Expanded Project Notification Form

Indigo Block Redevelopment

Submitted to:
Boston Redevelopment Authority
One City Hall Square
Boston, Massachusetts 02201

Prepared by:
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, Massachusetts 01754

Submitted by:
Dorchester Bay Economic Development Corporation
Boston Capital Corporation
Escazú Development
Newmarket Community Partners

In Association with:
Davis Square Architects
Klein Hornig LLP
Howard Stein Hudson
DeVellis Zrein Inc.

December 11, 2015

Epsilon ASSOCIATES INC.

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Chapter 1.0

Introduction / Project Description

1.0 INTRODUCTION / PROJECT DESCRIPTION

1.1 Introduction

Dorchester Bay Economic Development Corporation (DBEDC), Boston Capital Corporation, Escazú Development, LLC and Newmarket Community Partners (collectively, the "Proponents") proposes the Indigo Block Redevelopment (the "Project"), the redevelopment of the parcel located at 65 East Cottage Street in the Uphams Corner area of Dorchester, MA. The development team was selected by the City of Boston Department of Neighborhood Development in 2015 to redevelop the site.

The Project includes the construction of new residential units appropriate for a mix of incomes and a commercial building proposed to provide space for light industrial uses, a total of approximately 123,400 square feet (sf) of construction. The Project also includes new open space and surface parking.

The Project builds upon and respects the long process of resident neighborhood planning, including the Uphams Corner Working Advisory Group and the Fairmount Indigo Planning Initiative, as well as community meetings leading up to the request for proposals issued by the Department of Neighborhood Development, Dudley Street Neighborhood Initiative, and Uphams Corner Main Street. The recommendations from each of these groups served as the foundation for the Project's design and program. In addition, the Project team further refined the concept through discussions with individual abutters and neighborhood groups such as the Groom/Humphries and Eastman Elder Neighborhood Associations.

The outcome of the meetings has led to a vision to transform an underutilized City parcel near a major transportation station with high quality housing and permanent job opportunities for residents in a range of incomes. Achieving balance in income distribution, use, access to public transit, open space, and sensitivity to long-term abutters are the driving forces behind the Project program. The production of new housing units will contribute to the City's goals of 6,500 new units for low income, non-elderly housing and 20,000 new units for the middle class by 2030 (Housing A Changing City: Boston 2030).

The Uphams Corner Neighborhood is currently going through a demographic transition as new residents move into the neighborhood. The site is strategically located next to the Uphams Corner Massachusetts Bay Transportation Authority (MBTA) Station, the new Kroc Community Center, and recent residential and commercial developments by DBEDC. The Project concept addresses and stabilizes the ongoing demographic change. The program is designed with the goals to create significant affordable housing for local and new residents through its mixed-income residential housing approach, and continue the redevelopment of Uphams Corner to bring more jobs and increase access to public transit in an area that has long been neglected by quality mass transit. This effort builds upon the long-term organizing efforts and investment that the City of Boston and its local partners have made to create more housing along the Fairmont Line.

This Expanded Project Notification Form (PNF) is being submitted to the Boston Redevelopment Authority (BRA) to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code.

1.2 Project Identification and Project Team

Address/Location:	65 East Cottage Street, Dorchester
Proponents:	Dorchester Bay Economic Development Corporation 594 Columbia Road, Suite 302 Dorchester, MA 02125 (617) 825-4200 Leah Whiteside Escazú Development LLC 1582 Dorchester Avenue Boston, MA 02122 (857) 939-5220 My Lam Boston Capital Corporation One Boston Place Boston, MA 02108 (617) 624-8900 Richard Mazzocchi Newmarket Community Partners Southampton Road Boston, MA 02118 (617) 445-3445 Sue Sullivan
Architect:	Davis Square Architects 240A Elm Street Somerville, MA 02144 (617) 628-5700 Cliff Boehmer Artan Sadiku
Legal Counsel:	Klein Hornig LLP 101 Arch Street, Suite 1101 Boston, MA 02110 (617) 224-0600 John Achatz

Permitting Consultant:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 David Hewett Geoff Starsiak
Transportation Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Brian Beisel
Civil Engineer:	DeVellis Zrein Inc. P.O. Box 307 Foxborough, MA 02035 (508) 473-4114 Imad Zrein
Geotechnical Consultant:	Lahlaf Geotechnical Consulting, Inc. 23 McGinness Way Billerica, MA 01821 (978) 330-5912 Abdelmadjid Lahlaf

1.3 Project Description

1.3.1 Project Site

The approximately 119,648 sf, or approximately 2.75-acre, Project site is located in the Uphams Corner area of Dorchester and is bound by Massachusetts Bay Transportation Authority (MBTA) tracks to the west, East Cottage Street to the north, commercial and residential properties, as well as Hillsboro Street to the east, and residential properties to the south (see Figure 1-1). The Project site is currently vacant, as the existing buildings on the site were demolished in 2015. The site previously included industrial and commercial space.

1.3.2 Area Context

The Project site is located at the intersection of residential and commercial/industrial areas in Dorchester. Residential neighborhoods consisting mainly of double-deckers and triple-deckers are located to the south, southern, west and northwest. To the north and northeast

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

Indigo Block Redevelopment Boston, Massachuestts

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Figure 1-1

Aerial Locus Map

is a mix of industrial and commercial uses with large one to two story flat-roofed buildings surrounded by large areas of pavement. To the southwest is The Salvation Army Ray and Joan Kroc Corps Community Center which includes an extensive number of fitness and community programs. To the west of the site is Uphams Corner MBTA station on the Fairmount Commuter Rail Line.

1.3.3 Proposed Development

The Project site is adjacent to the Uphams Corner transit stop on the Fairmont Line Commuter Rail, sometimes referred to as the Indigo Line. The proximity of site to public transit and downtown Boston presents a unique opportunity to redevelop one of the largest city-owned sites in Uphams Corner. The Project will redevelop the underutilized site into a mixed use, mixed-income development that will provide housing for various income levels and also a job generating light industrial use. The program is a result of many discussions with community stakeholders, residents, and neighborhood groups. Table 1-1 provides the Project program.

Table 1-1 Project Program

Project Element	Approximate Dimension
Commercial Building	
Square Feet	20,000 sf
Mezzanine	3,400 sf
Height	34 feet
Parking	29 spaces
Apartment Building	
Square Feet	86,000 sf / 80 units
Residential units	80 units
Height	Up to 62 feet
Parking	54 spaces
Residential Condominiums	
Square Feet	14,000 sf
Residential Units	8 units
Height	35 feet
Parking	8 spaces

The Project will provide approximately 20,000 sf of light industrial commercial space, with an approximately 3,400 sf mezzanine, in a stand-alone building, up to approximately 80 units of residential apartments for different income levels, and eight market rate homeownership condominiums. The site will be subdivided based on these three separate uses. Approximately 91 parking spaces will be included in several surface lots. Figures 1-2 to 1-4 include a site plan and perspectives.

The Project site will be acquired from the City by an affiliate of DBEDC. The site will then be subdivided into lots to permit the commercial building, the residential apartments and the residential condominiums to be developed as separate projects by separate development entities.

1.3.3.1 Commercial Building for Light Industrial Use

The light industrial component of the Project will be situated on a parcel of land fronting East Cottage Street and containing approximately 33,300 sf of land. The land will be developed with a two-story building having approximately 20,000 sf of floor area, as well as an approximately 3,400 sf mezzanine, with light industrial uses on the first floor for businesses that require use of a loading dock; and office uses on the second floor. The commercial building project will be carried out by a limited liability company or other entity to be formed by the Proponents.

The first floor will be divided into one to four leasable spaces of no smaller than approximately 2,000 sf, with high ceilings to accommodate storage height or a mezzanine for tenants' office space. The space is intentionally designed to be easily programmable for any light industrial user. Some categories of potential users include wholesale distributors, small manufacturing, food business, high-tech manufacturing, and general wholesale. The first floor will have either four or five loading bays at a shared loading dock at the rear of the building, allowing this floor to accommodate four to five tenants.

Second floor office users could include architects' or contractors' offices, small publishers or printing firms, or other light industrial users (i.e., artists and artisans) that do not need first floor spaces with loading dock connections. As with the first floor, the second floor is also designed to be easily adapted to the space needs of any office user. Appendix A includes floor plans and elevations.

Parking will be provided for the commercial building in a parking lot at the rear of the building, accessed via the driveway from East Cottage Street only. Commercial tenants and visitors will have access to 29 parking spaces; 13 parking "swing" spaces will be shared between residents and commercial uses.

Indigo Block Redevelopment Boston, Massachusetts

DeVellis Zrein Inc.

Figure 1-2

Site Plan

Indigo Block Redevelopment Boston, Massachusetts

DZ I
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Figure 1-3

Perspective from East Cottage Street

Indigo Block Redevelopment **Boston, Massachusetts**

DZ I
DeVellis Zrein Inc.

Figure 1-4

Perspective of Apartment Building

The building's façade on East Cottage Street is designed to create a friendly street presence on this otherwise crowded industrial street. The first floor of the building will be set back approximately 10 feet from the sidewalk to soften its impact on the street while still making maximum use of the site's space. A ramp and staircase will provide access to an entrance patio approximately two feet above sidewalk level. The mezzanine level will form an overhang above this entrance patio. However, the main lobby entrance to the building, offering access to the second floor, will be located at the southeast corner of the building.

1.3.3.2 Residential Apartments

The residential apartment building will be situated on a parcel of land containing approximately 70,800 sf of land. There will be up to approximately 80 apartments in an approximately 86,000 sf building. The building will have access to East Cottage Street over a shared driveway and will have direct access to Beckwith Street. The open space will be used by residents for community activities. At the south end of the site, a landscaped open space will be designed to provide seating for a waiting area for a potential future public connection to the Uphams Corner train platform.

The residential apartment project will be carried out by a separate limited liability company or other entity to be formed by the Proponents.

The residential program aims to serve the City of Boston's working and middle class families and individuals. The apartments are proposed to include approximately 22 one bedroom, 48 two bedroom, and 10 three bedroom units. Approximately 44 units will be reserved for families making at or less than 60% of the area median income, approximately 10 units will be reserved for families between 61% and 80% of the area median income, and approximately 26 units will be reserved for families between 81% and 110% of the area median income.

Residential parking will be accommodated in a surface lot adjacent to the apartment buildings that includes approximately 54 spaces for residents, or a ratio of 0.68 per unit. An additional 13 spaces on the commercial lot will also be available on a shared basis to the residential residents. Additionally, residents will have access to Zipcar or similar car-sharing service and bike storage within the buildings. Amenities are proposed to include a common innovation work room equipped with WIFI and work stations to provide space for tenant collaboration. All tenants will also have access to a fitness room onsite. Appendix A includes floor plans and elevations.

1.3.3.3 Residential Condominiums

There will be eight residential townhouse-style condominiums in two new buildings on two lots facing Hillsboro Street. The residential townhouses will have separate parking onsite. The units will have three bedrooms and 2.5 baths. The units will be sold as market rate

homes. Each townhouse will have at least one parking space. Appendix A includes floor plans and elevations.

The residential condominium project will be carried out by a limited liability company or other entity to be formed by Escazú Development.

1.4 Public Benefits

The Project will redevelop a vacant site owned by the City of Boston with a development that will provide employment opportunities, as well as a mix of housing opportunities. The Project will include numerous benefits to the neighborhood and the City of Boston, including the following:

- The Project will create approximately 88 new residential units proximate to public transportation.
- The Project will exceed the requirements of the Executive Order dated February 29, 2000, which requires that 15% of market rate units be affordable to specified levels of income households, by including approximately 44 units reserved for families making at or less than 60% of the area median income, approximately 10 units reserved for families between 61% and 80% of the area median income, and approximately 26 units reserved for families between 81% and 110% of the area median income.
- Approximately 199 construction jobs will be created.
- The Project will generate new property taxes.

The Project will provide a variety of urban design benefits to the surrounding neighborhood, including:

- The Project will meet the requirements of Article 37 of the Boston Zoning Code with a goal of meeting the Silver level of the Leadership in Energy and Environmental Design (LEED) for Homes system for the apartment building.
- The Project will improve the site's edge along East Cottage Street and Hillsboro Street.
- The site will include new landscaped areas that will reduce stormwater runoff from the site.

1.5 City of Boston Zoning

The Project site is situated in the Massachusetts Avenue Light Industrial Subdistrict of the Dorchester Neighborhood District established by Article 65 of the Boston Zoning Code (BZC). The site abuts three-family residential districts on the east, south and west sides.

Uses allowed in a Light Industrial Subdistrict include light manufacturing and other commercial uses. The Proponents will seek zoning relief from the Zoning Board of Appeal to permit residential uses on the residential apartment and condominium townhouse lots, and to permit shared parking on a portion of the commercial building lot.

The BZC provides that for projects subject to Article 80 Large Project Review, off-street parking and loading requirements will be determined through such review in accordance with the provisions of Article 80. The Proponents seek approval of its proposed parking facilities, including the number, design, location, screening and buffering of parking and loading spaces, as part of this Article 80 Large Project Review.

To the extent that any aspect of the Project does not comply with BZC design or other requirements, the Proponents will seek zoning relief from the Zoning Board of Appeal.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Proponents have no knowledge of any legal judgments in effect or legal actions pending that are adverse to the Project.

1.6.2 History of Tax Arrears on Property Owned in Boston by the Proponents

None of the Proponents have any tax arrearage on property that they own in the City of Boston.

1.6.3 Site Control / Public Easements

The Proponents will purchase the Project site from the City of Boston. The City of Boston Public Improvements Commission approved the tentative designation of the Proponents as the developers of the Project site in their meeting of May 21, 2015, and issued its designation letter on May 22, 2015.

The Project site is subject to a sewer easement along its northeastern board, connecting East Cottage and Hillsboro Street.

1.7 Anticipated Permits and Approvals

Table 1-2 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project. 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/APPROVAL
Local	
Boston Redevelopment Authority	Article 80B Large Project Review and Related Agreements Section 80B-6 Certificate of Compliance
Zoning Board of Appeal	Variances and Conditional Use Permits
Boston Civic Design Commission	Design Review
Boston Department of Public Works/ Public Improvement Commission	Curb Cut Permit(s) Street Opening Permit Street/Sidewalk Occupancy Permit Sidewalk Improvements Temporary Earth Retention Permit Specific Repairs Permit New Street Trees Permit Discontinuances
Boston Water and Sewer Commission	Water and Sewer Connection Permits Storm Drainage Site Plan Review
Boston Fire Department	Flammable Storage Permit Approval of Fire Safety Equipment
Boston Transportation Department	Transportation Access Plan Agreement Construction Management Plan
Inspectional Services Department	Building Permits Certificates of Occupancy Site Cleanliness Permit Other Construction-Related Permits
State	
Executive Office of Transportation and Construction	Letter of consent pursuant to MGL Ch 40 §54A (railway), if applicable
Massachusetts Historical Commission	Determination of no adverse impact on historical resources, if required
Federal	
U.S. Environmental Protection Agency	NPDES Notice of Intent for Construction

1.8 Public Participation

A Letter of Intent was filed with the BRA on June 29, 2015 beginning the Project's formal public review process. The Proponents have met with abutters, Dorchester community groups and elected officials to date, and looks forward to working with the neighborhood and City through the course of the Article 80 review process.

1.9 Schedule

Construction of the Project is estimated to last approximately 14 to 16 months, with initial site work expected to begin in the first quarter of 2017.

Chapter 2.0

Transportation

2.0 TRANSPORTATION

2.1 Introduction

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the redevelopment of the Project located in the Dorchester neighborhood of Boston. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and Article 80 Large Project Review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity.

2.1.1 Project Description

The site is currently vacant, as existing buildings on the site were demolished earlier this year. The proposed Project will consist of approximately 80 residential apartments, approximately 8 residential condominiums, and approximately 20,000 sf of light industrial use, as well as an approximately 3,400 sf mezzanine in the commercial building. Off-street parking will be provided for approximately 91 vehicles as part of the Project.

2.1.2 Study Methodology

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

The Existing (2015) Condition analysis includes an inventory of the existing transportation conditions 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. Long-term impacts are evaluated for the year 2020, based on a five-year horizon from the year of the filing of this traffic study.

The No-Build (2020) 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 site.

The Build (2020) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2020) Condition analysis. Expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies, are identified.

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.

2.1.3 Study Area

The transportation study area is bounded by East Cottage Street, Humphreys Street, and Dudley Street. The study area consists of the following intersections in the vicinity of the site, also shown on Figure 2-1:

- East Cottage Street/West Cottage Street/Dudley Street (signalized);
- East Cottage Street/Norfolk Avenue (unsignalized);
- East Cottage Street/Humphreys Street (unsignalized);
- Dudley Street/Humphreys Street (unsignalized);
- Humphreys Street/Quincefield Street/Harrow Street (unsignalized); and
- Humphreys Street/Belden Street/Groom Street (unsignalized).

2.2 Existing (2015) 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:

East Cottage Street is a two-way, two lane roadway located adjacent to the north of the Project site. East Cottage Street is classified as an urban collector roadway under BTD jurisdiction and runs in a predominately east-west direction between Dudley Street to the west and Dorchester Avenue to the east. In the vicinity of the site, on-street parking is provided on the north side of East Cottage Street to the west of the Columbia Road/Massachusetts Avenue intersection, and on the south side of East Cottage Street to the east of the Columbia Road/Massachusetts Avenue intersection. Sidewalks are provided on both sides of the roadway.

Indigo Block Redevelopment Boston, Massachusetts

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Figure 2-1
Study Area Intersections

Dudley Street is a two-way, two lane roadway located to the south of the Project site. Dudley Street is classified as an urban minor arterial and runs between Washington Street in the north and Columbia Road in the south. In the vicinity of the site, on-street parking is provided along both sides of the roadway when possible. Sidewalks are provided on both sides of Dudley Street.

Humphreys Street is a one-way, two lane roadway located to the east of the Project site. Humphreys Street is classified as a local street under BTD jurisdiction and runs in a predominately north-south direction between East Cottage Street to the north and Dudley Street to the south. In the vicinity of the site, on-street parking is provided along both sides of the roadway when possible. Sidewalks are provided on both sides of the roadway.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

East Cottage Street/Dudley Street/West Cottage Street is a four-leg, signalized intersection with four approaches. The East Cottage Street westbound approach consists of a shared left-turn/through/right-turn lane. The West Cottage Street eastbound approach consists of a shared left-turn/through/right-turn lane. The Dudley Street northbound and southbound approaches consist of a shared left-turn/through/right-turn lane. Sidewalks, crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection. On-street parking is permitted on the north side of East Cottage Street and West Cottage Street, and on both sides of Dudley Street whenever possible.

East Cottage Street/Norfolk Avenue is a three-leg, unsignalized stop-controlled intersection with three approaches. The East Cottage Street eastbound approach consists of a shared left-turn/right-turn lane. The East Cottage Street northbound approach consists of a shared left-turn/through lane. The Norfolk Avenue southbound approach consists of a shared through/right-turn lane. Sidewalks and wheelchair ramps are provided across all approaches to the intersection. Crosswalks and pedestrian signal equipment are not provided across any of the approaches of the intersection. On-street parking is permitted along the north sides of the East Cottage Street approaches and the east side of the Norfolk Avenue approaches.

East Cottage Street/Humphreys Street is a three-leg, unsignalized stop-controlled intersection with three approaches. The East Cottage Street eastbound and westbound approaches consist of one through lane. The Humphreys Street northbound approach consists of a shared left-turn/right-turn lane. Sidewalks and wheelchair ramps are provided along all approaches. Crosswalks and pedestrian signal equipment are not provided across any of the approaches to the intersection. On-street parking is permitted along the north side of the East Cottage Street approaches and both sides of the Humphreys Street approach when possible.

Dudley Street/Humphreys Street is a three-leg, unsignalized intersection with two approaches. The Dudley Street eastbound consists of a shared left-turn/through lane. The Dudley Street westbound approach consists of a shared through/right-turn lane. Sidewalks are provided along all approaches. Crosswalks and wheelchair ramps are provided across the north and east leg of the intersection. On-street parking is permitted on both sides of Dudley Street and Humphreys Street whenever possible.

Humphreys Street/Harrow Street/Quincefield Street is a four-leg, unsignalized intersection with three approaches. The Harrow Street eastbound approach consists of one shared left-turn/through lane. The Quincefield Street westbound approach consists of a shared through/right-turn lane. The Humphreys Street northbound is a one-way approach and consists of a shared left-turn/through/right-turn lane. Sidewalks and wheelchair ramps are provided along all approaches. On-street parking is permitted along both sides of Harrow Street, Quincefield Street and Humphreys Street whenever possible.

Humphreys Street/Groom Street/Belden Street is a four-leg, unsignalized intersection with two approaches. The Belden Street westbound approach is one-way and consists of a shared through/right-turn lane. The Humphreys Street northbound approach is a one-way and consists of a shared left-turn/through lane. Sidewalks and wheelchair ramps are provided along all approaches. On-street parking is permitted along the southern side of the Belden Street approach and both sides of the Humphreys Street approach whenever possible.

2.2.3 Parking

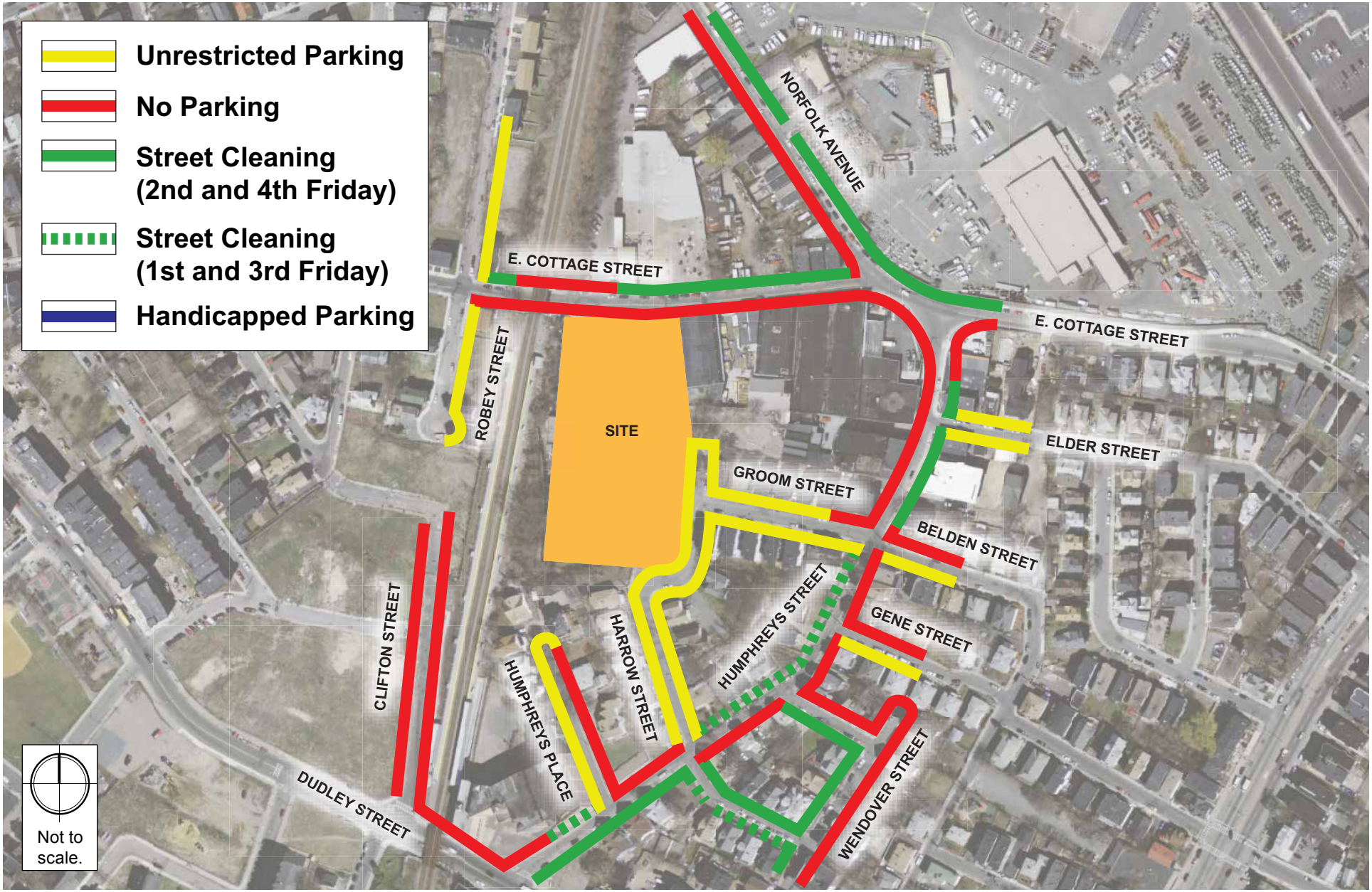
An inventory of the on-street and off-street parking in the vicinity of the Project was collected. A description of each follows.

2.2.3.1 On-Street Parking and Curb Usage

An inventory of the on-street parking and the curb usage was collected in the vicinity of the Project. On-street parking predominately consists of unrestricted parking. The on-street parking regulations within the study area are shown in Figure 2-2.

2.2.3.2 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. Zipcar locations exist at 16 Hamlet Street and at the JFK/UMass T Station.



Indigo Block Redevelopment Boston, Massachusetts

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Figure 2-2
On-Street Parking Regulations

2.2.4 Existing Public Transportation Services

The site is located in Uphams Corner with several public transportation opportunities. The site provides access to the Fairmont and Franklin Commuter Rail Lines. The JFK/UMass Station of the MBTA Red Line is located less than one mile away from the Project site. Additionally, the MBTA operates five bus routes in close proximity to the Project. Figure 2-3 maps all of the public transportation service located in close proximity of the site, and Table 2-1 provides a brief summary of all routes.

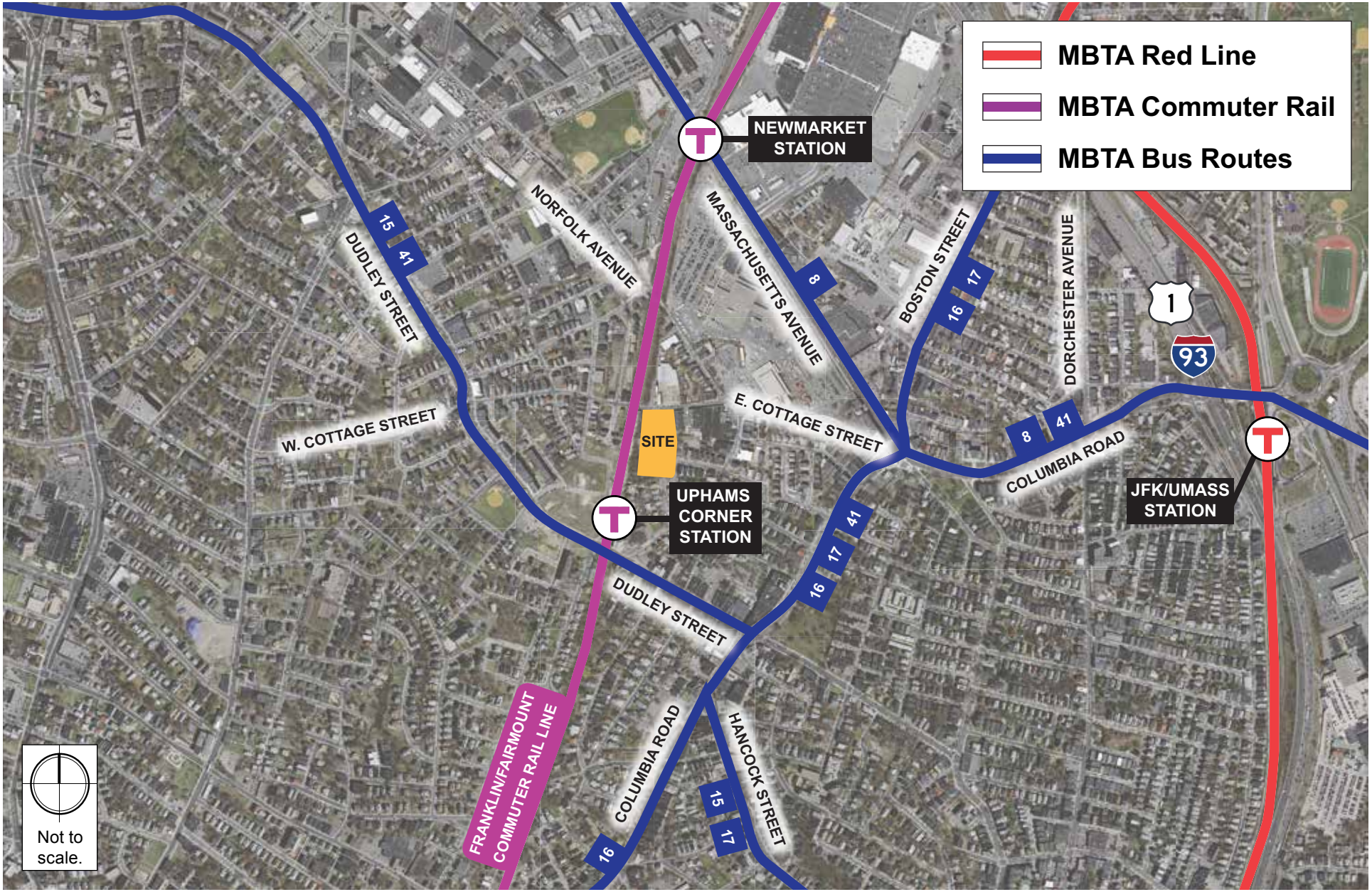
Table 2-1 Existing Public Transportation Service Summary

Transit Service	Description	Rush-hour Headway (in minutes)*
Subway		
Red Line	JFK/Umass Station – Braintree Station JFK/UMass Station – Ashmont Station	9 9
Commuter Rail		
Fairmont Line	Readville Station – South Station	40-45
Franklin Line	Forge Park/I495 – South Station	25
Bus Routes		
8	Harbor Point/UMass – Kenmore Station via B.U. Medical Center & Dudley Station	15
15	Kane Square or Fields Corner Station – Ruggles Station via Uphams Corner	8
16	Forrest Hills Station – Andrew or UMass via Columbia Road	15
17	Fields Corner Station – Andrew Station via Uphams Corner & Edward Everett Square	14
41	Centre & Eliot Stations – JFK/UMass Station via Dudley Station, Centre Street & Jackson Square Stations	22

* Headway is the time between buses.

2.2.5 Existing Traffic Data

Traffic volume data was collected at all of the study area intersections on August 12, 2015. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and p.m. peak periods (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 B.



Indigo Block Redevelopment Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 2-3
Existing Public Transportation

2.2.5.1 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along both sides of all roadways and are in good condition. Crosswalks and wheelchair ramps are also provided when necessary. 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 2-4.

2.2.5.2 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The site is conveniently located in close proximity to several bicycle facilities. The City of Boston's "Bike Routes of Boston" map indicates that East Cottage Street and Dudley Street are designated as intermediate routes. Intermediate routes are suitable for riders with some on-road experience. Bicycle counts were conducted concurrent with the vehicular TMCs, and are presented in Figure 2-5. As shown in the figure, bicycle volumes are heaviest along Dudley Street.

Bicycle Sharing Services

Hubway is a bicycle sharing system in Metro Boston, which was launched in July 2011 in Boston with 140 stations and 1,300 bicycles. Currently 33 Hubway docks exist within close proximity of the Project. There are nearby bicycle sharing locations at East Cottage Street at Columbia Road (18 bicycle docks) and in Upham's Corner (15 bicycle docks).

2.2.5.3 Existing Vehicular Traffic Volumes

The TMCs conducted showed that in the study area the vehicle weekday a.m. peak hour typically occurred from 7:30 – 8:30 a.m. and the weekday p.m. peak hour occurred from 5:00 – 6:00 p.m.

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 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is 0.92 for August. This indicates that average month traffic volumes are approximately eight percent less than the traffic volumes that were collected. The traffic counts were not adjusted downward to reflect average month conditions in order to provide a conservatively high analysis consistent with the peak season traffic volumes. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix B.

Existing traffic volumes were collected to develop the Existing (2015) Condition traffic volumes. The Existing (2015) Condition weekday morning and evening peak hour traffic volumes are shown in Figures 2-6 and Figure 2-7, respectively.

2.2.6 Existing 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 2000 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 acceptable 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 (sec/veh)	
	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: 2000 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 (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.

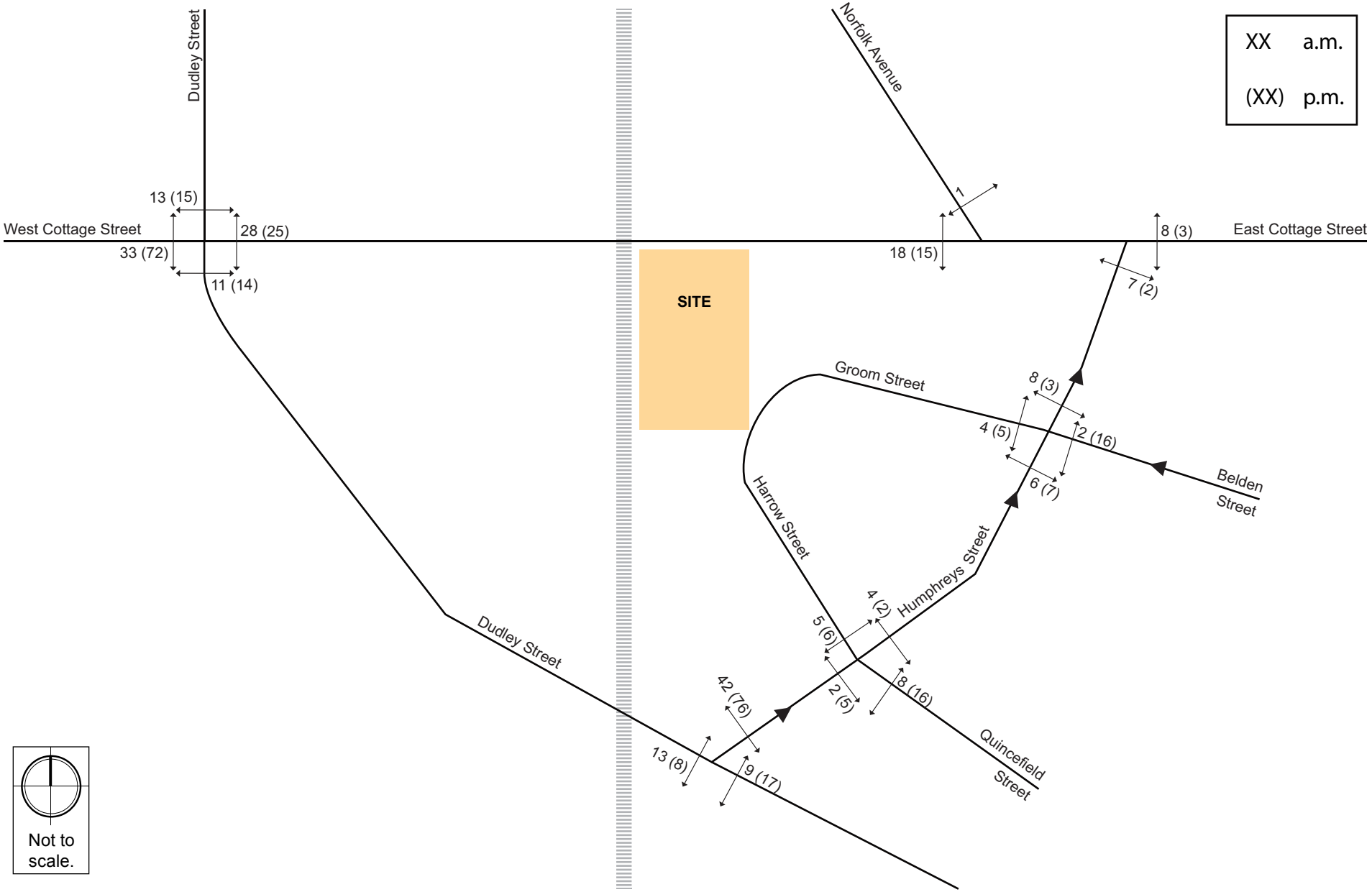


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Figure 2-4
Existing (2015) Condition Pedestrian Volumes, a.m. and p.m. Peak Hours

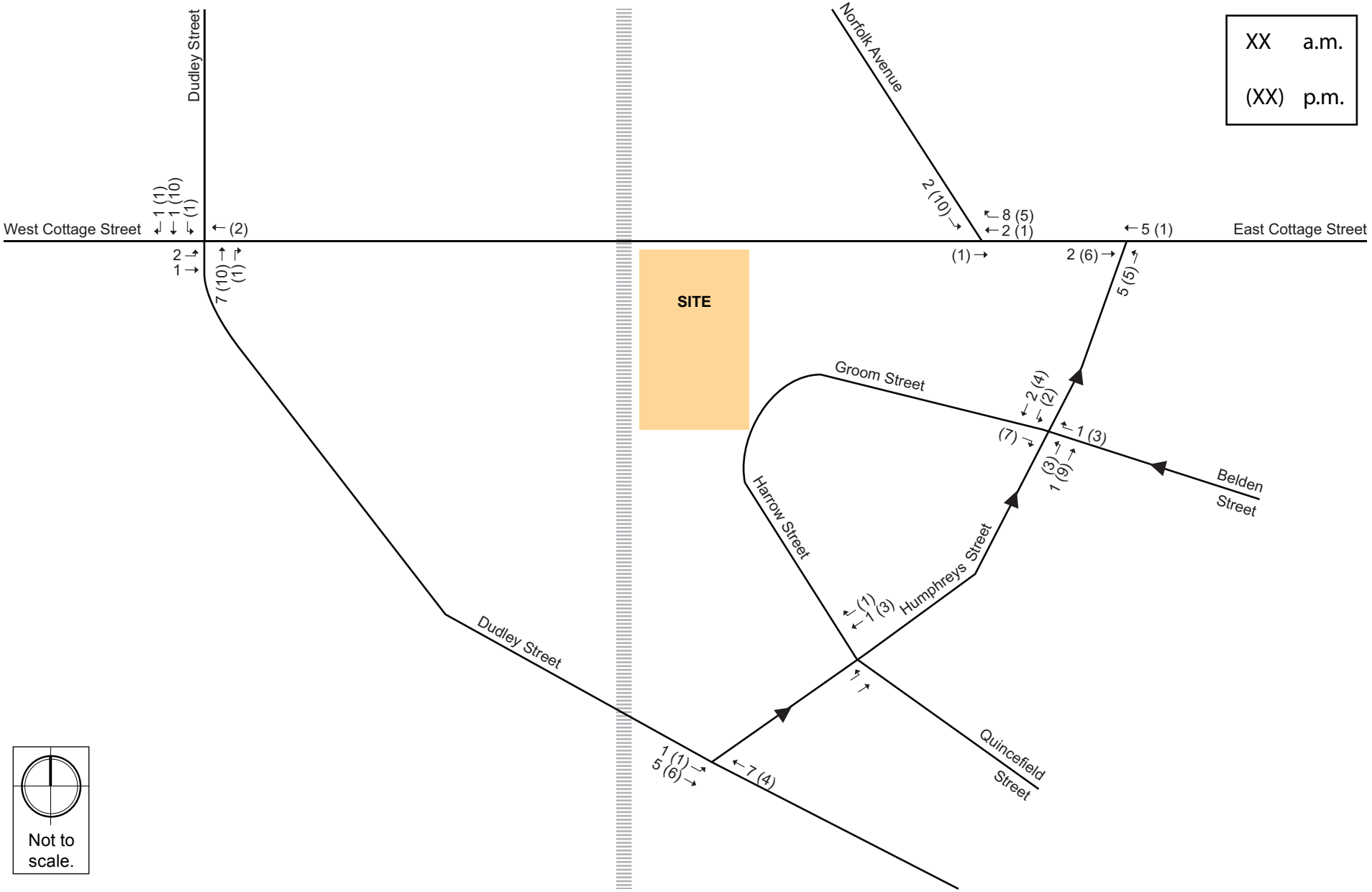

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Figure 2-5
Existing (2015) Condition Bicyclist Volumes, a.m. and p.m. Peak Hours

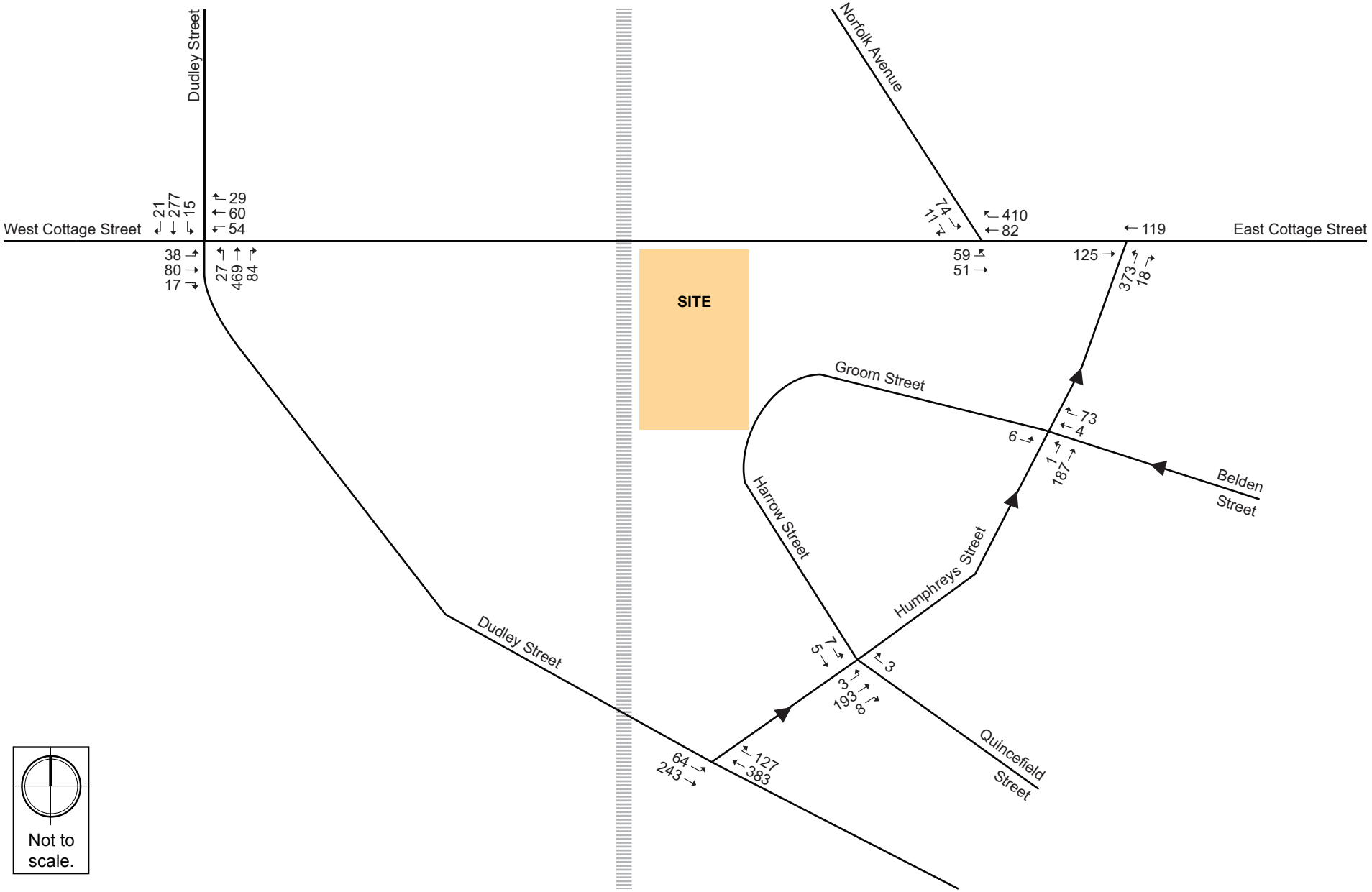

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Figure 2-6
Existing (2015) Condition Vehicular Traffic Volumes, a.m. Peak Hour

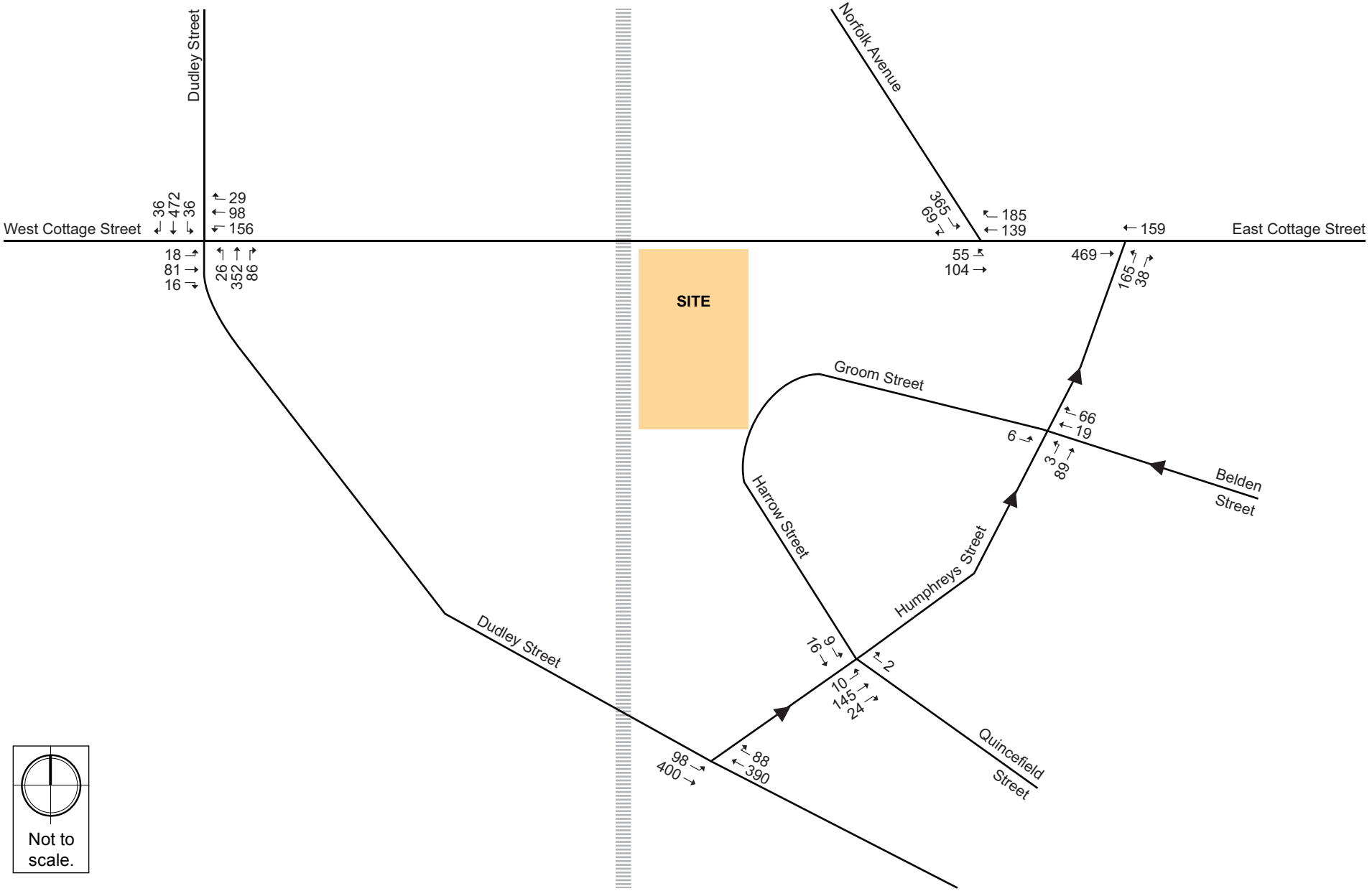

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Figure 2-7
Existing (2015) Condition Vehicular Traffic Volumes, p.m. Peak Hour

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 (2015) Condition capacity analysis for the study area intersection during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Attachment C.

Table 2-3 Existing (2015) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**C**	**32.1**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.3	0.26	22	50
East Cottage Street westbound left/thru/right	A	9.6	0.33	25	47
Dudley Street northbound left/thru/right	D	54.3	1.00	148	#336
Dudley Street southbound left/thru/right	B	14.1	0.55	62	123
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	A	9.0	0.18	-	15
East Cottage Street westbound thru/right	B	13.8	0.65	-	125
Norfolk Avenue southbound left/right	A	9.5	0.15	-	13
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	A	9.9	0.21	-	20
East Cottage Street westbound left/thru	A	9.9	0.21	-	20
Humphreys Street northbound left/right	C	17.0	0.67	-	128
Dudley Street/Humphreys Street	**-**	**-**	**-**	**-**	**-**
Dudley Street eastbound left/thru	A	2.5	0.07	-	6
Dudley Street westbound thru/right	A	0.0	0.32	-	0

Table 2-3 Existing (2015) Condition, Capacity Analysis Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Unsignalized Intersections					
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.02	-	3
Quincefield Street westbound thru/right	A	6.9	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.3	0.26	-	25
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	11.7	0.02	-	2
Belden Street westbound thru/right	B	10.1	0.12	-	10
Humphreys Street northbound left/thru	A	0.0	0.00	-	0

95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.

