PROJECT NOTIFICATION FORM

1785 Columbus Avenue

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

Submitted by:
Horizons Watermark LLC
1705 Columbus Avenue
Boston, MA 02119

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

In Association with:
Embarc Studio
Goulston & Storrs
Howard Stein Hudson
STV Incorporated
Geotechnical Consultants, Inc.
Soden Sustainability

DRAFT

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Introduction/ Project Description

1.0 INTRODUCTION/PROJECT DESCRIPTION

1.1 Introduction

Horizons Watermark LLC (the Proponent), a joint venture between Horizons for Homeless Children (Horizons) and Watermark Development Inc., proposes to redevelop an approximately 39,458 square foot site located at 1785 Columbus Avenue in the Jamaica Plain/Roxbury neighborhood of Boston. The existing site, located at the corner of Columbus Avenue and Dimock Street, currently contains a vacant warehouse previously used for storage, an auto body shop which will be relocated, and a surface parking lot. The site will be developed into a seven-story, approximately 139,200 square foot (sf) building to be occupied by Horizons on the second and third floors, and social service oriented tenants on the upper floors (the Project). The Project will also include a small ground floor retail space, and approximately 157 parking spaces.

Horizons for Homeless Children is the Commonwealth's leading organization devoted exclusively to serving homeless children, with a focus on helping young children mitigate the trauma and stress associated with homelessness. The Project will allow Horizons to expand the number of families served from 175 to 225, allowing them to serve additional families on their waiting list. In addition to providing Horizons with this needed expansion space, the Project will increase the number of non-profit and social service providers in the area. The team hopes to rent the upper floors to groups with similar missions. Social service based users would provide a community asset as well as allow families using the expanded Horizons for Homeless Children to consider this building as multi-stop spot for additional life skills training.

The Project will redevelop an underutilized site with a design that respects both the industrial past of the area to the north of the site, and the residential neighborhoods to the south and east of the site. The sidewalks will be improved with new street trees, lighting and specialty paving on Columbus Avenue, Dimock Street, and Amory Street with guidance from the City's Complete Streets Guidelines. In addition to providing childcare for 100s of families and numerous public realm benefits, the Project will create new construction and permanent jobs, and generate new tax revenues for the City.

This Project Notification Form (PNF) is being submitted to the Boston Planning and Development Agency (BPDA) to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code (Zoning Code).

1.2 Project Identification and Team

Address/Location:	1785 Columbus Avenue
Proponent:	Horizons Watermark LLC 1705 Columbus Avenue Boston, MA 02119 (617) 445-1900 Jeffrey Goodman Lee Goodman
Architect:	Embarc Studio 60 K Street, 3rd Floor Boston, MA 02127 (617) 766-8330 Dartagnan Brown Robert Del Savio
Legal Counsel:	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110 (617) 482-1776 Matt Epstein
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Talya Moked
Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Brian Beisel Michael Littman
LEED Consultant	Soden Sustainability Consulting 19 Richardson Street Winchester, MA 01890 (617) 372-7857 Colleen Soden

Civil Engineer	STV Incorporated One Financial Center, 3rd Floor Boston, MA 02111 (617) 482-7298 Paul Tyrell Dustin Kerksieck
Geotechnical Consultant	Geotechnical Consultants, Inc 201 Boston Post Road West Marlborough, MA 01752 (508) 229-0900 Daniel Kenneally Richard Pizzi

1.3 About Horizons for Homeless Children

The mission of Horizons for Homeless Children is to improve the lives of young homeless children in Massachusetts and help their families succeed by providing high-quality early education, opportunities for play, and comprehensive family support services.

1.3.1 Horizons Programs

Early Education Centers

Horizons operates one of the state's top-ranked early education programs, which starts children along the path toward success at school.

Horizons closes the learning and developmental gap for young homeless children. Early childhood education creates lifelong positive effects, both for individual children and society as a whole. Research shows that early education is critically important; children who lack access to early education programs are far more likely to experience developmental delays, learning disabilities, health problems, and other challenges.

Horizons provides access to a stimulating and nurturing early education experience – the kind that every child deserves. Their program produces happy, confident children who are poised for success and able to keep pace with their peers.

The early education centers operate year-round from 8:00 a.m. to 6:00 p.m. Every Horizons classroom has a bilingual teacher and support staff that is specially trained to address the unique circumstances homeless children face. While the children are in the classroom, Horizons' Family Advocates work closely with parents to help get them back on their feet by providing services ranging from parenting and financial literacy classes to connections

with educational opportunities. The team is in talks with similar mission based social service groups to rent space. All potential tenants would fit in with the overall goals of the proponent and the building.

Through their Next School Initiative in the Family Partnership Program, described below, Horizons maintains partnerships with the Boston Public Schools and local Catholic schools to facilitate kindergarten placements when kids transition out of the Horizons program.

Playspace Program

The shelter system in Massachusetts is primarily designed for adults, with staff focused on helping them reach self-sufficiency. Often there is less help to support the extensive needs of children experiencing homelessness. According to the Center on the Developing Child at Harvard University, frequent creative play is integral to developing executive functioning skills in young children. Horizons' Playspace Program, started in 1990, embodies their belief that every child has the right to joyful play experiences.

The Playspaces are designed – and play resources are carefully selected – to reflect the needs of children ages 0-6 experiencing trauma. Horizons' Playspaces are created to give children a dedicated place to play and grow, and build connections with other caring adults who are committed to their success.

