11** | | **8** |
| | | Out | | | **49** | | **57** | | **10** | | **29** | | **18** | **18** | | **15** |
| **PM Peak Hour** | | | | | | | | | | | | | | | | |
| Multifamily Housing (High Rise)[5] | 195 | Total | | 0.360 | 70 | 1.13 | **80** | | **25** | | **27** | | **28** | 28 | 1.13 | **25** |
| | units | In | 61% | 0.220 | 43 | 1.13 | **49** | 18% | **9** | 51% | **25** | 31% | **15** | 15 | 1.13 | **13** |
| | | Out | 39% | 0.140 | 27 | 1.13 | **31** | 52% | **16** | 7% | **2** | 41% | **13** | 13 | 1.13 | **12** |
| Shopping Center[6] | 7.753 | Total | | 3.81 | 29 | 1.78 | **52** | | **15** | | **18** | | **19** | 19 | 1.78 | **10** |
| | KSF | In | 48% | 1.829 | 14 | 1.78 | **25** | 10% | **3** | 58% | **14** | 32% | **8** | 8 | 1.78 | **4** |
| | | Out | 52% | 1.981 | 15 | 1.78 | **27** | 46% | **12** | 14% | **4** | 40% | **11** | 11 | 1.78 | **6** |
| **Total** | | Total | | | **99** | | **132** | | **40** | | **45** | | **47** | **47** | | **35** |
| | | In | | | **57** | | **74** | | **12** | | **39** | | **23** | **23** | | **17** |
| | | Out | | | **42** | | **58** | | **28** | | **6** | | **24** | **24** | | **18** |

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on peak-hour BTD Data for Area 2
4. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
5. ITE Trip Generation Manual, 10th Edition, LUC 222 (Multifamily Housing High-Rise (11+ Floors)), average rate
6. ITE Trip Generation Manual, 10th Edition, LUC 820 (Shopping Center), average rate

# Appendix D

## Wind

**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 | Annual | 6 | | Sitting | 10 | | Acceptable |
| | B | Annual | 14 | 133% | Standing | 21 | 110% | Acceptable |
| **2** | A | -- | -- | -- | -- | -- | -- | -- |
| | B | Annual | 13 | | Standing | 21 | | Acceptable |
| **3** | A | -- | -- | -- | -- | -- | -- | -- |
| | B | Annual | 11 | | Sitting | 18 | | Acceptable |
| **4** | A | Annual | 6 | | Sitting | 10 | | Acceptable |
| | B | Annual | 8 | 33% | Sitting | 14 | 40% | Acceptable |
| **5** | A | Annual | 9 | | Sitting | 16 | | Acceptable |
| | B | Annual | 18 | 100% | Walking | 24 | 50% | Acceptable |
| **6** | A | Annual | 8 | | Sitting | 14 | | Acceptable |
| | B | Annual | 13 | 62% | Standing | 19 | 36% | Acceptable |
| **7** | A | Annual | 9 | | Sitting | 14 | | Acceptable |
| | B | Annual | 11 | 22% | Sitting | 17 | 21% | Acceptable |
| **8** | A | Annual | 10 | | Sitting | 15 | | Acceptable |
| | B | Annual | 12 | 20% | Sitting | 18 | 20% | Acceptable |
| **9** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 14 | 40% | Standing | 21 | 31% | Acceptable |
| **10** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 16 | 60% | Walking | 24 | 50% | Acceptable |
| **11** | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 18 | 38% | Walking | 26 | 37% | Acceptable |
| **12** | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 20 | 43% | Uncomfortable | 27 | 29% | Acceptable |
| **13** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 16 | 45% | Walking | 22 | 29% | Acceptable |
| **14** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 14 | 27% | Standing | 20 | 18% | Acceptable |
| **15** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 16 | 45% | Walking | 21 | 24% | Acceptable |
| **16** | A | Annual | 13 | | Standing | 18 | | Acceptable |
| | B | Annual | 16 | 23% | Walking | 22 | 22% | Acceptable |

Table 1: Mean Speed and Effective Gust Categories - Annual

| Location | Configuration | Season | Mean Wind Speed: Speed (mph) | Mean Wind Speed: % Change | Mean Wind Speed: Rating | Effective Gust Wind Speed: Speed (mph) | Effective Gust Wind Speed: % Change | Effective Gust Wind Speed: Rating |
|---|---|---|---|---|---|---|---|---|
| **17** | A | Annual | 13 | | Standing | 18 | | Acceptable |
| | B | Annual | 15 | 15% | Standing | 21 | 17% | Acceptable |
| **18** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 17 | 55% | Walking | 23 | 35% | Acceptable |
| **19** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 9 | | Sitting | 13 | -13% | Acceptable |
| **20** | A | Annual | 12 | | Sitting | 17 | | Acceptable |
| | B | Annual | 8 | -33% | Sitting | 13 | -24% | Acceptable |
| **21** | A | Annual | 6 | | Sitting | 10 | | Acceptable |
| | B | Annual | 8 | 33% | Sitting | 11 | | Acceptable |
| **22** | A | Annual | 7 | | Sitting | 11 | | Acceptable |
| | B | Annual | 10 | 43% | Sitting | 14 | 27% | Acceptable |
| **23** | A | Annual | 10 | | Sitting | 15 | | Acceptable |
| | B | Annual | 11 | | Sitting | 17 | 13% | Acceptable |
| **24** | A | Annual | 8 | | Sitting | 13 | | Acceptable |
| | B | Annual | 13 | 62% | Standing | 19 | 46% | Acceptable |
| **25** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 14 | 56% | Standing | 20 | 33% | Acceptable |
| **26** | A | Annual | 11 | | Sitting | 18 | | Acceptable |
| | B | Annual | 16 | 45% | Walking | 23 | 28% | Acceptable |
| **27** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 17 | 89% | Walking | 25 | 67% | Acceptable |
| **28** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 17 | 89% | Walking | 24 | 60% | Acceptable |
| **29** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 18 | 100% | Walking | 24 | 60% | Acceptable |
| **30** | A | Annual | 10 | | Sitting | 17 | | Acceptable |
| | B | Annual | 15 | 50% | Standing | 23 | 35% | Acceptable |
| **31** | A | Annual | 11 | | Sitting | 18 | | Acceptable |
| | B | Annual | 13 | 18% | Standing | 20 | 11% | Acceptable |
| **32** | A | Annual | 14 | | Standing | 22 | | Acceptable |
| | B | Annual | 14 | | Standing | 22 | | 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 |
| **33** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 12 | 20% | Sitting | 19 | 19% | Acceptable |
| **34** | A | Annual | 8 | | Sitting | 15 | | Acceptable |
| | B | Annual | 11 | 38% | Sitting | 17 | 13% | Acceptable |
| **35** | A | Annual | 8 | | Sitting | 14 | | Acceptable |
| | B | Annual | 18 | 125% | Walking | 24 | 71% | Acceptable |
| **36** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 16 | 60% | Walking | 23 | 44% | Acceptable |
| **37** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 16 | 78% | Walking | 24 | 60% | Acceptable |
| **38** | A | Annual | 16 | | Walking | 21 | | Acceptable |
| | B | Annual | 18 | 12% | Walking | 26 | 24% | Acceptable |
| **39** | A | Annual | 17 | | Walking | 22 | | Acceptable |
| | B | Annual | 18 | | Walking | 24 | | Acceptable |
| **40** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 16 | | Walking | 23 | | Acceptable |
| **41** | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 15 | | Standing | 21 | | Acceptable |
| **42** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 11 | | Sitting | 17 | | Acceptable |
| **43** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 10 | | Sitting | 16 | | Acceptable |
| **44** | A | Annual | 11 | | Sitting | 16 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | 12% | Acceptable |
| **45** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 18 | 20% | Walking | 24 | | Acceptable |
| **46** | A | Annual | 7 | | Sitting | 12 | | Acceptable |
| | B | Annual | 10 | 43% | Sitting | 15 | 25% | Acceptable |
| **47** | A | Annual | 8 | | Sitting | 13 | | Acceptable |
| | B | Annual | 8 | | Sitting | 14 | | Acceptable |
| **48** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 10 | 11% | Sitting | 17 | 13% | 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 |
| **49** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 12 | 20% | Sitting | 19 | 19% | Acceptable |
| **50** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 10 | | Sitting | 17 | | Acceptable |
| **51** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| **52** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 12 | 20% | Sitting | 18 | 12% | Acceptable |
| **53** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 13 | 18% | Standing | 18 | | Acceptable |
| **54** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 10 | 11% | Sitting | 16 | | Acceptable |
| **55** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| **56** | A | Annual | 12 | | Sitting | 17 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| **57** | A | Annual | 8 | | Sitting | 13 | | Acceptable |
| | B | Annual | 9 | 12% | Sitting | 14 | | Acceptable |
| **58** | A | Annual | 9 | | Sitting | 15 | | Acceptable |
| | B | Annual | 9 | | Sitting | 15 | | Acceptable |
| **59** | A | Annual | 11 | | Sitting | 18 | | Acceptable |
| | B | Annual | 11 | | Sitting | 18 | | Acceptable |
| **60** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | Acceptable |
| **61** | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 13 | | Standing | 20 | | Acceptable |
| **62** | A | Annual | 8 | | Sitting | 14 | | Acceptable |
| | B | Annual | 10 | 25% | Sitting | 15 | | Acceptable |
| **63** | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| **64** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 13 | | Standing | 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 |
| **65** | A | Annual | 18 | | Walking | 26 | | Acceptable |
| | B | Annual | 18 | | Walking | 26 | | Acceptable |
| **66** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 13 | | Standing | 20 | | Acceptable |
| **67** | A | Annual | 12 | | Sitting | 19 | | Acceptable |
| | B | Annual | 11 | | Sitting | 18 | | Acceptable |
| **68** | A | Annual | 11 | | Sitting | 18 | | Acceptable |
| | B | Annual | 13 | 18% | Standing | 20 | 11% | Acceptable |
| **69** | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 15 | 25% | Standing | 21 | 17% | Acceptable |
| **70** | A | Annual | 12 | | Sitting | 17 | | Acceptable |
| | B | Annual | 15 | 25% | Standing | 21 | 24% | Acceptable |
| **71** | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 14 | 17% | Standing | 20 | 11% | Acceptable |
| **72** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 11 | -27% | Sitting | 18 | -14% | Acceptable |
| **73** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 12 | | Sitting | 19 | | Acceptable |
| **74** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 10 | | Sitting | 16 | | Acceptable |
| **75** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 9 | | Sitting | 15 | | Acceptable |
| **76** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 12 | | Sitting | 17 | | Acceptable |
| **77** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 10 | | Sitting | 17 | | Acceptable |
| **78** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 12 | | Sitting | 19 | 12% | Acceptable |
| **79** | A | Annual | 9 | | Sitting | 14 | | Acceptable |
| | B | Annual | 9 | | Sitting | 15 | | Acceptable |
| **80** | A | Annual | 13 | | Standing | 18 | | Acceptable |
| | B | Annual | 13 | | Standing | 18 | | 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 |
| 81 | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 10 | | Sitting | 15 | | Acceptable |
| 82 | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 8 | -20% | Sitting | 14 | -12% | Acceptable |
| 83 | A | Annual | 9 | | Sitting | 14 | | Acceptable |
| | B | Annual | 8 | -11% | Sitting | 13 | | Acceptable |
| 84 | A | Annual | 16 | | Walking | 22 | | Acceptable |
| | B | Annual | 19 | 19% | Walking | 25 | 14% | Acceptable |
| 85 | A | Annual | 12 | | Sitting | 17 | | Acceptable |
| | B | Annual | 17 | 42% | Walking | 23 | 35% | Acceptable |
| 86 | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 13 | -13% | Standing | 21 | | Acceptable |
| 87 | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 13 | | Standing | 20 | | Acceptable |
| 88 | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| 89 | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 13 | | Standing | 19 | | Acceptable |
| 90 | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 13 | | Standing | 19 | | Acceptable |
| 91 | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 14 | | Standing | 20 | | Acceptable |
| 92 | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 15 | | Standing | 21 | | Acceptable |
| 93 | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 14 | | Standing | 20 | | Acceptable |
| 94 | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | Acceptable |
| 95 | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | Acceptable |
| 96 | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | 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 |
| **97** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **98** | A | Annual | 16 | | Walking | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **99** | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 15 | | Standing | 21 | | Acceptable |
| **100** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **101** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **102** | A | Annual | 16 | | Walking | 23 | | Acceptable |
| | B | Annual | 16 | | Walking | 23 | | Acceptable |
| **103** | A | Annual | 16 | | Walking | 23 | | Acceptable |
| | B | Annual | 16 | | Walking | 23 | | Acceptable |
| **104** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 23 | | Acceptable |
| **105** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 23 | | Acceptable |
| **106** | A | Annual | 16 | | Walking | 23 | | Acceptable |
| | B | Annual | 16 | | Walking | 23 | | Acceptable |
| **107** | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **108** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **109** | A | Annual | 15 | | Standing | 22 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |
| **110** | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | Acceptable |
| **111** | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | Acceptable |
| **112** | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 14 | | Standing | 21 | | 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 |
| **113** | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 15 | | Standing | 21 | | Acceptable |
| **114** | A | Annual | 12 | | Sitting | 18 | | Acceptable |
| | B | Annual | 12 | | Sitting | 18 | | Acceptable |
| **115** | A | Annual | 10 | | Sitting | 16 | | Acceptable |
| | B | Annual | 11 | | Sitting | 16 | | Acceptable |
| **116** | A | Annual | 16 | | Walking | 23 | | Acceptable |
| | B | Annual | 17 | | Walking | 24 | | Acceptable |
| **117** | A | Annual | 11 | | Sitting | 17 | | Acceptable |
| | B | Annual | 11 | | Sitting | 17 | | Acceptable |
| **118** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 12 | | Sitting | 20 | | Acceptable |
| **119** | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 13 | | Standing | 19 | | Acceptable |
| **120** | A | Annual | 13 | | Standing | 19 | | Acceptable |
| | B | Annual | 13 | | Standing | 19 | | Acceptable |
| **121** | A | Annual | 8 | | Sitting | 14 | | Acceptable |
| | B | Annual | 8 | | Sitting | 14 | | Acceptable |
| **122** | A | Annual | 20 | | Uncomfortable | 25 | | Acceptable |
| | B | Annual | 20 | | Uncomfortable | 26 | | Acceptable |
| **123** | A | Annual | 17 | | Walking | 23 | | Acceptable |
| | B | Annual | 17 | | Walking | 23 | | Acceptable |
| **124** | A | Annual | 16 | | Walking | 23 | | Acceptable |
| | B | Annual | 17 | | Walking | 23 | | Acceptable |
| **125** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 16 | | Walking | 22 | | Acceptable |
| **126** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 16 | | Walking | 22 | | Acceptable |
| **127** | A | Annual | 16 | | Walking | 22 | | Acceptable |
| | B | Annual | 17 | | Walking | 23 | | Acceptable |
| **128** | A | Annual | 18 | | Walking | 24 | | Acceptable |
| | B | Annual | 18 | | Walking | 24 | | Acceptable |