~ 50th percentile volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

Grey Shading indicates LOS E or F

Table 2-4 Existing (2015) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**C**	**32.1**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.0	0.21	18	42
East Cottage Street westbound left/thru/right	C	22.6	0.73	73	117
Dudley Street northbound left/thru/right	C	25.0	0.81	102	#248
Dudley Street southbound left/thru/right	D	49.1	0.98	141	#322
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	B	11.6	0.30	-	30
East Cottage Street westbound thru/right	C	15.1	0.57	-	90
Norfolk Avenue southbound left/right	C	22.4	0.74	-	160

Table 2-4 Existing (2015) Condition, Capacity Analysis Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Unsignalized Intersections					
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	C	17.9	0.69	-	135
East Cottage Street westbound left/thru	B	10.7	0.32	-	33
Humphreys Street northbound left/right	B	12.1	0.37	-	43
Dudley Street/Humphreys Street	-	-	-	-	-
Dudley Street eastbound left/thru	A	2.9	0.11	-	9
Dudley Street westbound thru/right	A	0.0	0.30	-	0
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.04	-	3
Quincefield Street westbound thru/right	A	6.8	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.1	0.23	-	23
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	10.7	0.02	-	1
Belden Street westbound thru/right	A	9.5	0.12	-	10
Humphreys Street northbound left/thru	A	0.3	0.00	-	0

95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after two cycles.

~ 50th percentile volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

Grey Shading indicates LOS E or F

As shown in Tables 2-3 and 2-4, under the 2015 Existing conditions:

- The signalized intersection of **East Cottage Street / West Cottage Street / Dudley Street** operates at LOS C during the a.m. and p.m. peak hours. The longest queues at the intersection occur at the Dudley Street northbound approach during the a.m. peak hour, and the Dudley Street southbound approach during the p.m. peak hour.

- At the unsignalized intersection of **East Cottage Street / Norfolk Avenue**, the stop controlled East Cottage Street eastbound approach operates at LOS A during the a.m. peak hour and LOS B during the p.m. peak hour, and the free westbound approach operates at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. The stop-controlled Norfolk Avenue southbound approach operates at LOS A during the a.m. peak hour and LOS C during the p.m. peak hour.

- At the unsignalized intersection of **East Cottage Street / Humphreys Street**, the free East Cottage Street eastbound approach operates at LOS A during the a.m. peak hour and LOS C during the p.m. peak hour, and the stop-controlled westbound approach operates at LOS A during the a.m. peak hour and LOS B during the p.m. peak hour. The stop-controlled Humphreys Street northbound approach operates at LOS C during the a.m. peak hour and LOS B during the p.m. peak hour.

- At the unsignalized intersection of **Dudley Street / Humphreys Street**, the free Humphreys Street eastbound and westbound approaches operate at LOS A during both the a.m. and p.m. peak hours.

- At the unsignalized intersection of **Humphreys Street / Harrow Street / Quincefield Street**, the stop-controlled Harrow Street eastbound approach operates at LOS A during both the a.m. and p.m. peak hours. The stop-controlled Quincefield Street westbound approach operates at LOS A during both the a.m. and p.m. peak hours. The free Humphreys Street northbound approach operates at LOS A during both the a.m. and p.m. peak hours.

- At the unsignalized intersection of **Humphreys Street / Groom Street / Belden Street**, the stop-controlled Groom Street eastbound approach operates at LOS B during both the a.m. and p.m. peak hours. The stop-controlled Belden Street westbound approach operates at LOS B during the a.m. peak hour and LOS A during the p.m. peak hour. The free Humphreys Street northbound approach operates at LOS A during both the a.m. and p.m. peak hours.

2.3 No-Build (2020) Condition

The No-Build (2020) 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 percent per year, compounded annually, was used.

2.3.2 Specific Development Traffic Growth

Traffic volumes associated with the larger or closer known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. The hotel expansion adjacent to the South Bay Plaza and the larger overall South Bay expansion projects were specifically accounted for in the traffic volumes for future scenarios, while others were included in the general background traffic growth.

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. Based on this review, no planned infrastructure improvements in the area were found.

2.3.4 No-Build Traffic Volumes

A one percent per year annual growth rate, compounded annually, was applied to the Existing (2015) Condition traffic volumes to develop the No-Build (2020) Condition traffic volumes. The No-Build (2020) Condition weekday morning and evening peak hour traffic volumes are shown on Figures 2-8 and Figure 2-9, respectively.

2.3.5 No-Build Condition Traffic Operations Analysis

The No-Build (2020) Condition capacity analysis uses the same methodology as the Existing (2015) Condition capacity analysis. Tables 2-5 and Table 2-6 present the No-Build (2020) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the Existing (2015) Condition and the No-Build (2020) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix B.

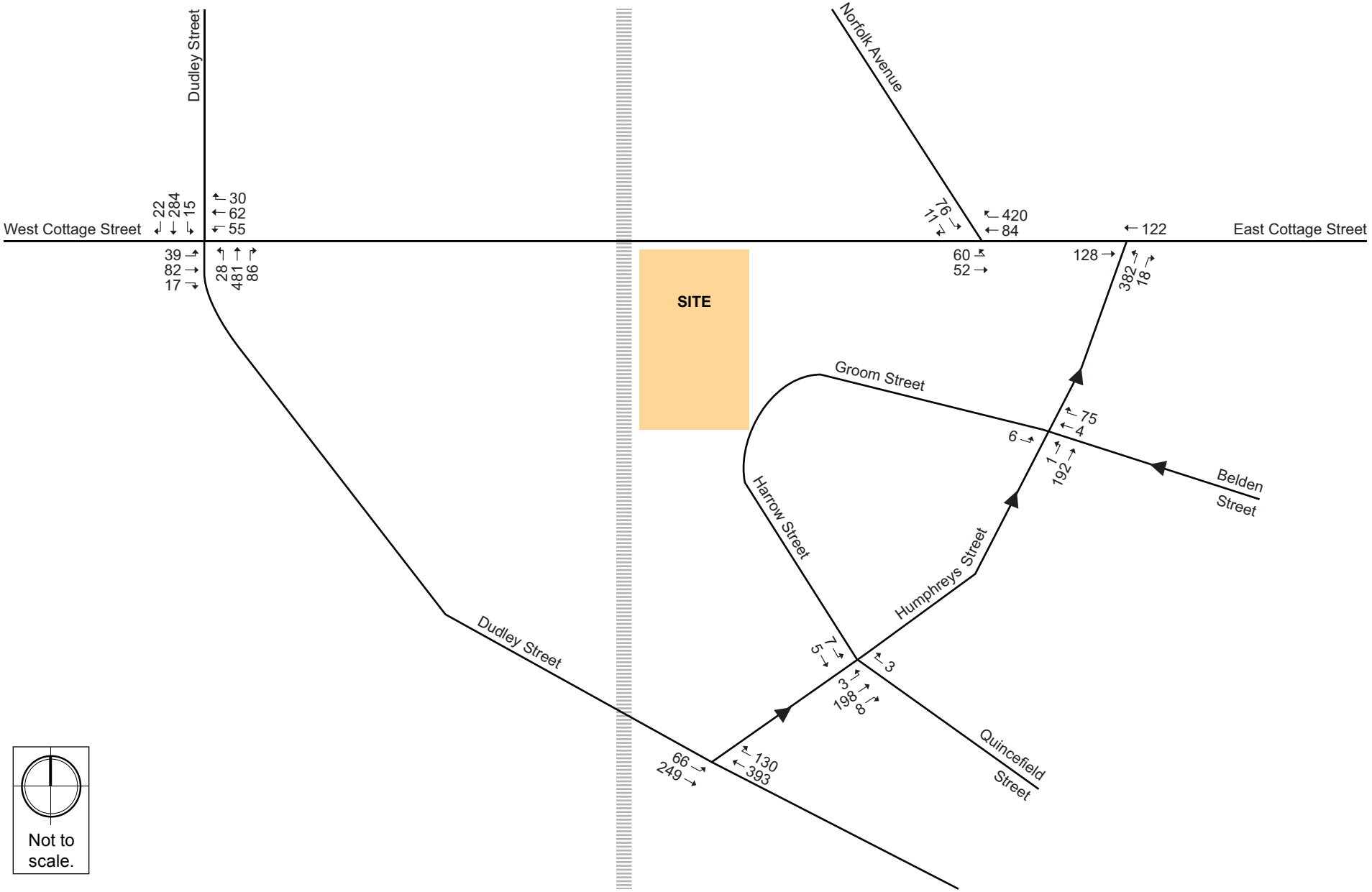

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Figure 2-8
No-Build (2020) Condition Vehicular Traffic Volumes, a.m. Peak Hour

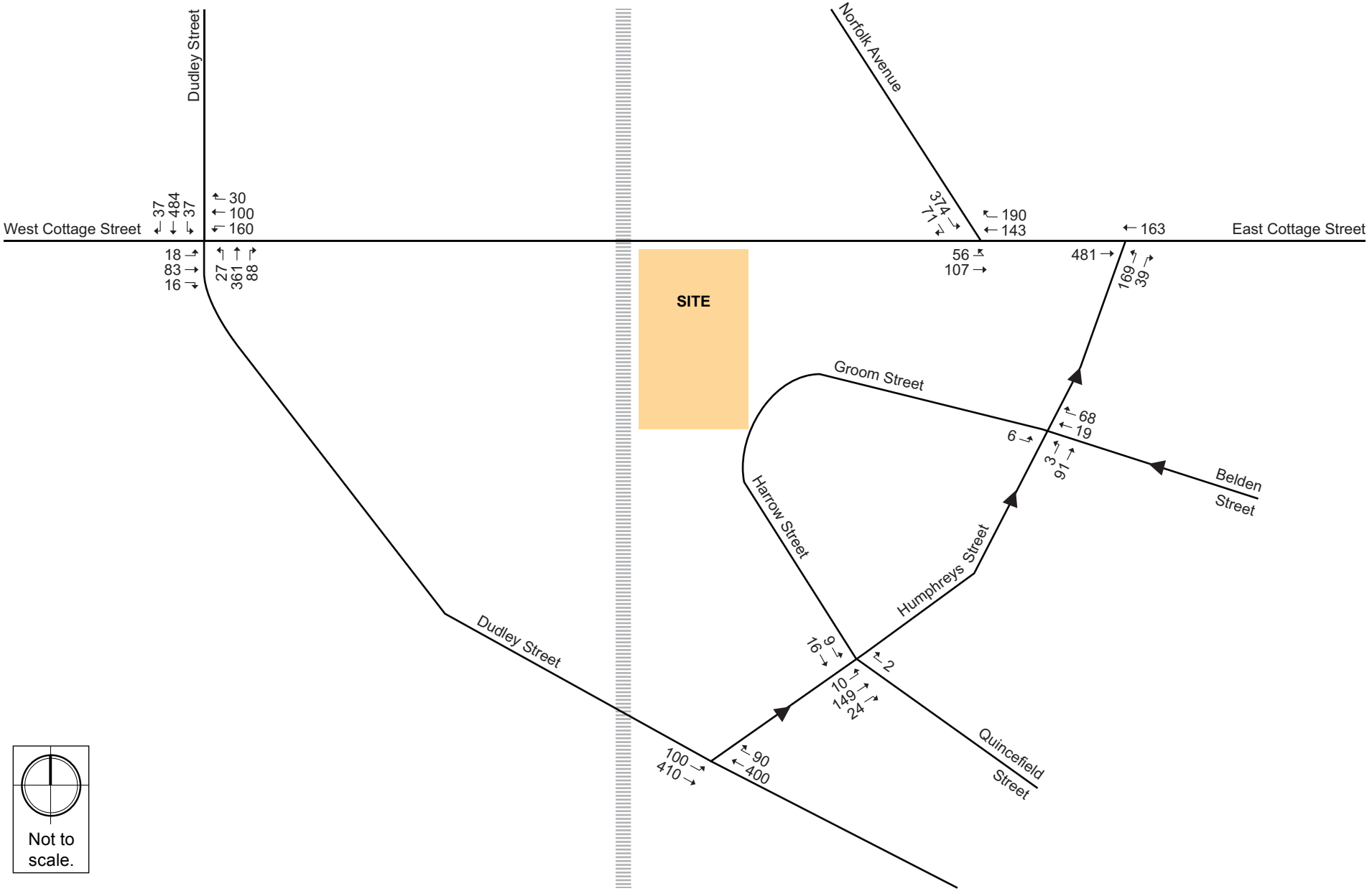

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Figure 2-9
No-Build (2020) Condition Vehicular Traffic Volumes, p.m. Peak Hour

Table 2-5 No-Build (2020) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**D**	**35.7**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.5	0.26	23	51
East Cottage Street westbound left/thru/right	A	9.7	0.34	26	49
Dudley Street northbound left/thru/right	E	61.6	>1.00	~165	#348
Dudley Street southbound left/thru/right	B	14.4	0.56	64	127
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	A	9.1	0.18	-	18
East Cottage Street westbound thru/right	B	14.3	0.67	-	133
Norfolk Avenue southbound left/right	A	9.6	0.16	-	15
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	A	10.0	0.21	-	20
East Cottage Street westbound left/thru	A	10.0	0.22	-	20
Humphreys Street northbound left/right	C	17.8	0.69	-	138
Dudley Street/Humphreys Street	**-**	**-**	**-**	**-**	**-**
Dudley Street eastbound left/thru	A	2.5	0.07	-	6
Dudley Street westbound thru/right	A	0.0	0.33	-	0
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.02	-	3
Quincefield Street westbound thru/right	A	6.9	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.3	0.26	-	28
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	11.9	0.02	-	2
Belden Street westbound thru/right	B	10.2	0.12	-	11
Humphreys Street northbound left/thru	A	0.0	0.00	-	0

Grey Shading indicates a degrade in LOS to LOS E or LOS F

Table 2-6 No-Build (2020) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**D**	**35.2**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.0	0.21	18	43
East Cottage Street westbound left/thru/right	C	23.8	0.75	76	120
Dudley Street northbound left/thru/right	C	26.8	0.83	106	#258
Dudley Street southbound left/thru/right	E	55.1	1.00	147	#333
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	B	11.8	0.31	-	33
East Cottage Street westbound thru/right	C	15.9	0.59	-	98
Norfolk Avenue southbound left/right	C	24.2	0.76	-	175
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	C	19.0	0.71	-	148
East Cottage Street westbound left/thru	B	10.9	0.33	-	35
Humphreys Street northbound left/right	B	12.3	0.38	-	45
Dudley Street/Humphreys Street	**-**	**-**	**-**	**-**	**-**
Dudley Street eastbound left/thru	A	2.9	0.11	-	10
Dudley Street westbound thru/right	A	0.0	0.31	-	0
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.04	-	3
Quincefield Street westbound thru/right	A	6.8	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.1	0.23	-	23
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	10.6	0.02	-	1
Belden Street westbound thru/right	A	9.5	0.12	-	10
Humphreys Street northbound left/thru	A	0.2	0.00	-	0

As shown in Tables 2-5 and 2-6, under the No-Build (2020) Condition:

- The signalized intersection of **Cottage Street / Dudley Street** decreases to LOS D during both the a.m. and p.m. peak hour. The Dudley Street northbound approach decreases to LOS E during the a.m. peak hour, and the southbound approach decreases to LOS E during the p.m. peak hour. The longest queues at the intersection continue to occur at the Dudley Street northbound approach during the a.m. peak hour and the southbound approach during the p.m. peak hour.

2.4 Build (2020) Condition

The Project consists of approximately 80 residential apartments, approximately eight residential condominiums, and approximately 20,000 sf of light industrial use, as well as an approximately 3,400 sf mezzanine in the commercial building. Off-street parking will be provided for approximately 91 vehicles as part of the Project. The Build (2020) Condition reflects a future scenario that adds anticipated Project-generated trips to the No-Build (2020) Condition traffic volumes.

2.4.1 Site Access and Circulation

The Site Plan is shown in Figure 2-10. Access/egress to the light industrial use will be via East Cottage Street. Vehicular access to the residential apartments will also be via East Cottage Street. However, egress will be from Harrow Street and Groom Street on the south end of the site as the internal site driveway will run one way southbound to the south of the commercial loading and parking area. The parking for the residential condominiums will be via Hillsborough Street.

2.4.2 Loading and Service Accommodations

Loading and service operations will occur on site. A loading dock is provided along the south side of the light industrial building. Residential move in and move out operations will be handled on site via the proposed parking spaces.

2.4.3 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 a minimum of 88 secure and covered bicycle parking/storage spaces within the site.

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Figure 2-10
Site Access Plan

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 a specific land use program. 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 codes (LUCs) were used:

Land Use Code 220 – Apartment. The apartment land use is defined as rental dwellings located within the same building with at least three other dwelling units. Trip generation estimates are based on average vehicle rates per unit.

Land Use Code 230 – Residential Condominium/Townhouse. Residential condominiums/townhouses are defined as units located in a building that has three or more floors with condominium residential units. Calculations of the number of trips use ITE's fitted curve equation per dwelling unit.

Land Use Code 110 – Light Industrial. Light industrial facilities are defined as free-standing facilities devoted to a single use that place emphasis on activities other than manufacturing and typically have minimal office space. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross floor area.

2.4.5 Mode Share

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in the eastern portion of designated Area 15 - Roxbury. 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.

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1 Trip Generation Manual, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

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

Table 2-7 Travel Mode Shares

Land Use		Walk/Bicycle Share	Transit Share	Auto Share	Vehicle Occupancy Rate
Daily					
Light Industrial[1]	In	17%	24%	58%	1.13
20,000 sf	Out	17%	24%	58%	1.13
Residential[2]	In	26%	17%	57%	1.13
88 Units	Out	26%	17%	57%	1.13
AM Peak					
Light Industrial[1]	In	18%	27%	55%	1.13
20,000 sf	Out	17%	40%	43%	1.13
Residential[2]	In	27%	19%	54%	1.13
88 Units	Out	27%	29%	44%	1.13
PM Peak					
Light Industrial[1]	In	17%	40%	43%	1.13
20,000 sf	Out	18%	27%	55%	1.13
Residential[2]	In	27%	29%	44%	1.13
88 Units	Out	27%	19%	54%	1.13

1. Based on LUC 110 – Light Industrial, 20,000 sf
2. Based on LUC 220 – Apartment, 80 Units and LUC 230 – Condominium, 8 Units

2.4.6 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. The trip generation for the Project by mode is shown in Table 2-8. The detailed trip generation information is provided in Appendix B.

Table 2-8 Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Light Industrial[1]	In	13	19	41
	Out	13	19	41
Residential – Apartment[2]	In	79	52	153
	Out	79	52	153
Residential – Condominium[3]	In	7	4	13
	Out	7	4	13
Total	In	99	75	207
	Out	99	75	207
a.m. Peak Hour				
Light Industrial[1]	In	3	5	9
	Out	0	1	1
Residential – Apartment[2]	In	2	2	4
	Out	10	11	15
Residential – Condominium[3]	In	0	0	1
	Out	1	1	1
Total	In	5	7	14
	Out	11	13	17
p.m. Peak Hour				
Light Industrial[1]	In	0	1	1
	Out	3	5	9
Residential – Apartment[2]	In	10	11	15
	Out	5	4	9
Residential – Condominium[3]	In	1	1	1
	Out	0	0	1
Total	In	11	13	17
	Out	8	9	19

1. Based on LUC 110 – Light Industrial, 20,000 sf
2. Based on LUC 220 – Apartment, 80 Units
3. Based on LUC 232 – Condominium, 8 Units

As shown in Table 2-8, the Project is estimated to generate 198 pedestrian trips, 150 transit trips, and 412 vehicle trips throughout the day. During the a.m. peak hour, the Project is estimated to generate 16 pedestrian trips (5 in and 11 out), 20 transit trips (7 in and 13 out),

and 31 vehicle trips (14 in and 17 out). During the p.m. peak hour, the Project is estimated to generate 19 pedestrian trips (11 in and 8 out), 22 transit trips (13 in and 9 out), and 36 vehicle trips (17 in and 19 out).

2.4.7 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 15 and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-11.

2.4.8 Build Traffic Volumes

The vehicle trips were distributed through the study area. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 2-12 and Figure 2-13, respectively. The trip assignments were added to the No-Build (2020) Condition vehicular traffic volumes to develop the Build (2020) Condition vehicular traffic volumes. The Build (2020) Condition weekday morning and evening peak hour traffic volumes are shown on Figure 2-14 and Figure 2-15, respectively.

2.4.9 Build Condition Traffic Operations Analysis

The Build (2020) Condition analysis uses the same methodology as the Existing (2015) Condition and No-Build (2020) Condition analysis. Table 2-9 and Table 2-10 present the Build (2020) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix B.

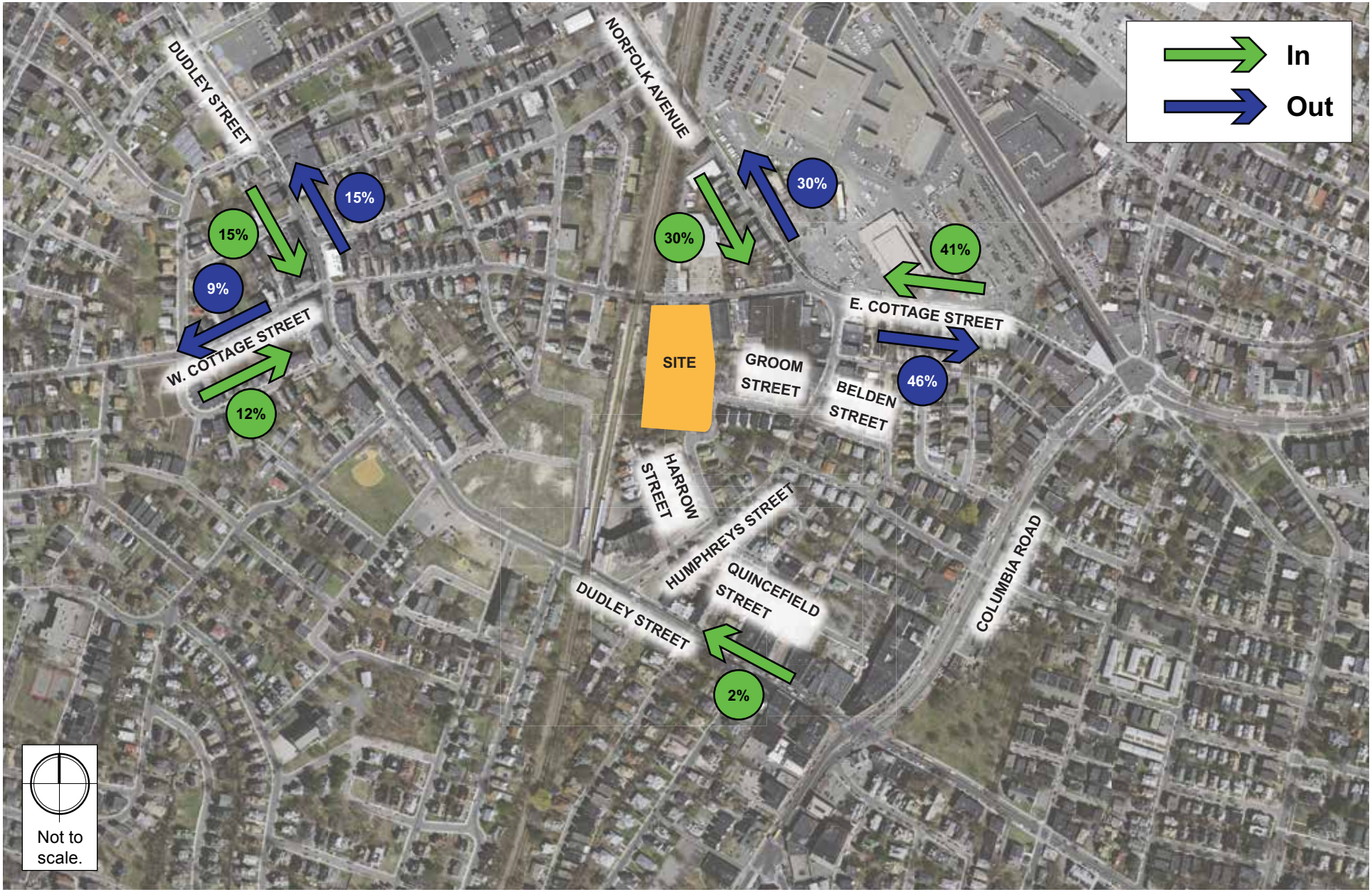

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Figure 2-11
Trip Distribution

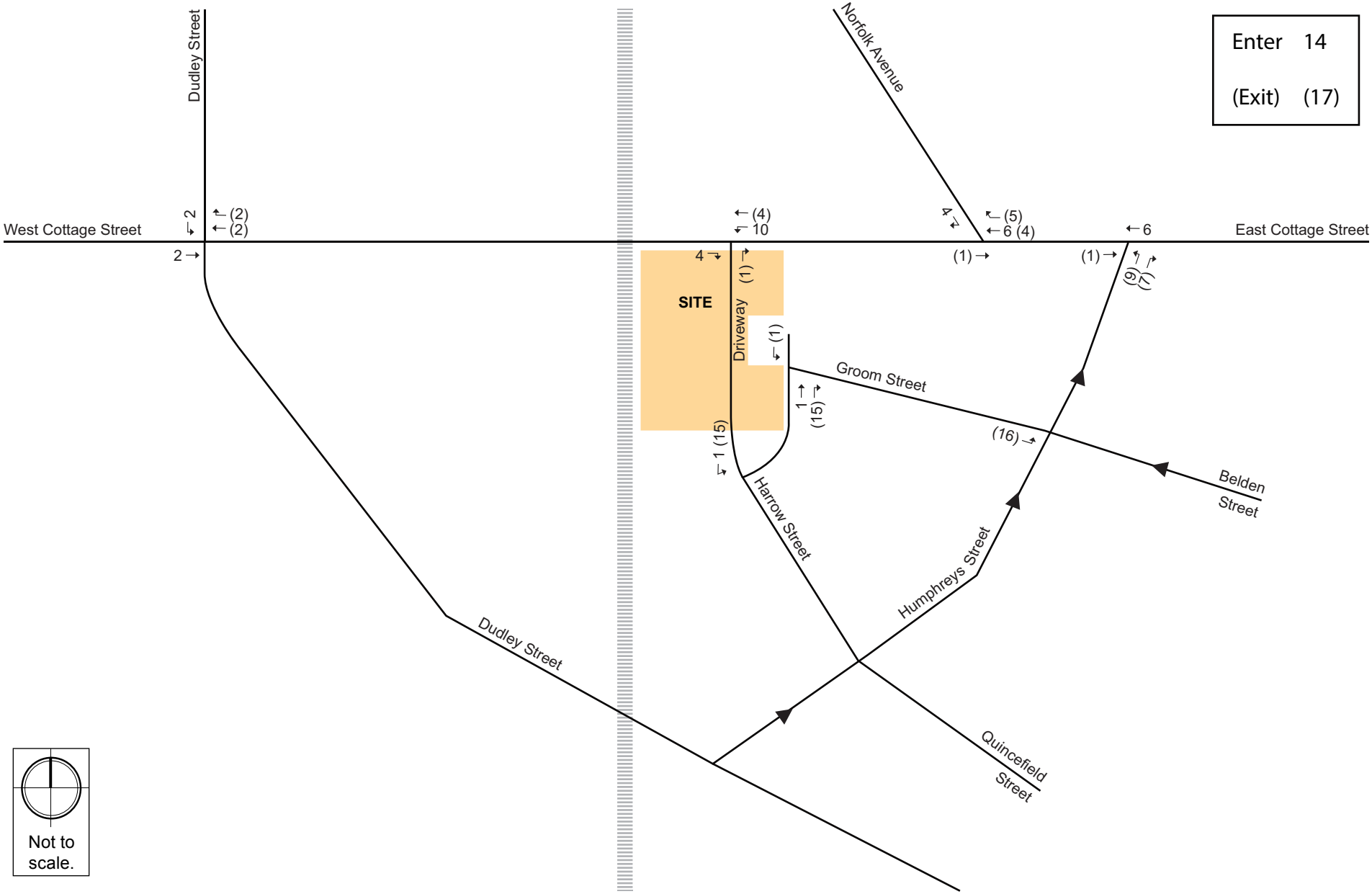

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Figure 2-12
Vehicle Trip Assignment, a.m. Peak Hour

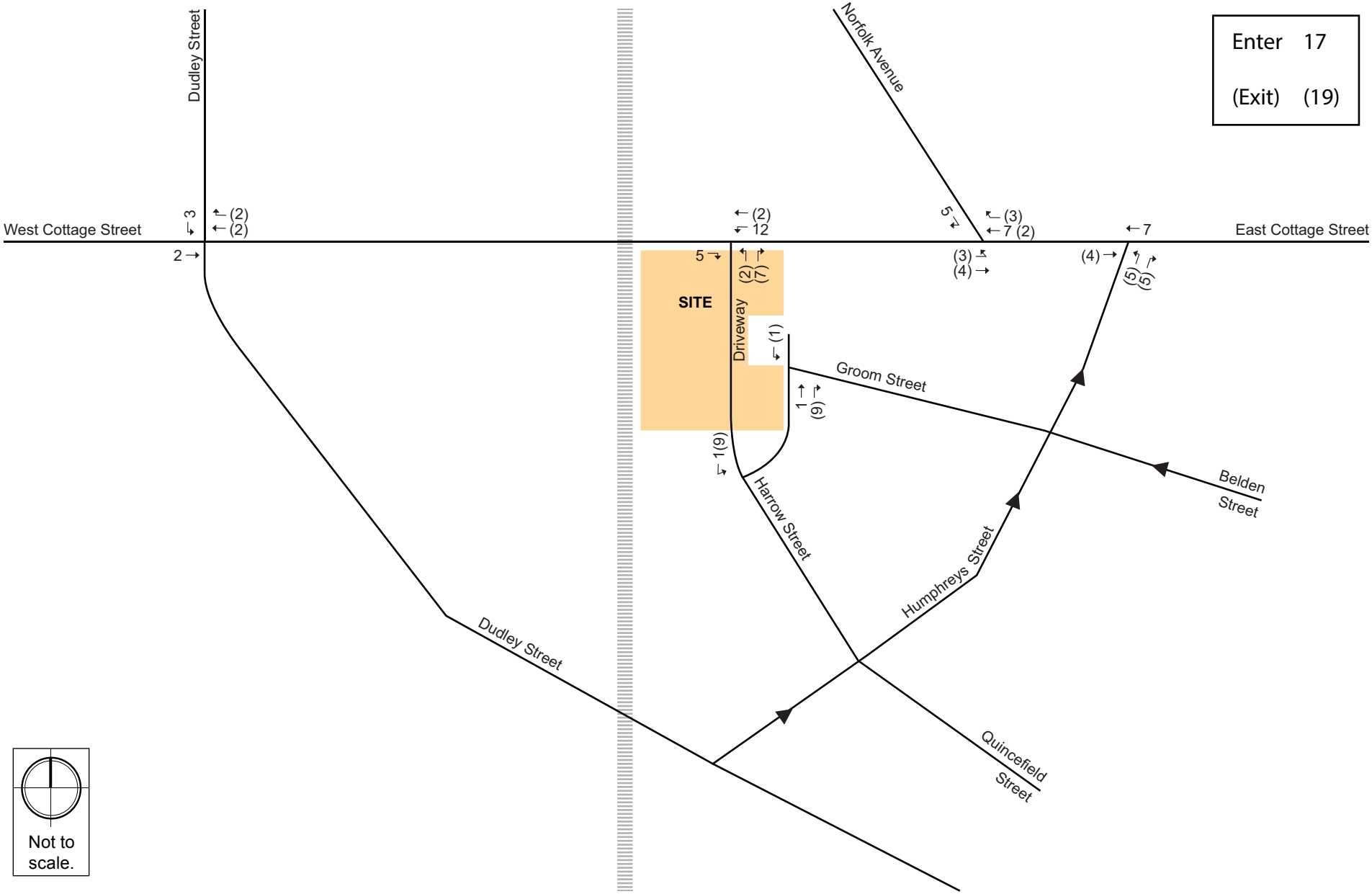

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Figure 2-13
Vehicle Trip Assignment, p.m. Peak Hour

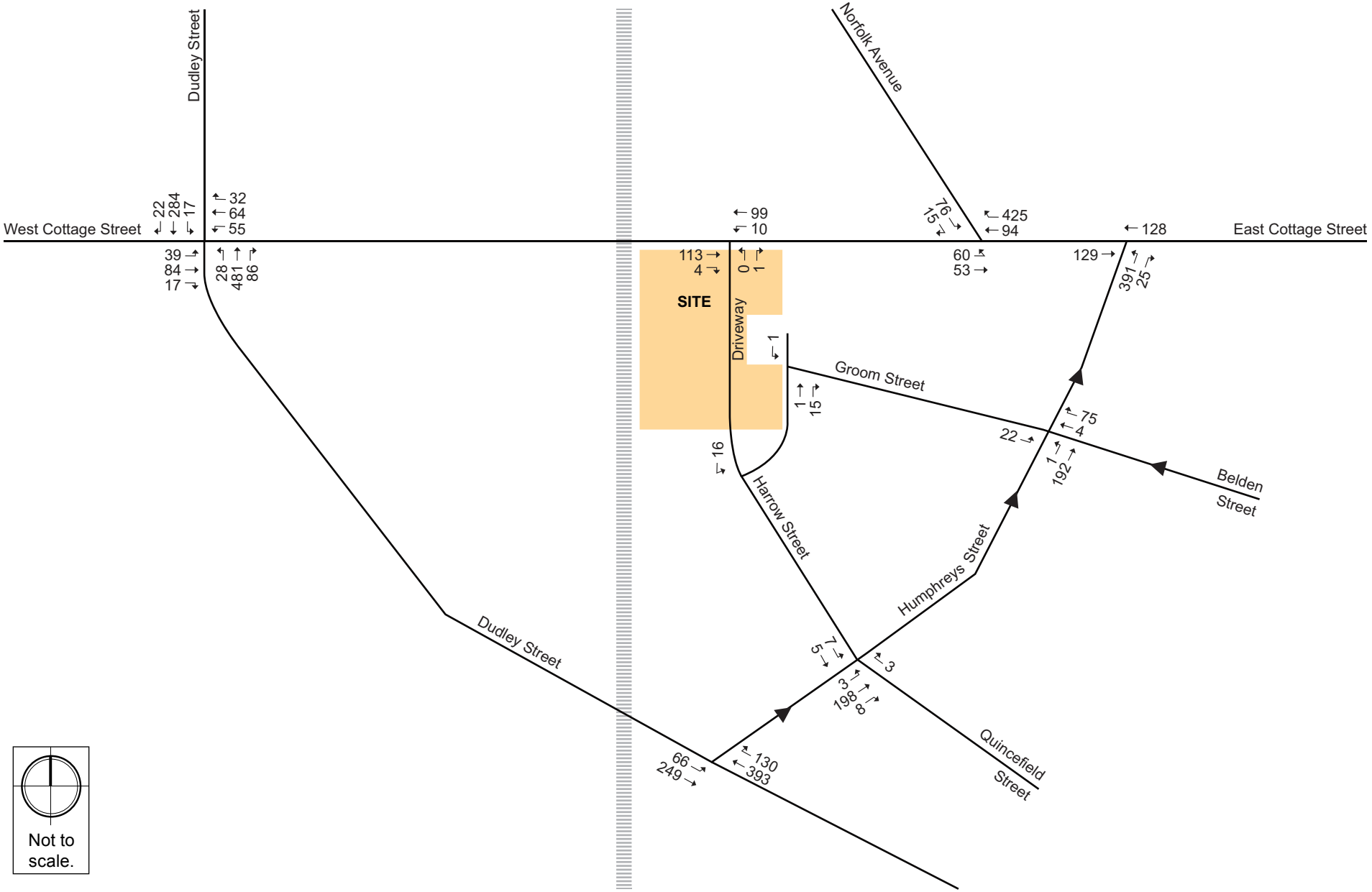

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Figure 2-14
Build (2020) Condition Vehicular Traffic Volumes, a.m. Peak Hour

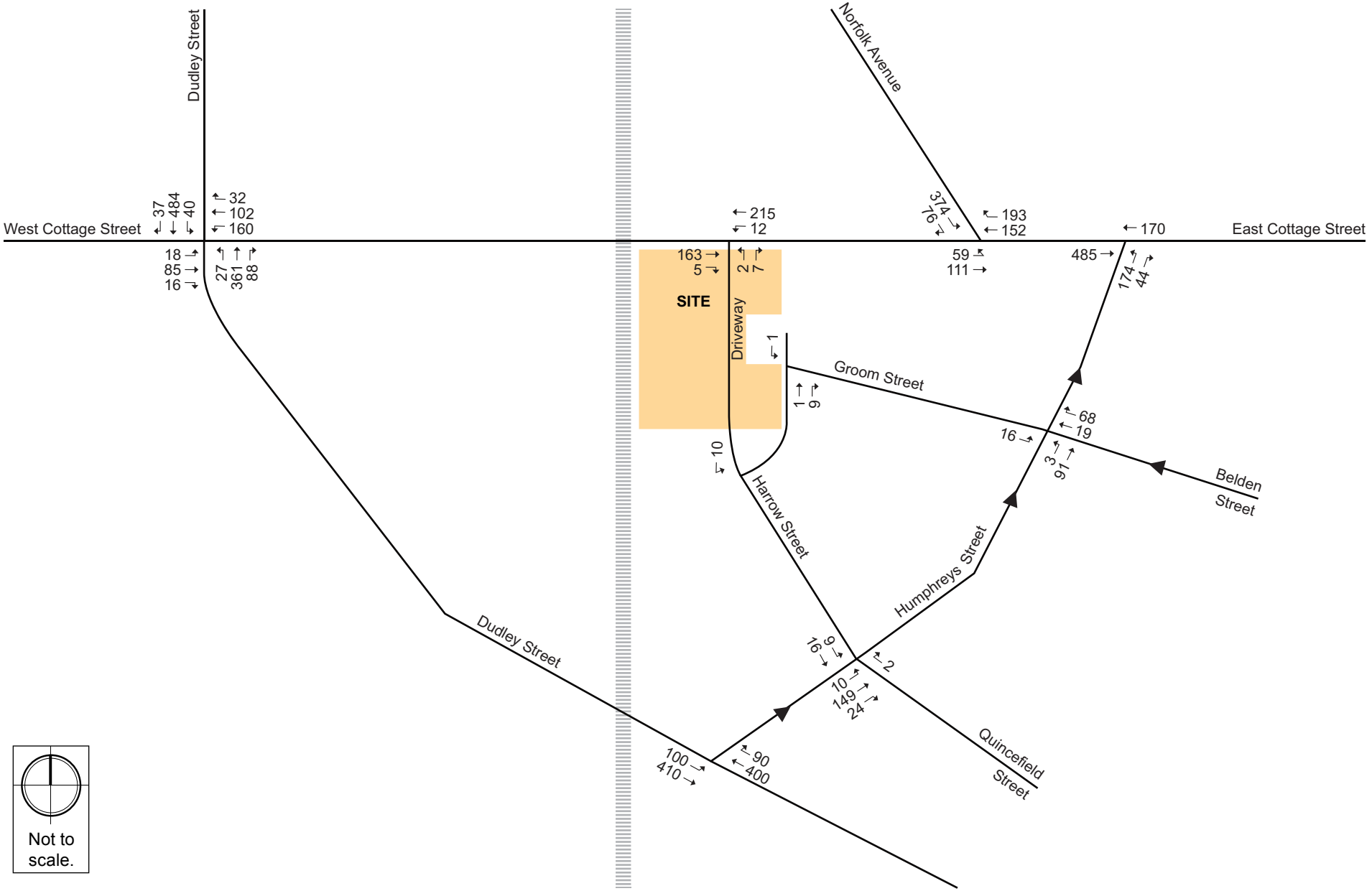

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Figure 2-15
Build (2020) Condition Vehicular Traffic Volumes, p.m. Peak Hour

Table 2-9 Build (2020) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**D**	**35.6**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.5	0.27	23	52
East Cottage Street westbound left/thru/right	A	9.7	0.34	27	49
Dudley Street northbound left/thru/right	E	61.6	>1.00	~165	#348
Dudley Street southbound left/thru/right	B	14.6	0.57	65	128
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	A	9.2	0.18	-	18
East Cottage Street westbound thru/right	C	15.2	0.69	-	145
Norfolk Avenue southbound left/right	A	9.7	0.17	-	15
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	B	10.1	0.22	-	20
East Cottage Street westbound left/thru	B	10.3	0.23	-	23
Humphreys Street northbound left/right	C	19.2	0.72	-	153
Dudley Street/Humphreys Street	**-**	**-**	**-**	**-**	**-**
Dudley Street eastbound left/thru	A	2.5	0.07	-	6
Dudley Street westbound thru/right	A	0.0	0.33	-	0
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.02	-	3
Quincefield Street westbound thru/right	A	6.9	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.3	0.26	-	28
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	12.3	0.08	-	7
Belden Street westbound thru/right	B	10.2	0.12	-	11
Humphreys Street northbound left/thru	A	0.0	0.00	-	0.0
East Cottage Street/Site Driveway	-	-	-	-	-
East Cottage Street eastbound thru/right	A	0.0	0.07	-	0
East Cottage Street westbound left/thru	A	0.7	0.01	-	1
Site Driveway northbound left/right	A	8.9	0.00	-	0

Table 2-10 Build (2020) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue Length (ft)	95th Percentile Queue Length (ft)
Signalized Intersections					
Cottage Street/Dudley Street	**D**	**36.3**	**-**	**-**	**-**
West Cottage Street eastbound left/thru/right	A	9.0	0.22	19	44
East Cottage Street westbound left/thru/right	C	24.4	0.76	78	#125
Dudley Street northbound left/thru/right	C	26.8	0.83	106	#258
Dudley Street southbound left/thru/right	E	57.7	>1.00	~152	#336
Unsignalized Intersection					
East Cottage Street/Norfolk Avenue	-	-	-	-	-
East Cottage Street eastbound left/thru	B	12.2	0.33	-	35
East Cottage Street westbound thru/right	C	16.9	0.62	-	108
Norfolk Avenue southbound left/right	D	25.7	0.78	-	185
East Cottage Street/Humphreys Street	-	-	-	-	-
East Cottage Street eastbound thru/right	C	20.6	0.73	-	163
East Cottage Street westbound left/thru	B	11.2	0.35	-	38
Humphreys Street northbound left/right	B	12.7	0.40	-	48
Dudley Street/Humphreys Street	**-**	**-**	**-**	**-**	**-**
Dudley Street eastbound left/thru	A	2.9	0.11	-	10
Dudley Street westbound thru/right	A	0.0	0.31	-	0
Humphreys Street/Harrow Street/Quincefield Street	-	-	-	-	-
Harrow Street eastbound left/thru	A	7.6	0.04	-	3
Quincefield Street westbound thru/right	A	6.8	0.01	-	0
Humphreys Street northbound left/thru/right	A	8.1	0.23	-	23
Humphreys Street/Belden Street/Groom Street	-	-	-	-	-
Groom Street eastbound left	B	10.8	0.05	-	4
Belden Street westbound thru/right	A	9.5	0.12	-	10
Humphreys Street northbound left/thru	A	0.2	0.00	-	0
East Cottage Street/Site Driveway	-	-	-	-	-
East Cottage Street eastbound thru/right	A	0.0	0.11	-	0
East Cottage Street westbound left/thru	A	0.5	0.01	-	1
Site Driveway northbound left/right	A	9.7	0.01	-	1

As shown in Table 2-9 and Table 2-10, under the Build (2020) Condition, when compared to the 2020 No-Build Condition, there are minimal changes in level of service at the intersections within the study area, showing that the future traffic impact of the Project is minimal. No movements degrade to LOS E or LOS F from the No-Build (2020) Condition.

2.5 Transportation Demand Management

The Proponents are committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project-related traffic impacts. TDM will be facilitated by the nature of the Project (which does not generate significant peak hour trips) and its proximity to numerous public transit alternatives.

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 Proponents will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact.

The Proponents are prepared to take advantage of good transit access in marketing the site to future residents 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:

- Orientation Packets: The Proponents will provide orientation packets to new tenants 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;

- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options;

- Transportation Coordinator: The Proponents 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;

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

- Electric Vehicle Charging: The Proponents will explore the feasibility of providing electric vehicle charging stations; and

- Vehicle Sharing Program: The Proponents will explore the feasibility of providing spaces for a car sharing service.

2.6 Transportation Mitigation Measures

While the traffic impacts associated with the new trips are minimal, the Proponents will continue to work with the City of Boston to create a Project that efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponents are responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponents 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 Proponents 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 proposed measures listed above and any additional transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

The Proponents 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 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 Construction Management Plan 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 Construction Management Plan:

- 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 Construction Management Plan 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

When a building is significantly taller than other buildings in the area and the trees, there is a potential for upper level winds to be deflected toward the ground. When there are many buildings of similar height in an area, they tend to shelter one another. The commercial building and townhome buildings are proposed to be a similar height to the existing buildings in the area. Therefore, these buildings are not anticipated to bring upper level winds to the pedestrian level. The residential apartment building, located next to the train tracks and buffered from the surrounding area by other Project buildings, will be taller than some of the buildings to the north and east of the site, but will be similar in height to the buildings to the south and west due to topographic changes. With the inclusion of trees and other landscaping on the site, impacts to the pedestrian level winds are not anticipated.

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BRA, 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 shadow analysis presents the existing shadow and new shadow that would be created by the proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces and sidewalks 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.

The analysis shows that the Project's impacts will generally be limited to the immediately surrounding streets and sidewalks. New shadow will be cast onto the existing streets, buildings, new open space and MBTA tracks.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest over the MBTA tracks and Project's open space, and onto East Cottage Street and its southern sidewalks.

At 12:00 p.m., new shadow will be cast to the north onto East Cottage Street and its southern sidewalks, and onto a small portion of the Project's main open space.

At 3:00 p.m., new shadow will be cast to the northeast onto minor areas of Hillsboro Street and East Cottage Street and its southern sidewalks.

During the time periods studied, most of the new shadow will be cast onto the Project site, and no new shadow is cast onto public open spaces or bus stops.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west onto a portion of the MBTA tracks and the Project's new open space.

At 12:00 p.m., new shadow will be cast to the north onto a small portion of the southern sidewalks of East Cottage Street and onto a small area of the Project's new open space.

At 3:00 p.m., new shadow will be cast to the northeast onto the southern sidewalk of East Cottage Street and Hillsboro Street.

At 6:00 p.m., new shadow will be cast to the east across Hillsboro Street.

During the time periods studied, most of the new shadow will be cast onto the Project site, and no new shadow is cast onto public open spaces or bus stops.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox, new shadow from the Project will be cast to the northwest onto the MBTA tracks, East Cottage Street and its southern sidewalks, and across the Project's new open space.

At 12:00 p.m., new shadow will be cast to the north onto East Cottage Street and its southern sidewalk, as well as a small portion of the Project's new open space.

At 3:00 p.m., new shadow will be cast to the northeast onto Cottage Street and its southern sidewalk and small portions of Hillsboro Street.

At 6:00 p.m., most of the area is under existing shadow. New shadow will be cast to the east onto a portion of East Cottage Street and its southern sidewalks and portions of Hillsboro Street and Groom Street.

During the time periods studied, most of the new shadow will be cast onto the Project site, and no new shadow is cast onto public open spaces or bus stops.

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 will be cast to the northwest onto East Cottage Street and its sidewalks, onto the MBTA tracks, and the Project's new open space.

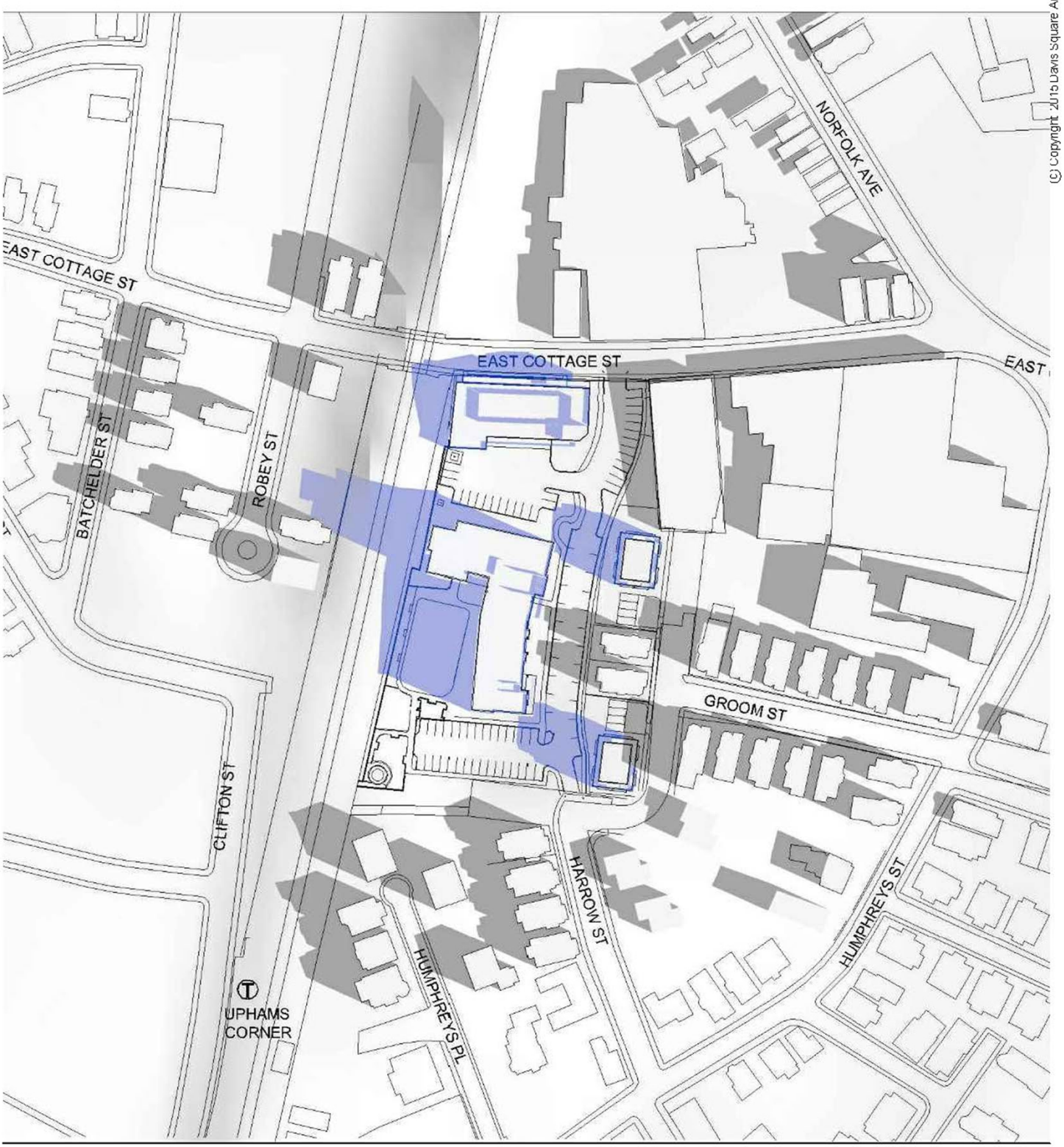
At 12:00 p.m., new shadow will be cast to the north onto a portion of East Cottage Street and its sidewalks.