No matter the size or shape of the room, the anatomy of a Playspace is the same. Five activity areas are established to address both the age and interest of all children. These activity areas include: dramatic play, arts and crafts, infant, manipulatives, and literacy. Horizons pays careful attention to using a trauma-informed approach, from defined areas of play to calm lighting and color-schemes. Playspaces are well-organized with labeled equipment, play areas, and a variety of materials and toys that inspire children's imaginations.

Each Playspace has two-hour volunteer shifts that occur throughout the week. These shifts are often scheduled in conjunction with financial literacy classes, parenting classes, case management meetings, and other programming that parents need, but are often unable to attend without this support. Playspaces are staffed by a dedicated volunteer corps of 1,200 Playspace Activity Leaders (PALs) – one of the largest groups of volunteers in the state. Horizons currently offers 340 Playspace shifts a week—which is 680 hours of play each week for the children living in shelters. The majority of shifts take place Monday through Thursday in the evenings from 4:00-8:00 p.m., but some programs also have morning or late afternoon shifts.

Family Partnerships Program

Horizons' Family Partnerships Program supports families in identifying and developing personal strengths and assets in order to take an empowered and knowledgeable approach in navigating the often frightening and frustrating terrain of homelessness.

Parents living in shelters must "parent in public" while dealing with issues related to finding work, securing housing, and interacting with several different social service agencies and providers. They do so with limited time and transportation options – and few financial resources – against a backdrop of exceptional stress. Horizons' highly trained staff understands the issues these families face; they help parents set achievable goals and build their self-confidence.

On a practical level, Horizons' staff members serve as valuable intermediaries between the parents they serve and the complex tangle of meetings and assessments the parents must deal with. Where appropriate, they coordinate services with outside agencies, assist in obtaining vouchers and submitting funding applications, and help families comply with various program requirements, so that their children remain eligible for early education services.

Using Mobility Mentoring™, Horizons' Family Advocates work with each family to help them develop goals and a plan to achieve those goals, and assist them in accessing resources, including education, job training, other services.

Once a family is permanently housed, Horizons works with parents to support their long-term success, so that the cycle of homelessness can be permanently broken. Horizons supports their search for and transition to kindergarten programs across Boston. For the 2016-2017 school year, Horizons supported 42 families in kindergarten placements for their children.

Horizons partners with organizations including EMPath, Homes for Families, and Project Hope to connect parents with much needed services, including job training, housing support, and more.

Policy & Advocacy

Even though homeless families constitute one of the most vulnerable segments of our state's population, they are virtually invisible to the vast majority of their fellow citizens. They are also among the most underrepresented constituent groups in the halls of government. As a direct service provider to over 2,000 homeless children per week, Horizons sees the direct impacts that legislative actions and regulatory policies can have on the families they support. Through policy and advocacy initiatives, they give homeless children and families a stronger voice in governmental decision-making.

1.4 Project Description

1.4.1 Project Site

The Project site is an approximately 39,458 sf site in the Jamaica Plain/Roxbury neighborhood of Boston. The site, located at 1785 Columbus Avenue, is bounded by Columbus Avenue to east, Dimock Street to the south, Amory Street to the west, and commercial buildings to the north. The site is comprised of three parcels, and currently contains two existing buildings - a vacant warehouse previously used for storage, and an auto body shop which will be relocated - and a surface parking lot which provides parking for the adjacent building at 1705 Columbus Avenue. The Project site has a significant east/west grade difference of 14 feet between Amory Street and Columbus Avenue. See Figure 1-1 for an aerial locus map and Figures 1-2 and 1-3 for photographs of the existing conditions on the Project site.

1.4.2 Area Context

The Project site is located on the eastern edge of Jamaica Plain at its border with Roxbury. The area to the north of the site consists primarily of low-rise commercial and light industrial buildings, and to the south and west are multifamily residential buildings. Directly to the east of the site across Columbus Avenue is the Dimock Center. The site located within a short walk from the Jackson Square MBTA station, provides access to the Orange Line, as well as several bus routes.

1.4.3 Proposed Project

The Project represents a shared vision between Watermark Development, Inc. and Horizons for Homeless Children to increase non-profit and social service providers at this corner of Jackson Square, while also allowing Horizons to expand on its existing space. As shown in Table 1-1, the Project is an approximately 139,200 square foot building that includes approximately 48,000 sf on the second and third floors to be used by Horizons for Homeless Children as childcare and administration space, approximately 87,500 sf of office space for social service programs, and approximately 1,500 sf of ground floor retail space. The Project will include approximately 157 parking spaces on two levels, with 25 of these spaces replacing the existing surface parking lot on the site. The existing grade change on the site allows for two levels of parking without a ramp to access the different levels, with each level having its own entrance. The lower level of parking will be below-grade, and will be accessed from Amory Street, and the upper level of parking will be at grade, and will be accessed from Dimock Street. Approximately 97 secure, covered bicycle parking spaces will be provided for employees, as well as public bicycle racks on the site for visitors.

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

1785 Columbus Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1
Aerial Locus Map

1785 Columbus Avenue Boston, Massachusetts

EMBARC STUDIO ARCHITECTURE+DESIGN studio MLA ARCHITECTS

Figure 1-2
Existing Conditions – Aerial View Looking West

1785 Columbus Avenue Boston, Massachusetts

EMBARC STUDIO ARCHITECTURE+DESIGN studio MLA ARCHITECTS

Figure 1-3
Existing Conditions

A site plan is presented in Figure 1-4. Floor plans, and sections are included in Appendix A.