**Table 1: Mean Speed and Effective Gust Categories - Annual**

| Location | Configuration | Season | Mean Wind Speed: Speed (mph) | Mean Wind Speed: % Change | Mean Wind Speed: Rating | Effective Gust Wind Speed: Speed (mph) | Effective Gust Wind Speed: % Change | Effective Gust Wind Speed: Rating |
|---|---|---|---|---|---|---|---|---|
| **129** | A | Annual | 16 | | Walking | 22 | | Acceptable |
| | B | Annual | 17 | | Walking | 24 | | Acceptable |
| **130** | A | Annual | 16 | | Walking | 22 | | Acceptable |
| | B | Annual | 17 | | Walking | 24 | | Acceptable |
| **131** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 16 | | Walking | 23 | | Acceptable |
| **132** | A | Annual | 13 | | Standing | 20 | | Acceptable |
| | B | Annual | 15 | 15% | Standing | 22 | | Acceptable |
| **133** | A | Annual | 14 | | Standing | 20 | | Acceptable |
| | B | Annual | 17 | 21% | Walking | 25 | 25% | Acceptable |
| **134** | A | Annual | 15 | | Standing | 21 | | Acceptable |
| | B | Annual | 16 | | Walking | 24 | 14% | Acceptable |
| **135** | A | Annual | 14 | | Standing | 21 | | Acceptable |
| | B | Annual | 15 | | Standing | 22 | | Acceptable |

| Configurations | | Mean Wind Criteria Speed (mph) | | Effective Gust Criteria (mph) | |
|---|---|---|---|---|---|
| A | No Build | ≤ 12 | Comfortable for Sitting | ≤ 31 | Acceptable |
| B | Build | 13 - 15 | Comfortable for Standing | > 31 | Unacceptable |
| | | 16 - 19 | Comfortable for Walking | | |
| | | 20 - 27 | Uncomfortable for Walking | | |
| | | > 27 | Dangerous Conditions | | |

1) Wind Speeds are for a 1% probability of exceedance; and,

2) % Change is based on comaprison with Configuration A and only those that are greater than 10% are listed

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 | 6 | 5 | 6 | 7 | 10 | 9 | 10 | 11 |
| | B | 14 | 12 | 14 | 15 | 22 | 18 | 21 | 23 |
| 2 | A | -- | -- | -- | -- | -- | -- | -- | -- |
| | B | 13 | 11 | 13 | 14 | 21 | 18 | 20 | 23 |
| 3 | A | -- | -- | -- | -- | -- | -- | -- | -- |
| | B | 11 | 9 | 11 | 12 | 18 | 15 | 18 | 20 |
| 4 | A | 6 | 5 | 6 | 6 | 9 | 8 | 9 | 11 |
| | B | 8 | 6 | 8 | 9 | 14 | 12 | 14 | 15 |
| 5 | A | 9 | 8 | 9 | 10 | 16 | 13 | 15 | 17 |
| | B | 18 | 14 | 17 | 19 | 25 | 20 | 24 | 27 |
| 6 | A | 8 | 7 | 8 | 9 | 14 | 11 | 14 | 15 |
| | B | 13 | 11 | 13 | 15 | 19 | 15 | 18 | 21 |
| 7 | A | 9 | 7 | 9 | 10 | 14 | 12 | 14 | 15 |
| | B | 11 | 9 | 10 | 12 | 17 | 14 | 16 | 18 |
| 8 | A | 10 | 8 | 10 | 11 | 16 | 12 | 15 | 17 |
| | B | 12 | 9 | 11 | 13 | 18 | 15 | 18 | 19 |
| 9 | A | 11 | 8 | 10 | 11 | 16 | 13 | 16 | 17 |
| | B | 14 | 12 | 14 | 15 | 21 | 18 | 21 | 23 |
| 10 | A | 10 | 8 | 9 | 10 | 16 | 13 | 15 | 17 |
| | B | 16 | 13 | 15 | 17 | 24 | 20 | 24 | 26 |
| 11 | A | 15 | 12 | 13 | 14 | 20 | 16 | 18 | 21 |
| | B | 19 | 15 | 18 | 20 | 27 | 21 | 26 | 28 |
| 12 | A | 15 | 12 | 14 | 15 | 21 | 17 | 20 | 22 |
| | B | 20 | 17 | 19 | 21 | 28 | 23 | 27 | 30 |
| 13 | A | 12 | 10 | 11 | 12 | 18 | 15 | 16 | 18 |
| | B | 17 | 15 | 14 | 16 | 23 | 20 | 21 | 23 |
| 14 | A | 13 | 11 | 11 | 12 | 18 | 16 | 16 | 18 |
| | B | 16 | 14 | 13 | 15 | 22 | 18 | 19 | 21 |
| 15 | A | 12 | 10 | 11 | 12 | 18 | 15 | 16 | 18 |
| | B | 17 | 15 | 15 | 16 | 23 | 20 | 20 | 22 |
| 16 | A | 13 | 12 | 12 | 13 | 19 | 16 | 17 | 19 |
| | B | 17 | 15 | 15 | 16 | 23 | 19 | 21 | 23 |

**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 |
| **17** | A | 14 | 12 | 12 | 13 | 19 | 16 | 17 | 19 |
| | B | 15 | 13 | 14 | 16 | 21 | 18 | 20 | 23 |
| **18** | A | 12 | 9 | 11 | 12 | 17 | 14 | 17 | 19 |
| | B | 17 | 13 | 16 | 18 | 24 | 18 | 23 | 25 |
| **19** | A | 10 | 7 | 9 | 10 | 16 | 12 | 15 | 16 |
| | B | 9 | 7 | 9 | 10 | 14 | 12 | 13 | 14 |
| **20** | A | 13 | 11 | 11 | 11 | 19 | 17 | 16 | 17 |
| | B | 9 | 6 | 8 | 9 | 13 | 10 | 13 | 14 |
| **21** | A | 6 | 5 | 6 | 6 | 11 | 9 | 9 | 10 |
| | B | 8 | 7 | 8 | 8 | 12 | 9 | 11 | 12 |
| **22** | A | 8 | 6 | 7 | 8 | 12 | 9 | 11 | 12 |
| | B | 10 | 8 | 10 | 11 | 15 | 12 | 14 | 15 |
| **23** | A | 10 | 8 | 9 | 11 | 16 | 12 | 15 | 17 |
| | B | 12 | 10 | 10 | 12 | 18 | 15 | 16 | 19 |
| **24** | A | 8 | 7 | 8 | 9 | 14 | 12 | 13 | 14 |
| | B | 13 | 11 | 12 | 14 | 20 | 17 | 19 | 21 |
| **25** | A | 9 | 7 | 9 | 10 | 15 | 12 | 14 | 16 |
| | B | 14 | 12 | 13 | 15 | 20 | 17 | 19 | 22 |
| **26** | A | 11 | 9 | 11 | 12 | 18 | 15 | 18 | 20 |
| | B | 16 | 14 | 16 | 18 | 23 | 19 | 23 | 26 |
| **27** | A | 9 | 7 | 8 | 9 | 14 | 12 | 14 | 16 |
| | B | 18 | 14 | 17 | 19 | 25 | 21 | 24 | 27 |
| **28** | A | 9 | 7 | 9 | 10 | 15 | 12 | 15 | 17 |
| | B | 17 | 14 | 17 | 19 | 24 | 20 | 23 | 26 |
| **29** | A | 9 | 7 | 9 | 10 | 15 | 12 | 15 | 17 |
| | B | 18 | 14 | 17 | 19 | 25 | 20 | 24 | 26 |
| **30** | A | 10 | 8 | 10 | 11 | 17 | 13 | 16 | 19 |
| | B | 15 | 12 | 15 | 16 | 23 | 18 | 22 | 24 |
| **31** | A | 11 | 9 | 11 | 13 | 18 | 14 | 17 | 20 |
| | B | 13 | 11 | 13 | 14 | 20 | 17 | 20 | 22 |
| **32** | A | 14 | 11 | 13 | 16 | 22 | 17 | 21 | 25 |
| | B | 13 | 11 | 13 | 15 | 21 | 17 | 21 | 24 |

