PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), pursuant to Article 80 of the Boston Zoning Code, hereby gives notice that an Expanded Project Notification Form ("Expanded PNF") for Large Project Review was filed by J. C. Cannistraro, LLC ("the Proponent") on October 1, 2015, for the proposed renovation of the approximately 157,000 square foot existing building at 25 Fid Kennedy Avenue, located in the Boston Marine Industrial Park in South Boston.

The Project proposes to substantially rehabilitate the existing, vacant, industrial building for use as a plumbing, HVAC, fire-protection and related construction industries product assembly plant incorporating fabrication, staging, storage, shipping/receiving and associated office functions. The Proponent will salvage and restore materials when feasible, and where not feasible, will replace materials with materials of similar appearance so as to preserve the historic character of the building. The Project will utilize existing parking spaces on-site.

The Proponent is seeking the issuance of a Scoping Determination by the BRA pursuant to Section 80B-5. The BRA, in the Scoping Determination for such Expanded PNF, may waive further review pursuant to Section 80B-5.3(d), if, after reviewing public comments, the BRA finds that such Expanded PNF adequately describes the Project's impacts.

The Expanded PNF may be reviewed in the office of the Secretary of the BRA, Room 910, Boston City Hall, 9th Floor, Boston, MA 02201 between 9:00 AM and 5:00 PM, Monday through Friday, except legal holidays. Public comments on the Expanded PNF, including the comments of public agencies, should be submitted in writing to Mr. Gary Uter, BRA, at the address stated above within 30 days of this notice.

BOSTON REDEVELOPMENT AUTHORITY
Brian P. Golden, Director

Expanded Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

25 Fid Kennedy Avenue

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

Submitted by:
J. C. Cannistraro, LLC
80 Rosedale Road
Watertown, MA 02472

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

In Association with:
Bargmann Hendrie + Archetype, Inc.
Dalton & Finegold, LLP
Howard Stein Hudson Associates, Inc.
H. W. Moore Associates Inc.
AHA Consulting Engineers

October 1, 2015

Epsilon
ASSOCIATES INC.

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Table of Contents

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

List of Appendices

List of Figures

List of Tables

Chapter 1.0

Introduction/ Project Description

1.0 INTRODUCTION/ PROJECT DESCRIPTION

1.1 Introduction

J. C. Cannistraro, LLC (the Proponent) proposes to renovate and restore the existing industrial building at 25 Fid Kennedy Avenue (the Project) in the Boston Marine Industrial Park (BMIP). The BMIP is owned by the Economic Development and Industrial Corporation of Boston, a quasi-public agency that has merged administratively with the Boston Redevelopment Authority (together, the BRA/EDIC). The Proponent seeks to lease the Project Site (defined below) from the BRA/EDIC for a term of 50 years, with two, consecutive 10-year options. The site, designated at Parcel N, is bound by Fid Kennedy Avenue to the north, Dolphin Way to the east, and Capstan Way to the west. Pursuant to the lease, the Proponent will return this currently vacant building to productive use, thereby maintaining the BMIP as an important base for industrial jobs and economic activity in Boston.

As an innovator in the construction industry, the Proponent mandates modular prefabrication so that the bulk of construction-related work will occur offsite and be delivered to the project for installation. The proposed Project will substantially rehabilitate the existing, vacant, industrial building for use as a plumbing, HVAC, fire-protection, and related construction industries product assembly plant incorporating fabrication, staging, storage, shipping/receiving and associated office functions. The Proponent will salvage and restore materials when feasible, and where not feasible, will replace materials with materials of similar appearance so as to preserve the historic character of the building. These improvements will reinvigorate the site consistent with the BMIP Master Plan.

This Expanded Project Notification Form (Expanded PNF) is being submitted to the Boston Redevelopment Authority (BRA) to initiate review of the Project under Section 80B, Large Project Review, of the City of Boston Zoning Code. The Expanded PNF offers a description of the Project, its benefits to the BMIP and the City of Boston analyzes the effects of the proposed interior and exterior improvements on the local environment.

1.2 Project Identification

Address/Location:	25 Fid Kennedy Avenue (the Project Site)
Developer:	J. C. Cannistraro, LLC 80 Rosedale Road Watertown, MA 02472 (617) 926-0092 John Cannistraro David Cannistraro

Architect:	Bargmann Hendrie + Archetype, Inc. 300 A Street Boston, MA 02210 (617) 350-0450 Joel Bargmann Jack Glassman
Legal Counsel:	Dalton & Finegold, LLP 183 State Street, 5th Floor Boston, MA 02109 (617) 936-7777 Jared Eigerman Nixon Peadbody LLP 100 Summer Street Boston, MA 02110 (617) 345-1000 Larry S. DiCara Matthew R. Lynch
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Doug Kelleher Talya Moked
Transportation and Parking Consultant	Howard Stein Hudson Associates, Inc. 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Guy Busa Mike Santos
Civil Engineer	H.W. Moore Associates Inc. 112 Shawmut Avenue, #4 Boston, MA 02118 (617) 357-8145 Frederick A. Keylor

MEP Engineer	AHA Consulting Engineers 24 Hartwell Avenue, Third Floor Lexington, MA 02421 (781) 372-3000 Tom Wisnaskas, PE Robert Andrews

1.3 Project Description

1.3.1 Area Context

The Project Site is located within the Boston Marine Industrial Park on the South Boston waterfront. The BMIP was largely created through landfill projects in the 19th and 20th centuries. BMIP has been and continues to be an important maritime facility in Boston with docks, wharves, and rail access. The majority of the buildings and structures were built between 1914 and the mid-1940s as part of the South Boston Naval Annex and South Boston Army Base, which operated here between 1920 and 1974. These buildings were robust warehouses and processing centers capable of supporting military equipment, vehicles, and ammunition for deployment around the world. By the 1970s, shipping had declined and the United States government closed the annex in 1974. The Economic Development and Industrial Commission (EDIC) acquired the BMIP in two transactions between 1977 and 1983 with the intent to promote economic growth and maritime industrial development. In the 1990s, following the completion of the Central Artery project and the establishment of the MBTA Silver Line connecting downtown Boston to the Reserved Channel, new growth began in this area.

The once nearly empty and abandoned BMIP is now occupied by 250 businesses housing 3,500 employees. This area has been identified as a prime location for consolidating, preserving, and growing Boston's ocean trade, maritime industries and industrial uses. It is also intended to create and protect decent-wage jobs for a variety of skill levels. Based on its Master Plan, adopted in 1999 (described below) most of the Boston Marine Industrial Park is reserved for maritime and general industrial purposes.

1.3.2 Project Site

The Project Site is an approximately 141,425 square-foot (3.25-acre) parcel of land located at 25 Fid Kennedy Avenue in the South Boston neighborhood of Boston (see Figure 1-1). The site is designated as Parcel N within the Boston Marine Industrial Park (see Figure 1-2). The existing building on the site occupies a footprint of approximately 85,600 square feet (sf) and has a gross floor area of approximately 157,000 sf, distributed across a large and very tall ground-floor flanked by one-story wings, a second story, and two added mezzanines. Figures 1-3 through 1-5 present existing conditions on the Project Site.

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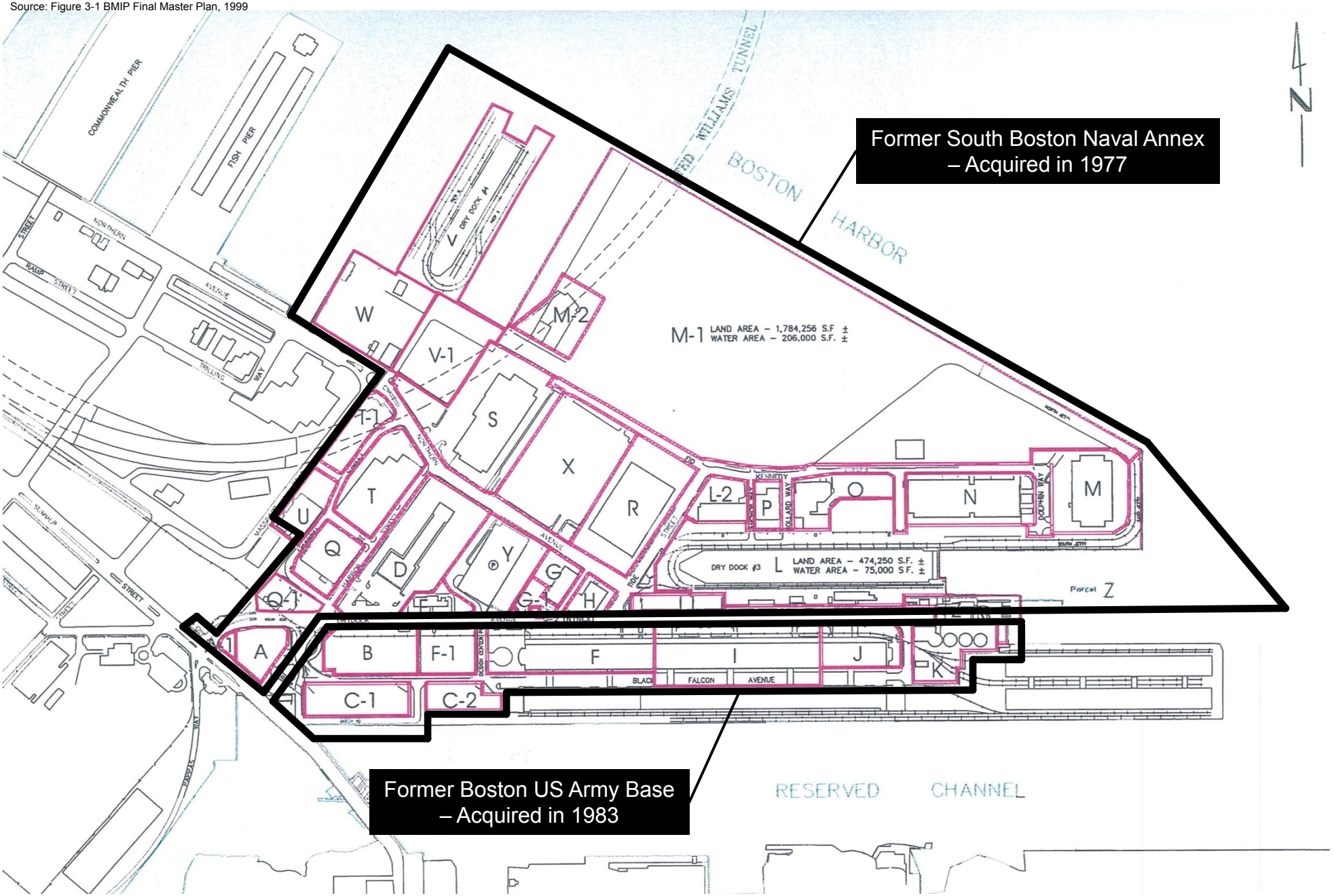
Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014

25 Fid Kennedy Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1
Aerial Locus Map

Source: Figure 3-1 BMIP Final Master Plan, 1999



25 Fid Kennedy Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-2

BMIP Boundary Plan

Erected ca. 1940-42 and originally known as "Building 16," the existing building at 25 Fid Kennedy Avenue is an expansive 20-by-8-bay, open-interior, rectangular, steel frame, corrugated-sheet-metal-clad structure. Stair towers rise above the roof at the southeast and northwest corners. The shallow-pent roof is surmounted by ten full-width illumination monitors, rectangular in plan, two of which were subsequently altered to accommodate timber-framed mezzanines. Of relatively recent vintage, the fully-adhered EPDM rubber roofing system is bordered with bright red cornice and fascia components and is crisscrossed by a network of avian control wires. Corrugated glass vertical glazing was salvaged, reconfigured and reinstalled in the monitors, flanked by corrugated steel ends.

The stair towers have subtle Moderne detailing, including offset vertical bands of windows flanked by vertical metal trim. The first floor of the north and south elevations consists of one-story, yellow-brick and concrete administrative blocks that extend one bay from the main block of the building; these blocks are characterized by continuous horizontal scored rustication, and a wide, molded concrete band at the cornice. Details include original heavy, single-and double-leaf paneled wood doors with decorative strap hinges, elaborate, abstracted carved drapery motifs and the number "16" carved into shields at the stair tower comer entrances.

Service access consists of oversize metal roll-type doors, with two each on the east and west elevations, three on the south, and one on the north elevation. The steel frame is clad in a relatively thin membrane of alternating wide horizontal bands of "asbestos-protected" corrugated metal panels and horizontal bands (in varying widths) of thick corrugated wire glass lights, which admit diffuse light to the interior. The fixed corrugated glass units are secured to horizontal girts and channels via gasketed, face-mounted caps; at some window bands, operable units were originally ganged together with geared rack-and-pinion mechanisms. The top band of windows is comprised of multiple-pane, steel-sash hopper - type projected sash for ventilating the interior; similar sash assemblies infill masonry openings at the north and south wings on the first floor.

The internal structure consists of three rows of massive, steel I-beam columns, one each running longitudinally at the north and south elevations, and one at the center of the building, dividing it into two east-west bays. These columns support overhead roof truss work, and each of the two east-west bays includes one or more rail-guided traveling cranes.

1.3.3 Proposed Project

Pursuant to a 50-year lease with the BRA/EDIC, with two, consecutive ten-year options, J. C. Cannistraro LLC proposes to substantially rehabilitate the existing approximately 157,000 sf building for use as a plumbing, HVAC, fire-protection, and related construction product assembly plant incorporating fabrication, staging, storage, shipping/receiving and associated office functions. The Project will be served by 30 on-site parking spaces, and loading spaces as described in Chapter 2.

The ground floor will combine welding, assembly, fabrication and materials storage areas, flanked on one side by administrative offices, and will also incorporate at-grade and raised truck loading/unloading areas on all four sides of the building. The second floor will combine fabrication, staging and cutting area, a tool room, office/support areas and expansion space. Existing freight elevators and stair towers will be upgraded and supplemented by one new enclosed fire stair and a new open-sided vertical lift for materials. Figures 1-6 and 1-7 present the proposed floor plans.

The building will be entirely re-clad with an interlocking, insulated metal panel system evocative of the existing asbestos-protected metal system.

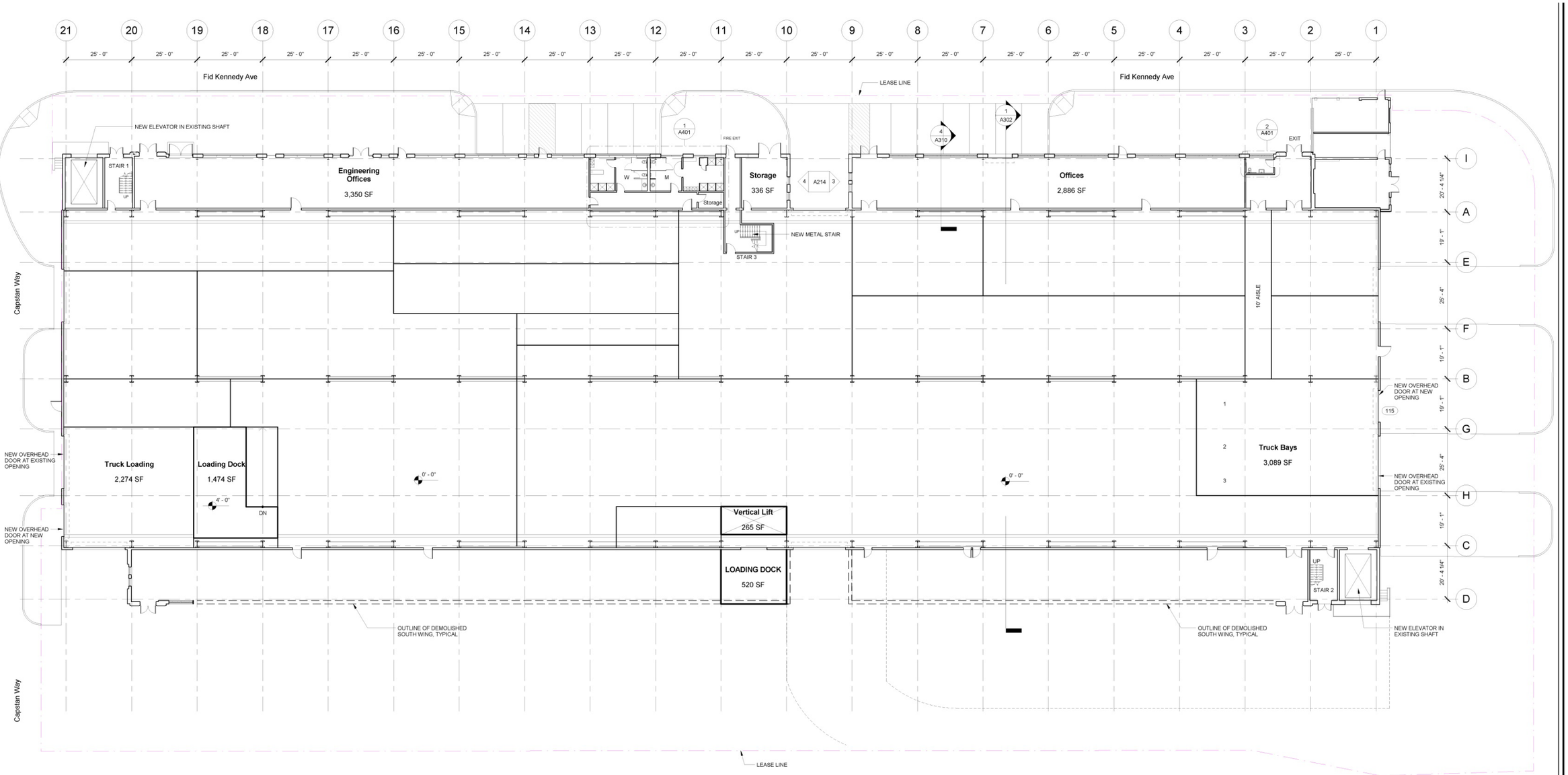
Throughout the expansive first-floor level, the fixed and (originally) operable wire glass sash will be replaced with translucent polycarbonate panels, oriented vertically and secured in place with metal caps to simulate the appearance of the corrugated glass. At the second floor level, the existing single-glazed steel industrial sash will be replaced with new clear insulated glazing in aluminum fixed and single-hung sash. In selected areas of the building, (e.g., the prominent stair/elevator towers), existing vertically running trim and corner caps will be replicated and the corrugated glass window assemblies will be retained and restored.

The existing one-story brick and concrete wing along the south elevation of the building will be demolished to accommodate new truck loading docks and materials staging areas; a structural steel canopy to create a covered outdoor staging area may be constructed in this location in the future. Construction materials salvaged from the demolished south wing will be used to repair and restore the nearly identical north wing which will be retained to house engineering offices, a break room and support functions.

Comprised primarily of buff-colored brick masonry and cast stone cornices copings and decorative features, the north wing requires a range of repair, repointing and restoration. At masonry openings, rusted and missing steel lintels will be replaced and door and window openings occupied by steel and aluminum window openings will be infilled with a combination of glass and opaque panels, all of it respectful of the original fenestration design. Handsome and robustly-detailed stile-and-rail doors with heavy strap hinges survive in fair to poor condition and are slated to be repaired and/or replaced.

1.3.4 Consistency with the BMIP Master Plan

As noted above, the Project is subject to the BMIP Master Plan, which comprises a Final Environmental Impact Report approved under the Massachusetts Environmental Policy Act (MEPA). The Project is consistent with goals stated in the Master Plan. The Master Plan identifies an overarching goal for the BMIP as accommodating both "new and existing industries that can provide attractive job opportunities for Boston residents" (Master Plan at page 1-1). The Project will improve existing conditions on the site while retaining it within general industrial use.



NOTE :

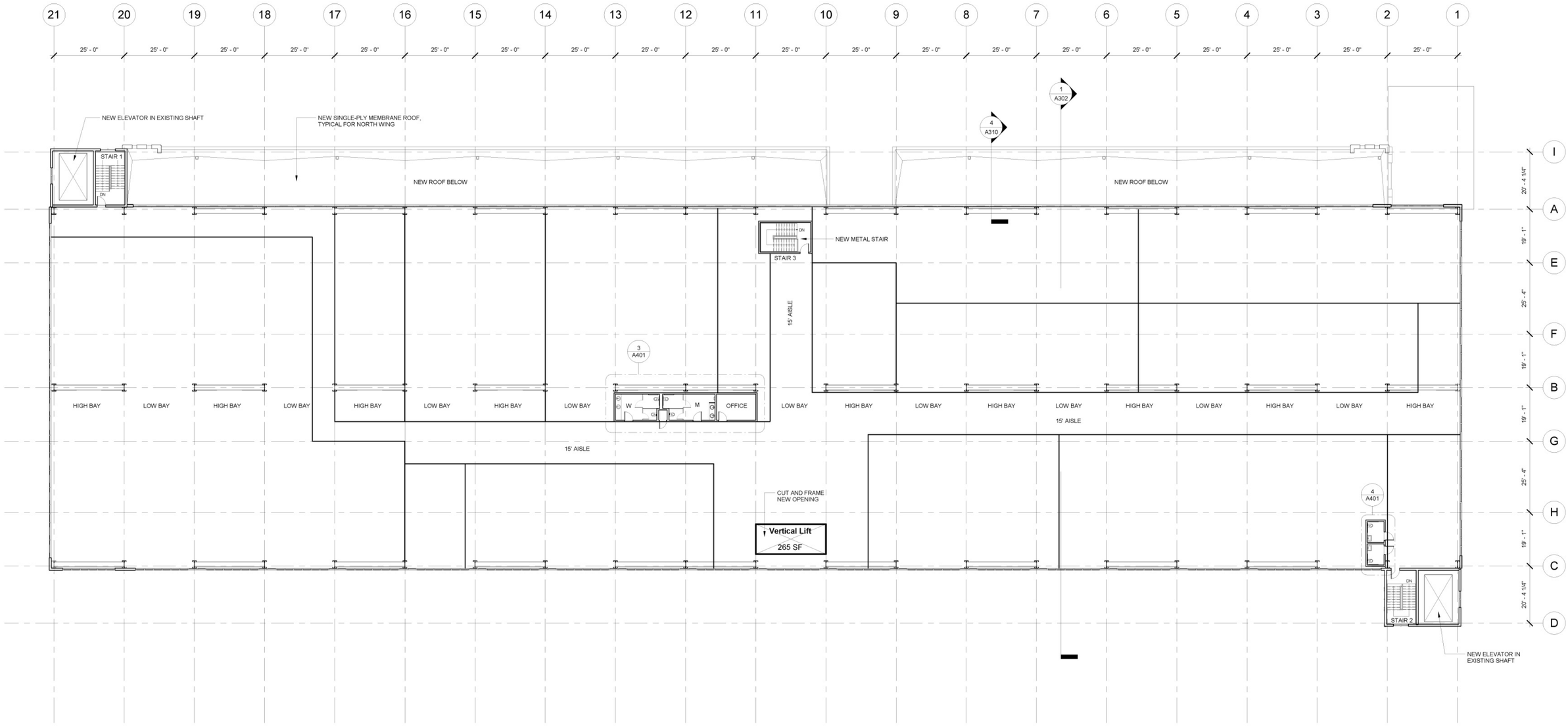
Demolish one-story masonry and concrete wing in its entirety. Patch and level existing floor slab to remain. Provide new façade infill (including without limitation, corrugated metal siding on new infill framing, steel doors and frames, aluminum window assemblies, and all associated flashing, sealants and hardware).

25 Fid Kennedy Avenue Boston, Massachusetts

bh+a

Figure 1-6

First Floor Plan



25 Fid Kennedy Avenue Boston, Massachusetts

bh+a

Figure 1-7

Second Floor Plan

The Master Plan also seeks "to protect [the BMIP's] existing job base and its industrial, manufacturing, and waterfront environment" (Id. at page 1-2). The Project will enhance the existing BMIP job base by converting long-vacant space to a productive use that attracts new industrial job opportunities. The Project will bring approximately 100 new, permanent jobs to the BMIP, including industrial, warehousing, and supporting office functions.

1.4 Public Benefits

As noted above, the Project includes the renovation of an existing, vacant building and will maintain the site's general industrial use. The Project will include numerous benefits to the BMIP specifically and the City of Boston, overall, including but not limited to:

- Creating approximately 140 construction jobs and approximately 100 permanent jobs;
- Restoring a vacant, industrial building using materials and techniques respectful of its original design;
- Developing in accordance with Smart Growth principles by reusing an existing building and infrastructure; and
- Utilizing sustainable design and green building features to promote energy conservation, and to comply with the provisions of Article 37 of the Boston Zoning Code.

1.5 City of Boston Zoning

1.5.1 Zoning Districts

Based on Zoning Map 4 (South Boston) appended to the Boston Zoning Code, the Project site is located within a General Industrial (I-2) zoning district, and the South Boston Restricted Parking Overlay District. (See Boston Zoning Code art. 8 and § 3-1A.)

1.5.2 Use Regulations

Industrial and office uses, such as those proposed as part of the Project, are permitted by right at all sites in the I-2 zoning district. (Id. art. 8, Table A, Uses 39-42, 68, and 69.) Accessory parking use is also permitted by right at the Project site. (Id., Use 72.)

1.5.3 Bulk and Dimensional Requirements

The applicable dimensional requirements appear in Table B of Article 13 of the Boston Zoning Code. (Id. § 13-1.) In the previous building permit filings for parcels located within the BMIP, applicants have taken the position that the entirety of the BMIP qualifies as a single zoning parcel because all internal roadways are private ways. (See, e.g., 2005 BRA/BRA/EDIC PNF § 1.3, p. 4.) Regardless, the Project does not entail any change to the

footprint or envelope of the existing building. A building or use existing on the effective date of the Zoning Code and not conforming to the applicable dimensional requirements specified therein may nevertheless be altered or enlarged, provided that such nonconformity is not increased and that any enlargement itself conforms to such dimensional requirements. (Boston Zoning Code § 13-3.)

1.5.4 Off-street Parking and Loading Requirements

In the South Boston Restricted Parking Overlay District, off-street parking facilities, including parking accessory or ancillary to any use other than certain residential uses, normally require a conditional use permit from the Boston Board of Appeal. (Boston Zoning Code §§ 3-1A(c) and 23-5.) However, the 30 parking spaces that will serve the Project already exist, and may continue lawfully as a pre-existing conditional use. (See id. § 8-6.) The loading spaces that will serve the Project exceed the minimum of three loading spaces normally required for 150,000 square feet of industrial use. (See § 24-1.)

1.5.5 Inapplicability of Linkage Requirements

The BRA's Development Impact Project (DIP) exactions (linkage) program requires the payment of development exactions, or equivalent in-kind contributions, for the creation of affordable housing and job training programs. (§ 80B-7(1).) The Project will not trigger the DIP exactions requirements of Section 80B-7 because it will not result in any new Development Impact Uses as defined in Section 80B-7.2(c) of the Zoning Code.

1.5.6 Boston Civic Design Commission

The Boston Civic Design Commission (BCDC) must review any project exceeding 100,000 square feet of gross floor area or any project determined by BCDC to be of "special urban design significance." (§ 28-5.) Although the Project would involve substantial rehabilitation of the Existing Building, which exceeds 100,000 square feet of gross floor area, it does not entail any substantial changes to that building. BCDC review, therefore, is not expected to be required.

1.5.7 Boston Landmarks Commission

The Boston Landmarks Commission (BLC) is empowered to designate structures, including interior areas of such structures, as Boston Landmarks. Alterations to such structures are subject to prior review and approval by the BLC. The BLC is also authorized to review and approve projects located within any of Boston's various local historic districts. Finally, the BLC reviews projects in Boston: (A) as a commenting agency under Large Project Review; (B) to assist MHC in conducting State Register Review; and (C) as a certified local government reviewing any historic rehabilitation tax credit application that might be

submitted for the project. The BLC has not determined that the existing building is a Boston Landmark, nor is the Project Site located within a local historic district administered by the BLC. BLC is, however, expected to comment on this Expanded PNF.

1.5.8 Boston Conservation Commission

The Boston Conservation Commission (Boston Con. Comm.) administers the Massachusetts Wetlands Protection Act and its associated regulations (MGL c. 131 § 40; 310 CMR § 10.00) as they apply to the Project. Prior to the commencement of construction in an area subject to protection under the Act, or within 100 feet thereof, a Notice of Intent must be filed with the local conservation commission and an order of conditions issued relative to the work proposed to be undertaken. The Proponent will file all requisite documentation with the Con. Comm. for the Project, to the extent it is subject to the Act.

1.5.9 South Boston Parking Freeze

The site is located within the South Boston Parking Freeze Area. As directed by federal and state law and implemented local by city ordinances, Boston's Air Pollution Control Commission (APCC) requires a permit for any non-residential parking spaces at the Project Site. (MGL c. 111, §§ 142A-142J; 310 CMR 7.33.) APCC has issued a master parking freeze permit for the entirety of BMIP. All parking freeze permits must be renewed annually. Parking freeze permits run with the land, and are non-transferable.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Project Team is unaware of any legal judgments adverse to the Project.

1.6.2 History of Tax Arrears on Property

The Project Team is unaware of any unpaid property taxes for the Project Site.

1.6.3 Site Control/ Public Easements

As noted above, BRA/EDIC owns a fee interest the Project Site. The Proponent intends to lease the Project Site from BRA/EDIC for a period of 50 years, with two, consecutive 10-year options. The Boston Water and Sewer Commission, a subdivision of the Commonwealth of Massachusetts, holds a 20 foot-wide easement area for sanitary sewer and water main line facilities, which crosses the southerly edge of the Project Site (Suffolk Registry of Deeds, Bk. 50164, Pg. 98). Drain lines at the site are owned by BRA/EDIC. The Proponent is unaware, however, of any public easements at the Project Site, other than by virtue of Chapter 91 of the Massachusetts General Laws, discussed in Section 1.7.2.1, below.

1.7 Regulatory Controls and Permits

1.7.1 City Review

Large Project Review under Section 80B of the Boston Zoning Code is required at the Project Site for any proposed project: to add at least 50,000 square feet of gross floor area; to change the uses of a gross floor area of 100,000 or more square feet; or for the substantial rehabilitation at least 100,000 square feet. (Boston Zoning Code § 80B-2.) Here, the Project would not add any floor area, nor change uses. However, the Project qualifies as "substantial rehabilitation," because the cost of improvements over a 12-month period would exceed 50% of the assessed physical value of the Existing Building. Accordingly, this Expanded PNF is being submitted as part of Large Project Review. The Proponent expects to facilitate a comprehensive public process.

1.7.2 State Review

1.7.2.1 Chapter 91

The Project Site is located on tidelands subject to Chapter 91 and associated Waterways Regulations (310 CMR 9.00), commonly known as "Chapter 91." Chapter 91 provides that any non-marine use project that includes fill or structures on any tidelands must not unreasonably diminish the capacity of such lands to accommodate marine industrial use. (310 CMR 9.51.)

The Project Site also lies within one of Massachusetts's Designated Port Areas (DPAs), which are overseen by the Office of Coastal Zone Management (CZM), a division of the Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA). The DPA Regulations complement and work in conjunction with the Chapter 91 Regulations, which govern the licensing of structures and uses in DPAs, and with the Municipal Harbor Plan Regulations, which govern the review and approval of DPAs.

For special flexibility in licensing, the Chapter 91 Regulations allow a city or town to designate a "Marine Industrial Park" by having a Marine Industrial Park Master Plan approved under the Massachusetts Environmental Policy Act (MEPA) and accepted by the Wetlands and Waterways Division of the Massachusetts Department of Environmental Protection (MassDEP Waterways). The Boston Marine Industrial Park Final Master Plan (BMIP Master Plan) – which also serves as the Final Environmental Impact Report for purposes of MEPA – was published in December 1999. Subsequently, the Secretary issued a certificate regarding the completeness of MEPA review on March 16, 2000 (2000 Master Plan MEPA Certificate).

By definition, a "Marine Industrial Park" is a multi-use complex on tidelands within a DPA, at which:

a) The predominant use is for marine industrial purposes. In general, at least two-thirds of the park site landward of any project shoreline must be used exclusively for such purposes.

b) Spaces and facilities not dedicated to marine industrial use are available primarily for general industrial purposes. Uses that are neither marine nor industrial may occur only in a manner that is incidental to and supportive of the marine industrial uses in the park, and may not include general residential or hotel facilities.

c) Any commitment of spaces and facilities to uses other than marine industry is governed by a comprehensive park plan.

(310 CMR 9.02.)

In 2005, six years after adoption of the BMIP Master Plan, MassDEP Waterways issued a Master Chapter 91 License (No. 10233) for the 129 acres out of the 191 acres at BMIP subject to Chapter 91 (Master Chapter 91 License). The Master Chapter 91 License has a 65-year term, and is the exclusive instrument for authorizing all existing unauthorized structures and uses within the DPA portion of BMIP, as well as for any future structural alterations and changes of use, except as may be authorized as a Minor Project Modification. (Master Chapter 91 License, Special Conditions 1 and 8.)

General industrial and commercial use of buildings and exterior spaces on each parcel are limited to the square footage amounts stipulated in the Future Buildout Land Usage Matrix appended to the Master Chapter 91 License (Table 7), which is maintained by BRA/EDIC staff. (Id., Special Condition 4.) The total usable interior square footage of a particular building is apportioned between uses in the same manner as the footprint of the building in question. (Id., Special Condition 7(a).)

MassDEP Waterways need not review any change of BMIP tenancy that complies with Table 7. According to Table 7, the entire approximately 85,600 square-foot footprint of the existing building, as well the entire approximately 54,400 square feet of exterior space, are designated for general industrial use. The Project would continue such use of the Project Site, unchanged. Therefore MassDEP Waterways need not review the Project.

1.7.2.2 Inapplicability of MEPA

The Project is not subject to review under the Massachusetts Environmental Policy Act, which is codified at Sections 62 through 62I of MGL Chapter 30, and implemented under the "MEPA Regulations" at Section 11 of Chapter 301 of the Code of Massachusetts Regulations (CMR). MEPA and the MEPA Regulations apply to: (a) projects undertaken by a state agency; (b) those aspects of a project that are within the subject matter of any required state permit; (b) projects involving state financial assistance; and (d) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR

11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations. (301 CMR 11.03.) Regardless of whether the Project requires state action, none of the review thresholds will be exceeded by the Project.

1.7.3 Federal Review

1.7.3.1 Federal Aviation Administration (FAA)

Given the proximity of the Project Site to active runways of Boston International Airport, federal law requires that notice be given to the FAA before starting to erect any new structures or temporary construction cranes of significant height. (49 USC § 44718; 14 CFR 77.13.) The Project is not, however, of sufficient height to encroach into FAA-regulated airspace.

1.7.3.2 National Environmental Policy Act

The National Environmental Policy Act, with its related regulations (NEPA), apply to major federal actions determined to have a significant impact on the quality of the human environment. "Major federal actions" include actions with effects that may be major and which are potentially subject to federal control and responsibility, including "new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies." (40 CFR § 1508.18.) The Project will not entail any major federal actions, and so is not subject to NEPA.

1.8 Anticipated Permits

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

Table 1-1 Anticipated Permits and Approvals

Agency	Permit, Review or Approval
Federal Agencies	
Environmental Protection Agency	NPDES General Construction Permit
State Agencies	
Department of Environmental Protection – Division of Water Pollution Control	Construction Dewatering Permit
Department of Environmental Protection	Notification prior to construction
City Agencies	
Boston Committee on Licenses/Public Safety Commission	Flammable Storage License (if required)
Boston Fire Department	Approval of Fire Safety Equipment
Boston Inspectional Services Department	Building Permits

Table 1-2 Anticipated Permits and Approvals (Continued)

Agency	Permit, Review or Approval
Boston Redevelopment Authority	Article 80 Large Project Review Cooperation Agreement Boston Residents Construction Employment Plan
Boston Transportation Department	Transportation Access Plan Agreement Construction Management Plan
Boston Water and Sewer Commission	Water and Sewer Connection Permits General Service Application Site Plan Review

1.9 Public Participation

As part of its planning efforts, the Proponent has consulted and will continue to consult with officials from city agencies, including BRA/EDIC, as well as elected officials and members of the public, to discuss the Project. The Proponent is committed to developing an effective dialogue with the community concerning the Project. The formal community outreach begins with the filing of this Expanded Project Notification Form, and the Proponent looks forward to a productive public review.

1.10 Schedule

Construction is anticipated to begin in January of 2016, and to last approximately 15 months.

Chapter 2.0

Transportation Component

2.0 TRANSPORTATION

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the redevelopment of 25 Fid Kennedy Avenue in the Boston Marine Industrial Park in Boston, Massachusetts. 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. Based on the results of the traffic analysis contained within this chapter, the Project is expected to have minimal impact on the surrounding transportation infrastructure.

2.1 Project Description

The Project site contains an approximately 157,000 square foot (sf) building that is currently unoccupied. The proposed Project will consist of rehabilitating the building to include approximately 157,000 gross square feet of light industrial space for J.C. Cannistraro, LLC to be used as a manufacturing and warehousing facility. J.C. Cannistraro, LLC provides a comprehensive package of mechanical services by delivering plumbing, fire protection, HVAC and sheet metal solutions, as well as turnkey service and maintenance to building owners and construction managers throughout the City of Boston and New England.

Currently, J.C. Cannistraro's manufacturing and warehousing operations are spread out between locations in Watertown, Wilmington, and Stoughton. Additionally, the company outsources a trucking yard in South Boston which is used for temporary staging of flat-bed truckloads of materials to be delivered to various job sites in the City of Boston.

The existing Watertown facility has approximately 35,000 sf of general warehouse operations, construction trade tool storage, and fire protection piping prefabrication. The Watertown facility is responsible for all day-to-day deliveries receiving smaller pieces of equipment from independent trucking carriers. The trucking pattern primarily includes smaller stake body trucks 26-feet or less, pick-up trucks, and vans.