Table 1-1 Project Program

Project Element	Approximate Dimension
Horizons for Homeless Children	48,000
Social Service Office Space	87,500
Retail	1,500 sf
Tenant Lobby	2,200 sf
Total Square Footage	139,200 sf
Parking	157 spaces (132 new)
Zoning Height	7 stories/ 92 feet

The Project site sits at an edge between an industrial and residential neighborhood, and will serve as a transition point between these two typologies. The building entry is pushed back from the Columbus Avenue and Dimock Street corner to ensure that Columbus Avenue is treated as the primary front of the building. The retail space will be located at the corner to Dimock Street and Amory Street, activating the corner facing the residential neighborhood to the south. The building will be seven stories along Columbus Avenue, and will step down to six stories along Amory Street.

The Projects fills the site to create an urban edge along Columbus Avenue, as well as Dimock Street and Amory Street. However, the building face itself is set back from the property line to ensure that twelve foot sidewalks are maintained along Columbus Avenue and Dimock Street and a nine-foot sidewalk is maintained along Amory Street.

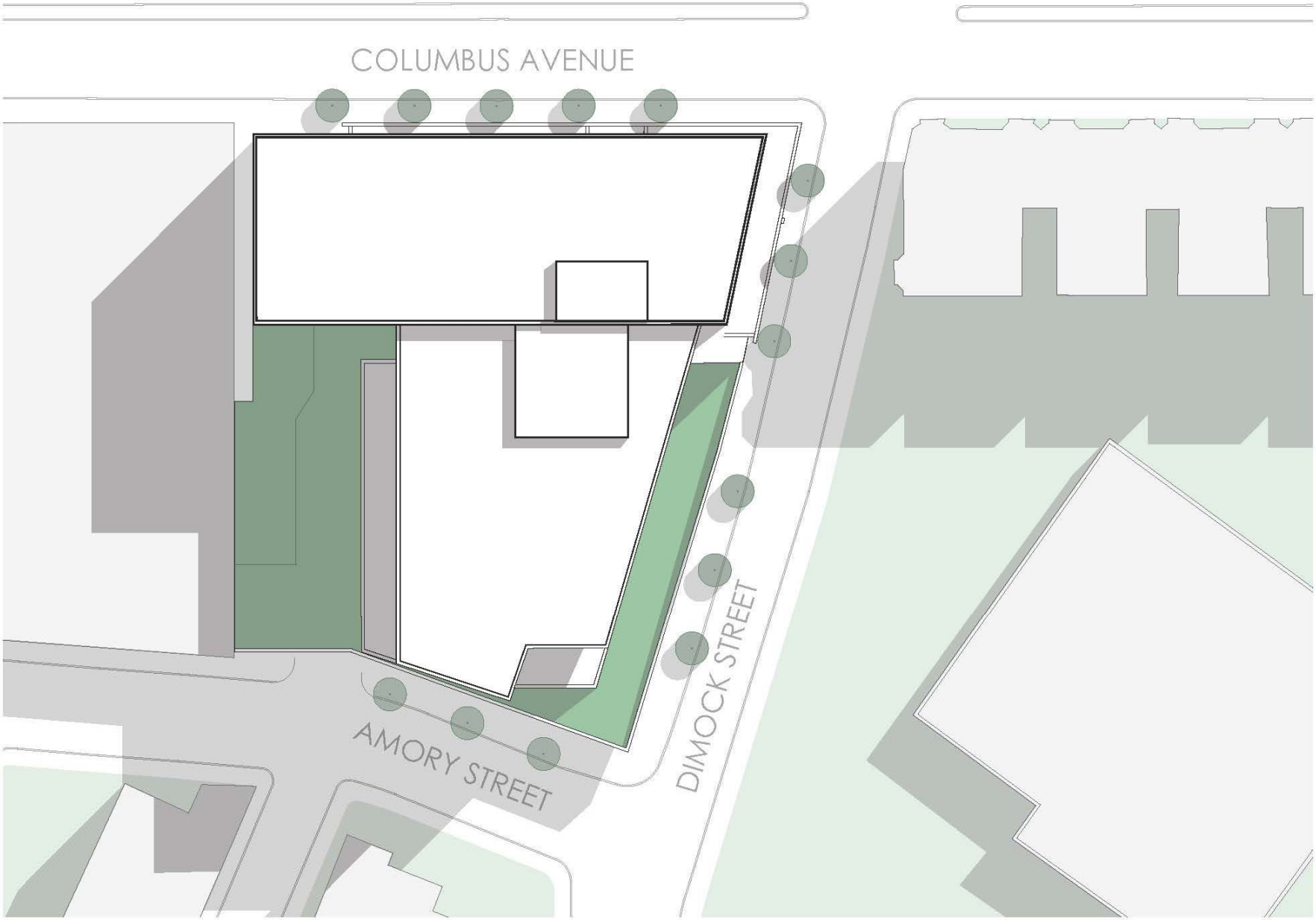
Improvements in the pedestrian right-of-way including street trees, lighting and specialty paving will be provided on Columbus Avenue, Dimock Street, and Amory Street consistent with the City's Complete Streets Guidelines.

1.5 Public Benefits

The development of the proposed Project will generate a myriad of public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction and on an ongoing basis upon its completion. These public benefits fall into multiple categories, outlined below.

Economic and Community Benefits

- Expand the existing space Horizons occupies on the adjacent site, allowing them to expand the number of families served from 175 to 225, allowing them to serve additional families on their waiting list.



1785 Columbus Avenue Boston, Massachusetts

EMBARC STUDIO ARCHITECTURE+DESIGN studio MLA ARCHITECTS

Figure 1-4
Site Plan

- Create approximately 87,500 square feet of office space to be leased to social service providers whose stated mission is to provide multiple facets of engagement and support to the neighborhood.

- Create approximately 124 new construction jobs and 501 permanent and part-time jobs.