**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 |
| **33** | A | 10 | 8 | 10 | 12 | 16 | 13 | 16 | 18 |
| | B | 12 | 10 | 12 | 13 | 20 | 16 | 19 | 21 |
| **34** | A | 8 | 6 | 8 | 9 | 15 | 12 | 14 | 17 |
| | B | 12 | 10 | 11 | 12 | 18 | 15 | 17 | 19 |
| **35** | A | 9 | 7 | 8 | 9 | 14 | 11 | 13 | 15 |
| | B | 18 | 15 | 17 | 19 | 25 | 20 | 24 | 27 |
| **36** | A | 11 | 9 | 10 | 11 | 16 | 13 | 15 | 17 |
| | B | 16 | 13 | 15 | 17 | 23 | 19 | 22 | 25 |
| **37** | A | 10 | 7 | 9 | 10 | 16 | 12 | 15 | 17 |
| | B | 18 | 12 | 16 | 17 | 26 | 19 | 24 | 25 |
| **38** | A | 17 | 14 | 15 | 17 | 23 | 18 | 21 | 23 |
| | B | 19 | 15 | 18 | 20 | 27 | 21 | 25 | 28 |
| **39** | A | 18 | 15 | 16 | 18 | 23 | 19 | 21 | 24 |
| | B | 19 | 15 | 17 | 19 | 25 | 20 | 24 | 26 |
| **40** | A | 15 | 13 | 14 | 16 | 21 | 17 | 20 | 22 |
| | B | 16 | 14 | 15 | 17 | 23 | 19 | 22 | 25 |
| **41** | A | 14 | 11 | 14 | 15 | 20 | 16 | 20 | 22 |
| | B | 15 | 12 | 15 | 16 | 21 | 17 | 21 | 23 |
| **42** | A | 11 | 9 | 11 | 12 | 17 | 14 | 16 | 18 |
| | B | 12 | 9 | 11 | 12 | 18 | 14 | 17 | 19 |
| **43** | A | 10 | 8 | 9 | 11 | 16 | 14 | 15 | 17 |
| | B | 10 | 8 | 9 | 11 | 16 | 14 | 15 | 17 |
| **44** | A | 11 | 8 | 10 | 12 | 17 | 13 | 16 | 18 |
| | B | 12 | 9 | 12 | 13 | 19 | 14 | 18 | 20 |
| **45** | A | 17 | 13 | 15 | 16 | 24 | 18 | 21 | 24 |
| | B | 19 | 15 | 17 | 19 | 26 | 20 | 23 | 26 |
| **46** | A | 8 | 6 | 7 | 8 | 13 | 9 | 12 | 13 |
| | B | 11 | 7 | 10 | 10 | 17 | 12 | 16 | 16 |
| **47** | A | 8 | 6 | 7 | 8 | 13 | 11 | 12 | 14 |
| | B | 8 | 7 | 8 | 9 | 14 | 12 | 13 | 15 |
| **48** | A | 9 | 7 | 8 | 10 | 15 | 12 | 14 | 17 |
| | B | 11 | 8 | 10 | 11 | 18 | 14 | 17 | 19 |

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 |
| 49 | A | 10 | 8 | 10 | 11 | 17 | 13 | 16 | 18 |
| | B | 12 | 10 | 12 | 13 | 19 | 15 | 19 | 21 |
| 50 | A | 10 | 8 | 9 | 11 | 16 | 12 | 15 | 17 |
| | B | 11 | 8 | 10 | 11 | 17 | 13 | 16 | 18 |
| 51 | A | 11 | 9 | 10 | 12 | 17 | 13 | 16 | 19 |
| | B | 12 | 9 | 11 | 13 | 18 | 14 | 17 | 19 |
| 52 | A | 10 | 8 | 10 | 12 | 16 | 12 | 15 | 18 |
| | B | 12 | 9 | 11 | 13 | 18 | 14 | 17 | 19 |
| 53 | A | 11 | 8 | 10 | 12 | 16 | 13 | 16 | 19 |
| | B | 12 | 10 | 12 | 14 | 18 | 14 | 18 | 20 |
| 54 | A | 9 | 7 | 9 | 10 | 15 | 12 | 14 | 16 |
| | B | 11 | 8 | 10 | 11 | 17 | 13 | 16 | 18 |
| 55 | A | 11 | 9 | 10 | 12 | 17 | 14 | 16 | 19 |
| | B | 12 | 10 | 12 | 14 | 18 | 15 | 18 | 20 |
| 56 | A | 11 | 9 | 11 | 13 | 17 | 14 | 16 | 19 |
| | B | 12 | 9 | 12 | 13 | 18 | 14 | 18 | 20 |
| 57 | A | 8 | 6 | 8 | 9 | 13 | 10 | 12 | 14 |
| | B | 9 | 7 | 9 | 10 | 14 | 11 | 14 | 15 |
| 58 | A | 9 | 7 | 8 | 10 | 15 | 12 | 14 | 16 |
| | B | 9 | 7 | 9 | 10 | 15 | 12 | 15 | 17 |
| 59 | A | 11 | 8 | 10 | 12 | 18 | 14 | 17 | 20 |
| | B | 11 | 9 | 11 | 12 | 18 | 14 | 18 | 20 |
| 60 | A | 12 | 10 | 12 | 14 | 20 | 16 | 19 | 23 |
| | B | 14 | 11 | 13 | 15 | 21 | 17 | 20 | 24 |
| 61 | A | 12 | 10 | 12 | 14 | 19 | 15 | 18 | 21 |
| | B | 13 | 11 | 13 | 15 | 20 | 16 | 19 | 22 |
| 62 | A | 9 | 7 | 8 | 9 | 14 | 11 | 14 | 15 |
| | B | 10 | 8 | 9 | 10 | 16 | 12 | 15 | 16 |
| 63 | A | 12 | 10 | 12 | 14 | 18 | 15 | 18 | 21 |
| | B | 12 | 10 | 11 | 14 | 18 | 15 | 18 | 21 |
| 64 | A | 13 | 10 | 12 | 14 | 20 | 16 | 19 | 21 |
| | B | 13 | 10 | 12 | 14 | 19 | 16 | 19 | 21 |

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 |
| **65** | A | 17 | 14 | 17 | 20 | 26 | 21 | 25 | 29 |
| | B | 18 | 14 | 17 | 20 | 26 | 21 | 25 | 29 |
| **66** | A | 13 | 11 | 13 | 14 | 20 | 17 | 19 | 22 |
| | B | 14 | 12 | 13 | 14 | 20 | 17 | 19 | 22 |
| **67** | A | 12 | 10 | 12 | 13 | 19 | 16 | 18 | 20 |
| | B | 12 | 10 | 11 | 12 | 19 | 15 | 18 | 20 |
| **68** | A | 13 | 10 | 11 | 12 | 19 | 15 | 17 | 19 |
| | B | 14 | 11 | 13 | 14 | 21 | 16 | 19 | 21 |
| **69** | A | 13 | 10 | 11 | 12 | 20 | 16 | 17 | 19 |
| | B | 16 | 12 | 14 | 16 | 23 | 18 | 21 | 23 |
| **70** | A | 13 | 10 | 11 | 13 | 19 | 15 | 16 | 19 |
| | B | 16 | 13 | 15 | 16 | 22 | 18 | 21 | 23 |
| **71** | A | 13 | 11 | 12 | 13 | 19 | 16 | 17 | 19 |
| | B | 15 | 12 | 13 | 15 | 21 | 17 | 20 | 22 |
| **72** | A | 16 | 13 | 14 | 16 | 23 | 18 | 21 | 23 |
| | B | 12 | 9 | 11 | 12 | 19 | 15 | 18 | 20 |
| **73** | A | 14 | 11 | 13 | 15 | 20 | 17 | 19 | 22 |
| | B | 12 | 10 | 12 | 13 | 19 | 16 | 19 | 20 |
| **74** | A | 11 | 9 | 10 | 11 | 18 | 13 | 16 | 18 |
| | B | 10 | 8 | 10 | 10 | 16 | 12 | 15 | 17 |
| **75** | A | 11 | 9 | 10 | 11 | 17 | 14 | 16 | 17 |
| | B | 9 | 8 | 9 | 10 | 15 | 13 | 15 | 16 |
| **76** | A | 12 | 9 | 11 | 13 | 18 | 14 | 17 | 19 |
| | B | 12 | 10 | 12 | 13 | 18 | 15 | 17 | 19 |
| **77** | A | 10 | 7 | 10 | 11 | 17 | 13 | 16 | 17 |
| | B | 11 | 8 | 10 | 11 | 18 | 13 | 17 | 19 |
| **78** | A | 11 | 8 | 11 | 12 | 17 | 13 | 17 | 18 |
| | B | 12 | 9 | 12 | 14 | 19 | 15 | 19 | 21 |
| **79** | A | 10 | 8 | 9 | 10 | 15 | 12 | 14 | 15 |
| | B | 10 | 8 | 9 | 10 | 15 | 12 | 14 | 16 |
| **80** | A | 13 | 10 | 13 | 14 | 19 | 14 | 18 | 20 |
| | B | 14 | 10 | 13 | 15 | 19 | 15 | 18 | 20 |

**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 |
| **81** | A | 11 | 9 | 10 | 11 | 17 | 13 | 15 | 17 |
| | B | 10 | 7 | 10 | 10 | 16 | 12 | 15 | 16 |
| **82** | A | 11 | 9 | 10 | 11 | 17 | 13 | 16 | 17 |
| | B | 9 | 7 | 8 | 9 | 15 | 12 | 14 | 15 |
| **83** | A | 9 | 7 | 9 | 9 | 14 | 12 | 14 | 15 |
| | B | 8 | 7 | 8 | 9 | 13 | 11 | 13 | 14 |
| **84** | A | 17 | 14 | 15 | 17 | 24 | 19 | 21 | 24 |
| | B | 20 | 17 | 18 | 20 | 27 | 22 | 24 | 27 |
| **85** | A | 13 | 11 | 11 | 13 | 19 | 15 | 16 | 19 |
| | B | 18 | 16 | 16 | 17 | 25 | 21 | 21 | 24 |
| **86** | A | 15 | 12 | 14 | 16 | 21 | 17 | 21 | 23 |
| | B | 14 | 11 | 13 | 15 | 21 | 17 | 20 | 22 |
| **87** | A | 13 | 11 | 12 | 14 | 19 | 16 | 18 | 21 |
| | B | 14 | 12 | 13 | 14 | 21 | 17 | 19 | 21 |
| **88** | A | 12 | 10 | 11 | 13 | 18 | 15 | 17 | 19 |
| | B | 13 | 11 | 12 | 13 | 19 | 16 | 18 | 20 |
| **89** | A | 12 | 10 | 12 | 13 | 19 | 15 | 18 | 20 |
| | B | 13 | 11 | 12 | 14 | 20 | 16 | 18 | 20 |
| **90** | A | 12 | 10 | 12 | 13 | 19 | 15 | 18 | 20 |
| | B | 13 | 11 | 12 | 14 | 20 | 16 | 18 | 21 |
| **91** | A | 14 | 11 | 12 | 14 | 20 | 16 | 19 | 21 |
| | B | 15 | 12 | 13 | 15 | 21 | 17 | 19 | 22 |
| **92** | A | 14 | 12 | 13 | 15 | 21 | 17 | 20 | 22 |
| | B | 15 | 13 | 14 | 16 | 21 | 17 | 20 | 23 |
| **93** | A | 14 | 11 | 13 | 15 | 20 | 17 | 20 | 22 |
| | B | 15 | 12 | 13 | 15 | 21 | 17 | 20 | 22 |
| **94** | A | 14 | 11 | 13 | 15 | 20 | 17 | 20 | 22 |
| | B | 15 | 12 | 14 | 15 | 21 | 17 | 20 | 23 |
| **95** | A | 15 | 12 | 14 | 16 | 21 | 17 | 21 | 23 |
| | B | 15 | 12 | 14 | 16 | 21 | 17 | 20 | 23 |
| **96** | A | 14 | 11 | 14 | 15 | 21 | 17 | 20 | 23 |
| | B | 15 | 12 | 14 | 16 | 22 | 18 | 21 | 23 |