The existing Wilmington facility has approximately 60,000 sf of heavy industrial space used for welding, piping, and plumbing systems prefabrication and modular component assembly. Because of the size of the modular and prefabricated assemblies, this facility has a mix of smaller trucks and 40-foot long open-bed trailer trucks.

The existing Stoughton facility has approximately 30,000 sf of industrial space used for HVAC sheet metal fabrication operations. This facility has a mix of box trucks, flatbeds, and pick-up truck deliveries to the various project sites throughout Boston.

Approximately 90 percent of J. C. Cannistraro's projects are within a five mile radius of the 25 Fid Kennedy Avenue site. By consolidating the facilities to South Boston, all major truck routing will be largely contained within Boston, reducing the impacts along the regional

highway system and along some of the local roadways between Watertown, Wilmington, Stoughton, and Boston. It is anticipated that the lay-down area will also be moved from South Boston to each individual project site. In addition, because of the efficiency of combining multiple trades and the staging area at a single location (25 Fid Kennedy Avenue), there will be further reductions in both local and regional delivery traffic.

2.1.1 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 intersections in the vicinity of the site. 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.

2.1.2 Study Area

The transportation study area is bounded by Fid Kennedy Avenue, Northern Avenue, Massport Haul Road, Summer Street, and Drydock Avenue. The study area consists of the following intersections in the vicinity of the site, also shown on Figure 2-1.

25 Fid Kennedy Avenue Boston, Massachusetts

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Figure 2-1
Study Area Intersections

- Summer Street/Drydock Avenue/Pappas Way (signalized);
- Drydock Avenue/Tide Street (unsignalized);
- Northern Avenue/Tide Street (unsignalized);
- Fid Kennedy Avenue/Tide Street (unsignalized); and
- Northern Avenue/Massport Haul Road/Marine Industrial Park Driveway (roundabout).

2.2 Existing Conditions

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:

Summer Street is a two-way, four lane roadway located west of the Project site. Summer Street is classified as an urban principal arterial roadway under BTD jurisdiction and generally runs in an east–west direction between Washington Street in Downtown Crossing to the west and East First Street in South Boston to the east. Within the study area, on-street parking is generally restricted. Sidewalks are provided on both sides of the roadway.

Northern Avenue is a two-way, two lane roadway located west of the Project site. Northern Avenue is classified as an urban minor arterial roadway east of D Street and an urban collector from Sleeper Street to Seaport Boulevard under BTD jurisdiction and generally runs in an east-west direction. Within the study area, on-street parking is generally restricted. Sidewalks are provided on both sides of the roadway.

Massport Haul Road is a two-way, two lane roadway located west of the Project site. Massport Haul Road is classified as an urban principal arterial south/west of Pumphouse Road and an urban minor arterial north/east of Pumphouse Road under BTD jurisdiction and generally runs in a north-south direction between South Boston Bypass Road to the south and Northern Avenue to the north. Within the study area, on-street parking is restricted and sidewalks are only provided along the north/west side of the roadway.

Drydock Avenue is a two-way, two lane roadway located south of the Project site. Drydock Avenue is classified as a local roadway under BTD jurisdiction that generally runs in an east-west direction between Summer Street to the west and Black Falcon Avenue to the east. Within the study area, on-street parking is generally restricted. Sidewalks are provided on both sides of the roadway.

Tide Street is a two-way, two lane roadway located west of the Project site. Tide Street is classified as a local roadway under BTD jurisdiction that generally runs in a north-south direction between Fid Kennedy Avenue to the north and Drydock Avenue to the south. Within the study area, on-street parking is restricted and sidewalks are provided on both sides of the roadway.

Fid Kennedy Avenue is a two-way, two lane roadway located adjacent to the north of the Project site. Fid Kennedy Avenue is classified as a local roadway under BTD jurisdiction that generally runs in an east-west direction between Seafood Way to the west and Dolphin Way in the east. Within the study area, on-street parking is restricted and 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.

Summer Street/Drydock Avenue/Pappas Way is a signalized intersection with four approaches under BTD jurisdiction. The Summer Street eastbound approach consists of a 12-foot wide exclusive left-turn lane, a 12-foot wide exclusive through lane, and a 16-foot wide shared through and right-turn lane. There is a 5-foot wide median present at the eastbound approach. There is an MBTA bus stop adjacent to the intersection on the eastbound approach. The Summer Street westbound approach consists of a 12-foot wide exclusive left-turn pocket lane, a 12-foot wide exclusive through lane, and a 12-foot wide shared through and right-turn lane. There is a 7-foot wide median separating the two directions of travel. There is an MBTA bus stop shelter on the far side of the intersection from this approach. The Pappas Way northbound approach consists of one 15-foot wide general purpose travel lane. The Drydock Avenue southbound approach consists of a 12-foot wide shared use left-turn/through lane and a 13-foot wide left-turn lane. There is also a 7-foot-wide median separating the two directions of travel. Parking is not permitted on any of the approaches of this intersection. Sidewalks are provided along both sides of all four approaches and marked crosswalks are provided across each approach.

Drydock Avenue/Tide Street is an unsignalized intersection with four approaches. The Drydock Avenue eastbound approach consists of one 12-foot wide general use lane and a wide bike lane. The Drydock Avenue westbound approach consists of one 15-foot wide general use lane. The parking lot northbound approach is stop-controlled and consists of one 15-foot wide general use lane. The Tide Street southbound approach is also stop controlled and consists of one 15-foot wide general use lane and a 7-foot wide bike lane.

On-street parking is not permitted on any of the approaches of this intersection. Sidewalks are provided along both sides of the eastbound, westbound, and southbound approaches. Crosswalks are provided across the eastbound, westbound, and southbound approaches. Crosswalk signs are in place on both Drydock Avenue approaches.

Northern Avenue/Tide Street is an unsignalized intersection with four approaches. The Northern Avenue eastbound approach consists of one 20-foot wide general use lane and a bike lane. There are MBTA bus stops on the northern and southern sides of this approach. The westbound approach is an alley that consists of one 14-foot wide general use lane. The Tide Street northbound approach is stop-controlled and consists of one 17-foot wide general use lane and a bike lane. The Tide Street southbound approach is also stop controlled and consists of one 23-foot wide general use lane. On-street parking is not permitted on any of the approaches of this intersection. Sidewalks are provided along both sides of all approaches. Crosswalks are provided across the eastbound, northbound, and southbound approaches.

Fid Kennedy Avenue/Tide Street is an unsignalized intersection with three approaches. The Fid Kennedy Avenue eastbound approach consists of one 30-foot wide general use lane with no pavement markings. The westbound approach consists of one 18-foot wide general use lane. The Tide Street northbound approach is stop-controlled and consists of one 24-foot wide general use lane. On-street parking is not permitted on any of the approaches of this intersection. Sidewalks are provided along both sides of all approaches. Crosswalks are provided across the westbound and northbound approaches.

Northern Avenue/Massport Haul Road is a 120-foot diameter roundabout that consists of four approaches. The Northern Avenue eastbound approach consists of one through/left-turn lane and one right-turn. There is a 17-foot wide median separating the directions of travel at this approach. Northern Avenue westbound approach consists of two general use lanes with a bike sharrow in the right lane. There is a 15-foot wide median separating the directions of travel at this approach. Massport Haul Road northbound approach consists of one 12-foot-wide general use lane and one 12-foot-wide right-turn lane. There is a 15-foot wide median separating the directions of travel at this approach. The southbound approach is a driveway entrance for Yankee Lobster and consists of a single wide travel lane. The circulating width of the roundabout is approximately 40-50 feet wide. Sidewalks are generally provided around the outside of the roundabout. On the east side of the northbound approach, the sidewalk ends about 10 feet behind the stop line. Crosswalks are provided across all legs of the roundabout.

2.2.3 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. The on-street parking predominantly consists of restricted parking due to the abundant supply of off street parking at each parcel. The on-street parking regulations within the study area are shown in Figure 2-2.

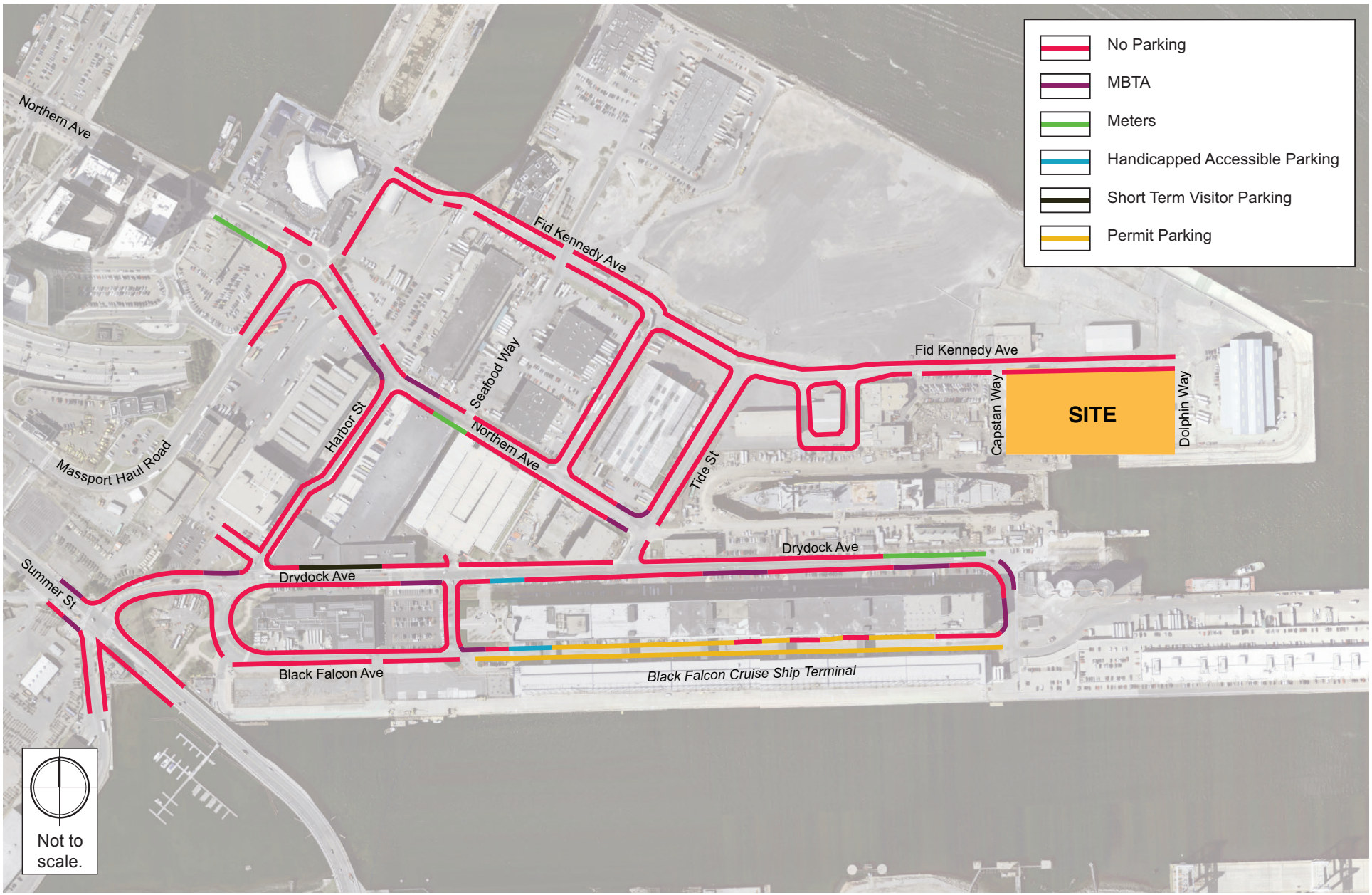

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Figure 2-2
On-Street Parking Regulations

2.2.3.1 Bicycle and Car Sharing Services

Launched in July 2011, Hubway is a bicycle sharing system in Metro Boston with approximately 140 stations and 1,300 bicycles. Currently, 36 Hubway docks exist within close proximity of the Project.

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.

The nearby bicycle and car sharing locations are shown in Figure 2-3 and summarized in Table 2-1.

Table 2-1 Bicycle and Car Sharing Services within a Quarter-Mile of the Site

Map #	*Address*
Zipcar Locations	
A	88 Black Falcon Avenue
B	Drydock Avenue/Tide Street – Boston Design Center
C	2 Seaport Lane
D	Summer Street/Pumphouse Road
E	411 D Street
Hubway Locations	
A	ID Building East
B	ID Building West
C	Seaport Hotel
D	Boston Convention & Exhibition Center

2.2.4 Existing Traffic Data

Traffic volume data was collected at four of the five study area intersections on January 01, 2014, and at the fifth study area intersection (Fid Kennedy Avenue/Tide Street) on September 17, 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.

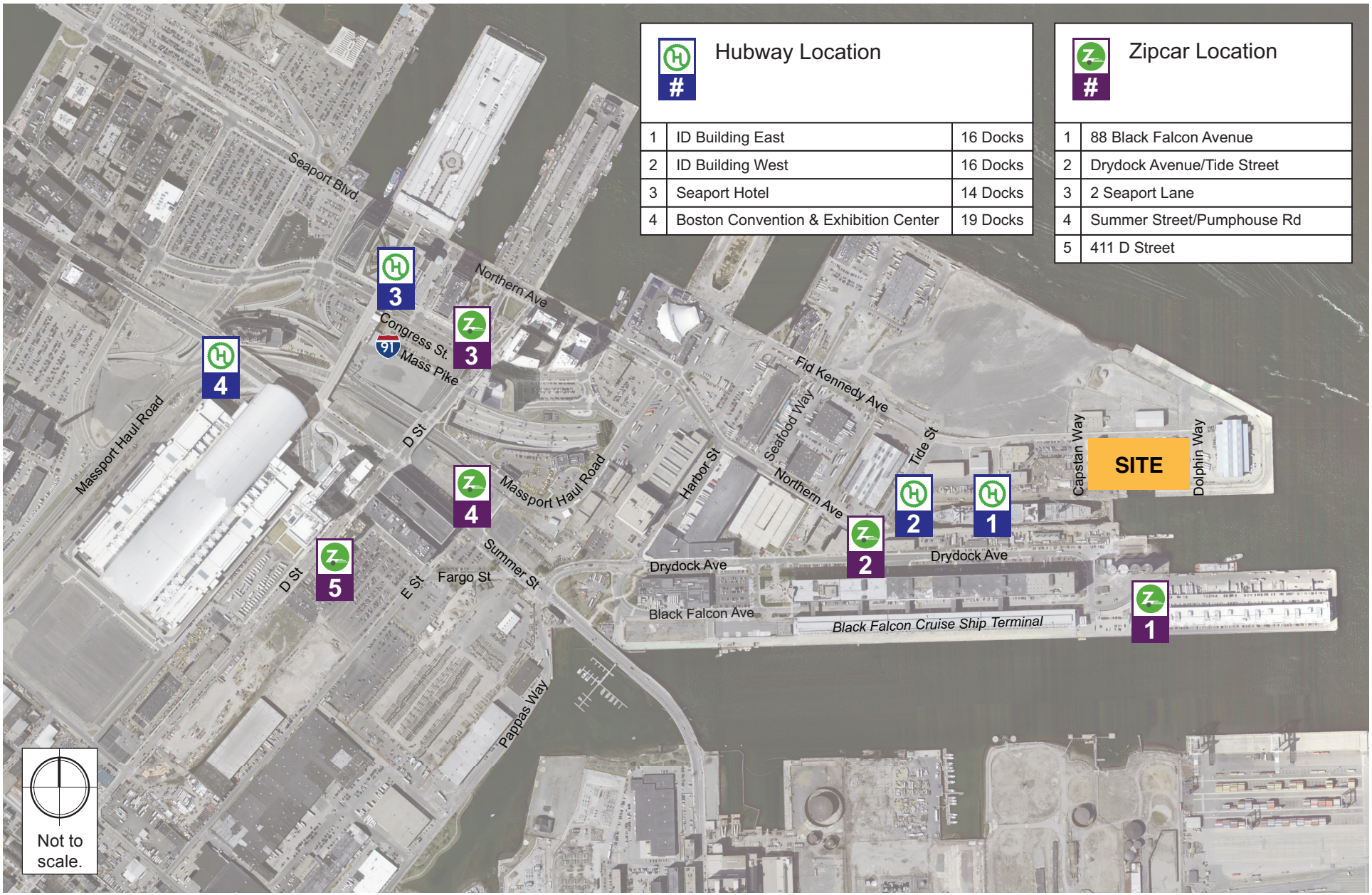

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Figure 2-3

Car and Bicycle Sharing Locations

2.2.5 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 1.02 for the month of January and 0.93 for the month of September. This indicates that average month traffic volumes are approximately two percent higher for the month of January and seven percent less for the month of September than the traffic volumes that were collected. The traffic counts were adjusted to reflect the average for the data collected in January, however, they were not adjusted downward to reflect average month of September in order to provide a conservative analysis consistent with the peak season traffic volumes.

2.2.6 Existing Vehicular Traffic Volumes

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 2-4 and Figure 2-5, respectively.

2.2.7 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The site is located in close proximity to several bicycle facilities. The City of Boston's "Bike Routes of Boston" map indicates that Drydock Avenue, Tide Street, Fid Kennedy Avenue, and Northern Avenue are designated as beginner routes suitable for all types of riders. Additionally Summer Street, Congress Street, and D Street are designated as intermediate routes, suitable for riders with some on-road experience. Bicycle counts were conducted concurrent with the vehicular TMCs, and are presented in Figure 2-6. As shown in the figure, bicycle volumes are heaviest along Summer Street and Drydock Avenue.

2.2.8 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 where needed. To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs at the study area intersection and are presented in Figure 2-7.

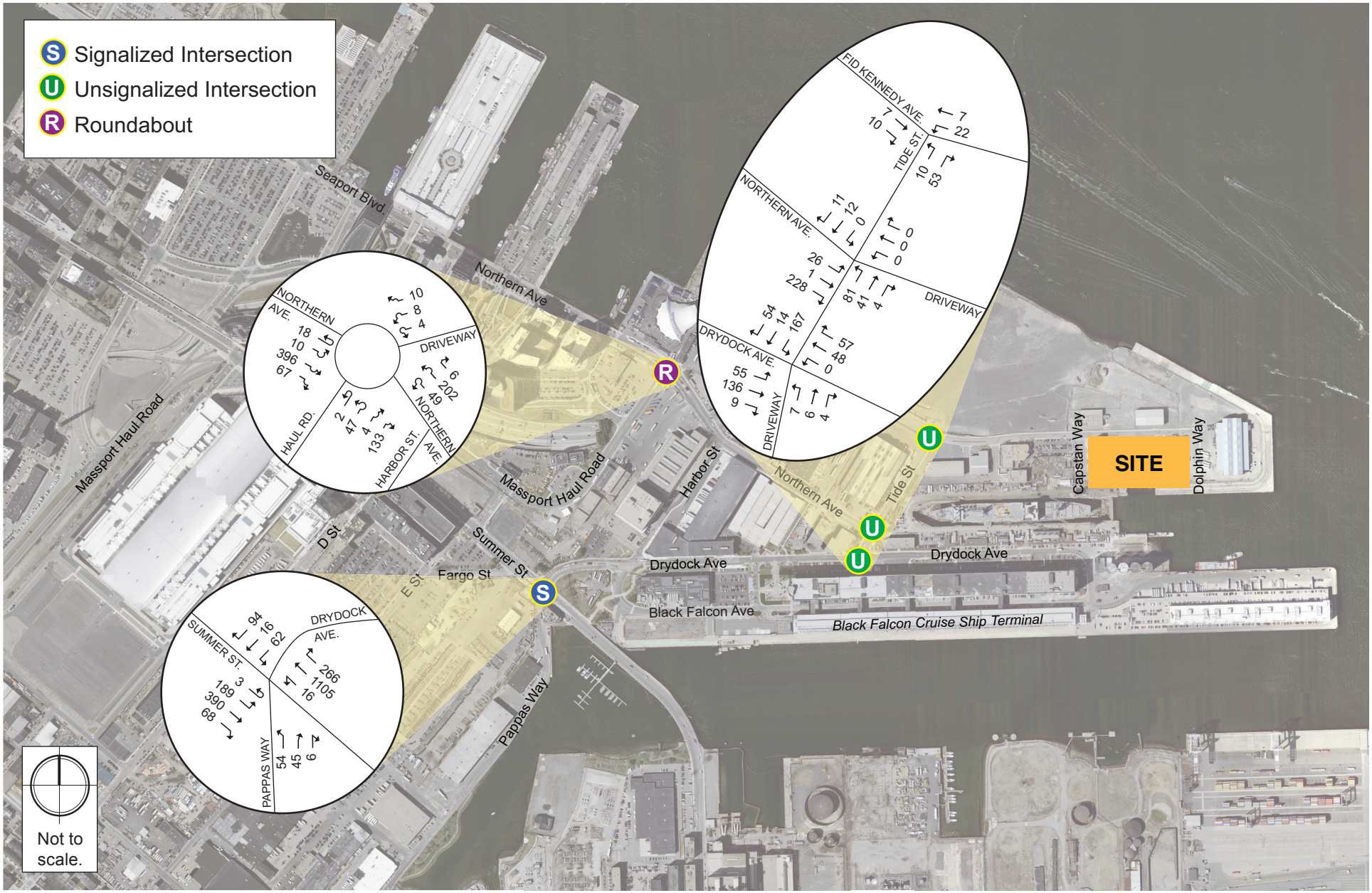

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Figure 2-4

Existing (2015) Condition Traf.c Volumes, Weekday a.m. Peak Hour

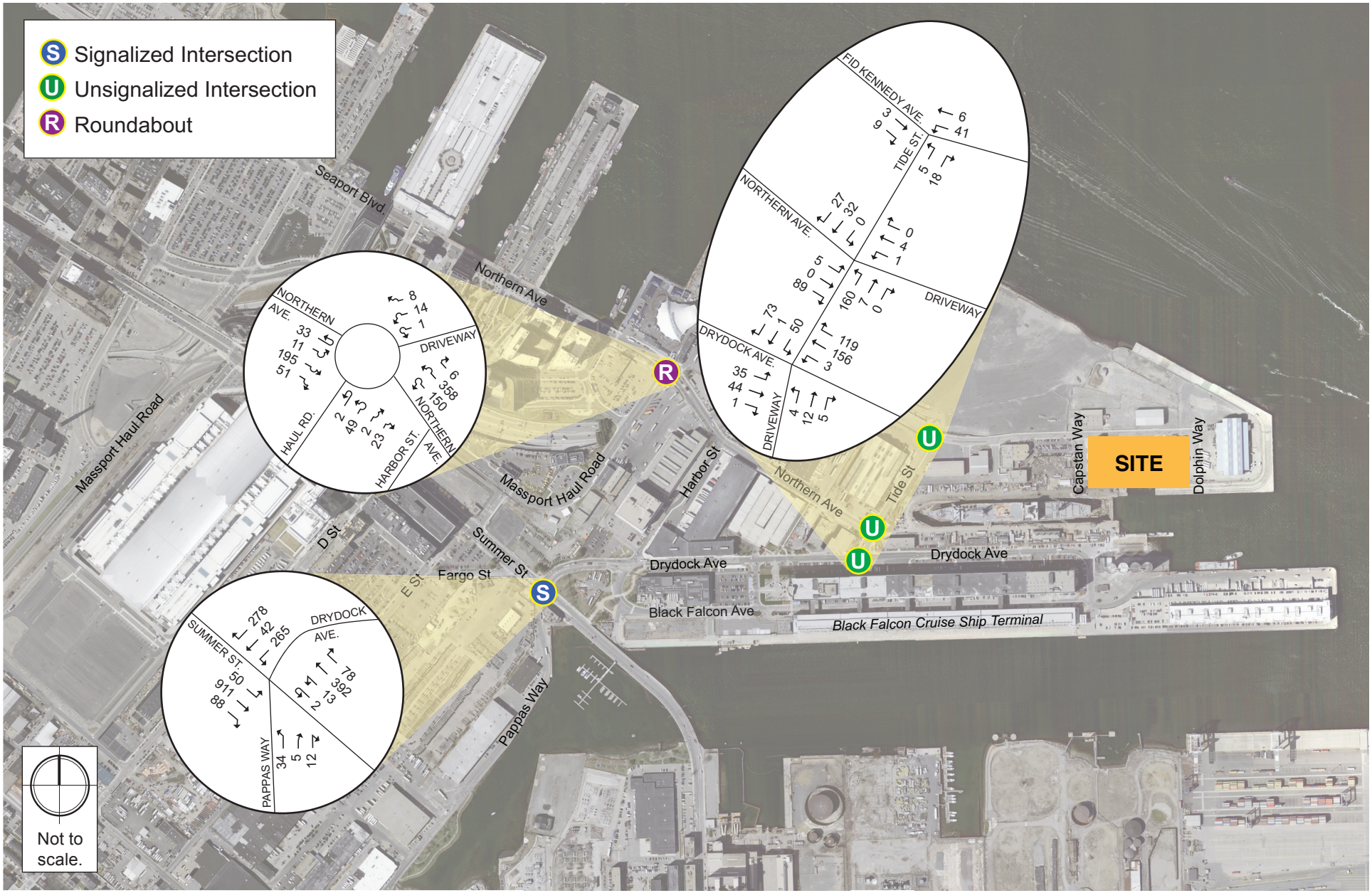

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Figure 2-5

Existing (2015) Condition Traf.c Volumes, Weekday p.m. Peak Hour

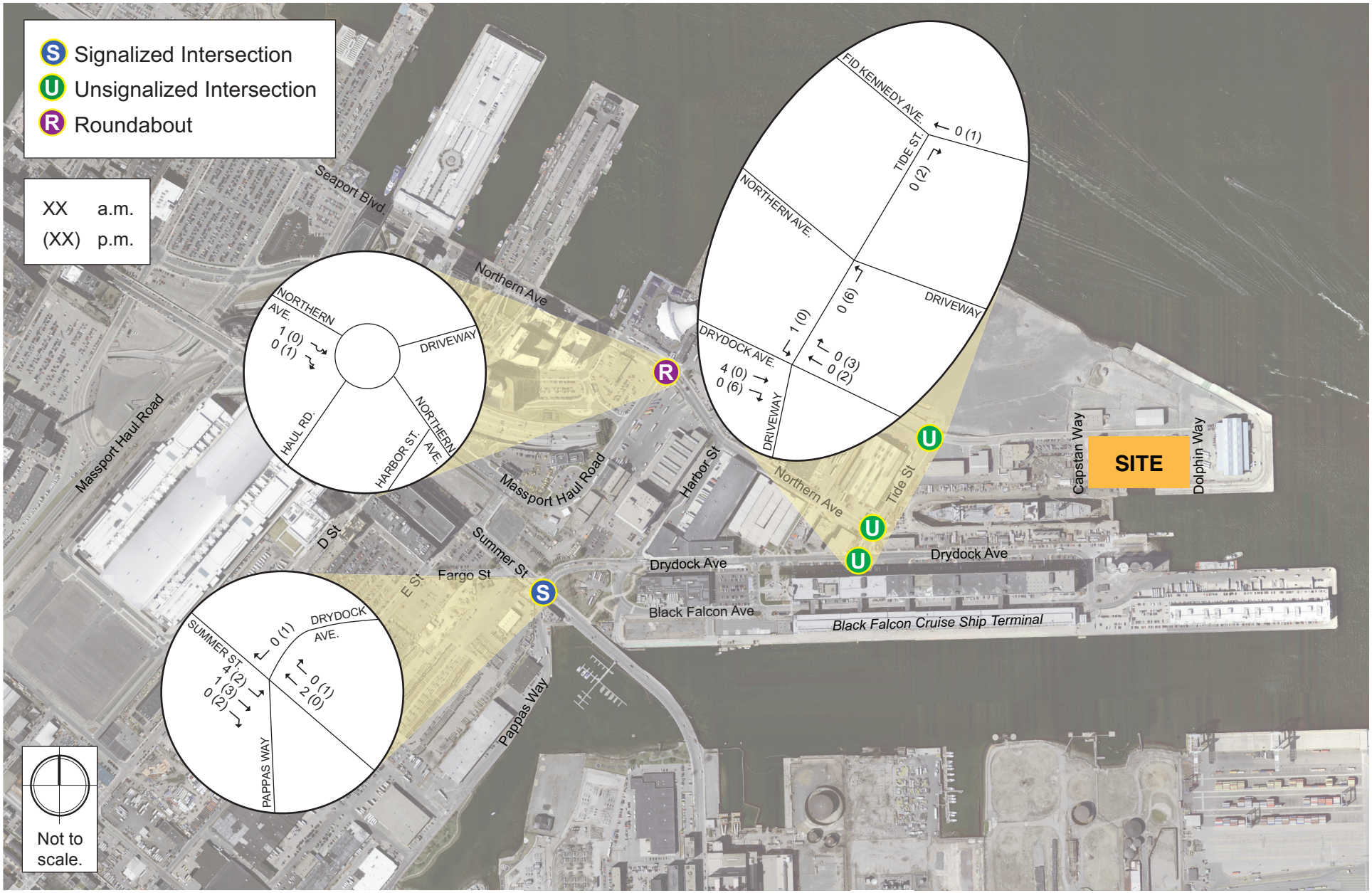

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Figure 2-6

Existing (2015) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours

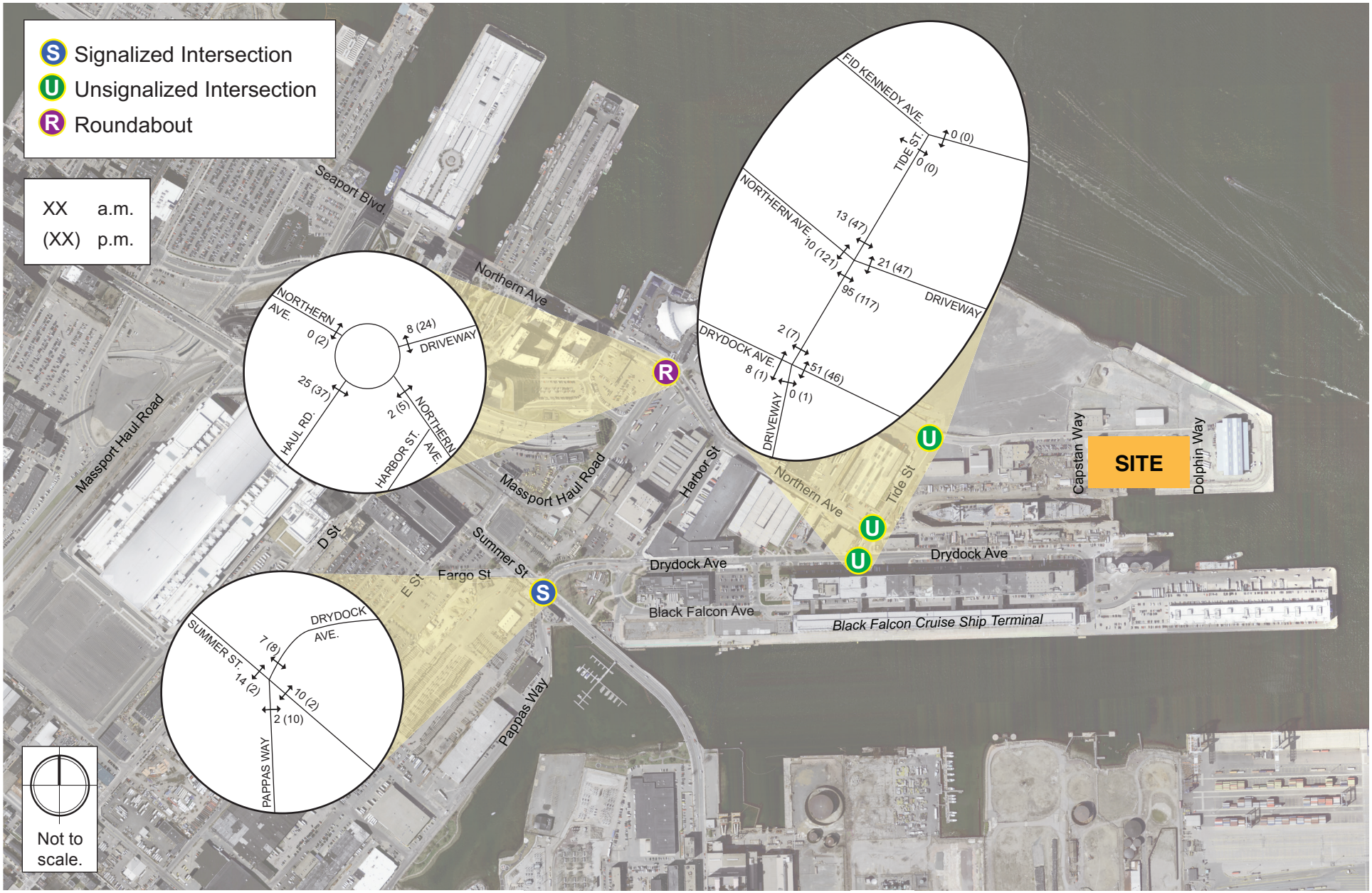

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Figure 2-7

Existing (2015) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours

2.2.9 Existing Public Transportation Services

The site is located in the Seaport District with several public transportation opportunities nearby. The Massachusetts Bay Transportation Authority (MBTA) Silver Line SL2 Branch provides access in the vicinity of the site. Additionally, the MBTA operates two bus routes in close proximity to the Project. Figure 2-8 maps all of the public transportation services located in close proximity of the site, and Table 2-2 provides a brief summary of all routes.

Table 2-2 Existing Public Transportation Service Summary

Transit Service	*Description*	*Rush-hour Headway (in minutes)**
Silver Line		
SL2 Branch	Design Center – South Station via Waterfront	5
Bus Routes		
4	North Station – World Trade Center via Federal Courthouse & South Station	12
7	City Point – Otis & Summer Streets via Summer Street & South Station	4

* Headway is the time between buses.

2.2.10 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 2-3 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.

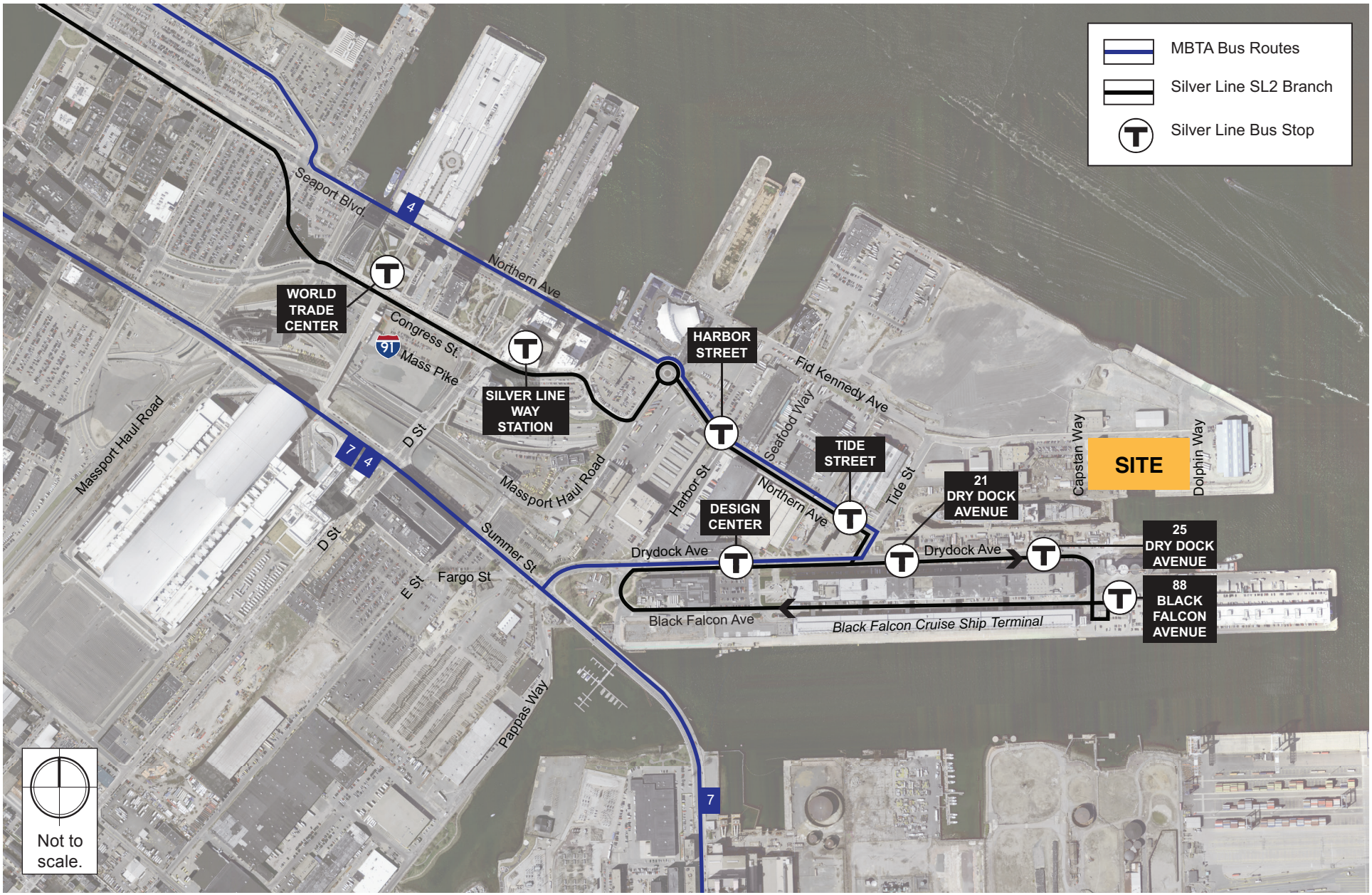

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Figure 2-8
Public Transportation

Table 2-3 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.