At 3:00 p.m., most of the area is under existing shadow. New shadow will be cast to the northeast onto a portion of East Cottage Street and its sidewalks and a small portion of Hillsboro Street.

During the time periods studied, most of the new shadow will be cast onto the Project site, and no new shadow is cast onto public open spaces or bus stops.

3.2.6 Conclusion

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. New shadow will generally be limited to the Project site itself, as well as the immediately surrounding streets and sidewalks. The Project's new open space will have shadowed areas during the morning and noontime periods. No new shadow will be cast onto public open spaces or bus stops.



DAVIS SQUARE ARCHITECTS

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Figure 3.2-1
Shadow Study, March 21 9AM

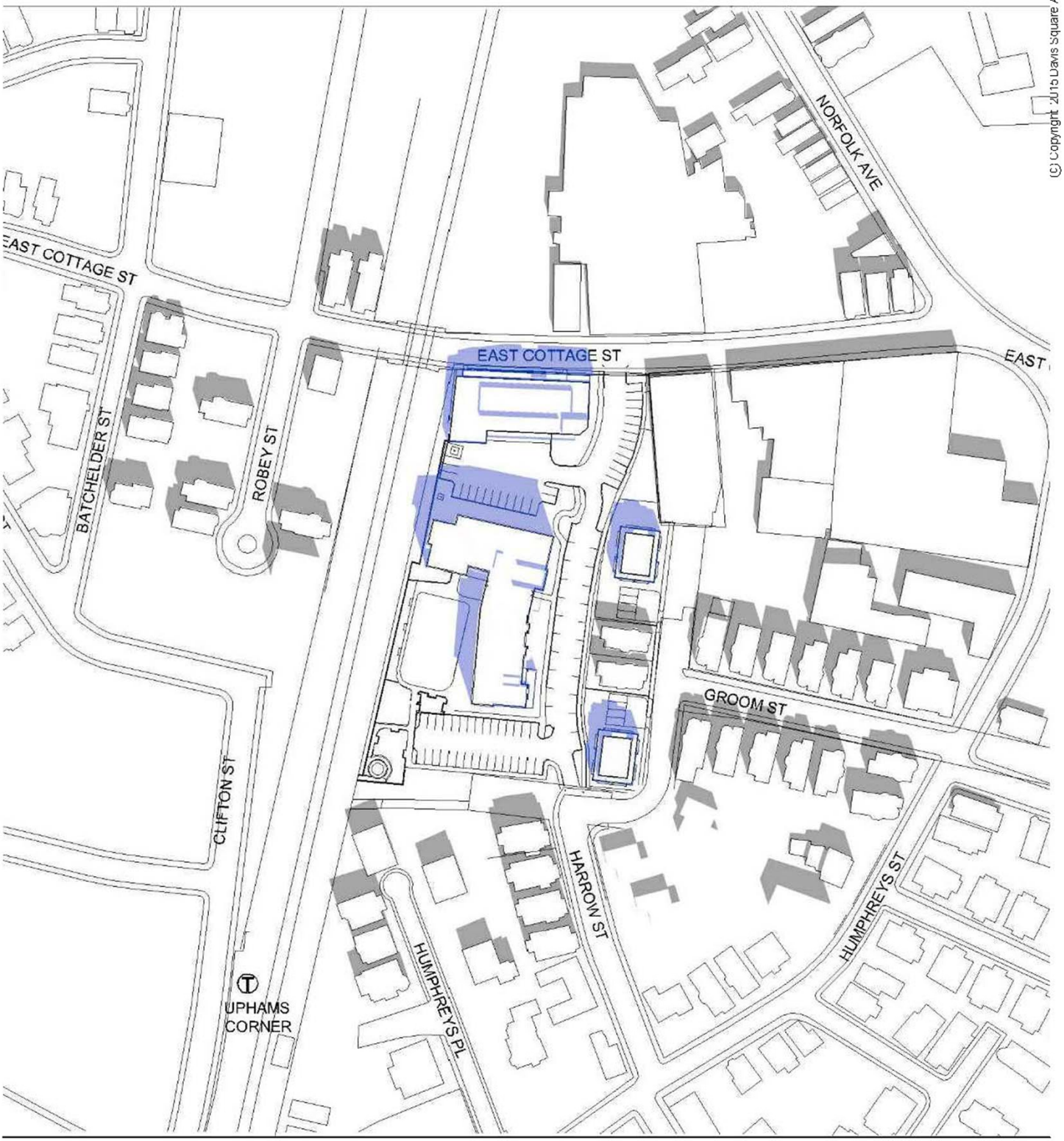

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Figure 3.2-2
Shadow Study, March 21 12PM

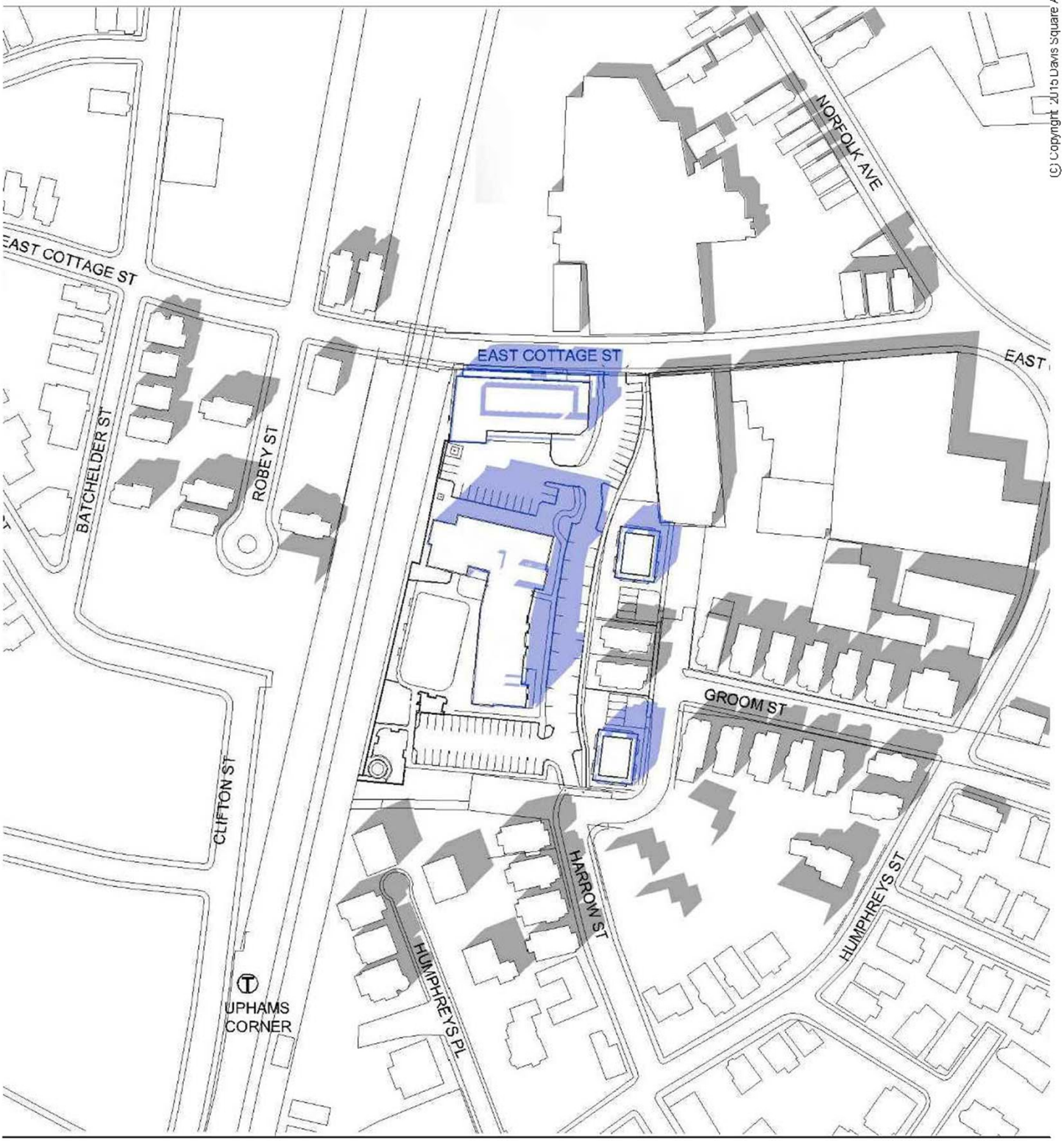

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Figure 3.2-3
Shadow Study, March 21 3PM

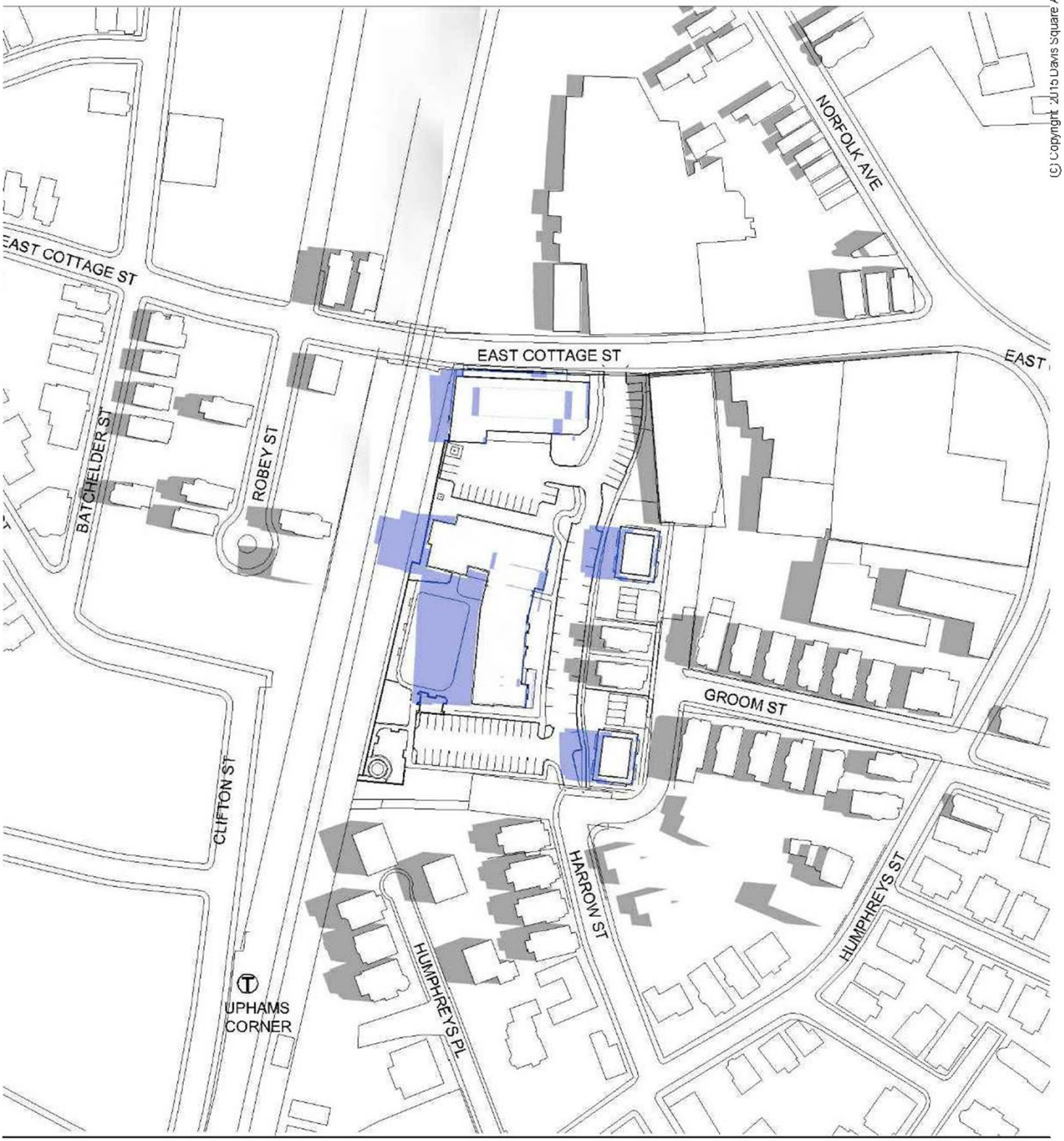

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Figure 3.2-4
Shadow Study, June 21 9AM

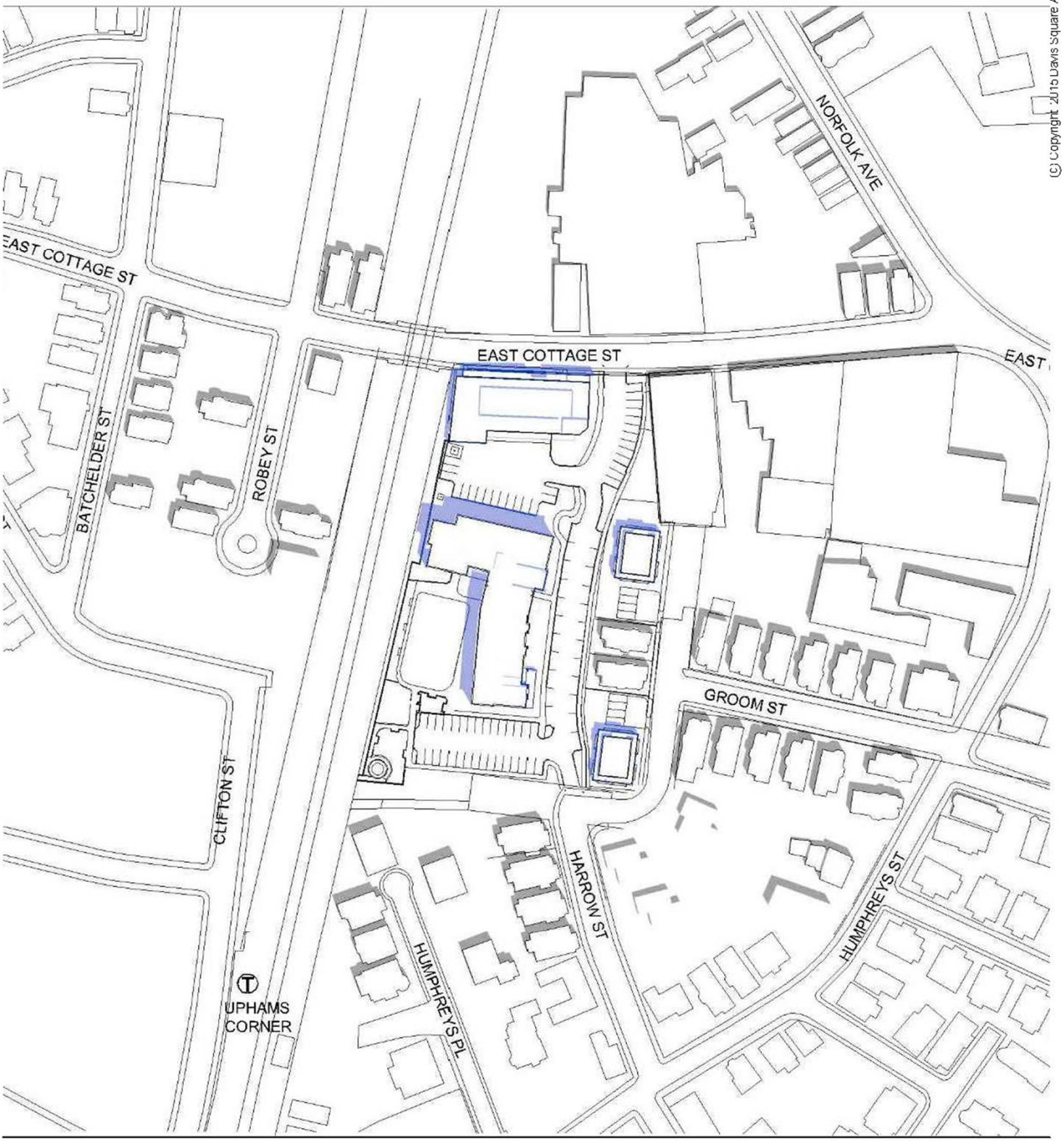

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Figure 3.2-5
Shadow Study, June 21 12PM

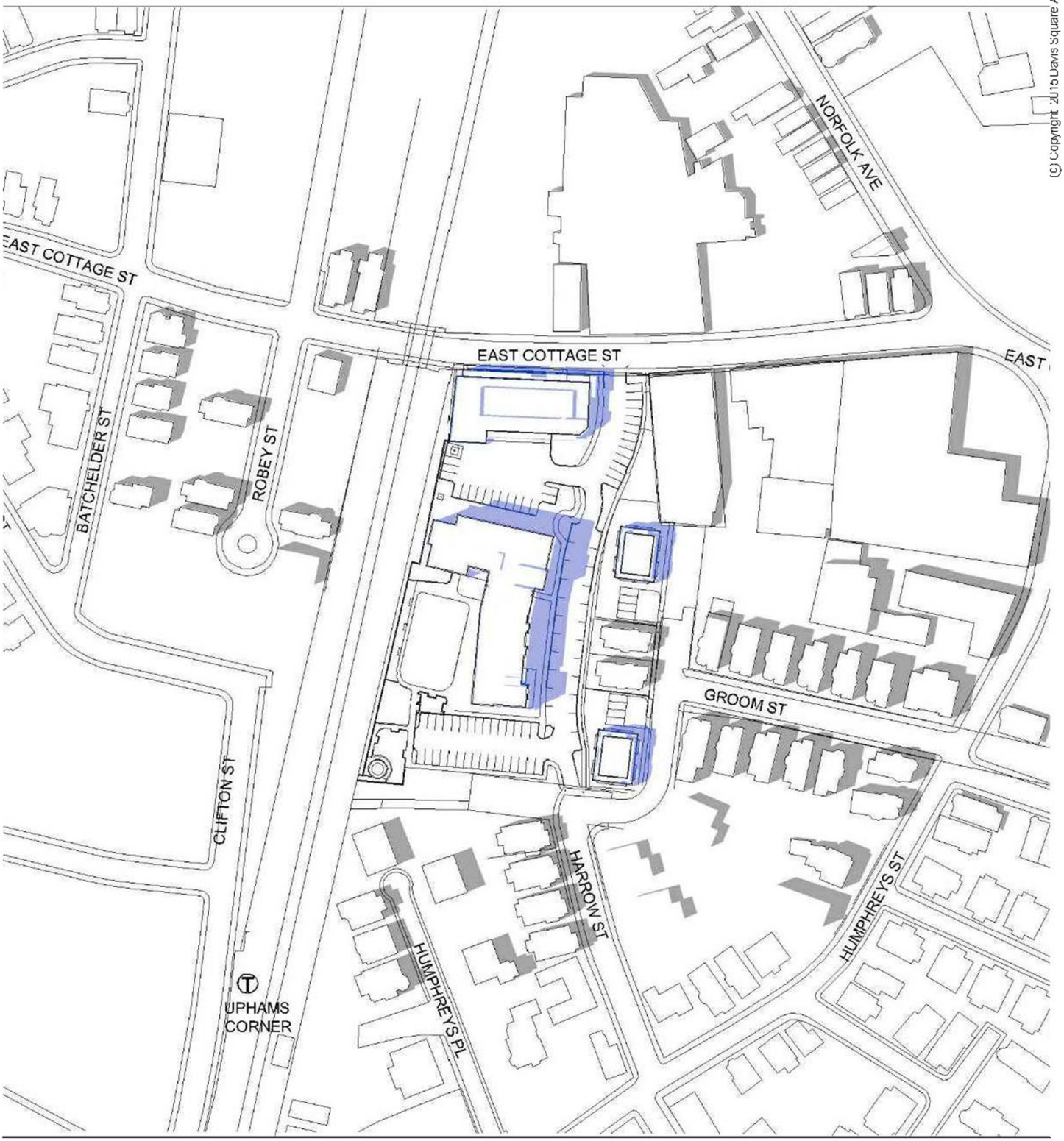

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Figure 3.2-6
Shadow Study, June 21 3PM

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Figure 3.2-7
Shadow Study, June 21 6PM

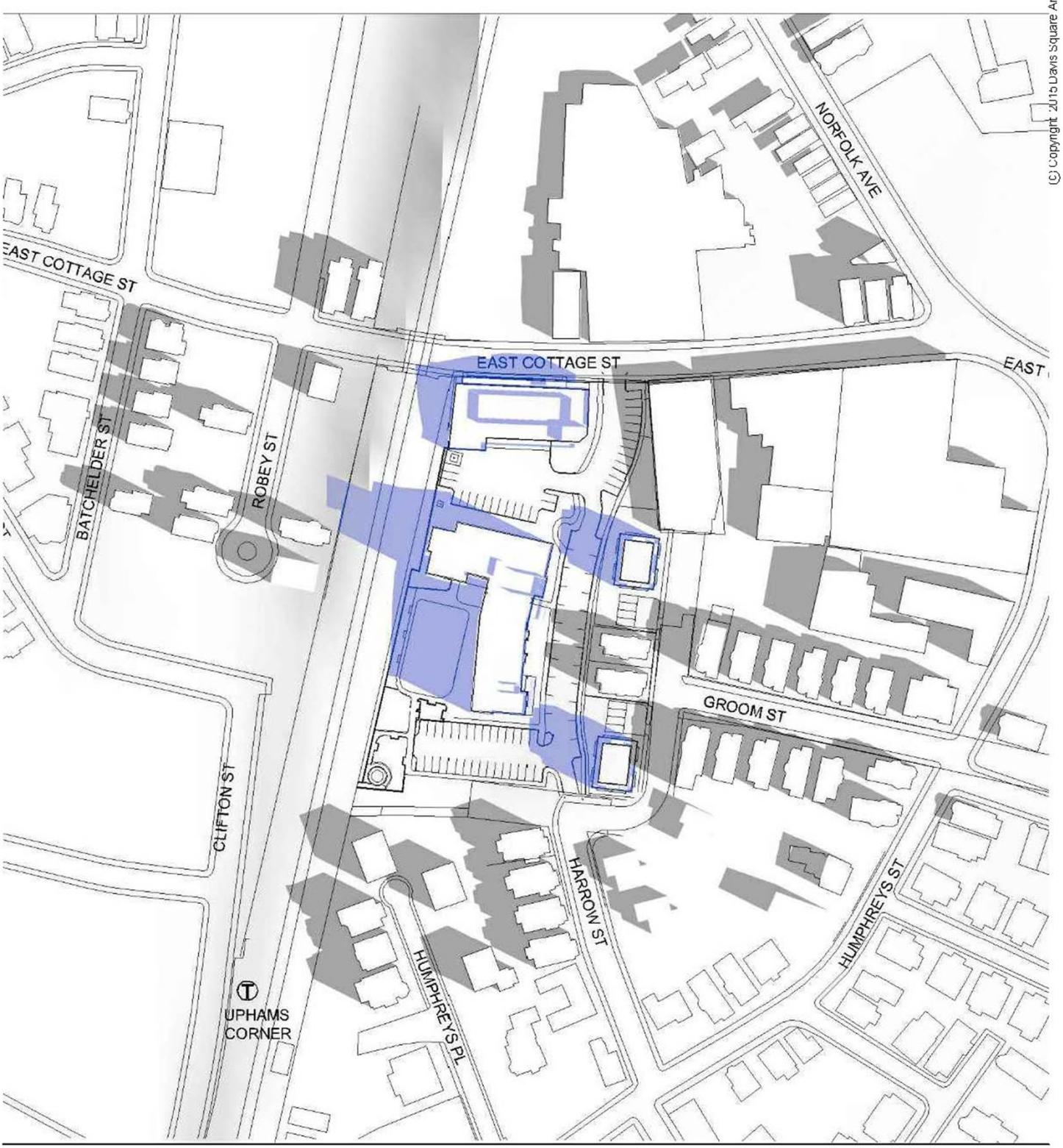

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Figure 3.2-8

Shadow Study, September 21 9AM

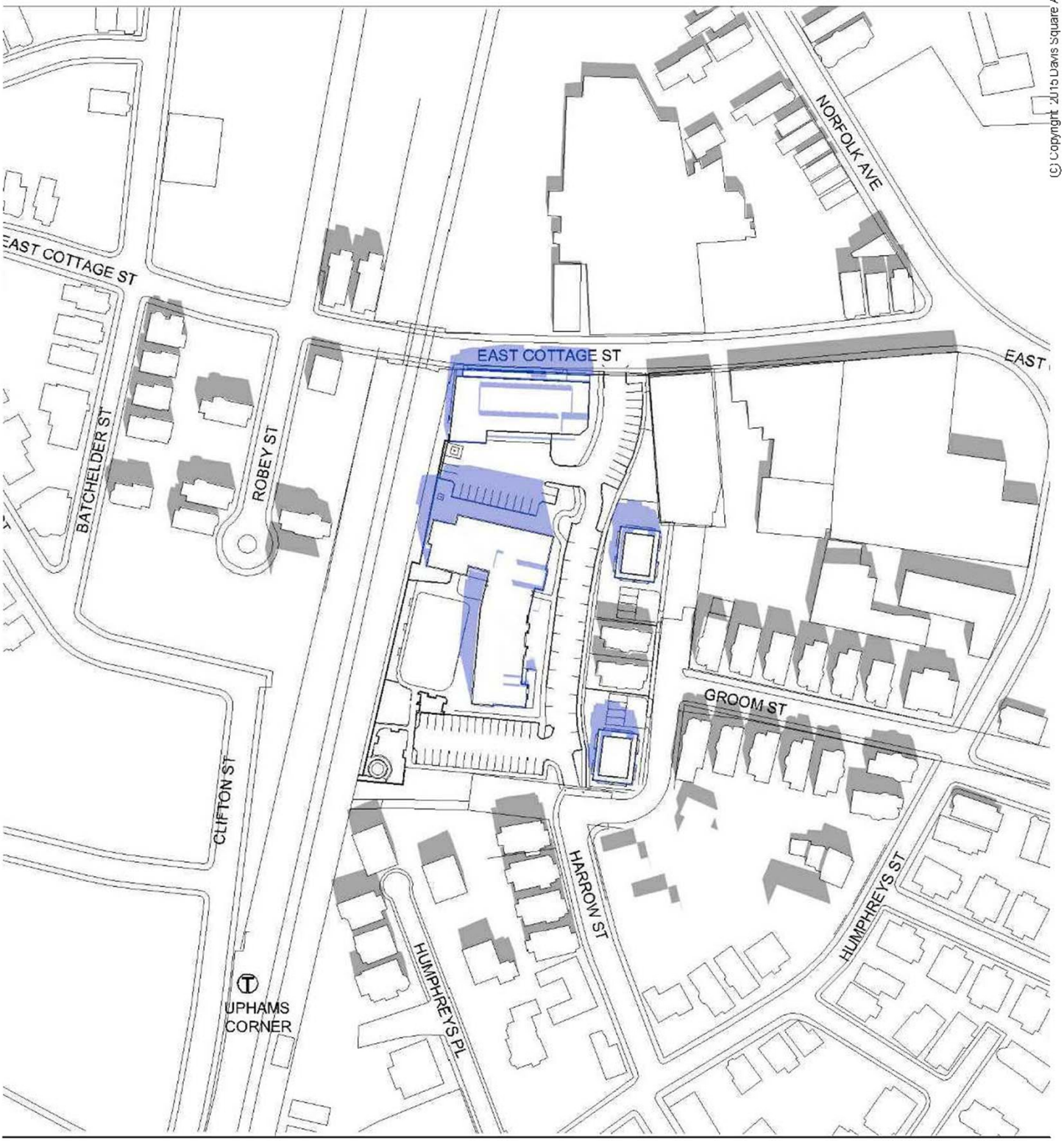

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Figure 3.2-9
Shadow Study, September 21 12PM

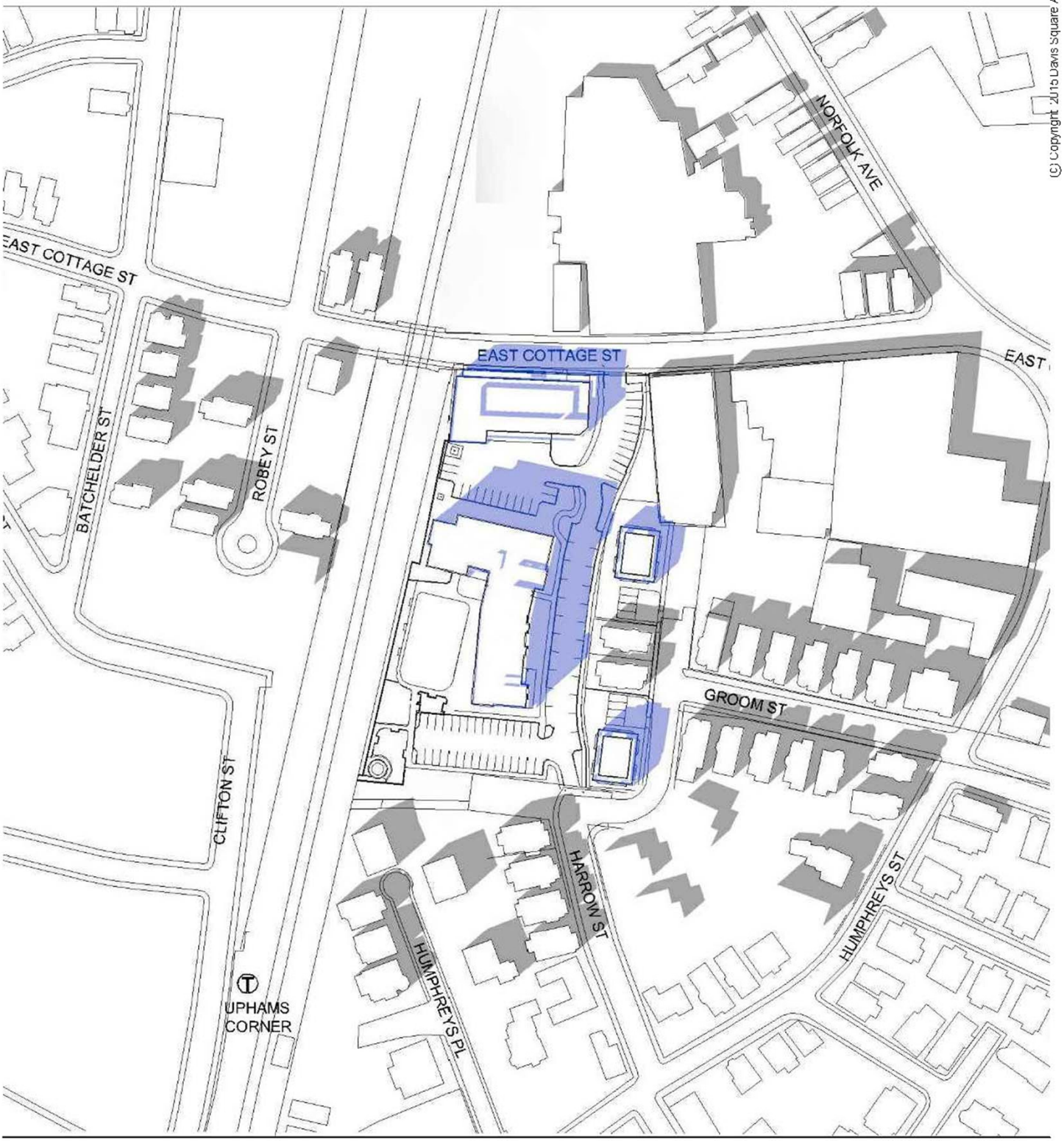

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Figure 3.2-10
Shadow Study, September 21 3PM

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Figure 3.2-11
Shadow Study, September 21 6PM

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Figure 3.2-12
Shadow Study, December 21 9AM

DAVIS SQUARE ARCHITECTS

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Figure 3.2-13
Shadow Study, December 21 12PM

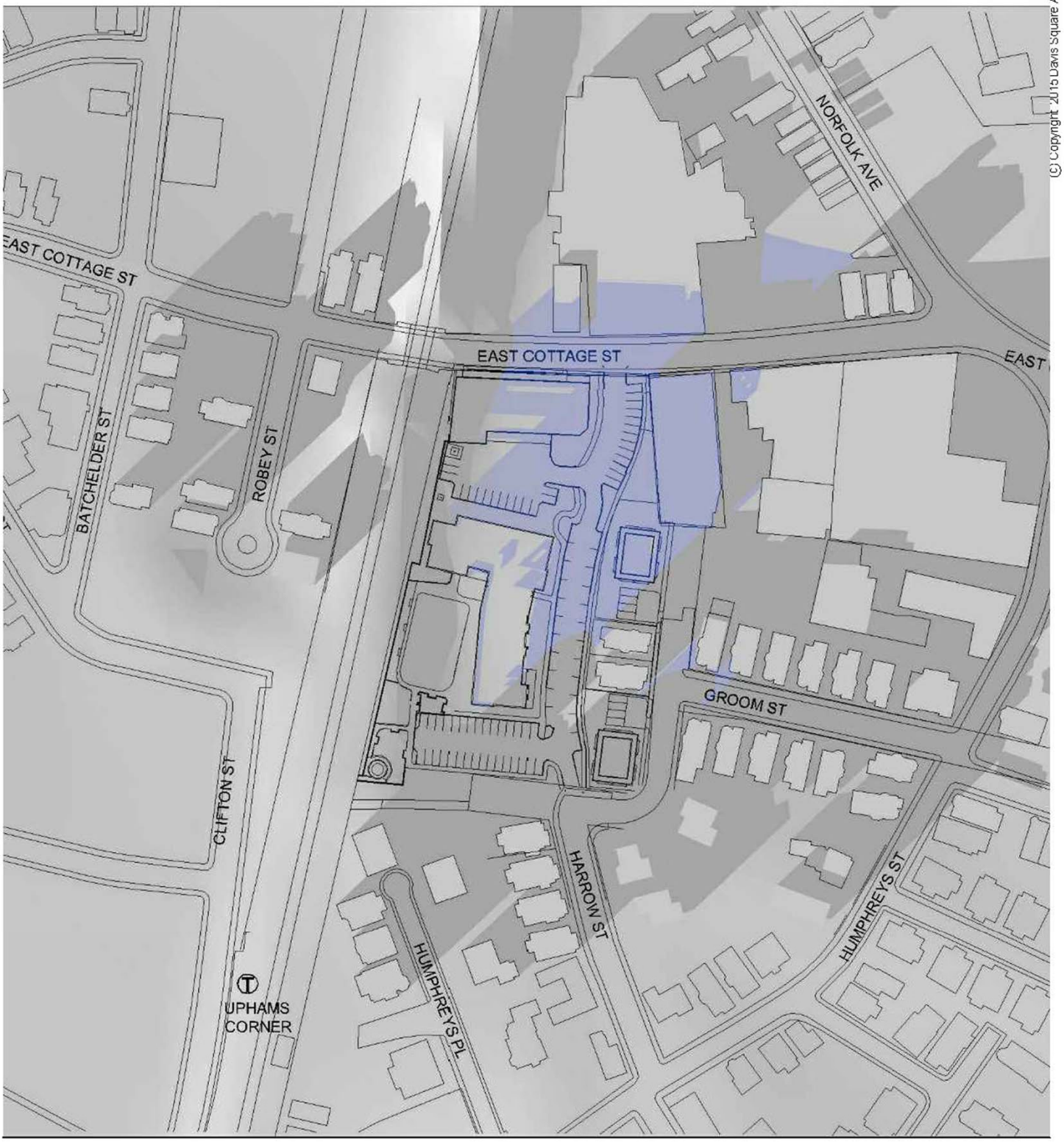

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Figure 3.2-14
Shadow Study, December 21 3PM

3.3 Daylight

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 typical daylight obstruction values of the surrounding area.

Because the Project site currently vacant, the proposed Project will increase daylight obstruction; however, the resulting conditions will be typical of the surrounding area.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. 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.

Two viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions. Two 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.

- **Viewpoint 1:** View from East Cottage Street facing southwest toward the Project site
- **Viewpoint 2:** View from Hillsboro Street facing west toward the Project site

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

- **Area Context Viewpoint AC1:** View from East Cottage Street facing southwest toward existing commercial buildings adjacent to the Project site.
- **Area Context Viewpoint AC2:** View from Groom Street facing north toward existing residential buildings

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 East Cottage Street facing southwest toward the Project Site	0%	40.7%
Viewpoint 2	View from the center of Hillsboro Street facing west toward the existing housing triplexes	19.2%	26.1%
Area Context Points			
AC1	View from the center of East Cottage Street facing southwest toward existing commercial buildings adjacent to the Project site	62.5%	N/A
AC2	View from Groom Street facing north toward existing housing	13.8%	N/A

East Cottage Street – Viewpoint 1

East Cottage Street runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of East Cottage Street facing directly south toward the Project site. Since the site is currently vacant, the development of the proposed Project would result in an increased daylight obstruction, 40.7%. However, this daylight obstruction value is less than the daylight obstruction value from East Cottage Street looking south at the buildings adjacent to the Project site.

Hillsboro Street - Viewpoint 2

Hillsboro Street runs along to the eastern side of the Project site. Viewpoint 2 was taken from the center of Hillsboro Street facing west toward the Project site, as well as two existing residential buildings. The development of the Project will result in a daylight obstruction value of 26.1%, compared to 19.2% in the existing condition. While this is an increase over existing conditions, the daylight obstruction value is consistent with the other housing units in the area, including the Area Context viewpoints.

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

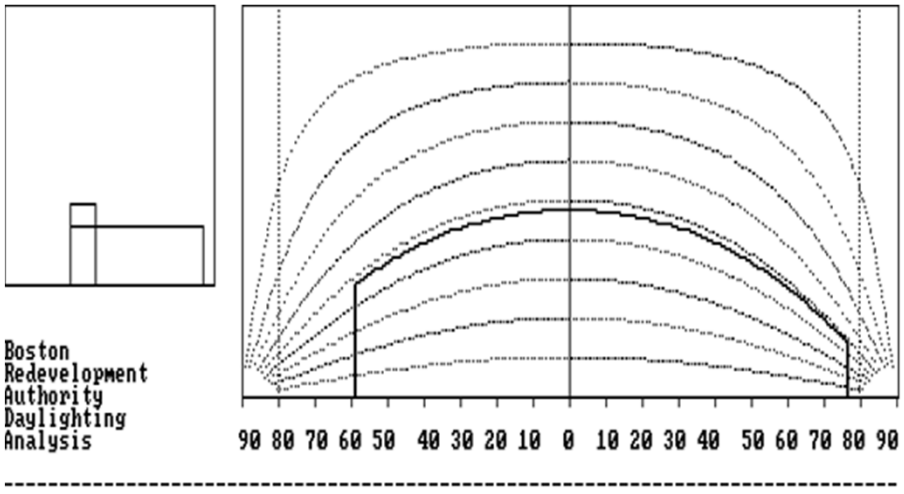
Indigo Block Redevelopment Boston, Massachuestts

Epsilon Associates Inc.

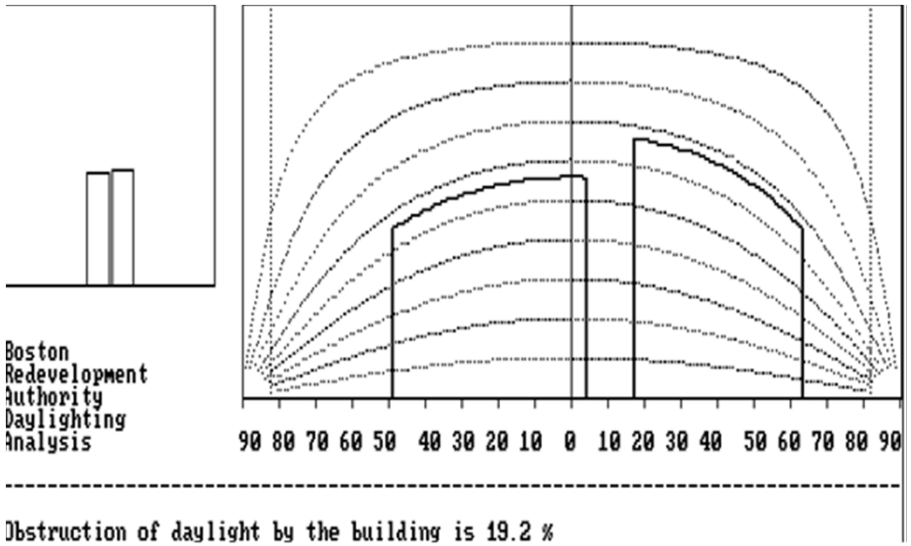
Figure 3.3-1

Daylight Analysis Viewpoints

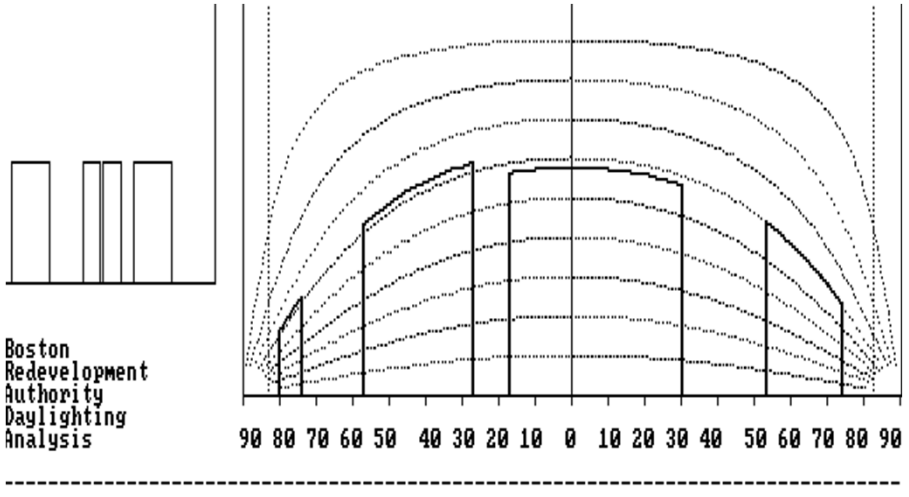
0% Daylight Obstruction



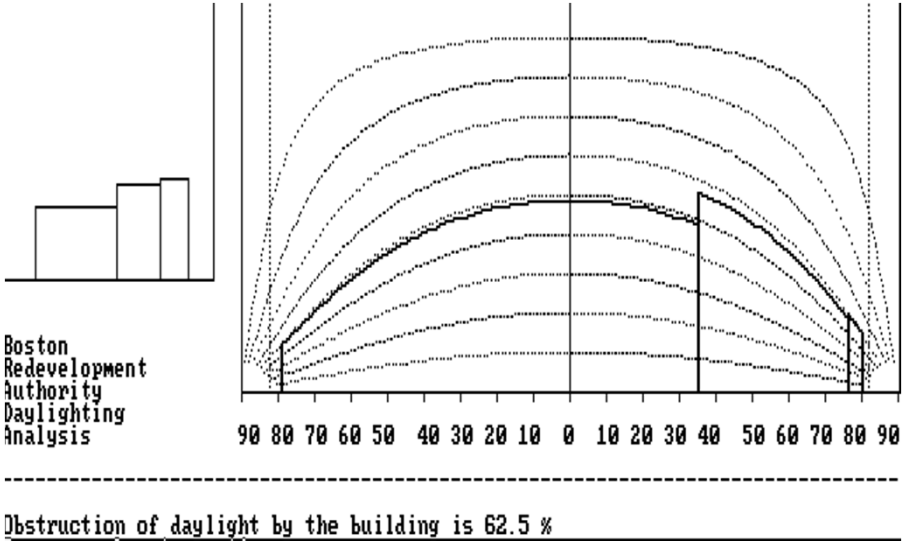
Viewpoint 1 (Proposed): View from the center of East Cottage Street facing southwest toward the Project Site



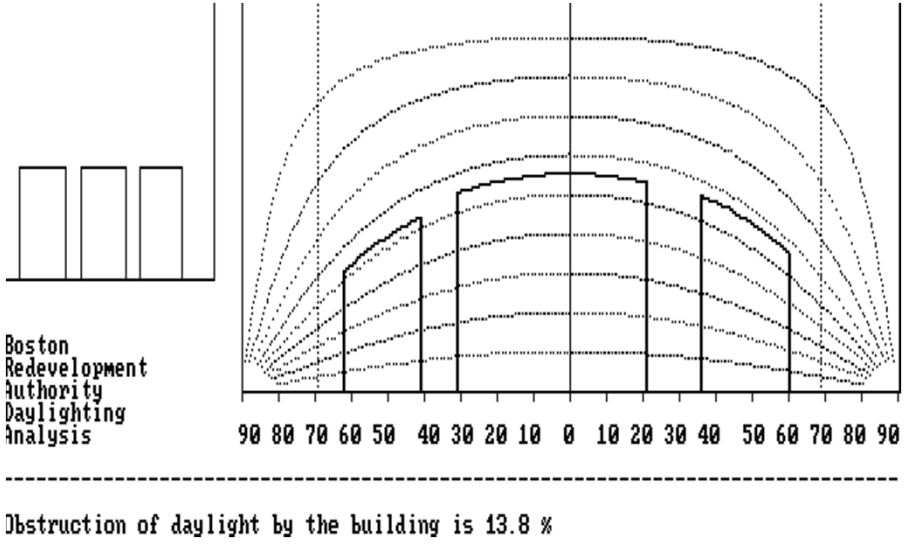
Viewpoint 2 (Existing): View from the center of Hillsboro Street facing west toward the existing residential buildings



Viewpoint 2 (Proposed): View from the center of Hillsboro Street facing west toward the existing residential buildings



AC1: View from the center of East Cottage Street facing southwest toward existing commercial buildings adjacent to the Project site



AC2: View from Groom Street facing north toward existing housing

Area Context Viewpoints

The Project site is located in an area of Boston with a mix of relatively low density commercial and residential uses with surface parking lots. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for two Area Context Viewpoints described above and shown in Figure 3.3-1. The daylight obstruction values ranged from 13.8% for AC2 to 62.5% for AC1.

3.3.4 Conclusion

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 some increased daylight obstruction over existing conditions, the resulting conditions will be similar to the daylight obstruction values within the surrounding area, and consistent with the moderately dense development of Dorchester.

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 anticipated, solar glare impacts are not currently anticipated.

3.5 Air Quality

3.5.1 Introduction

An air quality analysis has been conducted to determine the impact of pollutant emissions from mobile sources generated by the proposed Project. Specifically, a microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) resulting from traffic flow around the Project area. Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program (ERP), if required.

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 analysis. Federal National Ambient Air Quality Standards (NAAQS) were developed by US 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.[2] 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 US 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) (PM10 and PM2.5), carbon monoxide (CO), 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.

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

[2] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005.

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

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)		MAAQS ($\mu g/m^3$)	
		Primary	Secondary	Primary	Secondary
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 "nontattainment".

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

Massachusetts Ambient Air Quality Standards (MAAQS) are codified in 310 CMR 6.04, and generally follow the NAAQS but are not identical (highlighted in **bold** in Table 3.5-1 above).

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 in their Annual Air Quality Reports was obtained for 2012 to 2014. Data for these 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 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded.

Background concentrations were determined from the closest available monitoring stations to the proposed development. The closest monitor is at Harrison Avenue, roughly 0.9 miles northwest of the Project site. This site samples for all pollutants. A summary of the background air quality concentrations are presented in Table 3.5-2.

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

Pollutant	Averaging Time	2012	2013	2014	Background Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
SO_2 (1)(6)	1-Hour (5)	31.7	28.6	32.2	30.8	196.0	16%
	3-Hour	30.9	25.4	56.3	56.3	1300.0	4%
	24-Hour	13.1	13.1	13.4	13.4	365.0	4%
	Annual	2.9	2.8	2.8	2.9	80.0	4%
PM-10	24-Hour	32.0	34.0	61.0	61.0	150.0	41%
	Annual	14.2	15.1	13.9	15.1	50.0	30%
PM-2.5	24-Hour (5)	20.6	15.9	12.7	16.4	35.0	47%
	Annual (5)	8.3	7.3	6.0	7.2	12.0	60%
NO_2 (3)	1-Hour (5)	82.7	94.0	95.9	90.9	188.0	48%
	Annual	29.7	32.8	29.6	32.8	100.0	33%
CO (2)	1-Hour	2474.2	2145.3	1963.1	2474.2	40000.0	6%
	8-Hour	2177.4	1375.2	1489.8	2177.4	10000.0	22%
Ozone (4)	8-Hour	121.7	115.8	106.0	121.7	147.0	83%
Lead	Rolling 3-Month	0.014	0.006	0.014	0.014	0.15	9%

Notes:
From 2012-2014 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.