- Provide additional tax revenue to the City of Boston through increased assessed value and taxable area.

Urban Design Benefits

- Redevelop an underutilized site with a design that respects both the industrial past of the area to the north of the site, and the residential neighborhoods to the south and east of the site.

- Improve the sidewalk with street trees, lighting and specialty paving on Columbus Avenue, Dimock Street, and Amory Street consistent with the City's Complete Streets Guidelines.

- Activate the corner of Dimock Street and Amory Street with a retail space facing the residential buildings across the street.

- Comply with Article 37 of the Boston Zoning Code by being Leadership in Energy and Environmental Design (LEED) certifiable.

1.6 City of Boston Zoning

The Project site is located in the Industrial Development Area Subdistrict of the Jamaica Plain Neighborhood District, which is governed by Article 55 of the Boston Zoning Code. The Project site is subject to certain height and FAR limits of thirty-five feet and 1.0, respectively, for projects undergoing Large Project Review. The Project will require variances from the zoning controls regarding height, FAR and rear yard setback.

1.7 Legal Information

1.7.1 Legal Judgements Adverse on the Proposed Project

There are no legal judgements adverse to the proposed Project.

1.7.2 History of Tax Arrears on Property

The Proponent does not have a history of tax arrears on property that it owns in the City of Boston.

1.7.3 Site Control/Public Easements

The Project site is comprised of three parcels. The Proponent is the fee-simple owner of one of the parcels, and the other two parcels have been optioned by the Proponent. There are no public easements affecting the site. A survey is included as Appendix B.

1.8 Anticipated Permits

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

Table 1-2 Anticipated Permits and Approvals

Agency	Approval
Local	
Board of Appeal or Boston Zoning Commission	Zoning relief
Boston Civic Design Commission	Design Review
Boston Committee on Licenses	Parking Garage Permit and Fuel Storage License
Boston Employment Commission	Construction Employment Plan
Boston Fire Department	Approval of Fire Safety Equipment; Fuel Oil Storage Permit (if required)
Boston Inspectional Services Department	Building Permit; Other construction-related permits; Certificates of Occupancy
Boston Landmarks Commission	Article 85 Demolition Delay Review
Boston Public Works Department	Curb Cut Permit(s); Sidewalk Occupancy Permit (as required)
Boston Planning and Development Agency	Article 80B Large Project Review
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Agreement
Boston Water and Sewer Commission	Site Plan Review; Water and Sewer connection permits
Office of Jobs and Community Services	Permanent Employment Agreement (as required)
Public Improvement Commission	Specific Repair Plan
State	
Department of Environmental Protection	Notification of Demolition and Construction
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit (as required)

1.9 Public Participation

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

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

1.10 Schedule

It is anticipated that construction will commence in the fourth quarter of 2017. Once begun, construction is expected to last approximately 18 months and finish in the second quarter of 2019.

Chapter 2.0

Transportation Component

2.0 TRANSPORTATION

The Proponent engaged Howard Stein Hudson (HSH) to conduct an evaluation of the transportation impacts of the Project in the Jamaica Plain neighborhood of Boston, Massachusetts. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and Boston Planning and Development Association (BPDA) 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. Results of the transportation analysis show that the traffic impacts associated with the Project are minimal.

2.1 Project Description

The Project site, as previously described, is located at 1785 Columbus Avenue near Jackson Square in Boston's Jamaica Plain neighborhood. The Project site is bounded by Columbus Avenue to east, Dimock Street to the south, Amory Street to the west, and commercial buildings to the north. The Project site includes two existing vacant buildings, and a parking lot.

The proposed Project will consist of the demolition of the two existing buildings and the construction of a seven-story social services building, primarily housing the Horizons for Homeless Children day care center and supplemental office space, as well as other social services. In addition, the Project will include a small retail component and 157 underground parking spaces.