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.

SIDRA 5.1 was used to evaluate the roundabout at Northern Avenue/Massport Haul Road. SIDRA is a Massachusetts Department of Transportation approved software for analyzing roundabouts and is based on the 2010 HCM. Roundabouts are analyzed as an isolated location and are not evaluated in conjunction with a network. LOS and delay are determined based on geometry, lane use, and traffic volume data. The LOS grades are based on the same delay ranges as unsignalized intersections.

Table 2-4 and Table 2-5 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 Appendix B.

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

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	**C**	**33.0**	**-**	**-**	**-**
Summer Street eastbound left	D	40.6	0.74	71	#247
Summer Street eastbound thru|thru/right	A	6.5	0.24	33	125
Summer Street westbound left	B	16.9	0.05	5	23
Summer Street westbound thru|thru/right	D	38.0	0.96	463	#815
Pappas Way northbound left/thru/right	E	59.6	0.69	72	126
Drydock Avenue southbound left/thru	E	66.5	0.68	53	#116
Drydock Avenue southbound right	A	6.3	0.23	0	39
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	8.1	0.05	-	5
Drydock Avenue westbound left/thru/right	A	0.0	0.00	-	0
Parking Drive northbound left/thru/right	B	14.2	0.05	-	5
Tide Street southbound left/thru/right	C	23.0	0.58	-	90
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	B	13.6	0.42	-	53
Alley westbound left/thru/right	A	0.0	0.00	-	0
Tide Street northbound left/thru/right	A	8.2	0.08	-	8
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.7	0.03	-	3
Tide Street northbound left/right	A	9.3	0.10	-	8
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	**A**	**8.7**	-	-	-
Northern Avenue eastbound	A	9.5	50.5	-	50
Northern Avenue westbound	A	7.1	0.27	-	19
Massport Haul Road northbound	A	9.4	0.28	-	25
Parking Drive southbound	A	6.5	0.05	-	3

 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates LOS E or F

Table 2-5 Existing (2015) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	**C**	**27.0**	**-**	**-**	**-**
Summer Street eastbound left	B	18.1	0.22	19	42
Summer Street eastbound thru|thru/right	C	29.3	0.80	296	383
Summer Street westbound left	C	34.4	0.23	8	27
Summer Street westbound thru|thru/right	C	30.8	0.60	146	187
Pappas Way northbound left/thru/right	B	19.7	0.14	19	54
Drydock Avenue southbound left/thru	D	38.8	0.77	194	#443
Drydock Avenue southbound right	A	3.5	0.38	0	27
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	8.9	0.04	-	3
Drydock Avenue westbound left/thru/right	A	7.4	0.00	-	0
Parking Drive northbound left/thru/right	B	14.5	0.10	-	8
Tide Street southbound left/thru/right	C	15.5	0.30	-	30
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	B	14.4	0.23	-	23
Alley westbound left/thru/right	C	21.9	0.04	-	3
Tide Street northbound left/thru/right	A	8.8	0.17	-	15
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.4	0.04	-	3
Tide Street northbound left	A	8.8	0.03	-	3
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	**A**	**7.4**	-	-	-
Northern Avenue eastbound	A	7.1	0.31	-	23
Northern Avenue westbound	A	7.8	0.42	-	39
Massport Haul Road northbound	A	5.7	0.07	-	6
Parking Drive southbound	A	6.4	0.05	-	3

 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates LOS E or F

As shown in Table 2-4 and Table 2-5, under the Existing (2015) Condition, the signalized intersection of Summer Street / Drydock Avenue / Pappas Way operates at an overall LOS C during the a.m. and p.m. peak hours. The Pappas Way northbound left-turn/thru/right-turn lane and the Drydock Avenue southbound left-turn/thru lane operate at LOS E during the a.m. peak hour. The longest queues at the intersection occur in the Summer Street westbound through|through/right-turn lane during the a.m. peak hour and the Drydock Avenue southbound left-turn/thru lane during the p.m. peak hour. All unsignalized intersections and roundabouts operate at LOS C or better during both the a.m. and p.m. peak hours.

2.3 No-Build Conditions

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-half percent per year, compounded annually, was used, however along the Summer Street corridor, a one percent per year growth rate 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 following such projects were specifically accounted for in the traffic volumes for future scenarios while others were included in the general background traffic growth. The site specific background projects are mapped on Figure 2-9:

Pier 4 Development is a mixed-use development with the first phase of construction consisting of 383 residential units, 12,600 sf of restaurant/retail space, 20,000 sf of civic space, and 258 parking spaces located north of Seaport Boulevard.

411 D Street is a residential development consisting of 197 residential units and 129 parking spaces.

368 Congress Street is a mixed-use redevelopment consisting of 120-room hotel and 5,000 sf of retail/restaurant space.

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Figure 2-9
Nearby Development Projects

Congress Street Hotel is a hotel development consisting of a 505-room hotel located at 505 Congress Street.

Fan Pier is a mixed-use phased development consisting of office, residential, hotel, restaurant, and cultural space located north of Old Northern Avenue.

D Street Development is a mixed-use development consisting of 500 hotel rooms, 26,300 sf of retail space, and 1,350 parking spaces located at 401 D Street.

Waterside Place is a phased mixed-use development consisting of 347,700 sf of retail space, 236 residential units, and 140 parking spaces located off Congress Street.

Boston Cargo Terminal is a development consisting of an intermodal marine industrial facility including a 4.3-acre bulk cargo facility located off Northern Avenue.

6 Tide Street is a mixed-use development consisting of 355,000 sf of research development and manufacturing space and 60 parking spaces located at 316-318 Northern Avenue.

Parcel K is a mixed-use development consisting of 304 residential units, 247 hotel rooms, 16,500 sf of office space, 20,000 sf of retail/restaurant, and 640 parking spaces located at the corner of Northern Avenue and Massport Haul Road.

Seaport Square Development - Parcels A, B, C, D, K, L1 Development is a mixed use development located in several parcels generally along Seaport Boulevard between Sleeper Street and the East Service Road.

Innovation and Design Building (IDB) – The IDB calls for the conversion of approximately 206,388 sf of existing area to commercial uses and associated improvements at 21-23-25 Drydock Avenue and 1 Design Center Place.

Traffic from the study area projects described below is reflected in the background growth rate:

339 D Street is a residential development consisting of 24 residential units and 30 parking spaces.

360 West Second Street is a residential development consisting of 25 residential units and 25 parking spaces.

630 East Second Street is a residential development with 18 units and 21 parking spaces.

Distillery Project is a mixed-use development consisting of residential space, commercial space, art gallery space, a greenhouse, and 147 parking spaces located at 516-524 East Second Street.

Saint Augustine's is a redevelopment project transforming the existing school building into 39 residential units with 47 parking spaces. .

E Street Self-Storage Facility is a development consisting of approximately 100,000 sf of self-storage located off E Street.

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

The one-half percent per year annual growth rate (one percent per year along the Summer Street corridor), compounded annually, was applied to the Existing (2015) Condition traffic volumes, then the additional specific development traffic growth was added 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 2-10 and Figure 2-11, 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 2-6 and Table 2-7 present the No-Build (2020) Condition capacity 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 LOS E or worse. The detailed analysis sheets are provided in Appendix B.

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

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	F	>80.0	-	-	-
Summer Street eastbound left	C	27.3	0.63	121	#437
Summer Street eastbound thru|thru/right	A	7.3	0.28	45	144
Summer Street westbound left	C	23.2	0.09	8	24
Summer Street westbound thru|thru/right	F	>80.0	>1.00	~888	#944
Pappas Way northbound left/thru/right	E	60.9	0.71	78	#153
Drydock Avenue southbound left/thru	E	68.7	0.73	62	#146
Drydock Avenue southbound right	A	4.6	0.22	0	45

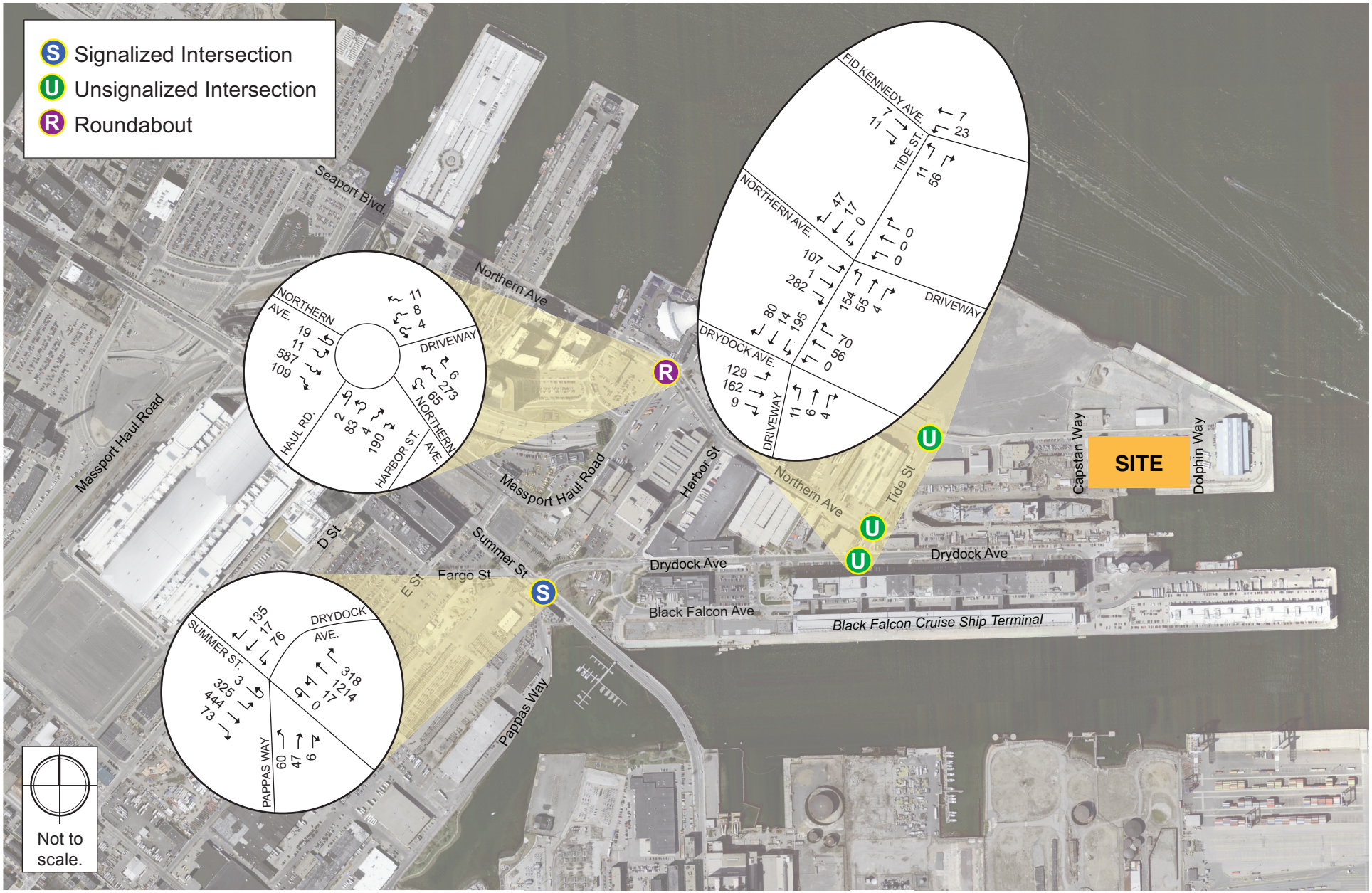

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Figure 2-10

No-Build (2020) Condition Traf.c Volumes, Weekday a.m. Peak Hour

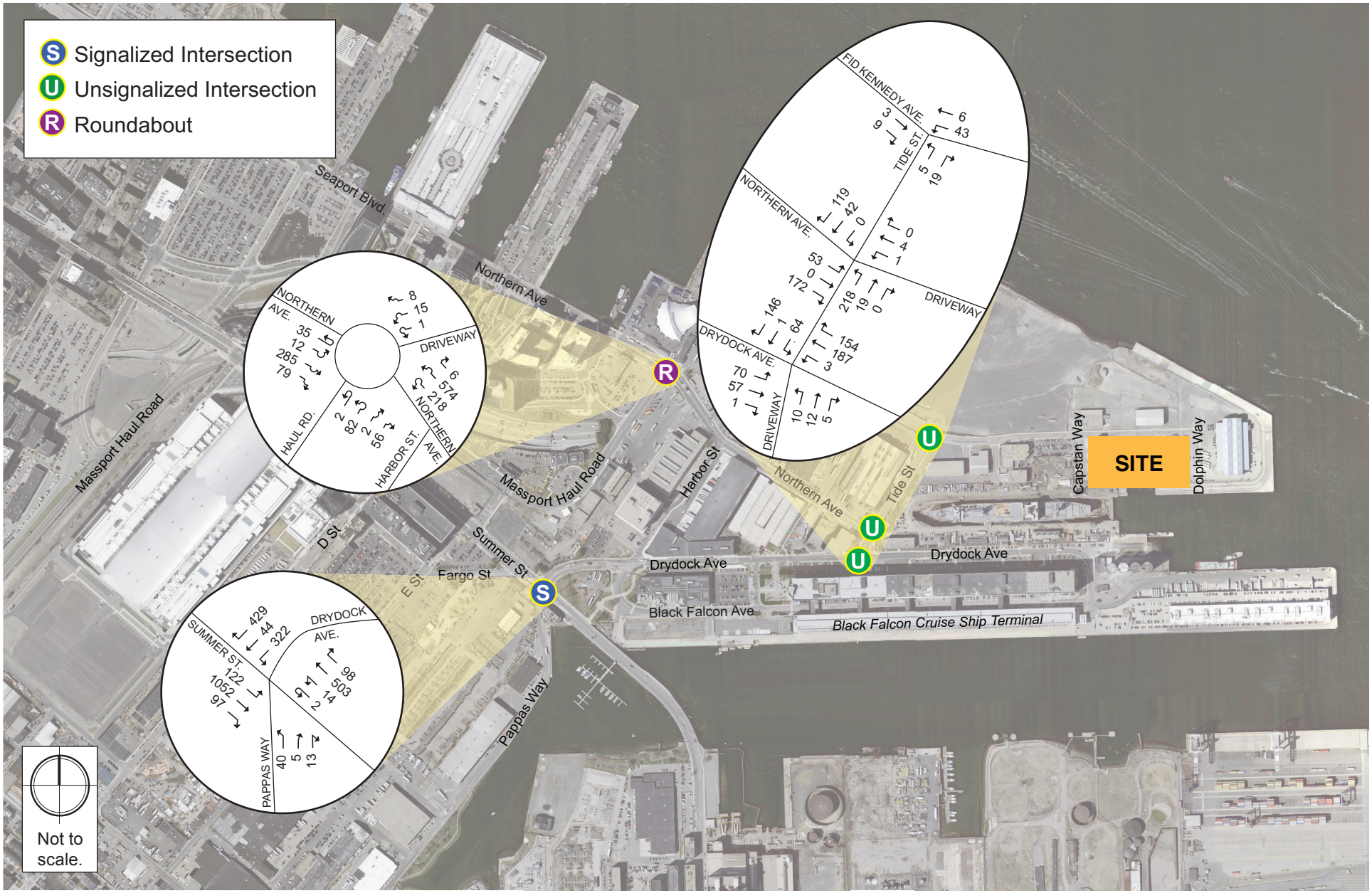

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Figure 2-11

No-Build (2020) Condition Traf.c Volumes, Weekday p.m. Peak Hour

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

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	8.4	0.12	-	10
Drydock Avenue westbound left/thru/right	A	0.0	0.00	-	0
Parking Drive northbound left/thru/right	C	20.0	0.09	-	8
Tide Street southbound left/thru/right	F	>50.0	0.99	-	273
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	E	48.6	0.91	-	263
Alley westbound left/thru/right	A	0.0	0.00	-	0
Tide Street northbound left/thru/right	A	8.6	0.16	-	15
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.7	0.03	-	3
Tide Street northbound left/right	A	9.3	0.11	-	10
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	B	12.9	-	-	-
Northern Avenue eastbound	B	14.8	0.71	-	101
Northern Avenue westbound	A	8.4	0.37	-	29
Massport Haul Road northbound	B	14.2	0.44	-	46
Parking Drive southbound	A	7.2	0.04	-	29

~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates decrease in LOS to LOS E or LOS F

Table 2-7 No-Build (2020) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	**C**	**33.3**	**-**	**-**	**-**
Summer Street eastbound left	C	31.6	0.63	50	#93
Summer Street eastbound thru|thru/right	D	35.5	0.90	372	#520
Summer Street westbound left	D	35.6	0.25	8	28
Summer Street westbound thru|thru/right	C	34.5	0.73	202	250
Pappas Way northbound left/thru/right	C	21.2	0.20	23	64
Drydock Avenue southbound left/thru	E	61.1	0.95	258	#541
Drydock Avenue southbound right	A	5.0	0.55	10	41
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	9.4	0.09	-	8
Drydock Avenue westbound left/thru/right	A	7.4	0.00	-	0
Parking Drive northbound left/thru/right	C	21.6	0.19	-	18
Tide Street southbound left/thru/right	C	23.8	0.57	-	88
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	F	>50.0	0.91	-	215
Alley westbound left/thru/right	E	37.7	0.07	-	5
Tide Street northbound left/thru/right	A	9.9	0.26	-	28
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.4	0.04	-	3
Tide Street northbound left/right	A	8.8	0.03	-	3
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	B	10.7	-	-	-
Northern Avenue eastbound	A	9.1	0.44	-	38
Northern Avenue westbound	B	12.3	0.66	-	90
Massport Haul Road northbound	A	7.3	0.13	-	11
Parking Drive southbound	A	8.0	0.05	-	3

 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates decrease in LOS to LOS E or LOS F

As shown in Table 2-6 and Table 2-7, under the No-Build (2020) Condition the signalized intersection of Summer Street / Drydock Avenue / Pappas Way decreases from LOS C to LOS F during the a.m. peak hour and continues to operate at LOS C during the p.m. peak hour. The Summer Street westbound through|through/right-turn lanes decrease from LOS D to LOS F during the a.m. peak hour. The Drydock Avenue southbound left-turn/thru lane decreases from LOS D to LOS E during the p.m. peak hour. The longest queues at the intersection continue to occur in the Summer Street westbound through|through/right-turn lane during the a.m. peak hour and the Drydock Avenue southbound left-turn/through lane during the p.m. peak hour.

At the unsignalized intersection of Drydock Avenue / Tide Street, the Tide Street southbound approach decreases from LOS C to LOS F during the a.m. peak hour.

At the unsignalized intersection of Northern Avenue/Tide Street, the Northern Avenue eastbound approach decreases from LOS B to LOS E during the a.m. peak hour and from LOS B to LOS F during the p.m. peak hour. The westbound alleyway approach decreases from LOS C to LOS E during the p.m. peak hour.

The changes in LOS at the study area intersections are due to the increases in traffic volumes expected to be generated by the background traffic growth caused by nearby development projects.

2.4 Build Conditions

The Project consists of rehabilitating the existing building on the Project site to include approximately 157,000 gross square feet of light industrial space for J.C. Cannistraro, LLC. 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 Vehicle Site Access and Circulation

Vehicular access/egress to the building is a critical component, specifically for heavy vehicles. All traffic will enter the site from the northwest along Fid Kennedy Avenue and either turn right to the south along Capstan Way, Dolphin Way, or into the building garage along Fid Kennedy Avenue. Along Capstan Way, the west side of the building, there are two loading zones. Along Dolphin Way, the east side of the building, there are three loading zones. Parking for employees will be located to the east of Dolphin Way with capacity for 30 vehicles. The site plan is shown in Figure 2-12.

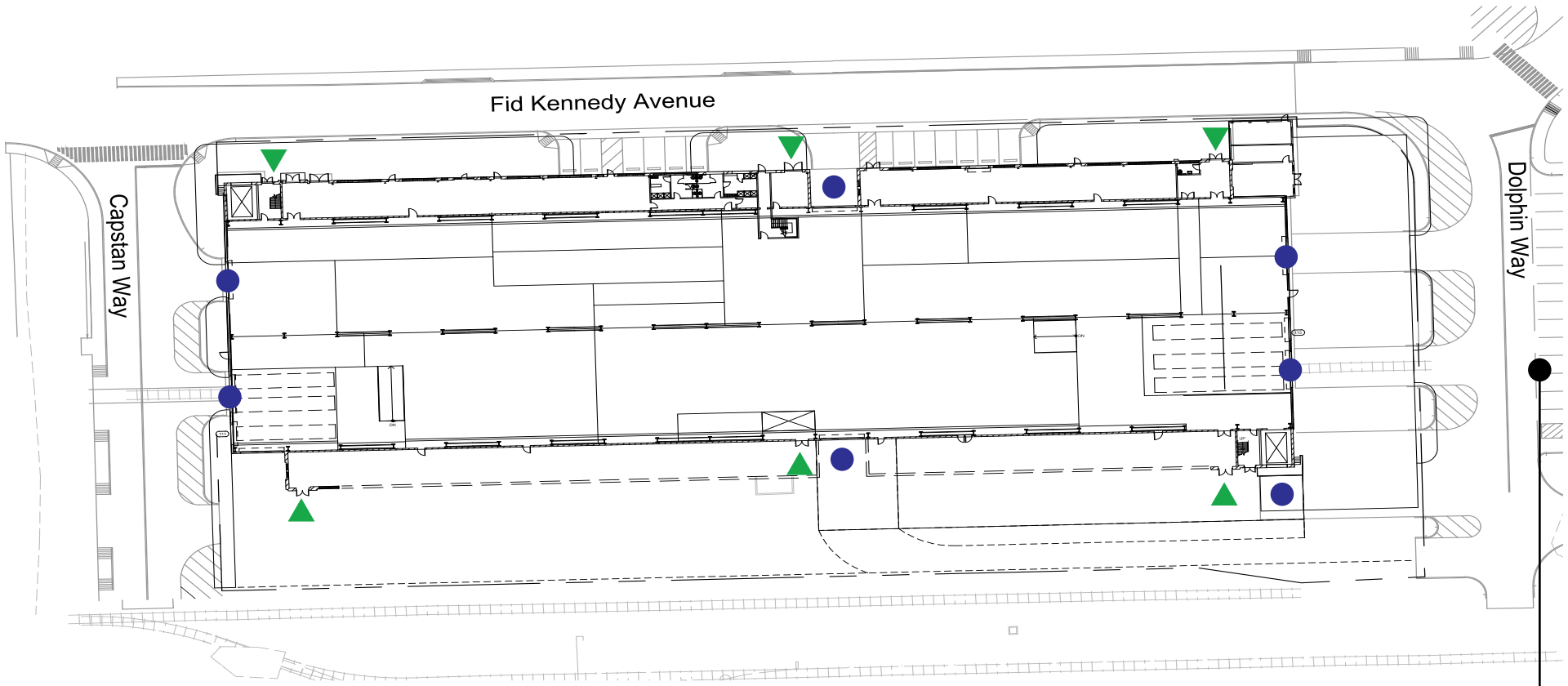

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Figure 2-12
Site Access Plan

2.4.2 Parking

The Project will provide parking for approximately 30 vehicles on site. Approximately 15 parking spaces will be provided along the east side of Dolphin Way and an additional 15 parking spaces will be provided along the south side of Fid Kennedy Avenue, in front of the building. It is expected that employees at the site will park on-site or will use nearby parking lots or garages.

2.4.3 Loading and Service Accommodations

Loading and service operations are the most critical component of the building, as deliveries will be entering and exiting the site throughout the day. The building consists of approximately six loading areas, including approximately 10 loading docks.

Truck trip estimates for the Project were based on data provided by the Proponent. According to the Proponent, approximately 100 truck trips take place during a typical week. These trips consist of flat-bed trucks, box trucks, and pick-up trucks. Truck departures and returns are generally distributed evenly throughout the week and throughout the day between the hours of 6:00 a.m. – 3:00 p.m.

The facility will consolidate operations from three facilities located in Watertown, Wilmington, and Stoughton and will allow more efficient operations for deliveries to and from the Proponent's various projects throughout the City of Boston. Currently, deliveries use the regional highway system and the local roadway network to service the Proponent's projects in Boston. By consolidating the facilities and relocating to the City of Boston, there will be an overall reduction in the transportation impacts from deliveries along the regional highway system and parts of the local roadway network.

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.

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

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

Land Use Code 110 – Light Industrial. The light industrial land use code includes free standing facilities devoted to a single use that have an emphasis on activities other than manufacturing and typically have minimal office space. Typical light industrial activities include printing, material testing and assembly of equipment.

The Project Proponent also provided estimated employment data expected at the facility during typical operations. The facility will operate with two shifts. The first shift will be between 6:00 a.m. and 3:00 p.m. and will include approximately 90 employees. The employees will generally arrive between 5:30 and 6:00 a.m. and depart between 3:00 and 3:30 p.m. The second shift will operate from 3:00 p.m. and 12:00 a.m. (midnight) and will include approximately ten employees. Employees will arrive and depart the site during the off-peak hours of traffic throughout the study area. The Project is expected to have very minimal impact upon traffic operations during the peak hours of traffic throughout the study area due to the anticipated shift times. To provide a conservative analysis and to account for the possibility of an alternative shift schedule in the future, the trip generation estimates based on the ITE data were used in the Build (2020) Condition analysis.

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 13 – South Boston. 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 2-8.

Based on data provided by the Proponent, approximately 55 percent of the employees are expected to travel by personal vehicle and park on-site or in the nearby garages, 17 percent are expected to use public transportation services, and 28 percent are expected to car-pool from various park & ride lots. To provide a more general analysis scenario, the BTD mode shares were used to estimate the number of trips by travel mode.

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

Table 2-8 Travel Mode Shares

Land Use		*Walk/Bicycle Share*	*Transit Share*	*Auto Share*	*Vehicle Occupancy Rate*
Daily					
Light Industrial[1] 160 KSF	In	21%	22%	57%	1.13
	Out	21%	22%	57%	1.13
AM Peak					
Light Industrial[1] 160 KSF	In	27%	29%	44%	1.13
	Out	17%	23%	60%	1.13
PM Peak					
Light Industrial[1] 160 KSF	In	17%	23%	60%	1.13
	Out	27%	29%	44%	1.13

1 Based on LUC 110 – Light Industrial, 160 KSF

2.4.6 Project Trip Generation

The mode share percentages shown in Table 2-8 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 2-9. The detailed trip generation information is provided in Appendix B.

Table 2-9 Project Trip Generation

Land Use		*Walk/Bicycle Trips*	*Transit Trips*	*Vehicle Trips*
Daily				
Light Industrial[1]	In	139	132	318
	Out	139	132	318
a.m. Peak Hour				
Light Industrial[1]	In	42	39	57
	Out	5	3	11
p.m. Peak Hour				
Light Industrial[1]	In	5	4	11
	Out	45	41	60

1 Based on LUC 110 – Light Industrial,160 KSF, average rate

As shown in Table 2-9, the Project is expected to generate 278 pedestrian trips, 264 transit trips, and 636 vehicle trips throughout the day. During the a.m. peak hour the Project is expected to generate 47 pedestrian trips (42 in and 5 out), 42 transit trips (39 in and 3 out),

and 68 vehicle trips (57 in and 11 out). During the p.m. peak hour the Project is expected to generate 50 pedestrian trips (5 in and 45 out), 45 transit trips (4 in and 41 out), and 71 vehicle trips (11 in and 60 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 13 – South Boston and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-13.

2.4.8 Build Traffic Volumes

The vehicle trips were distributed through the study area according to Figure 2-13. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 2-14 and Figure 2-15, 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 2-16 and Figure 2-17, 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 capacity analysis. Table 2-10 and Table 2-11 present the Build (2020) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the No-Build (2020) Condition and the Build (2020) Condition. The detailed analysis sheets are provided in Appendix B.

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

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	**F**	**>80.0**	**-**	**-**	-
Summer Street eastbound left	C	28.1	0.65	126	#452
Summer Street eastbound thru|thru/right	A	7.3	0.28	45	144
Summer Street westbound left	C	23.4	0.09	8	24
Summer Street westbound thru|thru/right	F	>80.0	>1.00	~901	#945
Pappas Way northbound left/thru/right	E	60.4	0.71	78	#154
Drydock Avenue southbound left/thru	E	68.9	0.73	63	#149
Drydock Avenue southbound right	A	4.6	0.22	0	46

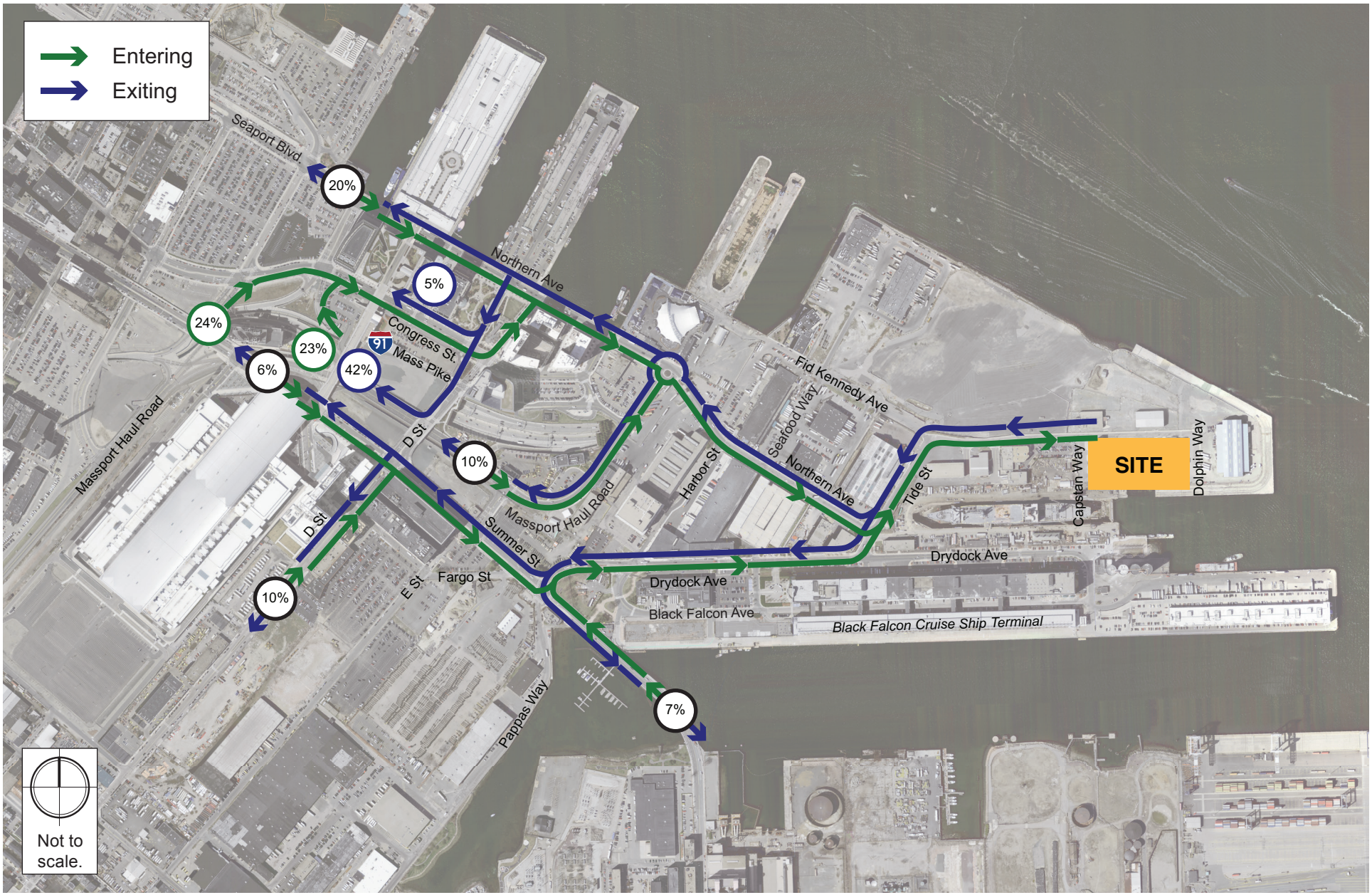

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Figure 2-13
Vehicle Trip Distribution