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

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 (2,474 $\mu g/m^3$) for one-hour and 1.9 ppm (2,177 $\mu g/m^3$) for eight-hour CO.

3.5.3 Methodology

3.5.3.1 Microscale Analysis

The BRA 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 (including garage entrances/exits) 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 analysis for the Project followed the procedure outlined in EPA's intersection modeling guidance.[3]

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 (2015) and future year (2020) 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.

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 1.9 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).

The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[4]

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[3] U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections; EPA-454/R-92-005, November 1992.

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

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

Intersection Selection

One signalized intersections included in the traffic study meets the conditions described in above for microscale analyses (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 only intersection found to meet the criteria for inclusion in the microscale analysis is:

- Intersection of Dudley Street and East and West Cottage Streets.

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2015 Existing Conditions, and the 2020 No-Build and Build Conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

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 (2015) and Build year (2020) are provided by MassDEP.

All link types for the modeled intersection 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 30 mph is used for all free-flow traffic. 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 analyses.

Receptors & Meteorology Inputs

A set of roughly 125 receptors were placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways

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

approaching the intersection. The roadway links and receptor locations of the modeled intersection are presented in Figure 3.5-1.

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 370 centimeters was selected.[7]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at 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.

3.5.4 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-5 for the 2015 and 2020 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 (0.1 ppm) plus background (2.2 ppm) is 2.3 ppm for all cases. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.1 ppm) plus background (1.9 ppm) is 2.0 ppm for the same location and scenarios. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

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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.

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.

Indigo Block Redevelopment Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Dudley St. and Cottage St.

3.5.5 Conclusions

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

3.5.6 Stationary Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions.

If the mechanical equipment is subject to MassDEP's Environmental Results Program (ERP), a certification form will be submitted to MassDEP within 60 days of installation, and the Proponents will comply with all requirements of the ERP.

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2015)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Dudley Street and East and West Cottage Streets	AM	0.1	2.2	2.3	35
	PM	0.1	2.2	2.3	35
8-Hour					
Dudley Street and East and West Cottage Streets	AM	0.09	1.9	2.0	9
	PM	0.09	1.9	2.0	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 2020)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Dudley Street and East and West Cottage Streets	AM	0.1	2.2	2.3	35
	PM	0.1	2.2	2.3	35
8-Hour					
Dudley Street and East and West Cottage Streets	AM	0.09	1.9	2.0	9
	PM	0.09	1.9	2.0	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2020)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Dudley Street and East and West Cottage Streets	AM	0.1	2.2	2.3	35
	PM	0.1	2.2	2.3	35
8-Hour					
Dudley Street and East and West Cottage Streets	AM	0.09	1.9	2.0	9
	PM	0.09	1.9	2.0	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

3.6 Stormwater / Water Quality

Chapter 7 includes a discussion of stormwater and water quality.

3.7 Flood Hazard Zones / Wetlands

The most current version of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for this area (25025C0079G) shows that the Project site is located outside of the 500-year flood zone area.

The Project site does not contain wetlands.

3.8 Geotechnical/Groundwater

3.8.1 Soils

Subsurface explorations and a geotechnical evaluation were performed at the site by Lahlaf Geotechnical Consulting, Inc. The soil strata encountered in the borings were as follows, starting at the ground surface:

Asphalt – A layer of asphalt was encountered at the ground surface at some borings and had a thickness of between 3 and 6 inches.

Existing Fill – Existing fill was encountered at the ground surface in some borings and beneath the asphalt in the borings that contained asphalt at the ground surface. The existing fill was comprised of sand with variable amounts of silt, gravel, and construction debris including brick, asphalt, and coal ash. The existing fill extended to depths ranging between 5 and 10 feet below the ground surface. Testing indicated loose to very loose fill.

Clay and Silt – A clay and silt layer was encountered below the fill in some borings. The stratum consisted of layers of silt and clay that contained up to 30 percent sand. The clay and silt stratum was between 8 feet and 15 feet thick. Generally, the top of this layer was silty and contained sand. The clay was encountered beneath the silt. Testing indicated medium stiff to hard consistency.

Sand and Gravel – A stratum of sand and gravel was encountered below the existing fill in one boring and below the clay in other borings. The samples in this layer were classified as silty sand, well graded sand, silty gravel, or well graded gravel. The samples contained up to 35 percent fines. Tested indicated medium dense to very dense material.

3.8.2 Groundwater

Groundwater was encountered in the borings at approximate depths ranging from 10.6 to 15 feet below the ground surface.

The groundwater levels measured during drilling are based on observations made during or shortly after the completion of the explorations and may not represent the actual groundwater level, as additional time may be required for the groundwater levels to stabilize. The groundwater level presented in this report only represents the conditions

encountered at the time and location of the explorations. Seasonal fluctuation should be anticipated.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

Woodard & Curran performed a Phase I Environmental Site Assessment in September 2014 in general conformance with the scope and limitations of ASTM Practice E1527 of 65 East Cottage Street in Boston, Massachusetts. This assessment revealed the following in connection with the Project site:

- A previously identified release of petroleum on the subject property is a historical Recognized Environmental Condition (REC) because the release has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority; and

- No evidence of RECs other than the historical REC described above in connection with the current and historical use of subject property, based on documents reviewed for this ESA.

Similar to other urban properties, fill material in the subsurface at the subject property likely contains coal, ash, and cinders which likely result in the presence of elevated concentrations of polycyclic aromatic hydrocarbons and metals in shallow soil at the site.

3.9.2 Solid Waste and Recycling

The residential portions of the Project will generate solid waste typical of residential 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.

With the exception of household hazardous wastes typical of residential developments (e.g., cleaning fluids and paint), the residential portion of the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials. Typical waste generated by the uses will be handled in compliance with all local, state and federal regulations.

Depending on the tenants of the commercial building, solid waste will be similar to the residential solid waste, or may be dealt with by each individual tenant. Any hazardous waste will be handled and disposed of in compliance with all federal, state and local regulations.

The buildings will include areas for trash collection and recycling collection on each floor, and a trash room in close proximity to the loading dock. Recycling facilities will be provided on-site for paper, glass, plastic and metal.

3.10 Noise

The mechanical equipment for the townhomes will be similar to that found for other similarly sized townhomes. The mechanical equipment for the apartment building is anticipated to include two compressors on the roof. Rooftop equipment will be screened, and acoustic screening will be included if necessary to meet local noise standards. It is anticipated that the tenants of the commercial building will install mechanical equipment suitable for their needs, and since no tenants are currently confirmed for the space, the mechanical equipment to be installed is not known at this time. The Project team will ensure that the buildings' mechanical equipment will meet the City of Boston Noise Standards.

3.11 Construction

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

The Proponents intend 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. 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. 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 Proponents will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. 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

Construction of the Project is estimated to last approximately 14 to 16 months, with initial site work expected to begin in the first quarter of 2017.

Typical construction hours will be from 7:00 a.m. to 6:00 p.m., Monday through Friday, with most shifts ordinarily ending at 3:30 p.m. No substantial sound-generating activity will occur before 7:00 a.m. 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. It is noted that some activities such as finishing activities could run beyond 6:00 p.m.

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 Proponents and their 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 Proponents will follow City and MassDEP guidelines which will direct the evaluation and mitigation of construction impacts.

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 Worker Transportation

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 encouraged to use public transportation and ridesharing options. The general contractors will work to ensure that construction workers are 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 construction. Plans for controlling fugitive dust during 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 a number of 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.

3.11.9 Construction Noise

The Proponents are 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 Waste

The Proponents 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.

3.12 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.

3.13 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

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

4.1 Sustainable Design

The Project will redevelop a currently vacant site that previously included industrial uses. The buildings will all meet the state's building and energy requirements. In compliance with Article 37 of the Boston Zoning Code, the apartment building, which is greater than 50,000 sf, will pursue a minimum of silver level certifiability under the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design for Homes: Mid-rise rating system (LEED H Midrise), as described below.

4.1.1 Introduction

The apartment building will incorporate sustainable principles into its design, construction, and continued operation activities. Implementation of LEED certifiability ensures that the Project design includes the following sustainable principles:

- An integrated team, members of which will be in constant communication throughout the design and construction process;
- Environmentally friendly site design and consideration of landscaping that benefits both residents and the surrounding habitats;
- Efficient water use that minimizes waste and maximizes applicable technology;
- Energy efficiency through installation of high-efficiency equipment and a right-sized system design;
- Healthy materials and finishes throughout all interior spaces, reducing health effects on residents; and
- Effective ventilation and exhaust systems design to ensure continued health and air quality throughout the life of each building.

4.1.2 Article 37/LEED Compliance

As mentioned previously, the apartment building will adhere to the LEED H Midrise rating system. The following is a summary of the proposed LEED compliance methodology. Additionally, please refer to the LEED H Midrise checklist at the end of this chapter for more detailed information on specific credit compliance pathways.

4.1.2.1 Innovation and Design

The Innovation and Design Process (ID) category of the LEED H Midrise rating system ensures integration of sustainable principles and integrated team practices throughout the design and construction phase, and rewards projects for design and installation of

sustainable methodology that is above and beyond the standard LEED credit requirements. The Project team will also use the credits in this category to address and mitigate potential issues in building durability and resiliency.

To comply with the prerequisites in this category, the design will employ an integrated design and construction team, including an energy expert, and at least one LEED H Midrise Accredited Professional. The team will participate in a sustainable design charrette prior to design development and will identify and address potential durability issues through the creation of a Durability Risk Evaluation and subsequent Durability Checklist. The latter will include design strategies to address the following durability concerns: exterior water and moisture, interior water and moisture, air infiltration, interstitial condensation, pest control, heat loss, ultraviolet radiation, and natural disasters.

4.1.2.2 Location and Linkages

The Location and Linkages (LL) category is unique to the LEED H Midrise rating system and aims to reduce urban sprawl—rewarding development on and near existing infrastructure, public transportation, and developed land.

Since the Project is a redevelopment of an existing, urban infill parcel, construction requires no use of undeveloped land for its construction, and the site includes existing access to utility lines, public transportation, and accessible open space for active and passive recreation.

The Project location also provides residents with walkable access to numerous neighborhood amenities, including restaurants, grocery stores, pharmacies, schools, religious institutions, laundry services, communities centers, and indoor recreation facilities.

4.1.2.3 Sustainable Sites

The Sustainable Sites (SS) category addresses environmental issues related to site landscape and civil engineering, ensuring a seamless co-existence between the built environment and the natural environment.

The Project team will ensure that installed landscaping includes only non-invasive plantings, maximizes drought-tolerant plantings, and minimizes the need for excessive irrigation, fertilizer, and ongoing maintenance. Additionally, the building roofing will seek to reduce heat island effects—increasing reflectivity of installed materials, where feasible and appropriate.

Stormwater collected onsite will be managed throughout construction and the life of the apartment building. During construction, the site design will implement a National Pollution Discharge Elimination System (NPDES)—approved erosion and sediment control plan, including Best Management Practices (BMPs) which minimize stormwater run-off and

wind erosion. Once construction is completed, the site will retain and infiltrate all stormwater onsite, per City of Boston requirements.

The site is located adjacent to the Uphams Corner Station on the MBTA Fairmount Commuter Rail line, promoting use of public transportation to and from downtown Boston. The Uphams Corner Station provides consistent ride availability 7 days a week.

Provided bicycle storage will be located within the building and will strive to promote resident biking by maximizing available secure, covered storage spaces. The Project is also located 0.3-miles from Columbia Avenue and 0.6-miles from Dorchester Avenue, which provide designated bike lanes for city commuters.

4.1.2.4 Water Efficiency

The Water Efficiency (WE) category addresses environmental degradation related to overuse of potable water within residential buildings and site irrigation systems. Where necessary, the site will utilize high-efficiency irrigation systems. Inside the apartment building, all residential units will utilize high-efficiency boilers as well as high-efficiency, low-flow water-use fixtures for water closets, lavatory faucets, showers, and kitchen faucets.

4.1.2.5 Energy and Atmosphere

The Energy and Atmosphere (EA) category addresses ongoing energy usage and continued building performance. The design will seek to exceed both the Massachusetts's Stretch Energy Code (Stretch Code) and the newly implemented International Energy Conservation Code (IECC) 2012, providing at least a 25% reduction in overall energy usage, annually, based on the ASHRAE 90.1-2007, Appendix G baseline.

To achieve these energy reduction goals, the design will utilize high-efficiency heating, cooling, and ventilation equipment as well as high-efficiency domestic hot water equipment and distribution systems. Additionally, the building envelope will include increased insulation, creating an effective thermal barrier subsequently reducing thermal losses to the exterior.

4.1.2.6 Materials and Resources

The Materials and Resources (MR) category addresses all installed materials, including framing and interior finishes, as well as diversion of waste from landfills.

To minimize use of virgin materials, the construction of the apartment building will pursue panelization where possible, as well as the use of efficiency framing design and right-sized material delivery.

The apartment building will also utilize non-tropical wood products and/or FSC-certification for necessary woods from tropical countries. Additionally, wood materials will be reviewed for reduction, or elimination, of added urea-formaldehyde resins.

All finish materials, including sealants, adhesives, paints, primers, coatings, etc. will be chosen for environmental benefits such as regional sourcing, low-Volatile Organic Compound (VOC) release, and green certification for health benefits. In particular, cement materials will be sourced within 500-miles of the site; paints, primers, adhesives, sealants will be reviewed for VOC compliance with the South Coast Air Quality Management District Rule #1113 and #1168; flooring materials will be FloorScore certificated, where applicable; and, for increased material durability, no carpeting will be installed.

During construction, all waste produced will be tracked and diverted to minimize landfill disposal. The team will seek to achieve a minimum diversion rate of 75%.

4.1.2.7 Indoor Environmental Quality

The Indoor Environmental Quality (IEQ) category addresses the exhaust and ventilation of all interior spaces within the building, ensuring a consistent healthy environment for building residents.

All apartment systems will be designed to meet, or exceed, the ASHRAE 62.2-2007 standard and all common spaces will meet the ASHRAE 62.1-2007 standard. Ductwork will be designed in accordance with the Air Conditioning Contractors of America (ACCA) Manual J Heating and Cooling Loads, and Manual D Duct Sizing, standards.

All installed combustion equipment will be directly vented to the exterior and each floor of the apartment building, as well as all common spaces, will be equipped with combination smoke and carbon dioxide detectors. All installed mechanical equipment will include minimum MERV 8 filtration media to ensure that harmful particulates are filtered out of the air stream, prior to entry into the interior spaces.

During construction, all installed ductwork will be protected from contamination by dust and debris produced onsite. Protection will remain in-place from delivery on-site until final cleaning and occupancy.

The site will include surface parking, but not interior garage parking.

Building management will enforce a no-smoking policy within the enclosure, as well as within 25-feet of all entries, air intakes, or operable windows.

Finally, all residential units will be sealed for compartmentalization, per LEED H Mid-rise and the Massachusetts Multifamily High-Rise Utility Rebate (MassSave) program standards. Installed sealing materials will limit transfer of heated and cooled air, moisture, and smells

both between units and between the interior and exterior. The maximum acceptable air leakage will be 7.0 Air Changes per Hour (ACH) when tested at 50 Pascals.

4.1.2.8 Awareness and Education

The Awareness and Education category ensures that the owner, building residents, and maintenance staff understand the unique requirements of all installed equipment and materials, especially those conditions and ongoing maintenance tasks related to sustainable and environmentally conscious development.

During the course of design and construction, the Sustainability Consultant and Owner will develop Operation and Maintenance handbooks, as well as resident green guides to be given to occupants and staff onsite. Additionally, training sessions will be held with all leasing and maintenance staff at construction completion.

4.1.3 Sustainable Practices

In addition to LEED H Midrise implementation, the Project team has included multiple environmentally friendly design practices. These include reuse of an existing site, pedestrian-and commuter-friendly location, and a "solar-ready" design, which will ensure adequate roof space, conduit installation, and mechanical room free space for a future solar installation.

4.2 Climate Change Preparedness

4.2.1 Introduction

Climate change conditions considered by the Project team include higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, and heavy rainfall events.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponents planned for climate-related conditions projected 50 years into the future. A copy of the completed Checklist is included in Appendix D. 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 Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current

five-to-twenty days annually, to thirty-to-sixty days annually.[1] The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- Installing operable windows where possible;
- Planting shade trees around the site;
- Installing a high performance building envelope; and
- Specifying high albedo roof tops to minimize the heat island effect, as well as consider high albedo paving materials.

Energy modeling for the Project has not yet been completed; however, the Proponents will strive to reduce the Project's overall energy demand and greenhouse gas emissions that contribute to global warming.

4.3.3 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponents will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable. The Project will increase the pervious area on the site from the existing condition, and is considering permeable paving, creating infiltration ability on the site. Section 7.4 includes a discussion of stormwater management, including measures to reduce runoff from the site.

4.3.4 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 a high efficiency irrigation system will be installed which will utilize a central shutoff valve, drip irrigation at all plant bed areas, and a sophisticated controller with solar, rain, and ice sensors. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

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[1] IPCC (Intergovernmental Panel on Climate Change), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Avery, M. Tignor, and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, UK, and New York, 996 pp.

LEED for Homes Mid-rise Simplified Project Checklist

for Homes

Builder Name:	*Unknown*
Project Team Leader (if different):	*My Lam*
Home Address (Street/City/State):	*65 Cottage Street, Dorchester, Massachusetts*

Project Description:

Building type: ***Mid-rise multi-family*** # of stories: ***6***

# of units: ***79*** Avg. Home Size Adjustment: ***-10***

Adjusted Certification Thresholds

Certified: ***35.0*** Gold: ***65.0***

Silver: ***50.0*** Platinum: ***80.0***

Project Point Total

Prelim: *62 + 2 maybe pts* Final: *16.5*

Certification Level

Prelim: *Silver* Final: *Not Certified*

Final Credit Category Total Points

ID: 0 *SS: 2* *EA: 12* *EQ: 0*

LL: 0 *WE: 0* *MR: 2.5* *AE: 0*

Minimum Point Thresholds Not Met for Final Rating

date last updated :

last updated by :

					Max Pts	Project Points Preliminary			Final
Innovation and Design Process (ID)			(No Minimum Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Integrated Project Planning		1.1	Preliminary Rating		Prereq	Y			
		1.2	Energy Expertise for MID-RISE		Prereq	Y			
		1.3	Professional Credentialed with Respect to LEED for Homes		1	1	0		0
		1.4	Design Charrette		1	1	0		0
		1.5	Building Orientation for Solar Design		1	0	0	N	0
		1.6	Trades Training for MID-RISE		1	0	0	N	0
2. Durability Management Process		2.1	Durability Planning		Prereq	Y			
		2.2	Durability Management		Prereq	Y			
		2.3	Third-Party Durability Management Verification		3	0	0	N	0
3.Innovative or Regional Design	✎	3.1	Innovation #1	***Irrigation Efficiency Exemplary Performance***	1	1	0		0
	✎	3.2	Innovation #2		1	0	0		0
	✎	3.3	Innovation #3		1	0	0		0
	✎	3.4	Innovation #4		1	0	0		0
				Sub-Total for ID Category:	**11**	3	0		0
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND		1	LEED for Neighborhood Development	**LL2-6**	10	0	0	N	0
2. Site Selection	✎	2	Site Selection		2	2	0		0
3. Preferred Locations		3.1	Edge Development		1	0	0	N	0
		3.2	Infill	**LL 3.1**	2	2	0		0
		3.3	Brownfield Redevelopment for MID-RISE		1	0	0	N	0
4. Infrastructure		4	Existing Infrastructure		1	1	0		0
5. Community Resources/ Transit		5.1	Basic Community Resources for MID-RISE		1	0	0	N	0
		5.2	Extensive Community Resources for MID-RISE	**LL 5.1, 5.3**	2	0	0	N	0
		5.3	Outstanding Community Resources for MID-RISE	**LL 5.1, 5.2**	3	3	0		0
6. Access to Open Space		6	Access to Open Space		1	1	0		0
				Sub-Total for LL Category:	**10**	9	0		0
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship		1.1	Erosion Controls During Construction		Prerequisite	Y			
		1.2	Minimize Disturbed Area of Site for MID-RISE		1	0	0	N	0
2. Landscaping	✎	2.1	No Invasive Plants		Prerequisite	Y			
	✎	2.2	Basic Landscape Design	**SS 2.5**	1	1	0		0
	✎	2.3	Limit Conventional Turf for MID-RISE	**SS 2.5**	2	0	0	N	0
	✎	2.4	Drought Tolerant Plants for MID-RISE	**SS 2.5**	1	1	0		0
	✎	2.5	Reduce Overall Irrigation Demand by at Least 20% for MID-RISE		3	0	0	N	0
3. Local Heat Island Effects	✎	3.1	Reduce Site Heat Island Effects for MID-RISE		1	0	0	N	0
	✎	3.2	Reduce Roof Heat Island Effects for MID-RISE		1	1	0		0
4. Surface Water Management	✎	4.1	Permeable Lot for MID-RISE		2	0	0	N	0
		4.2	Permanent Erosion Controls		1	0	0	N	0
	✎	4.3	Stormwater Quality Control for MID-RISE		2	2	0		0
5. Nontoxic Pest Control		5	Pest Control Alternatives		2	1.5	0		0
6. Compact Development		6.1	Moderate Density for MID-RISE		2	2	0		2
		6.2	High Density for MID-RISE	**SS 6.1, 6.3**	3	0	0	N	0
		6.3	Very High Density for MID-RISE	**SS 6.1, 6.2**	4	0	0	N	0
7. Alternative Transportation		7.1	Public Transit for MID-RISE		2	0	0	N	0
		7.2	Bicycle Storage for MID-RISE		1	1	0		0
		7.3	Parking Capacity/Low-Emitting Vehicles for MID-RISE		1	1	0		0
				Sub-Total for SS Category:	**22**	10.5	0		2

LEED for Homes Mid-rise Pilot Simplified Project Checklist (continued)

					Max Pts	Project Points Preliminary			Final
Water Efficiency (WE)			(Minimum of 3 WE Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Water Reuse	✎	1	Water Reuse for MID-RISE		5	0	0	N	0
2. Irrigation System	✎	2.1	High Efficiency Irrigation System for MID-RISE	**WE 2.2**	2	2	0		0
	✎	2.2	Reduce Overall Irrigation Demand by at Least 45% for MID-RISE		2	0	0	N	0
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	0	0		0
		3.2	Very High Efficiency Fixtures and Fittings		6	6	0		0
		3.3	Water Efficient Appliances for MID-RISE		2	2	0		0
				Sub-Total for WE Category:	**15**	10	0		0
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance		1.1	Minimum Energy Performance for MID-RISE		Prereq	Y			
		1.2	Testing and Verification for MID-RISE		Prereq	Y			
		1.3	Optimize Energy Performance for MID-RISE		34	12	0		12
7. Water Heating	✎	7.1	Efficient Hot Water Distribution		2	0	0	N	0
		7.2	Pipe Insulation		1	1	0		0
11. Residential Refrigerant Management		11.1	Refrigerant Charge Test		Prereq	Y			
		11.2	Appropriate HVAC Refrigerants		1	1	0		0
				Sub-Total for EA Category:	**38**	14	0		12
Materials and Resources (MR)			(Minimum of 2 MR Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Material-Efficient Framing		1.1	Framing Order Waste Factor Limit		Prereq	Y			
		1.2	Detailed Framing Documents	**MR 1.5**	1	0	0	N	0
		1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	0	0	N	0
		1.4	Framing Efficiencies	**MR 1.5**	3	2	0		0
		1.5	Off-site Fabrication		4	0	0		0
2. Environmentally Preferable Products	✎	2.1	FSC Certified Tropical Wood		Prereq	Y			
	✎	2.2	Environmentally Preferable Products		8	3	0		0
3. Waste Management		3.1	Construction Waste Management Planning		Prereq	Y			
		3.2	Construction Waste Reduction		3	2.5	0		2.5
				Sub-Total for MR Category:	**16**	7.5	0		2.5
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
2. Combustion Venting		2	Basic Combustion Venting Measures		Prereq	Y			
3. Moisture Control		3	Moisture Load Control		1	0	0	N	0
4. Outdoor Air Ventilation	✎	4.1	Basic Outdoor Air Ventilation for MID-RISE		Prereq				
		4.2	Enhanced Outdoor Air Ventilation for MID-RISE		2	0	2		0
		4.3	Third-Party Performance Testing for MID-RISE		1	0	0	N	0
5. Local Exhaust	✎	5.1	Basic Local Exhaust		Prerequisite	Y			
		5.2	Enhanced Local Exhaust		1	1	0		0
		5.3	Third-Party Performance Testing		1	0	0	N	0
6. Distribution of Space Heating and Cooling	✎	6.1	Room-by-Room Load Calculations		Prereq	Y			
		6.2	Return Air Flow / Room by Room Controls		1	0	0	N	0
		6.3	Third-Party Performance Test / Multiple Zones		2	0	0	N	0
7. Air Filtering		7.1	Good Filters		Prereq	Y			
		7.2	Better Filters	**EQ 7.3**	1	0	0	N	0
		7.3	Best Filters		2	0	0	N	0
8. Contaminant Control	✎	8.1	Indoor Contaminant Control during Construction		1	1	0		0
		8.2	Indoor Contaminant Control for MID-RISE		2	1	0		0
	✎	8.3	Preoccupancy Flush		1	0	0	N	0
9. Radon Protection	✎	9.1	Radon-Resistant Construction in High-Risk Areas		Prereq	N/A			
	✎	9.2	Radon-Resistant Construction in Moderate-Risk Areas		1	0	0	N	0
10. Garage Pollutant Protection		10.1	No HVAC in Garage for MID-RISE		Prereq	Y			
		10.2	Minimize Pollutants from Garage for MID-RISE	**EQ 10.3**	2	0	0	N	0
		10.3	Detached Garage or No Garage for MID-RISE		3	3	0		0
11. ETS Control		11	Environnmental Tobacco Smoke Reduction for MID-RISE		1	1	0		0
12. Compartmentalization of Units		12.1	Compartmentalization of Units		Prereq	Y			
		12.2	Enhanced Compartmentalization of Units		1	0	0	N	0
				Sub-Total for EQ Category:	**21**	7	2		0
Awareness and Education (AE)			(Minimum of 0 AE Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the Homeowner or Tenant	✎	1.1	Basic Operations Training		Prereq	Y			
	✎	1.2	Enhanced Training		1	0	0	N	0
		1.3	Public Awareness		1	0	0	N	0
2. Education of Building Manager	✎	2	Education of Building Manager		1	1	0		0
				Sub-Total for AE Category:	**3**	1	0		0

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Design Goals and Context

Complex Existing Context

The Project site is roughly a rectangle, averaging approximately 250 by 500 feet, oriented with the long direction north-south. There is significant grade change (approximately 31 feet) along the length of the site, rising up from East Cottage Street toward the south.

To the West

The site is completely "walled in" by the elevated MBTA Fairmount Line commuter rail tracks, with no access across or to the Uphams Corner Station. Next station north is Newmarket Station; to the south are Four Corners, Talbot Avenue, Morton Street, Fairmount, and Readville stations. Access to the Uphams station from the southernmost edge of the site is approximately a quarter mile walk, mostly through small scale residential neighborhood streets (Harrow, Humphrey, and then Dudley) to the stairs accessing the platform. Access to Uphams Corner platform is from Dudley Street. There is an accessible ramp to the inbound platform from Dudley Street, and a stairway to the outbound side. The accessible ramp to the outbound side is another 350 feet away towards the north on Clifton Street that runs along the west side of the railroad tracks. The extensive Kroc Center is located on a large parcel defined by Clifton Street and Dudley Street.

To the North

East Cottage Street is the northern boundary of the site. East Cottage connects to Massachusetts Avenue and Columbia Road towards the east, and to Dudley Street to the west. Generally, in the western direction, East Cottage Street winds through small scale, 2.5 to 3 story residential structures. The street is two-way, relatively narrow, with minimal setback to the housing from the sidewalks.

Eastbound on East Cottage Street there is an initial stretch of zero-setback commercial development, broken up with some large open sites, on both sides of the street. This pattern gives way to one-sided, small scale residential, until it ends at the Massachusetts Avenue and Columbia road intersection.

To the East

At the northern third of the site on Cottage Street, there is a neighboring commercial development. The remaining eastern edge of the site is defined by two existing triple-deckers, or is open space that fronts on Hillsboro Street. The neighborhood fabric to the east of Hillsboro is densely packed 2.5 and 3 story wood frame housing. The street pattern is non-gridded, with numerous indirect connections between Humphrey Street and Columbia Road.

To the South

Immediately to the south of the site, the terrain rises up into the same type of small scale residential that is to the east. This type of context continues to the south after crossing Dudley Street, with a similar, irregular street pattern between the MBTA tracks and Columbia Road.

Given the context described above, the Project site, even the stretch along East Cottage Street, has an embedded, disconnected quality, and is not particularly prominent. Its historical use has been industrial. The site is, in fact, just south of Boston's Newmarket District, but is included in a very large assemblage of commercial parcels roughly defined by Interstate 93, Melnea Cass Boulevard, Hampden Street, and Norfolk Avenue. The site has been blighted for many years, with one very large, decaying structure filling out at least half of the site, with most of the rest of it asphalt paving. All structures were recently demolished by the City, including a railroad siding connecting the elevated tracks to the commercial structure. The site is now completely vacant. Awaiting development, the visible edges of the site are long, inhospitable stretches of sidewalk (mostly along East Cottage Street), and existing, small residential streets, in relatively poor condition.

The primary goals of the redevelopment plan for the Project are to A: improve the edges and reinforce the uses along the existing, surrounding context, B: to define an area within the site to create a dense, residential development that takes advantage of its adjacency to the MBTA commuter station, and C: work with the MBTA to create new access to the Uphams Corner Station.

To these ends, a new, state-of-the-art commercial building will follow the edge of East Cottage Street, set back enough from the street to create a pedestrian-friendly landscaped setting. All parking and loading areas will be hidden from view behind the structure. The presence of the two existing triple-deckers on Hillsboro will be enhanced by bookending them with comparably-scaled multi-family home-ownership structures, putting more eyes on Hillsboro street. A heavily landscaped pedestrian and parking lane defines the site-within-the-site for an approximately 80-unit mid-rise apartment building. The L-shape of the building provides a protected, sunny, programmable open space for use by building residents and the local neighborhood. On the remaining edge, the southern boundary, parking and new public pedestrian access to the MBTA tracks will create a valuable amenity for the neighborhood, while distancing the mid-rise building from the smaller-scale residences further up the hill.

In summary, with the completion of the Project, the following will be realized:

- Significant empty street edges along East Cottage Street and Hillsboro Street will be activated with appropriately placed commercial and residential uses that reinforce the scale and character of surrounding uses.

- A new standard will be set for future commercial, and potentially mixed use development along East Cottage Street (parking hidden from street, pedestrian-friendly walkways, etc.).

- With the cooperation and support of the MBTA, the surrounding neighborhood will have enhanced—both safer and closer–pedestrian connectivity to Uphams Corner Station.

- The commercial history of the site will be preserved, and existing commercial developments will potentially benefit from adjacency to a denser residential setting.

- Pedestrian connectivity will be improved from the Hillsboro neighborhood through the site, down the hill to East Cottage Street.

- Active use of new public and semi-private areas throughout many hours of the day is assured through lively streetscapes with multiple building entries, commercial activities, passive recreation areas, tot lot, dispersed parking, and the new access to the Uphams Corner Station.

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The following section identifies historic resources in the vicinity of the Project. A review of the State and National Registers of Historic Places as well as the Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory) were undertaken to identify historic resources.

6.1 Project Site

The Project site is an approximately 2.75-acre vacant parcel located in the Upham's Corner area of Dorchester. The vacant site previously included 20th century concrete block industrial and commercial buildings; the buildings on the site were demolished in 2015. The site is bound by to the west by the MBTA's Fairmont commuter rail line, East Cottage Street to the north, commercial and residential properties, as well as Hillsboro Street to the east, and residential properties to the south.

No historic resources listed in the State and National Registers of Historic Places or included in the Inventory are located on the Project site.

6.2 Historic Resources Within the Project Vicinity

There is only one National Register listed property within a quarter-mile of the Project site. The Upham's Corner Market, 600-610 Columbia Road, is a brick Classical Revival commercial building significant as the first centralized "Supermarket" in the City of Boston.

Numerous properties included in the Inventory are located in the vicinity of the Project site. The name and address of properties included in the Inventory within a quarter-mile of the Project site are listed in Table 6-1. Figure 6-1 depicts the locations of these properties.

Table 6-1 Historic Resources in the Project Vicinity

Map No	Name	Address	Designation
A	Elder Streetscape (BOS.AAI)	6-14 Elder Street	Inventory
B	Jones Hill (BOS.DF)	Columbia Rd, Stougton St., Pleasant Street, and Hancock Street.	Inventory
C	Upham's Corner (BOS.DH)	Cemetery Corners-Columbia Square	Inventory
D	Humphreys – East Cottage Street (BOS.DI)	Humphrey and East Cottage Street	Inventory
E	Virginia- Monadnock (BOS.DJ)	Bird St., Cedar Pl., Dorchester Ave., Monadnock St., Sayward St. and Virginia St.	Inventory
F	Dudley Triangle (BOS.DK)	Bound by Dudley Street, New York, New Haven and Harford Railroad, Quincy St. and Blue Hill Ave.	Inventory

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

Map No	Name	Address	Designation
G	Humphreys Street, 4-60 (BOS.GB)	4-60 Humphreys Street	Inventory
H	Monadnock Street, 5-68 (BOS.GP)	5-60, 6-68 Monadnock Street 723-715 Dudley Street	Inventory
I	Virginia Street, 9-64 (BOS.HU)	9-59 and 10-64 Virginia Street	Inventory
J	Lower Roxbury Industrial District (BOS.RS)	Bound by New Market Sq., Hampden St., Melnea Cass Blvd, and Shirley Street	Inventory
K	Saint Paul Roman Catholic Church Complex (BOS.VY)	St. Paul Parish Complex Bound by Robin Hood St., Hartford St., Lingard St. Magnolia St. and Moon St.	Inventory
1	Star Brewing Company (BOS.12942)	69 Shirley Street	Inventory
2	Saint Paul Roman Catholic Church Rectory (BOS.15261)	1 Lingard Street	Inventory
3	Little Sisters of the Assumption Convent (BOS.15263)	45 Magnolia Street	Inventory
4	M. Duffley House (BOS.15561)	14 Annabel Street	Inventory
5	The Mount Monadnock (BOS.16460)	1-3 Monadnock Street	Inventory
6	The Denmark (BOS.16461)	713 Dudley Street	Inventory
7	Boston Engine House #21 (BOS.5797)	643 Columbia Road	Inventory
8	Dorchester Savings Bank (BOS.5801)	570-572 Columbia Road	Inventory
9	Columbia Square Building- Odd Fellows Hall (BOS.5802)	578-588 Columbia Road	Inventory
10	A.H. White House (BOS.5803)	683 Columbia Road	Inventory
11	Edward Holden House (BOS.5971)	121 East Cottage Street	Inventory
12	BOS.5973	6 Elder Street	Inventory
13	BOS.5974	8 Elder Street	Inventory
14	BOS.5975	10 Elder Street	Inventory
15	BOS.5976	12 Elder Street	Inventory
16	BOS.5977	14 Elder Street	Inventory
17	James H. Humphreys House (BOS.6029)	25 Humphreys Street	Inventory

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

Map No	Name	Address	Designation
18	Thomas Beal House (BOS.6030)	29 Humphreys Street	Inventory
19	A.Glover House (BOS.6031)	35 Humphreys Street	Inventory
20	B.G. Smith House (BOS.6098)	29 Monadnock Street	Inventory
21	Calvin Bird House (BOS.6387)	2 Wendover Street	Inventory
22	BOS.6494	722-726 Dudley Street	Inventory
23	BOS.6495	728 Dudley Street	Inventory
24	Pierce Building BOS.6496	592-598 Columbia Road	Inventory
25	BOS.6498	618-624 Columbia Road	Inventory
26	The Upham's Corner Market (BOS.6499)	600-610 Columbia Road	National Register Individual property Preservation Restriction
27	Henry D. Holden House (BOS.6500)	131 East Cottage Street	Inventory
28	Henry D. Holden House (BOS.6501)	133 East Cottage Street	Inventory
29	Henry D. Holden House (BOS.6502)	135 East Cottage Street	Inventory
30	E.R. Fowls Row House (BOS.6503)	654 Columbia Road	Inventory
31	J.A. Fowls Row House (BOS.6504)	656 Columbia Road	Inventory
32	C.J. Sayward Row House (BOS.6505)	658 Columbia Road	Inventory
33	H.S. Chase Row House (BOS.6506)	660 Columbia Road	Inventory
34	William Currier Row House (BOS.6507)	662 Columbia Road	Inventory
35	R.B William Row House (BOS.6508)	664 Columbia Road	Inventory
36	Merrill House (BOS.6509)	31 Wendover Street	Inventory
37	BOS.6510	76-78 Belden Street	Inventory
38	George Smith Row House (BOS.6528)	6 Magnolia Street	Inventory
39	Anne Greenlaw Row House (BOS.6529)	8 Magnolia Street	Inventory
40	James D.K. Willis House (BOS.6530)	10 Magnolia Street	Inventory

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

Map No	Name	Address	Designation
41	Ruth H. Martin Row House (BOS.6531)	12 Magnolia Street	Inventory
42	Robert B. Griffin Row House (BOS.6532)	14 Magnolia Street	Inventory
43	L.V. Morey Row House (BOS.6533)	16 Magnolia Street	Inventory
44	Alexander McDonald Row House (BOS.6534)	18 Magnolia Street	Inventory
45	Alexander McDonald Row House (BOS.6535)	20 Magnolia Street	Inventory
46	Alexander McDonald Row House (BOS.6536)	22 Magnolia Street	Inventory
47	A.L. Hitchcock House (BOS.6537)	24 Magnolia Street	Inventory
48	Dudley Street Bridge (BOS.9159)	Dudley Street	Inventory
49	East Cottage Street Bridge (BOS.9160)	East Cottage Street	Inventory
50	Norfolk Avenue Bridge (BOS.9191)	Norfolk Avenue	Inventory
51	Midland Railroad Bridge (BOS.9163)	Clapp Street	Inventory

6.3 Impacts to Historic Resources

6.3.1 Urban Design

The light industrial component will be housed in a two-story building and will include light industrial with loading dock and office space. The 80 apartment units will be located adjacent to the site's open space and the MBTA tracks to the west. Open space will be constructed on the western side of the residential buildings and a surface parking lot will be located to the north and east.

Eight residential townhouse-style condominiums within two new buildings will be constructed facing Hillsboro Street. The design and materials of the new construction will be consistent with the surrounding residential buildings.

The Project will include landscaped areas and improve the site's streetscape along East Cottage Street and Hillsboro Street.

6.3.2 Shadow Impacts

A shadow impact analysis was conducted to investigate shadow impacts from the Project during 14 time periods during the vernal equinox, summer solstice, autumnal equinox, and winter solstice. The analysis indicates that new shadows created by the Project will be cast onto the existing streets, buildings, open space and MBTA tracks. Overall, new shadows will not impact historic resources in the Project's vicinity except for the East Cottage Street Bridge.

6.4 Archaeological Resources

A review of the Inventory determined no previously identified archaeological resources located within the Project site. The approximately 2.76-acre Project site is a vacant urban parcel which was previously occupied with mid-20th century commercial buildings. Therefore no previously undisturbed areas will be affected by the proposed Project.

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Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

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Figure 6-1

Historic Resources Map

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

7.1 Introduction

This chapter discusses the existing and proposed utility infrastructure systems that will support the Project, including water, sewer and stormwater management and provides estimates of water use and wastewater generation.

The Project consists of the construction of an approximately 20,000 sf commercial (Light Industrial) building, with an approximately 3,400 sf mezzanine, an approximately 80-unit apartment building and a two four-unit townhomes, with associated parking, utility services and landscaping.

The existing building and structures on the site have recently been demolished and existing utility service connections serving the existing site building have been abandoned and capped at the respective mains located in the street. It is not anticipated that any of the existing service connections will be reused for the Project.

The Boston Water and Sewer Commission (BWSC) GSA Numbers for the cutting and capping of the existing utilities are 9974 and 9669.

7.2 Wastewater Generation

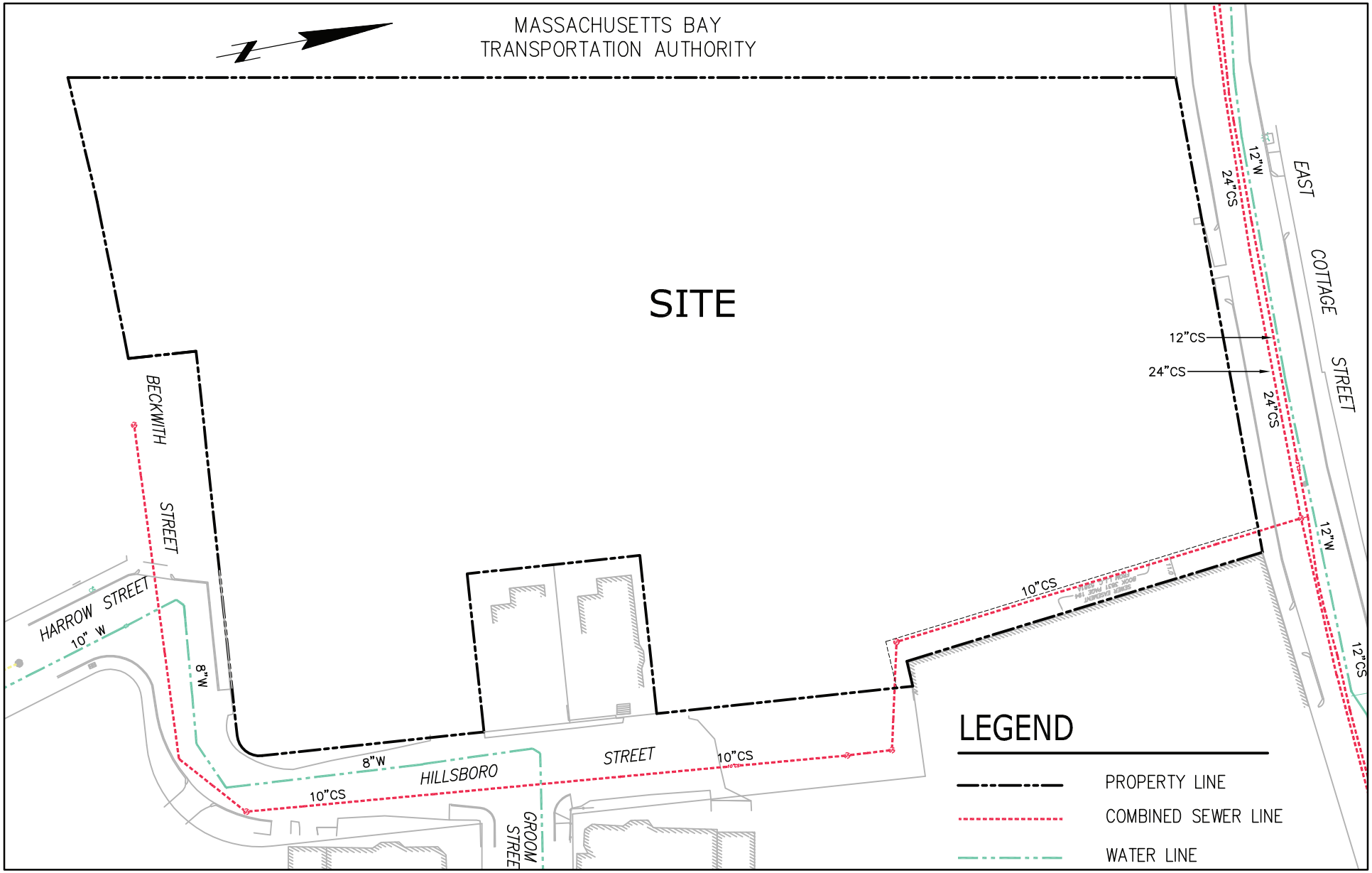
7.2.1 Existing Conditions

The sewer mains in the city of Boston are owned and operated by BWSC. These mains convey sanitary flows to the system owned and operated by the Massachusetts Water Resources Authority (MWRA), which carries the flow to the Deer Island Wastewater Treatment Plant for final treatment and disposal in Boston Harbor.

Sewer mains exist within all the streets surrounding the site. The existing site was served by a sewer main located in Cottage Street. A 24-inch and 12-inch combined sewer pipes are located in Cottage Street. A 10-inch combined sewer pipe is located in Hillsboro Street. This pipe enters the site at the terminus point of Hillsboro Street and travels through the site within a sewer easement and connects to the 24-inch combined sewer pipe in East Cottage Street. See Figure 7-1 for the location of these systems.

7.2.2 Wastewater Generation

The Project's estimated wastewater generation calculations are based on the Massachusetts Department of Environmental Protection (MassDEP), 314 CMR 7.00, Sewer System Extension and Connection Permit Program and 310 CMR 15.00, The State Environmental Code, Title 5. While these flows are generally considered conservative values for new



Indigo Block Redevelopment **Boston, Massachusetts**

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Figure 7-1

Existing Water and Sewer Systems

construction given current technologies in water demand and wastewater generation, they are the accepted standard for determination of permitting thresholds and hydraulic capacity design. The results of these calculations are presented in Table 7-1.

Table 7-1 Proposed Wastewater Demand

Proposed Use	Size	Unit Flow	Total Flow (gpd)
Light Industrial	20,000 SF/40 pp	20 gdp/person	800
Residential	172 bdm	110 gdp/bdm	18,920
TOTAL			19,720

SF = square feet, gpd = gallon per day, bdm = bedroom, pp = person

7.2.3 Proposed Sewer Service

As required by BWSC, the sewer service to each proposed building will have a separate connection to the BWSC system. These connections will be made at the closest existing sewer main within the surrounding streets. It is anticipated that the existing BWSC system will be able to accommodate the anticipated flows generated by the Project. In order to connect to the system, BWSC will require individual Site Plan Approval for each separate building.

7.3 Water Supply

7.3.1 Existing Conditions

The water mains in the City of Boston are owned and operated by BWSC. Water is purchased and supplied from the Massachusetts Water Resource Authority. The MWRA water supply is considered an unlimited source from the Quabbin Reservoir in Central Massachusetts. Water to the Project vicinity is delivered via the BWSC water main systems.

Water mains exist within all the streets surrounding the site. A 12-inch water main is located in East Cottage Street, cement lined (CL) 1958, and an 8-inch water main, low pressure service, is located in Harrow and Hillsboro Streets, CL 1997, see Figure 7-1. As mentioned previously, the various services for fire protection and domestic water use that served the site have been cut and capped.

Fire hydrants are located within the surrounding streets at approximately 300' intervals. During the Project's design development phase, hydrant flow tests will be performed to assess the water flow and pressure in the area.

7.3.2 Water Demand

The overall Project's estimated domestic water demand can be calculated by applying a factor of 1.1 to the estimated wastewater generation calculations provided in Table 7-1. This will result in an additional 10 percent consumption that can be attributed to building cooling systems, overall system losses, and other consumption that is not converted into wastewater.

The total water demand of the Project is therefore estimated to be 21,692 gpd.

It is anticipated that BWSC system will have adequate capacity to deliver this volume of water. This will be confirmed during the Site Plan Approval process with BWSC.

7.3.3 Proposed Water Service

The domestic water services to each proposed building will be tapped off the closest existing water main within the surrounding streets. Each service will have an individual meter that will be installed with meter transmitting units in accordance with BWSC's Automatic Meter Reading System. The exact size and location of each service will be determined during the final design and Site Plan Approval process.

Fire protection to each building will also be tapped off the closest existing water main within the surrounding streets. Any new hydrant locations will be coordinated with BWSC and Boston Fire Department. The building exteriors will also feature Siamese Connections for additional fire protection. All services, both domestic and fire protection, will have backflow prevention devices.

7.3.4 Water Conservation Measures

Water conservation measures proposed for the development will include low consumption plumbing fixtures such as low flow water closets and showers, aerated faucets in lavatories, and sensor operated devices in public areas, potential cisterns to capture rainwater for irrigation, and drought-tolerant or native plant selection in the landscape design.

Rainwater Re-use

Rainwater harvesting in either underground cisterns or rain barrels will be implemented in the development program as a supplemental source to the irrigation supply.

Native Plant Selection

Every attempt will be made to use a native plant palette. A landscape system based predominantly on native species will reduce water demand and site maintenance; particularly after the initial one or two year period of establishment. When non-native species are desired, invasive species will not be specified.

Xeriscaping

Xeriscaping is a concept that groups plants with similar water requirements to use water efficiently. In addition to incorporating native species, newly planted areas will be designed using the principals of xeriscaping. In most instances, these plantings require less water than typical planting designs and often rely solely on rainwater.

7.4 Stormwater Management

The stormwater management plan is based on a multi-dimensional approach which recognizes the need for site planning, source control of potential contaminants, and implementation of structural and non-structural treatment methods to ensure the protection of groundwater and downstream resource areas.

The stormwater management plan is developed in compliance with BWSC regulations, the Stormwater Policy Handbook issued by MassDEP and the U.S. Environmental Protection Agency's (EPA) NPDES General Permit Program for Stormwater Discharges from Construction Sites. The Project has been designed to minimize impacts on downstream resource areas from the construction and operation of the Project.

7.4.1 Existing Conditions

The site is the former home to the Maxwell Box Company. The site is approximately 2.75 acres and is bounded by the MBTA commuter rail to the west, East Cottage Street to the north, Hillsboro Street and an industrial building to the east, and Harrow and Beckwith Streets to the south.