**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 |
| **97** | A | 15 | 12 | 14 | 16 | 22 | 17 | 21 | 24 |
| | B | 15 | 12 | 14 | 16 | 22 | 18 | 21 | 24 |
| **98** | A | 16 | 12 | 15 | 17 | 22 | 18 | 21 | 25 |
| | B | 15 | 12 | 15 | 17 | 22 | 18 | 21 | 25 |
| **99** | A | 14 | 12 | 14 | 16 | 21 | 17 | 20 | 23 |
| | B | 15 | 12 | 14 | 16 | 22 | 18 | 20 | 23 |
| **100** | A | 16 | 12 | 15 | 17 | 22 | 18 | 21 | 25 |
| | B | 16 | 12 | 15 | 17 | 22 | 18 | 21 | 25 |
| **101** | A | 15 | 12 | 15 | 17 | 22 | 18 | 21 | 24 |
| | B | 16 | 13 | 15 | 17 | 22 | 18 | 21 | 24 |
| **102** | A | 16 | 13 | 15 | 17 | 23 | 18 | 22 | 25 |
| | B | 16 | 13 | 15 | 17 | 23 | 18 | 22 | 25 |
| **103** | A | 16 | 13 | 15 | 18 | 23 | 18 | 22 | 25 |
| | B | 16 | 13 | 15 | 18 | 23 | 18 | 22 | 26 |
| **104** | A | 16 | 13 | 15 | 17 | 22 | 18 | 21 | 25 |
| | B | 16 | 13 | 15 | 17 | 23 | 18 | 22 | 25 |
| **105** | A | 15 | 12 | 14 | 17 | 22 | 18 | 21 | 25 |
| | B | 16 | 12 | 15 | 17 | 23 | 18 | 22 | 25 |
| **106** | A | 16 | 12 | 15 | 18 | 23 | 18 | 22 | 25 |
| | B | 16 | 13 | 15 | 18 | 23 | 18 | 22 | 25 |
| **107** | A | 14 | 11 | 14 | 16 | 21 | 17 | 21 | 24 |
| | B | 15 | 12 | 14 | 16 | 22 | 17 | 21 | 24 |
| **108** | A | 15 | 12 | 14 | 17 | 22 | 18 | 21 | 25 |
| | B | 15 | 12 | 15 | 17 | 22 | 18 | 21 | 25 |
| **109** | A | 15 | 12 | 14 | 17 | 22 | 17 | 21 | 24 |
| | B | 15 | 12 | 14 | 17 | 22 | 17 | 21 | 24 |
| **110** | A | 14 | 11 | 13 | 15 | 20 | 16 | 19 | 22 |
| | B | 14 | 11 | 13 | 16 | 21 | 17 | 20 | 23 |
| **111** | A | 14 | 11 | 13 | 16 | 21 | 16 | 20 | 23 |
| | B | 15 | 11 | 14 | 16 | 21 | 17 | 20 | 23 |
| **112** | A | 14 | 11 | 13 | 15 | 20 | 17 | 19 | 22 |
| | B | 14 | 11 | 13 | 16 | 21 | 17 | 20 | 23 |

**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 |
| 113 | A | 14 | 11 | 13 | 15 | 21 | 16 | 20 | 23 |
| | B | 15 | 11 | 14 | 16 | 21 | 17 | 20 | 23 |
| 114 | A | 12 | 9 | 11 | 13 | 18 | 14 | 17 | 20 |
| | B | 12 | 9 | 12 | 13 | 18 | 15 | 18 | 20 |
| 115 | A | 10 | 8 | 10 | 11 | 16 | 13 | 16 | 17 |
| | B | 11 | 8 | 10 | 12 | 16 | 13 | 16 | 18 |
| 116 | A | 16 | 13 | 16 | 18 | 23 | 18 | 22 | 26 |
| | B | 17 | 13 | 16 | 18 | 24 | 19 | 23 | 26 |
| 117 | A | 12 | 10 | 11 | 12 | 18 | 15 | 17 | 19 |
| | B | 12 | 10 | 11 | 12 | 18 | 15 | 17 | 19 |
| 118 | A | 14 | 11 | 13 | 15 | 21 | 17 | 20 | 22 |
| | B | 13 | 10 | 12 | 14 | 20 | 16 | 19 | 21 |
| 119 | A | 13 | 11 | 12 | 14 | 20 | 16 | 19 | 21 |
| | B | 13 | 10 | 12 | 14 | 19 | 16 | 19 | 21 |
| 120 | A | 13 | 10 | 12 | 14 | 19 | 15 | 19 | 21 |
| | B | 13 | 11 | 13 | 14 | 19 | 16 | 19 | 21 |
| 121 | A | 9 | 7 | 8 | 9 | 14 | 12 | 14 | 15 |
| | B | 9 | 7 | 8 | 9 | 14 | 11 | 14 | 15 |
| 122 | A | 21 | 18 | 19 | 21 | 27 | 22 | 25 | 27 |
| | B | 22 | 18 | 19 | 22 | 27 | 23 | 25 | 27 |
| 123 | A | 18 | 15 | 17 | 19 | 24 | 20 | 23 | 25 |
| | B | 18 | 15 | 17 | 19 | 24 | 20 | 23 | 25 |
| 124 | A | 17 | 14 | 15 | 17 | 24 | 19 | 22 | 24 |
| | B | 18 | 15 | 16 | 18 | 25 | 20 | 23 | 25 |
| 125 | A | 15 | 12 | 14 | 16 | 21 | 17 | 21 | 23 |
| | B | 16 | 13 | 15 | 17 | 22 | 18 | 21 | 24 |
| 126 | A | 15 | 12 | 14 | 16 | 21 | 17 | 20 | 23 |
| | B | 16 | 13 | 15 | 17 | 22 | 18 | 21 | 24 |
| 127 | A | 16 | 14 | 15 | 17 | 22 | 18 | 21 | 23 |
| | B | 17 | 14 | 16 | 18 | 23 | 19 | 22 | 25 |
| 128 | A | 19 | 16 | 17 | 19 | 25 | 21 | 23 | 26 |
| | B | 19 | 16 | 17 | 19 | 25 | 21 | 23 | 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 |
| 129 | A | 17 | 14 | 16 | 18 | 23 | 19 | 22 | 24 |
| | B | 18 | 15 | 17 | 19 | 24 | 20 | 23 | 26 |
| 130 | A | 17 | 14 | 15 | 17 | 23 | 19 | 21 | 24 |
| | B | 17 | 15 | 17 | 18 | 24 | 20 | 23 | 25 |
| 131 | A | 15 | 12 | 14 | 16 | 21 | 17 | 20 | 22 |
| | B | 16 | 13 | 16 | 18 | 23 | 19 | 22 | 24 |
| 132 | A | 14 | 11 | 13 | 15 | 21 | 17 | 20 | 22 |
| | B | 15 | 13 | 14 | 16 | 22 | 18 | 21 | 23 |
| 133 | A | 14 | 12 | 14 | 15 | 21 | 17 | 20 | 22 |
| | B | 18 | 15 | 17 | 19 | 25 | 21 | 24 | 27 |
| 134 | A | 15 | 12 | 14 | 16 | 21 | 17 | 20 | 23 |
| | B | 17 | 14 | 16 | 18 | 24 | 20 | 23 | 26 |
| 135 | A | 14 | 11 | 14 | 16 | 21 | 17 | 20 | 23 |
| | B | 15 | 12 | 14 | 16 | 22 | 18 | 21 | 24 |

| Configurations | | Mean Wind Criteria Speed (mph) | | Effective Gust Criteria (mph) | |
|---|---|---|---|---|---|
| A | No Build | ≤ 12 | Comfortable for Sitting | ≤ 31 | Acceptable |
| B | Build | 13 - 15 | Comfortable for Standing | > 31 | Unacceptable |
| | | 16 - 19 | Comfortable for Walking | | |
| | | 20 - 27 | Uncomfortable for Walking | | |
| | | > 27 | Dangerous Conditions | | |

Wind Speeds are for a 1% probability of exceedance

# Appendix E

Air Quality

# AIR QUALITY APPENDIX

## Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

## Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2017 and 2024 for speed limits of idle, 10, 15, and 25 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

**Carbon Monoxide Only**

| | | 2017 | 2024 |
|---|---|---|---|
| **Free Flow** | 25 mph | 2.611 | 1.758 |
| **Right Turns** | 10 mph | 4.058 | 2.693 |
| **Left Turns** | 15 mph | 3.508 | 2.369 |
| **Queues** | Idle | 8.013 | 3.216 |

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

## CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness ($z_0$) of 321 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 25 mph were used for right turn, left turn, and free flow links, respectively.

# Background Concentrations

| POLLUTANT | AVERAGING TIME | Form | 2014 | 2015 | 2016 | Units | ppm/ppb to $\mu g/m^3$ Conversion Factor | 2014-2016 Background Concentration ($\mu g/m^3$) | Location |
|---|---|---|---|---|---|---|---|---|---|
| $SO_2$ (1)(6)(7) | 1-Hour (5) | 99th % | 9.7 | 5.5 | 4.1 | ppb | 2.62 | 16.9 | Kenmore Sq., Boston |
| | 3-Hour (6) | H2H | 9.4 | 4.4 | 3.8 | ppb | 2.62 | 24.6 | Kenmore Sq., Boston |
| | 24-Hour | H2H | 5 | 2.9 | 2 | ppb | 2.62 | 13.1 | Kenmore Sq., Boston |
| | Annual | H | 0.94 | 0.5 | 0.4 | ppb | 2.62 | 2.5 | Kenmore Sq., Boston |
| PM-10 | 24-Hour | H2H | 53 | 30 | 30 | $\mu g/m^3$ | 1 | 53 | Kenmore Sq., Boston |
| | Annual | H | 14.9 | 14.2 | 14.1 | $\mu g/m^3$ | 1 | 14.9 | Kenmore Sq., Boston |
| PM-2.5 | 24-Hour (5) | 98th % | 14.35 | 16.65 | 14.7 | $\mu g/m^3$ | 1 | 15.2 | 174 North St., Boston |
| | Annual (5) | H | 6.935 | 7.3 | 7.7 | $\mu g/m^3$ | 1 | 7.3 | 174 North St., Boston |
| $NO_2$ (3)(7) | 1-Hour (5) | 98th % | 49 | 56 | 47 | ppb | 1.88 | 95.3 | Kenmore Sq., Boston |
| | Annual | H | 17.17 | 17.3 | 15.0 | ppb | 1.88 | 32.5 | Kenmore Sq., Boston |
| CO (2)(7) | 1-Hour | H2H | 1.3 | 1.4 | 2.2 | ppm | 1146 | 2489.1 | Harrison Ave., Boston |
| | 8-Hour | H2H | 0.9 | 0.9 | 1.8 | ppm | 1146 | 2062.8 | Harrison Ave., Boston |
| Ozone (4) | 8-Hour | H4H | 0.054 | 0.056 | 0.058 | ppm | 1963 | 113.9 | Harrison Ave., Boston |
| Lead | Rolling 3-Month | H | 0.014 | 0.016 | 0.017 | $\mu g/m^3$ | 1 | 0.017 | Harrison Ave., Boston |

Notes:
From 2014-2016 EPA's AirData Website
[1] $SO_2$ reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
[2] CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
[3] $NO_2$ reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
(4) $O_3$ reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
[5] Background level is the average concentration of the three years.
[6] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
[7] CO monitor at Kenmore Square was deactivated in January 2015. Harrison Avenue monitor used for 2015 and 2016.

Due to excessive size CAL3QHC, and MOVES input and output files are available on digital media upon request.

# Appendix F

Climate Change Preparedness Checklist

## Boston Planning & Development Agency
# Climate Resiliency Report Summary

**Submitted:** 02/15/2018 09:30:02

### A.1 - Project Information

| | | | | |
|---|---|---|---|---|
| Project Name: | Dock Square | | | |
| Project Address: | 20 Clinton Street | | | |
| Filing Type: | Initial (PNF, EPNF, NPC or other substantial filing) | | | |
| Filing Contact: | Talya Moked | Epsilon Associates | tmoked@epsilonassociates.com | 9784616223 |
| Is MEPA approval required? | No | MEPA date: | | |

### A.2 - Project Team

| | |
|---|---|
| Owner / Developer: | FPG DS Owner One, LLC & FPG DS Owner Two, LLC |
| Architect: | Stantec Architecture |
| Engineer: | Nitsch Engineering |
| Sustainability / LEED: | Stantec |
| Permitting: | Epsilon Associates |
| Construction Management: | |

### A.3 - Project Description and Design Conditions

| | |
|---|---|
| List the principal Building Uses: | Residential, Parking |
| List the First Floor Uses: | Residential lobby, restaurant, parking |
| List any Critical Site Infrastructure and or Building Uses: | |

**Site and Building:**

| | | | |
|---|---|---|---|
| Site Area (SF): | 57084 | Building Area (SF): | 535000 |
| Building Height (Ft): | 209 | Building Height (Stories): | 17 |
| Existing Site Elevation – Low (Ft BCB): | 10 | Existing Site Elevation – High (Ft BCB): | 10 |
| Proposed Site Elevation – Low (Ft BCB): | 10 | Proposed Site Elevation – High (Ft BCB): | 10 |
| Proposed First Floor Elevation (Ft BCB): | 15 | Below grade spaces/levels (#): | 0 |

**Article 37 Green Building:**

| | | | |
|---|---|---|---|
| LEED Version - Rating System: | LEED v4 for BD+C | LEED Certification: | No |
| Proposed LEED rating: | Certified | Proposed LEED point score (Pts.): | 47 |

**Energy Loads and Performance**

| | | | |
|---|---|---|---|
| For this filing – describe how energy loads & performance were determined | | | |
| Annual Electric (kWh): | 3311845 | Peak Electric (kW): | 750 |
| Annual Heating (MMbtu/hr): | 3756 | Peak Heating (MMbtu): | 2500 |
| Annual Cooling (Tons/hr): | 458333 | Peak Cooling (Tons): | 900 |
| Energy Use - Below ASHRAE 90.1 - 2013 (%): | 14.1 | Have the local utilities reviewed the building energy performance?: | No |
| Energy Use - Below Mass. Code (%): | 14.1 | Energy Use Intensity (kBtu/SF): | |

**Back-up / Emergency Power System**

| | | | |
|---|---|---|---|
| Electrical Generation Output (kW): | 500 | Number of Power Units: | 1 |
| System Type (kW): | Combustion Engine | Fuel Source: | Diesel |

**Emergency and Critical System Loads** (in the event of a service interruption)

| | | | |
|---|---|---|---|
| Electric (kW): | 450 | Heating (MMbtu/hr): | |
| | | Cooling (Tons/hr): | |

## B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

### B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons):

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

The team has had a meeting to discuss performance targets for the building, and supporting analysis will be completed as the design progresses.