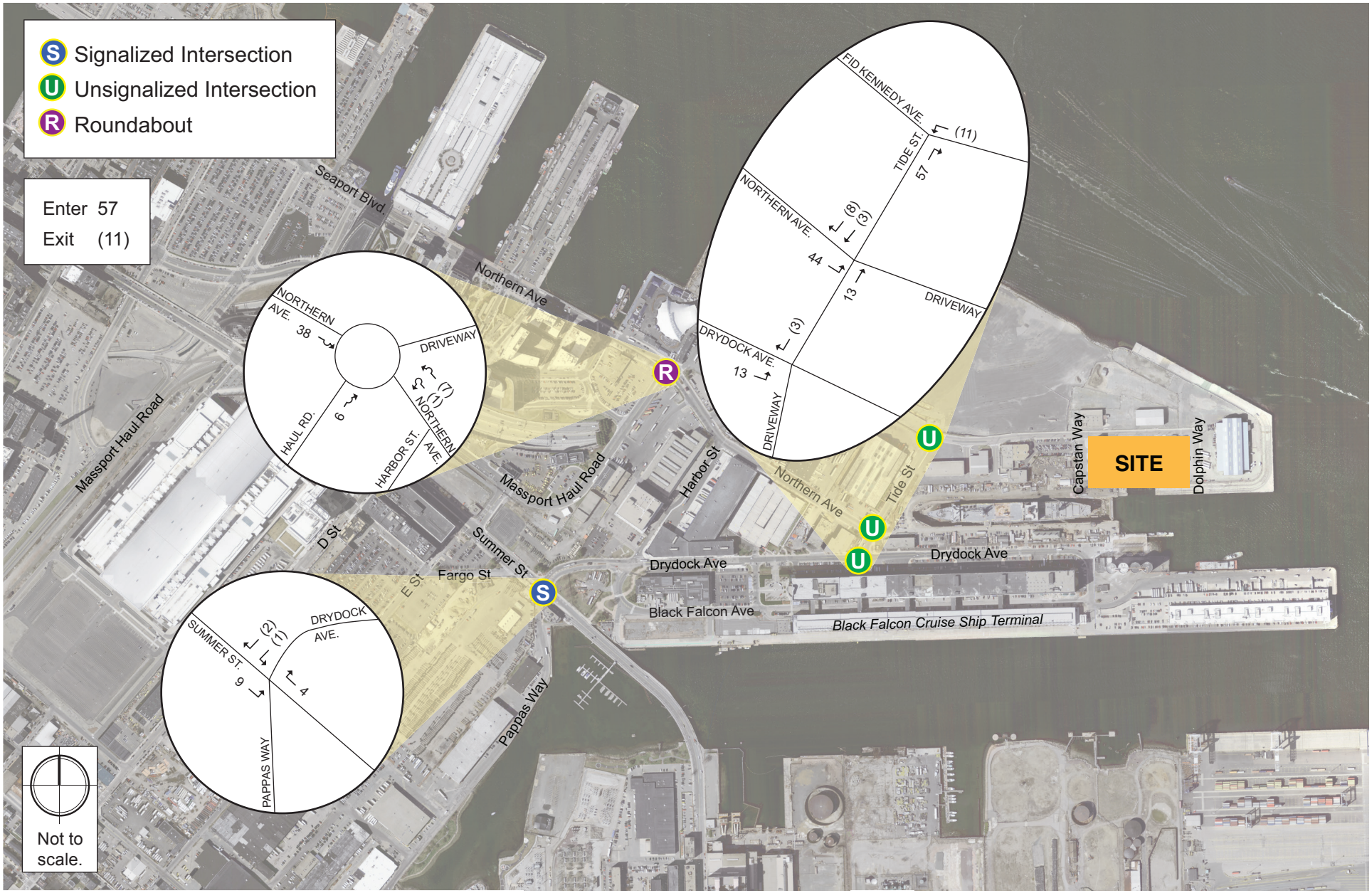

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Figure 2-14

Project Generated Trips, Weekday a.m. Peak Hour

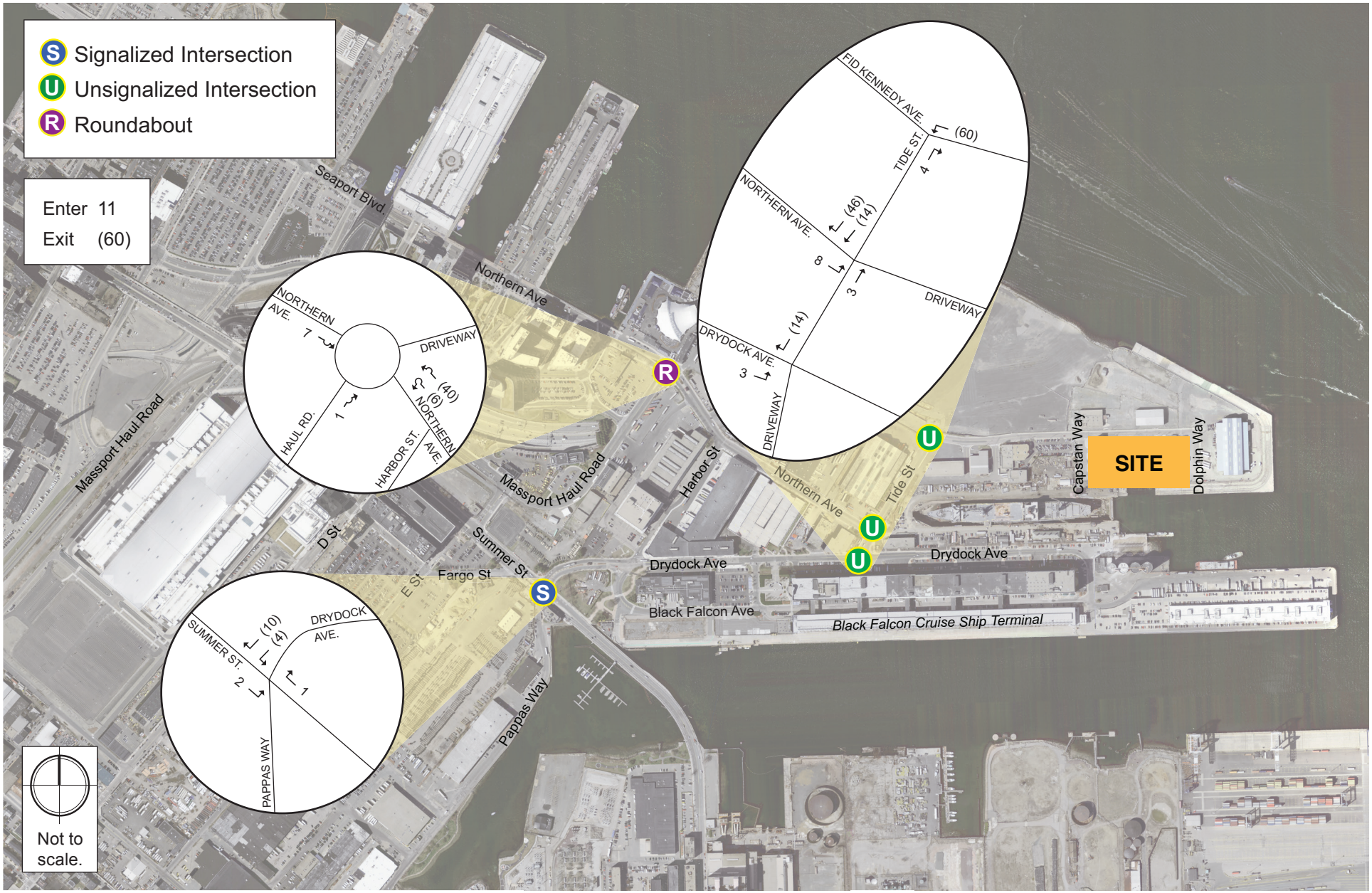

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Figure 2-15

Project Generated Trips, Weekday p.m. Peak Hour

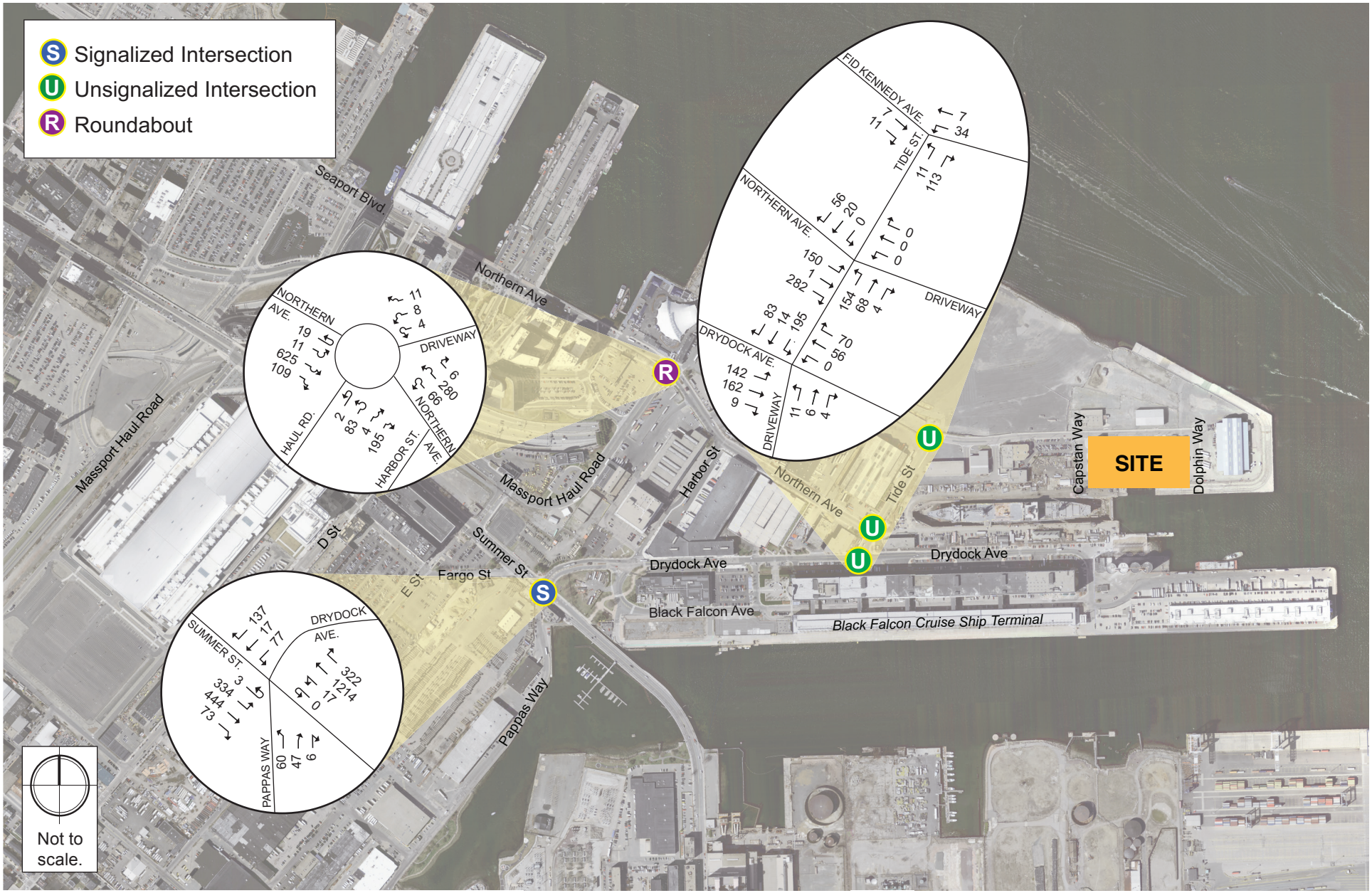

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Figure 2-16

Build (2020) Condition Traf.c Volumes, Weekday a.m. Peak Hour

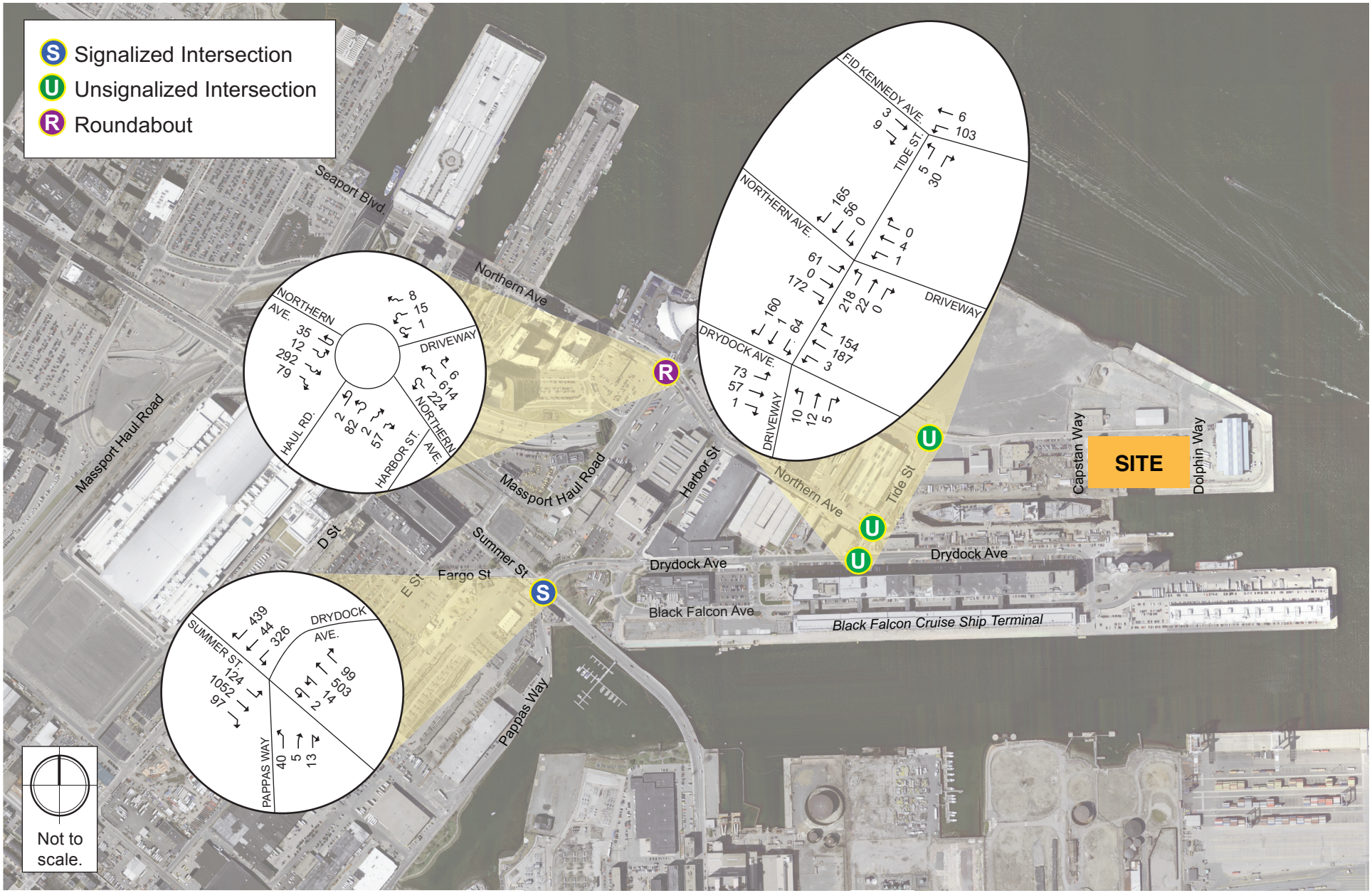

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Figure 2-17

Build (2020) Condition Traf.c Volumes, Weekday p.m. Peak Hour

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

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	8.5	0.14	-	13
Drydock Avenue westbound left/thru/right	A	0.0	0.00	-	0
Parking Drive northbound left/thru/right	C	20.9	0.10	-	8
Tide Street southbound left/thru/right	F	>50.0	>1.00	-	303
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	F	>50.0	>1.00	-	448
Alley westbound left/thru/right	A	0.0	0.00	-	0
Tide Street northbound left/thru/right	A	8.7	0.16	-	15
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.8	0.05	-	3
Tide Street northbound left/right	A	9.7	0.19	-	18
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	B	14.4	-	-	-
Northern Avenue eastbound	C	16.8	0.76	-	125
Northern Avenue westbound	A	8.5	0.38	-	30
Massport Haul Road northbound	C	15.6	0.47	-	50
Parking Drive southbound	A	7.2	0.04	-	3

~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates decrease in LOS to LOS E or LOS F

Table 2-11 Build (2020) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection	*LOS*	*Delay (seconds)*	*V/C Ratio*	*50th Percentile Queue Length (ft)*	*95th Percentile Queue Length (ft)*
Signalized Intersection					
Summer Street/Drydock Avenue/Pappas Way	**C**	**33.6**	**-**	**-**	**-**
Summer Street eastbound left	C	32.3	0.64	51	#97
Summer Street eastbound thru|thru/right	D	35.5	0.90	372	#520
Summer Street westbound left	D	35.6	0.25	8	28
Summer Street westbound thru|thru/right	C	34.5	0.73	202	250
Pappas Way northbound left/thru/right	C	21.3	0.20	23	65
Drydock Avenue southbound left/thru	E	63.1	0.96	262	#548
Drydock Avenue southbound right	A	5.3	0.56	13	47
Unsignalized Intersections					
Drydock Avenue/Tide Street	-	-	-	-	-
Drydock Avenue eastbound left/thru/right	A	9.4	0.09	-	8
Drydock Avenue westbound left/thru/right	A	7.4	0.00	-	0
Parking Drive northbound left/thru/right	C	22.4	0.20	-	18
Tide Street southbound left/thru/right	C	24.9	0.60	-	98
Northern Avenue/Tide Street	-	-	-	-	-
Northern Avenue eastbound left/thru/right	F	>50.0	>1.00	-	295
Alley westbound left/thru/right	E	44.1	0.08	-	8
Tide Street northbound left/thru/right	B	10.4	0.28	-	30
Tide Street southbound left/thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue/Tide Street	-	-	-	-	-
Fid Kennedy Avenue eastbound thru/right	A	0.0	0.00	-	0
Fid Kennedy Avenue westbound left/thru	A	7.5	0.10	-	8
Tide Street northbound left/right	A	9.1	0.05	-	5
Unsignalized Roundabout					
Northern Avenue/Massport Haul Road	B	11.6	-	-	-
Northern Avenue eastbound	A	9.3	0.45	-	40
Northern Avenue westbound	B	13.6	0.70	-	110
Massport Haul Road northbound	A	7.4	0.13	-	11
Parking Drive southbound	A	8.4	0.05	-	3

 # 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
Grey Shading indicates decrease in LOS to LOS E or LOS F

As shown in Table 2-10 and Table 2-11, under the Build (2020) Condition the signalized intersection of Summer Street / Drydock Avenue / Pappas Way continues to operate at LOS F during the a.m. peak hour and LOS C during the p.m. peak hour. The longest queues at the intersection continue occur in the Summer Street westbound through|through/right-turn lane during the a.m. peak hour and the Drydock Avenue southbound left-turn/through lane during the p.m. peak hour. At the unsignalized intersection of Northern Avenue/Tide Street, the Northern Avenue eastbound approach decreases from LOS E to LOS F during the a.m. peak hour.

2.5 Transportation Demand Management

The Proponent is 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 employees of the site. The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact.

The Proponent is prepared to take advantage of good transit access in marketing the 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 Proponent will provide orientation packets to employees containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations.

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

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

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

2.6 Transportation Mitigation Measures

While the traffic impacts associated with the new trips are minimal, the Proponent 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 Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The 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 Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project.

2.7 Evaluation of Short-term Construction Impacts

Most construction activities will be accommodated within the current 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, Shadow, Daylight and Solar Glare

The Project proposes limited exterior site work and interior renovation to an existing building as well as restoration work for the structure's historic façade. Because no significant changes are proposed to the building's height or massing, no new wind, shadow, daylight obstruction or solar glare impacts are anticipated in association with the Project.

3.2 Air Quality Analysis

The Boston Redevelopment Authority requires that project-induced impacts to ambient air quality be addressed. A microscale analysis is used to determine the effect on air quality of the increase in traffic generated by the Project. This microscale analysis may be required for a project at intersections where 1) project traffic would impact intersections or roadway links currently operating at Level of Service (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 (ADT) on roadways providing access to a single location.

The proposed Project does not generate 3,000 ADT, nor does it increase traffic volumes by 10 percent or 100 vehicles per hour. As discussed in Chapter 2, all intersections studied will continue to operate at the same LOS as under the No Build conditions during both the a.m. and p.m. peak hours. Therefore, no quantitative analysis is required. Given the generally well-operating intersections, and the small increases in volume at the worst intersections, it is expected that there would be no violations of the NAAQS for CO at any intersections associated with Project-related traffic.

3.3 Stormwater/Water Quality

Please refer to Section 7.3.

3.4 Flood Hazard Zones/ Wetlands

The existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Project Site indicates that it is located outside of a designated special flood hazard area (FIRM, City of Boston, Community-Panel Numbers 25025C0082G, Effective Date September 25, 2009). However, a "preliminary" revised floodplain map for the site area was recently released by FEMA which shows the site as lying within the 100-year special flood hazard area (FIRM, Suffolk County, Massachusetts; Panel 0082J, Map Number 25025C0082J, Map Revised, Preliminary July 9, 2015).

The site does not contain wetlands.

3.5 Geotechnical Impacts

3.5.1 Subsurface Soil and Bedrock Conditions

A review of historical geotechnical information obtained by others and of information compiled by the Boston Society of Civil Engineers suggests that the subsurface conditions below the existing building is likely to consist of the following (listed from the ground surface down):

- Approximately 5 to 26 feet of loose, urban fill, associated with the filling of the Boston Harbor.
- A natural lacustrine deposit consisting of varying amounts of peat, sand and silt to a depth of approximately 25 to 36 feet below ground surface.
- Approximately 10 to 30 feet of medium stiff to hard, silty clay and clay interbedded with silt and sand seams.
- Approximately 10 to 25 feet of dense to very dense glacial till that consists of a heterogeneous mixture of sand, gravel, silt and boulders.
- Argillite bedrock at depths of approximately 50 to more than 85 feet below grade.

3.5.2 Groundwater

A review of historical groundwater levels data indicates that the groundwater surface is located between 5 to 31 feet below existing grade. Groundwater levels in the Project vicinity will be influenced by the sea level in the adjacent Reserved Channel, as well as by seasonal variations in temperature and precipitation, and may also be influenced by nearby utilities and other subsurface structures.

Dewatering is not anticipated as part of construction.

The Project Site is not located within the City of Boston Groundwater Conservation Overlay District.

3.6 Solid and Hazardous Waste

3.6.1 Hazardous Waste

VERTEX has performed a Phase I ESA in conformance with the scope and limitations of ASTME 1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and a Phase II LSI of the Project site. This assessment has revealed the following Recognized Environmental Conditions (RECs) in connection with the site.

- Potential and confirmed soil and/or groundwater impacts related to the historical military and industrial use of the site with operations including steel fabrication, repair of light rail vehicles, ship repair, and use as a machine shop are considered a REC.

- The potential for impacts from undocumented releases from the AST located to the south of the site building is considered a REC.

Volatile Organic Compounds (VOC) and Volatile Petroleum Hydrocarbons (VPH) concentrations were identified in soil and groundwater samples, and represent a Massachusetts Contingency Plan (MCP) 120-day Reporting Condition for the site. The Proponent will manage any regulated soil, groundwater and building materials during renovations and will protect the human health of future occupants of the building in a manner that will not contribute to historic contamination.

3.6.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of industrial manufacturing uses. This solid waste is expected to include wastepaper, cardboard, glass bottles, and food. Recyclable materials will be recycled through a program implemented by the Proponent. The Project will generate approximately 370 tons of solid waste per year.

The Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials.

3.6.3 Recycling

Recycling will be required, coordinated, and comprehensive. To encourage recycling, the Proponent will implement a recycling program throughout the Project. Recyclable materials associated with the industrial use of the Project will include metal, copper, and steel. Dedicated recycling bins will be made available for each of these materials, with the intent that 100% of recyclable debris will be recycled. The loading/receiving area will include space for the storage and pick-up of recyclable materials.

3.7 Noise Impacts

The principal sources of noise associated with the Project are anticipated to be rooftop mechanicals and loading dock traffic. Given the location of the building well within the BMIP, and half way between Logan International Airport to the north and the Massport Conley Terminal and associated industrial areas on the south side of the Reserved Channel (as well as the intervening Black Falcon Cruise Terminal building and piers) to the south, no noise impacts to residential or similar public areas are anticipated.

3.8 Construction Impacts

3.8.1 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.

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

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

3.8.2 Construction Methodology/Public Safety

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

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

3.8.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in January of 2016 and last for approximately 15 months.

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

3.8.4 Construction Staging/Access

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

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

3.8.5 Construction Mitigation

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

The 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 Charles River" plaques will be installed at storm drains that are replaced or installed as part of the Project.

3.8.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 140 construction jobs will be created over the length of construction. The Proponent will make reasonable, good-faith efforts to have at least 50% of the total employee work hours be performed by Boston residents, at least 25% of total employee work hours by minorities and at least 10% of the total employee work hours by women. The Proponent will enter into jobs agreements with the City of Boston.

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

3.8.7 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 reviewed by the BTD and documented 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.

3.8.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for 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; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

3.8.9 Construction Noise

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

Mitigation measures are expected to include:

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

3.8.10 Construction Vibration

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

3.8.11 Construction Waste

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

3.8.12 Protection of Utilities

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

3.8.13 Rodent Control

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

3.8.14 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

4.1 Sustainable Design

To comply with Article 37, the Proponent intends to measure the results of their sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. The Project will use the LEED for New Construction v2009 as the rating system to show compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation in Design.

A LEED checklist is included at the end of this section, and shows the credits the Project anticipates achieving. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. Presently the Proponent is striving to be certifiable at the Certified level with 47 points targeted, not including any of the potential Boston Zoning Code Article 37 points. A credit by credit analysis of how the prerequisite and credit compliance will be achieved is presented below.

Sustainable Sites

Prerequisite 1: Construction Activity Pollution Prevention. The Project will create and implement an erosion and sedimentation control plan for all activities associated with the Project.

Credit 1: Site Selection. The Project includes renovations to an existing building located in a well-developed urban area on the Boston waterfront.

Credit 2: Development Density and Community Connectivity. The Project meets the Community Connectivity criteria by being located on a previously developed site in a densely developed area.

Credit 3: Brownfield Redevelopment. As part of the Project, all asbestos-protected sheet metal siding and trim will be remediated according to accepted standards.

Credit 4.1: Alternative Transportation – Public Transportation Access. The Project site is within a ½ mile walking distance of the MBTA Silver Line, which travels to and from South Station, a major transit hub with access to MBTA commuter rail, the Red Line subway, and bus routes.

Credit 4.2: Alternative Transportation – Bicycle Storage and Changing Rooms. The Project will include secure bike racks or storage for 5% of peak occupants and show and changing facilities for 0.5% of FTE occupants.

Credit 4.3: Alternative Transportation - Low Emission & Fuel Efficient Vehicles. The Project will provide preferred parking spaces for low-emitting and fuel-efficient vehicles for 5% of the total parking capacity.

Credit 4.4: Alternative Transportation – Parking Capacity. The Project will not provide new parking.

Credit 7.2: Heat Island Effect – Roof. The Project will use roofing materials that meet the criteria for this credit.

Water Efficiency

Prerequisite 1: Water Use Reduction—20% Reduction. The Project will comply with the minimum potable water consumption reduction of 20% less water used when compared to a baseline case by using low-flow and efficient plumbing fixtures (not including irrigation).

Credit 3: Water Use Reduction. Through the specification of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that will target an overall potable water use savings of 30% from the calculated baseline use.

Energy and Atmosphere

Prerequisite 1: Fundamental Commissioning of the Building Energy Systems. The Project will engage a commission agent for the commissioning process and to verify that the building's related systems are installed and performed as intended.

Prerequisite 2: Minimum Energy Performance. The Project will include energy efficiency measures. However, the Proponent does anticipate the Project being subject to the stretch code, and will contact the Department of Inspectional Services to confirm this.

Prerequisite 3: Fundamental Refrigerant Management. The Project will use refrigerants that are chlorofluorocarbon (CFC) free in the HVAC&R system

Credit 2: On-Site Renewable Energy. The Project will include solar photovoltaics (PV) on the roof that will produce renewable energy to offset at least 13% of the building's annual energy costs.

EA Credit 3 - Enhanced Commissioning: The Project will have a third party Commissioning Agent that will fulfill the requirements of the credit. The CA's services will include review of the Owner's Project Requirements (OPR) and Basis of Design (BOD) documents, development of a commissioning plan, incorporation of a commissioning specification section into the construction documents and verification through startup observation and functional testing that the installed systems are operating in accordance with the OPR, BOD, and construction documents.

Materials and Resources

Prerequisite 1: Storage and Collection of Recyclables. The Project will reduce the amount of building waste that is taken to landfills by supporting occupant recycling efforts. A central area for the collection of recyclables will be included in the building.

Credit 1.1: Building Reuse – Maintain Existing Walls, Floors, and Roof. The Project will reuse at least 55% of the existing walls, floors and roof.

Credit 2: Construction Waste Management. The construction management team will develop and implement a Construction Waste Management plan for waste generation on site. The construction manager will endeavor to divert as much demolition debris and construction waste from area landfills as possible, with a goal to achieve 75% diversion.

Credits 4: Recycled Content. The Project will specify materials to require a minimum of 10% recycled content materials (combination of pre-consumer and post-consumer recycled content) based on the calculation of cost against total value of materials.

Credit 7: Certified Wood. The Project will use a minimum of 50% of wood-based materials and products that are FSC certified.

Indoor Environmental Quality

Prerequisite 1: Minimum IAQ Performance. The building mechanical systems will be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and/or applicable building codes. Any naturally ventilated spaces will comply with the applicable portions of ASHRAE 62.1 as well.

Prerequisite 2: Environmental Tobacco Smoke (ETS) Control. No smoking will be allowed within the building. Designated smoking areas outside of the building will be located at least 25 feet from doorways, operable windows and outdoor air intakes.

Credit 1: Outdoor Air Delivery Monitoring. CO2 concentrations will be monitored within all densely occupied spaces (those with a design occupant density of 25 people or more per 1,000 square feet). CO2 monitors must be between 3 and 6 feet above the floor.

Credit 3.1: Construction IAQ Management Plan, During Construction. The Proponent will follow all of the requirements for implementation and documentation of Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008, and installation and replacement of filtration media prior to occupancy.

Credits 4.1, 4.2 and 4.3, Low Emitting Materials. The Project will specify the use of adhesives and sealants, paints and coatings, and flooring systems with low VOC content to reduce the quantity of indoor air contaminants.

IEQ Credit 5 - Indoor Chemical and Pollutant Source Control: For this Project, entry pollutants and later cross contamination will employ the following strategies:

- All air handlers will be equipped with a MERV 13 air filter to reduce dust and particles in the air supply.
- At every main, high-volume entryway there will be special floor mats to prevent outside materials from being carried into the building. Each of these mats will be cleaned on a regular basis.

Innovation in Design

The team has identified several possible ID credits listed below, (limited to five ID credits total):

ID Credit 1.1: Exemplary Performance EAc2: On-site Renewable Energy. The Project will include solar photovoltaics (PV) on the roof that will produce renewable energy to offset at least 15% of the building's annual energy costs.

Credit 2 LEED Accredited Professional. The Project complies with the credit requirements of having at least one LEED AP on the Project team.

Regional Priority

Regional Priority Credits, (RPC) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. RPCs applicable to the site include: SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2(1%) and MRc1.1(75%). This Project anticipates two RPCs for SSc3 Brownfield Redevelopment and SSc7.2 Heat Island Effect – Roof.

4.2 Climate Change Preparedness Checklist

The BRA requires proponents to complete a Climate Change Preparedness and Resiliency Checklist. A copy of the completed Checklist is included as Appendix C. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

LEED 2009 for New Construction and Major Renovations

Project Checklist

25 Fid Kennedy Avenue

September, 2015

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
1			Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y			Prereq 1	Water Use Reduction—20% Reduction	
		4	Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
2	2		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
		19	Credit 1	Optimize Energy Performance	1 to 19
7			Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
		2	Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	
1	1	1	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	1	1	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
1	1		Credit 4	Recycled Content	1 to 2
	1	1	Credit 5	Regional Materials	1 to 2
		1	Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
		1	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
	1		Credit 6.1	Controllability of Systems—Lighting	1
		1	Credit 6.2	Controllability of Systems—Thermal Comfort	1
	1		Credit 7.1	Thermal Comfort—Design	1
		1	Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
		1	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1			Credit 1.1	Exemplary Performance: EAc2	1
	1		Credit 1.2	Exemplary Performance: MRc2	1
			Credit 1.3	Innovation in Design: Specific Title	1
			Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1			Credit 1.1	SSc3	1
1			Credit 1.2	SSc7.2	1
1			Credit 1.3	EAc2	1
	1		Credit 1.4	MRc1.1	1

Total — Possible Points: 110

47	21	38	

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Site Context

The Project Site is located within the Boston Marine Industrial Park, a sub-district of the Boston Seaport area. The BMIP was created through landfill projects in the nineteenth century, and became a center for shipping, docks, wharves and rail facilities. In 1920, the U.S. Government created the South Boston Naval Annex; the facility was built out to include Dry Dock No. 3, which is south of the Project Site. Following a postwar period of decline in business and shipping in the area, the U.S. Government closed the annex in 1974. In 1977, EDIC acquired the property in order to promote economic growth and maritime industrial development. During the 1990s, the area's isolation from downtown Boston began to diminish as a result of major infrastructure projects that depressed the Central Artery and created the Silver Line transit system. Together with the Massachusetts Convention Center Authority Boston Convention and Exhibition Center, these improvements have provided the Seaport area with capacity for growth.

The BMIP provides space for an array of marine-related industrial and light-industrial businesses, including ship repair, seafood shipping and processing, a brewery and cruise port operations. Attracted by the availability of large parcels of open land and by low-cost industrial space, many new commercial businesses have relocated to the area in recent years. Together with the distinctive maritime infrastructure, the positioning of the site between Logan Airport and interstate highways offers additional advantages. The BMIP also includes R&D laboratory space, general office, parking structures and transportation infrastructure.

Existing buildings include a collection of concrete and masonry structures, pre-engineered metal structures, and a collection of newer steel-framed, precast concrete, steel and glass buildings. The district also incorporates a number of dedicated open spaces, including a public viewing platform for viewing operations at Drydock No. 3.

5.2 Project Site

Originally known as "Building 16," the existing building at 25 Fid Kennedy Avenue was erected in 1940. Subsequent modifications over the next several years included "heater room" additions to the long north and south facades, and an electrical substation enclosure. Internally, two of the high-bay skylight monitors were reframed to accommodate men's and women's locker rooms and shops.

Due to the scale of BMIP as a whole, 25 Fid Kennedy Avenue appears somewhat remote and detached from its neighbors when viewed from a distance. The scale and character of the building become evident as the visitor turns onto Fid Kennedy Avenue, passes the Au Bon Pain bakery, and proceeds east toward the North Jetty. Extending from the northwest

corner of 25 Fid Kennedy Avenue, the existing stair/elevator tower is a prominent feature, its verticality emphasized by the corrugated sheet metal paneling and the slim column of corrugated glass fenestration window flanked by metal trim (see Figure 5-1).

5.3 Urban Design Objectives

Urban Design objectives include:

- Recognize, respect, and reinforce the existing scale and character of the BMIP;
- Re-clad the visually prominent building facades in a respectful way, to create an attractive "gateway" visible from the air and from Boston Harbor, as well as the immediate surroundings;
- Retain and restore the stair and elevator towers, which are character-defining features;
- Restore the masonry, one-story wing facing Fid Kennedy Avenue to maintain a human-proportioned edge; and
- Support efficient vehicular delivery and shipping access to, through, and around the site.

5.4 Massing, Façade Design, Fenestration and Building Materials

Proposed exterior modifications to the main block of the building are intended to replicate the historical appearance using new, uncontaminated, and energy-efficient products. Accordingly, the renovations will have a minimal visual impact on the overall appearance of the building.

Visible from the air, the harbor and many vantage points around the BMIP, the stepped profile of the existing high- and low-bay skylight monitors at 25 Fid Kennedy Avenue will be preserved. The potential installation of low-profile solar photovoltaic panel arrays atop the high bays should result in little if any visual impact on the existing skyline. Other than demolition of the south wing (see below) and the possible future addition of a steel-framed canopy facing the Drydock, no major alterations to the building massing are proposed. Figure 5-2 presents the proposed south elevations. At the stair/elevator towers and at existing gable-ends and monitors, retention of the existing red fascia and drip-edge trim installed by the BRA/EDIC is proposed, in order to avoid compromising the fully-intact membrane roofing system.

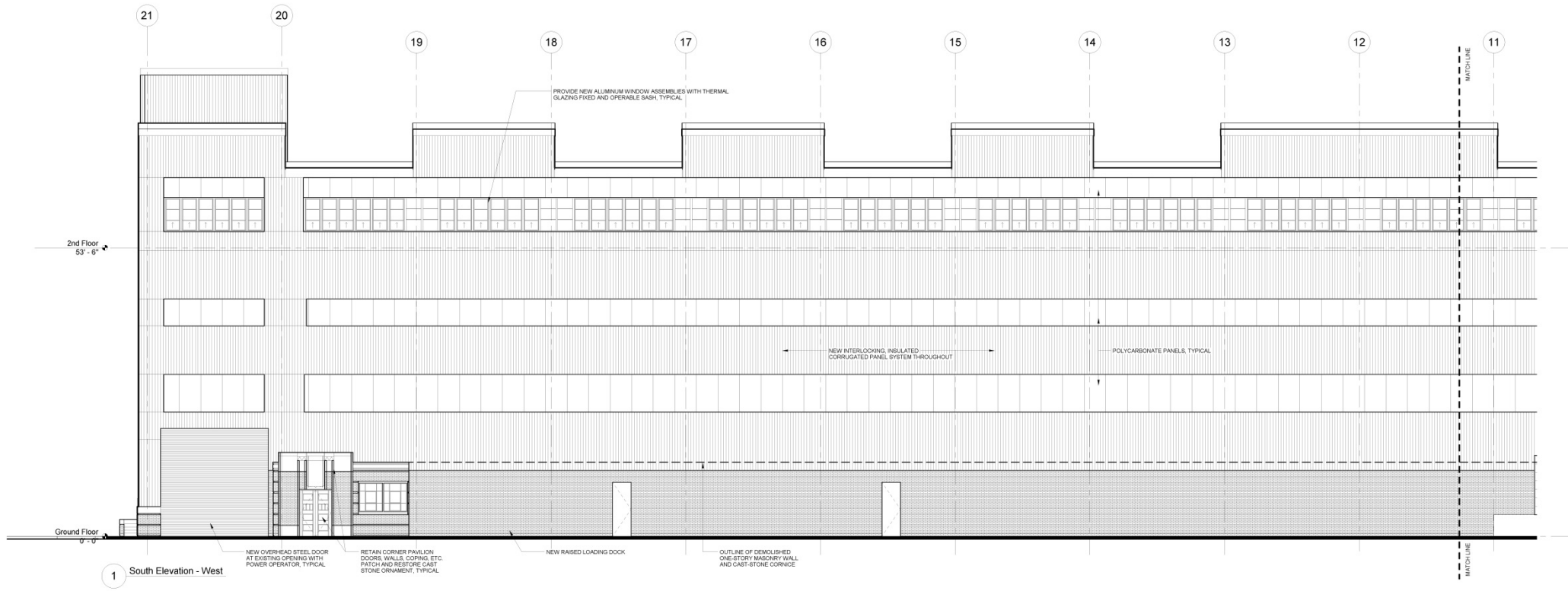
Repair and restoration of the one-story wing along the north elevation is proposed. This work will include replacing and re-setting brick, repointing all deteriorated masonry and repair (and replacement as required) of the cast-stone window sills, grooved cornices, and

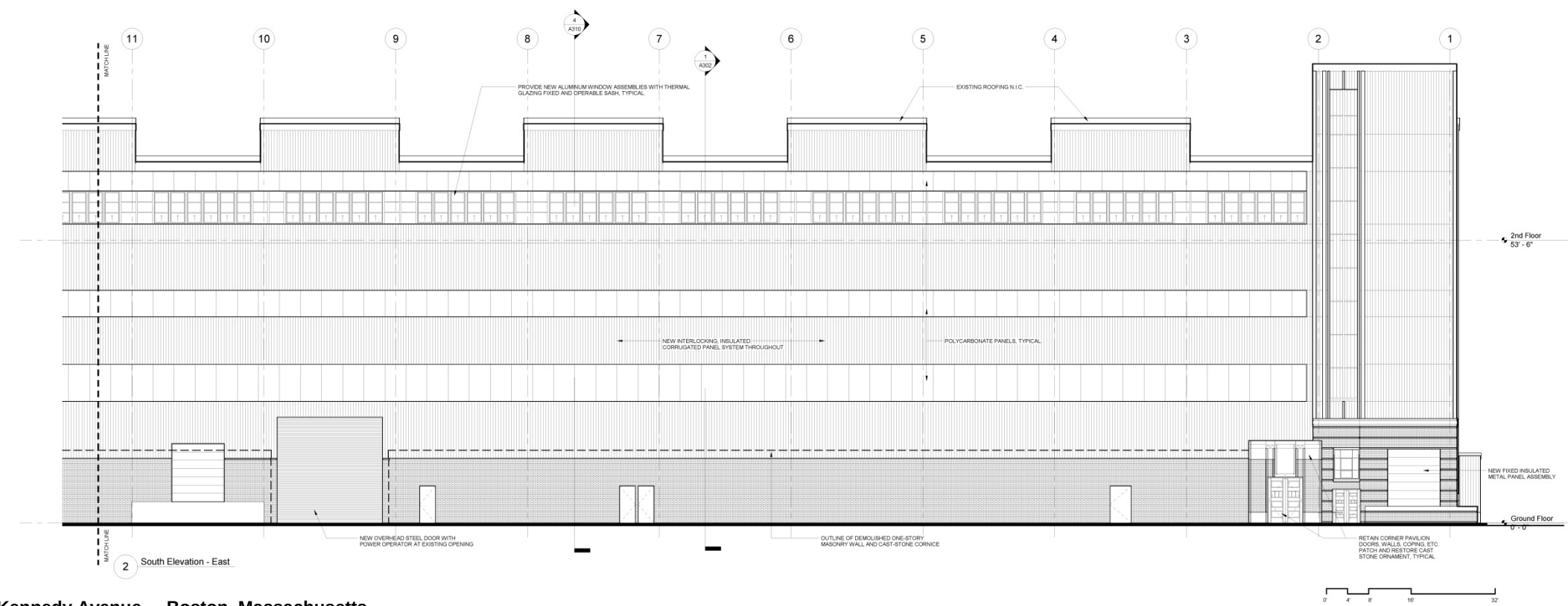
25 Fid Kennedy Avenue Boston, Massachusetts

Cannistraro

Figure 5-1

Existing Conditions – Northwestern Corner





25 Fid Kennedy Avenue Boston, Massachusetts

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Figure 5-2

South Elevations

decorative panels. In conjunction with the masonry repair/restoration work, highly corroded steel window lintels will be replaced in kind. Existing masonry openings will be retained and infilled with an appropriate combination of doors, windows and opaque insulated panels set in aluminum and/or steel frames. Figure 5-3 presents the proposed north elevations.