A manufacturing complex and expansive parking and loading paved areas had occupied the majority of the site until it was demolished earlier this year to make way for the proposed development. Currently, the site is covered with gravel with all buildings and structures removed from the site. The site slopes upward from north to south with an approximate elevation of 22 feet BCB along East Cottage Street to an approximate elevation of 53 feet BCB at the southwest corner of the site.

Prior to demolition, the runoff from the site was either collected through a series of catch basins and roof drains that discharged to the existing on-site combined sewer system and connected to the BWSC combined sewer system located in East Cottage Street, or sheet flowed overland and entered the BWSC system in East Cottage Street. Currently, all the runoff from the site sheet flows in a south to north direction and enters the BWSC combined sewer system in East Cottage Street. See Figure 7-1.

7.4.2 Proposed Conditions

The Project consists of the construction of a mixed-use development (commercial and residential) with several proposed buildings with associated parking, drive isles, walkways, utility connections, public use spaces and landscaping areas.

The Project will reduce the total impervious areas on site with the addition of landscaped areas and open space areas, and therefore will reduce the stormwater runoff quantity and improve the quality of stormwater runoff discharged from the site. It will also provide some recharge benefits where none exists today. The overall integrated approach to storm water management does not only address and focus on water quantity discharged from the site, but also water quality. Due to the inclusion of rooftops and newly created open space areas, there will be modest opportunities to introduce rain gardens, rainwater harvesting from roofs, and recharge areas for stormwater to surcharge back into the ground at the Project site. Additional water conservation measures incorporated into the drainage design include native plants. This will help reduce the quantity of runoff generated as well as enhance the runoff by removing sediment and pollutants from the overall site discharge.

The proposed site drainage includes the installation of catch basins with hoods and deep sumps, a subsurface piping network leading to water quality inlets and below-grade stormwater recharge systems.

The stormwater management system will be designed in accordance with BWSC design standards and requirements. Site Plan Approval will be required for the connections to the BWSC storm drain system. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared. The SWPPP will include spill contingency plans, short term and long term operation and maintenance information and construction operations discussions, all relating to the stormwater management of the Project.

7.4.3 Stormwater Quality

The goal of the stormwater quality plan is not only to protect property and resources on-site and nearby, but also to protect resources in the region that may be affected by the activities at the site during and after construction. Water quality treatment measures will result in the removal of a minimum of 80 percent of the total suspended solid (TSS) load in runoff prior to discharge from the site, consistent with MassDEP's TSS removal standard.

Non-structural pollutant controls include encouraging the use of salt substitutes for maintenance of parking and roadway areas; sweeping of driveways and parking areas on a regular basis; and use of slow-release organic fertilizers on landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Structural pollutant controls include catch basins equipped with deep sumps and hoods, water quality inlets designed to separate gas, oil, and suspended solids from the stormwater, and recharge/infiltration trenches.

7.4.4 Non-Structural Pollutant Controls

The proposed stormwater management system will be designed to protect the runoff water quality through the removal of sediments and pollutants. Non-structural pollutant controls used to separate and capture stormwater pollutants are described below.

7.4.4.1 Deicing

Sand will be the primary agent used for roadway and parking lot safety during ice or snow conditions. Use of road salt (sodium chloride) for maintenance of parking and roadway areas will be limited, and use of salt substitutes, such as calcium magnesium acetate, will be encouraged. These practices will limit the amount of dissolved pollutants in runoff and minimize potential impacts of deicing chemicals on downstream resource areas.

7.4.4.2 Pavement Sweeping

Long-term management practices will include regular sweeping of driveways and parking areas. The sweeping program will remove contaminants directly from paved surfaces to prevent their release into the drainage system. Street sweeping has been shown to be an effective initial treatment for reducing pollutant loadings in stormwater.

7.4.4.3 Fertilizer

Only slow-release organic fertilizers will be used in the landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Fertilizer use will be reduced once proposed landscaping is established.

7.4.5 Structural Pollutant Controls

The proposed stormwater management system is designed to protect the quality of stormwater runoff through the removal of sediments and pollutants. Structural pollutant controls used to separate and capture stormwater pollutants are described below.

7.4.5.1 Catch Basins

Catch basins at the site will be equipped with deep sumps and hooded outlets to trap debris, sediments, and floating contaminants, which are the largest constituents of urban runoff. Catch basins will be cleaned twice per year. This practice, in coordination with minimal use of sand and street sweeping, comprises a multi-level source control approach that prevents sand, sediment, and litter from entering the drainage basins and ultimately the resource area. Regular maintenance and cleaning of catch basins will assure adequate performance of these structures.

7.4.5.2 Gas and Oil Separators (Water Quality Inlets)

The interception and removal of petroleum products is essential to maintaining the quality of stormwater. Flow collected by catch basins and stormwater piping is conveyed to water quality inlets designed to lower sediment and hydrocarbon loadings from parking lot runoff. These units will also serve as gas and oil traps in case of a spill in parking areas. These water quality inlets will be located at the terminal point of drainage trunk lines, before discharging into the BWSC system. Regular maintenance and cleaning of these units will assure adequate performance.

7.4.5.3 Recharge/Infiltration Trenches

Loss of annual recharge to groundwater is minimized through the use of infiltration measures to the maximum extent practicable. Stormwater peak runoff rate and volume mitigation will be provided via infiltration trenches, where feasible. The annual recharge from the post-development site will be higher than the annual recharge from the existing site conditions.

7.4.5.4 Maintenance Program of Structural Pollutant Controls

An operation and maintenance plan is proposed to ensure the effectiveness of the structural controls. During construction, the site contractor will inspect sediment and erosion control structures weekly and after each rainfall event. Silt will be removed from hay bales either if the silt depth exceeds six inches or as needed. Damaged and deteriorated erosion control measures will be repaired immediately after identification. The underside of the hay bales will be kept in close contact with the earth and reset as necessary. Erosion control measures will remain in place until construction is completed and disturbed earth is stabilized.

Following construction, the property owner will sweep paved parking areas and drives on a semi-annual basis. Catch basin sumps will be cleaned twice per year. Eroded areas will be immediately repaired with loam, seed, and jute matting or other acceptable erosion control measures.

7.4.6 Mitigation Measures

Grading, filling and installation of structures may cause erosion and sedimentation resulting in temporarily increased turbidity and suspended solid loads. Runoff from construction sites may also transport sediment to downstream watercourses where sediment deposition and accumulation will occur as flow velocities decrease. Erosion and sedimentation controls will be employed to minimize the erosion and transport of sediment during the earthwork and construction phases of the Project.

7.4.6.1 Stormwater Runoff Quality During Construction (NPDES)

The Project will result in disturbance of greater than one acre of land and, therefore, requires the preparation and implementation of a Storm Water Pollution Prevention Plan for an EPA Construction General Permit. The short-term erosion and sediment control measures described below, in conjunction with the permanent stormwater management system and maintenance program, will ensure that no aspect of the Project site preparation, construction or continuing operation will have detrimental impact on downstream resource areas. Two factors are significant for meeting water quality standards: (1) minimization of exposed soil subject to erosion and (2) containment of stormwater runoff so that it can be treated before it is discharged.

Erosion and Sediment Control Measures

Erosion and sedimentation controls will be employed to minimize the erosion and transport of sediment into resource areas during the earthwork and construction phases of the Project. Erosion and sedimentation control measures will be installed prior to site excavation or disturbance and will be maintained throughout the construction period.

Primary erosion control techniques proposed include hay bale barriers, silt fence barriers, inlet sediment traps, a stabilized construction entrance and temporary diversion channels, when applicable. A detailed description of each technique is discussed below. During the growing season, slope stabilization will be achieved by applying topsoil followed by seeding and mulching as soon as final grades are achieved. Organic mulching, jute netting, or a combination, will be used to stabilize slopes completed outside of the growing season.

Silt Fence Hay Bale Barriers

Hay bale barriers will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. In areas where high runoff velocities or high sediment loads are expected, silt fencing may be installed adjacent to the hay bale barriers. This semi-permeable barrier made of a synthetic porous fabric will provide additional protection. The silt fences and hay bale barrier will be replaced as determined by periodic field inspection. The underside of hay bales will be kept in close contact with the earth and reset as necessary. Hay bale barriers and siltation fences will be maintained and cleaned until slopes have healthy stands of grass.

Drain System Protection

Hay bale sediment traps will be installed at drainage structures and maintained and cleaned until slopes have healthy stands of grass. Catch basins, drain manholes, storm drain pipes, and water quality inlets will be cleaned of sediment and debris after the completion of construction. Sediment collected in structures will be disposed of properly and covered, if stored on-site.

Diversion Channels

Diversion channels may be used to intercept and divert runoff from slopes that are exposed during construction. These diversions will minimize the development of concentrated runoff down slopes, which could produce gully erosion. Diversions will also be used to collect runoff from construction areas and convey it to temporary sediment basins or traps. Temporary diversions will remain in place until slopes are stabilized or graded level. Vegetation of the diversion channel is required to avoid erosion of the channel; the channel will be temporarily stabilized to ensure viability of the grass seed.

Slope Stabilization

The smallest practicable area of land will be exposed at a time. Slopes greater than three-to-one (horizontal to vertical) will be stabilized with seed, secured geotextile fabric, or rip-rap, as appropriate, to prevent erosion during construction. After disturbed areas have been stabilized, the temporary erosion control measures will be removed and accumulated sediment will be removed and disposed of in an appropriate location. Disturbed areas will be stabilized with appropriate ground cover as soon as possible. After the removal of temporary erosion control measures, disturbed areas will receive a layer of topsoil for stabilization.

Stabilized Construction Entrance

Temporary stabilized construction entrances will be installed at the site. The purpose of the construction entrance is to remove sediment attached to vehicle tires and to minimize sediment transport and deposition onto public road surfaces. The construction entrances will be composed of beds of crushed stone, which will be replenished as necessary to maintain their proper function.

7.4.7 Compliance with MassDEP Stormwater Management Policies

A discussion of how the redevelopment of the site will be will comply with MassDEP's Stormwater Management Policy is presented below.

Standard 1: No New Untreated Discharges

The Project will treat all of the stormwater runoff from the entire site.

Standard 2: Peak Rate Attenuation

The post-redevelopment of the site will result in a net decrease in impervious area as compared to existing conditions. As a result of the decrease in impervious area and implementation of best management practices (BMPs), the post-redevelopment discharge rate and volume will be less than the existing runoff discharge rate. Therefore, the

redevelopment of the site is expected to improve the existing drainage conditions at the site.

Standard 3: Recharge

The groundwater recharge systems will be sized in accordance with MassDEP's Stormwater Handbook.

Standard 4: Water Quality

The long-term stormwater pollution plan will incorporate all items described under this standard. The overall water quality discharged from the site will be dramatically improved compared to existing conditions. The proposed drainage system will reduce the total suspended solids (TSS) and nutrient pollution by using control devices such as hooded deep sump catch basins, rain gardens, water quality inlets and subsurface recharge/infiltration trenches.

Standard 5: Land Uses with Higher Potential Pollutant Loads

The Project site does not contain land uses with higher potential pollutant loads.

Standard 6: Critical Areas

The Project site does not contain any critical areas.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

The redevelopment of the site will decrease the impervious area and meet all of the stormwater management standards to the maximum extent practicable. Overall, stormwater runoff will be improved in quality and quantity compared to the existing condition.

Standard 8: Construction-Period Pollution Prevention and Erosion and Sedimentation Control

A stormwater pollution and prevention plan will be created as part of the NPDES permit requirements. The construction documents for the Project will include measures and specifications for all erosion and sediment control techniques. These may include items like siltation fences, hay bales, erosion control blankets, seeding, mulching, inlet protection devices, silt sacks, construction entrance details, vehicle washdown area details, and any other measures needed to minimize site erosion.

Standard 9: Operation and Maintenance Plan

An Operation and Maintenance Plan will be developed for both the construction and post-construction phases. The plan will provide the system ownership information, parties

responsible for operation and maintenance, and maintenance schedules. Routine maintenance will include catch basin and water quality inlet cleaning, sweeping of parking areas and roadways and the removal of debris.

Standard 10: Prohibition of Illicit Discharges

The Project will not have any such discharges.

7.4.8 Methodology and Design Criteria

7.4.8.1 Hydrologic Model Description

The drainage analysis is performed using the software HydroCAD 10.0 which utilizes the Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) TR-20 program. The SCS TR-55 Method was utilized in developing the pertinent back-up data.

Design Storms

The analysis was performed on the 2, 10, and 100-year frequency rainfall events. The events were based on the 24-hour duration storm.

Time of Concentration

The minimum time of concentration (Tc) used is 6 minutes. Values found using Average Velocities for Overland Flow, found in SCS TR-55 Urban Hydrology for Small Watersheds.

Curve Numbers

Curve numbers were developed for each of the different use categories and hydrologic soil group types within each sub-area. The curve numbers were based on the SCS TR-55 method.

Rainfall Intensity

Rainfall intensities were acquired from the publication Rainfall Frequency Atlas of the United States (TP-40). Rainfall events for the 2, 10, 20, and 100-year storms were analyzed.

SCS rainfall frequency values with 24-hour duration are:

Table 7-2 Rainfall Frequency Values with 24-hour duration

Storm Event	Rainfall
2-Year	3.20 Inches
10-Year	4.80 Inches
100-Year	6.80 Inches

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENT AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designed to comply with the standards of the Americans with Disabilities Act. Appendix E includes the Accessibility Checklist as required by the City of Boston.

8.2 Massachusetts Environmental Policy Act (MEPA)

The Proponents do not expect that the Project will require review under the Massachusetts Environmental Policy Act (MEPA) by the Executive Office of Energy and Environmental Affairs. The Project does not currently exceed a review threshold that would require MEPA review.

8.3 Boston Civic Design Commission

The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BRA as part of the Article 80 review process.

Appendix A

Floor Plans and Elevations

BUILDING A, COMMERCIAL

EAST COTTAGE ST

BOSTON, MA

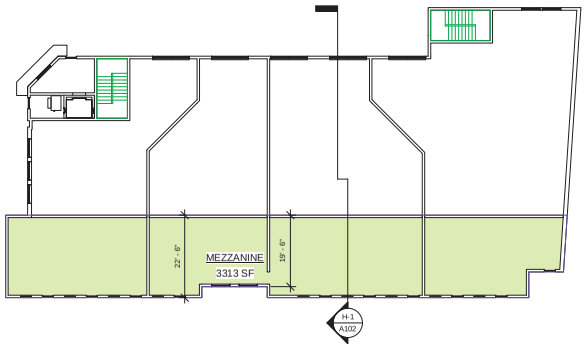
Area Schedule (Gross Building)		
Number	Name	Area
C LEVEL 1		
	COMMON	441 SF
	COMMON	161 SF
01	LIGHT INDUSTRIAL	1718 SF
02	LIGHT INDUSTRIAL	1675 SF
03	LIGHT INDUSTRIAL	2217 SF
04	LIGHT INDUSTRIAL	3027 SF
		9239 SF
C MEZZANINE		
9	MEZZANINE	3313 SF
		3313 SF
C OFFICES		
	COMMON	1669 SF
	OFFICE SPACE	9179 SF
		10848 SF
Grand total		23400 SF

LOCATION MAP

12/08/2015

DAVIS SQUARE ARCHITECTS

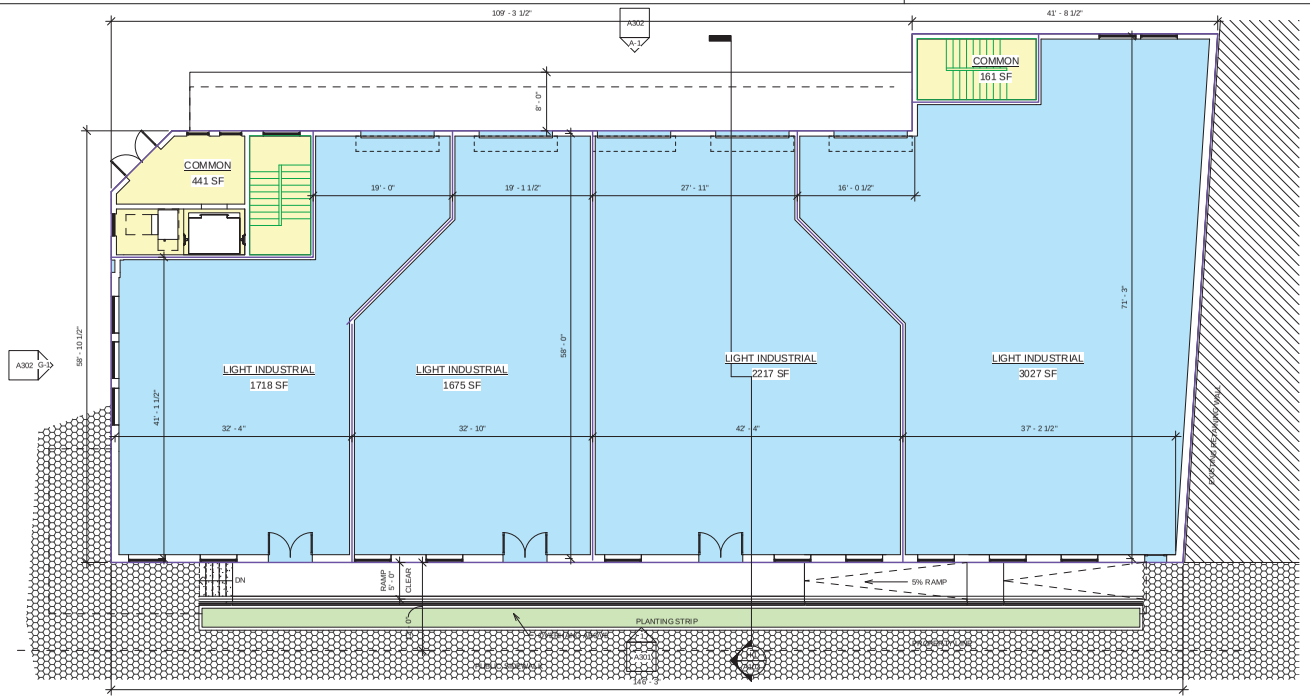
DSA PROJECT NO.
14058



Area Schedule (Gross Building)		
Number	Name	Area
C LEVEL 1		
	COMMON	441 SF
	COMMON	161 SF
01	LIGHT INDUSTRIAL	1718 SF
02	LIGHT INDUSTRIAL	1675 SF
03	LIGHT INDUSTRIAL	2217 SF
04	LIGHT INDUSTRIAL	3027 SF
		9239 SF
C MEZZANINE		
9	MEZZANINE	3313 SF
		3313 SF
C OFFICES		
	COMMON	1669 SF
	OFFICE SPACE	9179 SF
		10848 SF
Grand total		23400 SF

H-1 C MEZZANINE

1/16" = 1'-0"



A-1 C LEVEL 1

1/8" = 1'-0"

NOTES

DO NOT SCALE DRAWINGS.

No.	REVISIONS/SUBMISSIONS	Date

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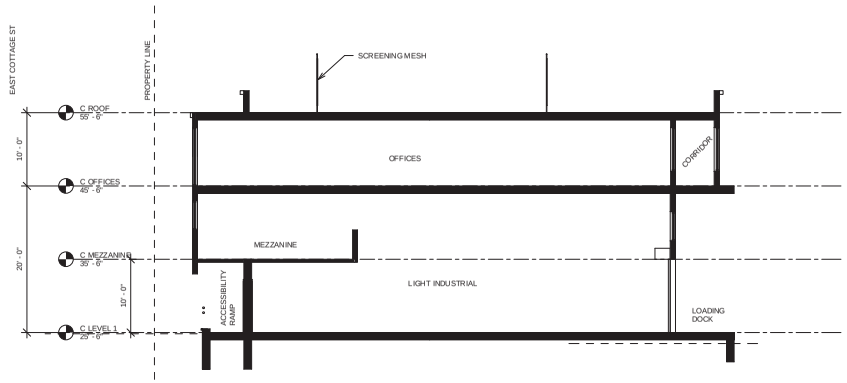
Consultant

Project BUILDING A, COMMERCIAL
EAST COTTAGE ST
BOSTON, MA

Title FIRST FLOOR LAYOUT

Designed	Designer
Checked	Author
Project No.	14058
Scale	As indicated
Date	12/8/2015 2:39:00 PM

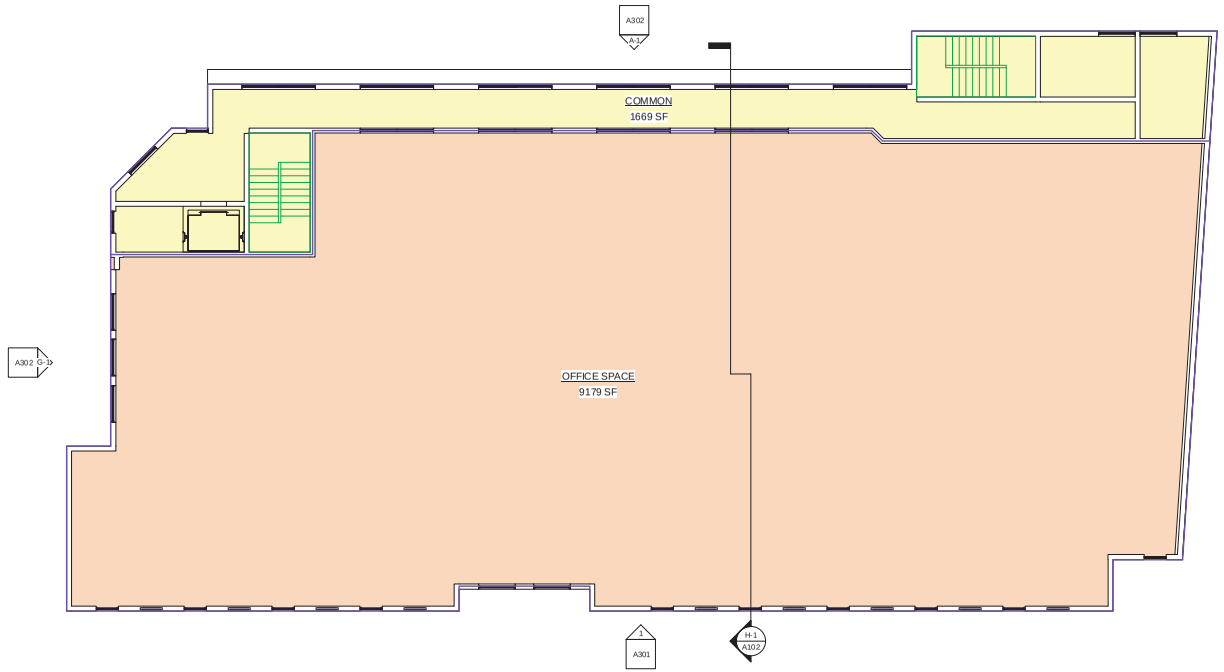
Drawing No. A101



H-1 Comm Cross Section

1/8" = 1'-0"

Area Schedule (Gross Building)		
Number	Name	Area
C LEVEL 1		
	COMMON	441 SF
	COMMON	161 SF
01	LIGHT INDUSTRIAL	1718 SF
02	LIGHT INDUSTRIAL	1675 SF
03	LIGHT INDUSTRIAL	2217 SF
04	LIGHT INDUSTRIAL	3027 SF
		9239 SF
C MEZZANINE		
9	MEZZANINE	3313 SF
		3313 SF
C OFFICES		
	COMMON	1669 SF
	OFFICE SPACE	9179 SF
		10848 SF
Grand total		23400 SF



Building Area Legend

COMMON

OFFICE SPACE

A-1 C OFFICES

1/8" = 1'-0"

NOTES

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Project BUILDING A, COMMERCIAL
EAST COTTAGE ST
BOSTON, MA

Title OFFICE FLOOR LAYOUT

Designed	Designer
Checked	Author
Project No.	14058
Scale	1/8" = 1'-0"
Date	12/8/2015 2:39:01 PM

Drawing No. A102

NOTES

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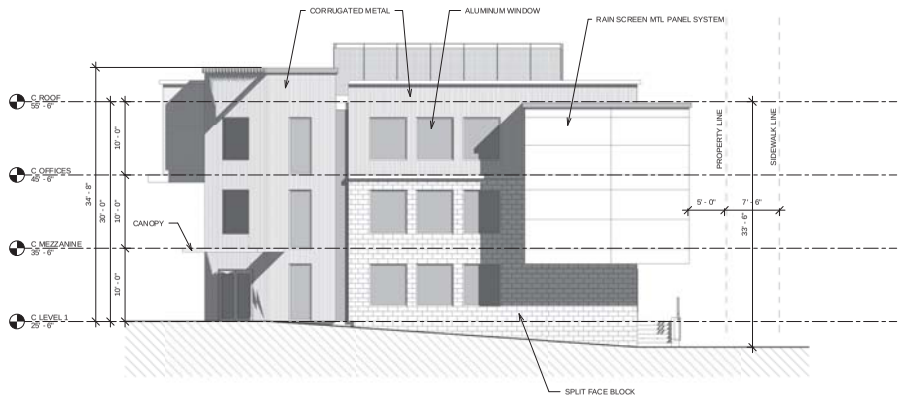
Consultant

Project: BUILDING A, COMMERCIAL
EAST COTTAGE ST
BOSTON, MA

Title: NORTH ELEVATION

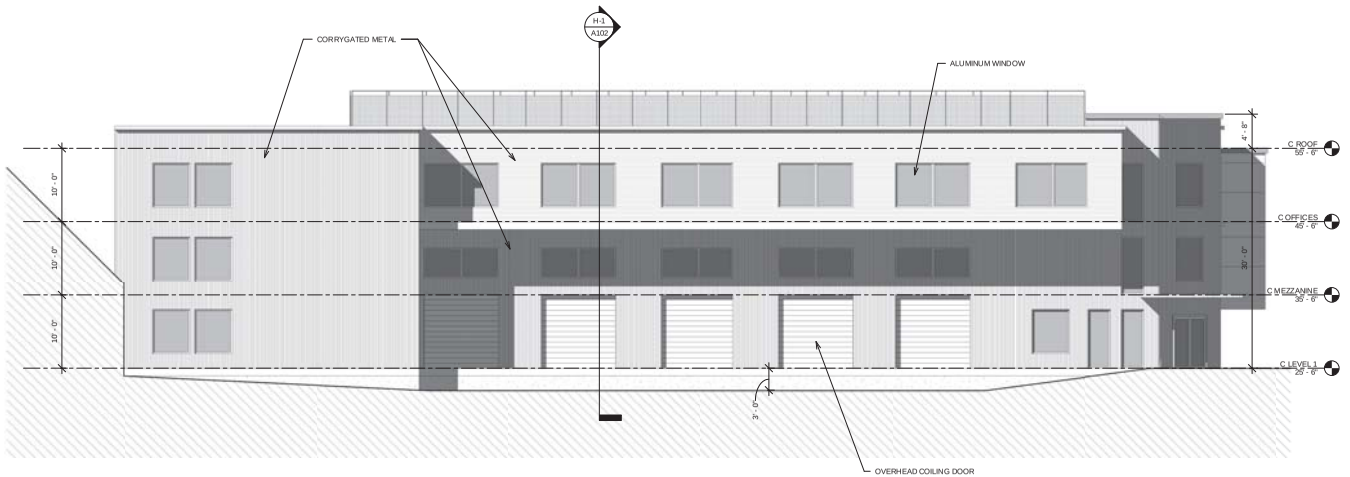
Designed	Designer
Checked	Author
Project No.	14058
Scale	1/8" = 1'-0"
Date	12/8/2015 2:40:04 PM

Drawing No.: A301



G-1 EAST ELEVATION

1/8" = 1'-0"



A-1 SOUTH ELEVATION

1/8" = 1'-0"

NOTES

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No.	REVISIONS/SUBMISSIONS	Date

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Consultant

Project: BUILDING A, COMMERCIAL
EAST COTTAGE ST
BOSTON, MA

Title: EXTERIOR VIEWS

Designed	Designer
Checked	Author
Project No.	14058
Scale	1/8" = 1'-0"
Date	12/8/2015 2:40:09 PM

Drawing No.

A302

BUILDING B, RESIDENTIAL

INDIGO BLOCK

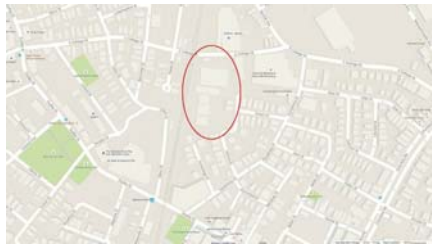
EAST COTTAGE ST, BOSTON, MA

DRAWINGS LIST

UNIT MIX BUILDING B

01 LEVEL	
1 BED	1
2 BED	4
02 LEVEL	
1 BED	5
2 BED	8
3 BED	2
03 LEVEL	
1 BED	4
2 BED	9
3 BED	2
04 LEVEL	
1 BED	4
2 BED	9
3 BED	2
05 LEVEL	
1 BED	4
2 BED	9
3 BED	2
06 LEVEL	
1 BED	4
2 BED	9
3 BED	2
	80

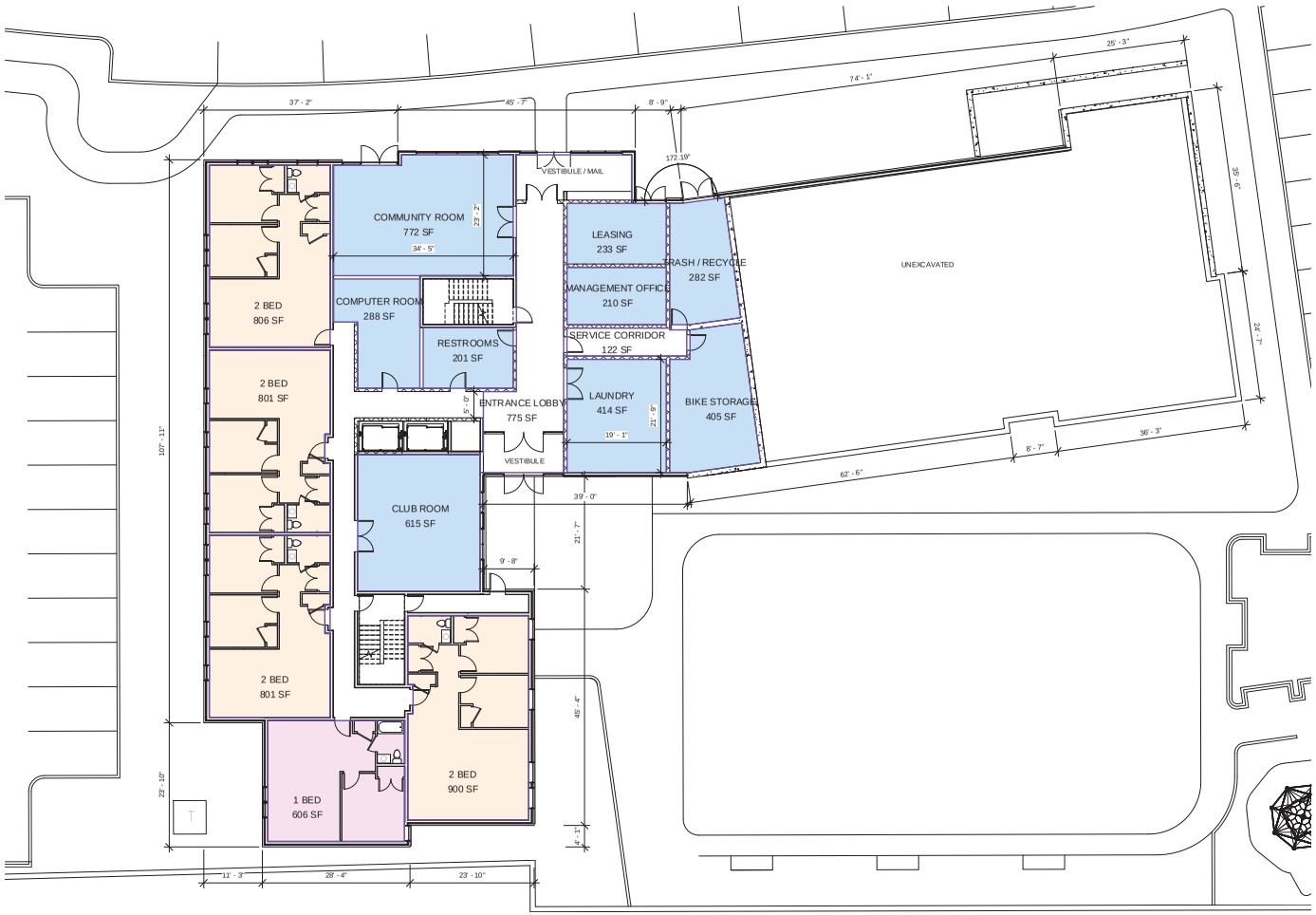
LOCATION MAP



PNF
12/08/2015

DAVIS SQUARE ARCHITECTS

DSA PROJECT NO.
14058



BUILDING B,
RESIDENTIAL

NOTES

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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
FIRST FLOOR PLAN

PNF

Designed	SA
Checked	
Project No.	1405.8
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Date	12/8/2015 2:32:12 PM

Drawing No.
A101

BUILDING B,
RESIDENTIAL

NOTES

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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
SECOND FLOOR PLAN

Designed	Designer
Checked	Author
Project No.	14058
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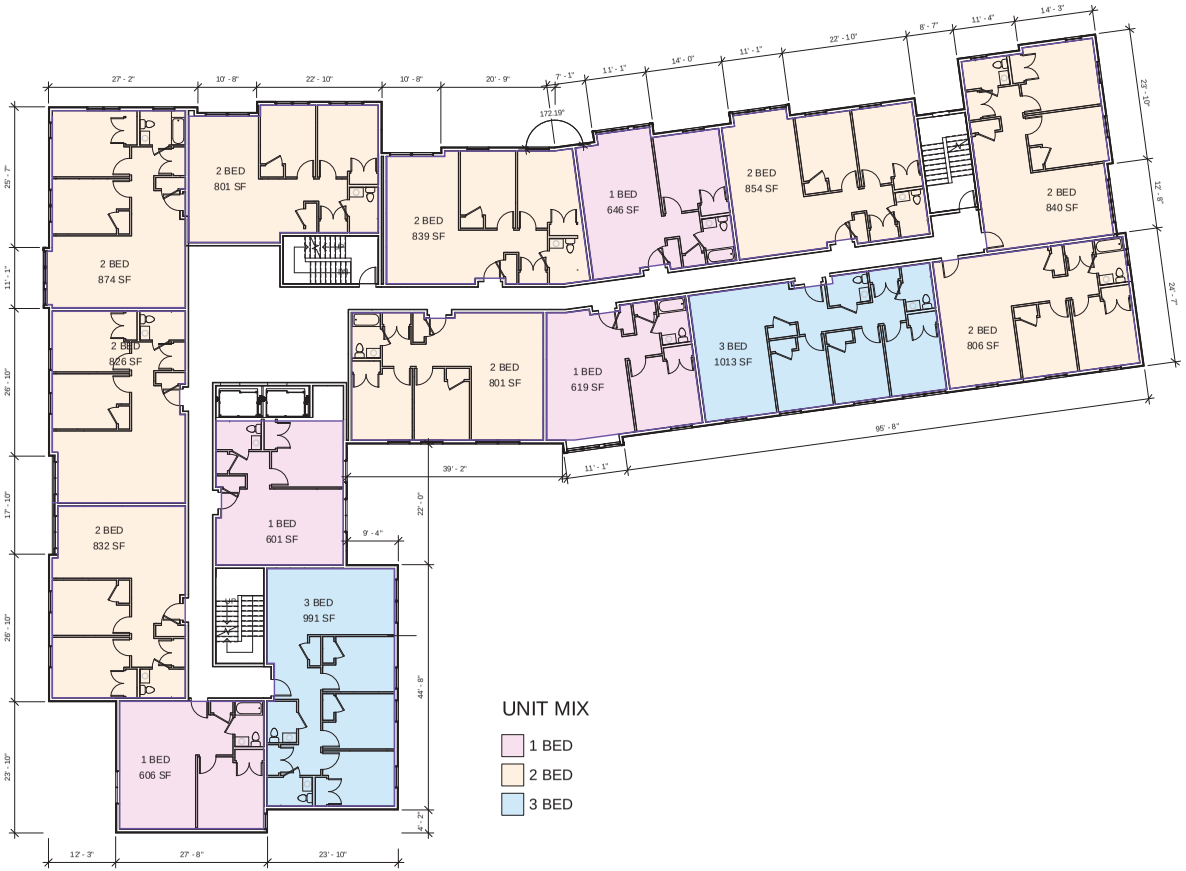
Drawing No.
A102



UNIT MIX

- 1 BED
- 2 BED
- 3 BED

BUILDING B,
RESIDENTIAL

NOTES

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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
TYPICAL FLOOR PLAN

Designed	Designer
Checked	Author
Project No.	14058
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Date	12/8/2015 2:32:19 PM

Drawing No.
A105

PDF

BUILDING B,
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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
SIXTH FLOOR PLAN

Designed	Designer
Checked	Author
Project No.	14058
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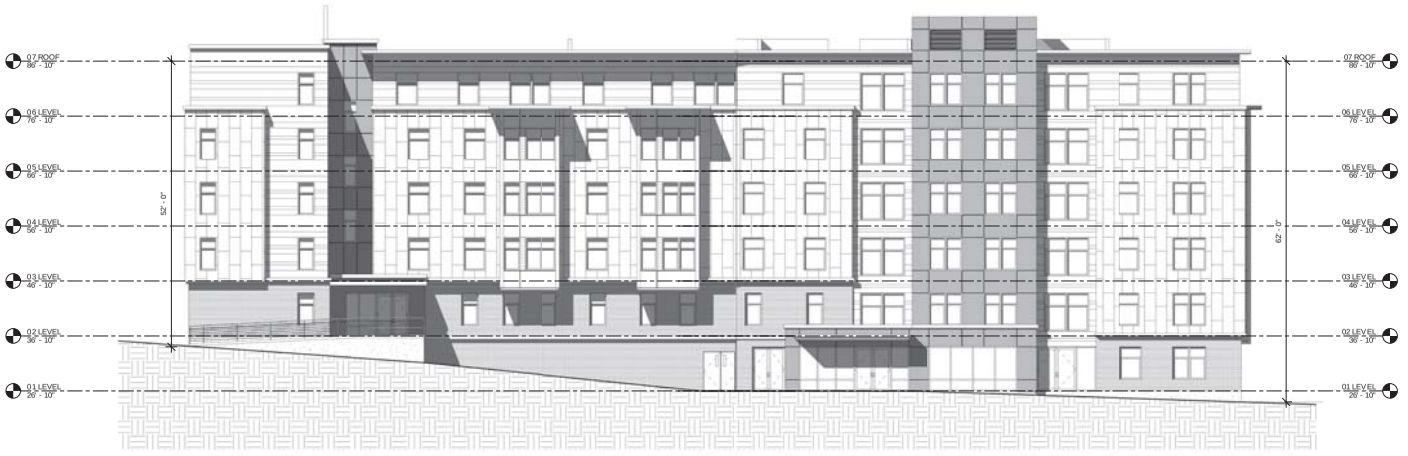

G-1 EAST ELEVATION

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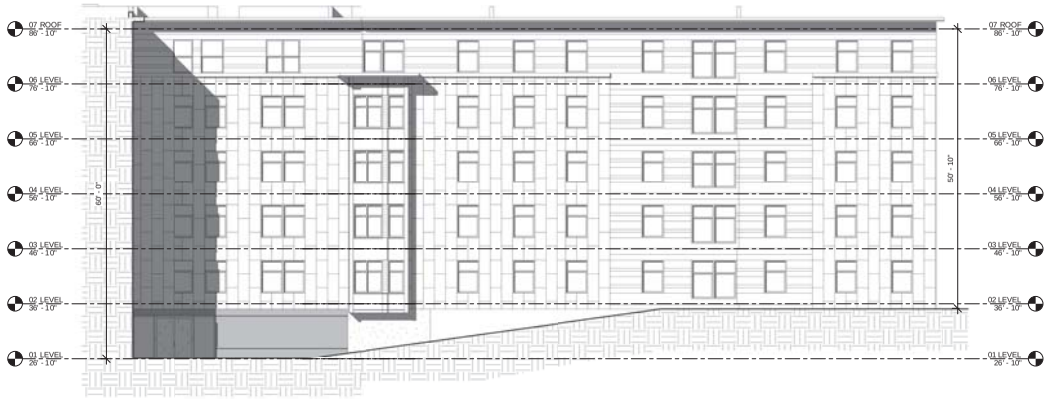

A-1 WEST ELEVATION

3/32" = 1'-0"

BUILDING B,
RESIDENTIAL

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No.	REVISIONS/SUBMISSIONS	Date

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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
EAST ELEVATION & WEST ELEVATION

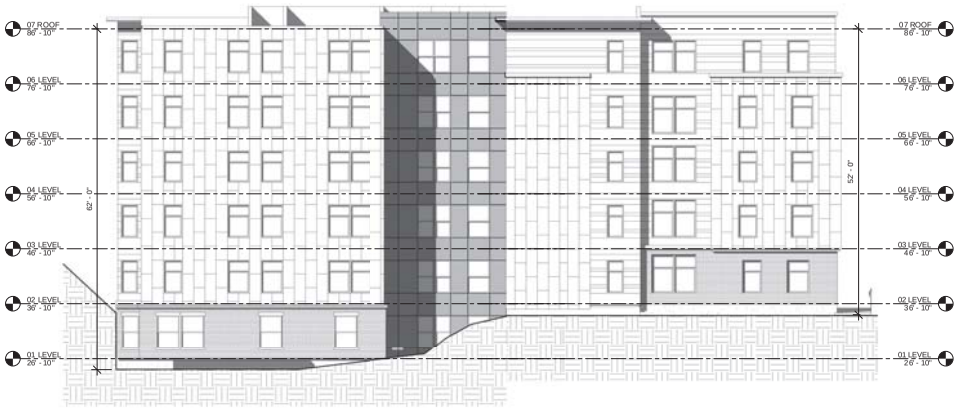
Designed	Designer
Checked	Author
Project No.	14058
Scale	3/32" = 1'-0"
Date	12/8/2015 2:32:27 PM

Drawing No.

A301

F-1 NORTH ELEVATION

1/8" = 1'-0"



A-1 SOUTH ELEVATION

3/32" = 1'-0"

BUILDING B,
RESIDENTIAL

NOTES

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No.	REVISIONS/SUBMISSIONS	Date

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Consultant

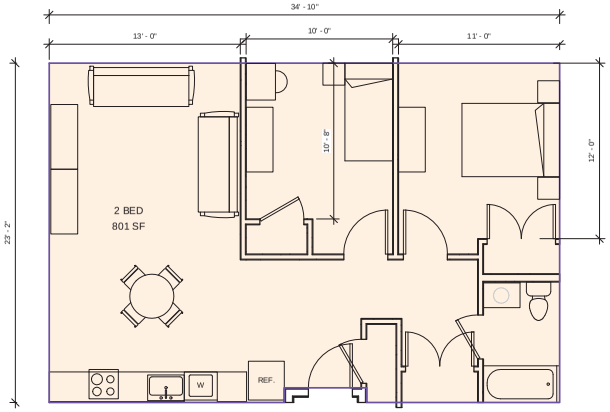
Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

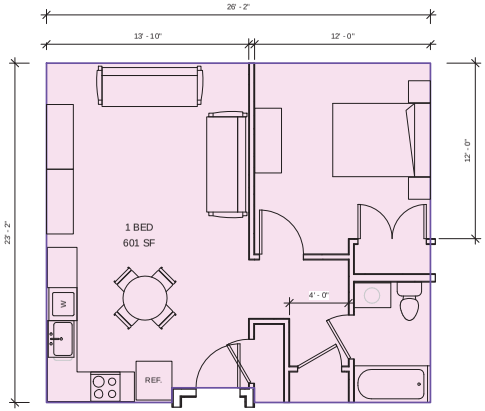
Title
NORTH ELEVATION & SOUTH ELEVATION

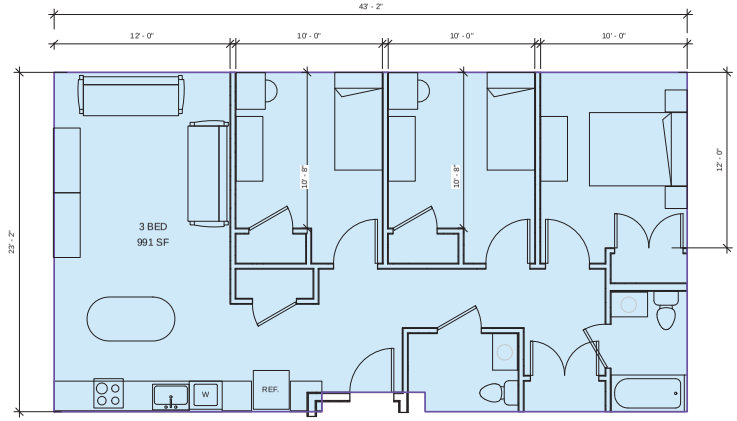
Designed	Designer
Checked	Author
Project No.	14058
Scale	As indicated
Date	12/8/2015 2:32:33 PM

Drawing No.
A302

DRAFT







BUILDING B,
RESIDENTIAL

NOTES

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No.	REVISIONS/SUBMISSIONS	Date

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Consultant

Project
INDIGO BLOCK
EAST COTTAGE ST, BOSTON, MA

Title
TYPICAL UNITS PLANS

Designed	Designer
Checked	Author
Project No.	14058
Scale	1/4" = 1'-0"
Date	12/8/2015 2:32:33 PM

Drawing No.
A601

INDIGO BLOCK, BUILDINGS C & D

HILLSBORO ST

ARCHITECTURE

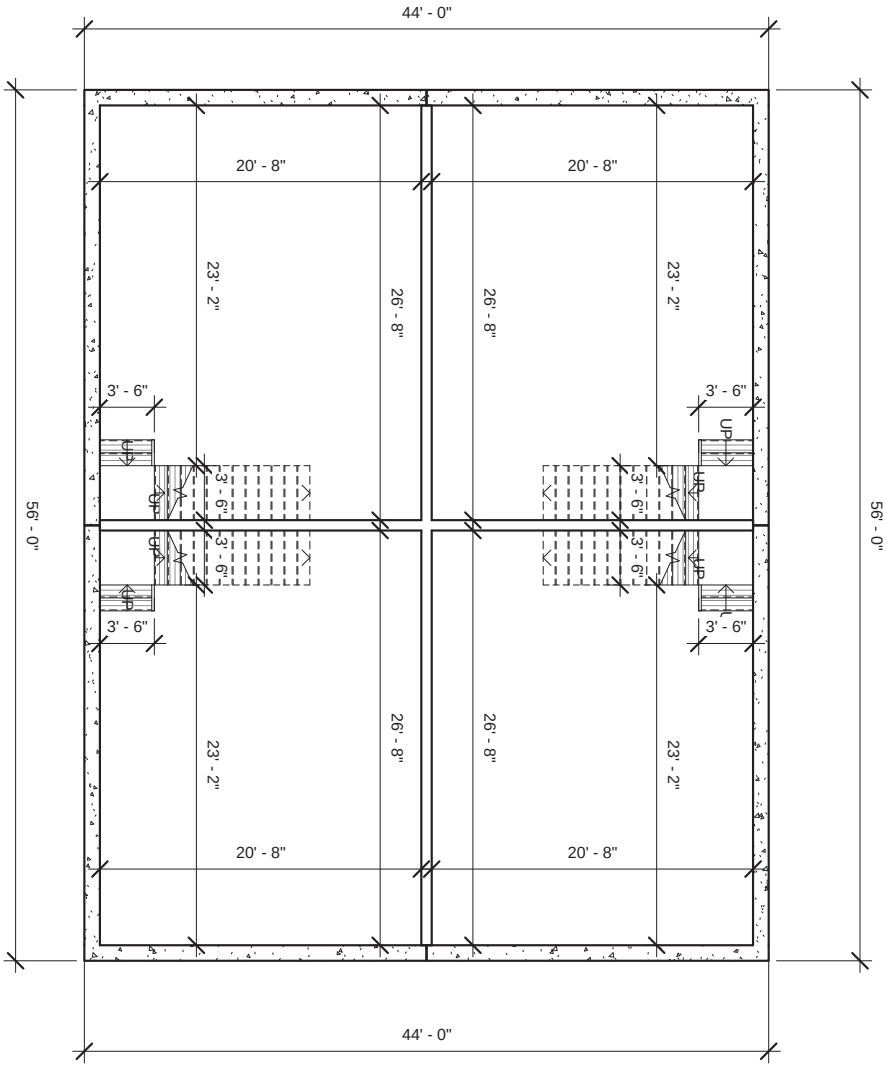
GROSS SQUARE FOOTAGE

01 FIRST FLOOR	2588 SF
02 SECOND FLOOR	2588 SF
03 THIRD FLOOR	1783 SF
	6960 SF

12/08/15

DAVIS SQUARE ARCHITECTS

DSA PROJECT NO.
14058



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Project
INDIGO BLOCK, BUILDINGS C & D