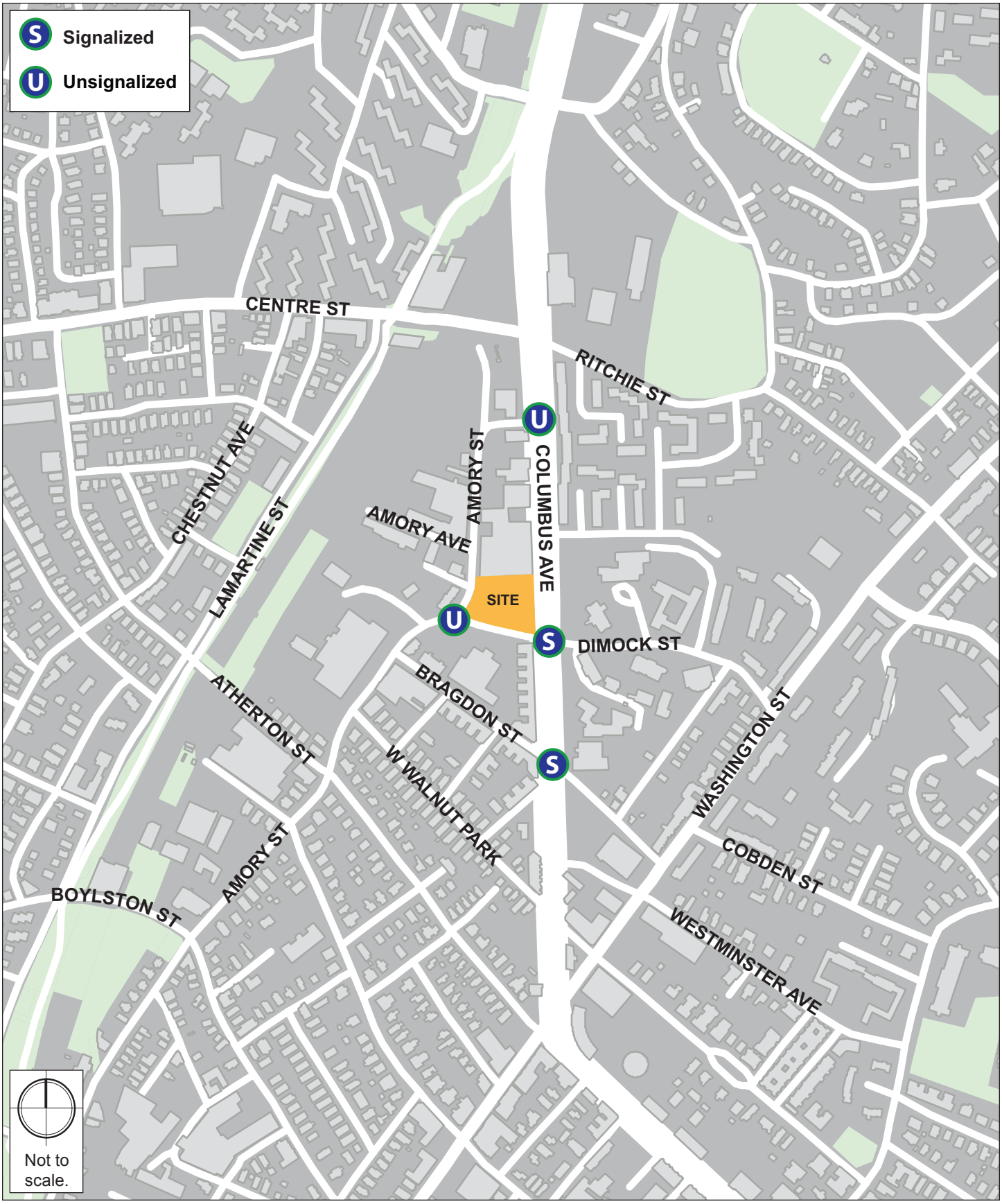
The mission of Horizons for Homeless Children is to improve the lives of young homeless children in Massachusetts and help their families succeed by providing high quality early education, opportunities for plan, and comprehensive family support services.

2.1.1 Study Area

The transportation study area runs along the Columbus Avenue corridor, bounded by Amory Street to the north and west, Columbus Avenue to the east, and Bragdon Street to the south. The study area consists of the following four intersections in the vicinity of the Project site, also shown on Figure 2-1:

- Columbus Avenue/Dimock Street (signalized);
- Columbus Avenue/Bragdon Street/Bancroft Street (signalized);
- Columbus Avenue Southbound/Amory Street (unsignalized); and
- Amory Street/Dimock Street (unsignalized).

The existing driveway into the parking lot was also counted to account for existing driveway trips.



1785 Columbus Avenue Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 2-1
Study Area

2.1.2 Study Methodology

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

The Existing (2016) Condition analysis includes an inventory of the existing transportation conditions such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected at the study area intersections. A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2023, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2023) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project site.

The Build (2023) 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 (2023) Condition analysis. The transportation study identifies expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies.

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

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

2.2 Existing Condition

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

2.2.1 Existing Roadway Conditions

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

Columbus Avenue is a two-way, four lane roadway located to the east of the Project site. Columbus Avenue runs in a predominately north-south direction between Park Plaza in downtown Boston to the north and Franklin Park to the south. Columbus Avenue is classified as an urban principal arterial roadway under BTD jurisdiction. In the vicinity of the Project site, on-street parking and sidewalks are provided along both sides of the roadway.

Amory Street is a two-way, two lane roadway located adjacent to the west of the Project site. Amory Street runs in a predominately north-south direction between Jackson Square to the north and English High School to the south. Amory Street is classified as an urban collector roadway under BTD jurisdiction. In the vicinity of the Project site, on-street parking is provided along the east side of the roadway and sidewalks are provided along both sides of the roadway.

Dimock Street is a two-way, two lane roadway located to the west of Columbus Avenue, and a one-way eastbound one lane roadway to the east of Columbus Avenue, located to the east of the Project site. Dimock Street runs in a predominately east-west direction between Amory Street to the west and Washington Street to the east. Dimock Street is classified as a local roadway under BTD jurisdiction. In the vicinity of the Project site, on-street parking is restricted along both sides of the roadway, and small asphalt sidewalks are provided along both sides of the roadway.

Bragdon Street is a one-way one lane roadway located to the south of the Project site. Bragdon Street runs in a predominately east-west direction between Washington Street to the east and Amory Street to the west and is classified as a local roadway under BTD jurisdiction. Between Columbus Avenue and Amory Street, Bragdon Street is one-way westbound and between Columbus Avenue and Washington Street, Bragdon is one-way eastbound. In the vicinity of the Project site, on-street parking and sidewalks are provided along both sides of the roadway.

Bancroft Street is a one-way southbound one lane roadway located to the south of the Project site. Bancroft Street runs in a predominately north-south direction between Columbus Avenue to the north and W Walnut Park to the south. In the vicinity of the Project site, on-street parking and sidewalks are provided along both sides of the roadway.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Columbus Avenue/Dimock Street is a four-leg, signalized intersection with three approaches. The Dimock Street eastbound approach consists of one shared left-turn/through/right-turn lane. The Columbus Avenue northbound approach consists of two lanes, one shared left-turn/through lane and one shared through/right-turn lane. The Columbus Avenue southbound approach consists of two lanes, one shared left-turn/through

lane and one shared through/right-turn lane. Sidewalks, crosswalks, wheelchair ramps, and pedestrian signal equipment are provided at all approaches to the intersection. MBTA Bus Stops are provided to the south of the intersection along both sides of Columbus Avenue.