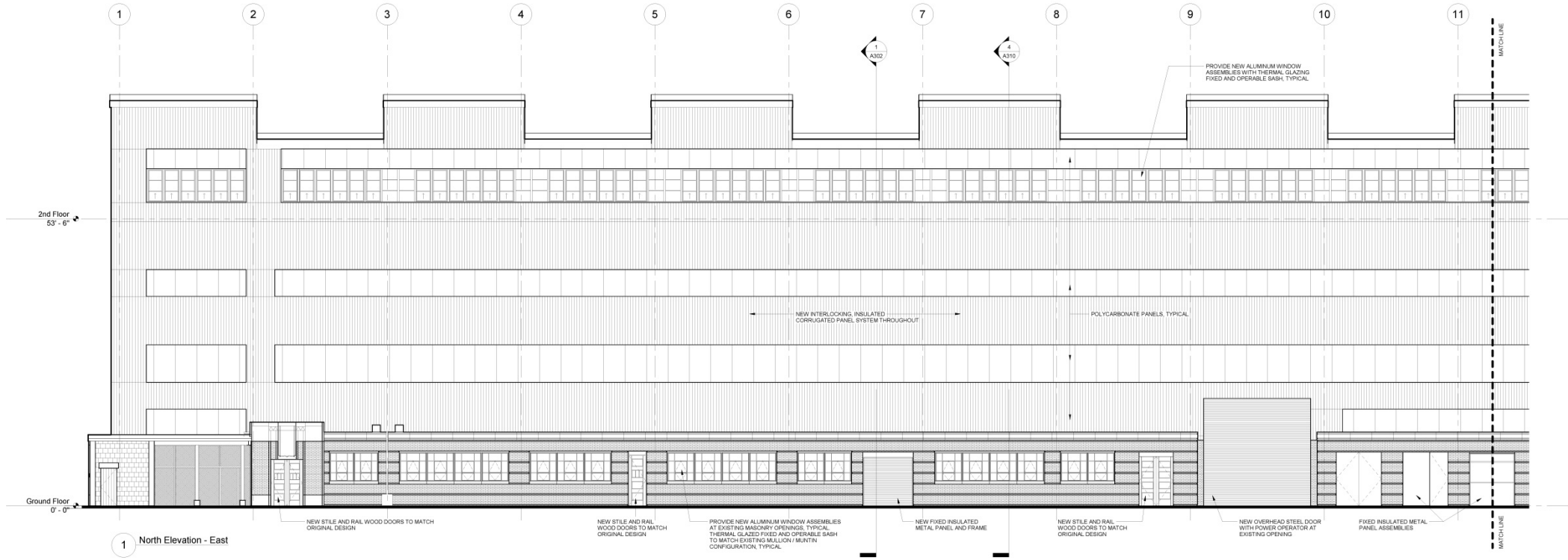
Demolition of the one-story south wing of the building is required in order to provide room for maneuvering, loading and staging trucks and flatbeds – key components of the tenant's operations. Intact brick and cast-stone masonry, doors and hardware will be salvaged for reuse and integration with the proposed repair and rehabilitation of the north wing. Constructed of the same buff-colored brick as the other masonry walls at 25 Fid Kennedy Avenue, the interior masonry wall exposed by removing the south wing will be retained and infilled with new exterior access doors and/or opaque panels, in accordance with programmatic needs.

In order to facilitate shipping and receiving industrial materials and products, an additional overhead door is proposed at both the east and west end elevations, adjacent to and aligned with existing doors. Figure 5-4 presents the proposed east and west elevations.

Existing corrugated wire glass panels weighing more than 70 pounds each are secured in metal frames and trim sealed with unique rubber gaskets and asbestos-containing caulking. Glazing of this type is no longer available as a new product, due to the danger of asbestos as a carcinogen. Therefore, use of an extruded polycarbonate product of similar transparency and light-diffusion is proposed, with the long horizontal strips of fixed and operable sash illuminating the tall first-floor fabrication areas. The strong, relatively-lightweight polycarbonate panels facilitate installation from a mobile lift and preclude the need for fixed scaffolding; given the sheer size of the building, scaffolding each and every face is not feasible or practical.

In addition to the fenestration, the most significant visual change proposed as part of the rehabilitation Project concerns replacement of the building cladding, stemming from the need to abate friable asbestos-containing materials (e.g., "Galbestos" composite metal panels and trim, closure gaskets and sealants), which represent an environmental and public-safety hazard. A prefabricated, insulated metal panel system with vertical corrugated profiles evocative of the existing Galbestos metal panels is proposed throughout.

At the northwest and southeast stair/elevator towers, retention of the original corrugated wire-glass fenestration is proposed; the ensemble will include replacement of the existing metal panels and trim with new insulated metal panels and new trim matching the existing locations and dimensions as closely as possible. Figure 5-5 presents a comparison of the existing conditions to the proposed conditions.



25 Fid Kennedy Avenue Boston, Massachusetts

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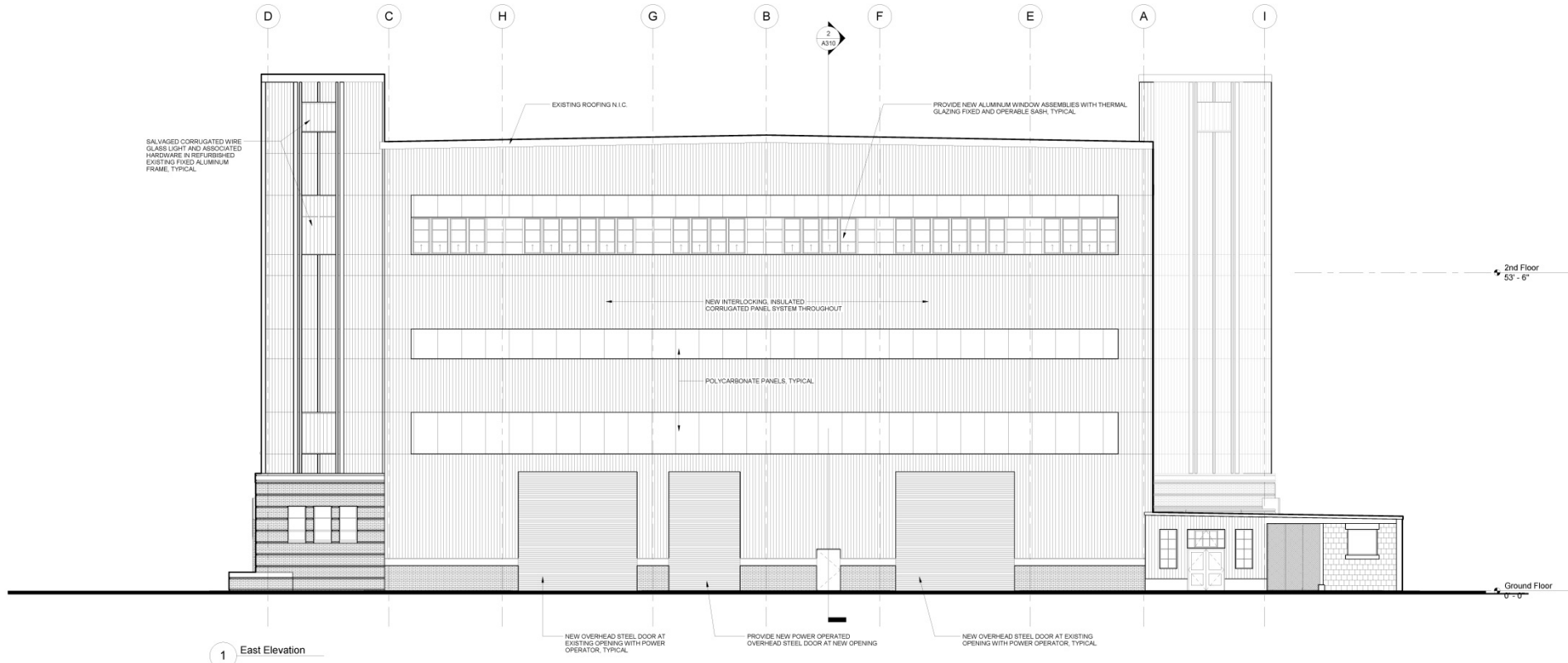
Figure 5-3

North Elevations



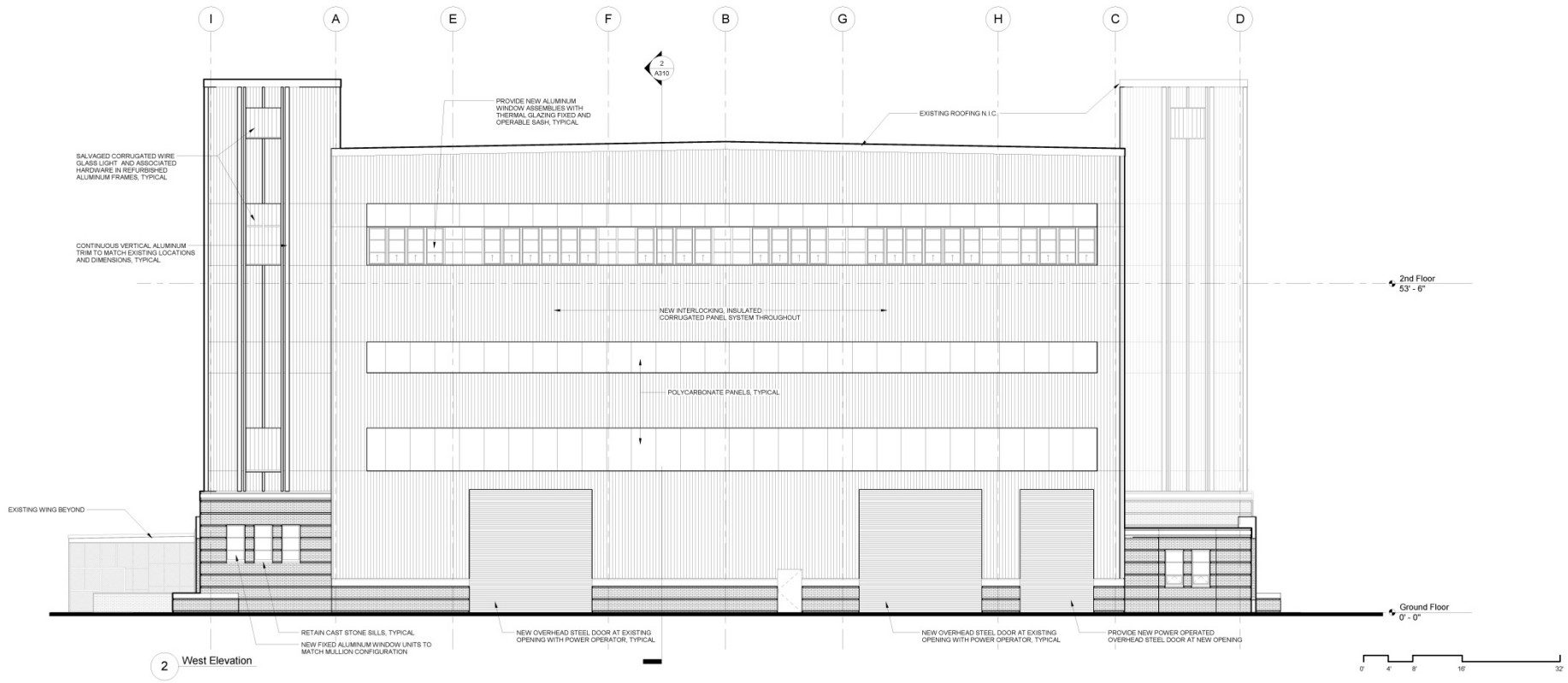


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Figure 5-4

Eat and West Elevations

Existing Conditions

Proposed Conditions

25 Fid Kennedy Avenue Boston, Massachusetts

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Figure 5-5
Existing and Proposed Conditions

5.5 Open Spaces, Pedestrian Ways and Public Amenities

At the northwest and southeast corners of the building, the existing loading docks enclosed by masonry retaining walls with cast-stone copings originally intended to serve the freight elevators will be retained and repurposed as outdoor seating areas. Bicycle racks and benches will be provided adjacent to the Fid Kennedy Avenue (north) elevation, convenient to the offices in the building.

5.6 Vehicular Circulation

Managing truck traffic on site will be an important part of the Project. New interior and exterior loading docks will be located and configured to allow adequate maneuvering and storage of WB-50 (approximately 40- to 45-foot long trailers) and flatbed trucks. Most trucks will use Capstan Way to access the docks on the western edge of the building and Dolphin Way on the eastern edge of the building; backing into each dock. Reusing existing loading doors at the north and south elevations, provision will be made to reuse the existing truck access near the center of the building from Fid Kennedy Avenue, and then to travel through to the rear of the building to exit. These trucks will then circulate around to Capstan Way and exit onto Fid Kennedy Avenue.

The Proponent anticipates initiation of a shuttle service facilitating employee use of the existing BRA/EDIC or other parking garages on Drydock Avenue.

5.7 Signage and Lighting

New signs identifying J.C. Cannistraro as the user will be placed at the ends and sides of the building. New site lighting will also be provided to activate the space for a safer pedestrian environment. Each entry will be adequately lit to accommodate early-morning delivery or discharge during winter months.

Properly-shielded (i.e., complying with night-sky protection standards) site lighting will be introduced on all sides of the building to illuminate storage yards, loading areas and entrances. Supplemental lighting will be provided as required to illuminate the parking areas along Fid Kennedy Avenue and the existing perimeter sidewalks.

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

6.1 Introduction

The Project Site has a street address of 25 Fid Kennedy Avenue, and corresponds to Parcel N within the Boston Marine Industrial Park (BMIP). The site is bound by Fid Kennedy Avenue to the north, Dolphin Way to the east and Capstan Way to the West.

6.2 Historic Resources on the Project Site

The Project Site is located within the former Boston Army Supply Base, an area included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth. The triangular shaped Boston Army Supply Base Area (MHC# BOS.RT) is comprised of 43 acres, with 29 individual buildings and one major structure; Drydock #3. The listed area is bounded by Boston Harbor to the northeast, the Reserved Channel to the south, and Harbor Street to the northwest, and incorporates Northern Avenue, Channel Street, Tide Street, Fid Kennedy Avenue (where the Project Site is located), Drydock Street and Dolphin Way.

The Project Site includes one existing building, originally known as Building #16 (MHC# BOS.12965), which is a contributing structure to the Boston Army Supply Base Area. The existing building is located at the northeast corner of the former base, north of Drydock #3 (MHC# BOS.12956), on the south side of Fid Kennedy Avenue, and east of Building #31 (MHC# BOS.12947). Constructed ca. 1940-1942 Building #16 has a floor area of approximately 157,000 gross square feet and is an expansive 20-by-8 bay, open interior, rectangular, steel framed, corrugated sheet metal-clad structure. The shallow pent roof is surmounted by ten, full-width, raised, rectangular illumination monitors.

The structure consists of three rows of massive steel I-beam columns, each running longitudinally at the north and south elevation, and one at the center of the building, dividing it into two east-west bays. These columns support the roof truss work, and each of the two east-west bays includes one or more rail-guided traveling cranes. This configuration suggests that it was a heavy fabrication shop associated with the adjacent Drydock #3. The steel frame is clad in a thin membrane of alternating wide horizontal bands of corrugated "asbestos-protected" sheet metal panels and translucent corrugated wire glass. The stair towers have subtle Moderne detailing, including offset vertical bands of windows flanked by vertical metal trim. Building #16 possesses the unusual combination of utilitarian mass and decorative detail that characterizes the pre-Pearl Harbor, U.S. Navy architecture at the Boston Army Supply Base.

The BMIP was largely created through landfill projects in the 19th and 20th centuries. BMIP has been and continues to be an important maritime facility in Boston with docks, wharves, and rail access. The majority of the buildings and structures were built between 1914 and the mid-1940s as part of the South Boston Naval Annex and South Boston Army Base,

which operated here between 1920 and 1974. These buildings were sturdy warehouses and processing centers capable of supporting military equipment, vehicles, and ammunition for deployment around the world. By the 1970s, shipping had declined and the United States government closed the annex in 1974.

The Economic Development and Industrial Commission (EDIC) acquired the BMIP in two transactions between 1977 and 1983 with the intent to promote economic growth and maritime industrial development. In the 1990s, following the completion of the Central Artery project and the establishment of the MBTA Silver Line connecting downtown Boston to the Reserved Channel, new growth began in this area. Numerous projects over the last 25 years, including residential, hotel, entertainment, and civic projects, have changed the character of the BMIP and the surrounding area. The BMIP today contains a variety of marine-related, heavy industrial, and light industrial businesses, as well as new commercial enterprises and design showrooms.

6.3 Historic Resources in the Vicinity of the Project Site

The Project Site is in the immediate vicinity of several other buildings associated with the World War II development phase of the Boston Army Supply Base; the closest of which includes Drydock #3 (MHC# BOS.12956) and Building 31 (MHC# BOS.12947). The historic resources located within the Project's vicinity are depicted in Figure 6-1.

6.4 Impacts to Historic Resources

6.4.1 Building Façade Changes

The proposed Project will substantially rehabilitate the existing building (Building #16) for continued industrial use. The Project includes removing the existing corrugated asbestos siding and replacing it with an interlocking, insulated metal panel system similar in appearance to the existing siding. Existing corrugated glass window assemblies will be retained in selected areas, e.g., the clerestory windows will remain intact, stair/elevator towers, and parts of the wing on the north first floor offices. Throughout the expansive first-floor level, the fixed and (originally) operable wire glass sash will be replaced with translucent polycarbonate panels, oriented vertically and secured in place with metal caps to simulate the appearance of the corrugated glass. At the second floor level, the existing single-glazed steel industrial sash will be replaced with new clear insulated glazing in aluminum fixed and single-hung sash.

An existing one-story brick and concrete "lean-to" on the south elevation will be demolished. Materials salvaged will be used to repair the identical, but deteriorated materials on the north wing. The north wing will be repainted and rusted steel lintels will be removed and replaced with in-kind materials. Window and door openings will be

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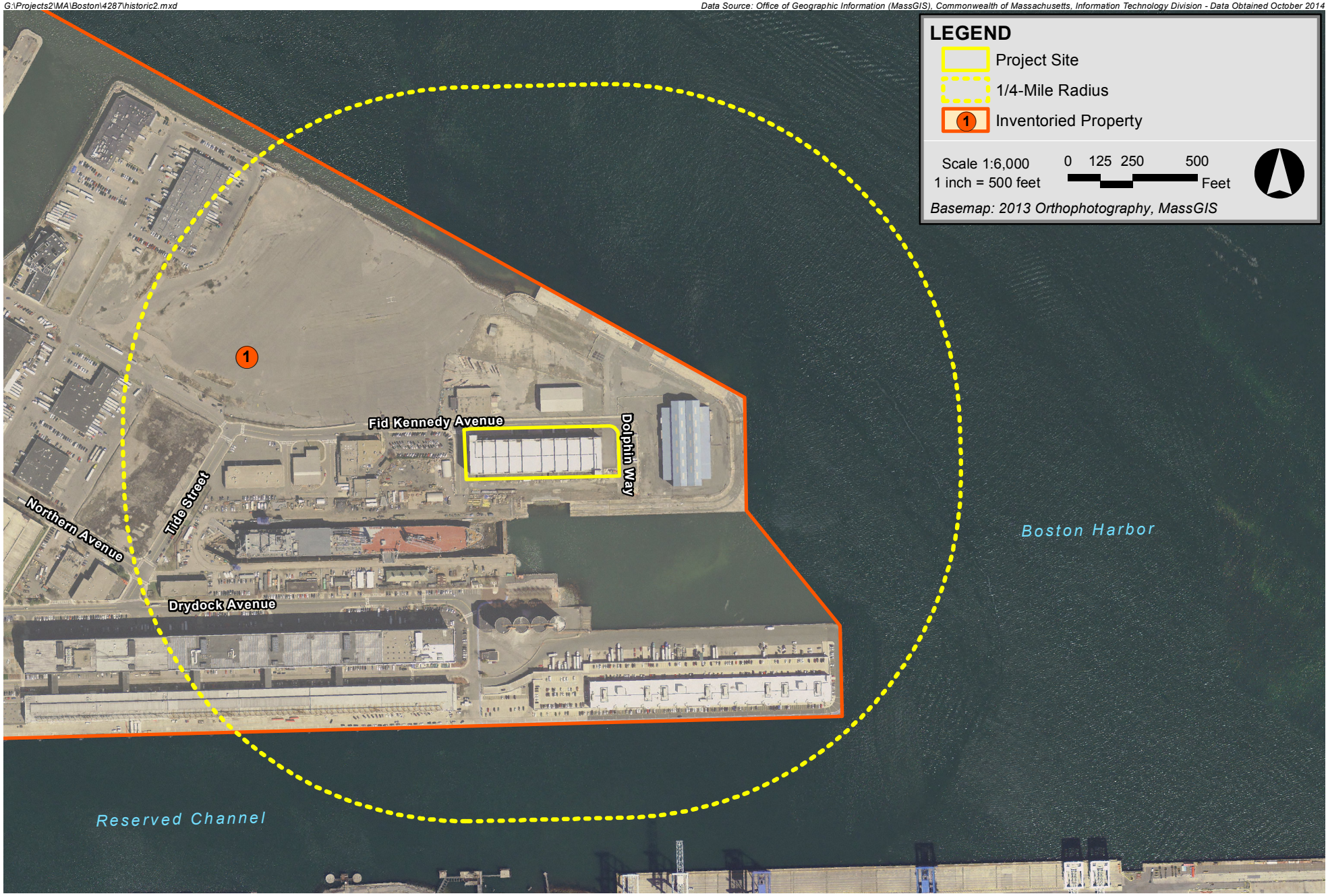
Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division - Data Obtained October 2014



25 Fid Kennedy Avenue Boston, Massachusetts

Epsilon Associates Inc.

Figure 6-1
Historic Resources

infilled with a combination of glass and opaque panels consistent with the original fenestration. Existing doors are in fair to poor condition and will be repaired or replaced as necessary.

6.4.2 Site Changes

Site work will be limited to paving of the side yard for loading docks. Site utilities will be upgraded as required.

6.4.3 Visual Impacts

The redevelopment of Building #16 is not anticipated to have adverse visual impacts to the existing building and surrounding former Boston Army Supply Base. Exterior modifications proposed for the building are minimal and will retain the overall historic industrial character of the structure.

6.4.4 Archaeological Resources within the Project Site

The Project Site is located on filled land which has been previously disturbed by the construction of Boston Army Supply Base. No previously identified archaeological resources are located within the Project site. No impacts to archaeological resources are anticipated.

6.5 Status of Project Reviews with Historical Agencies

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

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

This section provides a description of the existing utility systems in the vicinity of the Project Site and evaluates potential impacts to those systems. Appropriate mitigation measures are discussed to address Project-related impacts. The Project is in the early design stages and as a more definitive design evolves the Proponent will coordinate with the various utility companies to ensure full services for the planned renovation of 25 Fid Kennedy Avenue.

Required permits/approvals for Project utility infrastructure may include approvals from the Bston Conservation Commission, the Massachusetts Department of Environmental Protection (MassDEP), and the U.S. Environmental Protection Agency (EPA). A Boston Water and Sewer Commission (BWSC) Utility Site Plan and General Service Application will be required for all proposed water, sewer and drain connections. In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be submitted specifying best management practices (BMPs) for protecting on-site and adjacent off-site drainage systems during construction.

7.1 Sanitary Sewer System

7.1.1 Existing Sewer System

In the vicinity of the Project Site there are private and BWSC sewers ranging in size from 6 to 12 inches in diameter (Figure 7-1). These sewers are routed to the Boston Main Drainage Tunnel ultimately discharging to the MWRA Deer Island Treatment Facility, where it is treated and discharged to the Boston Harbor. The Deer Island Treatment Facility has a design capacity of 1,200 million gallons per day (mgpd) and currently has an average daily flow of about 250 mgpd.

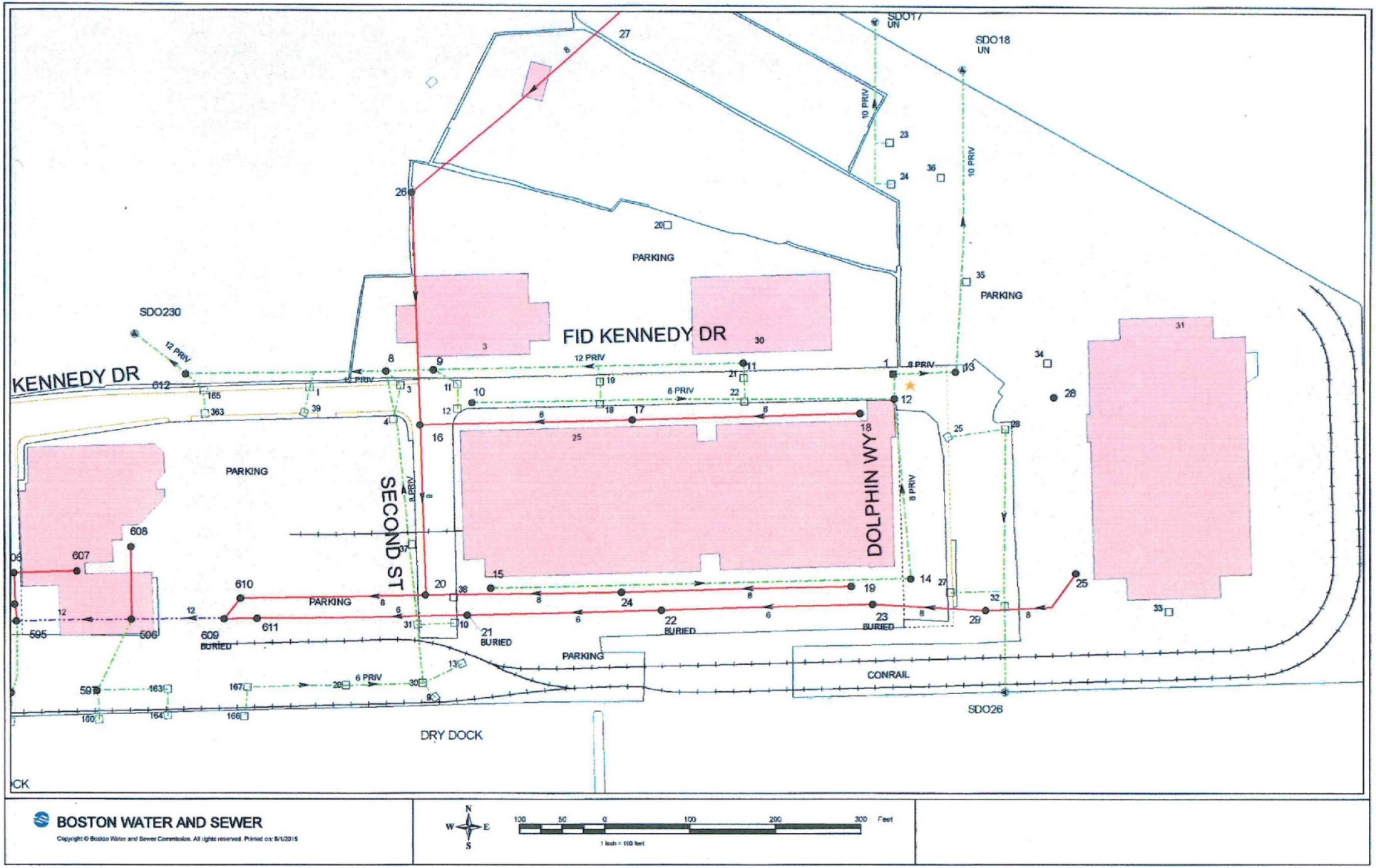
7.1.2 Projected Wastewater Flows

The Project's sanitary sewage system is anticipated to have multiple connections to the adjacent, on-site private sewer lines which are located along both the north and the south sides of the existing building. These private sewer lines flow in a westerly direction with connections to the 8-inch diameter BWSC sewer located in Capstan Way.

The proposed Project will rehabilitate and reuse the existing building located at 25 Fid Kennedy Avenue as a single-use, approximately 157,000 gross square foot industrial/manufacturing facility for J. C. Cannistraro, LLC, who provides mechanical construction services of plumbing, fire protection, HVAC and sheet metal, and plans to consolidate their three existing assembly plants at this one location.

The anticipated Project sewage generation in gallons per day (gpd), pursuant to 314 CMR 7.15, is calculated as follows:

Industrial Plant without cafeteria: (100 people)(15 gpd/person) = 1,500 gpd.



25 Fid Kennedy Avenue Boston, Massachusetts

hwmoore ASSOCIATES, INC.
CIVIL ENGINEERING - LAND PLANNING

Figure 7-1

Existing Sewer and Storm Systems

7.1.3 Sanitary Sewer Connections

The Project is in the preliminary design stages and a detailed Site Plan showing proposed utilities has not been fully developed; however, as discussed above, it is anticipated that the Project will connect to the existing private 8-inch diameter sewer lines located on the north and south sides of the building which connect to the existing BWSC sewer line in Capstan Way.

At the appropriate design stage the Proponent will submit a Utility Site Plan to the BWSC for review and approval.

7.1.4 Sewer System Mitigation

To help conserve water and reduce the amount of wastewater generated by the Project, the Proponent will incorporate the use of water conservation devices such as low-flow toilets and flow-restricting faucets.

7.2 Water System

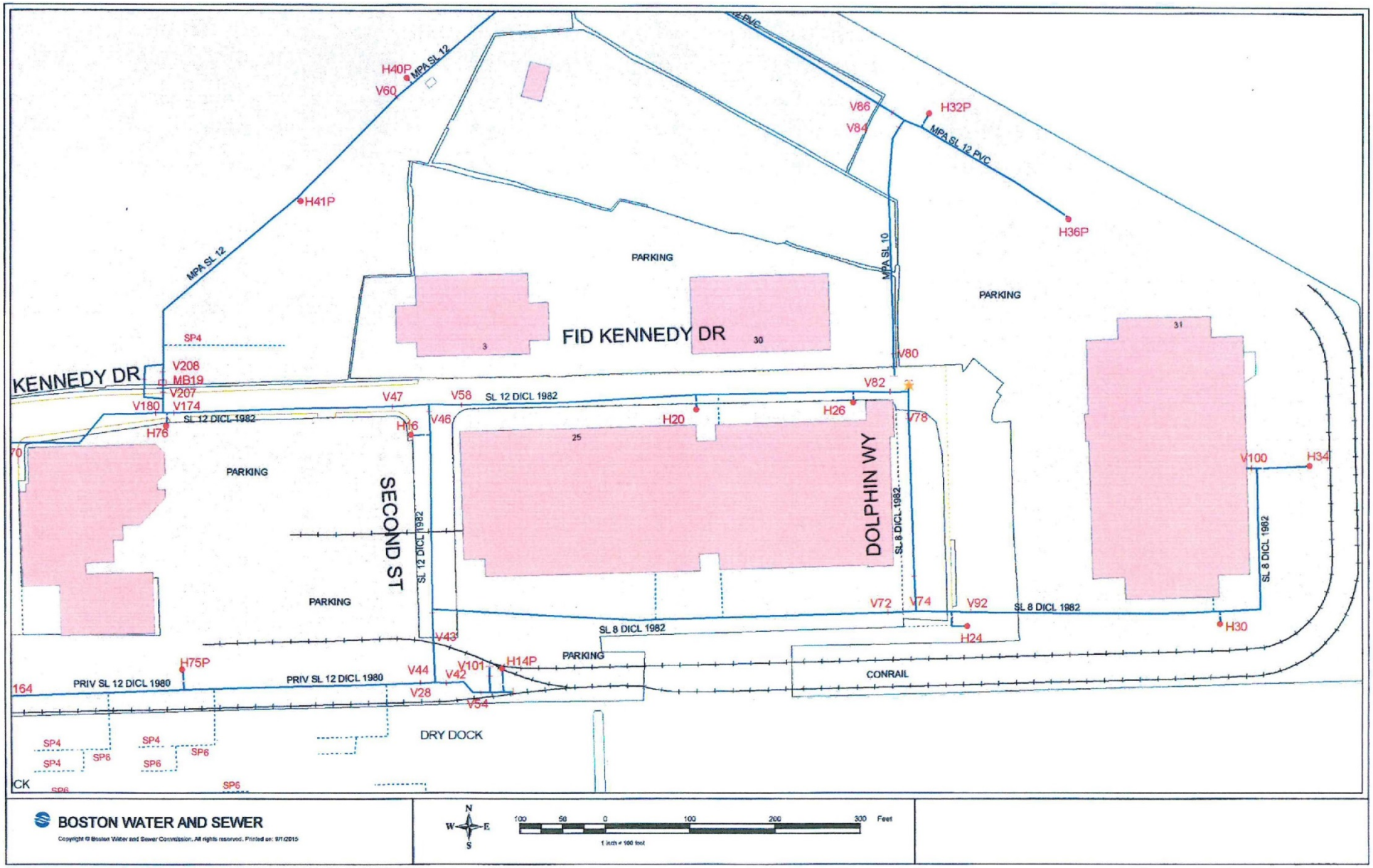
7.2.1 Existing Water Supply System

The BWSC owns and maintains water mains in Fid Kennedy Avenue, Capstan Way, and within easements traversing the Project Site. BWSC water mains consist of 12-inch diameter low-service water mains installed in 1982 in Fid Kennedy Avenue and Capstan Way, and 1982 8-inch diameter low service water mains on-site to the south and east of the existing building, also installed in 1982. See Figure 7-2 for the existing water mains adjacent to the Project site.

Existing fire hydrants are located in Fid Kennedy Avenue, Capstan Way and Dolphin Way in close proximity to the Project Site. Hydrant flow tests will be conducted as the Project design progresses to determine available water pressure and flow from the adjacent water supply infrastructure. The Proponent will design appropriate domestic and fire protection lines for the Project in consultation with the BWSC and the Boston Fire Department during the detailed design phase.

7.2.2 Proposed Water Services

It is anticipated that the proposed Project will be serviced via the existing 8-inch and 12-inch BWSC water mains adjacent to the site. Separate new domestic water and fire protection services will be required. These services will be designed and coordinated with the BWSC as part of the Utility Site Plan review process and General Service Application.



25 Fid Kennedy Avenue Boston, Massachusetts

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Figure 7-2

Existing Water System

7.2.3 Anticipated Water Consumption

The estimated water consumption for the proposed Project is 1,650 gpd. This is based on 110% of the estimated sewage flow of 1,500 gpd to account for consumption. Refer to Section 7.1.2 above for the calculation of estimated sewage flows.

The proposed domestic water service will be metered in accordance with BWSC requirements. The meter will be connected to the BWSC automatic meter-reading system with a meter interface unit, telephone line and jack, and an outside meter-reading device provided at the meter.

7.3 Storm Drainage System

7.3.1 Existing Storm Drainage System

The Project Site is approximately 141,425 square feet or 3.25 acres in area, most of which is comprised of impervious surfaces associated with the existing building and surrounding paved access drives, equipment pads and railroad tracks. It is anticipated that redevelopment of the site will trigger the requirement for a National Pollutant Discharge Elimination System (NPDES) Permit from the United States Environmental Protection Agency (EPA) for more than one acre of land disturbance. Existing on-site and nearby storm drainage systems are privately owned and maintained and discharge to Boston Harbor. Refer to Figure 7-1.

7.3.2 Proposed Storm Drainage System

Under proposed conditions, with modest Project green space additions, the impervious surface area on-site will be equal to or less than currently exists. Accordingly, stormwater runoff from the Project Site will be equal to or less than under existing conditions. The BWSC requires that all new construction or redevelopment projects significant in scale capture and infiltrate a volume of stormwater runoff equal to 1-inch over the area of the project site. For this site, the volume of runoff to be captured and infiltrated into the subsurface soils is 11,785 cubic feet (141,425 sf x 1″/12″ = 11,785 cf). Because there will be a reduction in runoff from the Project Site by the addition of some limited green space, and the infiltration of the first 1-inch of runoff, there will be no adverse impact to the surrounding areas or the existing storm drainage systems.

The Project's stormwater management systems will be designed in accordance with the BWSC's design standards and the BWSC "Requirements for Site Plans". A Utility Site Plan will be submitted for BWSC approval and a General Service Application will be completed prior to any site drain work. A Stormwater Pollution Prevention Plan (SWPPP), if required due to disturbance of an acre or more of land area, will be prepared for implementation by the general contractor during construction. Regardless of the requirement for a Project

SWPPP, a strict and comprehensive erosion control plan will be included as part of the project construction documents to ensure protection of abutting properties and the Boston Harbor.

7.3.3 Groundwater Conservation Overlay District

According to City of Boston Zoning Maps, the Project Site is not located within the Groundwater Conservation Overlay District.

7.3.4 State Stormwater Standards

As of January 2008, the MassDEP Stormwater Management Standards, originally adopted as policy, have been part of the Commonwealth's Wetlands Regulations and Water Quality Certification Regulations (Stormwater Management Regulations). These regulations prescribe specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The segulations are administered locally pursuant to MGL Ch. 131, s. 40. This Project is characterized as a redevelopment project under the Stormwater Management Regulations, and accordingly will comply with all of the stormwater management standards to the maximum extent practicable.