Title
BASEMENT

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/30/15

Sheet No.
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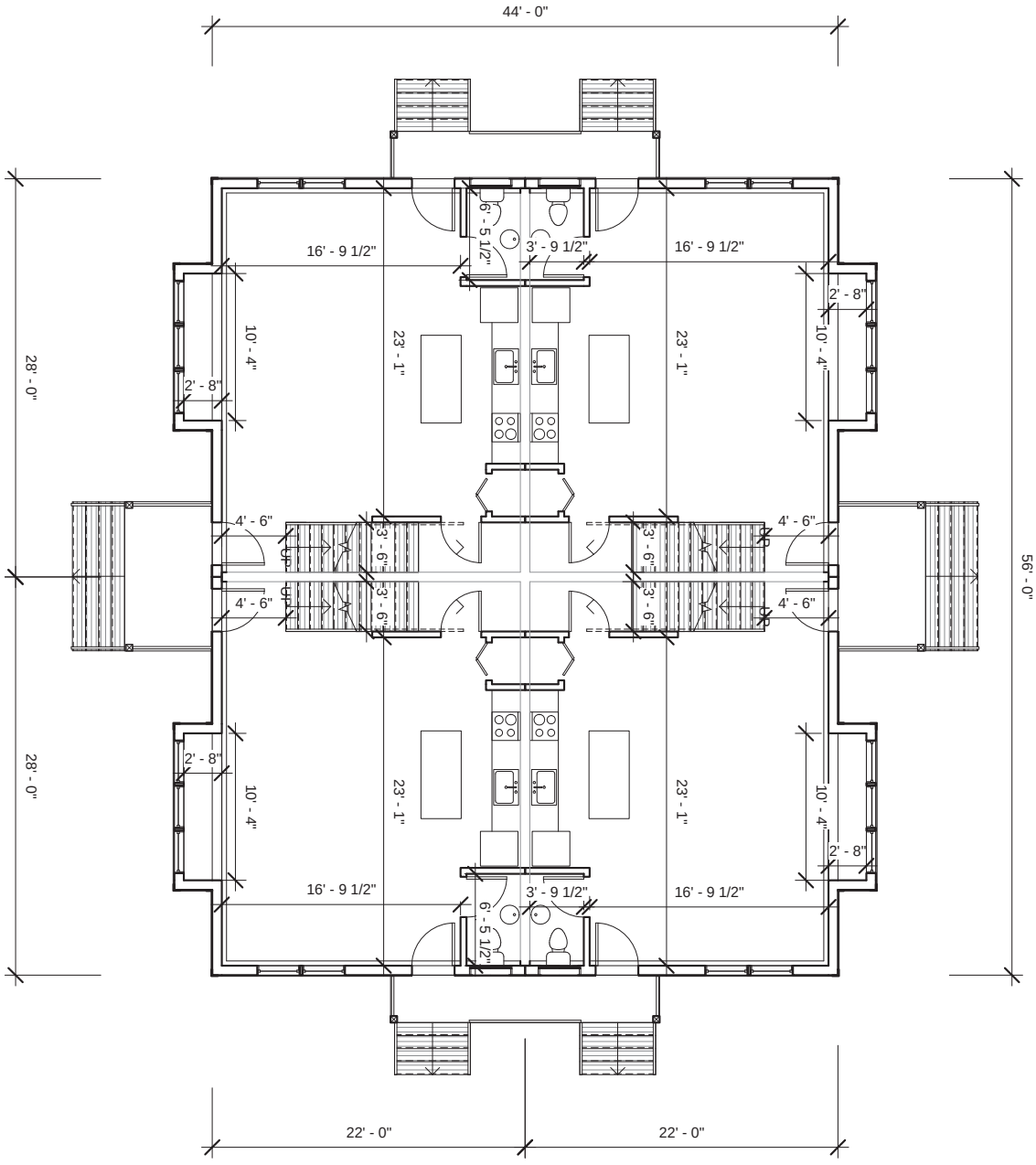

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Project: INDIGO BLOCK, BUILDINGS C & D

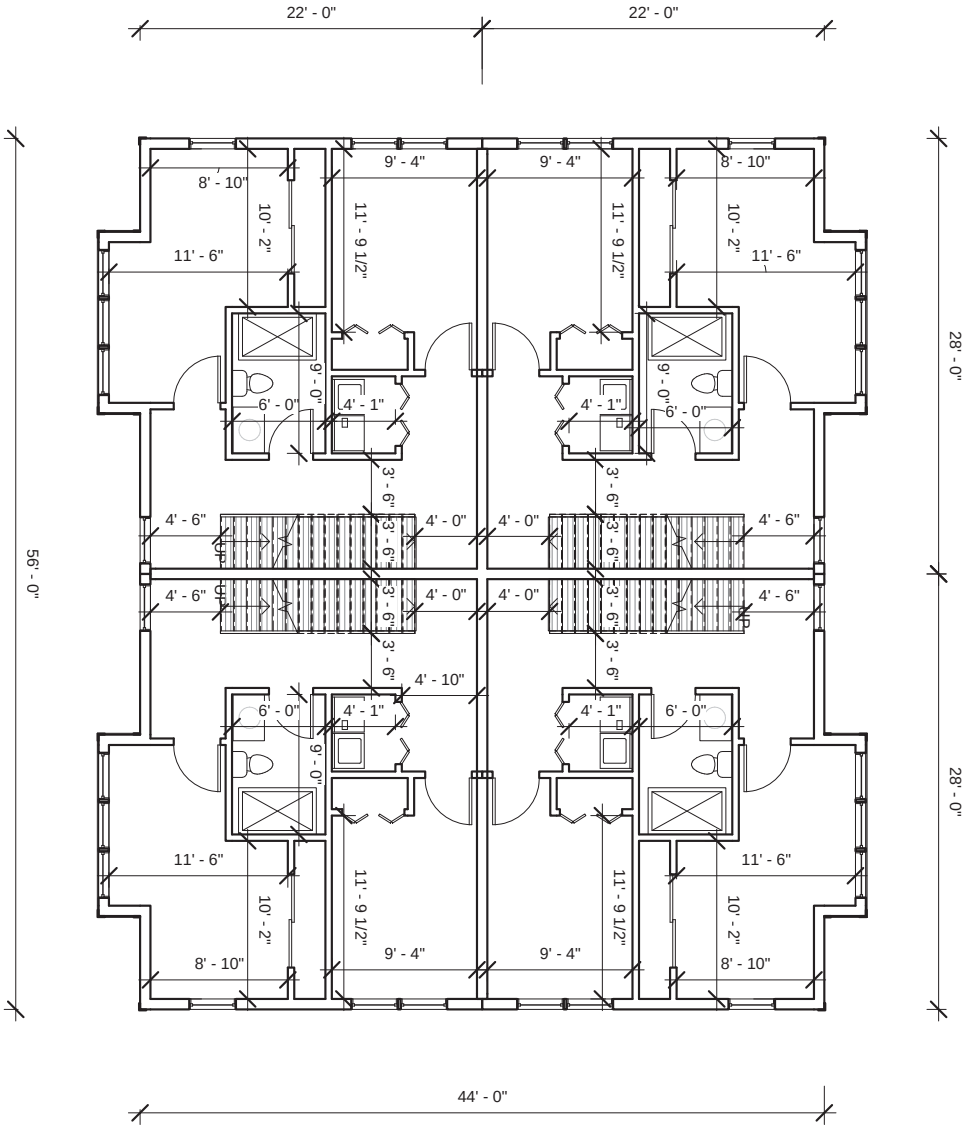
Title: FIRST FLOOR

Scale: 1/8" = 1'-0"

Project No.: 14058

Date: 11/25/15

Sheet No.: A101



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Project
INDIGO BLOCK, BUILDINGS C & D

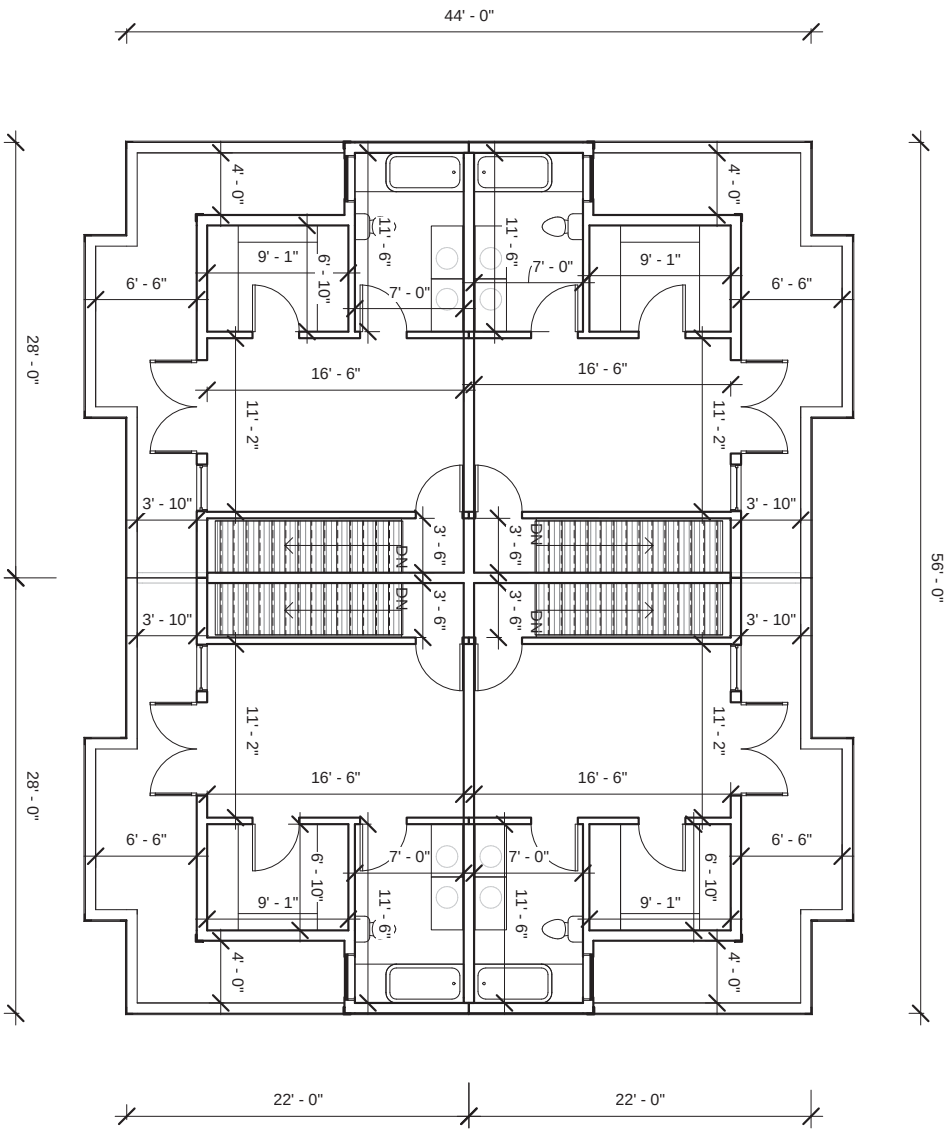
Title
SECOND FLOOR

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/25/15

Sheet No.
A102



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Project
INDIGO BLOCK, BUILDINGS C & D

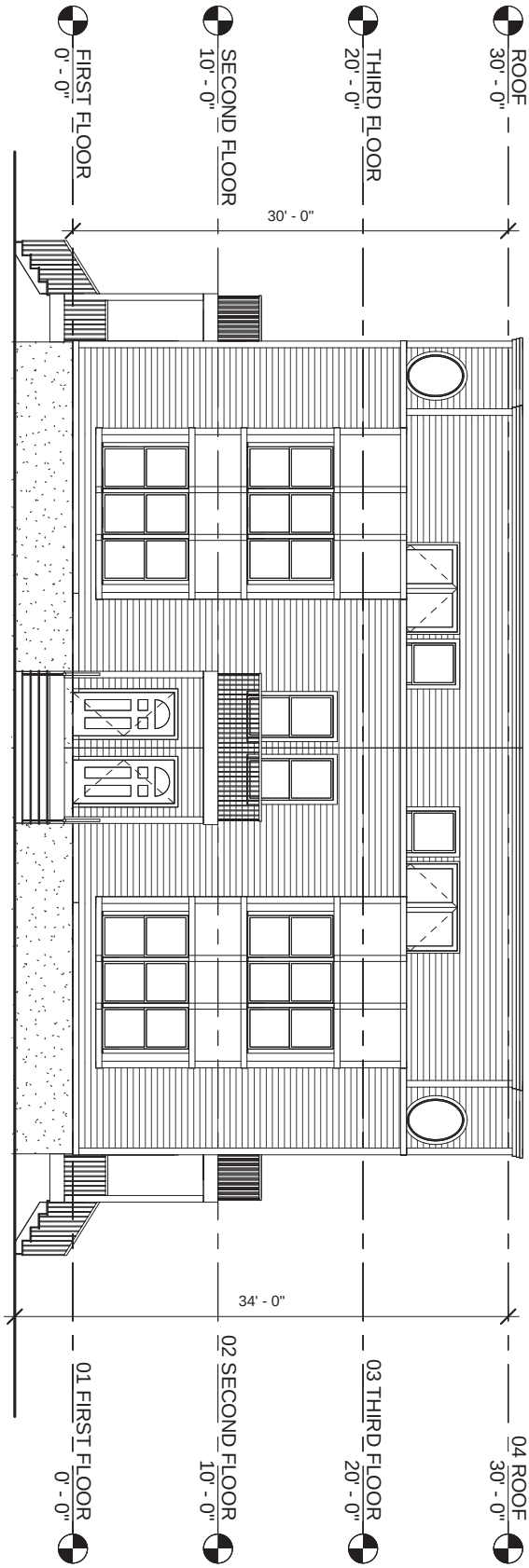
Title
THIRD FLOOR

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/25/15

Sheet No.
A103



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Project
INDIGO BLOCK, BUILDINGS C & D

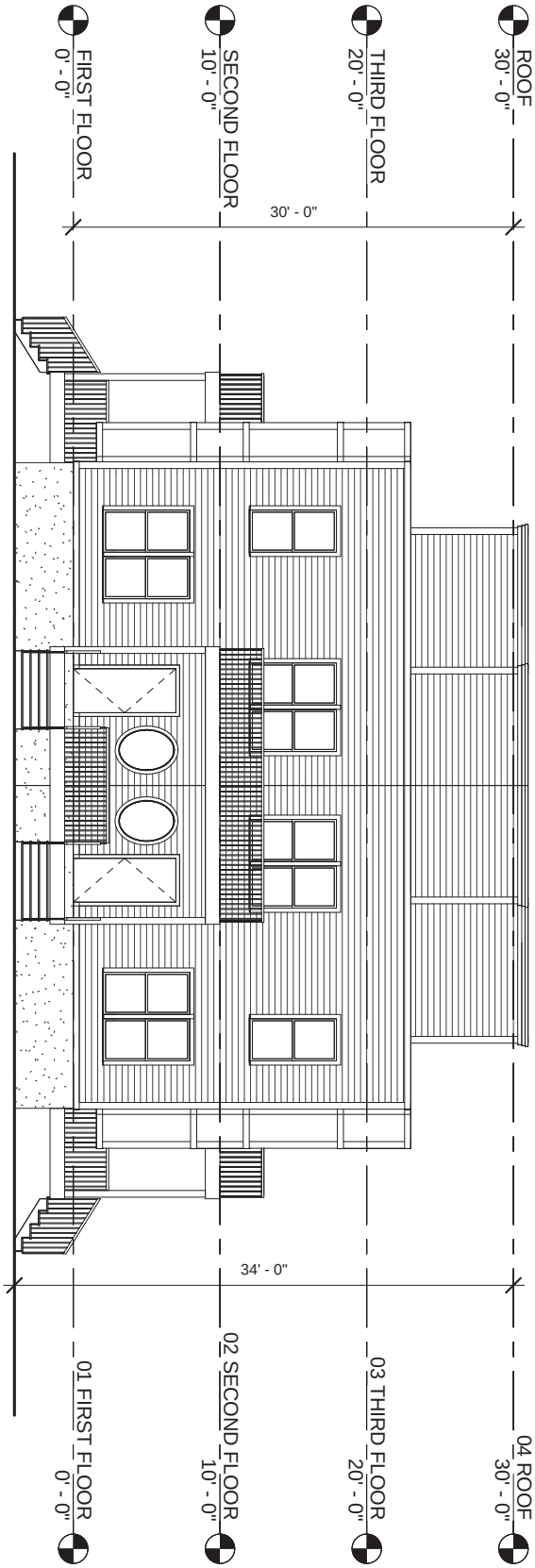
Title
SOUTH ELEVATION

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/30/15

Sheet No.
A201



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Project
INDIGO BLOCK, BUILDINGS C & D

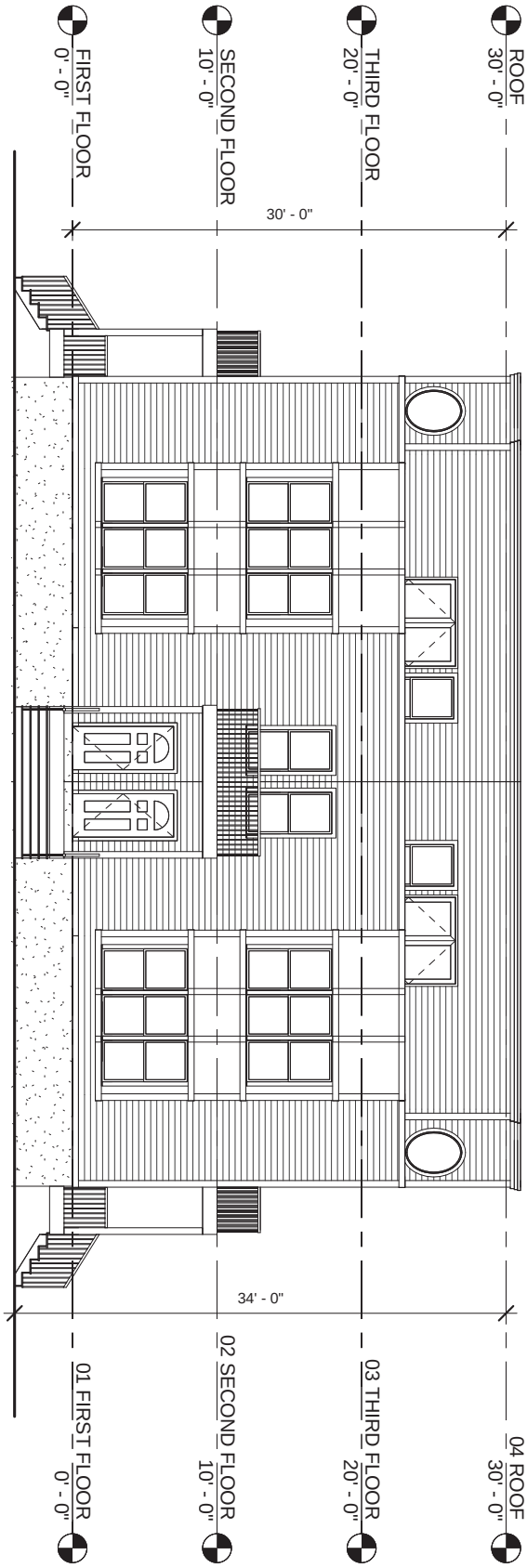
Title
EAST ELEVATION

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/30/15

Sheet No.
A202



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Project
INDIGO BLOCK, BUILDINGS C & D

Title
NORTH ELEVATION

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/30/15

Sheet No.
A203

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Project
INDIGO BLOCK, BUILDINGS C & D

Title
WEST ELEVATION

Scale
1/8" = 1'-0"

Project No.
14058

Date
11/30/15

Sheet No.
A204

Appendix B

Transportation

Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015

Groups Printed- Cars - Trucks

	Norfolk St From North			E. Cottage St From East			Humphreys St From South			E. Cottage St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	14	0	3	0	14	12	7	69	4	11	7	0	141
07:15 AM	5	0	2	0	15	17	3	64	5	18	16	0	145
07:30 AM	16	0	3	1	10	14	4	100	2	19	11	0	180
07:45 AM	19	1	3	0	20	15	3	114	8	11	15	0	209
Total	54	1	11	1	59	58	17	347	19	59	49	0	675
08:00 AM	22	0	3	1	21	14	2	75	4	14	8	0	164
08:15 AM	17	0	2	1	18	7	4	71	4	15	17	0	156
08:30 AM	17	3	3	3	12	14	7	71	9	16	14	0	169
08:45 AM	17	0	9	0	26	19	2	75	5	12	12	0	177
Total	73	3	17	5	77	54	15	292	22	57	51	0	666
Grand Total	127	4	28	6	136	112	32	639	41	116	100	0	1341
Apprch %	79.9	2.5	17.6	2.4	53.5	44.1	4.5	89.7	5.8	53.7	46.3	0	
Total %	9.5	0.3	2.1	0.4	10.1	8.4	2.4	47.7	3.1	8.7	7.5	0	
Cars	125	4	28	6	129	109	32	635	41	113	98	0	1320
% Cars	98.4	100	100	100	94.9	97.3	100	99.4	100	97.4	98	0	98.4
Trucks	2	0	0	0	7	3	0	4	0	3	2	0	21
% Trucks	1.6	0	0	0	5.1	2.7	0	0.6	0	2.6	2	0	1.6

Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015

Groups Printed- Bikes Peds

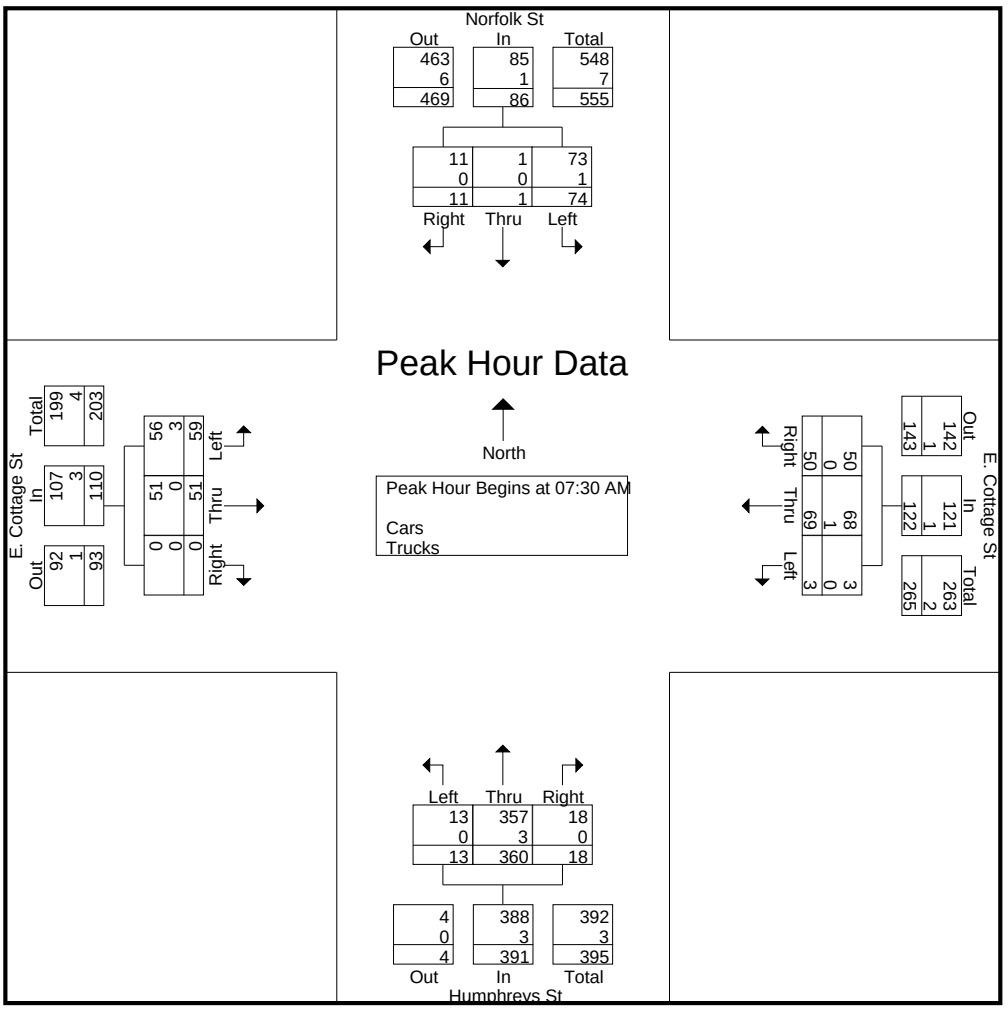
	Norfolk St From North				E. Cottage St From East				Humphreys St From South				E. Cottage St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	0	2	0	0	0	0	0	5	6	3	9
07:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	2	3
07:30 AM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	2	2	4	6
07:45 AM	1	0	0	0	0	1	0	2	0	0	0	2	0	0	0	10	14	2	16
Total	1	1	0	1	0	3	1	2	0	4	0	2	0	0	1	18	23	11	34
08:00 AM	0	0	0	0	0	0	1	5	0	2	0	1	0	0	0	4	10	3	13
08:15 AM	1	0	0	1	0	0	1	1	0	1	0	4	0	0	0	2	8	3	11
08:30 AM	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	2	3	2	5
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
Total	1	0	0	1	0	0	2	7	0	5	0	5	0	0	0	10	23	8	31
Grand Total	2	1	0	2	0	3	3	9	0	9	0	7	0	0	1	28	46	19	65
Apprch %	66.7	33.3	0		0	50	50		0	100	0		0	0	100				
Total %	10.5	5.3	0		0	15.8	15.8		0	47.4	0		0	0	5.3		70.8	29.2	

Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015

	Norfolk St From North				E. Cottage St From East				Humphreys St From South				E. Cottage St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	16	0	**3**	19	**1**	10	14	25	**4**	100	2	106	**19**	11	0	30	180
07:45 AM	19	**1**	3	23	0	20	**15**	35	3	**114**	**8**	**125**	11	15	0	26	**209**
08:00 AM	**22**	0	3	**25**	1	**21**	14	**36**	2	75	4	81	14	8	0	22	164
08:15 AM	17	0	2	19	1	18	7	26	4	71	4	79	15	**17**	0	**32**	156
Total Volume	74	1	11	86	3	69	50	122	13	360	18	391	59	51	0	110	709
% App. Total	86	1.2	12.8		2.5	56.6	41		3.3	92.1	4.6		53.6	46.4	0		
PHF	.841	.250	.917	.860	.750	.821	.833	.847	.813	.789	.563	.782	.776	.750	.000	.859	.848
Cars	73	1	11	85	3	68	50	121	13	357	18	388	56	51	0	107	701
% Cars	98.6	100	100	98.8	100	98.6	100	99.2	100	99.2	100	99.2	94.9	100	0	97.3	98.9
Trucks	1	0	0	1	0	1	0	1	0	3	0	3	3	0	0	3	8
% Trucks	1.4	0	0	1.2	0	1.4	0	0.8	0	0.8	0	0.8	5.1	0	0	2.7	1.1



Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015
Page No : 1

Groups Printed- Cars - Trucks

	Norfolk St From North			E. Cottage St From East			Humphreys St From South			E. Cottage St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	115	0	19	0	19	11	6	32	9	15	38	1	265
04:15 PM	76	0	14	0	25	8	9	30	7	10	26	0	205
04:30 PM	83	0	14	0	23	19	10	31	7	19	30	0	236
04:45 PM	81	0	15	1	25	19	10	28	5	10	25	0	219
Total	355	0	62	1	92	57	35	121	28	54	119	1	925
05:00 PM	101	2	17	0	16	12	4	33	8	12	25	1	231
05:15 PM	105	1	16	0	19	14	10	37	11	20	23	0	256
05:30 PM	78	1	21	0	41	13	14	29	14	13	31	0	255
05:45 PM	71	0	8	0	17	13	5	21	10	11	28	0	184
Total	355	4	62	0	93	52	33	120	43	56	107	1	926
Grand Total	710	4	124	1	185	109	68	241	71	110	226	2	1851
Apprch %	84.7	0.5	14.8	0.3	62.7	36.9	17.9	63.4	18.7	32.5	66.9	0.6	
Total %	38.4	0.2	6.7	0.1	10	5.9	3.7	13	3.8	5.9	12.2	0.1	
Cars	707	4	124	1	185	109	68	241	71	109	226	2	1847
% Cars	99.6	100	100	100	100	100	100	100	100	99.1	100	100	99.8
Trucks	3	0	0	0	0	0	0	0	0	1	0	0	4
% Trucks	0.4	0	0	0	0	0	0	0	0	0.9	0	0	0.2

Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015

Groups Printed- Bikes Peds

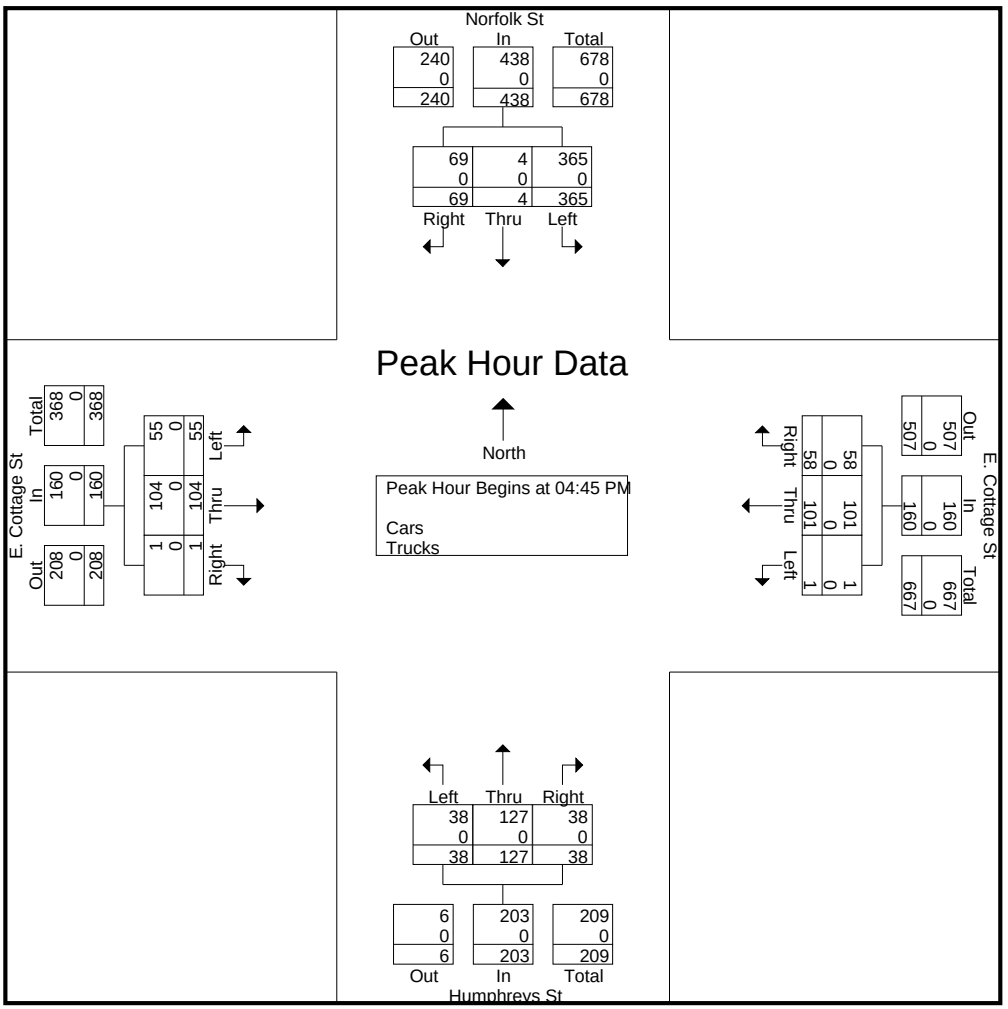
	Norfolk St From North				E. Cottage St From East				Humphreys St From South				E. Cottage St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	1	0	0	0	0	1	0	0	3	0	0	0	0	0	3	3	5	8
04:15 PM	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0	12	14	2	16
04:30 PM	0	0	0	1	0	0	0	3	0	1	0	0	0	0	0	0	4	1	5
04:45 PM	1	2	0	0	0	1	0	3	0	4	0	0	0	0	0	2	5	8	13
Total	1	4	0	1	0	1	1	6	0	9	0	2	0	0	0	17	26	16	42
05:00 PM	4	0	0	0	0	0	0	0	0	1	0	2	0	0	0	4	6	5	11
05:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	5	2	7
05:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2	6
05:45 PM	1	0	0	0	0	0	0	0	0	1	0	4	0	1	0	9	13	3	16
Total	6	2	0	0	0	0	0	0	0	2	0	6	0	1	1	22	28	12	40
Grand Total	7	6	0	1	0	1	1	6	0	11	0	8	0	1	1	39	54	28	82
Apprch %	53.8	46.2	0		0	50	50		0	100	0		0	50	50				
Total %	25	21.4	0		0	3.6	3.6		0	39.3	0		0	3.6	3.6		65.9	34.1	

Accurate Counts
978-664-2565

N/S Street : Norfolk St / Humphreys St
E/W Street : East Cottage Street
City/State : Boston, MA
Weather : Clear

File Name : 15082001
Site Code : 15082001
Start Date : 8/12/2015
Page No : 2

	Norfolk St From North				E. Cottage St From East				Humphreys St From South				E. Cottage St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	81	0	15	96	**1**	25	**19**	45	10	28	5	43	10	25	0	35	219
05:00 PM	101	**2**	17	120	0	16	12	28	4	33	8	45	12	25	**1**	38	231
05:15 PM	**105**	1	16	**122**	0	19	14	33	10	**37**	11	**58**	**20**	23	0	43	**256**
05:30 PM	78	1	**21**	100	0	**41**	13	**54**	**14**	29	**14**	57	13	**31**	0	**44**	255
Total Volume	365	4	69	438	1	101	58	160	38	127	38	203	55	104	1	160	961
% App. Total	83.3	0.9	15.8		0.6	63.1	36.2		18.7	62.6	18.7		34.4	65	0.6		
PHF	.869	.500	.821	.898	.250	.616	.763	.741	.679	.858	.679	.875	.688	.839	.250	.909	.938
Cars	365	4	69	438	1	101	58	160	38	127	38	203	55	104	1	160	961
% Cars	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Accurate Counts

978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015
Page No : 1

Groups Printed- Cars - Trucks

	Dudley St From North			E Cottage St From East			Dudley St From South			W Cottage St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	5	49	2	6	12	3	2	85	5	5	12	2	188
07:15 AM	5	48	5	7	9	7	8	109	17	7	12	2	236
07:30 AM	3	61	3	9	12	5	4	107	15	8	12	8	247
07:45 AM	9	67	2	9	15	8	7	132	11	14	22	3	299
Total	22	225	12	31	48	23	21	433	48	34	58	15	970
08:00 AM	3	58	6	13	12	2	10	115	21	8	16	7	271
08:15 AM	3	69	3	15	12	5	5	114	18	8	27	4	283
08:30 AM	2	74	10	13	17	7	7	129	21	12	18	3	313
08:45 AM	7	76	2	13	19	15	5	111	24	10	19	3	304
Total	15	277	21	54	60	29	27	469	84	38	80	17	1171
Grand Total	37	502	33	85	108	52	48	902	132	72	138	32	2141
Apprch %	6.5	87.8	5.8	34.7	44.1	21.2	4.4	83.4	12.2	29.8	57	13.2	
Total %	1.7	23.4	1.5	4	5	2.4	2.2	42.1	6.2	3.4	6.4	1.5	
Cars	33	470	32	84	106	51	47	854	132	70	137	30	2046
% Cars	89.2	93.6	97	98.8	98.1	98.1	97.9	94.7	100	97.2	99.3	93.8	95.6
Trucks	4	32	1	1	2	1	1	48	0	2	1	2	95
% Trucks	10.8	6.4	3	1.2	1.9	1.9	2.1	5.3	0	2.8	0.7	6.2	4.4

Accurate Counts
978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015

Groups Printed- Bikes Peds

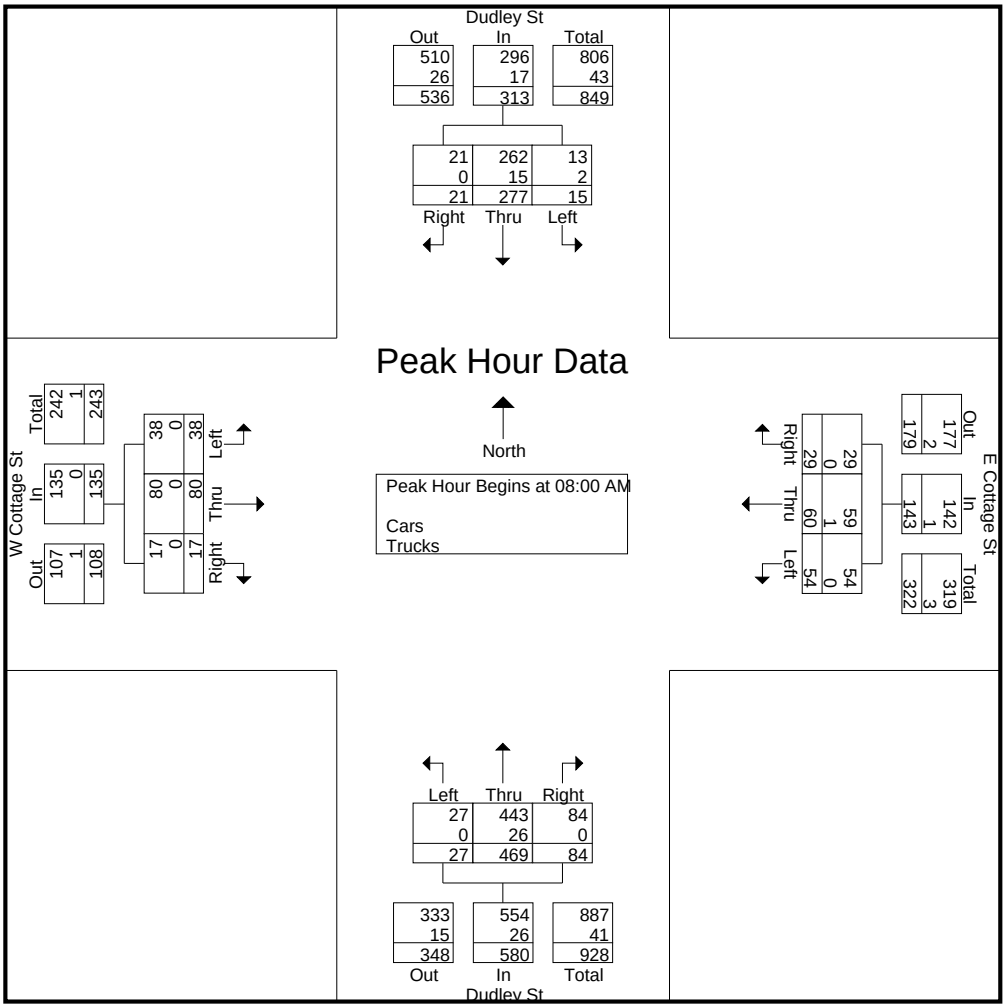
	Dudley St From North				E Cottage St From East				Dudley St From South				W Cottage St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	5	0	0	0	4	0	0	0	5	0	0	0	9	23	1	24
07:15 AM	0	0	0	5	0	0	0	2	0	1	1	0	0	0	0	3	10	2	12
07:30 AM	0	1	0	5	0	0	0	4	0	3	0	3	0	0	0	9	21	4	25
07:45 AM	0	0	0	6	0	0	0	18	0	3	0	0	0	0	0	10	34	3	37
Total	0	2	0	21	0	0	0	28	0	7	1	8	0	0	0	31	88	10	98
08:00 AM	0	1	0	6	0	0	0	14	0	0	0	7	1	1	0	6	33	3	36
08:15 AM	0	0	1	4	0	0	0	6	0	2	0	0	0	0	0	8	18	3	21
08:30 AM	0	0	0	2	0	0	0	4	0	2	0	2	1	0	0	13	21	3	24
08:45 AM	0	0	0	1	0	0	0	4	0	3	0	2	0	0	0	6	13	3	16
Total	0	1	1	13	0	0	0	28	0	7	0	11	2	1	0	33	85	12	97
Grand Total	0	3	1	34	0	0	0	56	0	14	1	19	2	1	0	64	173	22	195
Apprch %	0	75	25		0	0	0		0	93.3	6.7		66.7	33.3	0				
Total %	0	13.6	4.5		0	0	0		0	63.6	4.5		9.1	4.5	0		88.7	11.3	

Accurate Counts
978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015
Page No : 2

	Dudley St From North				E Cottage St From East				Dudley St From South				W Cottage St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	3	58	6	67	13	12	2	27	**10**	115	21	146	8	16	**7**	31	271
08:15 AM	3	69	3	75	**15**	12	5	32	5	114	18	137	8	**27**	4	**39**	283
08:30 AM	2	74	**10**	**86**	13	17	7	37	7	**129**	21	**157**	**12**	18	3	33	**313**
08:45 AM	**7**	**76**	2	85	13	**19**	**15**	**47**	5	111	**24**	140	10	19	3	32	304
Total Volume	15	277	21	313	54	60	29	143	27	469	84	580	38	80	17	135	1171
% App. Total	4.8	88.5	6.7		37.8	42	20.3		4.7	80.9	14.5		28.1	59.3	12.6		
PHF	.536	.911	.525	.910	.900	.789	.483	.761	.675	.909	.875	.924	.792	.741	.607	.865	.935
Cars	13	262	21	296	54	59	29	142	27	443	84	554	38	80	17	135	1127
% Cars	86.7	94.6	100	94.6	100	98.3	100	99.3	100	94.5	100	95.5	100	100	100	100	96.2
Trucks	2	15	0	17	0	1	0	1	0	26	0	26	0	0	0	0	44
% Trucks	13.3	5.4	0	5.4	0	1.7	0	0.7	0	5.5	0	4.5	0	0	0	0	3.8



Accurate Counts
978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015
Page No : 1

Groups Printed- Cars - Trucks

	Dudley St From North			E Cottage St From East			Dudley St From South			W Cottage St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	10	120	6	44	26	10	7	75	21	5	20	8	352
04:15 PM	5	106	10	41	26	11	8	93	17	3	17	1	338
04:30 PM	11	113	8	36	26	14	9	83	21	3	15	5	344
04:45 PM	8	75	13	36	23	4	17	76	19	2	25	3	301
Total	34	414	37	157	101	39	41	327	78	13	77	17	1335
05:00 PM	10	120	11	26	18	8	5	72	20	5	17	3	315
05:15 PM	6	129	11	42	21	6	3	82	30	7	16	3	356
05:30 PM	7	118	10	43	34	5	10	95	20	4	17	5	368
05:45 PM	13	105	4	45	25	10	8	103	16	2	31	5	367
Total	36	472	36	156	98	29	26	352	86	18	81	16	1406
Grand Total	70	886	73	313	199	68	67	679	164	31	158	33	2741
Apprch %	6.8	86.1	7.1	54	34.3	11.7	7.4	74.6	18	14	71.2	14.9	
Total %	2.6	32.3	2.7	11.4	7.3	2.5	2.4	24.8	6	1.1	5.8	1.2	
Cars	69	857	73	313	199	68	66	655	163	31	158	32	2684
% Cars	98.6	96.7	100	100	100	100	98.5	96.5	99.4	100	100	97	97.9
Trucks	1	29	0	0	0	0	1	24	1	0	0	1	57
% Trucks	1.4	3.3	0	0	0	0	1.5	3.5	0.6	0	0	3	2.1

Accurate Counts
978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015

Groups Printed- Bikes Peds

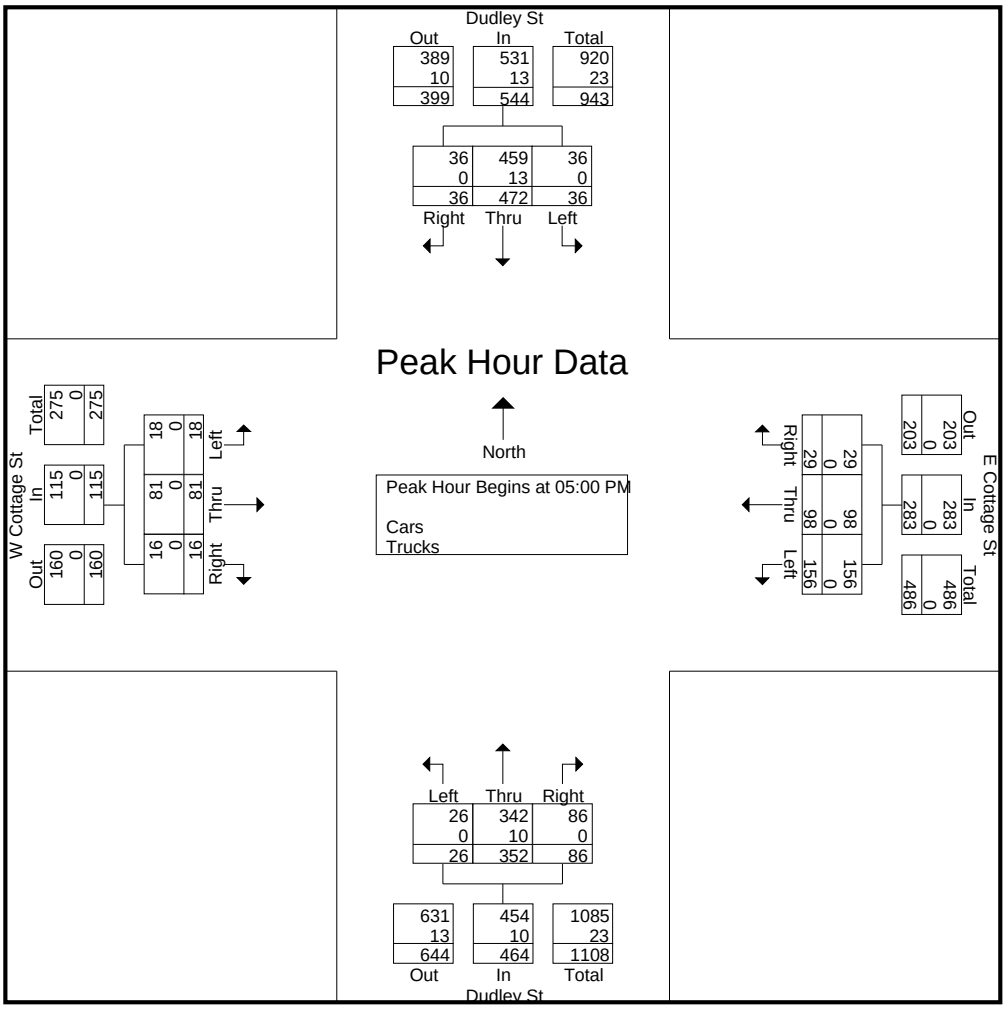
	Dudley St From North				E Cottage St From East				Dudley St From South				W Cottage St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	7	0	0	0	8	0	3	0	3	0	0	0	36	54	3	57
04:15 PM	1	3	0	1	0	1	0	11	0	0	1	11	0	0	0	18	41	6	47
04:30 PM	0	0	0	4	0	0	2	17	0	0	1	8	0	0	0	8	37	3	40
04:45 PM	0	4	0	0	0	1	0	5	0	3	0	3	0	0	0	27	35	8	43
Total	1	7	0	12	0	2	2	41	0	6	2	25	0	0	0	89	167	20	187
05:00 PM	0	0	0	12	0	0	0	3	0	1	0	3	0	0	0	24	42	1	43
05:15 PM	0	4	1	1	0	0	0	12	0	1	0	4	0	0	0	13	30	6	36
05:30 PM	1	2	0	1	0	2	0	6	0	7	1	3	0	0	0	18	28	13	41
05:45 PM	0	4	0	1	0	0	0	4	0	1	0	4	0	0	0	17	26	5	31
Total	1	10	1	15	0	2	0	25	0	10	1	14	0	0	0	72	126	25	151
Grand Total	2	17	1	27	0	4	2	66	0	16	3	39	0	0	0	161	293	45	338
Apprch %	10	85	5		0	66.7	33.3		0	84.2	15.8		0	0	0				
Total %	4.4	37.8	2.2		0	8.9	4.4		0	35.6	6.7		0	0	0		86.7	13.3	

Accurate Counts
978-664-2565

N/S Street : Dudley Street
E/W Street : W Cottage St / E Cottage St
City/State : Boston, MA
Weather : Clear

File Name : 15082003
Site Code : 15082003
Start Date : 8/12/2015
Page No : 2

	Dudley St From North				E Cottage St From East				Dudley St From South				W Cottage St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	10	120	**11**	141	26	18	8	52	5	72	20	97	5	17	3	25	315
05:15 PM	6	**129**	11	**146**	42	21	6	69	3	82	**30**	115	**7**	16	3	26	356
05:30 PM	7	118	10	135	43	**34**	5	**82**	**10**	95	20	125	4	17	**5**	26	**368**
05:45 PM	**13**	105	4	122	**45**	25	**10**	80	8	**103**	16	**127**	2	**31**	5	**38**	367
Total Volume	36	472	36	544	156	98	29	283	26	352	86	464	18	81	16	115	1406
% App. Total	6.6	86.8	6.6		55.1	34.6	10.2		5.6	75.9	18.5		15.7	70.4	13.9		
PHF	.692	.915	.818	.932	.867	.721	.725	.863	.650	.854	.717	.913	.643	.653	.800	.757	.955
Cars	36	459	36	531	156	98	29	283	26	342	86	454	18	81	16	115	1383
% Cars	100	97.2	100	97.6	100	100	100	100	100	97.2	100	97.8	100	100	100	100	98.4
Trucks	0	13	0	13	0	0	0	0	0	10	0	10	0	0	0	0	23
% Trucks	0	2.8	0	2.4	0	0	0	0	0	2.8	0	2.2	0	0	0	0	1.6



Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015

Groups Printed- Cars - Trucks

	Humphreys St From North			Belden St From East			Humphreys St From South			Groom St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	1	16	1	27	1	4	0	0	50
07:15 AM	0	0	0	0	1	16	0	34	0	1	0	0	52
07:30 AM	0	0	0	0	1	16	0	55	0	1	0	0	73
07:45 AM	0	0	0	0	1	23	0	57	0	1	0	0	82
Total	0	0	0	0	4	71	1	173	1	7	0	0	257
08:00 AM	0	0	0	0	1	17	0	38	0	3	0	0	59
08:15 AM	0	0	0	0	1	17	1	37	0	1	0	0	57
08:30 AM	0	0	1	0	0	17	0	33	0	0	0	0	51
08:45 AM	0	0	0	0	1	15	0	24	0	3	0	0	43
Total	0	0	1	0	3	66	1	132	0	7	0	0	210
Grand Total	0	0	1	0	7	137	2	305	1	14	0	0	467
Apprch %	0	0	100	0	4.9	95.1	0.6	99	0.3	100	0	0	
Total %	0	0	0.2	0	1.5	29.3	0.4	65.3	0.2	3	0	0	
Cars	0	0	1	0	7	137	2	304	1	14	0	0	466
% Cars	0	0	100	0	100	100	100	99.7	100	100	0	0	99.8
Trucks	0	0	0	0	0	0	0	1	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0.3	0	0	0	0	0.2

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015
Page No : 10

Groups Printed- Bikes Peds

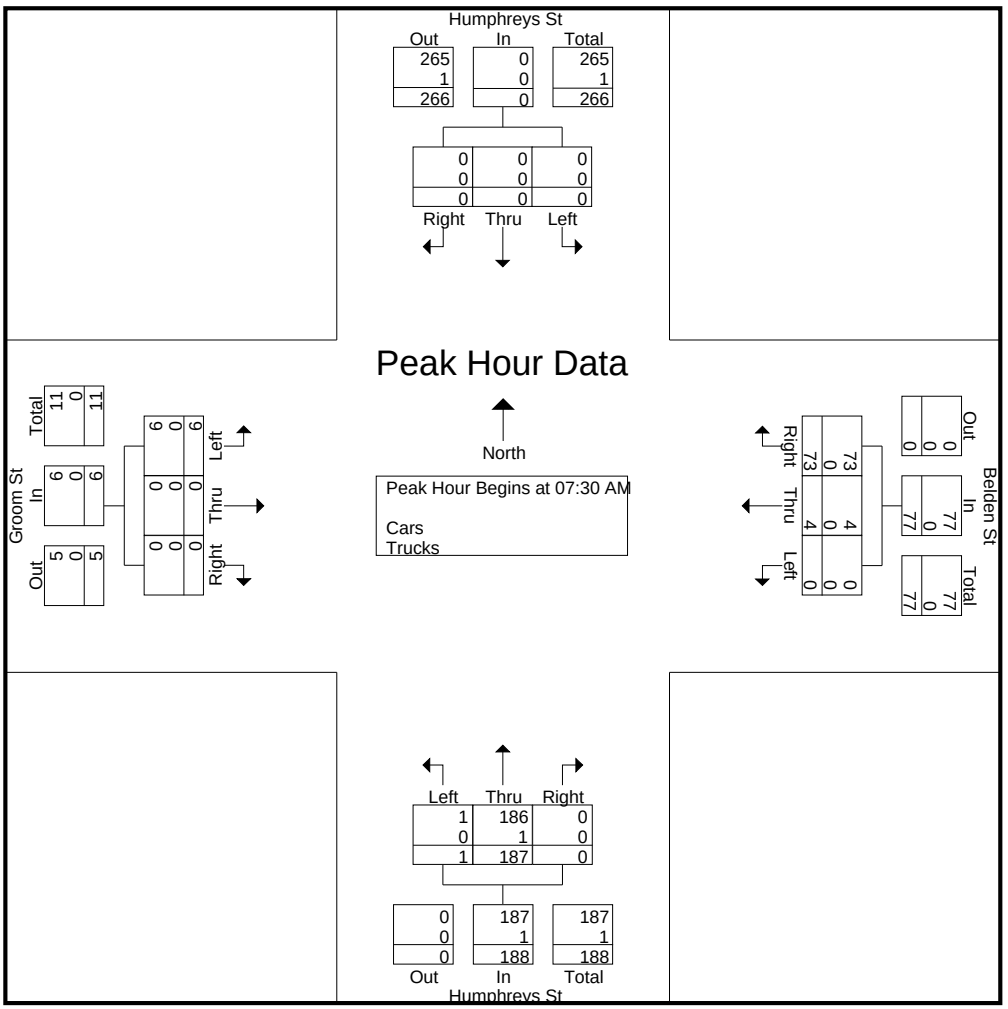
	Humphreys St From North				Belden St From East				Humphreys St From South				Groom St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	4	5	3	8
07:15 AM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	0	3
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	3	1	4
07:45 AM	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	5	0	5
Total	0	1	0	6	0	0	3	2	0	0	0	3	0	0	0	5	16	4	20
08:00 AM	0	0	0	0	0	0	1	2	0	1	0	2	0	0	0	3	7	2	9
08:15 AM	0	1	0	3	0	0	0	0	0	0	0	2	0	0	0	0	5	1	6
08:30 AM	0	0	0	1	0	0	2	0	0	0	0	1	0	0	0	1	3	2	5
08:45 AM	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	0	4
Total	0	1	0	4	0	0	3	6	0	1	0	5	0	0	0	4	19	5	24
Grand Total	0	2	0	10	0	0	6	8	0	1	0	8	0	0	0	9	35	9	44
Apprch %	0	100	0		0	0	100		0	100	0		0	0	0				
Total %	0	22.2	0		0	0	66.7		0	11.1	0		0	0	0		79.5	20.5	

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015
Page No : 2

	Humphreys St From North				Belden St From East				Humphreys St From South				Groom St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**1**	16	17	0	55	0	55	1	0	0	1	73
07:45 AM	0	0	0	0	0	1	**23**	**24**	0	**57**	0	**57**	1	0	0	1	**82**
08:00 AM	0	0	0	0	0	1	17	18	0	38	0	38	**3**	0	0	**3**	59
08:15 AM	0	0	0	0	0	1	17	18	**1**	37	0	38	1	0	0	1	57
Total Volume	0	0	0	0	0	4	73	77	1	187	0	188	6	0	0	6	271
% App. Total	0	0	0		0	5.2	94.8		0.5	99.5	0		100	0	0		
PHF	.000	.000	.000	.000	.000	1.00	.793	.802	.250	.820	.000	.825	.500	.000	.000	.500	.826
Cars	0	0	0	0	0	4	73	77	1	186	0	187	6	0	0	6	270
% Cars	0	0	0	0	0	100	100	100	100	99.5	0	99.5	100	0	0	100	99.6
Trucks	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0.4



Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015

Groups Printed- Cars - Trucks

	Humphreys St From North			Belden St From East			Humphreys St From South			Groom St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	3	12	0	11	0	1	0	0	27
04:15 PM	0	0	0	0	2	15	2	21	0	2	0	0	42
04:30 PM	0	0	0	0	7	20	0	24	0	0	0	0	51
04:45 PM	0	0	0	0	2	12	0	25	0	3	0	0	42
Total	0	0	0	0	14	59	2	81	0	6	0	0	162
05:00 PM	0	0	0	0	8	19	1	19	0	1	0	0	48
05:15 PM	0	0	0	0	4	9	1	24	0	1	0	0	39
05:30 PM	0	0	0	0	4	11	5	21	0	2	0	0	43
05:45 PM	0	0	0	0	8	7	2	22	0	1	0	0	40
Total	0	0	0	0	24	46	9	86	0	5	0	0	170
Grand Total	0	0	0	0	38	105	11	167	0	11	0	0	332
Apprch %	0	0	0	0	26.6	73.4	6.2	93.8	0	100	0	0	
Total %	0	0	0	0	11.4	31.6	3.3	50.3	0	3.3	0	0	
Cars	0	0	0	0	38	105	11	167	0	11	0	0	332
% Cars	0	0	0	0	100	100	100	100	0	100	0	0	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015
Page No : 10

Groups Printed- Bikes Peds

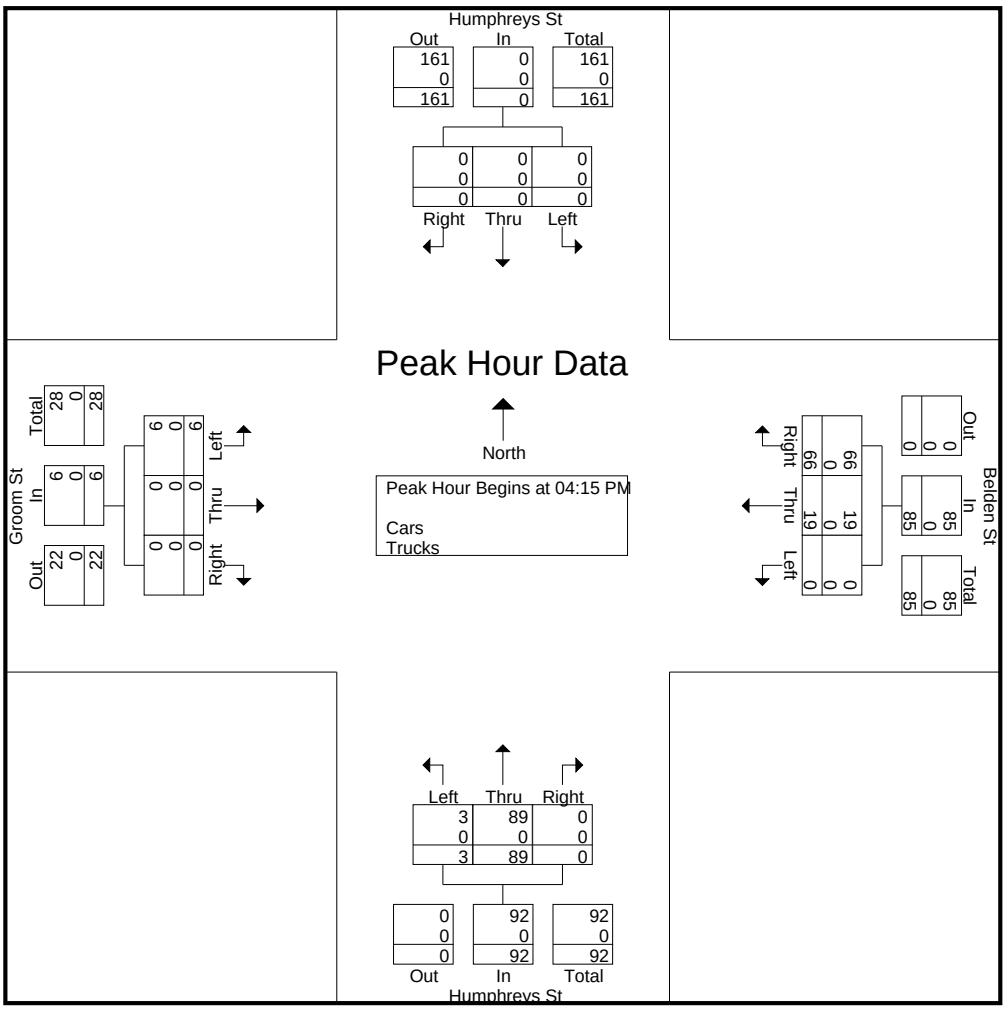
	Humphreys St From North				Belden St From East				Humphreys St From South				Groom St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	1	0	0	0	4	0	0	1	6	1	0	0	0	11	2	13
04:15 PM	2	0	0	2	0	0	1	1	1	3	0	0	0	0	2	3	6	9	15
04:30 PM	0	0	0	0	0	0	1	0	1	0	0	4	0	0	1	0	4	3	7
04:45 PM	0	2	0	0	0	0	1	2	1	3	0	1	0	0	3	0	3	10	13
Total	2	2	0	3	0	0	3	7	3	6	1	11	1	0	6	3	24	24	48
05:00 PM	0	2	0	1	0	0	0	3	0	3	0	2	0	0	1	2	8	6	14
05:15 PM	1	0	0	2	0	0	0	1	0	0	0	9	0	0	0	6	18	1	19
05:30 PM	1	0	0	3	0	0	0	9	2	0	0	3	0	0	0	4	19	3	22
05:45 PM	2	2	0	0	0	0	1	3	2	0	1	2	0	0	0	1	6	8	14
Total	4	4	0	6	0	0	1	16	4	3	1	16	0	0	1	13	51	18	69
Grand Total	6	6	0	9	0	0	4	23	7	9	2	27	1	0	7	16	75	42	117
Apprch %	50	50	0		0	0	100		38.9	50	11.1		12.5	0	87.5				
Total %	14.3	14.3	0		0	0	9.5		16.7	21.4	4.8		2.4	0	16.7		64.1	35.9	

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Belden St / Groom St
City/State : Boston, MA
Weather : Clear

File Name : 15082004
Site Code : 15082004
Start Date : 8/12/2015
Page No : 2

	Humphreys St From North				Belden St From East				Humphreys St From South				Groom St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	2	15	17	**2**	21	0	23	2	0	0	2	42
04:30 PM	0	0	0	0	0	7	**20**	**27**	0	24	0	24	0	0	0	0	**51**
04:45 PM	0	0	0	0	0	2	12	14	0	**25**	0	**25**	**3**	0	0	**3**	42
05:00 PM	0	0	0	0	0	**8**	19	27	1	19	0	20	1	0	0	1	48
Total Volume	0	0	0	0	0	19	66	85	3	89	0	92	6	0	0	6	183
% App. Total	0	0	0		0	22.4	77.6		3.3	96.7	0		100	0	0		
PHF	.000	.000	.000	.000	.000	.594	.825	.787	.375	.890	.000	.920	.500	.000	.000	.500	.897
Cars	0	0	0	0	0	19	66	85	3	89	0	92	6	0	0	6	183
% Cars	0	0	0	0	0	100	100	100	100	100	0	100	100	0	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015

Groups Printed- Cars - Trucks

	Humphreys St From North			Quincefield St From East			Humphreys St From South			Harrow St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	35	1	1	1	0	38
07:15 AM	0	0	0	0	0	0	1	40	5	0	2	0	48
07:30 AM	0	0	0	0	0	0	0	56	1	2	1	0	60
07:45 AM	0	0	0	0	0	0	0	57	2	2	0	0	61
Total	0	0	0	0	0	0	1	188	9	5	4	0	207
08:00 AM	0	0	0	0	0	2	2	36	3	1	2	0	46
08:15 AM	0	0	0	0	0	1	1	44	2	2	2	0	52
08:30 AM	0	0	0	0	0	0	2	37	2	0	4	0	45
08:45 AM	0	0	0	0	0	0	1	26	1	1	1	0	30
Total	0	0	0	0	0	3	6	143	8	4	9	0	173
Grand Total	0	0	0	0	0	3	7	331	17	9	13	0	380
Apprch %	0	0	0	0	0	100	2	93.2	4.8	40.9	59.1	0	
Total %	0	0	0	0	0	0.8	1.8	87.1	4.5	2.4	3.4	0	
Cars	0	0	0	0	0	3	7	330	17	9	13	0	379
% Cars	0	0	0	0	0	100	100	99.7	100	100	100	0	99.7
Trucks	0	0	0	0	0	0	0	1	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0.3	0	0	0	0	0.3

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015
Page No : 10

Groups Printed- Bikes Peds

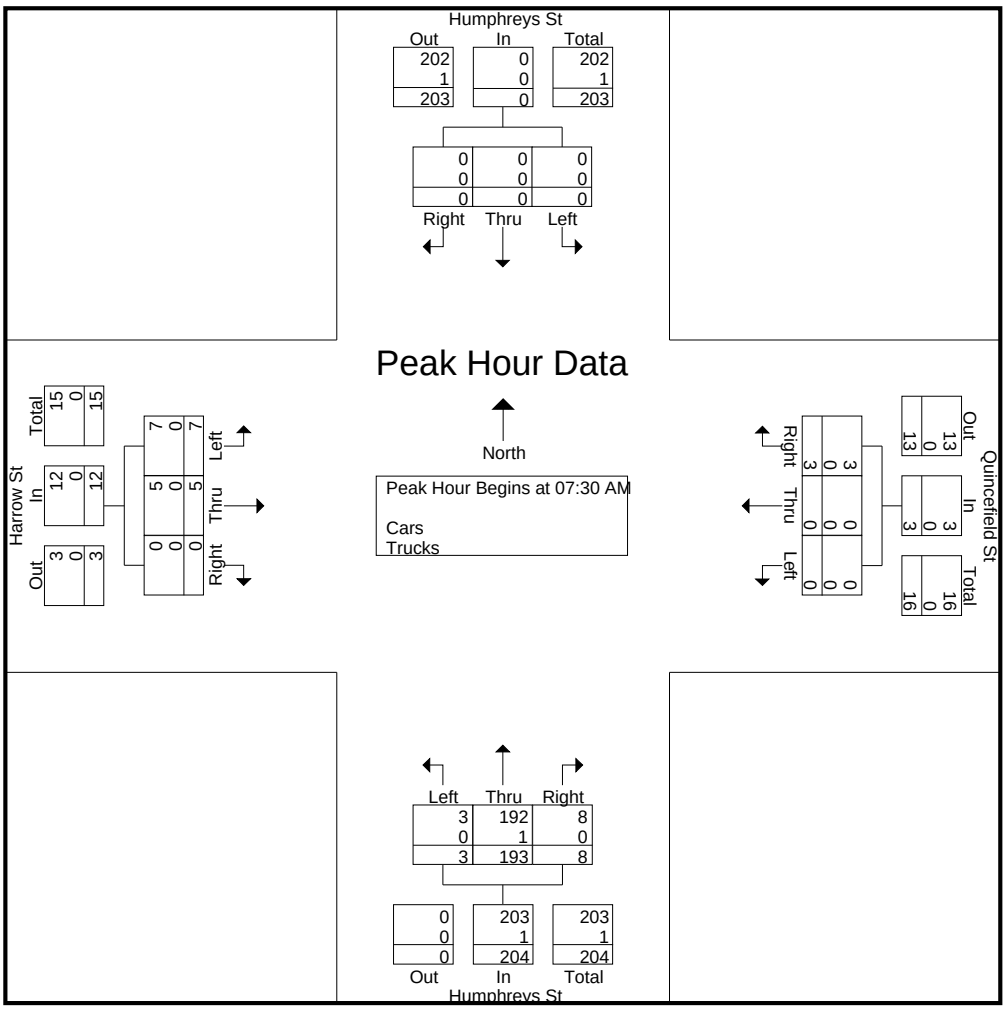
	Humphreys St From North				Quincefield St From East				Humphreys St From South				Harrow St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3	0	3
07:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	2	1	3
07:30 AM	0	0	0	1	0	0	0	4	0	0	0	2	0	0	0	2	9	0	9
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
Total	0	0	0	1	0	0	0	7	0	0	0	2	1	0	0	6	16	1	17
08:00 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
08:15 AM	0	1	0	2	0	0	0	3	0	0	0	0	0	0	0	1	6	1	7
08:30 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
08:45 AM	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	5
Total	0	1	0	3	0	0	0	12	0	0	0	0	0	0	0	1	16	1	17
Grand Total	0	1	0	4	0	0	0	19	0	0	0	2	1	0	0	7	32	2	34
Apprch %	0	100	0		0	0	0		0	0	0		100	0	0				
Total %	0	50	0		0	0	0		0	0	0		50	0	0		94.1	5.9	

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015
Page No : 2

	Humphreys St From North				Quincefield St From East				Humphreys St From South				Harrow St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	56	1	57	**2**	1	0	3	60
07:45 AM	0	0	0	0	0	0	0	0	0	**57**	2	**59**	2	0	0	2	**61**
08:00 AM	0	0	0	0	0	0	**2**	**2**	**2**	36	**3**	41	1	**2**	0	3	46
08:15 AM	0	0	0	0	0	0	1	1	1	44	2	47	2	2	0	**4**	52
Total Volume	0	0	0	0	0	0	3	3	3	193	8	204	7	5	0	12	219
% App. Total	0	0	0		0	0	100		1.5	94.6	3.9		58.3	41.7	0		
PHF	.000	.000	.000	.000	.000	.000	.375	.375	.375	.846	.667	.864	.875	.625	.000	.750	.898
Cars	0	0	0	0	0	0	3	3	3	192	8	203	7	5	0	12	218
% Cars	0	0	0	0	0	0	100	100	100	99.5	100	99.5	100	100	0	100	99.5
Trucks	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0.5



Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015
Page No : 1

Groups Printed- Cars - Trucks

	Humphreys St From North			Quincefield St From East			Humphreys St From South			Harrow St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	2	2	24	9	1	2	0	40
04:15 PM	0	0	0	0	0	0	5	37	6	3	3	0	54
04:30 PM	0	0	0	0	0	0	0	38	6	2	4	0	50
04:45 PM	0	0	0	0	0	1	1	37	4	1	3	0	47
Total	0	0	0	0	0	3	8	136	25	7	12	0	191
05:00 PM	0	0	0	0	0	0	2	35	4	1	5	0	47
05:15 PM	0	0	0	0	0	0	4	40	6	2	3	0	55
05:30 PM	0	0	0	0	0	2	0	33	5	3	4	0	47
05:45 PM	0	0	0	0	0	0	4	37	9	3	4	0	57
Total	0	0	0	0	0	2	10	145	24	9	16	0	206
Grand Total	0	0	0	0	0	5	18	281	49	16	28	0	397
Apprch %	0	0	0	0	0	100	5.2	80.7	14.1	36.4	63.6	0	
Total %	0	0	0	0	0	1.3	4.5	70.8	12.3	4	7.1	0	
Cars	0	0	0	0	0	5	18	281	49	16	28	0	397
% Cars	0	0	0	0	0	100	100	100	100	100	100	0	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0

Accurate Counts
978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015
Page No : 10

Groups Printed- Bikes Peds

	Humphreys St From North				Quincefield St From East				Humphreys St From South				Harrow St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	2	0	0	0	1	1	0	0	0	0	0	0	2	5	1	6
04:15 PM	0	0	0	1	0	0	0	2	0	1	0	2	0	0	0	2	7	1	8
04:30 PM	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	2	7	0	7
04:45 PM	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	3	6	0	6
Total	0	0	0	7	0	0	0	7	1	1	0	2	0	0	0	9	25	2	27
05:00 PM	0	1	0	0	0	0	0	1	0	3	0	0	0	0	0	0	1	4	5
05:15 PM	0	0	1	0	0	0	0	3	0	1	0	2	0	0	0	2	7	2	9
05:30 PM	0	2	0	2	0	0	0	8	0	0	0	2	0	0	0	0	12	2	14
05:45 PM	0	0	0	0	0	0	0	4	1	1	0	1	0	0	0	4	9	2	11
Total	0	3	1	2	0	0	0	16	1	5	0	5	0	0	0	6	29	10	39
Grand Total	0	3	1	9	0	0	0	23	2	6	0	7	0	0	0	15	54	12	66
Apprch %	0	75	25		0	0	0		25	75	0		0	0	0				
Total %	0	25	8.3		0	0	0		16.7	50	0		0	0	0		81.8	18.2	

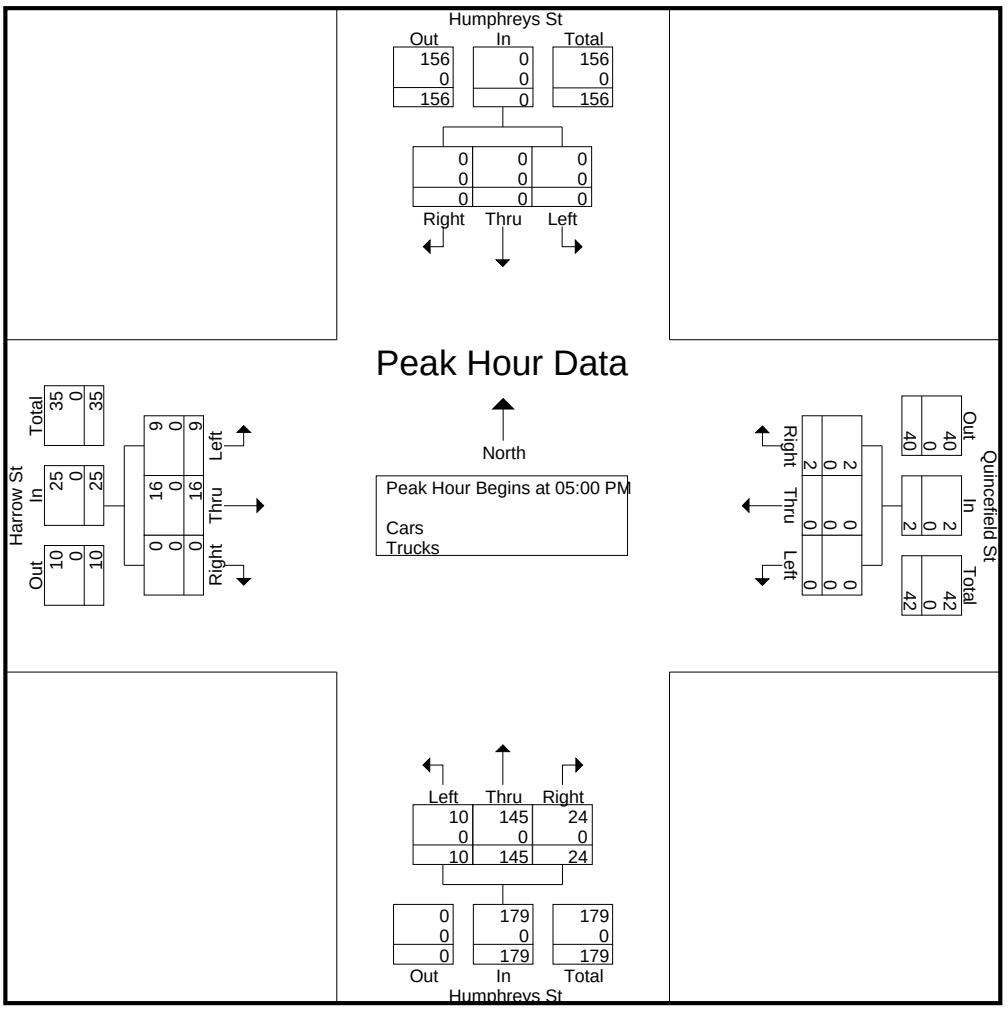
Accurate Counts

978-664-2565

N/S Street : Humphreys Street
E/W Street : Quincefield St / Harrow St
City/State : Boston, MA
Weather : Clear

File Name : 15082005
Site Code : 15082005
Start Date : 8/12/2015
Page No : 2

	Humphreys St From North				Quincefield St From East				Humphreys St From South				Harrow St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	2	35	4	41	1	**5**	0	6	47
05:15 PM	0	0	0	0	0	0	0	0	**4**	**40**	6	**50**	2	3	0	5	55
05:30 PM	0	0	0	0	0	0	**2**	**2**	0	33	5	38	**3**	4	0	**7**	47
05:45 PM	0	0	0	0	0	0	0	0	4	37	**9**	50	3	4	0	7	**57**
Total Volume	0	0	0	0	0	0	2	2	10	145	24	179	9	16	0	25	206
% App. Total	0	0	0		0	0	100		5.6	81	13.4		36	64	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.625	.906	.667	.895	.750	.800	.000	.893	.904
Cars	0	0	0	0	0	0	2	2	10	145	24	179	9	16	0	25	206
% Cars	0	0	0	0	0	0	100	100	100	100	100	100	100	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015

Groups Printed- Cars - Trucks

	Humphreys St From North			Dudley St From East			Nonquit St From South			Dudley St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	75	24	1	0	0	13	52	0	165
07:15 AM	0	0	0	0	104	36	0	0	0	14	55	3	212
07:30 AM	0	0	0	1	93	31	0	1	2	20	62	0	210
07:45 AM	0	0	0	0	111	36	0	1	1	17	74	0	240
Total	0	0	0	1	383	127	1	2	3	64	243	3	827
08:00 AM	0	0	0	2	123	25	2	0	0	22	79	0	253
08:15 AM	0	0	0	0	113	25	0	0	2	18	60	2	220
08:30 AM	0	0	0	2	131	26	0	0	3	12	92	0	266
08:45 AM	0	0	0	0	113	17	0	1	0	9	83	0	223
Total	0	0	0	4	480	93	2	1	5	61	314	2	962
Grand Total	0	0	0	5	863	220	3	3	8	125	557	5	1789
Apprch %	0	0	0	0.5	79.3	20.2	21.4	21.4	57.1	18.2	81.1	0.7	
Total %	0	0	0	0.3	48.2	12.3	0.2	0.2	0.4	7	31.1	0.3	
Cars	0	0	0	5	819	219	3	3	8	125	520	5	1707
% Cars	0	0	0	100	94.9	99.5	100	100	100	100	93.4	100	95.4
Trucks	0	0	0	0	44	1	0	0	0	0	37	0	82
% Trucks	0	0	0	0	5.1	0.5	0	0	0	0	6.6	0	4.6

Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015

Groups Printed- Bikes Peds

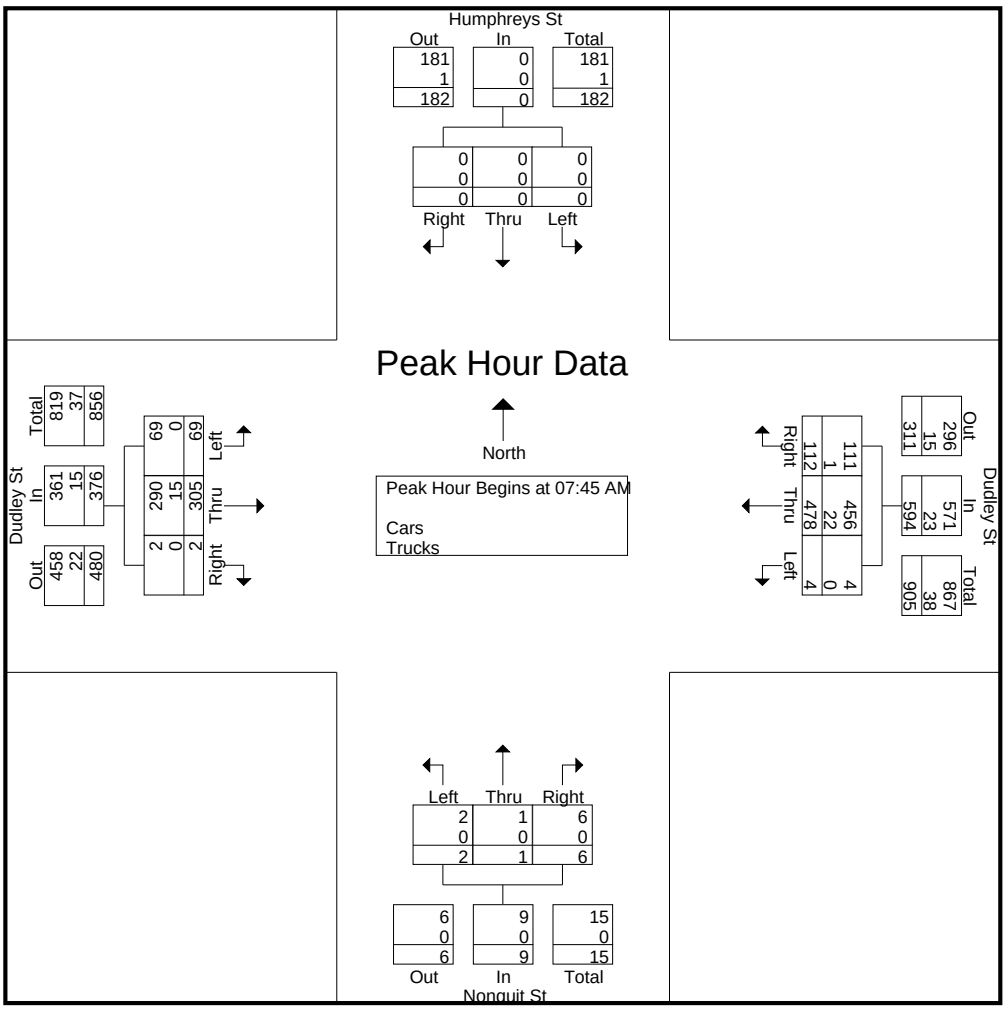
	Humphreys St From North				Dudley St From East				Nonquit St From South				Dudley St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	4	0	2	0	1	0	0	0	2	0	0	0	0	7	2	9
07:15 AM	0	0	0	9	0	1	0	1	0	0	0	5	0	0	0	0	15	1	16
07:30 AM	0	0	0	18	0	3	0	0	0	0	0	5	0	0	0	1	24	3	27
07:45 AM	0	0	0	13	0	3	0	3	0	0	0	7	0	0	0	6	29	3	32
Total	0	0	0	44	0	9	0	5	0	0	0	19	0	0	0	7	75	9	84
08:00 AM	0	0	0	9	0	0	0	1	0	0	0	1	0	2	0	0	11	2	13
08:15 AM	0	0	0	11	0	2	0	3	0	0	0	4	0	1	0	0	18	3	21
08:30 AM	0	0	0	9	0	2	0	2	0	0	0	7	1	2	0	7	25	5	30
08:45 AM	0	0	0	17	0	2	0	2	0	0	0	3	0	2	0	0	22	4	26
Total	0	0	0	46	0	6	0	8	0	0	0	15	1	7	0	7	76	14	90
Grand Total	0	0	0	90	0	15	0	13	0	0	0	34	1	7	0	14	151	23	174
Apprch %	0	0	0		0	100	0		0	0	0		12.5	87.5	0				
Total %	0	0	0		0	65.2	0		0	0	0		4.3	30.4	0		86.8	13.2	

Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015

	Humphreys St From North				Dudley St From East				Nonquit St From South				Dudley St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	111	**36**	147	0	**1**	1	2	17	74	0	91	240
08:00 AM	0	0	0	0	**2**	123	25	150	**2**	0	0	2	**22**	79	0	101	253
08:15 AM	0	0	0	0	0	113	25	138	0	0	2	2	18	60	**2**	80	220
08:30 AM	0	0	0	0	2	**131**	26	**159**	0	0	**3**	**3**	12	**92**	0	**104**	**266**
Total Volume	0	0	0	0	4	478	112	594	2	1	6	9	69	305	2	376	979
% App. Total	0	0	0		0.7	80.5	18.9		22.2	11.1	66.7		18.4	81.1	0.5		
PHF	.000	.000	.000	.000	.500	.912	.778	.934	.250	.250	.500	.750	.784	.829	.250	.904	.920
Cars	0	0	0	0	4	456	111	571	2	1	6	9	69	290	2	361	941
% Cars	0	0	0	0	100	95.4	99.1	96.1	100	100	100	100	100	95.1	100	96.0	96.1
Trucks	0	0	0	0	0	22	1	23	0	0	0	0	0	15	0	15	38
% Trucks	0	0	0	0	0	4.6	0.9	3.9	0	0	0	0	0	4.9	0	4.0	3.9



Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015
Page No : 1

Groups Printed- Cars - Trucks

	Humphreys St From North			Dudley St From East			Nonquit St From South			Dudley St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	2	0	91	17	0	0	1	18	112	1	242
04:15 PM	0	0	0	0	88	20	1	0	0	26	90	0	225
04:30 PM	0	0	0	1	73	24	0	0	1	19	106	1	225
04:45 PM	0	0	0	2	82	18	0	0	1	20	73	0	196
Total	0	0	2	3	334	79	1	0	3	83	381	2	888
05:00 PM	0	0	1	1	100	18	1	0	2	24	109	0	256
05:15 PM	2	0	1	0	83	26	1	0	0	27	99	2	241
05:30 PM	0	0	0	1	107	16	1	0	0	26	102	1	254
05:45 PM	2	0	0	2	100	28	0	0	1	21	90	1	245
Total	4	0	2	4	390	88	3	0	3	98	400	4	996
Grand Total	4	0	4	7	724	167	4	0	6	181	781	6	1884
Apprch %	50	0	50	0.8	80.6	18.6	40	0	60	18.7	80.7	0.6	
Total %	0.2	0	0.2	0.4	38.4	8.9	0.2	0	0.3	9.6	41.5	0.3	
Cars	4	0	4	7	702	167	4	0	6	181	754	6	1835
% Cars	100	0	100	100	97	100	100	0	100	100	96.5	100	97.4
Trucks	0	0	0	0	22	0	0	0	0	0	27	0	49
% Trucks	0	0	0	0	3	0	0	0	0	0	3.5	0	2.6

Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015
Page No : 10

Groups Printed- Bikes Peds

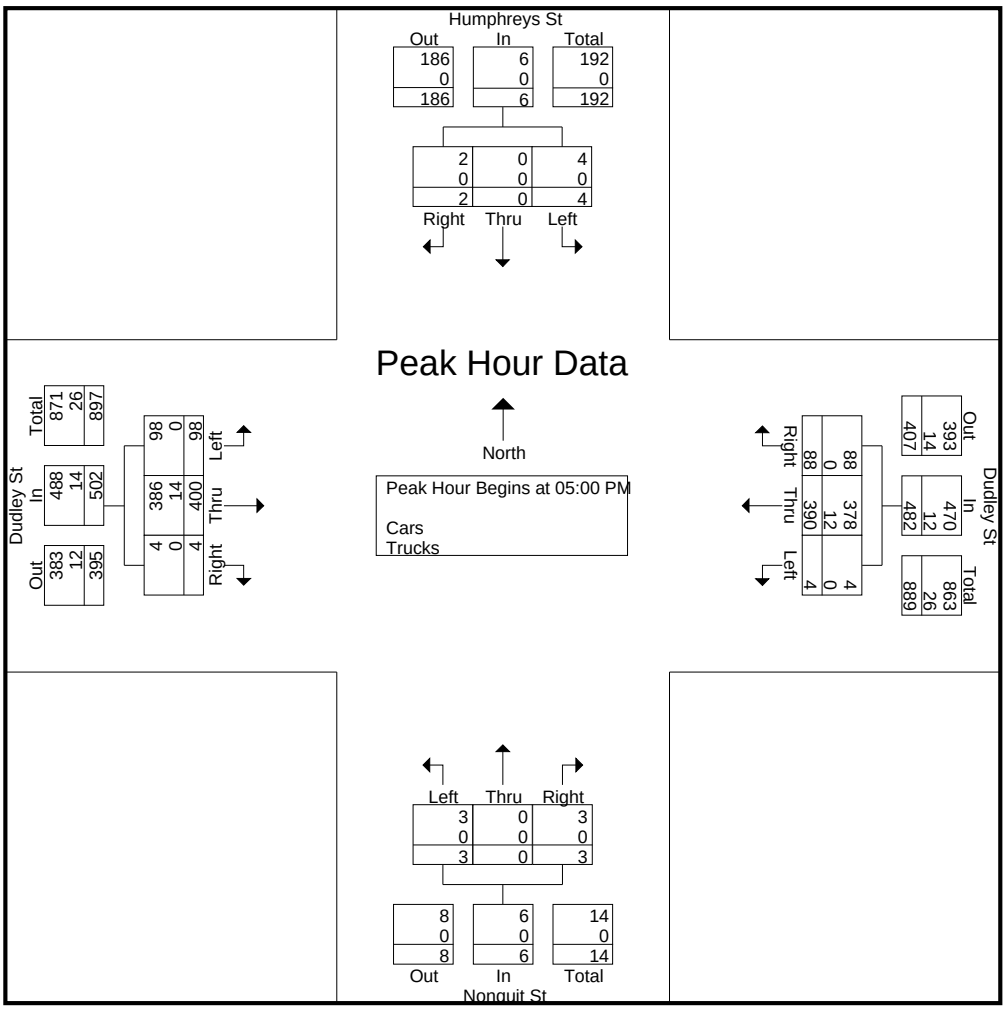
	Humphreys St From North				Dudley St From East				Nonquit St From South				Dudley St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	13	0	5	0	7	0	0	0	8	1	1	0	6	34	7	41
04:15 PM	0	0	0	14	0	0	0	3	0	0	0	7	0	4	0	5	29	4	33
04:30 PM	0	0	0	17	0	2	0	2	0	0	0	15	0	1	0	0	34	3	37
04:45 PM	0	0	0	12	0	2	0	4	0	0	0	21	0	3	0	1	38	5	43
Total	0	0	0	56	0	9	0	16	0	0	0	51	1	9	0	12	135	19	154
05:00 PM	0	0	0	19	0	0	0	6	0	0	0	12	1	0	0	2	39	1	40
05:15 PM	0	0	0	10	0	1	0	6	0	0	0	25	0	2	0	0	41	3	44
05:30 PM	0	0	0	15	0	1	0	5	0	0	0	7	0	1	0	3	30	2	32
05:45 PM	0	0	0	32	0	2	0	0	0	0	0	5	0	3	0	3	40	5	45
Total	0	0	0	76	0	4	0	17	0	0	0	49	1	6	0	8	150	11	161
Grand Total	0	0	0	132	0	13	0	33	0	0	0	100	2	15	0	20	285	30	315
Apprch %	0	0	0		0	100	0		0	0	0		11.8	88.2	0				
Total %	0	0	0		0	43.3	0		0	0	0		6.7	50	0		90.5	9.5	

Accurate Counts
978-664-2565

N/S Street : Humphreys St / Nonquit St
E/W Street : Dudley Street
City/State : Boston, MA
Weather : Clear

File Name : 15082006
Site Code : 15082006
Start Date : 8/12/2015
Page No : 2

	Humphreys St From North				Dudley St From East				Nonquit St From South				Dudley St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	**1**	1	1	100	18	119	**1**	0	**2**	**3**	24	**109**	0	**133**	**256**
05:15 PM	**2**	0	1	**3**	0	83	26	109	1	0	0	1	**27**	99	**2**	128	241
05:30 PM	0	0	0	0	1	**107**	16	124	1	0	0	1	26	102	1	129	254
05:45 PM	2	0	0	2	**2**	100	**28**	**130**	0	0	1	1	21	90	1	112	245
Total Volume	4	0	2	6	4	390	88	482	3	0	3	6	98	400	4	502	996
% App. Total	66.7	0	33.3		0.8	80.9	18.3		50	0	50		19.5	79.7	0.8		
PHF	.500	.000	.500	.500	.500	.911	.786	.927	.750	.000	.375	.500	.907	.917	.500	.944	.973
Cars	4	0	2	6	4	378	88	470	3	0	3	6	98	386	4	488	970
% Cars	100	0	100	100	100	96.9	100	97.5	100	0	100	100	100	96.5	100	97.2	97.4
Trucks	0	0	0	0	0	12	0	12	0	0	0	0	0	14	0	14	26
% Trucks	0	0	0	0	0	3.1	0	2.5	0	0	0	0	0	3.5	0	2.8	2.6



Indigo Block
Trip Generation Assessment

HOWARD STEIN HUDSON
11-Nov-15

Land Use	Size	Category	Trip Rates (Trips/ksf or unit)	Unadjusted Vehicle Trips	Internal trips	Pass-by %	Less capture trips	Assumed national vehicle occupancy rate[1]	Converted to Person trips	Transit Share[2]	Transit Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Vehicle Share[2]	Total Vehicle Person Trips	Assumed local auto occupancy rate for autos [4]	Total Adjusted Auto Trips
Daily Peak Hour																	
Apartment[6]	81	Total	6.64	538	0%	0%	538	1.13	**608**	17%	**104**	26%	**158**	57%	**347**	1.13	**306**
	Units	In	3.32	269	0%	0%	269	1.13	**304**	17%	**52**	26%	**79**	57%	**173**	1.13	**153**
		Out	3.32	269	0%	0%	269	1.13	**304**	17%	**52**	26%	**79**	57%	**173**	1.13	**153**
Condominium[7]	8	Total	5.75	46	0%	0%	46	1.13	**52**	17%	**8**	26%	**14**	57%	**30**	1.13	**26**
	Units	In	2.88	23	0%	0%	23	1.13	**26**	17%	**4**	26%	**7**	57%	**15**	1.13	**13**
		Out	2.88	23	0%	0%	23	1.13	**26**	17%	**4**	26%	**7**	57%	**15**	1.13	**13**
Light Industrial[8]	20	Total	7.00	140	0%	0%	140	1.13	**158**	24%	**38**	17%	**26**	58%	**92**	1.13	**82**
	KSF	In	3.50	70	0%	0%	70	1.13	**79**	24%	**19**	17%	**13**	58%	**46**	1.13	**41**
		Out	3.50	70	0%	0%	70	1.13	**79**	24%	**19**	17%	**13**	58%	**46**	1.13	**41**
Total		Total		**724**					**818**		**150**		**198**		**468**		**414**
		In		**362**					**409**		**75**		**99**		**234**		**207**
		Out		**362**					**409**		**75**		**99**		**234**		**207**
AM Peak Hour																	
Apartment[6]	81	Total	0.51	41	0%	0%	41	1.13	**46**		**13**		**12**		**21**	1.13	**19**
	Units	In	0.10	8	0%	0%	8	1.13	**9**	19%	**2**	27%	**2**	54%	**5**	1.13	**4**
		Out	0.41	33	0%	0%	33	1.13	**37**	29%	**11**	27%	**10**	44%	**16**	1.13	**15**
Condominium[7]	8	Total	0.50	4	0%	0%	4	1.13	**5**		**1**		**1**		**2**	1.13	**2**
	Units	In	0.13	1	0%	0%	1	1.13	**1**	19%	**0**	27%	**0**	54%	**1**	1.13	**1**
		Out	0.38	3	0%	0%	3	1.13	**3**	29%	**1**	27%	**1**	44%	**1**	1.13	**1**
Light Industrial[8]	20	Total	0.90	18	0%	0%	18	1.13	**20**		**6**		**3**		**11**	1.13	**10**
	KSF	In	0.80	16	0%	0%	16	1.13	**18**	27%	**5**	18%	**3**	55%	**10**	1.13	**9**
		Out	0.10	2	0%	0%	2	1.13	**2**	40%	**1**	17%	**0**	43%	**1**	1.13	**1**
Total		Total		**63**					**71**		**20**		**16**		**34**		**31**
		In		**25**					**28**		**7**		**5**		**15**		**14**
		Out		**38**					**43**		**13**		**11**		**19**		**17**
PM Peak Hour																	
Apartment[6]	81	Total	0.62	50	0%	0%	50	1.13	**57**		**15**		**15**		**27**	1.13	**24**
	Units	In	0.41	33	0%	0%	33	1.13	**37**	29%	**11**	27%	**10**	44%	**16**	1.13	**15**
		Out	0.21	17	0%	0%	17	1.13	**19**	19%	**4**	27%	**5**	54%	**10**	1.13	**9**
Condominium[7]	8	Total	0.50	4	0%	0%	4	1.13	**5**		**1**		**1**		**2**	1.13	**2**
	Units	In	0.38	3	0%	0%	3	1.13	**3**	29%	**1**	27%	**1**	44%	**1**	1.13	**1**
		Out	0.13	1	0%	0%	1	1.13	**1**	19%	**0**	27%	**0**	54%	**1**	1.13	**1**
Light Industrial[8]	20	Total	0.95	19	0%	0%	19	1.13	**21**		**6**		**3**		**12**	1.13	**10**
	KSF	In	0.10	2	0%	0%	2	1.13	**2**	40%	**1**	17%	**0**	43%	**1**	1.13	**1**
		Out	0.85	17	0%	0%	17	1.13	**19**	27%	**5**	18%	**3**	55%	**11**	1.13	**9**
Total		Total		**73**					**82**		**22**		**19**		**40**		**36**
		In		**38**					**43**		**13**		**11**		**19**		**17**
		Out		**35**					**40**		**9**		**8**		**22**		**19**

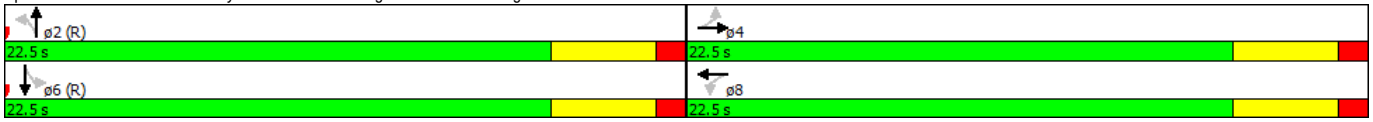
1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Mode shares based on peak-hour BTD Data for Area 15
4. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
6. ITE Trip Generation Rate, 9th Edition, LUC 220 (Apartment), average rate
7. ITE Trip Generation Rate, 9th Edition, LUC 310 (Residential Condominium/Townhouse), average rate
8. ITE Trip Generation Rate, 9th Edition, LUC 931 (Shopping Center), average rate

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	80	17	54	60	29	27	469	84	15	277	21
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			1.00	
Frt		0.983			0.973			0.980			0.991	
Flt Protected		0.986			0.981			0.998			0.998	
Satd. Flow (prot)	0	1650	0	0	1607	0	0	1581	0	0	1603	0
Flt Permitted		0.888			0.848			0.974			0.968	
Satd. Flow (perm)	0	1481	0	0	1383	0	0	1541	0	0	1555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			34			23			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1740			297			318	
Travel Time (s)		6.0			39.5			6.8			7.2	
Confl. Peds. (#/hr)	13		11	11		13	33		28	28		33
Confl. Bikes (#/hr)			1						7			1
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	44	92	20	71	79	38	29	510	91	16	304	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	188	0	0	630	0	0	343	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.26			0.33			1.00			0.55	
Control Delay		9.3			9.6			54.3			14.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.3			9.6			54.3			14.1	
LOS		A			A			D			B	
Approach Delay		9.3			9.6			54.3			14.1	
Approach LOS		A			A			D			B	
Queue Length 50th (ft)		22			25			148			62	
Queue Length 95th (ft)		50			47			#336			123	
Internal Link Dist (ft)		182			1660			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		604			573			630			628	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			0.33			1.00			0.55	

Intersection Summary

Area Type: CBD
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 66.5% 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.