Columbus Avenue/Bragdon Street/Bancroft Street is a six legged signalized intersection with two approaches and a driveway to the fire station. Columbus Avenue has a divided median, however, approximately 40 feet to the south of the intersection there is a 60 foot break in the median allowing for left turns onto Bancroft Street which is offset from the intersection. The Columbus Avenue northbound approach consists of two lanes, a shared left-turn/through lane and a shared through/right-turn lane and a parking lane. The stop bar is located approximately 75 feet behind the crosswalk at the start of the break in the median allowing left turns onto Bancroft Street. The Columbus Avenue southbound approach consists of two lanes, a shared left-turn/through lane and a shared through/right-turn lane, and a parking lane. All three other roadway approaches of (Bragdon Street from the east, Bragdon Street from the west, and Bancroft Street from the southwest) are one-way away from the intersection therefore there are no approaches to the intersection. Lastly the fire station (Boston Fire Engine 42) is located to the east of the intersection and can turn all approaches to the intersection red allowing for the fire trucks to enter or exit the station during emergencies. Sidewalks, crosswalks, and curb ramps are provided throughout the intersection; however on the north side of the intersection, there is no break in the Columbus Avenue median for wheelchairs to cross Columbus Avenue. The crosswalk along the east side of the intersection is over 140 feet long (taking the average person about 40 seconds to cross) and crosses both Bragdon Street and the fire station driveway. There are no pedestrian signal indications at this intersection.

Columbus Avenue/Amory Street is a three legged unsignalized intersection. The Amory Street eastbound approach consists of one right-turn only lane. The Columbus Avenue northbound approach consists of two through lanes and a parking lane, and the Columbus Avenue southbound approach consists of two lanes, a through lane, and a shared through/right-turn lane, and a parking lane. Columbus Avenue is separated by a median. Curb ramps are provided across the eastbound Amory Street approach however no crosswalk is provided.

Amory Street/Dimock Street is a three-legged, all-way stop controlled intersection. The Amory Street eastbound approach operates under stop control and consists of one shared left-turn/through lane. The Dimock Street westbound approach operates under free control and consists of one shared through/right-turn lane. The Amory Street southbound approach operates under stop control and consists of one shared left-turn/right-turn lane. Sidewalks are provided along all approaches to the intersection. A crosswalk is provided across the eastbound approach to the intersection.

2.2.3 Existing Parking

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

2.2.3.1 Car Sharing Services

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

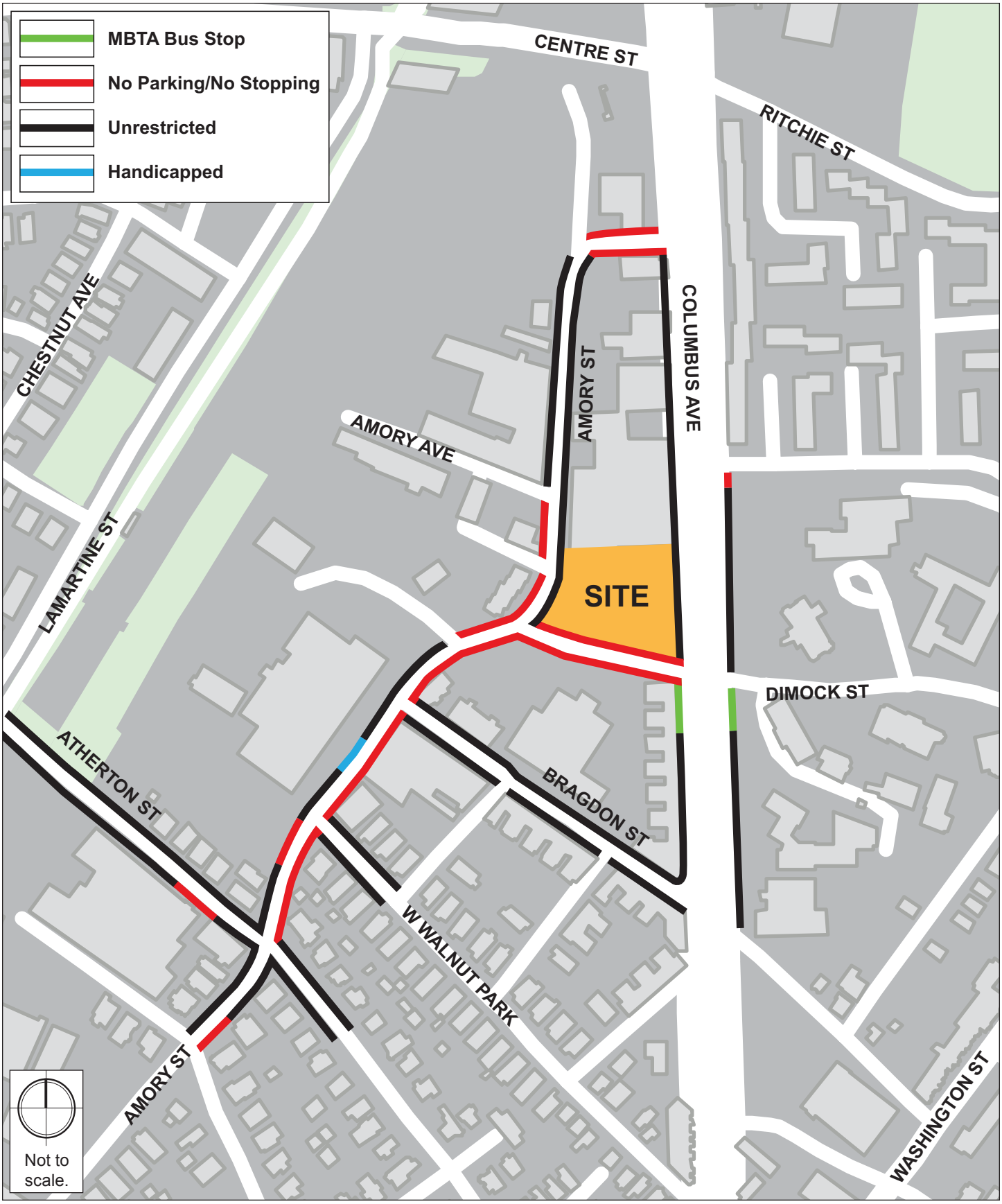
Zipcar is the primary company in the Boston car sharing market. There are currently five Zipcar locations within a half-mile walk of the Project site. The nearby car sharing locations are shown in Figure 2-3.