Standard #1: No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed stormwater management system will comply with this standard; stormwater discharge will be treated prior to connection to existing systems.

Standard #2: Stormwater management systems must be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

Compliance: The proposed design will reduce peak discharge rates under all storm events. The vast majority of the Project Site is comprised of impervious surface areas under existing conditions; the proposed Project includes a modest amount of added landscaping and as noted above will capture and infiltrate the first inch of site-generated stormwater runoff thereby reducing peak discharge rates.

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

Compliance: The Project will comply with Standard #3 to the maximum extent practicable. The existing soils are comprised of Urban Fill with marginal infiltration capabilities, however; per BWSC requirements the Project will include a stormwater infiltration system with a design volume of 11,785 cf.

Standard #4: For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS).

Compliance: The proposed Project is a Redevelopment Project, not "New Development" on a virgin undisturbed site. As such, to the extent possible, the Project's stormwater management system will remove the site's post-development average annual TSS load.

Standard #5: Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs. The use of infiltration practices without pretreatment is prohibited.

Compliance: The Project site is not a Land Use with Higher Potential Pollutant Loads (LUHPPL) as defined by the Stormwater Management Regulations; therefore, this standard is not applicable. The proposed use of the rehabilitated building will be for assembly of mechanical and fire protection products.

Standard #6: Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for "critical areas". Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public water supplies.

Compliance: The proposed Project does not discharge to a critical area as defined by the Standards.

Standard #7: Redevelopment of previously developed sites must meet the Stormwater Management Regulations to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new stormwater management systems must be designed to improve existing conditions.

Compliance: The proposed redevelopment Project will meet the Stormwater Management Standards to the maximum extent practicable and will improve existing conditions.

Standard #8: Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

Compliance: Existing catch basins located in the abutting streets will be fitted with silt sacs which will be maintained for the duration of construction activities. The Project construction documents will include a strict and comprehensive erosion control plan to protect abutting properties and the Boston Harbor.

Standard #9: All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

Compliance: The site shall be maintained by the Project Proponent; an Operation and Maintenance Plan will be prepared for the Project to ensure that the stormwater management systems function properly as designed.

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

Compliance: The Project will not have any illicit discharges to the proposed stormwater management system. An Illicit Discharge Compliance Certification will be filed when the project stormwater management system is designed.

7.3.5 Mitigation Measures

The proposed redevelopment Project will provide a modest amount of added green space and so less impervious surface area on-site compared with existing conditions, and it will include a stormwater infiltration system sized for a volume of 11,785 cf. Accordingly there will be a reduction in surface runoff from the Project Site and no adverse impact to surrounding areas and existing storm drainage systems. The Project will employ erosion control measures to control sediment during construction, and will comply with the Stormwater Management Standards to the maximum extent practicable.

7.4 Electrical Systems

Eversource provides electric service in the City of Boston. A new electric service will be required for the proposed Project. This new service will be coordinated by the Proponent's electrical engineer with Eversource. Existing infrastructure is available in Fid Kennedy Avenue, Dolphin Way and on-site both north and south of the existing building.

The electrical, space heating, and energy systems for the proposed Project are in the early stages of design. When the design loads are determined, electrical power supply requirements will be coordinated with Eversource. Energy-saving measures will be incorporated into the building design and Project construction. The Proponent will evaluate, and where feasible, install energy-efficient lighting, heating and cooling systems in the building.

7.5 Telecommunication Systems

New telephone/data services will be required to service the proposed Project. Existing telecommunications infrastructure is available in Fid Kennedy Avenue, Dolphin Way and on-site both north and south of the existing building. Service requirements will be coordinated with the utility companies as the Project design progresses.

7.6 Cable Systems

Cable service for the Project will be from available infrastructure located within Fid Kennedy Avenue, service requirements will be coordinated with the provider as Project design progresses.

7.7 Gas Systems

A new gas service will be required for the Project, existing infrastructure is available adjacent to the site and Project loads and service requirements will be coordinated with the utility company as the design progresses.

7.8 Utility Protection during Construction

During construction, infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The general contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The general contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. In the event that a utility cannot be maintained in service during switch over to a temporary or permanent system, the general contractor will be required to coordinate the shutdown with the utility owners and project abutters to minimize impacts and inconveniences accordingly.

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designated to comply with the standards of the federal Americans with Disabilities Act. See Appendix D for the Accessibility Checklist.

8.2 Massachusetts Environmental Policy Act (MEPA)

The Project is not subject to review under the Massachusetts Environmental Policy Act, which is codified at Sections 62 through 62I of MGL Chapter 30, and implemented under the "MEPA Regulations" at Section 11 of Chapter 301 of the Code of Massachusetts Regulations (CMR). MEPA and the MEPA Regulations apply to: (i) projects undertaken by a state agency; (ii) those aspects of a project that are within the subject matter of any required state permit; (iii) projects involving state financial assistance; and (iv) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR 11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations. (301 CMR 11.03.) Regardless of whether the Project requires state action, none of the review thresholds will be exceeded by the Project.

8.3 Massachusetts Historical Commission

The Proponent does not anticipate that the Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project. The Project may, however, seek state and/or federal historic tax credits, in which case, MHC would be involved in reviewing the necessary applications.

8.4 Boston Civic Design Commission

The Boston Civic Design Commission (BCDC) must review any project exceeding 100,000 square feet of gross floor area or any project determined by BCDC to be of "special urban design significance." (§ 28-5.) Although the Project would involve substantial rehabilitation of the Existing Building, which exceeds 100,000 square feet of gross floor area, it does not entail any substantial changes to that building. BCDC review, therefore, is not expected to be required.

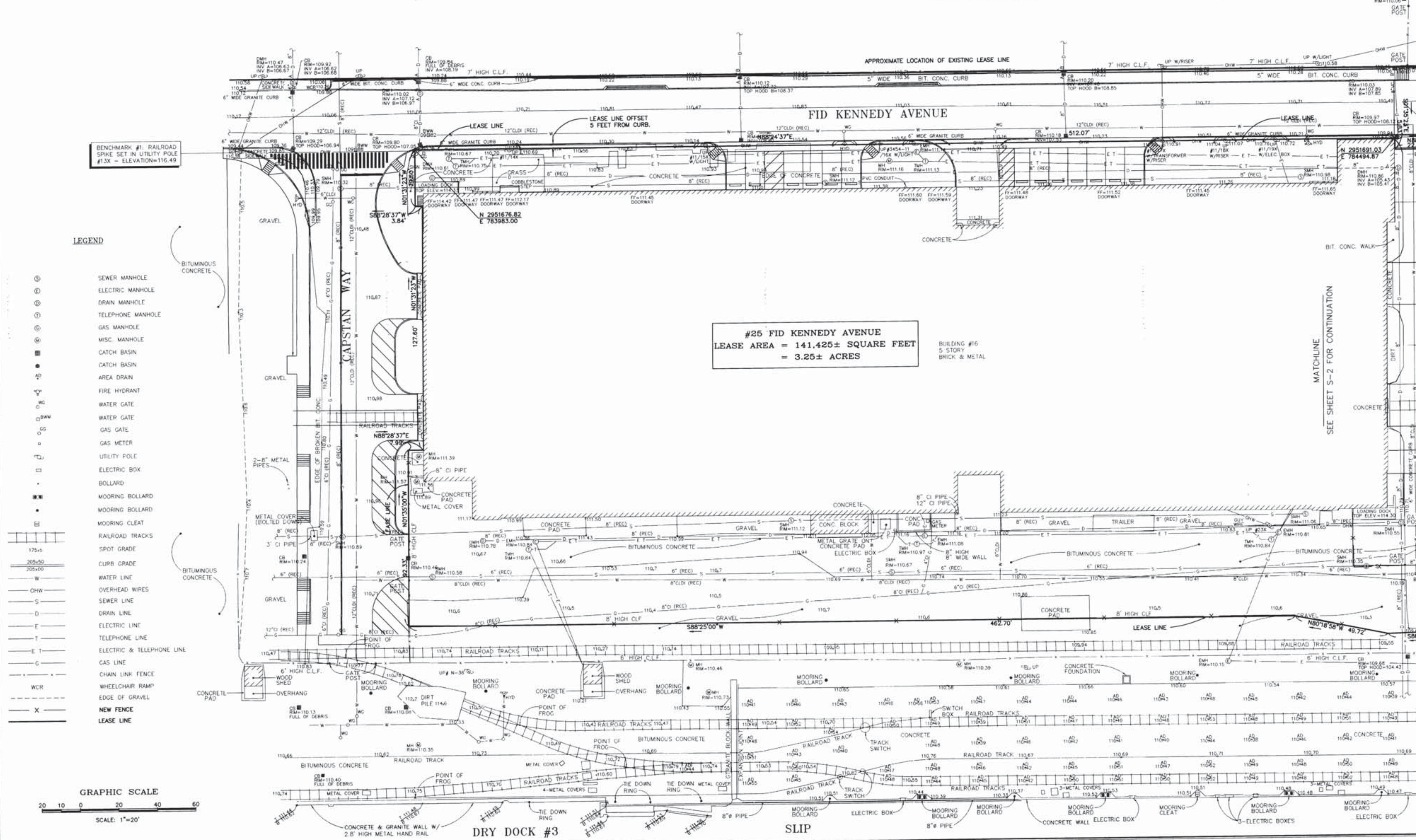
Appendix A

Site Survey

NOTES

1. THE PURPOSE OF THIS PLAN IS TO CREATE LEASE LINES THAT ARE AN APPROXIMATION OF PHYSICAL FEATURES ON THE SITE (I.E. FENCES, FACE OF BUILDING, AND OFFSETS FROM CURB LINES).
2. THE EXISTING BASE MAPPING, SHOWN SCREENED ON THIS PLAN, IS TAKEN FROM A PLAN ENTITLED "TOPOGRAPHIC SITE PLAN, EDIC SOUTH AND EAST JETTY, MARINE INDUSTRIAL PARK, BOSTON, MASSACHUSETTS 02210", PREPARED FOR: CHILDS ENGINEERING CORPORATION, BOX 333, MEDFIELD, MASSACHUSETTS 02052; PREPARED BY: JUDITH NITSCH ENGINEERING, INC., DATED JULY 11, 1995. SEE REFERENCED PLAN FOR NOTES PERTAINING TO THE UTILITIES SHOWN.
2. THE NEW ROADWAY FEATURES SHOWN ON CAPSTAN WAY, FID KENNEDY WAY AND DOLPHIN WAY ARE TAKEN FROM PLANS ENTITLED "LAYOUT MATERIALS", PLAN NUMBERS LM-1, LM-2, AND LM-3, DATED JANUARY 1996 PREPARED BY STORCH ASSOCIATES.
3. VERTICAL DATUM REFERENCED TO THE CENTRAL ARTERY/TUNNEL DATUM (CA/T PROJECT DATUM), WHICH IS ONE HUNDRED FEET BELOW THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29). EXAMPLE: ELEVATION 110.59 (CA/T) = 10.59 (NGVD 29)
4. HORIZONTAL DATUM REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM AS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83).

MASSACHUSETTS PORT AUTHORITY
LEASE AREA
SEE PLAN ENTITLED "BOSTON MARINE INDUSTRIAL PARK, LEASE OF PROPERTY, ECONOMIC DEVELOPMENT AND INDUSTRIAL CORPORATION OF BOSTON TO MASSACHUSETTS PORT AUTHORITY" DATED REVISED MAY 22, 1980, PREPARED BY MASSACHUSETTS PORT AUTHORITY.



JUDITH NITSCH ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS • PLANNERS
ONE APPLETON STREET BOSTON, MA 02116
TEL: (617) 338-0063 • FAX: (617) 338-6472

FIELD CHIEF: JWN	DES/COMP.: JPG/JSA	DRAFTED BY: TPC/PAR	CHECKED BY:
DATE: NOVEMBER 26, 1997	SCALE: 1" = 20'	JNEI JOB#1050	1050ST-4.DWG

REVISIONS

REV.	COMMENTS	DATE

LEASE LINE SURVEY
SOUTH AND EAST JETTY
MARINE INDUSTRIAL PARK, BOSTON, MASSACHUSETTS 02210
PREPARED FOR:
CHILDS ENGINEERING CORPORATION
BOX 333, MEDFIELD, MA 02052

SHEET S-1 OF 2
REV.

MASSACHUSETTS PORT AUTHORITY
LEASE AREA

SEE PLAN ENTITLED "BOSTON MARINE INDUSTRIAL PARK, LEASE OF PROPERTY, ECONOMIC DEVELOPMENT AND INDUSTRIAL CORPORATION OF BOSTON TO MASSACHUSETTS PORT AUTHORITY" DATED REVISED MAY 22, 1980, PREPARED BY MASSACHUSETTS PORT AUTHORITY.

BOSTON HARBOR

#3 DOLPHIN WAY
LEASE AREA = 134,595± SQUARE FEET
= 3.09± ACRES

BUILDING #31
3 STORY
BRICK & METAL

NOTE
SEE SHEET S-1 FOR LEGEND AND NOTES.

GRAPHIC SCALE
20 10 0 20 40 60
SCALE: 1"=20'

JUDITH NITSCH ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS • PLANNERS
ONE APPLETON STREET BOSTON, MA 02116
TEL: (617) 338-0063 • FAX: (617) 338-6472

REV.	REVISIONS	DATE
	COMMENTS	

FIELD CHIEF: JWN | DES./COMP.: JPG | DRAFTED BY: TPC/PAR | CHECKED BY:
DATE: NOVEMBER 26, 1997 | SCALE: 1" = 20' | JND. JOB#1050 | 05057-4.DWG

LEASE LINE SURVEY
SOUTH AND EAST JETTY
MARINE INDUSTRIAL PARK, BOSTON, MASSACHUSETTS 02210

PREPARED FOR:
CHILDS ENGINEERING CORPORATION
BOX 333, MEDFIELD, MA 02052

SHEET S-2 OF 2 REV.

Appendix B

Transportation

TRANSPORTATION TECHNICAL APPENDIX

- TRAFFIC COUNTS
- TRIP GENERATION CALCULATIONS
- INTERSECTION CAPACITY ANALYSIS WORKSHEETS

TRAFFIC COUNTS

Drydock Ave/Summer Street

1/8/2014

	Drydock Avenue From North				Summer Street From East				Pappas Way From South				Summer Street From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
07:45 AM	23	6	12	0	72	323	6	0	2	10	18	0	15	92	57	1
08:00 AM	19	5	13	0	69	258	8	0	1	6	12	0	16	100	43	1
08:15 AM	22	2	23	0	52	270	2	0	2	12	12	0	26	84	35	1
08:30 AM	28	3	13	0	65	222	0	0	1	16	11	0	9	102	48	0
Total	**92**	**16**	**61**	**0**	**258**	**1073**	**16**	**0**	**6**	**44**	**53**	**0**	**66**	**378**	**183**	**3**
PHF	0.90				0.84				0.86				0.95			
HV #	20	2	14	0	2	36	2	0	0	6	8	0	14	63	16	0
HV %	22%	13%	23%	0%	1%	3%	13%	0%	0%	14%	15%	0%	21%	17%	9%	0%

Drydock Ave/Tide Street

1/8/2014

	Tide Street From North				Drydock Avenue From East				Driveway From South				Drydock Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
07:45 AM	13	3	45	0	14	8	0	0	2	0	2	0	1	34	14	0
08:00 AM	16	3	46	0	12	8	0	1	2	0	2	0	5	28	14	0
08:15 AM	12	4	38	1	18	17	0	0	0	4	1	0	2	28	13	0
08:30 AM	12	4	34	0	12	14	0	0	0	2	2	0	1	42	13	0
Total	**53**	**14**	**163**	**1**	**56**	**47**	**0**	**1**	**4**	**6**	**7**	**0**	**9**	**132**	**54**	**0**
PHF	0.89				0.74				0.85				0.87			
HV #	12	0	22	1	18	5	0	0	1	1	0	0	1	14	17	0
HV %	23%	0%	13%	100%	32%	11%	0%	0%	25%	17%	0%	0%	11%	11%	31%	0%

Tide Street/Northern Avenue

1/8/2014

	Tide Street From North				Driveway From East				Tide Street From South				Northern Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
07:45 AM	3	2	0	0	0	0	0	0	1	8	20	0	60	1	4	0
08:00 AM	4	2	0	0	0	0	0	0	0	12	16	0	66	0	8	0
08:15 AM	2	3	0	0	0	0	0	0	1	11	26	0	57	0	8	0
08:30 AM	2	5	0	0	0	0	0	0	2	9	17	0	40	0	5	0
Total	**11**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**40**	**79**	**0**	**223**	**1**	**25**	**0**
PHF	0.82				#DIV/0!				0.81				0.84			
HV #	4	4	0	0	0	0	0	0	1	7	31	0	29	0	1	0
HV %	36%	33%	0%	0%	0%	0%	0%	0%	25%	18%	39%	0%	13%	0%	4%	0%

Haul Road/Northern Avenue

1/8/2014

	Driveway From North				Northern Avenue From East				Haul Road From South				Northern Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:45 AM	3	3	1	0	2	46	14	0	40	0	13	0	6	103	2	3
08:00 AM	1	0	1	0	0	43	11	0	38	1	10	1	6	99	1	6
08:15 AM	3	1	2	0	2	51	15	0	33	2	9	0	8	107	4	1
08:30 AM	3	4	0	0	2	57	8	0	18	1	14	1	46	77	3	8
Total	**10**	**8**	**4**	**0**	**6**	**197**	**48**	**0**	**129**	**4**	**46**	**2**	**66**	**386**	**10**	**18**
PHF	0.79				0.92				0.85				0.90			
HV #	4	2	2	0	2	50	25	0	21	0	8	0	8	41	2	8
HV %	40%	25%	50%	0%	33%	25%	52%	0%	16%	0%	17%	0%	12%	11%	20%	44%

Drydock Ave/Summer Street

1/8/2014

	Drydock Avenue From North				Summer Street From East				Pappas Way From South				Summer Street From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
04:30 PM	47	6	59	0	26	112	0	1	2	1	9	0	13	201	16	0
04:45 PM	57	5	44	0	18	96	4	0	3	0	9	0	18	214	13	0
05:00 PM	90	14	82	0	15	99	4	1	4	2	11	0	26	229	12	0
05:15 PM	78	16	74	0	16	73	5	0	3	2	4	0	28	240	8	0
Total	**272**	**41**	**259**	**0**	**75**	**380**	**13**	**2**	**12**	**5**	**33**	**0**	**85**	**884**	**49**	**0**
PHF	0.77				0.85				0.74				0.92			
HV #	11	2	4	0	6	28	0	0	0	1	3	0	6	32	9	0
HV %	4%	5%	2%	0%	8%	7%	0%	0%	0%	20%	9%	0%	7%	4%	18%	0%

Drydock Ave/Tide Street

1/8/2014

	Tide Street From North				Drydock Avenue From East				Driveway From South				Drydock Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
04:30 PM	14	0	13	0	39	33	0	0	2	1	1	2	1	9	7	0
04:45 PM	16	0	10	0	21	31	1	0	0	2	1	0	0	15	7	0
05:00 PM	24	1	11	0	31	51	1	0	2	7	2	0	0	10	9	0
05:15 PM	18	0	15	0	25	37	1	0	1	2	0	0	0	9	11	0
Total	**72**	**1**	**49**	**0**	**116**	**152**	**3**	**0**	**5**	**12**	**4**	**2**	**1**	**43**	**34**	**0**
PHF	0.85				0.82				0.52				0.89			
HV #	13	0	18	0	12	7	0	0	1	0	1	0	0	13	16	0
HV %	18%	0%	37%	0%	10%	5%	0%	0%	20%	0%	25%	0%	0%	30%	47%	0%

Tide Street/Northern Avenue

1/8/2014

	Tide Street From North				Driveway From East				Tide Street From South				Northern Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
04:30 PM	6	8	0	0	0	2	0	0	0	3	46	0	18	0	1	0
04:45 PM	7	4	0	0	0	1	0	0	0	1	28	0	23	0	0	0
05:00 PM	7	14	0	0	0	1	1	0	0	2	45	0	18	0	4	0
05:15 PM	6	5	0	0	0	0	0	0	0	1	37	0	28	0	0	0
Total	**26**	**31**	**0**	**0**	**0**	**4**	**1**	**0**	**0**	**7**	**156**	**0**	**87**	**0**	**5**	**0**
PHF	0.68				0.63				0.83				0.82			
HV #	2	7	0	0	0	0	0	0	0	1	27	0	24	0	1	0
HV %	8%	23%	0%	0%	0%	0%	0%	0%	0%	14%	17%	0%	28%	0%	20%	0%

Haul Road/Northern Avenue

1/8/2014

	Driveway From North				Northern Avenue From East				Haul Road From South				Northern Avenue From West			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
04:30 PM	2	2	0	0	2	91	29	0	9	0	11	0	8	36	3	9
04:45 PM	2	4	0	0	0	76	35	0	6	0	8	1	17	47	3	7
05:00 PM	2	3	0	0	3	102	36	0	5	0	14	1	12	56	1	8
05:15 PM	2	5	1	0	1	80	46	0	3	2	15	0	13	51	4	8
Total	**8**	**14**	**1**	**0**	**6**	**349**	**146**	**0**	**23**	**2**	**48**	**2**	**50**	**190**	**11**	**32**
PHF	0.72				0.89				0.94				0.92			
HV #	1	1	0	0	1	24	30	0	12	0	2	0	3	21	1	10
HV %	13%	7%	0%	0%	17%	7%	21%	0%	52%	0%	4%	0%	6%	11%	9%	31%

Drydock Ave/Summer Street

1/8/2014

	Drydock Avenue From North				Summer Street From East				Pappas Way From South				Summer Street From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM peak	0	0	0	7	0	2	0	10	0	0	0	2	0	1	4	14

Drydock Ave/Tide Street

1/8/2014

	Tide Street From North				Drydock Avenue From East				Driveway From South				Drydock Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM Peak	0	0	1	2	0	0	0	51	0	0	0	0	0	4	0	8

Tide Street/Northern Avenue

1/8/2014

	Tide Street From North				Driveway From East				Tide Street From South				Northern Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM peak	0	0	0	13	0	0	0	21	0	0	0	95	0	0	0	10

Haul Road/Northern Avenue

1/8/2014

	Driveway From North				Northern Avenue From East				Haul Road From South				Northern Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
Total	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**25**	**0**	**1**	**0**	**0**

Drydock Ave/Summer Street

1/8/2014

	Drydock Avenue From North				Summer Street From East				Pappas Way From South				Summer Street From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
PM peak	1	0	0	8	1	0	0	2	0	0	0	10	2	3	2	2

Drydock Ave/Tide Street

1/8/2014

	Tide Street From North				Drydock Avenue From East				Driveway From South				Drydock Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
PM peak	0	0	0	7	3	2	0	46	0	0	0	1	0	0	0	1

Tide Street/Northern Avenue

1/8/2014

	Tide Street From North				Driveway From East				Tide Street From South				Northern Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
PM peak	0	0	0	47	0	0	0	47	0	0	6	117	0	0	0	121

Haul Road/Northern Avenue

1/8/2014

	Driveway From North				Northern Avenue From East				Haul Road From South				Northern Avenue From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
PM peak	**0**	**0**	**0**	**24**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**37**	**1**	**0**	**0**	**2**

S: Tide Street
E/W: FID Kennedy Avenue
City, State: South Boston, MA
Client: Howard Stein-Hudson/ M. Santos

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154648 A
Site Code : TBA
Start Date : 9/17/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	0	11	0	6	1	0	0	0	0	18
07:15 AM	5	8	0	7	0	0	3	0	0	23
07:30 AM	2	9	0	16	2	0	2	0	0	31
07:45 AM	1	5	0	11	1	1	1	0	0	20
Total	8	33	0	40	4	1	6	0	0	92
08:00 AM	0	3	0	12	1	0	2	1	0	19
08:15 AM	5	2	0	9	2	0	4	1	0	23
08:30 AM	1	7	0	13	2	0	2	3	0	28
08:45 AM	1	10	0	19	5	0	2	2	0	39
Total	7	22	0	53	10	0	10	7	0	109
Grand Total	15	55	0	93	14	1	16	7	0	201
Apprch %	21.4	78.6	0	86.1	13	0.9	69.6	30.4	0	
Total %	7.5	27.4	0	46.3	7	0.5	8	3.5	0	
Cars	15	23	0	67	8	1	7	4	0	125
% Cars	100	41.8	0	72	57.1	100	43.8	57.1	0	62.2
Heavy Vehicles	0	32	0	26	6	0	9	3	0	76
% Heavy Vehicles	0	58.2	0	28	42.9	0	56.2	42.9	0	37.8

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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	0	3	0	3	12	1	0	13	2	1	0	3	19
08:15 AM	5	2	0	7	9	2	0	11	4	1	0	5	23
08:30 AM	1	7	0	8	13	2	0	15	2	3	0	5	28
08:45 AM	1	10	0	11	19	5	0	24	2	2	0	4	39
Total Volume	7	22	0	29	53	10	0	63	10	7	0	17	109
% App. Total	24.1	75.9	0		84.1	15.9	0		58.8	41.2	0		
PHF	.350	.550	.000	.659	.697	.500	.000	.656	.625	.583	.000	.850	.699
Cars	7	13	0	20	39	6	0	45	4	4	0	8	73
% Cars	100	59.1	0	69.0	73.6	60.0	0	71.4	40.0	57.1	0	47.1	67.0
Heavy Vehicles	0	9	0	9	14	4	0	18	6	3	0	9	36
% Heavy Vehicles	0	40.9	0	31.0	26.4	40.0	0	28.6	60.0	42.9	0	52.9	33.0

S: Tide Street
E/W: FID Kennedy Avenue
City, State: South Boston, MA
Client: Howard Stein-Hudson/ M. Santos

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154648 A
Site Code : TBA
Start Date : 9/17/2015
Page No : 1

Groups Printed- Cars

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	0	4	0	1	1	0	0	0	0	6
07:15 AM	5	4	0	7	0	0	1	0	0	17
07:30 AM	2	1	0	11	1	0	1	0	0	16
07:45 AM	1	1	0	9	0	1	1	0	0	13
Total	8	10	0	28	2	1	3	0	0	52
08:00 AM	0	2	0	11	0	0	1	1	0	15
08:15 AM	5	0	0	6	2	0	2	0	0	15
08:30 AM	1	4	0	8	2	0	1	1	0	17
08:45 AM	1	7	0	14	2	0	0	2	0	26
Total	7	13	0	39	6	0	4	4	0	73
Grand Total	15	23	0	67	8	1	7	4	0	125
Apprch %	39.5	60.5	0	88.2	10.5	1.3	63.6	36.4	0	
Total %	12	18.4	0	53.6	6.4	0.8	5.6	3.2	0	

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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	0	2	0	2	11	0	0	11	1	1	0	2	15
08:15 AM	5	0	0	5	6	2	0	8	2	0	0	2	15
08:30 AM	1	4	0	5	8	2	0	10	1	1	0	2	17
08:45 AM	1	7	0	8	14	2	0	16	0	2	0	2	26
Total Volume	7	13	0	20	39	6	0	45	4	4	0	8	73
% App. Total	35	65	0		86.7	13.3	0		50	50	0		
PHF	.350	.464	.000	.625	.696	.750	.000	.703	.500	.500	.000	1.00	.702

S: Tide Street
E/W: FID Kennedy Avenue
City, State: South Boston, MA
Client: Howard Stein-Hudson/ M. Santos

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Site Code : TBA
Start Date : 9/17/2015
Page No : 1

Groups Printed- Heavy Vehicles

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	0	7	0	5	0	0	0	0	0	12
07:15 AM	0	4	0	0	0	0	2	0	0	6
07:30 AM	0	8	0	5	1	0	1	0	0	15
07:45 AM	0	4	0	2	1	0	0	0	0	7
Total	0	23	0	12	2	0	3	0	0	40
08:00 AM	0	1	0	1	1	0	1	0	0	4
08:15 AM	0	2	0	3	0	0	2	1	0	8
08:30 AM	0	3	0	5	0	0	1	2	0	11
08:45 AM	0	3	0	5	3	0	2	0	0	13
Total	0	9	0	14	4	0	6	3	0	36
Grand Total	0	32	0	26	6	0	9	3	0	76
Apprch %	0	100	0	81.2	18.8	0	75	25	0	
Total %	0	42.1	0	34.2	7.9	0	11.8	3.9	0	

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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 07:00 AM													
07:00 AM	0	7	0	7	5	0	0	5	0	0	0	0	12
07:15 AM	0	4	0	4	0	0	0	0	2	0	0	2	6
07:30 AM	0	8	0	8	5	1	0	6	1	0	0	1	15
07:45 AM	0	4	0	4	2	1	0	3	0	0	0	0	7
Total Volume	0	23	0	23	12	2	0	14	3	0	0	3	40
% App. Total	0	100	0		85.7	14.3	0		100	0	0		
PHF	.000	.719	.000	.719	.600	.500	.000	.583	.375	.000	.000	.375	.667

S: Tide Street
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Page No : 1

Groups Printed- Peds and Bikes

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	Peds SB	Peds NB	Right	Left	Peds WB	Peds EB	Right	Thru	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	1	0	0	0	1	1	0	0	4
07:30 AM	4	0	0	0	1	0	0	0	1	2	0	0	8
07:45 AM	2	1	0	0	2	0	0	0	0	1	0	0	6
Total	7	1	0	0	4	0	0	0	2	4	0	0	18
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	7	1	0	0	4	0	0	0	2	4	0	0	18
Apprch %	87.5	12.5	0	0	100	0	0	0	33.3	66.7	0	0	
Total %	38.9	5.6	0	0	22.2	0	0	0	11.1	22.2	0	0	

	FID Kennedy Avenue From East					Tide Street From South					FID Kennedy Avenue From West					
Start Time	Thru	Left	Peds SB	Peds NB	App. Total	Right	Left	Peds WB	Peds EB	App. Total	Right	Thru	Peds NB	Peds SB	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 07:00 AM																
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	1	1	0	0	0	1	1	1	0	0	2	4
07:30 AM	4	0	0	0	4	1	0	0	0	1	1	2	0	0	3	8
07:45 AM	2	1	0	0	3	2	0	0	0	2	0	1	0	0	1	6
Total Volume	7	1	0	0	8	4	0	0	0	4	2	4	0	0	6	18
% App. Total	87.5	12.5	0	0		100	0	0	0		33.3	66.7	0	0		
PHF	.438	.250	.000	.000	.500	.500	.000	.000	.000	.500	.500	.500	.000	.000	.500	.563

S: Tide Street
E/W: FID Kennedy Avenue
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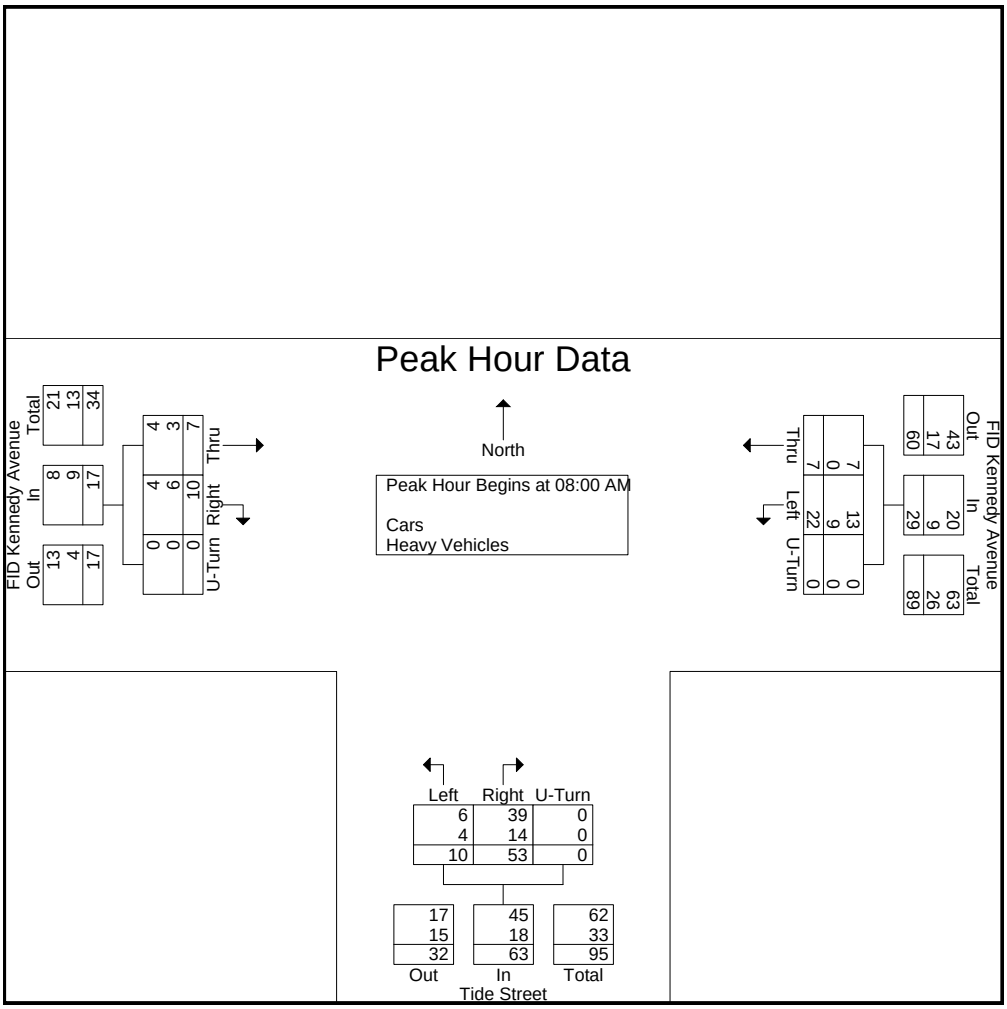
Page No : 1

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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	0	3	0	3	12	1	0	13	2	1	0	3	19
08:15 AM	5	2	0	7	9	2	0	11	4	1	0	5	23
08:30 AM	1	7	0	8	13	2	0	15	2	3	0	5	28
08:45 AM	1	10	0	11	19	5	0	24	2	2	0	4	39
Total Volume	7	22	0	29	53	10	0	63	10	7	0	17	109
% App. Total	24.1	75.9	0		84.1	15.9	0		58.8	41.2	0		
PHF	.350	.550	.000	.659	.697	.500	.000	.656	.625	.583	.000	.850	.699
Cars	7	13	0	20	39	6	0	45	4	4	0	8	73
% Cars	100	59.1	0	69.0	73.6	60.0	0	71.4	40.0	57.1	0	47.1	67.0
Heavy Vehicles	0	9	0	9	14	4	0	18	6	3	0	9	36
% Heavy Vehicles	0	40.9	0	31.0	26.4	40.0	0	28.6	60.0	42.9	0	52.9	33.0



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Page No : 1

Groups Printed- Cars - Heavy Vehicles

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	6	9	0	1	0	0	5	1	0	22
04:15 PM	2	4	0	3	1	0	5	0	0	15
04:30 PM	0	9	0	5	2	0	4	1	0	21
04:45 PM	2	4	0	3	2	0	0	2	0	13
Total	10	26	0	12	5	0	14	4	0	71
05:00 PM	1	13	0	6	0	1	3	0	0	24
05:15 PM	3	15	0	4	1	0	2	0	0	25
05:30 PM	2	5	0	1	3	1	0	1	0	13
05:45 PM	1	3	0	2	1	0	2	0	0	9
Total	7	36	0	13	5	2	7	1	0	71
Grand Total	17	62	0	25	10	2	21	5	0	142
Apprch %	21.5	78.5	0	67.6	27	5.4	80.8	19.2	0	
Total %	12	43.7	0	17.6	7	1.4	14.8	3.5	0	
Cars	16	58	0	22	7	1	6	5	0	115
% Cars	94.1	93.5	0	88	70	50	28.6	100	0	81
Heavy Vehicles	1	4	0	3	3	1	15	0	0	27
% Heavy Vehicles	5.9	6.5	0	12	30	50	71.4	0	0	19

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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 04:30 PM													
04:30 PM	0	9	0	9	5	2	0	7	4	1	0	5	21
04:45 PM	2	4	0	6	3	2	0	5	0	2	0	2	13
05:00 PM	1	13	0	14	6	0	1	7	3	0	0	3	24
05:15 PM	3	15	0	18	4	1	0	5	2	0	0	2	25
Total Volume	6	41	0	47	18	5	1	24	9	3	0	12	83
% App. Total	12.8	87.2	0		75	20.8	4.2		75	25	0		
PHF	.500	.683	.000	.653	.750	.625	.250	.857	.563	.375	.000	.600	.830
Cars	6	39	0	45	16	5	1	22	2	3	0	5	72
% Cars	100	95.1	0	95.7	88.9	100	100	91.7	22.2	100	0	41.7	86.7
Heavy Vehicles	0	2	0	2	2	0	0	2	7	0	0	7	11
% Heavy Vehicles	0	4.9	0	4.3	11.1	0	0	8.3	77.8	0	0	58.3	13.3

S: Tide Street
E/W: FID Kennedy Avenue
City, State: South Boston, MA
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Page No : 1

Groups Printed- Cars

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	5	8	0	1	0	0	1	1	0	16
04:15 PM	2	4	0	3	0	0	2	0	0	11
04:30 PM	0	9	0	5	2	0	0	1	0	17
04:45 PM	2	4	0	2	2	0	0	2	0	12
Total	9	25	0	11	4	0	3	4	0	56
05:00 PM	1	11	0	5	0	1	2	0	0	20
05:15 PM	3	15	0	4	1	0	0	0	0	23
05:30 PM	2	5	0	0	1	0	0	1	0	9
05:45 PM	1	2	0	2	1	0	1	0	0	7
Total	7	33	0	11	3	1	3	1	0	59
Grand Total	16	58	0	22	7	1	6	5	0	115
Apprch %	21.6	78.4	0	73.3	23.3	3.3	54.5	45.5	0	
Total %	13.9	50.4	0	19.1	6.1	0.9	5.2	4.3	0	