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	59	51	0	82	410	0	74	11
Peak Hour Factor	0.92	0.86	0.86	0.92	0.81	0.81	0.92	0.85	0.85
Heavy Vehicles, %	2	5	0	2	1	1	2	1	0
Mvmt Flow	0	69	59	0	101	506	0	87	13
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9	13.8	9.5
HCM LOS	A	B	A

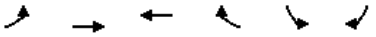
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	0%	87%
Vol Thru, %	46%	17%	0%
Vol Right, %	0%	83%	13%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	110	492	85
LT Vol	59	0	74
Through Vol	51	82	0
RT Vol	0	410	11
Lane Flow Rate	128	607	100
Geometry Grp	1	1	1
Degree of Util (X)	0.175	0.65	0.152
Departure Headway (Hd)	4.939	3.853	5.488
Convergence, Y/N	Yes	Yes	Yes
Cap	725	941	650
Service Time	2.977	1.872	3.548
HCM Lane V/C Ratio	0.177	0.645	0.154
HCM Control Delay	9	13.8	9.5
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.6	5	0.5

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	125	0	0	0	119	0	373	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.85	0.85	0.92	0.78	0.78
Heavy Vehicles, %	2	1	0	2	0	1	2	1	0
Mvmt Flow	0	136	0	0	0	140	0	478	23
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.9	9.9	17
HCM LOS	A	A	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	95%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	5%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	391	125	119
LT Vol	373	0	0
Through Vol	0	125	119
RT Vol	18	0	0
Lane Flow Rate	501	136	140
Geometry Grp	1	1	1
Degree of Util (X)	0.667	0.203	0.209
Departure Headway (Hd)	4.793	5.376	5.371
Convergence, Y/N	Yes	Yes	Yes
Cap	747	660	661
Service Time	2.857	3.466	3.46
HCM Lane V/C Ratio	0.671	0.206	0.212
HCM Control Delay	17	9.9	9.9
HCM Lane LOS	C	A	A
HCM 95th-tile Q	5.1	0.8	0.8



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	64	243	383	127	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	71	270	412	137	0	0
Pedestrians					42	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	590				934	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590				934	522
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				100	100
cM capacity (veh/h)	995				274	555

Direction, Lane #	EB 1	WB 1
Volume Total	341	548
Volume Left	71	0
Volume Right	0	137
cSH	995	1700
Volume to Capacity	0.07	0.32
Queue Length 95th (ft)	6	0
Control Delay (s)	2.5	0.0
Lane LOS	A	
Approach Delay (s)	2.5	0.0
Approach LOS		

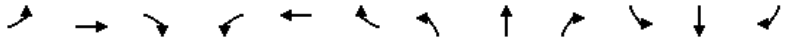
Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	7	5	0	0	0	0	3	0	3	193	8	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	9	7	0	0	0	0	8	0	3	224	9	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.9	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	1%	58%	0%
Vol Thru, %	95%	42%	0%
Vol Right, %	4%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	204	12	3
LT Vol	3	7	0
Through Vol	193	5	0
RT Vol	8	0	3
Lane Flow Rate	237	16	8
Geometry Grp	1	1	1
Degree of Util (X)	0.258	0.02	0.008
Departure Headway (Hd)	3.92	4.44	3.727
Convergence, Y/N	Yes	Yes	Yes
Cap	918	794	941
Service Time	1.934	2.534	1.825
HCM Lane V/C Ratio	0.258	0.02	0.009
HCM Control Delay	8.3	7.6	6.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	4	73	1	187	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	5	91	1	225	0	0	0	0
Pedestrians		4									8	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	333	232	4	228	232	233	4			225		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	333	232	4	228	232	233	4			225		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	99	89	100			100		
cM capacity (veh/h)	547	669	1081	729	669	811	1625			1343		

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	12	96	227
Volume Left	12	0	1
Volume Right	0	91	0
cSH	547	802	1625
Volume to Capacity	0.02	0.12	0.00
Queue Length 95th (ft)	2	10	0
Control Delay (s)	11.7	10.1	0.0
Lane LOS	B	B	A
Approach Delay (s)	11.7	10.1	0.0
Approach LOS	B	B	

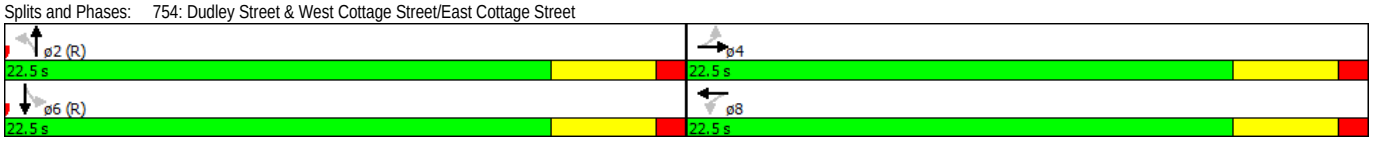
Intersection Summary					
Average Delay	3.4				
Intersection Capacity Utilization	25.4%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	81	16	156	98	29	26	352	86	36	472	36
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			0.99	
Frt		0.982			0.986			0.975			0.991	
Flt Protected		0.992			0.973			0.997			0.997	
Satd. Flow (prot)	0	1657	0	0	1623	0	0	1572	0	0	1594	0
Flt Permitted		0.922			0.757			0.961			0.953	
Satd. Flow (perm)	0	1538	0	0	1252	0	0	1513	0	0	1522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			15			30			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1740			297			318	
Travel Time (s)		6.0			39.5			6.8			7.2	
Confl. Peds. (#/hr)	15		14	14		15	72		25	25		72
Confl. Bikes (#/hr)						2			10			10
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	21	93	18	205	129	38	28	383	93	40	519	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	132	0	0	372	0	0	504	0	0	599	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.21			0.73			0.81			0.98	
Control Delay		9.0			22.6			25.0			49.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			22.6			25.0			49.1	
LOS		A			C			C			D	
Approach Delay		9.0			22.6			25.0			49.1	
Approach LOS		A			C			C			D	
Queue Length 50th (ft)		18			73			102			141	
Queue Length 95th (ft)		42			117			#248			#322	
Internal Link Dist (ft)		182			1660			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		626			509			623			614	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.73			0.81			0.98	

Intersection Summary

Area Type: CBD
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 74.9% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	55	104	0	139	185	0	365	69
Peak Hour Factor	0.92	0.90	0.90	0.92	0.84	0.84	0.92	0.90	0.90
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	61	116	0	165	220	0	406	77
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	11.6	15.1	22.4
HCM LOS	B	C	C

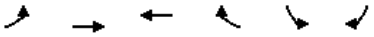
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	0%	84%
Vol Thru, %	65%	43%	0%
Vol Right, %	0%	57%	16%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	159	324	434
LT Vol	55	0	365
Through Vol	104	139	0
RT Vol	0	185	69
Lane Flow Rate	177	386	482
Geometry Grp	1	1	1
Degree of Util (X)	0.295	0.566	0.736
Departure Headway (Hd)	6.007	5.286	5.497
Convergence, Y/N	Yes	Yes	Yes
Cap	595	679	656
Service Time	4.071	3.341	3.541
HCM Lane V/C Ratio	0.297	0.568	0.735
HCM Control Delay	11.6	15.1	22.4
HCM Lane LOS	B	C	C
HCM 95th-tile Q	1.2	3.6	6.4

Intersection	
Intersection Delay, s/veh	14.9
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	469	0	0	0	159	0	165	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.74	0.74	0.92	0.88	0.88
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	510	0	0	0	215	0	187	43
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.9	10.7	12.1
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	81%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	19%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	203	469	159
LT Vol	165	0	0
Through Vol	0	469	159
RT Vol	38	0	0
Lane Flow Rate	231	510	215
Geometry Grp	1	1	1
Degree of Util (X)	0.368	0.683	0.315
Departure Headway (Hd)	5.743	4.937	5.283
Convergence, Y/N	Yes	Yes	Yes
Cap	630	739	683
Service Time	3.753	2.937	3.302
HCM Lane V/C Ratio	0.367	0.69	0.315
HCM Control Delay	12.1	17.9	10.7
HCM Lane LOS	B	C	B
HCM 95th-tile Q	1.7	5.4	1.3



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	98	400	390	88	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	109	444	419	95	0	0
Pedestrians					76	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	590				1205	543
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590				1205	543
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	100
cM capacity (veh/h)	995				181	540

Direction, Lane #	EB 1	WB 1
Volume Total	553	514
Volume Left	109	0
Volume Right	0	95
cSH	995	1700
Volume to Capacity	0.11	0.30
Queue Length 95th (ft)	9	0
Control Delay (s)	2.9	0.0
Lane LOS	A	
Approach Delay (s)	2.9	0.0
Approach LOS		

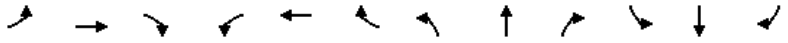
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	65.8%	ICU Level of Service	C	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	9	16	0	0	0	0	2	0	10	145	24	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	12	21	0	0	0	0	5	0	12	169	28	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.8	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	6%	36%	0%
Vol Thru, %	81%	64%	0%
Vol Right, %	13%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	179	25	2
LT Vol	10	9	0
Through Vol	145	16	0
RT Vol	24	0	2
Lane Flow Rate	208	33	5
Geometry Grp	1	1	1
Degree of Util (X)	0.225	0.04	0.005
Departure Headway (Hd)	3.899	4.342	3.69
Convergence, Y/N	Yes	Yes	Yes
Cap	922	815	953
Service Time	1.918	2.421	1.778
HCM Lane V/C Ratio	0.226	0.04	0.005
HCM Control Delay	8.1	7.6	6.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	19	66	3	89	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	24	82	4	107	0	0	0	0
Pedestrians		5									3	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	217	119	5	114	119	110	5			107		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217	119	5	114	119	110	5			107		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	97	91	100			100		
cM capacity (veh/h)	656	769	1079	863	769	949	1622			1484		

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	12	106	111
Volume Left	12	0	4
Volume Right	0	82	0
cSH	656	902	1622
Volume to Capacity	0.02	0.12	0.00
Queue Length 95th (ft)	1	10	0
Control Delay (s)	10.6	9.5	0.3
Lane LOS	B	A	A
Approach Delay (s)	10.6	9.5	0.3
Approach LOS	B	A	

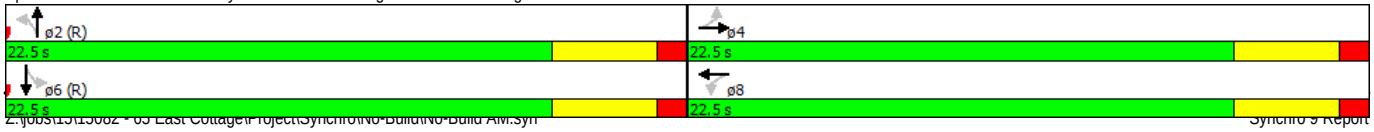
Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	18.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	82	17	55	62	30	28	481	86	15	284	22
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			1.00	
Frt		0.983			0.973			0.981			0.991	
Flt Protected		0.986			0.982			0.998			0.998	
Satd. Flow (prot)	0	1650	0	0	1608	0	0	1583	0	0	1604	0
Flt Permitted		0.886			0.848			0.973			0.969	
Satd. Flow (perm)	0	1478	0	0	1383	0	0	1541	0	0	1556	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			34			22			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1740			297			318	
Travel Time (s)		6.0			39.5			6.8			7.2	
Confl. Peds. (#/hr)	13		11	11		13	33		28	28		33
Confl. Bikes (#/hr)			1						7			1
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	45	94	20	72	82	39	30	523	93	16	312	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	159	0	0	193	0	0	646	0	0	352	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.26			0.34			1.03			0.56	
Control Delay		9.5			9.7			61.6			14.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.5			9.7			61.6			14.4	
LOS		A			A			E			B	
Approach Delay		9.5			9.7			61.6			14.4	
Approach LOS		A			A			E			B	
Queue Length 50th (ft)		23			26			~165			64	
Queue Length 95th (ft)		51			49			#348			127	
Internal Link Dist (ft)		182			1660			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		602			573			629			628	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			0.34			1.03			0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 35.7 Intersection LOS: D
Intersection Capacity Utilization 67.9% 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.

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	60	52	0	84	420	0	76	11
Peak Hour Factor	0.92	0.86	0.86	0.92	0.81	0.81	0.92	0.85	0.85
Heavy Vehicles, %	2	5	0	2	1	1	2	1	0
Mvmt Flow	0	70	60	0	104	519	0	89	13
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.1	14.3	9.6
HCM LOS	A	B	A

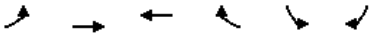
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	0%	87%
Vol Thru, %	46%	17%	0%
Vol Right, %	0%	83%	13%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	112	504	87
LT Vol	60	0	76
Through Vol	52	84	0
RT Vol	0	420	11
Lane Flow Rate	130	622	102
Geometry Grp	1	1	1
Degree of Util (X)	0.18	0.668	0.157
Departure Headway (Hd)	4.962	3.865	5.526
Convergence, Y/N	Yes	Yes	Yes
Cap	721	933	646
Service Time	3.004	1.886	3.591
HCM Lane V/C Ratio	0.18	0.667	0.158
HCM Control Delay	9.1	14.3	9.6
HCM Lane LOS	A	B	A
HCM 95th-tile Q	0.7	5.3	0.6

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	128	0	0	0	122	0	382	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.85	0.85	0.92	0.78	0.78
Heavy Vehicles, %	2	1	0	2	0	1	2	1	0
Mvmt Flow	0	139	0	0	0	144	0	490	23
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10	10	17.8
HCM LOS	A	A	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	95%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	4%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	400	128	122
LT Vol	382	0	0
Through Vol	0	128	122
RT Vol	18	0	0
Lane Flow Rate	513	139	144
Geometry Grp	1	1	1
Degree of Util (X)	0.686	0.209	0.216
Departure Headway (Hd)	4.814	5.418	5.411
Convergence, Y/N	Yes	Yes	Yes
Cap	744	655	656
Service Time	2.881	3.513	3.505
HCM Lane V/C Ratio	0.69	0.212	0.22
HCM Control Delay	17.8	10	10
HCM Lane LOS	C	A	A
HCM 95th-tile Q	5.5	0.8	0.8



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	66	249	393	130	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	73	277	423	140	0	0
Pedestrians					42	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	604				958	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604				958	534
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				100	100
cM capacity (veh/h)	983				264	546

Direction, Lane #	EB 1	WB 1
Volume Total	350	562
Volume Left	73	0
Volume Right	0	140
cSH	983	1700
Volume to Capacity	0.07	0.33
Queue Length 95th (ft)	6	0
Control Delay (s)	2.5	0.0
Lane LOS	A	
Approach Delay (s)	2.5	0.0
Approach LOS		

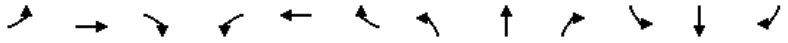
Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	57.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	7	5	0	0	0	0	3	0	3	198	8	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	9	7	0	0	0	0	8	0	3	230	9	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.9	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	1%	58%	0%
Vol Thru, %	95%	42%	0%
Vol Right, %	4%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	209	12	3
LT Vol	3	7	0
Through Vol	198	5	0
RT Vol	8	0	3
Lane Flow Rate	243	16	8
Geometry Grp	1	1	1
Degree of Util (X)	0.265	0.02	0.008
Departure Headway (Hd)	3.921	4.45	3.838
Convergence, Y/N	Yes	Yes	Yes
Cap	919	792	938
Service Time	1.934	2.547	1.838
HCM Lane V/C Ratio	0.264	0.02	0.009
HCM Control Delay	8.3	7.6	6.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	4	75	1	192	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	5	94	1	231	0	0	0	0
Pedestrians		4									8	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	342	238	4	234	238	239	4			231		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	342	238	4	234	238	239	4			231		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	99	88	100			100		
cM capacity (veh/h)	537	664	1081	723	664	805	1625			1336		

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	12	99	233
Volume Left	12	0	1
Volume Right	0	94	0
cSH	537	796	1625
Volume to Capacity	0.02	0.12	0.00
Queue Length 95th (ft)	2	11	0
Control Delay (s)	11.9	10.2	0.0
Lane LOS	B	B	A
Approach Delay (s)	11.9	10.2	0.0
Approach LOS	B	B	

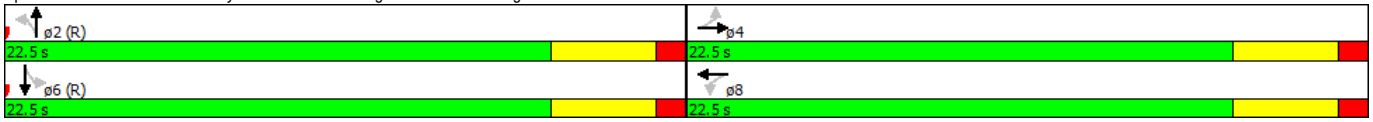
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	25.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	83	16	160	100	30	27	361	88	37	484	37
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			0.99	
Frt		0.982			0.986			0.975			0.991	
Flt Protected		0.992			0.973			0.997			0.997	
Satd. Flow (prot)	0	1657	0	0	1623	0	0	1572	0	0	1594	0
Flt Permitted		0.921			0.756			0.959			0.953	
Satd. Flow (perm)	0	1537	0	0	1251	0	0	1510	0	0	1522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			15			30			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1740			297			318	
Travel Time (s)		6.0			39.5			6.8			7.2	
Confl. Peds. (#/hr)	15		14	14		15	72		25	25		72
Confl. Bikes (#/hr)						2			10			10
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	21	95	18	211	132	39	29	392	96	41	532	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	134	0	0	382	0	0	517	0	0	614	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.21			0.75			0.83			1.00	
Control Delay		9.0			23.8			26.8			55.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			23.8			26.8			55.1	
LOS		A			C			C			E	
Approach Delay		9.0			23.8			26.8			55.1	
Approach LOS		A			C			C			E	
Queue Length 50th (ft)		18			76			106			147	
Queue Length 95th (ft)		43			120			#258			#333	
Internal Link Dist (ft)		182			1660			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		625			509			622			614	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.75			0.83			1.00	

Intersection Summary

Area Type: CBD
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 35.2 Intersection LOS: D
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	19
Intersection LOS	C

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	56	107	0	143	190	0	374	71
Peak Hour Factor	0.92	0.90	0.90	0.92	0.84	0.84	0.92	0.90	0.90
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	62	119	0	170	226	0	416	79
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	11.8	15.9	24.2
HCM LOS	B	C	C

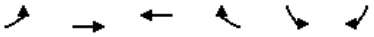
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	34%	0%	84%
Vol Thru, %	66%	43%	0%
Vol Right, %	0%	57%	16%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	163	333	445
LT Vol	56	0	374
Through Vol	107	143	0
RT Vol	0	190	71
Lane Flow Rate	181	396	494
Geometry Grp	1	1	1
Degree of Util (X)	0.306	0.589	0.762
Departure Headway (Hd)	6.083	5.349	5.551
Convergence, Y/N	Yes	Yes	Yes
Cap	587	670	653
Service Time	4.155	3.408	3.598
HCM Lane V/C Ratio	0.308	0.591	0.757
HCM Control Delay	11.8	15.9	24.2
HCM Lane LOS	B	C	C
HCM 95th-tile Q	1.3	3.9	7

Intersection	
Intersection Delay, s/veh	15.6
Intersection LOS	C

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	481	0	0	0	163	0	169	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.74	0.74	0.92	0.88	0.88
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	523	0	0	0	220	0	192	44
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	19	10.9	12.3
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	81%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	19%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	208	481	163
LT Vol	169	0	0
Through Vol	0	481	163
RT Vol	39	0	0
Lane Flow Rate	236	523	220
Geometry Grp	1	1	1
Degree of Util (X)	0.381	0.705	0.326
Departure Headway (Hd)	5.797	4.976	5.332
Convergence, Y/N	Yes	Yes	Yes
Cap	624	732	676
Service Time	3.807	2.976	3.353
HCM Lane V/C Ratio	0.378	0.714	0.325
HCM Control Delay	12.3	19	10.9
HCM Lane LOS	B	C	B
HCM 95th-tile Q	1.8	5.9	1.4



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	100	410	400	90	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	111	456	430	97	0	0
Pedestrians					76	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	603				1232	554
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	603				1232	554
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	100
cM capacity (veh/h)	985				173	532

Direction, Lane #	EB 1	WB 1
Volume Total	567	527
Volume Left	111	0
Volume Right	0	97
cSH	985	1700
Volume to Capacity	0.11	0.31
Queue Length 95th (ft)	10	0
Control Delay (s)	2.9	0.0
Lane LOS	A	
Approach Delay (s)	2.9	0.0
Approach LOS		

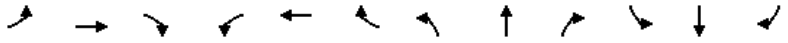
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	67.2%	ICU Level of Service	C	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	9	16	0	0	0	0	2	0	10	149	24	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	12	21	0	0	0	0	5	0	12	173	28	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.8	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	5%	36%	0%
Vol Thru, %	81%	64%	0%
Vol Right, %	13%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	183	25	2
LT Vol	10	9	0
Through Vol	149	16	0
RT Vol	24	0	2
Lane Flow Rate	213	33	5
Geometry Grp	1	1	1
Degree of Util (X)	0.231	0.04	0.005
Departure Headway (Hd)	3.9	4.35	3.698
Convergence, Y/N	Yes	Yes	Yes
Cap	921	813	950
Service Time	1.92	2.433	1.79
HCM Lane V/C Ratio	0.231	0.041	0.005
HCM Control Delay	8.1	7.6	6.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	19	68	3	91	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	0	0	24	85	4	110	0	0	0	0
Pedestrians		5									3	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	222	122	5	117	122	113	5			110		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222	122	5	117	122	113	5			110		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	97	91	100			100		
cM capacity (veh/h)	650	767	1079	860	767	946	1622			1481		

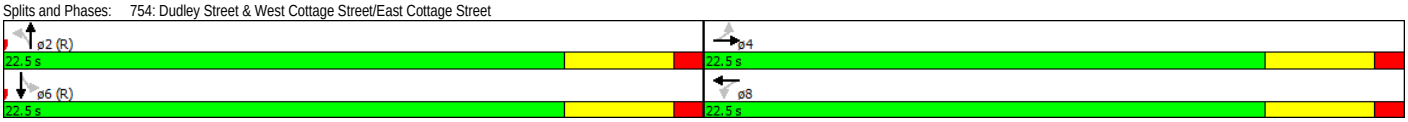
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	12	109	113
Volume Left	12	0	4
Volume Right	0	85	0
cSH	650	900	1622
Volume to Capacity	0.02	0.12	0.00
Queue Length 95th (ft)	1	10	0
Control Delay (s)	10.6	9.5	0.2
Lane LOS	B	A	A
Approach Delay (s)	10.6	9.5	0.2
Approach LOS	B	A	

Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	18.9%	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												
Volume (vph)	39	84	17	55	64	32	28	481	86	17	284	22
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			1.00	
Frt		0.983			0.971			0.981			0.991	
Flt Protected		0.986			0.982			0.998			0.997	
Satd. Flow (prot)	0	1650	0	0	1604	0	0	1583	0	0	1601	0
Flt Permitted		0.887			0.850			0.973			0.963	
Satd. Flow (perm)	0	1480	0	0	1383	0	0	1541	0	0	1546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			36			22			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1427			297			318	
Travel Time (s)		6.0			32.4			6.8			7.2	
Confl. Peds. (#/hr)	13		11	11		13	33		28	28		33
Confl. Bikes (#/hr)			1						7			1
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	45	97	20	72	84	42	30	523	93	19	312	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	162	0	0	198	0	0	646	0	0	355	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.27			0.34			1.03			0.57	
Control Delay		9.5			9.7			61.6			14.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.5			9.7			61.6			14.6	
LOS		A			A			E			B	
Approach Delay		9.5			9.7			61.6			14.6	
Approach LOS		A			A			E			B	
Queue Length 50th (ft)		23			27			~165			65	
Queue Length 95th (ft)		52			49			#348			128	
Internal Link Dist (ft)		182			1347			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		603			574			629			624	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.27			0.34			1.03			0.57	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 35.6		Intersection LOS: D	
Intersection Capacity Utilization 67.1%		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.			

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	60	53	0	94	425	0	76	15
Peak Hour Factor	0.92	0.86	0.86	0.92	0.81	0.81	0.92	0.85	0.85
Heavy Vehicles, %	2	5	0	2	1	1	2	1	0
Mvmt Flow	0	70	62	0	116	525	0	89	18
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.2	15.2	9.7
HCM LOS	A	C	A

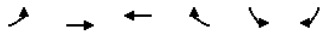
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	53%	0%	84%
Vol Thru, %	47%	18%	0%
Vol Right, %	0%	82%	16%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	113	519	91
LT Vol	60	0	76
Through Vol	53	94	0
RT Vol	0	425	15
Lane Flow Rate	131	641	107
Geometry Grp	1	1	1
Degree of Util (X)	0.182	0.692	0.165
Departure Headway (Hd)	4.997	3.89	5.538
Convergence, Y/N	Yes	Yes	Yes
Cap	716	929	643
Service Time	3.043	1.913	3.607
HCM Lane V/C Ratio	0.183	0.69	0.166
HCM Control Delay	9.2	15.2	9.7
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.7	5.8	0.6

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	129	0	0	0	128	0	391	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.85	0.85	0.92	0.78	0.78
Heavy Vehicles, %	2	1	0	2	0	1	2	1	0
Mvmt Flow	0	140	0	0	0	151	0	501	32
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.1	10.3	19.2
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	94%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	6%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	416	129	128
LT Vol	391	0	0
Through Vol	0	129	128
RT Vol	25	0	0
Lane Flow Rate	533	140	151
Geometry Grp	1	1	1
Degree of Util (X)	0.715	0.218	0.233
Departure Headway (Hd)	4.828	5.588	5.571
Convergence, Y/N	Yes	Yes	Yes
Cap	741	646	648
Service Time	2.916	3.593	3.575
HCM Lane V/C Ratio	0.719	0.217	0.233
HCM Control Delay	19.2	10.1	10.3
HCM Lane LOS	C	B	B
HCM 95th-tile Q	6.1	0.8	0.9



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	66	249	393	130	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	73	277	423	140	0	0
Pedestrians					42	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	604				958	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604				958	534
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				100	100
cM capacity (veh/h)	983				264	546

Direction, Lane #	EB 1	WB 1
Volume Total	350	562
Volume Left	73	0
Volume Right	0	140
cSH	983	1700
Volume to Capacity	0.07	0.33
Queue Length 95th (ft)	6	0
Control Delay (s)	2.5	0.0
Lane LOS	A	
Approach Delay (s)	2.5	0.0
Approach LOS		

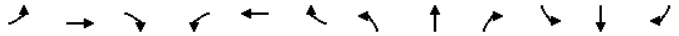
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	7	5	0	0	0	0	3	0	3	198	8	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	9	7	0	0	0	0	8	0	3	230	9	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.9	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	1%	58%	0%
Vol Thru, %	95%	42%	0%
Vol Right, %	4%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	209	12	3
LT Vol	3	7	0
Through Vol	198	5	0
RT Vol	8	0	3
Lane Flow Rate	243	16	8
Geometry Grp	1	1	1
Degree of Util (X)	0.265	0.02	0.008
Departure Headway (Hd)	3.921	4.45	3.838
Convergence, Y/N	Yes	Yes	Yes
Cap	919	792	938
Service Time	1.934	2.547	1.838
HCM Lane V/C Ratio	0.264	0.02	0.009
HCM Control Delay	8.3	7.6	6.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	22	0	0	0	4	75	1	192	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	44	0	0	0	5	94	1	231	0	0	0	0
Pedestrians		4									8	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	342	238	4	234	238	239	4			231		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	342	238	4	234	238	239	4			231		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	100	100	99	88	100			100		
cM capacity (veh/h)	537	664	1081	723	664	805	1625			1336		

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	44	99	233
Volume Left	44	0	1
Volume Right	0	94	0
cSH	537	796	1625
Volume to Capacity	0.08	0.12	0.00
Queue Length 95th (ft)	7	11	0
Control Delay (s)	12.3	10.2	0.0
Lane LOS	B	B	A
Approach Delay (s)	12.3	10.2	0.0
Approach LOS	B	B	

Intersection Summary					
Average Delay		4.1			
Intersection Capacity Utilization		26.0%	ICU Level of Service	A	
Analysis Period (min)		15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	113	4	10	99	0	1
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)	123	4	11	108	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			127		254	125
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			127		254	125
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1459		729	926

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	127	118	1
Volume Left	0	11	0
Volume Right	4	0	1
cSH	1700	1459	926
Volume to Capacity	0.07	0.01	0.00
Queue Length 95th (ft)	0	1	0
Control Delay (s)	0.0	0.7	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	0.7	8.9
Approach LOS			A

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		23.1%	ICU Level of Service
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	0	0	0
Volume Left (vph)	0	0	0
Volume Right (vph)	0	0	0
Hadj (s)	0.00	0.00	0.00
Departure Headway (s)	3.9	3.9	3.9
Degree Utilization, x	0.00	0.00	0.00
Capacity (veh/h)	917	917	917
Control Delay (s)	6.9	6.9	6.9
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A	A	A

Intersection Summary				
Delay	0.0			
Level of Service	A			
Intersection Capacity Utilization	0.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	0
Intersection LOS	-

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	0	0
HCM LOS	-	-	-

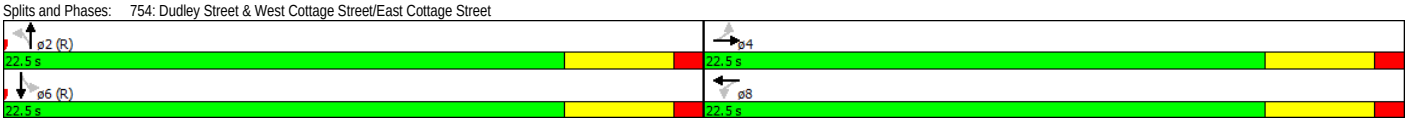
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0
LT Vol	0	0	0
Through Vol	0	0	0
RT Vol	0	0	0
Lane Flow Rate	0	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0	0	0
Departure Headway (Hd)	3.934	3.934	3.934
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	1.934	1.934	1.934
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	85	16	160	102	32	27	361	88	40	484	37
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.99			0.99	
Frt		0.982			0.985			0.975			0.991	
Flt Protected		0.992			0.973			0.997			0.996	
Satd. Flow (prot)	0	1658	0	0	1621	0	0	1572	0	0	1591	0
Flt Permitted		0.922			0.756			0.959			0.949	
Satd. Flow (perm)	0	1538	0	0	1249	0	0	1510	0	0	1515	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			16			30			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		262			1393			297			318	
Travel Time (s)		6.0			31.7			6.8			7.2	
Confl. Peds. (#/hr)	15		14	14		15	72		25	25		72
Confl. Bikes (#/hr)						2			10			10
Peak Hour Factor	0.87	0.87	0.87	0.76	0.76	0.76	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	6%	0%	13%	5%	0%
Adj. Flow (vph)	21	98	18	211	134	42	29	392	96	44	532	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	137	0	0	387	0	0	517	0	0	617	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		18.0			18.0			18.0			18.0	
Actuated g/C Ratio		0.40			0.40			0.40			0.40	
v/c Ratio		0.22			0.76			0.83			1.01	
Control Delay		9.0			24.4			26.8			57.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			24.4			26.8			57.7	
LOS		A			C			C			E	
Approach Delay		9.0			24.4			26.8			57.7	
Approach LOS		A			C			C			E	
Queue Length 50th (ft)		19			78			106			~152	
Queue Length 95th (ft)		44			#125			#258			#336	
Internal Link Dist (ft)		182			1313			217			238	
Turn Bay Length (ft)												
Base Capacity (vph)		626			509			622			611	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.22			0.76			0.83			1.01	

Intersection Summary

Area Type: CBD
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 36.3 Intersection LOS: D
Intersection Capacity Utilization 77.8% ICU Level of Service D
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.

Splits and Phases: 754: Dudley Street & West Cottage Street/East Cottage Street



Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Vol, veh/h	0	59	111	0	152	193	0	374	76
Peak Hour Factor	0.92	0.90	0.90	0.92	0.84	0.84	0.92	0.90	0.90
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	66	123	0	181	230	0	416	84
Number of Lanes	0	0	1	0	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	12.2	16.9	25.7
HCM LOS	B	C	D

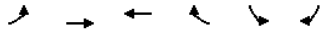
Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	0%	83%
Vol Thru, %	65%	44%	0%
Vol Right, %	0%	56%	17%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	170	345	450
LT Vol	59	0	374
Through Vol	111	152	0
RT Vol	0	193	76
Lane Flow Rate	189	411	500
Geometry Grp	1	1	1
Degree of Util (X)	0.322	0.617	0.779
Departure Headway (Hd)	6.146	5.404	5.611
Convergence, Y/N	Yes	Yes	Yes
Cap	582	665	645
Service Time	4.226	3.469	3.664
HCM Lane V/C Ratio	0.325	0.618	0.775
HCM Control Delay	12.2	16.9	25.7
HCM Lane LOS	B	C	D
HCM 95th-tile Q	1.4	4.3	7.4

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	485	0	0	0	170	0	174	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.74	0.74	0.92	0.88	0.88
Heavy Vehicles, %	2	0	0	2	0	0	2	0	0
Mvmt Flow	0	527	0	0	0	230	0	198	50
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	20.6	11.2	12.7
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	80%	0%	0%
Vol Thru, %	0%	100%	100%
Vol Right, %	20%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	218	485	170
LT Vol	174	0	0
Through Vol	0	485	170
RT Vol	44	0	0
Lane Flow Rate	248	527	230
Geometry Grp	1	1	1
Degree of Util (X)	0.401	0.733	0.344
Departure Headway (Hd)	5.831	5.006	5.389
Convergence, Y/N	Yes	Yes	Yes
Cap	617	722	666
Service Time	3.87	3.036	3.427
HCM Lane V/C Ratio	0.402	0.73	0.345
HCM Control Delay	12.7	20.6	11.2
HCM Lane LOS	B	C	B
HCM 95th-tile Q	1.9	6.5	1.5



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	100	410	400	90	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	111	456	430	97	0	0
Pedestrians					76	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	603				1232	554
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	603				1232	554
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	100
cM capacity (veh/h)	985				173	532

Direction, Lane #	EB 1	WB 1
Volume Total	567	527
Volume Left	111	0
Volume Right	0	97
cSH	985	1700
Volume to Capacity	0.11	0.31
Queue Length 95th (ft)	10	0
Control Delay (s)	2.9	0.0
Lane LOS	A	
Approach Delay (s)	2.9	0.0
Approach LOS		

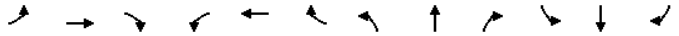
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	9	16	0	0	0	0	2	0	10	149	24	0	0	0	0
Peak Hour Factor	0.92	0.75	0.75	0.75	0.92	0.38	0.38	0.38	0.92	0.86	0.86	0.86	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0	2	2	2	2
Mvmt Flow	0	12	21	0	0	0	0	5	0	12	173	28	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	6.8	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	5%	36%	0%
Vol Thru, %	81%	64%	0%
Vol Right, %	13%	0%	100%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	183	25	2
LT Vol	10	9	0
Through Vol	149	16	0
RT Vol	24	0	2
Lane Flow Rate	213	33	5
Geometry Grp	1	1	1
Degree of Util (X)	0.231	0.04	0.005
Departure Headway (Hd)	3.9	4.35	3.698
Convergence, Y/N	Yes	Yes	Yes
Cap	921	813	950
Service Time	1.92	2.433	1.79
HCM Lane V/C Ratio	0.231	0.041	0.005
HCM Control Delay	8.1	7.6	6.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.1	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	0	0	0	19	68	3	91	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.80	0.80	0.80	0.83	0.83	0.83	0.92	0.92	0.92
Hourly flow rate (vph)	32	0	0	0	24	85	4	110	0	0	0	0
Pedestrians		5									3	
Lane Width (ft)		12.0									0.0	
Walking Speed (ft/s)		3.5									3.5	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	222	122	5	117	122	113	5			110		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222	122	5	117	122	113	5			110		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	100	100	97	91	100			100		
cM capacity (veh/h)	650	767	1079	860	767	946	1622			1481		

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	32	109	113
Volume Left	32	0	4
Volume Right	0	85	0
cSH	650	900	1622
Volume to Capacity	0.05	0.12	0.00
Queue Length 95th (ft)	4	10	0
Control Delay (s)	10.8	9.5	0.2
Lane LOS	B	A	A
Approach Delay (s)	10.8	9.5	0.2
Approach LOS	B	A	

Intersection Summary					
Average Delay	5.6				
Intersection Capacity Utilization	19.8%	ICU Level of Service		A	
Analysis Period (min)	15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	163	5	12	215	2	7
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)	177	5	13	234	2	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			183		440	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			183		440	180
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1392		569	863

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	183	247	10
Volume Left	0	13	2
Volume Right	5	0	8
cSH	1700	1392	774
Volume to Capacity	0.11	0.01	0.01
Queue Length 95th (ft)	0	1	1
Control Delay (s)	0.0	0.5	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	9.7
Approach LOS			A

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		33.5%	ICU Level of Service
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	0	0	1	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	0	0	0

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	0	1	0
Volume Left (vph)	0	0	0
Volume Right (vph)	0	0	0
Hadj (s)	0.00	0.03	0.00
Departure Headway (s)	3.9	3.9	3.9
Degree Utilization, x	0.00	0.00	0.00
Capacity (veh/h)	917	912	917
Control Delay (s)	6.9	6.9	6.9
Approach Delay (s)	0.0	6.9	0.0
Approach LOS	A	A	A

Intersection Summary				
Delay		6.9		
Level of Service		A		
Intersection Capacity Utilization		6.7%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	1	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	1	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	6.9	0
HCM LOS	-	A	-

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	1	0	0
LT Vol	0	0	0
Through Vol	1	0	0
RT Vol	0	0	0
Lane Flow Rate	1	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0.001	0	0
Departure Headway (Hd)	3.934	3.936	3.935
Convergence, Y/N	Yes	Yes	Yes
Cap	915	0	0
Service Time	1.934	1.936	1.935
HCM Lane V/C Ratio	0.001	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	A	N	N
HCM 95th-tile Q	0	0	0

Appendix C

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 2015 and 2020 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2015	2020
Free Flow	30 mph	2.018	2.091
Right Turns	10 mph	3.484	3.369
Left Turns	15 mph	2.920	2.939
Queues	Idle	7.654	5.015

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 370 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 30 mph were used for right turn, left turn, and free flow links, respectively.

65 East Cottage Street, Boston
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2012	2013	2014	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2012-2014 Background Concentration ($\mu g/m^3$)	Location
SO_2 [1][6]	1-Hour [5]	99th %	12.1	10.9	12.3	ppb	2.62	30.8	Harrison Ave., Boston
	3-Hour	H2H	11.8	9.7	21.5	ppb	2.62	56.3	Harrison Ave., Boston
	24-Hour	H2H	5	5	5.1	ppb	2.62	13.4	Harrison Ave., Boston
	Annual	H	1.1	1.1	1.1	ppb	2.62	2.9	Harrison Ave., Boston
PM-10	24-Hour	H2H	32.0	34	61	$\mu g/m^3$	1	61	Harrison Ave., Boston
	Annual	H	14.2	15.1	13.9	$\mu g/m^3$	1	15.1	Harrison Ave., Boston
PM-2.5	24-Hour [5]	98th %	20.6	15.9	12.7	$\mu g/m^3$	1	16.4	Harrison Ave., Boston
	Annual [5]	H	8.3	7.3	6.0	$\mu g/m^3$	1	7.2	Harrison Ave., Boston
NO_2 [3]	1-Hour [5]	98th %	44	50	51	ppb	1.88	90.9	Harrison Ave., Boston
	Annual	H	15.8	17.4	15.8	ppb	1.88	32.8	Harrison Ave., Boston
CO [2]	1-Hour	H2H	2.2	1.9	1.7	ppm	1146	2474.2	Harrison Ave., Boston
	8-Hour	H2H	1.9	1.2	1.3	ppm	1146	2177.4	Harrison Ave., Boston
Ozone [4]	8-Hour	H4H	0.062	0.059	0.054	ppm	1963	121.7	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.014	0.006	0.014	$\mu g/m^3$	1	0.014	Harrison Ave., Boston

Notes:
From 2012-2014 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.

Due to excessive size, CAL3QHC and MOVES input and output files are available on digital media upon request.

Appendix D

Climate Change Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

A.1 - Project Information

Project Name:	**Indigo Block Redevelopment**
Project Address Primary:	**65 East Cottage Street**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	**My Lam, Manager, Escazú Development, my.lam@escazudev.com, 857-939-5220**

A.2 - Team Description

Owner / Developer:	**Dorchester Bay Economic Development, Boston Capital-Escazu Development, LLC, Newmarket Community Partners**
Architect:	**Davis Square Architects**
Engineer:	
Sustainability / LEED:	**New Ecology**
Permitting:	**Epsilon Associates, Inc.**
Construction Management:	
Climate Change Expert:	**Epsilon Associates, Inc.**

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☑ PNF / Expanded PNF Submission	☐ Draft / Final Project Impact Report Submission	☐ BRA Board Approved	☐ Notice of Project Change
☐ Planned Development Area	☐ BRA Final Design Approved	☐ Under Construction	☐ Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Commercial/Industrial, Residential
List the First Floor Uses:	*Commercial/Industrial, Residential*

What is the principal Construction Type – select most appropriate type?

☑ Wood Frame	☐ Masonry	☐ Steel Frame	☐ Concrete

Describe the building?

Site Area:	*119,648 SF*	Building Area:	*123,400 SF*
Building Height:	*34-62 Ft.*	Number of Stories:	*2-6 Flrs.*
First Floor Elevation (reference Boston City Base):	*varies*	Are there below grade spaces/levels, if yes how many:	*Yes, Townhomes only*

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?
(Apartment building only)

Select by Primary Use:	☐ New Construction	☐ Core & Shell	☐ Healthcare	☐ Schools
	☐ Retail	☐ Homes Midrise	☑ Homes	☐ Other
Select LEED Outcome:	☐ Certified	☑ Silver	☐ Gold	☐ Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes / No*	Certified:	*Yes / No*

A.6 - Building Energy-

What are the base and peak operating energy loads for the building? **TBD**

Electric:	*(kW)*	Heating:	*(MMBtu/hr)*
What is the planned building Energy Use Intensity:	*(kWh/SF)*	Cooling:	*(Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*(kW)*	Heating:	*(MMBtu/hr)*
		Cooling:	*(Tons/hr)*

What is nature and source of your back-up / emergency generators? **TBD**

Electrical Generation:	*(kW)*		Fuel Source:	
System Type and Number of Units:	☐ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	☐ 10 Years	☑ 25 Years	☐ 50 Years	☐ 75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

8/91 Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	*5 Days*	*6 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 Events / yr.*

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

45 Inches / yr.	*4 Inches*	*0.5 Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

105 Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	***25%***
How is performance determined:	

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:	☑ High performance building envelop	☐ High performance lighting & controls	☐ Building day lighting	☑ EnergyStar equip. / appliances
	☑ High performance HVAC equipment	☐ Energy recovery ventilation	☐ No active cooling	☐ No active heating
Describe any added measures:				

What are the insulation (R) values for building envelop elements?

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13BATTS + R8 continuous insulation*
Foundation:	*R = 15*	Basement / Slab:	*R =10*
Windows:	*R = / U =0.4*	Doors:	*R = / U =0.7*

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

☐ On-site clean energy / CHP system(s)	☐ Building-wide power dimming	☐ Thermal energy storage systems	☐ Ground source heat pump
☐ On-site Solar PV	☐ On-site Solar Thermal	☐ Wind power	☑ None
Describe any added measures:	Studying the use of solar PV or solar hot water		

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:	☐ Connected to local distributed electrical	☐ Building will be Smart Grid ready	☐ Connected to distributed steam, hot, chilled water	☐ Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

No	If yes, for how long:	*Days*
If Yes, is building "Islandable?		
If Yes, describe strategies:		

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:	☐ Solar oriented – longer south walls	☐ Prevailing winds oriented	☐ External shading devices	☐ Tuned glazing,
	☐ Building cool zones	☑ Operable windows	☑ Natural ventilation	☐ Building shading
	☐ Potable water for drinking / food preparation	☐ Potable water for sinks / sanitary systems	☐ Waste water storage capacity	☑ High Performance Building Envelop
Describe any added measures:				

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:	☐ High reflective paving materials	☑ Shade trees & shrubs	☑ High reflective roof materials	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:	☐ On-site retention systems & ponds	☐ Infiltration galleries & areas	☐ Vegetated water capture systems	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:	☐ Hardened building structure & elements	☐ Buried utilities & hardened infrastructure	☐ Hazard removal & protective landscapes	☑ Soft & permeable surfaces (water infiltration)
Describe other strategies:				

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

	No

Describe site conditions?

Site Elevation – Low/High Points:	*Boston City Base Elev. 22-53 (Ft.)*
Building Proximity to Water:	*N/A*

Is the site or building located in any of the following?

Coastal Zone:	*No*	Velocity Zone:	*No*
Flood Zone:	*No*	Area Prone to Flooding:	*No*

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	*No*	Future floodplain delineation updates:	*No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

N/A

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*Ft.*	Frequency of storms:	*per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

☐ Systems located above 1st Floor.	☐ Water tight utility conduits	☐ Waste water back flow prevention	☐ Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

Yes / No

If Yes, describe:

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	☐ Hardened / Resilient Ground Floor Construction	☐ Temporary shutters and or barricades	☐ Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*Yes / No*	☐ Solar PV	☐ Solar Thermal	☐ Clean Energy / CHP System(s)
		☐ Potable water storage	☐ Wastewater storage	☐ Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix E

Accessibility Checklist

Project Information

Project Name:	INDIGO BLOCK REDEVELOPMENT
Project Address Primary:	EAST COTTAGE ST
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	CLIFFORD BOEHMER, DAVIS SQUARE ARCHITECTS INC. 240 A ELM ST SOMERVILLE MA 02144

Team Description

Owner / Developer:	DORCHESTER BAY, ESCAZU DEVELOPMENT, NEWMARKET COMMUNITY PARTNERS, BOSTON CAPITAL
Architect:	DAVIS SQUARE ARCHITECTS INC.
Engineer (building systems):	TBD
Sustainability / LEED:	NEW ECOLOGY
Permitting:	EPSILON ASSOCIATES
Construction Management:	TBD

Project Permitting and Phase

At what phase is the project -- at time of this questionnaire?

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	**Residential - Multi-unit, Four +**	Institutional	Education
Commercial	**Office**	Retail	Assembly
Laboratory / Medical	**Manufacturing / Industrial**	Mercantile	Storage, Utility and Other
First Floor Uses (List)			

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	**Steel Frame**	**Concrete**

Describe the building?

Site Area:	119,648 *SF*	Building Area:	123,400 *SF*
Building Height:	34 TO 62 *Ft.*	Number of Stories:	2 TO 6 *Flrs.*
First Floor Elevation:	VARIES *Elev.*	Are there below grade spaces:	**Yes** / *No*

Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and proximate institutions such as, but not limited to hospitals, elderly and disabled housing, and general neighborhood information. The proponent should identify how the area surrounding the development is accessible for people with mobility impairments and should analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the development neighborhood and identifying characteristics.	SEE URBAN DESIGN NARRATIVE , SECTION 5.0
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	UPHAMS CORNER MBTA STOP APROXIMATELY 1/4 MILE FROM SITE (NO ACCESSIBLE PATH FROM SITE TO STOP)
List the surrounding institutions: hospitals, public housing and	SEE URBANDESIGN NARRATIVE, SECTION 5.0

elderly and disabled housing developments, educational facilities, etc.	
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	NOT ON A PRIORITY ACCESSIBLE ROUTE KROC CENTER IS 1/2 MILE FROM SITE

Surrounding Site Conditions – Existing:

This section identifies the current condition of the sidewalks and pedestrian ramps around the development site.

Are there sidewalks and pedestrian ramps existing at the development site?	NO
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	NO
Is the development site within a historic district? If yes, please identify.	NO

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of 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. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of

pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	ALL NEW SIDEWALKS ARE ON PRIVATE PROPERTY
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	5 FT
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?	CONCRETE, ALL ON PRIVATE PROPERTY
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	TBD
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	NO
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	

Proposed 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 Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	91
What is the total number of accessible spaces provided at the development site?	4
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	ALL STREETS PRIVATE
Where is accessible visitor parking located?	ALONG PARKING LANE
Has a drop-off area been identified? If yes, will it be accessible?	NOT IDENTIFIED
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all

abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	SEE ATTACHMENT
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	ALL ENTRIES INTO COMMON SPACES AND 80 RESIDENTIAL UNITS WILL HAVE FLAT OR SLOPED WALKWAY ENTRANCES WITH 1/2" THRESHOLDS
Are the accessible entrance and the standard entrance integrated?	YES
If no above, what is the reason?	
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	SEE ATTACHMENT
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	WILL BE DEVELOPED

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

What is the total number of proposed units for the development?	88
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	8 FOR SALE - MARKET RATE 80 FOR RENTAL - AFFORDABLE
How many accessible units are being proposed?	4 (1 @ 1 BED, 2 @ 2 BED, 1 @ 3 BED)
Please provide plan and diagram of the accessible units.	SEE PLANS SECTION

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How many accessible units will also be affordable? If none, please describe reason.	100% AFFORDABLE
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	ALL RENTAL UNITS WILL BE AAB GROUP 1 OR GROUP 2
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	NO
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	TBD

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities


PUBLIC WAY
Building A
Building B
Building C
Building D
TO COURTYARD
TO PLAYSPACE
TO MBTA
PUBLIC WAY
EAST COTTAGE STREET
HILLSBORO
BECKWITH STREET