2.2.4 Existing Traffic Data

Traffic volume data was collected at two of the study area intersections, Columbus Avenue/Dimock Street and Amory Street/Dimock Street, on September 14, 2016, and counts were collected at the remaining intersections on November 2, 2016. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday 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 C.

2.2.4.1 Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the September 2016 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is 0.93 for the month of September and 0.97 for the month of November. This indicates that average month traffic volumes are approximately three to seven percent less than the traffic volumes that were collected. Therefore, the traffic counts were not adjusted downward to reflect average month conditions, providing a conservatively high analysis consistent with the peak season traffic volumes. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix C.



1785 Columbus Avenue Boston, Massachusetts

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Figure 2-2
On-Street Parking

1785 Columbus Avenue Boston, Massachusetts

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Figure 2-3
Car Sharing Services

2.2.4.2 Existing Vehicular Traffic Volumes

The existing traffic volumes were balanced through the network, and then used to develop the Existing (2016) Condition traffic volumes. The Existing (2016) weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown in Figure 2-4 and Figure 2-5, respectively.

2.2.5 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is conveniently located in close proximity to several bicycle facilities. Most significantly, the southwest corridor is a major bicycle corridor providing an off-street bicycle facility from Forrest Hills to Back Bay Station.

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

2.2.5.1 Bicycle Sharing Services

The site is also located in proximity to a bicycle sharing station provided by Hubway. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 180 stations and 1,600 bicycles in four municipalities, including Boston, Cambridge, Brookline, and Somerville. There are two Hubway locations within a quarter mile of the site. Figure 2-7 shows the Hubway stations within a one-quarter mile radius.

2.2.6 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along all roadways and are in good condition, with the exception of the sidewalks along Dimock Street. The sidewalks along Dimock Street are paved with asphalt and cracked in many locations with grass and other vegetation growing through. The width of the sidewalks is approximately 4-5 feet wide with light poles placed in the middle, creating narrow pinch points for pedestrians. Lastly, there are no vertical granite curbs separating pedestrians from vehicles, instead there is a slanted cobblestone strip which can easily be crossed by a vehicle. Crosswalks are provided at all study area intersections, however pedestrian signal equipment is only provided at the Columbus Avenue/Dimock Street signalized intersection.