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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 04:30 PM													
04:30 PM	0	9	0	9	5	2	0	7	0	1	0	1	17
04:45 PM	2	4	0	6	2	2	0	4	0	2	0	2	12
05:00 PM	1	11	0	12	5	0	1	6	2	0	0	2	20
05:15 PM	3	15	0	18	4	1	0	5	0	0	0	0	23
Total Volume	6	39	0	45	16	5	1	22	2	3	0	5	72
% App. Total	13.3	86.7	0		72.7	22.7	4.5		40	60	0		
PHF	.500	.650	.000	.625	.800	.625	.250	.786	.250	.375	.000	.625	.783

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Page No : 1

Groups Printed- Heavy Vehicles

	FID Kennedy Avenue From East			Tide Street From South			FID Kennedy Avenue From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	1	1	0	0	0	0	4	0	0	6
04:15 PM	0	0	0	0	1	0	3	0	0	4
04:30 PM	0	0	0	0	0	0	4	0	0	4
04:45 PM	0	0	0	1	0	0	0	0	0	1
Total	1	1	0	1	1	0	11	0	0	15
05:00 PM	0	2	0	1	0	0	1	0	0	4
05:15 PM	0	0	0	0	0	0	2	0	0	2
05:30 PM	0	0	0	1	2	1	0	0	0	4
05:45 PM	0	1	0	0	0	0	1	0	0	2
Total	0	3	0	2	2	1	4	0	0	12
Grand Total	1	4	0	3	3	1	15	0	0	27
Apprch %	20	80	0	42.9	42.9	14.3	100	0	0	
Total %	3.7	14.8	0	11.1	11.1	3.7	55.6	0	0	

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	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 04:00 PM													
04:00 PM	1	1	0	2	0	0	0	0	4	0	0	4	6
04:15 PM	0	0	0	0	0	1	0	1	3	0	0	3	4
04:30 PM	0	0	0	0	0	0	0	0	4	0	0	4	4
04:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
Total Volume	1	1	0	2	1	1	0	2	11	0	0	11	15
% App. Total	50	50	0		50	50	0		100	0	0		
PHF	.250	.250	.000	.250	.250	.250	.000	.500	.688	.000	.000	.688	.625

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Page No : 1

Groups Printed- Peds and Bikes

	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	Peds SB	Peds NB	Right	Left	Peds WB	Peds EB	Right	Thru	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	1	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
05:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	2
Total	1	0	0	0	1	0	2	0	0	0	0	0	4
Grand Total	2	0	0	0	2	0	2	0	0	0	0	0	6
Apprch %	100	0	0	0	50	0	50	0	0	0	0	0	
Total %	33.3	0	0	0	33.3	0	33.3	0	0	0	0	0	

	FID Kennedy Avenue From East					Tide Street From South					FID Kennedy Avenue From West					
Start Time	Thru	Left	Peds SB	Peds NB	App. Total	Right	Left	Peds WB	Peds EB	App. Total	Right	Thru	Peds NB	Peds SB	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	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
05:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
Total Volume	1	0	0	0	1	1	0	2	0	3	0	0	0	0	0	4
% App. Total	100	0	0	0		33.3	0	66.7	0		0	0	0	0		
PHF	.250	.000	.000	.000	.250	.250	.000	.250	.000	.375	.000	.000	.000	.000	.000	.500

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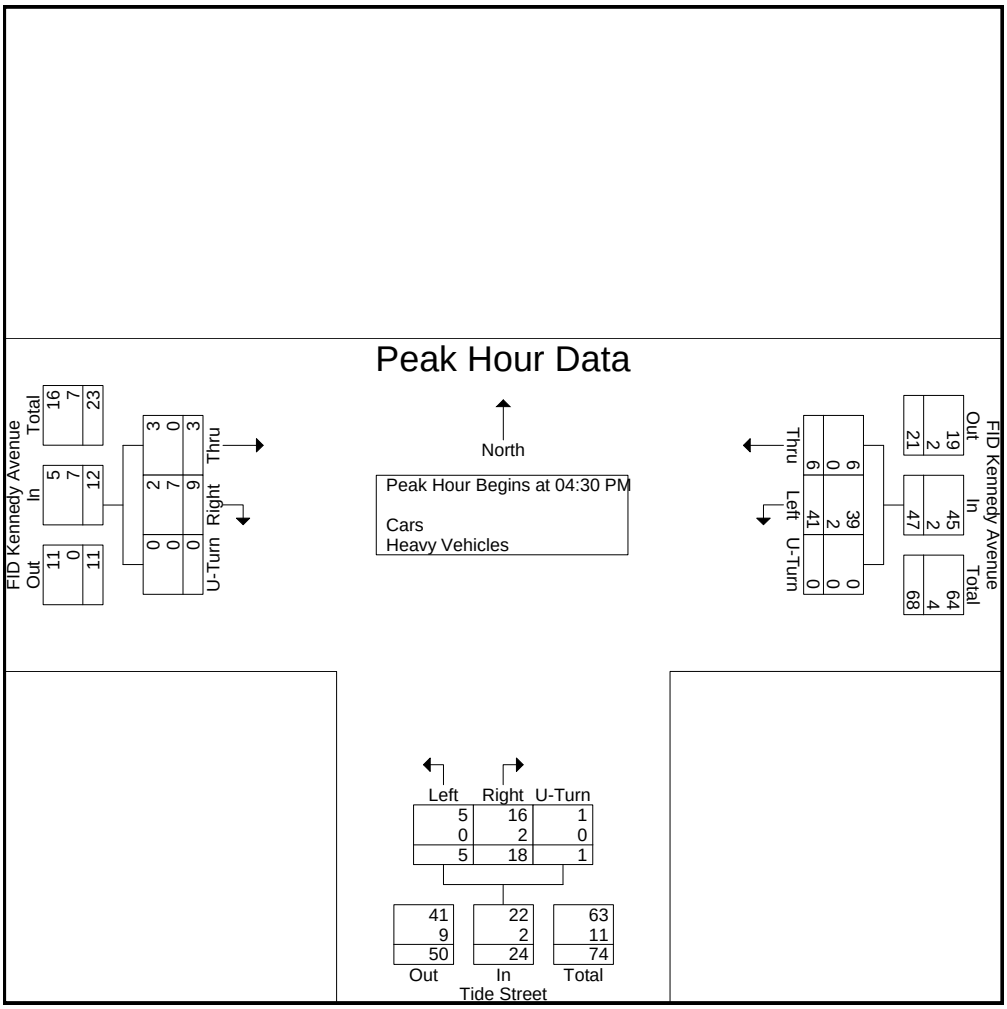
	FID Kennedy Avenue From East				Tide Street From South				FID Kennedy Avenue From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	9	0	9	5	2	0	7	4	1	0	5	21
04:45 PM	2	4	0	6	3	2	0	5	0	2	0	2	13
05:00 PM	1	13	0	14	6	0	1	7	3	0	0	3	24
05:15 PM	3	15	0	18	4	1	0	5	2	0	0	2	25
Total Volume	6	41	0	47	18	5	1	24	9	3	0	12	83
% App. Total	12.8	87.2	0		75	20.8	4.2		75	25	0		
PHF	.500	.683	.000	.653	.750	.625	.250	.857	.563	.375	.000	.600	.830
Cars	6	39	0	45	16	5	1	22	2	3	0	5	72
% Cars	100	95.1	0	95.7	88.9	100	100	91.7	22.2	100	0	41.7	86.7
Heavy Vehicles	0	2	0	2	2	0	0	2	7	0	0	7	11
% Heavy Vehicles	0	4.9	0	4.3	11.1	0	0	8.3	77.8	0	0	58.3	13.3



INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	3	189	390	68	16	1105	266	54	45	6	62	16	94	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)		400		0	150		0	0		0	0		0	
Storage Lanes		1		0	1		0	0		0	0		1	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			1.00			1.00								
Frt			0.978			0.971			0.992				0.850	
Flt Protected		0.950			0.950				0.975			0.962		
Satd. Flow (prot)	0	1492	2694	0	1438	3061	0	0	1600	0	0	1360	1231	
Flt Permitted		0.077			0.464				0.770			0.657		
Satd. Flow (perm)	0	121	2694	0	702	3061	0	0	1264	0	0	929	1231	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			28			32			3				104	
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			757			821			949			619		
Travel Time (s)			17.2			18.7			21.6			14.1		
Confl. Bikes (#/hr)				1			2							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	9%	17%	21%	13%	3%	1%	15%	14%	0%	23%	13%	22%	
Adj. Flow (vph)	3	199	411	72	19	1315	317	63	52	7	69	18	104	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	202	483	0	19	1632	0	0	122	0	0	87	104	
Turn Type	custom	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases		4	1 4			1			3			3	3 4!	2
Permitted Phases	4!	1			1			3			3			
Detector Phase	4	4	1 4		1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0	8.0			8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0	13.0			13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	15.0	15.0			39.0	39.0		20.0	20.0		20.0	20.0		26.0
Total Split (%)	15.0%	15.0%			39.0%	39.0%		20.0%	20.0%		20.0%	20.0%		26%
Maximum Green (s)	11.0	11.0			34.0	34.0		15.0	15.0		15.0	15.0		23.0
Yellow Time (s)	4.0	4.0			4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0	0.0			1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)		0.0			-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)		4.0			4.0	4.0			4.0			4.0		
Lead/Lag	Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None			C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		69.0	73.0		55.1	55.1			13.8			13.8	30.7	
Actuated g/C Ratio		0.69	0.73		0.55	0.55			0.14			0.14	0.31	
v/c Ratio		0.74	0.24		0.05	0.96			0.69			0.68	0.23	
Control Delay		40.6	6.5		16.9	38.0			59.6			66.5	6.3	
Queue Delay		0.0	0.0		0.0	0.0			0.0			0.0	0.0	
Total Delay		40.6	6.5		16.9	38.0			59.6			66.5	6.3	
LOS		D	A		B	D			E			E	A	
Approach Delay			16.6			37.8			59.6			33.7		
Approach LOS			B			D			E			C		
Queue Length 50th (ft)		71	33		5	463			72			53	0	
Queue Length 95th (ft)		#247	125		23	#815			126			#116	39	
Internal Link Dist (ft)			677			741			869			539		
Turn Bay Length (ft)		400			150									
Base Capacity (vph)		279	1963		387	1702			208			151	444	
Starvation Cap Reductn		0	0		0	0			0			0	0	
Spillback Cap Reductn		0	0		0	0			0			0	0	
Storage Cap Reductn		0	0		0	0			0			0	0	
Reduced v/c Ratio		0.72	0.25		0.05	0.96			0.59			0.58	0.23	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 33.0 — Intersection LOS: C
Intersection Capacity Utilization 82.7% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 2249: Pappas Way/Drydock Avenue & Summer Street

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	55	136	9	0	48	57	7	6	4	167	14	54
Conflicting Peds, #/hr	2	0	0	0	0	2	8	0	51	51	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	74	74	74	85	85	85	89	89	89
Heavy Vehicles, %	31	11	11	0	11	32	0	17	25	13	0	23
Mvmt Flow	63	156	10	0	65	77	8	7	5	188	16	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	193	0	0	218	0	0	532	532	214	499	498	156
Stage 1	-	-	-	-	-	-	339	339	-	154	154	-
Stage 2	-	-	-	-	-	-	193	193	-	345	344	-
Critical Hdwy	4.41	-	-	4.1	-	-	7.1	6.67	6.45	7.23	6.5	6.43
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Follow-up Hdwy	2.479	-	-	2.2	-	-	3.5	4.153	3.525	3.617	4	3.507
Pot Cap-1 Maneuver	1224	-	-	1364	-	-	461	433	771	465	477	837
Stage 1	-	-	-	-	-	-	680	614	-	823	774	-
Stage 2	-	-	-	-	-	-	813	713	-	648	640	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1222	-	-	1361	-	-	370	360	722	408	397	785
Mov Cap-2 Maneuver	-	-	-	-	-	-	370	360	-	408	397	-
Stage 1	-	-	-	-	-	-	602	544	-	729	727	-
Stage 2	-	-	-	-	-	-	733	670	-	598	567	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0	14.2	23
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	413	1222	-	-	1361	-	-	458
HCM Lane V/C Ratio	0.048	0.052	-	-	-	-	-	0.577
HCM Control Delay (s)	14.2	8.1	0	-	0	-	-	23
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	3.6

Intersection	
Int Delay, s/veh	10.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	26	1	228	0	0	0	81	41	4	0	12	11
Conflicting Peds, #/hr	13	0	95	95	0	13	10	0	21	21	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	25	25	25	81	81	81	82	82	82
Heavy Vehicles, %	4	0	13	0	0	0	39	18	25	0	33	36
Mvmt Flow	31	1	271	0	0	0	100	51	5	0	15	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	464	467	137	601	471	169	123	0	0	151	0	0
Stage 1	116	116	-	348	348	-	-	-	-	-	-	-
Stage 2	348	351	-	253	123	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.33	7.1	6.5	6.2	4.49	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.417	3.5	4	3.3	2.551	-	-	2.2	-	-
Pot Cap-1 Maneuver	505	496	883	415	494	880	1264	-	-	1442	-	-
Stage 1	884	803	-	672	638	-	-	-	-	-	-	-
Stage 2	664	636	-	756	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	422	376	787	226	375	784	1239	-	-	1413	-	-
Mov Cap-2 Maneuver	422	376	-	226	375	-	-	-	-	-	-	-
Stage 1	737	730	-	560	532	-	-	-	-	-	-	-
Stage 2	597	530	-	485	726	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	0	5.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1239	-	-	720	-	1413	-	-
HCM Lane V/C Ratio	0.081	-	-	0.422	-	-	-	-
HCM Control Delay (s)	8.2	0	-	13.6	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.1	-	0	-	-

Intersection	
Int Delay, s/veh	6.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	7	10	22	7	10	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	58	63	55	35	50	70
Heavy Vehicles, %	43	60	41	0	40	26
Mvmt Flow	12	16	40	20	20	76

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	28	0	120	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	100	-
Critical Hdwy	-	-	4.51	-	6.8	6.46
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.534
Pot Cap-1 Maneuver	-	-	1367	-	792	992
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1367	-	768	992
Mov Cap-2 Maneuver	-	-	-	-	768	-
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	935	-	-	1367	-
HCM Lane V/C Ratio	0.102	-	-	0.029	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

MOVEMENT SUMMARY

Site: Existing_AM - Seasonally Adj

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	58	16.3	0.109	7.6	LOS A	0.3	9.0	0.50	0.84	25.8
8	T	5	0.0	0.109	7.6	LOS A	0.3	9.0	0.50	0.71	27.8
18	R	156	16.0	0.275	10.1	LOS B	0.9	25.1	0.55	0.83	26.3
Approach		219	15.7	0.275	9.4	LOS A	0.9	25.1	0.54	0.83	26.2
East: Northern Avenue											
1	L	53	52.0	0.078	6.1	LOS A	0.1	4.9	0.17	0.69	26.5
6	T	220	25.0	0.271	7.3	LOS A	0.6	19.4	0.19	0.55	28.4
16	R	7	33.0	0.271	7.3	LOS A	0.6	19.4	0.19	0.70	27.7
Approach		279	30.3	0.271	7.1	LOS A	0.6	19.4	0.19	0.58	28.0
North East: Parking Lot											
1X	L	15	33.3	0.046	6.5	LOS A	0.1	2.7	0.34	0.81	26.7
16X	R	13	40.0	0.046	6.5	LOS A	0.1	2.7	0.34	0.60	28.8
Approach		28	36.4	0.046	6.5	LOS A	0.1	2.7	0.34	0.71	27.6
West: Northern Avenue											
5	L	31	35.4	0.505	10.2	LOS B	1.8	50.4	0.25	0.86	24.6
2	T	440	11.0	0.505	10.2	LOS B	1.8	50.4	0.25	0.55	26.7
12	R	74	12.0	0.080	4.6	LOS A	0.2	5.3	0.17	0.59	29.4
Approach		546	12.5	0.505	9.5	LOS A	1.8	50.4	0.24	0.57	26.9
All Vehicles		1072	18.4	0.505	8.7	LOS A	1.8	50.4	0.29	0.63	27.1

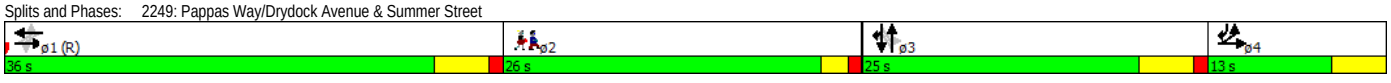
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	50	911	88	2	13	392	78	34	5	12	265	42	278	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)	400		0		150		0	0		0	0		0	
Storage Lanes	1		0		1		0	0		0	0		1	
Taper Length (ft)	25				25			25			25			
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00												
Frt		0.987				0.975			0.969				0.850	
Flt Protected	0.950				0.950				0.968			0.959		
Satd. Flow (prot)	1377	3069	0	0	1624	2956	0	0	1633	0	0	1601	1444	
Flt Permitted	0.286				0.141				0.681			0.725		
Satd. Flow (perm)	414	3069	0	0	241	2956	0	0	1149	0	0	1211	1444	
Right Turn on Red			Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)		13				24			14				361	
Link Speed (mph)		30				30			30			30		
Link Distance (ft)		757				821			949			619		
Travel Time (s)		17.2				18.7			21.6			14.1		
Confl. Bikes (#/hr)			3											
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.74	0.74	0.74	0.77	0.77	0.77	
Heavy Vehicles (%)	18%	4%	7%	0%	0%	7%	8%	9%	20%	0%	2%	5%	4%	
Adj. Flow (vph)	54	990	96	2	15	461	92	46	7	16	344	55	361	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	54	1086	0	0	17	553	0	0	69	0	0	399	361	
Turn Type	D.P+P	NA		Perm	Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases	4	1 4				1			3			3	3 4	2
Permitted Phases	1			1	1			3			3			
Detector Phase	4	1 4		1	1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0			8.0	8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0			13.0	13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	13.0			36.0	36.0	36.0		25.0	25.0		25.0	25.0		26.0
Total Split (%)	13.0%			36.0%	36.0%	36.0%		25.0%	25.0%		25.0%	25.0%		26%
Maximum Green (s)	9.0			31.0	31.0	31.0		20.0	20.0		20.0	20.0		23.0
Yellow Time (s)	4.0			4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0			1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0				-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)	4.0				4.0	4.0			4.0			4.0		
Lead/Lag	Lag			Lead	Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0			2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None			C-Min	C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)	39.8	43.8			30.8	30.8			43.0			43.0	55.0	
Actuated g/C Ratio	0.40	0.44			0.31	0.31			0.43			0.43	0.55	
v/c Ratio	0.22	0.80			0.23	0.60			0.14			0.77	0.38	
Control Delay	18.1	29.3			34.4	30.8			19.7			38.8	3.5	
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0	0.0	
Total Delay	18.1	29.3			34.4	30.8			19.7			38.8	3.5	
LOS	B	C			C	C			B			D	A	
Approach Delay		28.8				30.9			19.7			22.1		
Approach LOS		C				C			B			C		
Queue Length 50th (ft)	19	296			8	146			19			194	0	
Queue Length 95th (ft)	42	383			27	187			54			#443	27	
Internal Link Dist (ft)		677				741			869			539		
Turn Bay Length (ft)	400				150									
Base Capacity (vph)	251	1388			77	962			501			520	956	
Starvation Cap Reductn	0	0			0	0			0			0	0	
Spillback Cap Reductn	0	0			0	0			0			0	0	
Storage Cap Reductn	0	0			0	0			0			0	0	
Reduced v/c Ratio	0.22	0.78			0.22	0.57			0.14			0.77	0.38	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 27.0 Intersection LOS: C
Intersection Capacity Utilization 71.8% 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: 2249: Pappas Way/Drydock Avenue & Summer Street



Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	35	44	1	3	156	119	4	12	5	50	1	73
Conflicting Peds, #/hr	7	0	1	1	0	7	1	0	46	46	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	82	82	82	52	52	52	85	85	85
Heavy Vehicles, %	47	30	0	0	5	10	25	0	20	37	0	18
Mvmt Flow	39	49	1	4	190	145	8	23	10	59	1	86

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	381	0	0	97	0	0	535	564	103	507	491	316
Stage 1	-	-	-	-	-	-	175	175	-	316	316	-
Stage 2	-	-	-	-	-	-	360	389	-	191	175	-
Critical Hdwy	4.57	-	-	4.1	-	-	7.35	6.5	6.4	7.47	6.5	6.38
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Follow-up Hdwy	2.623	-	-	2.2	-	-	3.725	4	3.48	3.833	4	3.462
Pot Cap-1 Maneuver	969	-	-	1509	-	-	422	438	905	424	481	689
Stage 1	-	-	-	-	-	-	776	758	-	627	659	-
Stage 2	-	-	-	-	-	-	613	612	-	736	758	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	963	-	-	1496	-	-	331	374	848	362	410	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	331	374	-	362	410	-
Stage 1	-	-	-	-	-	-	703	686	-	568	621	-
Stage 2	-	-	-	-	-	-	526	577	-	668	686	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	0.1	14.5	15.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	419	963	-	-	1496	-	-	489
HCM Lane V/C Ratio	0.096	0.041	-	-	0.002	-	-	0.298
HCM Control Delay (s)	14.5	8.9	0	-	7.4	0	-	15.5
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.2

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	0	89	1	4	0	160	7	0	0	32	27
Conflicting Peds, #/hr	47	0	117	117	0	47	121	0	47	47	0	121
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	63	63	63	83	83	83	68	68	68
Heavy Vehicles, %	20	0	28	0	0	0	17	14	0	0	23	8
Mvmt Flow	6	0	109	2	6	0	193	8	0	0	47	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	698	695	305	749	715	246	204	0	0	125	0	0
Stage 1	184	184	-	511	511	-	-	-	-	-	-	-
Stage 2	514	511	-	238	204	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.48	7.1	6.5	6.2	4.27	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4	3.552	3.5	4	3.3	2.353	-	-	2.2	-	-
Pot Cap-1 Maneuver	332	368	678	331	359	798	1283	-	-	1474	-	-
Stage 1	778	751	-	549	540	-	-	-	-	-	-	-
Stage 2	512	540	-	770	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	241	533	180	235	627	1135	-	-	1304	-	-
Mov Cap-2 Maneuver	222	241	-	180	235	-	-	-	-	-	-	-
Stage 1	573	667	-	404	398	-	-	-	-	-	-	-
Stage 2	370	398	-	543	655	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	21.9	8.5	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1135	-	-	496	221	1304	-	-
HCM Lane V/C Ratio	0.17	-	-	0.231	0.036	-	-	-
HCM Control Delay (s)	8.8	0	-	14.4	21.9	0	-	-
HCM Lane LOS	A	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	0.9	0.1	0	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	3	9	41	6	5	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	38	56	68	50	63	75
Heavy Vehicles, %	0	78	5	0	0	11
Mvmt Flow	8	16	60	12	8	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	149	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	-	-	4.15	-	6.4	6.31
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.245	-	3.5	3.399
Pot Cap-1 Maneuver	-	-	1572	-	848	1038
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	898	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	816	1038
Mov Cap-2 Maneuver	-	-	-	-	816	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	864	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.2	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	972	-	-	1572	-
HCM Lane V/C Ratio	0.033	-	-	0.038	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

MOVEMENT SUMMARY

Site: Existing_PM - Seasonally Adj

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	54	3.8	0.070	5.1	LOS A	0.2	6.0	0.38	0.74	27.0
8	T	2	0.0	0.070	5.1	LOS A	0.2	6.0	0.38	0.57	29.4
18	R	24	52.0	0.044	7.0	LOS A	0.1	3.5	0.37	0.65	27.9
Approach		81	18.3	0.070	5.7	LOS A	0.2	6.0	0.37	0.71	27.3
East: Northern Avenue											
1	L	169	21.0	0.197	6.2	LOS A	0.5	14.2	0.20	0.70	26.5
6	T	402	7.0	0.421	8.5	LOS A	1.5	38.8	0.24	0.56	27.7
16	R	7	17.0	0.421	8.5	LOS A	1.5	38.8	0.24	0.70	27.1
Approach		578	11.2	0.421	7.8	LOS A	1.5	38.8	0.23	0.60	27.3
North East: Parking Lot											
1X	L	21	6.5	0.052	6.4	LOS A	0.1	3.2	0.43	0.86	26.9
16X	R	11	13.0	0.052	6.4	LOS A	0.1	3.2	0.43	0.69	28.7
Approach		32	8.8	0.052	6.4	LOS A	0.1	3.2	0.43	0.80	27.5
West: Northern Avenue											
5	L	48	25.5	0.307	7.6	LOS A	0.8	23.3	0.29	0.88	25.6
2	T	212	11.0	0.307	7.6	LOS A	0.8	23.3	0.29	0.60	28.1
12	R	55	6.0	0.062	4.6	LOS A	0.2	4.1	0.25	0.62	29.4
Approach		315	12.3	0.307	7.1	LOS A	0.8	23.3	0.29	0.65	27.9
All Vehicles		1006	12.0	0.421	7.4	LOS A	1.5	38.8	0.27	0.63	27.5

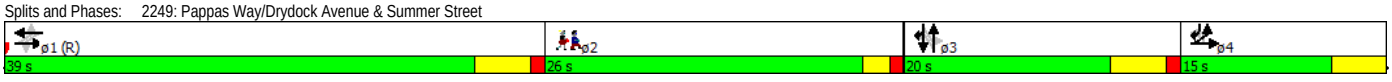
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	3	325	444	73	17	1214	318	60	47	6	76	17	135	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)		400		0	150		0	0		0	0		0	
Storage Lanes		1		0	1		0	0		0	0		1	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			1.00			1.00								
Frt			0.979			0.969			0.993				0.850	
Flt Protected		0.950			0.950				0.974			0.961		
Satd. Flow (prot)	0	1491	2698	0	1438	3055	0	0	1599	0	0	1356	1231	
Flt Permitted		0.126			0.415				0.722			0.650		
Satd. Flow (perm)	0	198	2698	0	628	3055	0	0	1185	0	0	917	1231	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			27			36			2				150	
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			757			821			949			619		
Travel Time (s)			17.2			18.7			21.6			14.1		
Confl. Bikes (#/hr)				1			2							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	9%	17%	21%	13%	3%	1%	15%	14%	0%	23%	13%	22%	
Adj. Flow (vph)	3	342	467	77	20	1445	379	70	55	7	84	19	150	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	345	544	0	20	1824	0	0	132	0	0	103	150	
Turn Type	custom	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases		4	1 4			1			3			3	3 4!	2
Permitted Phases	4!	1			1			3			3			
Detector Phase	4	4	1 4		1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0	8.0			8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0	13.0			13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	15.0	15.0			39.0	39.0		20.0	20.0		20.0	20.0		26.0
Total Split (%)	15.0%	15.0%			39.0%	39.0%		20.0%	20.0%		20.0%	20.0%		26%
Maximum Green (s)	11.0	11.0			34.0	34.0		15.0	15.0		15.0	15.0		23.0
Yellow Time (s)	4.0	4.0			4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0	0.0			1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)		0.0			-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)		4.0			4.0	4.0			4.0			4.0		
Lead/Lag	Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None			C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		67.3	71.3		35.2	35.2			15.5			15.5	50.6	
Actuated g/C Ratio		0.67	0.71		0.35	0.35			0.16			0.16	0.51	
v/c Ratio		0.63	0.28		0.09	1.66			0.71			0.73	0.22	
Control Delay		27.3	7.3		23.2	327.3			60.9			68.7	4.6	
Queue Delay		0.0	0.0		0.0	0.0			0.0			0.0	0.0	
Total Delay		27.3	7.3		23.2	327.3			60.9			68.7	4.6	
LOS		C	A		C	F			E			E	A	
Approach Delay			15.0			324.0			60.9			30.7		
Approach LOS			B			F			E			C		
Queue Length 50th (ft)		121	45		8	~888			78			62	0	
Queue Length 95th (ft)		#437	144		24	#944			#153			#146	45	
Internal Link Dist (ft)			677			741			869			539		
Turn Bay Length (ft)		400			150									
Base Capacity (vph)		548	1932		220	1098			205			157	690	
Starvation Cap Reductn		0	0		0	0			0			0	0	
Spillback Cap Reductn		0	0		0	0			0			0	0	
Storage Cap Reductn		0	0		0	0			0			0	0	
Reduced v/c Ratio		0.63	0.28		0.09	1.66			0.64			0.66	0.22	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.66
Intersection Signal Delay: 201.0 Intersection LOS: F
Intersection Capacity Utilization 99.1% ICU Level of Service F
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.
! Phase conflict between lane groups.

Splits and Phases: 2249: Pappas Way/Drydock Avenue & Summer Street



Intersection	
Int Delay, s/veh	33.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	129	162	9	0	56	70	11	6	4	195	14	80
Conflicting Peds, #/hr	2	0	0	0	0	2	8	0	51	51	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	74	74	74	85	85	85	89	89	89
Heavy Vehicles, %	31	11	11	0	11	32	0	17	25	13	0	23
Mvmt Flow	148	186	10	0	76	95	13	7	5	219	16	90

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	221	0	0	248	0	0	766	760	244	719	718	176
Stage 1	-	-	-	-	-	-	539	539	-	174	174	-
Stage 2	-	-	-	-	-	-	227	221	-	545	544	-
Critical Hdwy	4.41	-	-	4.1	-	-	7.1	6.67	6.45	7.23	6.5	6.43
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Follow-up Hdwy	2.479	-	-	2.2	-	-	3.5	4.153	3.525	3.617	4	3.507
Pot Cap-1 Maneuver	1194	-	-	1330	-	-	322	318	742	330	357	816
Stage 1	-	-	-	-	-	-	530	498	-	803	759	-
Stage 2	-	-	-	-	-	-	780	693	-	503	522	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1192	-	-	1327	-	-	227	241	695	268	271	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	241	-	268	271	-
Stage 1	-	-	-	-	-	-	428	402	-	649	713	-
Stage 2	-	-	-	-	-	-	672	651	-	421	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.6	0	20	84.6
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	265	1192	-	-	1327	-	-	327
HCM Lane V/C Ratio	0.093	0.124	-	-	-	-	-	0.993
HCM Control Delay (s)	20	8.4	0	-	0	-	-	84.6
HCM Lane LOS	C	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.3	0.4	-	-	0	-	-	10.9

Intersection	
Int Delay, s/veh	30

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	107	1	282	0	0	0	154	55	4	0	17	47
Conflicting Peds, #/hr	13	0	95	95	0	13	10	0	21	21	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	25	25	25	81	81	81	82	82	82
Heavy Vehicles, %	4	0	13	0	0	0	39	18	25	0	33	36
Mvmt Flow	127	1	336	0	0	0	190	68	5	0	21	57

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	690	692	165	859	719	186	173	0	0	168	0	0
Stage 1	144	144	-	546	546	-	-	-	-	-	-	-
Stage 2	546	548	-	313	173	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.33	7.1	6.5	6.2	4.49	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.417	3.5	4	3.3	2.551	-	-	2.2	-	-
Pot Cap-1 Maneuver	357	370	852	279	357	861	1208	-	-	1422	-	-
Stage 1	854	782	-	526	521	-	-	-	-	-	-	-
Stage 2	518	520	-	702	760	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	277	255	759	120	246	767	1184	-	-	1394	-	-
Mov Cap-2 Maneuver	277	255	-	120	246	-	-	-	-	-	-	-
Stage 1	647	711	-	399	395	-	-	-	-	-	-	-
Stage 2	423	394	-	383	691	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	48.6	0	6.2	0
HCM LOS	E	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1184	-	-	512	-	1394	-	-
HCM Lane V/C Ratio	0.161	-	-	0.907	-	-	-	-
HCM Control Delay (s)	8.6	0	-	48.6	0	0	-	-
HCM Lane LOS	A	A	-	E	A	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	10.5	-	0	-	-

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	7	11	23	7	11	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	58	63	55	35	50	70
Heavy Vehicles, %	43	60	41	0	40	26
Mvmt Flow	12	17	42	20	22	80

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	30	0	125	21
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.51	-	6.8	6.46
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.534
Pot Cap-1 Maneuver	-	-	1364	-	787	991
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	834	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1364	-	763	991
Mov Cap-2 Maneuver	-	-	-	-	763	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	931	-	-	1364	-
HCM Lane V/C Ratio	0.11	-	-	0.031	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

MOVEMENT SUMMARY

Site: No Build_AM

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	91	16.6	0.206	10.8	LOS B	0.6	17.3	0.59	0.89	24.4
8	T	4	0.0	0.206	10.8	LOS B	0.6	17.3	0.59	0.78	26.0
18	R	202	16.0	0.437	15.9	LOS C	1.6	45.7	0.66	0.92	23.6
Approach		298	15.9	0.437	14.2	LOS B	1.6	45.7	0.64	0.91	23.9
East: Northern Avenue											
1	L	70	52.0	0.105	6.6	LOS A	0.2	6.6	0.21	0.70	26.3
6	T	291	25.0	0.367	8.8	LOS A	1.0	28.6	0.24	0.57	27.5
16	R	7	33.0	0.367	8.8	LOS A	1.0	28.6	0.24	0.72	26.9
Approach		367	30.3	0.367	8.4	LOS A	1.0	28.6	0.24	0.60	27.3
North East: Parking Lot											
1X	L	13	33.3	0.044	7.2	LOS A	0.1	2.6	0.39	0.84	26.4
16X	R	11	40.0	0.044	7.2	LOS A	0.1	2.6	0.39	0.65	28.3
Approach		24	36.4	0.044	7.2	LOS A	0.1	2.6	0.39	0.75	27.2
West: Northern Avenue											
5	L	30	35.4	0.712	16.5	LOS C	3.7	101.3	0.39	0.84	22.3
2	T	627	11.0	0.712	16.5	LOS C	3.7	101.3	0.39	0.59	23.8
12	R	117	12.0	0.128	5.1	LOS A	0.3	8.9	0.19	0.60	29.1
Approach		775	12.1	0.712	14.8	LOS B	3.7	101.3	0.36	0.60	24.4
All Vehicles		1464	17.8	0.712	12.9	LOS B	3.7	101.3	0.38	0.67	25.0

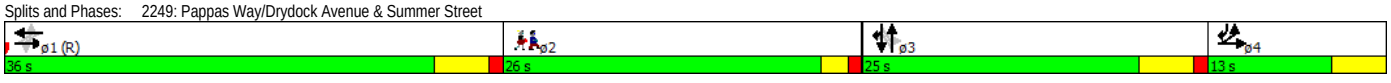
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	122	1052	97	2	14	503	98	40	5	13	322	44	429	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)	400		0		150		0	0		0	0		0	
Storage Lanes	1		0		1		0	0		0	0		1	
Taper Length (ft)	25				25			25			25			
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00												
Frt		0.987				0.976			0.969				0.850	
Flt Protected	0.950				0.950				0.967			0.958		
Satd. Flow (prot)	1377	3070	0	0	1624	2959	0	0	1633	0	0	1600	1444	
Flt Permitted	0.191				0.135				0.549			0.714		
Satd. Flow (perm)	277	3070	0	0	231	2959	0	0	927	0	0	1193	1444	
Right Turn on Red			Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)		12				24			13				518	
Link Speed (mph)		30				30			30			30		
Link Distance (ft)		757				821			949			619		
Travel Time (s)		17.2				18.7			21.6			14.1		
Confl. Bikes (#/hr)			3											
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.74	0.74	0.74	0.77	0.77	0.77	
Heavy Vehicles (%)	18%	4%	7%	0%	0%	7%	8%	9%	20%	0%	2%	5%	4%	
Adj. Flow (vph)	133	1143	105	2	16	592	115	54	7	18	418	57	557	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	133	1248	0	0	18	707	0	0	79	0	0	475	557	
Turn Type	D.P+P	NA		Perm	Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases	4	1 4				1			3			3	3 4	2
Permitted Phases	1			1	1			3			3			
Detector Phase	4	1 4		1	1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0			8.0	8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0			13.0	13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	13.0			36.0	36.0	36.0		25.0	25.0		25.0	25.0		26.0
Total Split (%)	13.0%			36.0%	36.0%	36.0%		25.0%	25.0%		25.0%	25.0%		26%
Maximum Green (s)	9.0			31.0	31.0	31.0		20.0	20.0		20.0	20.0		23.0
Yellow Time (s)	4.0			4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0			1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0				-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)	4.0				4.0	4.0			4.0			4.0		
Lead/Lag	Lag			Lead	Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0			2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None			C-Min	C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)	41.0	45.0			32.0	32.0			41.8			41.8	53.8	
Actuated g/C Ratio	0.41	0.45			0.32	0.32			0.42			0.42	0.54	
v/c Ratio	0.63	0.90			0.25	0.73			0.20			0.95	0.55	
Control Delay	31.6	35.5			35.6	34.5			21.2			61.1	5.0	
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0	0.0	
Total Delay	31.6	35.5			35.6	34.5			21.2			61.1	5.0	
LOS	C	D			D	C			C			E	A	
Approach Delay		35.1				34.6			21.2			30.8		
Approach LOS		D				C			C			C		
Queue Length 50th (ft)	50	372			8	202			23			258	10	
Queue Length 95th (ft)	#93	#520			28	250			64			#541	41	
Internal Link Dist (ft)		677				741			869			539		
Turn Bay Length (ft)	400				150									
Base Capacity (vph)	212	1388			73	963			394			498	1016	
Starvation Cap Reductn	0	0			0	0			0			0	0	
Spillback Cap Reductn	0	0			0	0			0			0	0	
Storage Cap Reductn	0	0			0	0			0			0	0	
Reduced v/c Ratio	0.63	0.90			0.25	0.73			0.20			0.95	0.55	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 33.3 Intersection LOS: C
Intersection Capacity Utilization 80.5% 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: 2249: Pappas Way/Drydock Avenue & Summer Street



Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	70	57	1	3	187	154	10	12	5	64	1	146
Conflicting Peds, #/hr	7	0	1	1	0	7	1	0	46	46	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	82	82	82	52	52	52	85	85	85
Heavy Vehicles, %	47	30	0	0	5	10	25	0	20	37	0	18
Mvmt Flow	79	64	1	4	228	188	19	23	10	75	1	172

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	462	0	0	111	0	0	730	737	118	659	643	375
Stage 1	-	-	-	-	-	-	268	268	-	375	375	-
Stage 2	-	-	-	-	-	-	462	469	-	284	268	-
Critical Hdwy	4.57	-	-	4.1	-	-	7.35	6.5	6.4	7.47	6.5	6.38
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Follow-up Hdwy	2.623	-	-	2.2	-	-	3.725	4	3.48	3.833	4	3.462
Pot Cap-1 Maneuver	899	-	-	1492	-	-	310	348	887	333	394	637
Stage 1	-	-	-	-	-	-	690	691	-	581	621	-
Stage 2	-	-	-	-	-	-	538	564	-	653	691	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	893	-	-	1480	-	-	192	281	831	268	318	598
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	281	-	268	318	-
Stage 1	-	-	-	-	-	-	592	593	-	499	585	-
Stage 2	-	-	-	-	-	-	379	531	-	559	593	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.2	0.1	21.6	23.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	268	893	-	-	1480	-	-	434
HCM Lane V/C Ratio	0.194	0.088	-	-	0.002	-	-	0.572
HCM Control Delay (s)	21.6	9.4	0	-	7.4	0	-	23.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0	-	-	3.5

Intersection	
Int Delay, s/veh	27.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	53	0	172	1	4	0	218	19	0	0	42	119
Conflicting Peds, #/hr	47	0	117	117	0	47	121	0	47	47	0	121
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	63	63	63	83	83	83	68	68	68
Heavy Vehicles, %	20	0	28	0	0	0	17	14	0	0	23	8
Mvmt Flow	65	0	210	2	6	0	263	23	0	0	62	175

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	934	931	387	1036	1019	261	354	0	0	140	0	0
Stage 1	266	266	-	665	665	-	-	-	-	-	-	-
Stage 2	668	665	-	371	354	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.48	7.1	6.5	6.2	4.27	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4	3.552	3.5	4	3.3	2.353	-	-	2.2	-	-
Pot Cap-1 Maneuver	228	269	608	212	239	783	1126	-	-	1456	-	-
Stage 1	701	692	-	453	461	-	-	-	-	-	-	-
Stage 2	419	461	-	653	634	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	138	156	478	74	138	616	996	-	-	1288	-	-
Mov Cap-2 Maneuver	138	156	-	74	138	-	-	-	-	-	-	-
Stage 1	457	615	-	295	300	-	-	-	-	-	-	-
Stage 2	266	300	-	324	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	69.1	37.7	9.1	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	996	-	-	302	118	1288	-	-
HCM Lane V/C Ratio	0.264	-	-	0.909	0.067	-	-	-
HCM Control Delay (s)	9.9	0	-	69.1	37.7	0	-	-
HCM Lane LOS	A	A	-	F	E	A	-	-
HCM 95th %tile Q(veh)	1.1	-	-	8.6	0.2	0	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	3	9	43	6	5	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	38	56	68	50	63	75
Heavy Vehicles, %	0	78	5	0	0	11
Mvmt Flow	8	16	63	12	8	25

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	154	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	-	-	4.15	-	6.4	6.31
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.245	-	3.5	3.399
Pot Cap-1 Maneuver	-	-	1572	-	842	1038
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	894	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	808	1038
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	858	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.2	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	972	-	-	1572	-
HCM Lane V/C Ratio	0.034	-	-	0.04	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

MOVEMENT SUMMARY

Site: No Build_PM

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	90	3.9	0.127	6.3	LOS A	0.4	11.2	0.45	0.80	26.4
8	T	2	0.0	0.127	6.3	LOS A	0.4	11.2	0.45	0.65	28.6
18	R	61	52.0	0.122	8.8	LOS A	0.3	9.8	0.44	0.73	26.9
Approach		153	23.0	0.127	7.3	LOS A	0.4	11.2	0.45	0.77	26.6
East: Northern Avenue											
1	L	233	21.0	0.280	7.4	LOS A	0.7	21.7	0.25	0.72	25.9
6	T	614	7.0	0.657	14.1	LOS B	3.4	90.0	0.41	0.62	24.9
16	R	7	17.0	0.657	14.1	LOS B	3.4	90.0	0.41	0.73	24.5
Approach		853	10.9	0.657	12.3	LOS B	3.4	90.0	0.36	0.65	25.2
North East: Parking Lot											
1X	L	16	6.5	0.051	8.0	LOS A	0.1	3.2	0.54	0.90	26.1
16X	R	9	13.0	0.051	8.0	LOS A	0.1	3.2	0.54	0.76	27.7
Approach		25	8.8	0.051	8.0	LOS A	0.1	3.2	0.54	0.85	26.6
West: Northern Avenue											
5	L	49	25.6	0.436	10.0	LOS B	1.4	37.6	0.38	0.92	24.6
2	T	304	11.0	0.436	10.0	LOS B	1.4	37.6	0.38	0.67	26.8
12	R	84	6.0	0.098	5.2	LOS A	0.3	6.7	0.30	0.66	29.0
Approach		437	11.7	0.436	9.1	LOS A	1.4	37.6	0.37	0.69	26.9
All Vehicles		1468	12.3	0.657	10.7	LOS B	3.4	90.0	0.38	0.68	25.8

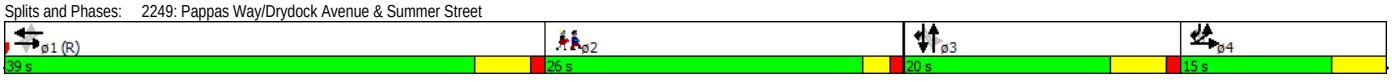
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	3	334	444	73	17	1214	322	60	47	6	77	17	137	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)		400		0	150		0	0		0	0		0	
Storage Lanes		1		0	1		0	0		0	0		1	
Taper Length (ft)		25			25			25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			1.00			1.00								
Frt			0.979			0.969			0.993				0.850	
Flt Protected		0.950			0.950				0.974			0.961		
Satd. Flow (prot)	0	1491	2698	0	1438	3055	0	0	1599	0	0	1356	1231	
Flt Permitted		0.127			0.415				0.717			0.650		
Satd. Flow (perm)	0	199	2698	0	628	3055	0	0	1177	0	0	917	1231	
Right Turn on Red				Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			27			37			2				152	
Link Speed (mph)			30			30			30			30		
Link Distance (ft)			757			821			949			619		
Travel Time (s)			17.2			18.7			21.6			14.1		
Confl. Bikes (#/hr)				1			2							
Peak Hour Factor	0.95	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.90	0.90	0.90	
Heavy Vehicles (%)	0%	9%	17%	21%	13%	3%	1%	15%	14%	0%	23%	13%	22%	
Adj. Flow (vph)	3	352	467	77	20	1445	383	70	55	7	86	19	152	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	355	544	0	20	1828	0	0	132	0	0	105	152	
Turn Type	custom	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases		4	1 4			1			3			3	3 4!	2
Permitted Phases	4!	1			1			3			3			
Detector Phase	4	4	1 4		1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0	8.0			8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0	13.0			13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	15.0	15.0			39.0	39.0		20.0	20.0		20.0	20.0		26.0
Total Split (%)	15.0%	15.0%			39.0%	39.0%		20.0%	20.0%		20.0%	20.0%		26%
Maximum Green (s)	11.0	11.0			34.0	34.0		15.0	15.0		15.0	15.0		23.0
Yellow Time (s)	4.0	4.0			4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0	0.0			1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)		0.0			-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)		4.0			4.0	4.0			4.0			4.0		
Lead/Lag	Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None	None			C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)		67.1	71.1		35.0	35.0			15.7			15.7	50.8	
Actuated g/C Ratio		0.67	0.71		0.35	0.35			0.16			0.16	0.51	
v/c Ratio		0.65	0.28		0.09	1.67			0.71			0.73	0.22	
Control Delay		28.1	7.3		23.4	332.3			60.4			68.9	4.6	
Queue Delay		0.0	0.0		0.0	0.0			0.0			0.0	0.0	
Total Delay		28.1	7.3		23.4	332.3			60.4			68.9	4.6	
LOS		C	A		C	F			E			E	A	
Approach Delay			15.5			328.9			60.4			30.9		
Approach LOS			B			F			E			C		
Queue Length 50th (ft)		126	45		8	~901			78			63	0	
Queue Length 95th (ft)		#452	144		24	#945			#154			#149	46	
Internal Link Dist (ft)			677			741			869			539		
Turn Bay Length (ft)		400			150									
Base Capacity (vph)		548	1927		219	1093			205			158	693	
Starvation Cap Reductn		0	0		0	0			0			0	0	
Spillback Cap Reductn		0	0		0	0			0			0	0	
Storage Cap Reductn		0	0		0	0			0			0	0	
Reduced v/c Ratio		0.65	0.28		0.09	1.67			0.64			0.66	0.22	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.67
Intersection Signal Delay: 203.4 Intersection LOS: F
Intersection Capacity Utilization 99.9% ICU Level of Service F
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.
! Phase conflict between lane groups.

Splits and Phases: 2249: Pappas Way/Drydock Avenue & Summer Street



Intersection	
Int Delay, s/veh	40

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	142	162	9	0	56	70	11	6	4	195	14	83
Conflicting Peds, #/hr	2	0	0	0	0	2	8	0	51	51	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	74	74	74	85	85	85	89	89	89
Heavy Vehicles, %	31	11	11	0	11	32	0	17	25	13	0	23
Mvmt Flow	163	186	10	0	76	95	13	7	5	219	16	93

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	221	0	0	248	0	0	797	790	244	749	748	176
Stage 1	-	-	-	-	-	-	569	569	-	174	174	-
Stage 2	-	-	-	-	-	-	228	221	-	575	574	-
Critical Hdwy	4.41	-	-	4.1	-	-	7.1	6.67	6.45	7.23	6.5	6.43
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.67	-	6.23	5.5	-
Follow-up Hdwy	2.479	-	-	2.2	-	-	3.5	4.153	3.525	3.617	4	3.507
Pot Cap-1 Maneuver	1194	-	-	1330	-	-	307	306	742	315	343	816
Stage 1	-	-	-	-	-	-	511	483	-	803	759	-
Stage 2	-	-	-	-	-	-	779	693	-	484	506	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1192	-	-	1327	-	-	213	228	695	253	256	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	228	-	253	256	-
Stage 1	-	-	-	-	-	-	406	384	-	638	713	-
Stage 2	-	-	-	-	-	-	668	651	-	398	402	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	0	20.9	101.8
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	251	1192	-	-	1327	-	-	313
HCM Lane V/C Ratio	0.098	0.137	-	-	-	-	-	1.048
HCM Control Delay (s)	20.9	8.5	0	-	0	-	-	101.8
HCM Lane LOS	C	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.3	0.5	-	-	0	-	-	12.1

Intersection	
Int Delay, s/veh	65.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	150	1	282	0	0	0	154	68	4	0	20	56
Conflicting Peds, #/hr	13	0	95	95	0	13	10	0	21	21	0	10
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	25	25	25	81	81	81	82	82	82
Heavy Vehicles, %	4	0	13	0	0	0	39	18	25	0	33	36
Mvmt Flow	179	1	336	0	0	0	190	84	5	0	24	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	716	718	175	884	750	202	188	0	0	184	0	0
Stage 1	154	154	-	562	562	-	-	-	-	-	-	-
Stage 2	562	564	-	322	188	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.33	7.1	6.5	6.2	4.49	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.417	3.5	4	3.3	2.551	-	-	2.2	-	-
Pot Cap-1 Maneuver	343	357	841	268	342	844	1192	-	-	1403	-	-
Stage 1	844	774	-	515	513	-	-	-	-	-	-	-
Stage 2	508	512	-	694	748	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	266	245	750	114	235	752	1168	-	-	1375	-	-
Mov Cap-2 Maneuver	266	245	-	114	235	-	-	-	-	-	-	-
Stage 1	636	704	-	388	387	-	-	-	-	-	-	-
Stage 2	413	386	-	375	680	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	109.3	0	5.9	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1168	-	-	459	-	1375	-	-
HCM Lane V/C Ratio	0.163	-	-	1.123	-	-	-	-
HCM Control Delay (s)	8.7	0	-	109.3	0	0	-	-
HCM Lane LOS	A	A	-	F	A	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	17.9	-	0	-	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	7	11	34	7	11	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	58	63	55	35	50	70
Heavy Vehicles, %	43	60	41	0	40	26
Mvmt Flow	12	17	62	20	22	161

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	30	0	165	21
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	144	-
Critical Hdwy	-	-	4.51	-	6.8	6.46
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.569	-	3.86	3.534
Pot Cap-1 Maneuver	-	-	1364	-	745	991
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1364	-	711	991
Mov Cap-2 Maneuver	-	-	-	-	711	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	946	-	-	1364	-
HCM Lane V/C Ratio	0.194	-	-	0.045	-
HCM Control Delay (s)	9.7	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

MOVEMENT SUMMARY

Site: Build_AM

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	91	16.6	0.216	11.4	LOS B	0.6	18.0	0.61	0.90	24.1
8	T	4	0.0	0.216	11.4	LOS B	0.6	18.0	0.61	0.79	25.7
18	R	208	16.0	0.469	17.5	LOS C	1.8	50.3	0.68	0.94	23.0
Approach		303	15.9	0.469	15.6	LOS C	1.8	50.3	0.66	0.92	23.4
East: Northern Avenue											
1	L	71	52.0	0.107	6.6	LOS A	0.2	6.7	0.21	0.70	26.3
6	T	299	25.0	0.376	9.0	LOS A	1.0	29.6	0.25	0.57	27.4
16	R	7	33.0	0.376	9.0	LOS A	1.0	29.6	0.25	0.72	26.8
Approach		376	30.2	0.376	8.5	LOS A	1.0	29.6	0.24	0.60	27.2
North East: Parking Lot											
1X	L	13	33.3	0.044	7.2	LOS A	0.1	2.6	0.39	0.84	26.3
16X	R	11	40.0	0.044	7.2	LOS A	0.1	2.6	0.39	0.65	28.3
Approach		24	36.4	0.044	7.2	LOS A	0.1	2.6	0.39	0.75	27.2
West: Northern Avenue											
5	L	30	35.4	0.758	18.8	LOS C	4.6	125.4	0.43	0.84	21.6
2	T	668	11.0	0.758	18.8	LOS C	4.6	125.4	0.43	0.61	22.9
12	R	117	12.0	0.128	5.1	LOS A	0.3	8.9	0.19	0.60	29.1
Approach		816	12.1	0.758	16.8	LOS C	4.6	125.4	0.39	0.61	23.6
All Vehicles		1520	17.7	0.758	14.4	LOS B	4.6	125.4	0.41	0.67	24.4

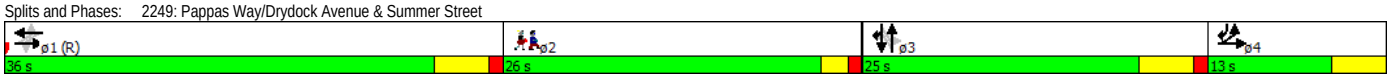
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations														
Volume (vph)	124	1052	97	2	14	503	98	40	5	13	326	44	439	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	15	12	12	12	13	
Storage Length (ft)	400		0		150		0	0		0	0		0	
Storage Lanes	1		0		1		0	0		0	0		1	
Taper Length (ft)	25				25			25			25			
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00												
Frt		0.987				0.976			0.969				0.850	
Flt Protected	0.950				0.950				0.967			0.958		
Satd. Flow (prot)	1377	3070	0	0	1624	2959	0	0	1633	0	0	1600	1444	
Flt Permitted	0.191				0.135				0.543			0.714		
Satd. Flow (perm)	277	3070	0	0	231	2959	0	0	917	0	0	1193	1444	
Right Turn on Red			Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)		12				24			13				518	
Link Speed (mph)		30				30			30			30		
Link Distance (ft)		757				821			949			619		
Travel Time (s)		17.2				18.7			21.6			14.1		
Confl. Bikes (#/hr)			3											
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.74	0.74	0.74	0.77	0.77	0.77	
Heavy Vehicles (%)	18%	4%	7%	0%	0%	7%	8%	9%	20%	0%	2%	5%	4%	
Adj. Flow (vph)	135	1143	105	2	16	592	115	54	7	18	423	57	570	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	135	1248	0	0	18	707	0	0	79	0	0	480	570	
Turn Type	D.P+P	NA		Perm	Perm	NA		Perm	NA		Perm	NA	pt+ov	
Protected Phases	4	1 4				1			3			3	3 4	2
Permitted Phases	1			1	1			3			3			
Detector Phase	4	1 4		1	1	1		3	3		3	3	3 4	
Switch Phase														
Minimum Initial (s)	8.0			8.0	8.0	8.0		8.0	8.0		8.0	8.0		1.0
Minimum Split (s)	13.0			13.0	13.0	13.0		13.0	13.0		13.0	13.0		26.0
Total Split (s)	13.0			36.0	36.0	36.0		25.0	25.0		25.0	25.0		26.0
Total Split (%)	13.0%			36.0%	36.0%	36.0%		25.0%	25.0%		25.0%	25.0%		26%
Maximum Green (s)	9.0			31.0	31.0	31.0		20.0	20.0		20.0	20.0		23.0
Yellow Time (s)	4.0			4.0	4.0	4.0		4.0	4.0		4.0	4.0		2.0
All-Red Time (s)	0.0			1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0				-1.0	-1.0			-1.0			-1.0		
Total Lost Time (s)	4.0				4.0	4.0			4.0			4.0		
Lead/Lag	Lag			Lead	Lead	Lead		Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0			2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	None			C-Min	C-Min	C-Min		None	None		None	None		None
Walk Time (s)														12.0
Flash Dont Walk (s)														11.0
Pedestrian Calls (#/hr)														10
Act Effct Green (s)	41.0	45.0			32.0	32.0			41.8			41.8	53.8	
Actuated g/C Ratio	0.41	0.45			0.32	0.32			0.42			0.42	0.54	
v/c Ratio	0.64	0.90			0.25	0.73			0.20			0.96	0.56	
Control Delay	32.3	35.5			35.6	34.5			21.3			63.1	5.3	
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0	0.0	
Total Delay	32.3	35.5			35.6	34.5			21.3			63.1	5.3	
LOS	C	D			D	C			C			E	A	
Approach Delay		35.1				34.6			21.3			31.8		
Approach LOS		D				C			C			C		
Queue Length 50th (ft)	51	372			8	202			23			262	13	
Queue Length 95th (ft)	#97	#520			28	250			65			#548	47	
Internal Link Dist (ft)		677				741			869			539		
Turn Bay Length (ft)	400				150									
Base Capacity (vph)	212	1388			73	963			390			498	1016	
Starvation Cap Reductn	0	0			0	0			0			0	0	
Spillback Cap Reductn	0	0			0	0			0			0	0	
Storage Cap Reductn	0	0			0	0			0			0	0	
Reduced v/c Ratio	0.64	0.90			0.25	0.73			0.20			0.96	0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 33.6 Intersection LOS: C
Intersection Capacity Utilization 80.9% 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: 2249: Pappas Way/Drydock Avenue & Summer Street



Intersection	
Int Delay, s/veh	9.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	72	57	1	3	187	154	10	12	5	64	1	160
Conflicting Peds, #/hr	7	0	1	1	0	7	1	0	46	46	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	82	82	82	52	52	52	85	85	85
Heavy Vehicles, %	47	30	0	0	5	10	25	0	20	37	0	18
Mvmt Flow	81	64	1	4	228	188	19	23	10	75	1	188

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	462	0	0	111	0	0	742	741	118	664	648	375
Stage 1	-	-	-	-	-	-	272	272	-	375	375	-
Stage 2	-	-	-	-	-	-	470	469	-	289	273	-
Critical Hdwy	4.57	-	-	4.1	-	-	7.35	6.5	6.4	7.47	6.5	6.38
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.47	5.5	-
Follow-up Hdwy	2.623	-	-	2.2	-	-	3.725	4	3.48	3.833	4	3.462
Pot Cap-1 Maneuver	899	-	-	1492	-	-	304	347	887	330	392	637
Stage 1	-	-	-	-	-	-	686	688	-	581	621	-
Stage 2	-	-	-	-	-	-	533	564	-	649	688	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	893	-	-	1480	-	-	180	280	831	265	316	598
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	280	-	265	316	-
Stage 1	-	-	-	-	-	-	587	589	-	498	585	-
Stage 2	-	-	-	-	-	-	361	531	-	554	589	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.2	0.1	22.4	24.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	259	893	-	-	1480	-	-	439
HCM Lane V/C Ratio	0.2	0.091	-	-	0.002	-	-	0.603
HCM Control Delay (s)	22.4	9.4	0	-	7.4	0	-	24.9
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0.3	-	-	0	-	-	3.9

Intersection	
Int Delay, s/veh	41.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	62	0	172	1	4	0	218	22	0	0	55	165
Conflicting Peds, #/hr	47	0	117	117	0	47	121	0	47	47	0	121
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	63	63	63	83	83	83	68	68	68
Heavy Vehicles, %	20	0	28	0	0	0	17	14	0	0	23	8
Mvmt Flow	76	0	210	2	6	0	263	27	0	0	81	243

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	991	988	440	1093	1110	265	441	0	0	144	0	0
Stage 1	319	319	-	669	669	-	-	-	-	-	-	-
Stage 2	672	669	-	424	441	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.48	7.1	6.5	6.2	4.27	-	-	4.1	-	-
Critical Hdwy Stg 1	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.3	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4	3.552	3.5	4	3.3	2.353	-	-	2.2	-	-
Pot Cap-1 Maneuver	209	249	566	193	211	779	1044	-	-	1451	-	-
Stage 1	656	657	-	450	459	-	-	-	-	-	-	-
Stage 2	417	459	-	612	580	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	140	445	62	118	612	924	-	-	1284	-	-
Mov Cap-2 Maneuver	123	140	-	62	118	-	-	-	-	-	-	-
Stage 1	414	584	-	284	290	-	-	-	-	-	-	-
Stage 2	257	290	-	286	515	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	121.8	44.1	9.5	0
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	924	-	-	263	100	1284	-	-
HCM Lane V/C Ratio	0.284	-	-	1.085	0.079	-	-	-
HCM Control Delay (s)	10.4	0	-	121.8	44.1	0	-	-
HCM Lane LOS	B	A	-	F	E	A	-	-
HCM 95th %tile Q(veh)	1.2	-	-	11.8	0.3	0	-	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	3	9	103	6	5	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	38	56	68	50	63	75
Heavy Vehicles, %	0	78	5	0	0	11
Mvmt Flow	8	16	151	12	8	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	331	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.15	-	6.4	6.31
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.245	-	3.5	3.399
Pot Cap-1 Maneuver	-	-	1572	-	668	1038
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	744	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1572	-	603	1038
Mov Cap-2 Maneuver	-	-	-	-	603	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	672	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	927	-	-	1572	-
HCM Lane V/C Ratio	0.052	-	-	0.096	-
HCM Control Delay (s)	9.1	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.3	-

MOVEMENT SUMMARY

Site: Build_PM

Northern Avenue at Trilling Road
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Trilling Road											
3	L	90	3.9	0.128	6.3	LOS A	0.4	11.3	0.46	0.80	26.4
8	T	2	0.0	0.128	6.3	LOS A	0.4	11.3	0.46	0.65	28.6
18	R	63	52.0	0.128	9.0	LOS A	0.3	10.3	0.44	0.73	26.8
Approach		155	23.4	0.128	7.4	LOS A	0.4	11.3	0.45	0.77	26.6
East: Northern Avenue											
1	L	239	21.0	0.288	7.5	LOS A	0.8	22.5	0.25	0.72	25.9
6	T	658	7.0	0.703	15.8	LOS C	4.2	110.2	0.45	0.64	24.1
16	R	7	17.0	0.703	15.8	LOS C	4.2	110.2	0.45	0.74	23.7
Approach		903	10.8	0.703	13.6	LOS B	4.2	110.2	0.39	0.66	24.6
North East: Parking Lot											
1X	L	16	6.5	0.053	8.4	LOS A	0.1	3.3	0.56	0.90	25.9
16X	R	9	13.0	0.053	8.4	LOS A	0.1	3.3	0.56	0.77	27.5
Approach		25	8.8	0.053	8.4	LOS A	0.1	3.3	0.56	0.86	26.4
West: Northern Avenue											
5	L	49	25.6	0.448	10.3	LOS B	1.4	39.6	0.39	0.93	24.5
2	T	312	11.0	0.448	10.3	LOS B	1.4	39.6	0.39	0.68	26.7
12	R	84	6.0	0.099	5.2	LOS A	0.3	6.8	0.31	0.66	29.0
Approach		445	11.7	0.448	9.3	LOS A	1.4	39.6	0.38	0.70	26.8
All Vehicles		1528	12.3	0.703	11.6	LOS B	4.2	110.2	0.40	0.69	25.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

TRIP GENERATION CALCULATIONS

2015116 - Fid Kennedy Avenue

Trip Generation Assessment

HOWARD STEIN HUDSON

11-Sep-15

Land Use	Size	Category	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]
Daily Peak Hour													
Light Industrial Park[6]	160	Total	1,116	0%	0%	1,116	1.13	**1,261**		**264**		**278**	
	ksf	In	558	0%	0%	558	1.13	**631**	21%	**132**	22%	**139**	57%
		Out	558	0%	0%	558	1.13	**631**	21%	**132**	22%	**139**	57%
AM Peak Hour													
Light Industrial Park[6]	160	Total	147	0%	0%	147	1.13	**166**		**42**		**47**	
	ksf	In	129	0%	0%	129	1.13	**146**	27%	**39**	29%	**42**	44%
		Out	18	0%	0%	18	1.13	**20**	17%	**3**	23%	**5**	60%
PM Peak Hour													
Light Industrial Park[6]	160	Total	155	0%	0%	155	1.13	**175**		**45**		**50**	
	ksf	In	19	0%	0%	19	1.13	**21**	17%	**4**	23%	**5**	60%
		Out	136	0%	0%	136	1.13	**154**	27%	**41**	29%	**45**	44%

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on BTD mode shares for Area 13
3. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
4. ITE Trip Generation Rate, 9th Edition, LUC 110 (Light Industrial), Average Rate

Appendix C

Climate Change Preparedness 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:	25 Fid Kennedy Avenue
Project Address Primary:	25 Fid Kennedy Avenue
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	David G. Cannistraro, CEO, JC Cannistrarro, DCannistraro@cannistraro.com, (617) 926-0092

A.2 - Team Description

Owner / Developer:	J. C. Cannistraro, LLC
Architect:	Bargmann Hendrie + Archetype, Inc.
Engineer (building systems):	AHA Consulting Engineers
Sustainability / LEED:	Epsilon Associates
Permitting:	Epsilon Associates
Construction Management:	
Climate Change Expert:	

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:	Industrial
List the First Floor Uses:	*Industrial*

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

☐ Wood Frame	☐ Masonry	☑ Steel Frame	☐ Concrete

Describe the building?

Site Area:	*141,125 SF/ 85,600 SF building footprint*	Building Area:	*157,000 SF*
Building Height:	*76' 7 ½"Ft.*	Number of Stories:	*2 Flrs.*
First Floor Elevation (reference Boston City	*17 BCB.*	Are there below grade spaces/levels, if yes how many:	*No*

Base):		

A.5 - Green Building

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

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?

Electric:	*1,500 (kW)*	Heating:	*8,400 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*9.375 (kWh/SF)*	Cooling:	*30 (Tons/hr)*

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

Electric:	*0 (kW)*	Heating:	*0 (MMBtu/hr)*
		Cooling:	*0 (Tons/hr)*

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

Electrical Generation:	*None (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.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

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?

130 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:	
How is performance determined:	The Project consists of renovating an existing building. New HVAC equipment will be high efficiency.

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:	*Existing to remain*	Walls / Curtain Wall Assembly:	*Existing to remain*
Foundation:	*Existing to remain*	Basement / Slab:	
Windows:	*Existing to remain*	Doors:	*Existing to remain*

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:	

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 where feasible	☑ 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:	The Project is within an existing building. No new construction is planned that would enable the Project to address extreme storm events and high winds.			

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?

	Yes

Describe site conditions?

Site Elevation – Low/High Points:	*16/17.2 Boston City Base Elev.(Ft.)*
Building Proximity to Water:	*50 Ft.*

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

Coastal Zone:	*Yes*	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:	*Yes*	Future floodplain delineation updates:	*Yes*

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

	0 Ft.

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:	*3 Ft.*	Frequency of storms:	*0.25 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):

	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:

No

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

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?

No

If Yes, describe:	

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

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*	☑ 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:	*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 D

Accessibility Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, 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 the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Article 80 | ACCESSIBILTY CHECKLIST

Project Information

Project Name:	25 Fid Kennedy
Project Address Primary:	25 Fid Kennedy Avenue, South Boston, MA
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	David G. Cannistraro, CEO, JC Cannistrarro, DCannistraro@cannistraro.com, (617) 926-0092

Team Description

Owner / Developer:	J. C. Cannistraro
Architect:	Bargmann, Hendrie + Archetype
Engineer (building systems):	AHA Consulting Engineers
Sustainability / LEED:	Epsilon Associates
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

Article 80 | ACCESSIBILTY CHECKLIST

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)	Manufacturing / Industrial (including associated loading, storage and engineering office areas)			

What is the Construction Type – select most appropriate type?

	Wood Frame	Masonry	☑Steel Frame	Concrete

Describe the building?

Site Area:	*141,425 ± SF*	Building Area:	*157,000 SF*
Building Height:	*76.6 Ft.*	Number of Stories:	*2Flrs.*
First Floor Elevation:	*+ 11.45 Elev. (NGVD 29)*	Are there below grade spaces:	*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.	The Boston Marine Industrial Park includes a wide range of marine-related industrial and light-industrial businesses, including ship repair, seafood shipping and processing, and cruise port operations. The district also includes R&D laboratory space, general office, parking structures and transportation infrastructure. Together with the distinctive maritime infrastructure, the site is strategically positioned between Logan Airport and highway systems.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	MBTA Bus Route 4 (North Station - World Trade Center via Federal Courthouse & South Station); nearest stop is Northern Avenue/Tide Street. Same stop serves Silver Line Subway Route SL2 (Design Center - South Station via Waterfront).

List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	There are no hospitals, public housing, elderly and disabled housing developments or educational facilities in the immediate area of this industrial district.
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.	No. No nearby government buildings, libraries, community centers or recreational facilities. There is a wheelchair-accessible outdoor viewing area associated with Drydock No. 3.

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?	Yes.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	The sidewalks along Fid Kennedy Avenue have had relatively recent public improvements implemented by BRA/EDIC and remain in excellent condition. The sidewalk fronting the development site has integral concrete ramps with visually-contrasting (red) thermoplastic detectable warnings. Existing Dolphin Way sidewalk and Capstan Way sidewalk peninsulas divide vehicular loading areas and are not wheelchair-accessible.
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.	Yes, existing to remain; not verified as compliant.
Is the development site within a historic district? **If yes,** please identify.	The Project site is located within the former Boston Army Supply Base, an area included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth.

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	Existing sidewalk at Fid Kennedy Avenue is in general compliance with guidelines; however, existing perpendicular parking spaces require driving across at-grade crosswalks. Also, an existing electrical substation enclosure at the northeast corner of the building protrudes into the sidewalk, creating an accessible dead-end. New sidewalks are not proposed at Capstan or Dolphin Ways, which are both slated to accommodate tractor-trailer and flatbed truck loading areas.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	n/a
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	n/a
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?	n/a
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?	n/a
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	n/a
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	n/a

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?	Lease area includes 13 existing striped (perpendicular) parking spaces incorporated in BRA/EDIC improvements. Balance of employee parking needs will be met via use of EDIC (Drydock Avenue) and/or other parking garages.
What is the total number of accessible spaces provided at the development site?	3 spaces (currently lacking appropriate identification and signage).
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?	No.
Where is accessible visitor parking located?	Existing parking spaces are proposed for upgrade.
Has a drop-off area been identified? **If yes,** will it be accessible?	No drop-off area proposed.
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.	See attached Exhibits A and B

Article 80 | ACCESSIBILTY CHECKLIST

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.	n/a
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Entry to engineering office and exit from corridor connecting to new internal egress stair will be flush condition. All other entries will be for loading and/or service doors.
Are the accessible entrance and the standard entrance integrated?	Yes, they will be integrated.
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.	No.
Has an accessible routes way-finding and signage package been developed? **If yes,** please describe.	No.

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?	n/a
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	n/a
How many accessible units are being proposed?	n/a

Article 80 | ACCESSIBILTY CHECKLIST

Please provide plan and diagram of the accessible units.	n/a
How many accessible units will also be affordable? If none, please describe reason.	n/a
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.	n/a
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	n/a
Did the Advisory Board vote to support this project? **If no,** what recommendations did the Advisory Board give to make this project more accessible?	n/a

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

EXHIBIT A

Travel route and distance from existing EDIC parking garage to 25 Fid Kennedy Avenue

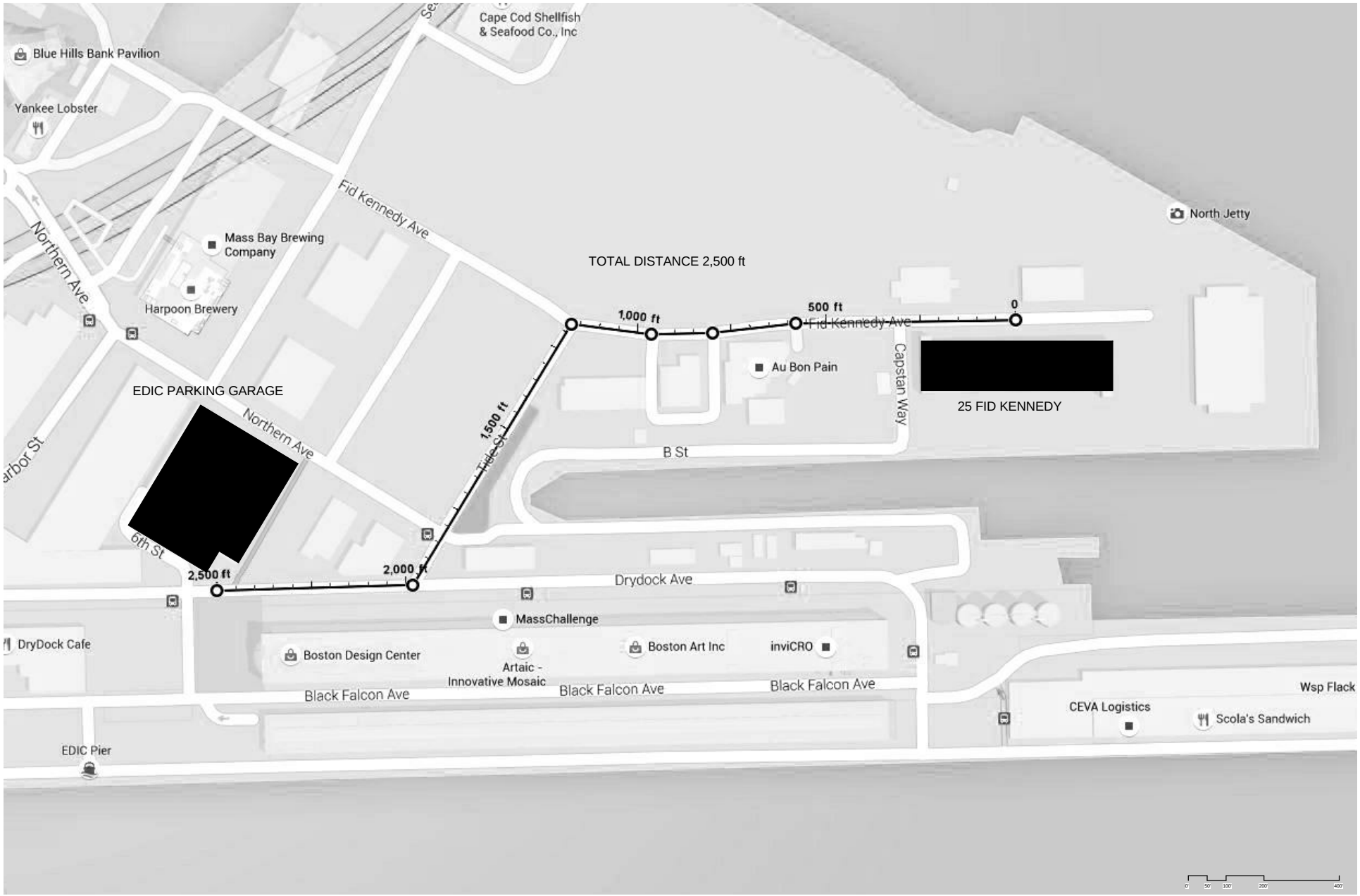


EXHIBIT B

Partial first floor plan of northwest corner of 25 Fid Kennedy, illustrating travel distance from existing parking spaces to proposed main entrance, via existing sidewalk ramp