Describe building specific passive energy efficiency measures including orientation, massing, building envelope, and systems:

The Project will include high performance building envelope, green terraces, and light or reflective roofing materials.

Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:

The Project will include high-performance HVAC equipment, and lighting and controls. EnergyStar equipment and appliances will be installed.

Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:

The project team will continue to evaluate energy conservation strategies during the design phase of the project.

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

Describe any energy efficiency assistance or support provided or to be provided to the project:

The Proponent will reach out to the utility company regarding incentives as design progresses.

### B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

The building/systems may evolve to further reduce GHG over time through inclusion of metering, tenant guidelines, energy conservation measures, opportunities for renewables, and exploring energy storage options as they emerge and as systems get upgraded. The project team will continue to evaluate energy conservation strategies during the design phase of the project.

### C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

### C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.): 8 | Temperature Range - High (Deg.): 91

| | | | |
|---|---|---|---|
| Annual Heating Degree Days: | 295.9 | Annual Cooling Degree Days | 1783 |

What Extreme Heat Event characteristics will be / have been used for project planning

| | | | |
|---|---|---|---|
| Days - Above 90° (#): | 60 | Days - Above 100° (#): | 30 |
| Number of Heatwaves / Year (#): | 6 | Average Duration of Heatwave (Days): | 5 |

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

The Project will install high-reflective paving materials and roof materials, and some of the roofs will feature green terraces to reduce building-related heat island effects. The site will also feature new landscaping where there is currently a brick-paved plaza.

### C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

The building will include high performance HVAC equipment. Measures to reduce the heat island effect include high-albedo rooftops, and rooftop terraces.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

The building will include a generator for life safety systems. Also, units will feature operable windows for passive ventilation in case of ventilation system failures and/or extreme heat. The terraces can be used as areas of refuge for sheltering in place securely for prolonged periods.

### D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25”. There is a significant probability that this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

### D.1 – Extreme Precipitation - Design Conditions

| | |
|---|---|
| What is the project design precipitation level? (In. / 24 Hours) | 6 |

Describe all building and site measures for reducing storm water run-off:

The building will include an infiltration system for the first one inch of run-off.

### D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

The Project includes a series of rooftop terraces that will reduce stormwater runoff compared to existing conditions, which are entirely impervious.

### E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

| | | | |
|---|---|---|---|
| Is any portion of the site in a FEMA Special Flood Hazard Area? | Yes | What Zone: | AE |
| | | What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)? | 17.5 |

| | |
|---|---|
| Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see SLR-FHA online map)? | Yes |

***If you answered YES to either of the above questions, please complete the following questions.***
***Otherwise you have completed the questionnaire; thank you!***

### E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2' of sea level rise above 2013 tide levels, an additional 2.5" to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project's Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by adding 12" of freeboard for buildings, and 24" of freeboard for critical facilities and infrastructure and any ground floor residential units.

| | | | |
|---|---|---|---|
| What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)? | 17.5 | | |
| What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)? | 15.65 | First Floor Elevation (Ft BCB): | 16.25 |
| What are the Site Elevations at Building (Ft BCB)? | 15.65 | What is the Accessible Route Elevation (Ft BCB)? | 16.25 |

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

The Project consists of an existing building, making site design strategies challenging. However, existing ground floor spaces currently in the floodplain will be upgraded to utilize protective strategies. Lobbies will be designed to be wet-flood-proofed in the event of flooding with the potential for operable windows to ease cleaning and maintenance post-event.

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

Backup power supply and fuel sources will be located above the base flood elevation. Backflow prevention will be designed into the space to protect drains and waste conveyance systems, and utility access routes will be protected and easily accessible for routine maintenance.

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

Emergency power will be supplied on site to maintain life safety systems.

Describe any strategies that would support rapid recovery after a weather event:

Lobbies will be designed to be wet-flood-proofed in the event of flooding with the potential for operable windows to ease cleaning and maintenance post-event.

### E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

Storage within the building can accommodate protective deployable barriers, if they are determined to be necessary.

Thank you for completing the Boston Climate Change Checklist!

For questions or comments about this checklist or Climate Change best practices, please contact: John.Dalzell@boston.gov

# Appendix G

## Accessibility Checklist

# Article 80 – Accessibility Checklist

## A requirement of the Boston Planning & Development Agency (BPDA)
## Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

### Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

### Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

| **1. Project Information:** *If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.* | | | |
|---|---|---|---|
| Project Name: | Dock Square | | |
| Primary Project Address: | 20 Clinton Street, Boston, MA 02109 | | |
| Total Number of Phases/Buildings: | 1 Proposed Building over 1 Existing Renovated Garage | | |
| Primary Contact (Name / Title / Company / Email / Phone): | Jonathon Landau/Proponent/Fortis Property Group jlandau@fortispropertygroup.com | | |
| Owner / Developer: | FPG DS Owner One, LLC & FPG DS Owner Two, LLC | | |
| Architect: | Stantec Architecture | | |
| Civil Engineer: | Nitsch Engineering | | |
| Landscape Architect: | TBD | | |
| Permitting: | Epsilon Associates, Inc. | | |
| Construction Management: | TBD | | |
| At what stage is the project at time of this questionnaire? Select below: | | | |
| | ☑PNF / Expanded PNF Submitted | Draft / Final Project Impact Report Submitted | BPDA Board Approved |
| | BPDA Design Approved | Under Construction | Construction Completed: |
| Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? *If yes,* identify and explain. | 1. 521 CMR 43.3.2 & 45.4.5 – Variance for kitchen sink depths. Required to be 6.5” in depth for all Group 1 and 2a units – request for deeper sinks with intent that should an ADA compliant sink be needed it will be provided.<br>2. 521 CMR 39.3.1 – Variance for outlets below windows. Required to be 15” AFF to centerline of lowest receptacle. Request for outlets to be allowed lower on walls below windows, provided an adjacent accessible outlet is included. | | |

| **3. Building Classification and Description:** *This section identifies preliminary construction information about the project including size and uses.* | | | |
|---|---|---|---|
| What are the dimensions of the project? | | | |
| Site Area: | 57,084 SF | Building Area: | 535,000 GSF |
| Building Height: | *209 feet* | Number of Stories: | 17 Floors |
| First Floor Elevation: | North: 16’-0”<br>Clinton: 14’-9” | Is there below grade space: | *No* |
| what is the Construction Type? (Select most appropriate type) | | | |

| | | | | |
|---|---|---|---|---|
| *NOTE: Wood Frame on Non-combustible podium | Wood Frame | Masonry | ☑Existing: Steel Frame | ☑Proposed: Concrete |
| What are the principal building uses? (IBC definitions are below – select all appropriate that apply) | | | | |
| | Residential – One - Three Unit | ☑Residential - Multi-unit, Four + | Institutional | Educational |
| | Business | Mercantile | Factory | Hospitality |
| | Laboratory / Medical | Storage, Utility and Other | | |
| List street-level uses of the building: | Lobby, Parking and Services and Restaurant | | | |

## 4. Assessment of Existing Infrastructure for Accessibility:

*This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports*.

| | |
|---|---|
| Provide a description of the neighborhood where this development is located and its identifying topographical characteristics: | The Project is located in the Greenway Overlay District adjacent to Faneuil Hall and the Greenway. The North End is across the Greenway to the north of the site. The site slopes gradually with an elevation change of approximately 1'-3" feet from North Street towards Clinton Street. |
| List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops: | MBTA Blue line at Aquarium is less than 0.2 miles. The Green Line at Government Center is less than 0.2 miles away. Orange/Green Line at Haymarket is less than 0.2 miles. Orange/Red Line at Downtown Crossing is less than 0.5 miles. |
| List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others: | Massachusetts General Hospital and miscellaneous facilities, Long Island Shelter Clinic, Freedom Trail Clinic, Passport Health Downtown Boston Travel Clinic, Boston Elderly Affairs Community, ABCD North End Head Start, Commonwealth Children's Center |
| List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities: | North End Branch of the Boston Public Library, Social Law Library, Trial Court Law Library, Nazzaro Community Center, Boston Community ESOL Center, YMCA Training, Inc, JFK Fitness Center, Foundation Fitness, Polcari Playground, Boston City Hall |

## 5. Surrounding Site Conditions – Existing:

*This section identifies current condition of the sidewalks and pedestrian ramps at the development site.*

| | |
|---|---|
| Is the development site within a historic district? ***If yes,*** identify which district: | No |
| Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, | Yes. The sidewalk around the site varies in width from 10'-0" to 35'-0" and the existing plaza that is approximately 3'-0" lower than the sidewalk will be filled in for the Project. |

| | |
|---|---|
| slopes, materials, and physical condition at the development site: | |
| Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos: | Existing sidewalks are to remain, but the existing lowered plaza will be filled in for the Project. |

**6. Surrounding Site Conditions – Proposed**

*This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.*

| | |
|---|---|
| Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard. | Yes. |
| What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone: | All sidewalks are existing to remain except the ~3'-0" lower Plaza on North Street and Clinton Street which will be filled to become flush with the existing grade with a vehicular drop off. Sidewalks will be designed to be compliant with accessibility standards. |
| List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way? | The majority of the sidewalks are in the City of Boston pedestrian right-of-way and will meet the standards required by the city.<br><br>Paving materials will adhere to Boston Complete Street Guidelines. |
| Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be? | No |
| If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)? | TBD |

| | |
|---|---|
| | |
| Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details. | Yes for Specific Repairs (sidewalks), and a License, Maintenance, and Indemnification Agreement |
| **7. Accessible Parking:** *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*. | |
| What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage? | 682 garage parking spaces |
| What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle? | 9 Accessible Spaces will be provided with 1 of those spaces being Van Accessible. |
| Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need? | No |
| Where is the accessible visitor parking located? | Within the existing parking garage |
| Has a drop-off area been identified? ***If yes,*** will it be accessible? | Yes and Yes |
| **8. Circulation and Accessible Routes:** *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors*. | |
| Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator: | All entry ways will be flush condition with access to the upper level via elevators |
| Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe*. ***If no***, what is the reason? | Yes |

| | |
|---|---|
| ***If project is subject to Large Project Review/Institutional Master Plan,*** describe the accessible routes way-finding / signage package. | Signage will be provided when accessible route is not in direct view of pedestrian. The Project will include wayfinding for any vertical transportation as necessary. |
| **9. Accessible Units (Group 2) and Guestrooms: (If applicable)**<br>*In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.* | |
| What is the total number of proposed housing units or hotel rooms for the development? | 195 Units |
| ***If a residential development,*** how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units? | All units will be for-sale Condominiums and will meet the cities' requirements for IDP. |
| ***If a residential development,*** how many accessible Group 2 units are being proposed? | As a for-sale development no Group 2 units are required or proposed. |
| ***If a residential development,*** how many accessible Group 2 units will also be IDP units? ***If none***, describe reason. | N/A |
| ***If a hospitality development,*** how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment. | N/A |
| Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes***, provide reason. | No |
| Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes***, describe: | Yes, there are 2 existing garage elevators and 3 proposed residential elevators to provide access from the proposed residential lobby to all floors in the development |
| **10. Community Impact:**<br>*Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.* | |

| | |
|---|---|
| Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives? | This will be determined during the Article 80 process. |
| What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility? | The Project will include common outdoor seating and indoor seating and will be accessible |
| Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not. | TBD |
| Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments? | No review has been completed at this time |
| Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible? | No presentation has been completed at this time |

## 11. Attachments

*Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.*

| |
|---|
| Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances.<br>**See attached** |
| Provide a diagram of the accessible route connections through the site, including distances. |

| |
|---|
| **See attached** |
| Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable)<br>**See attached** |
| Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry.<br>N/A |
| Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project.<br>•<br>•<br>•<br>• |

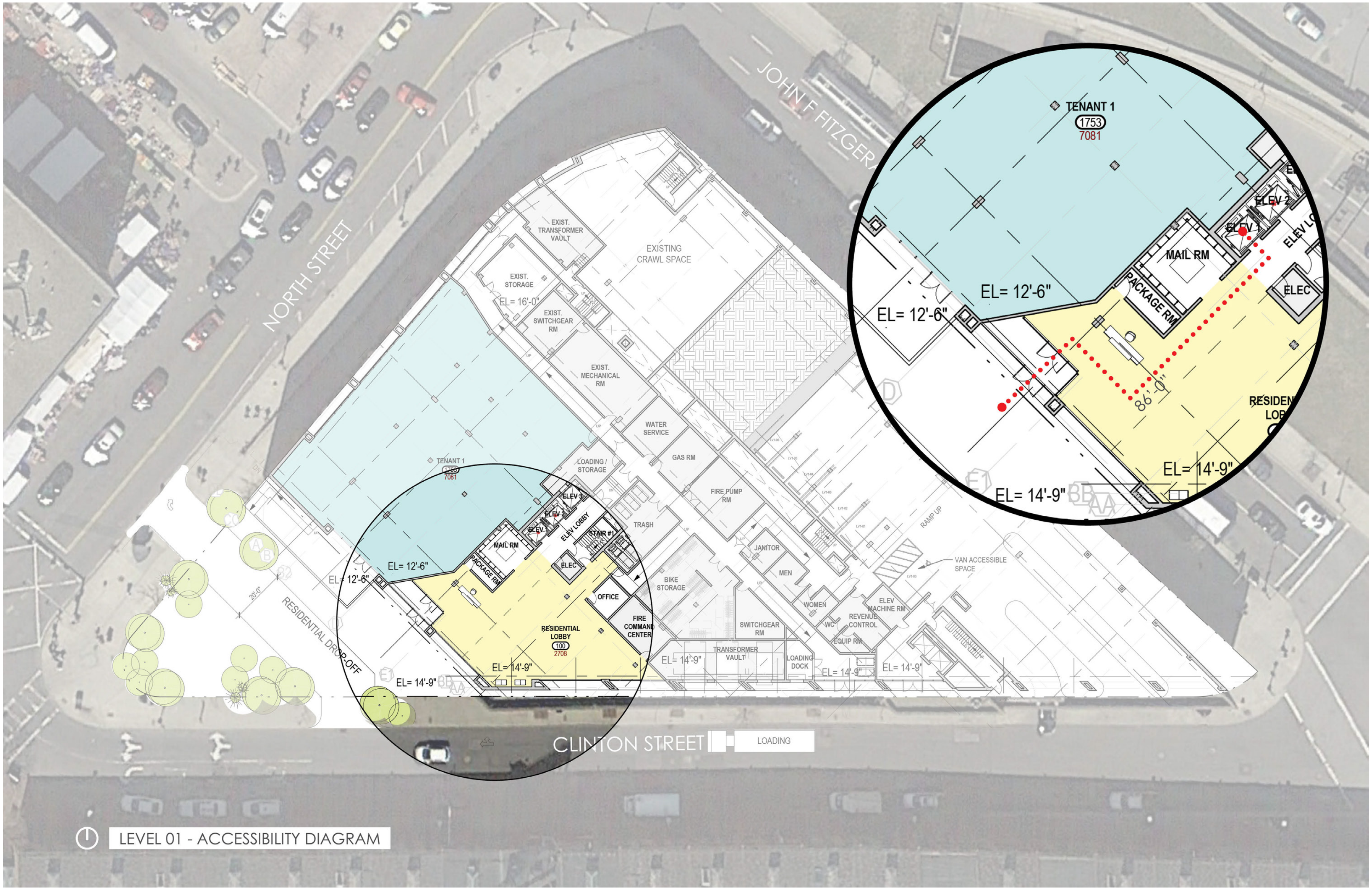
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

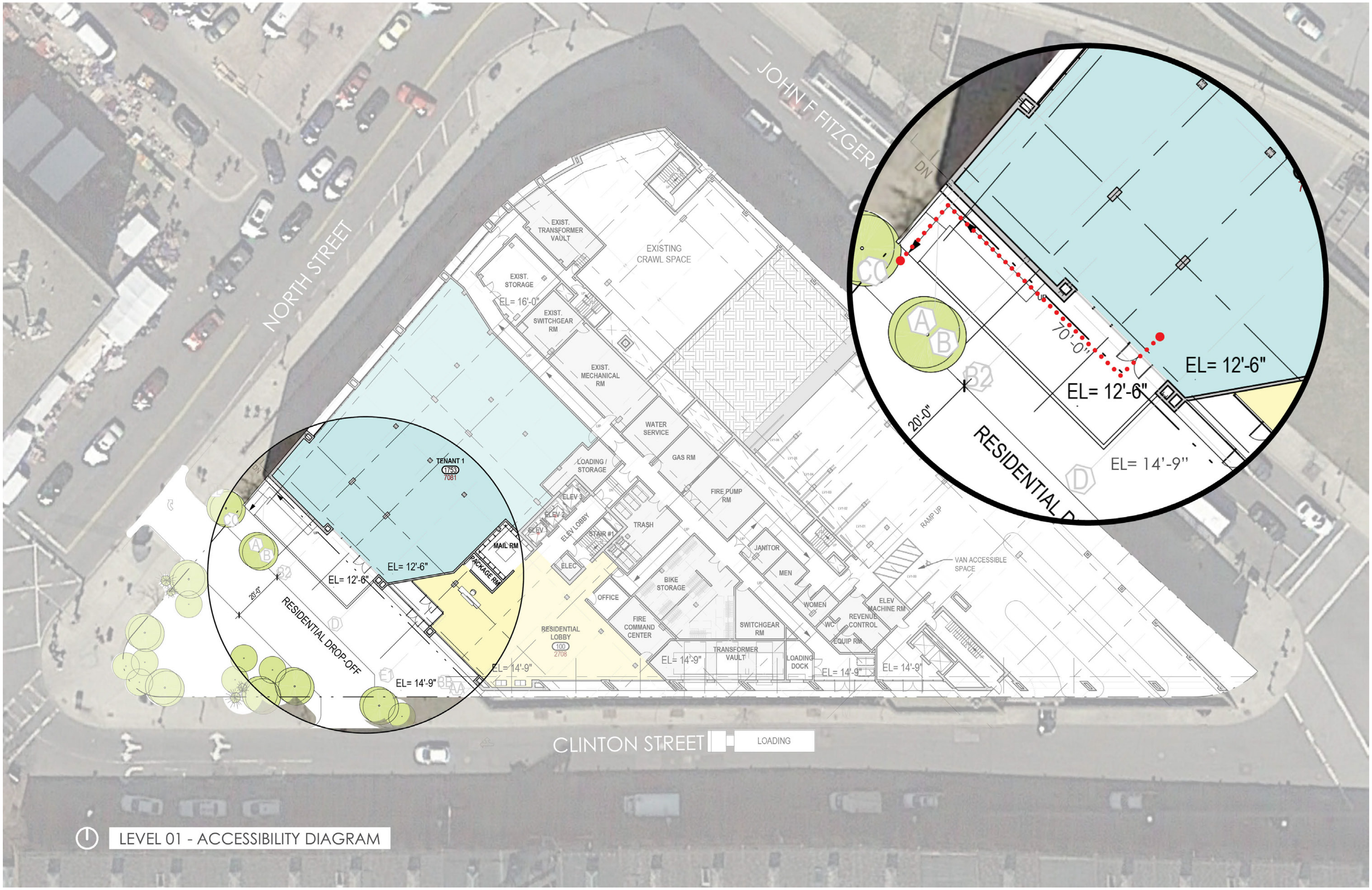
The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682



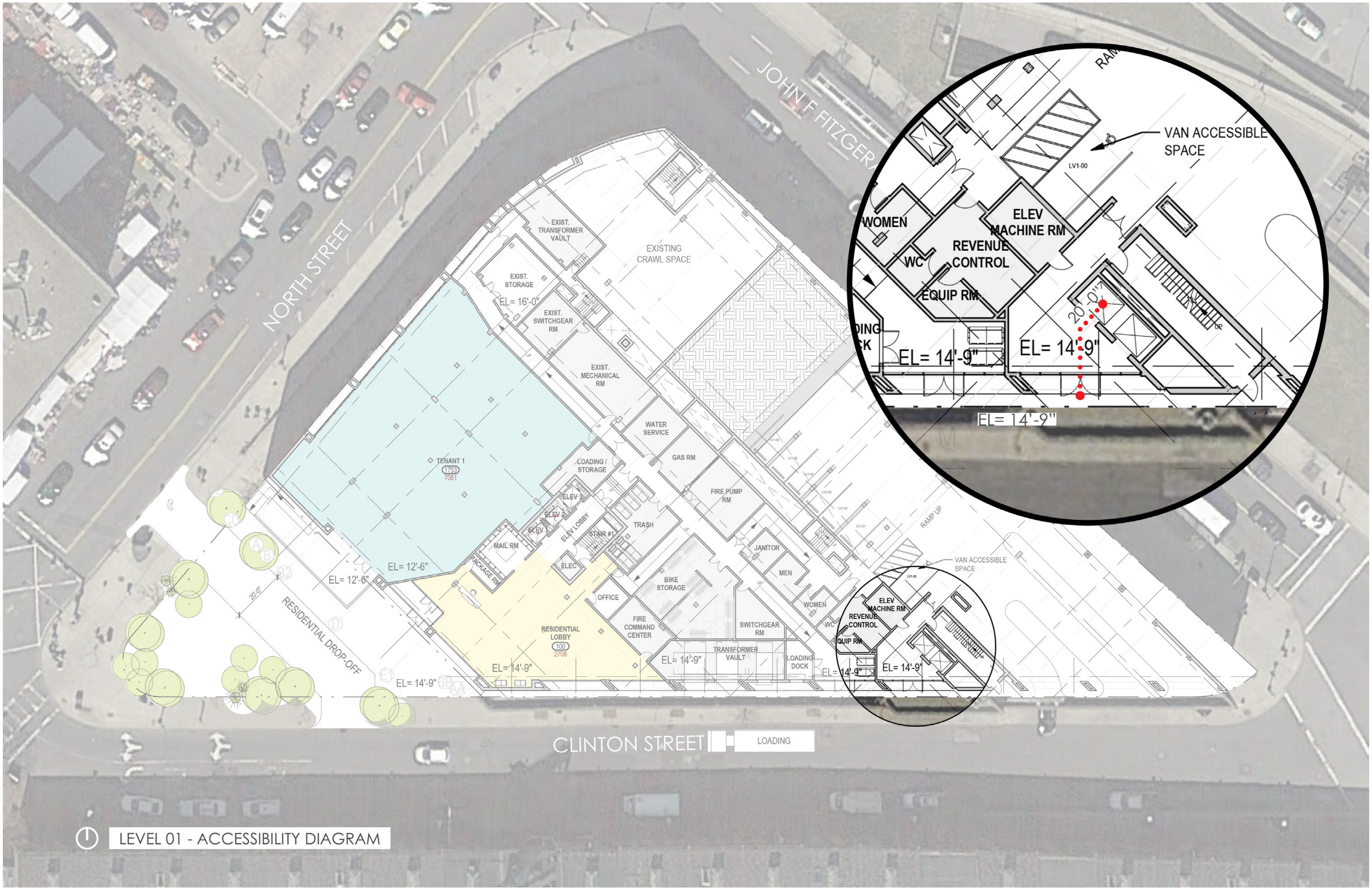

**Dock Square Boston, Massachusetts**




**Dock Square Boston, Massachusetts**

Stantec

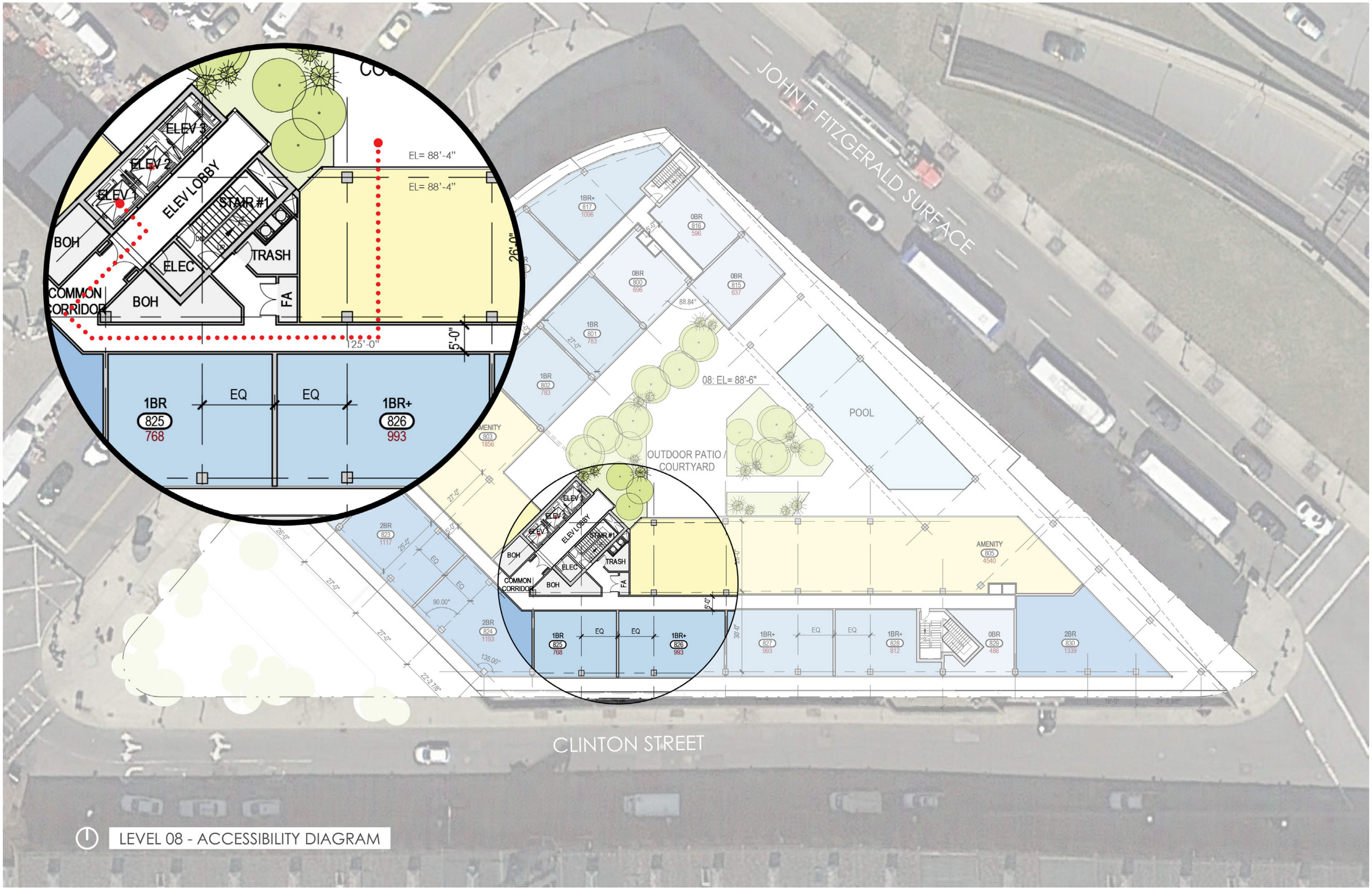
*Accessibility Diagram – Retail Entrance*




**Dock Square Boston, Massachusetts**

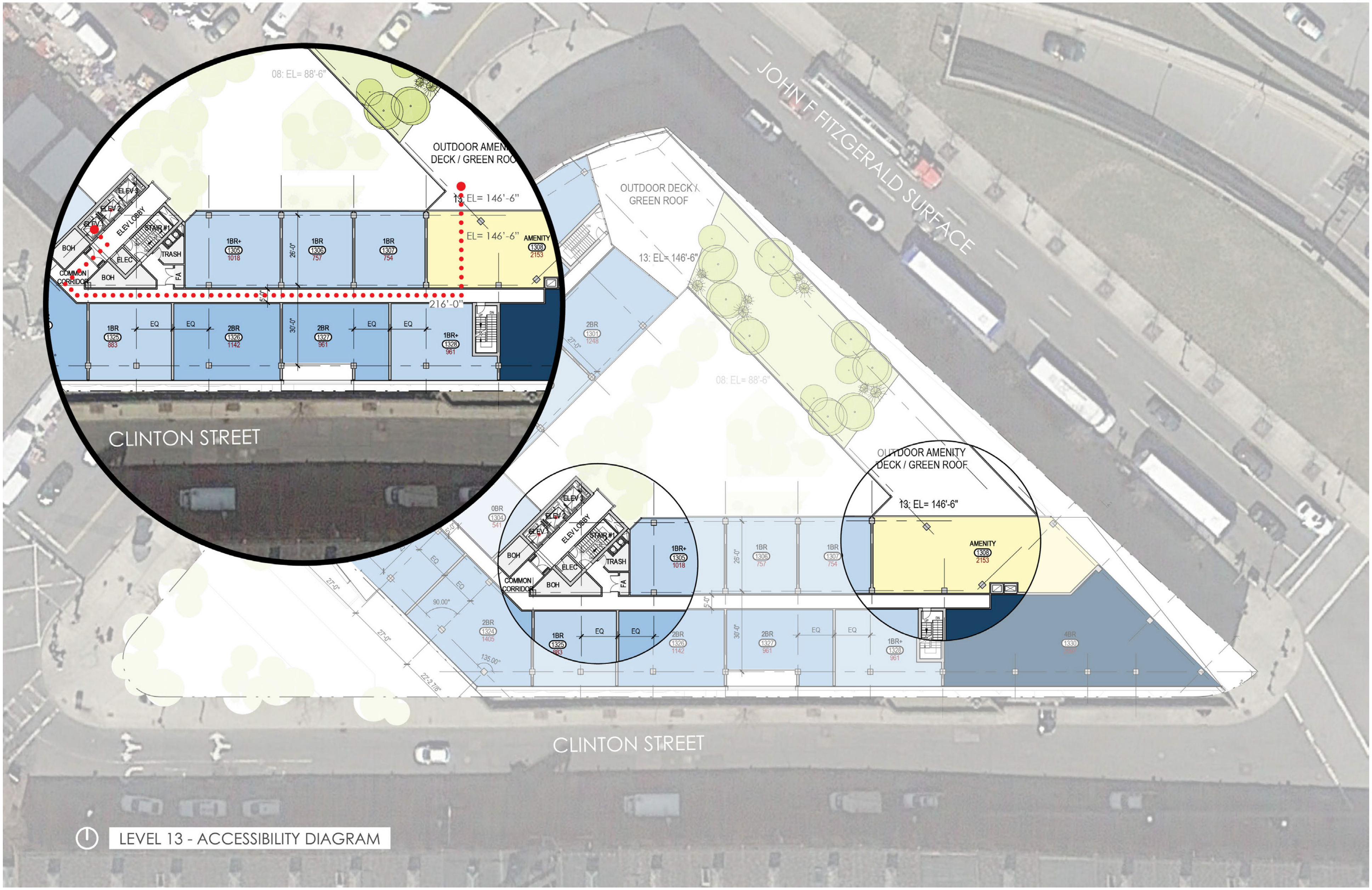
Stantec

*Accessibility Diagram – Garage Entrance*

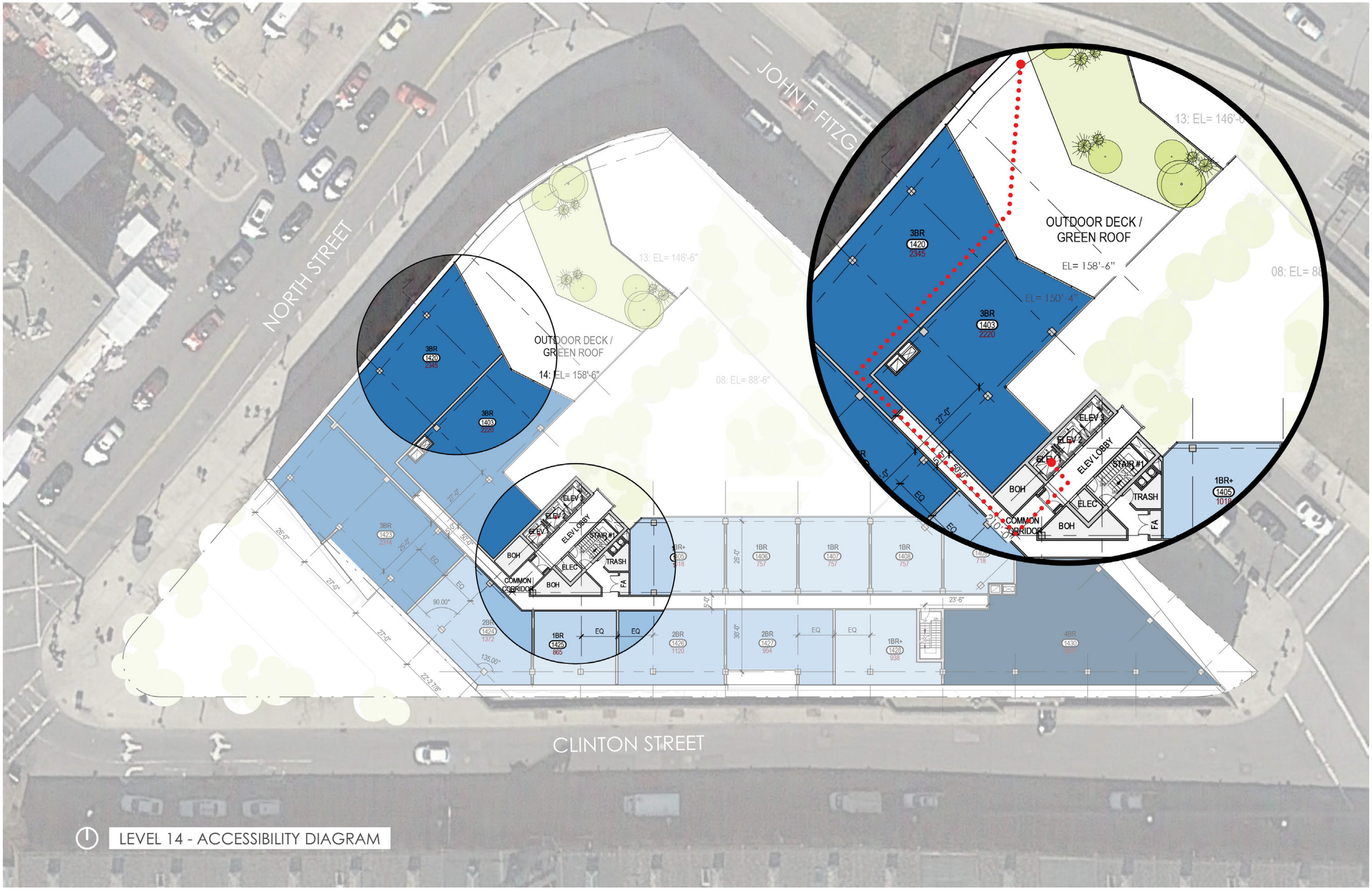



**Dock Square Boston, Massachusetts**

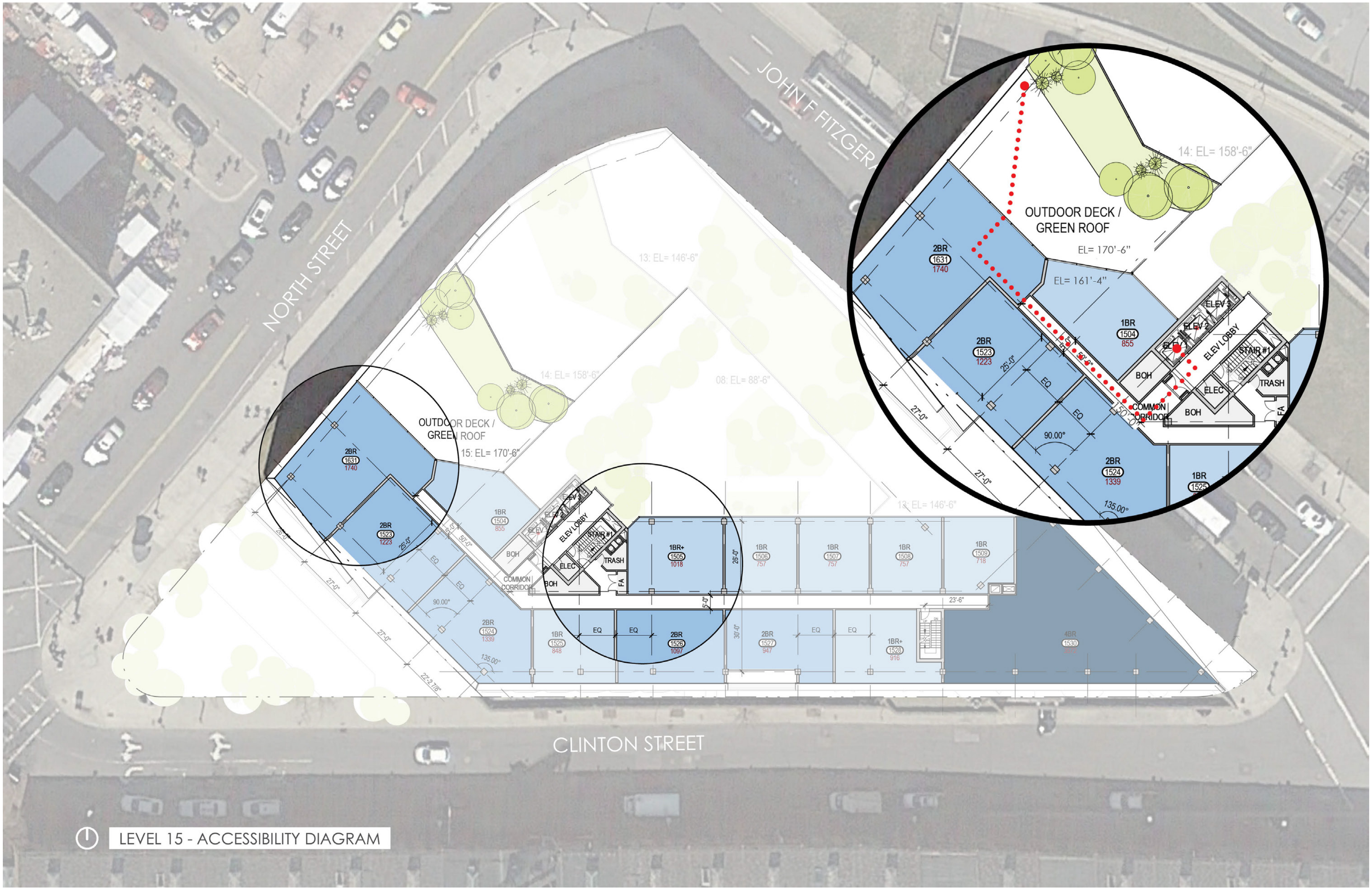
Stantec



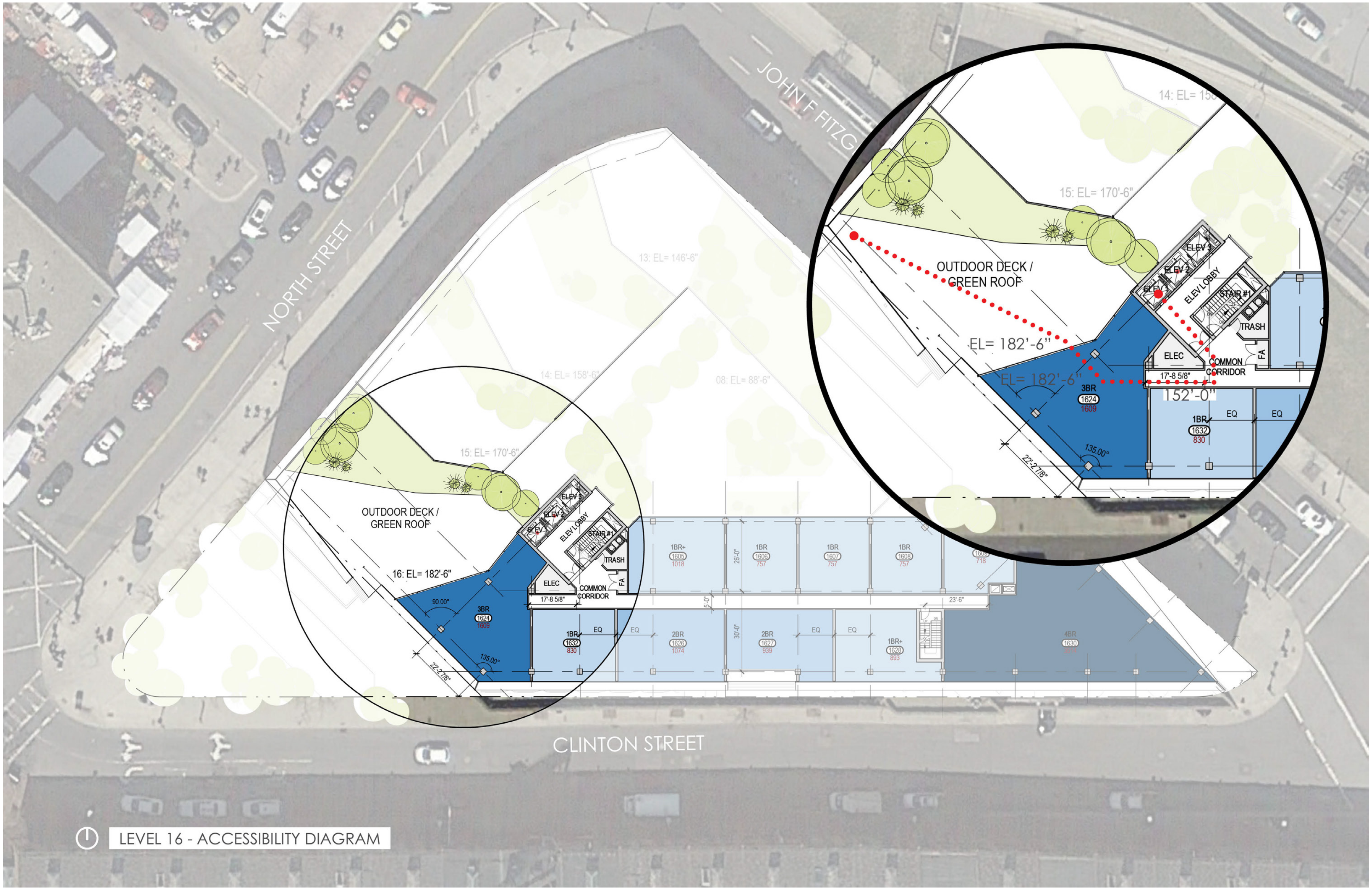

**Dock Square Boston, Massachusetts**



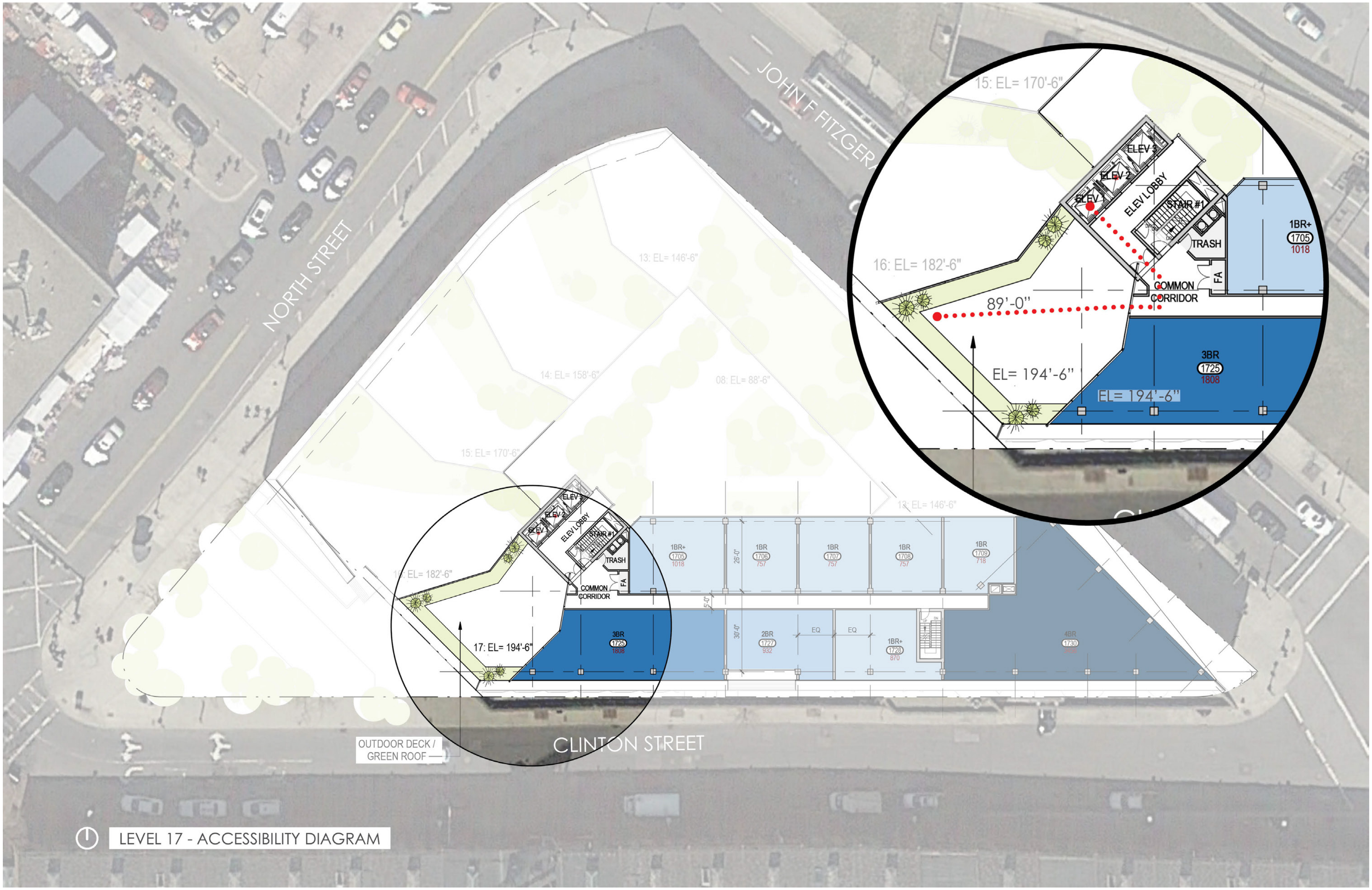

**Dock Square** **Boston, Massachusetts**




**Dock Square** **Boston, Massachusetts**




Dock Square Boston, Massachusetts




**Dock Square Boston, Massachusetts**