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

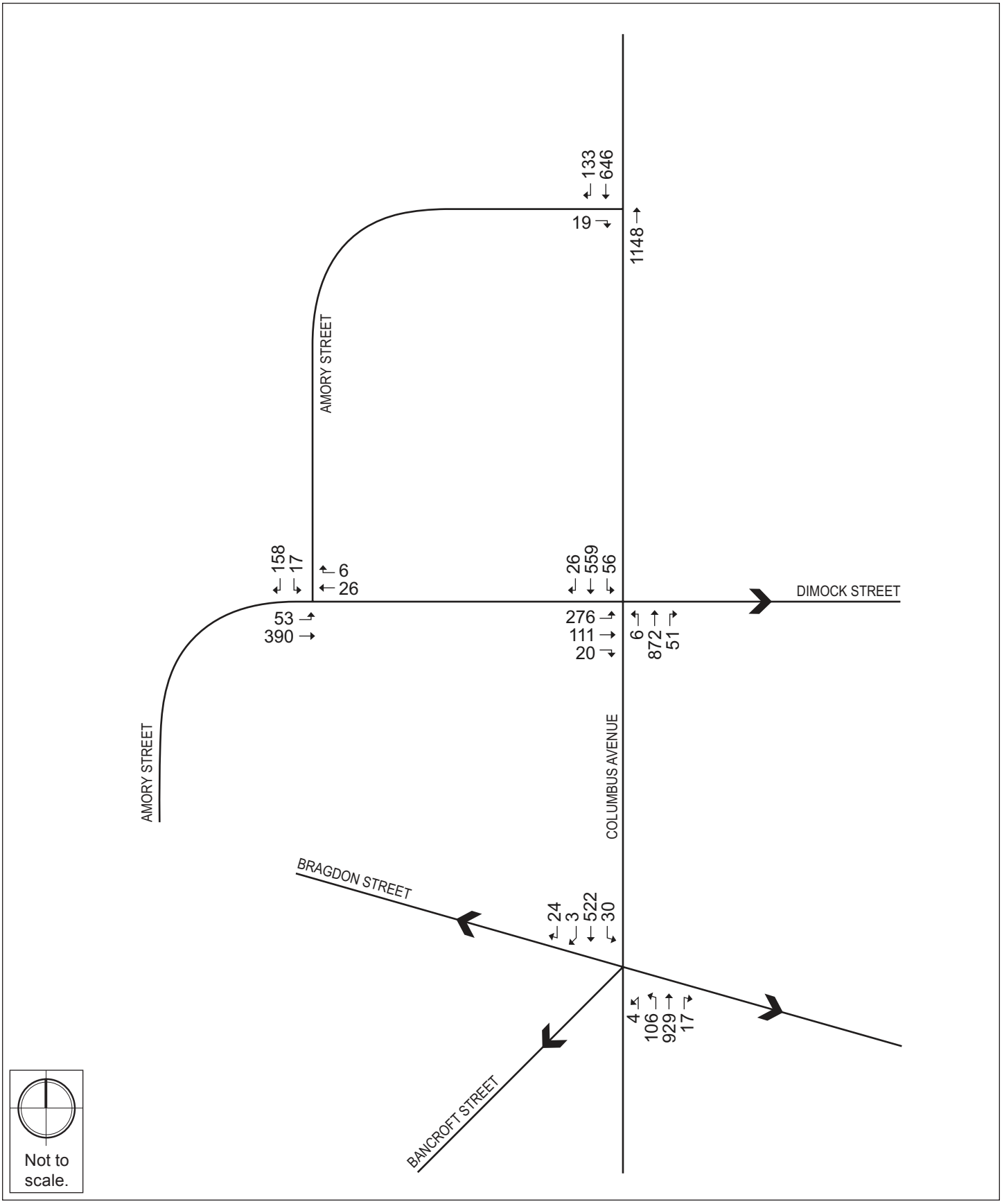

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Figure 2-4

Existing (2016) Condition Vehicular Traffic Volumes, a.m. Peak Hour

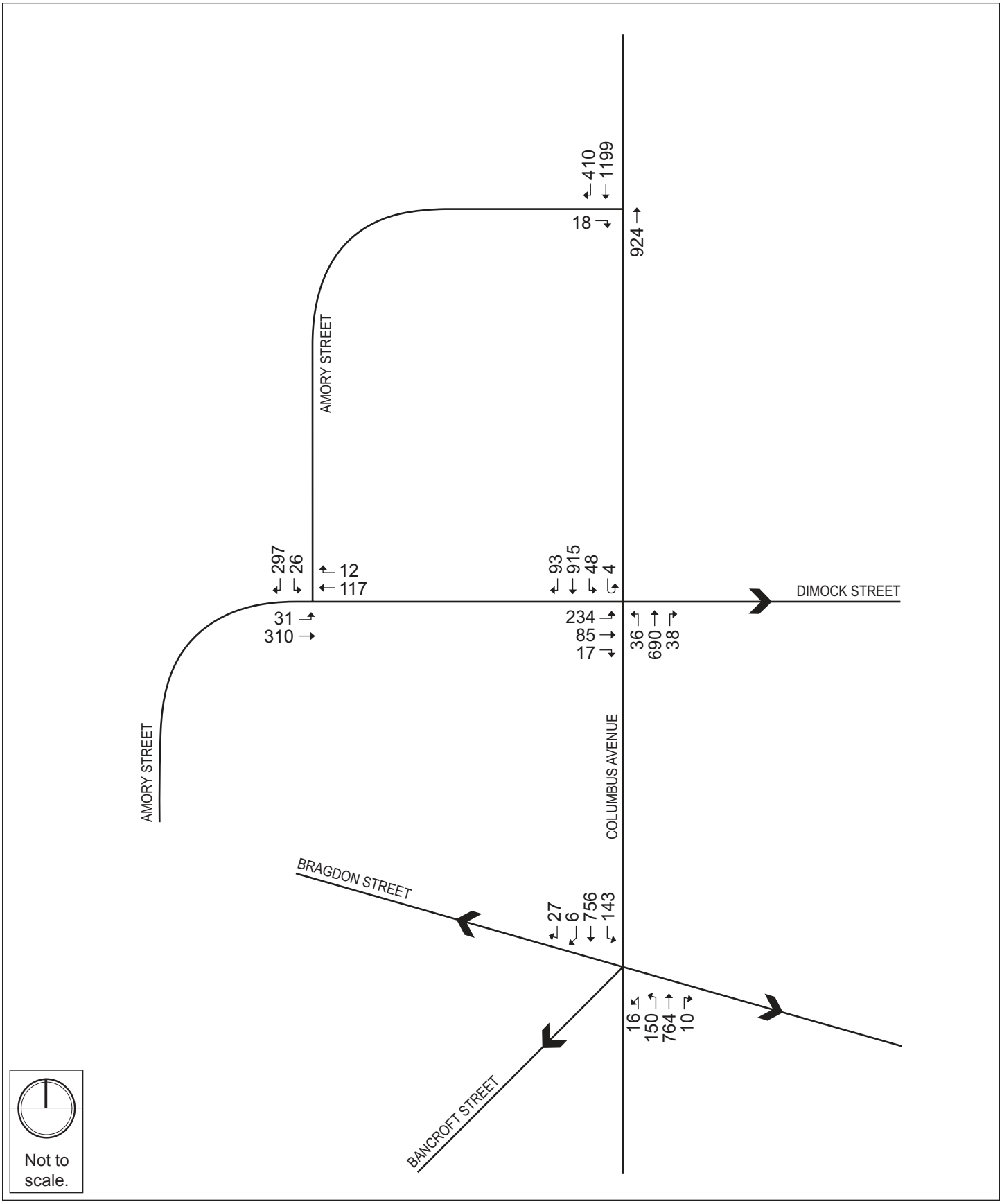

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Figure 2-5

Existing (2016) Condition Vehicular Traffic Volumes, p.m. Peak Hour

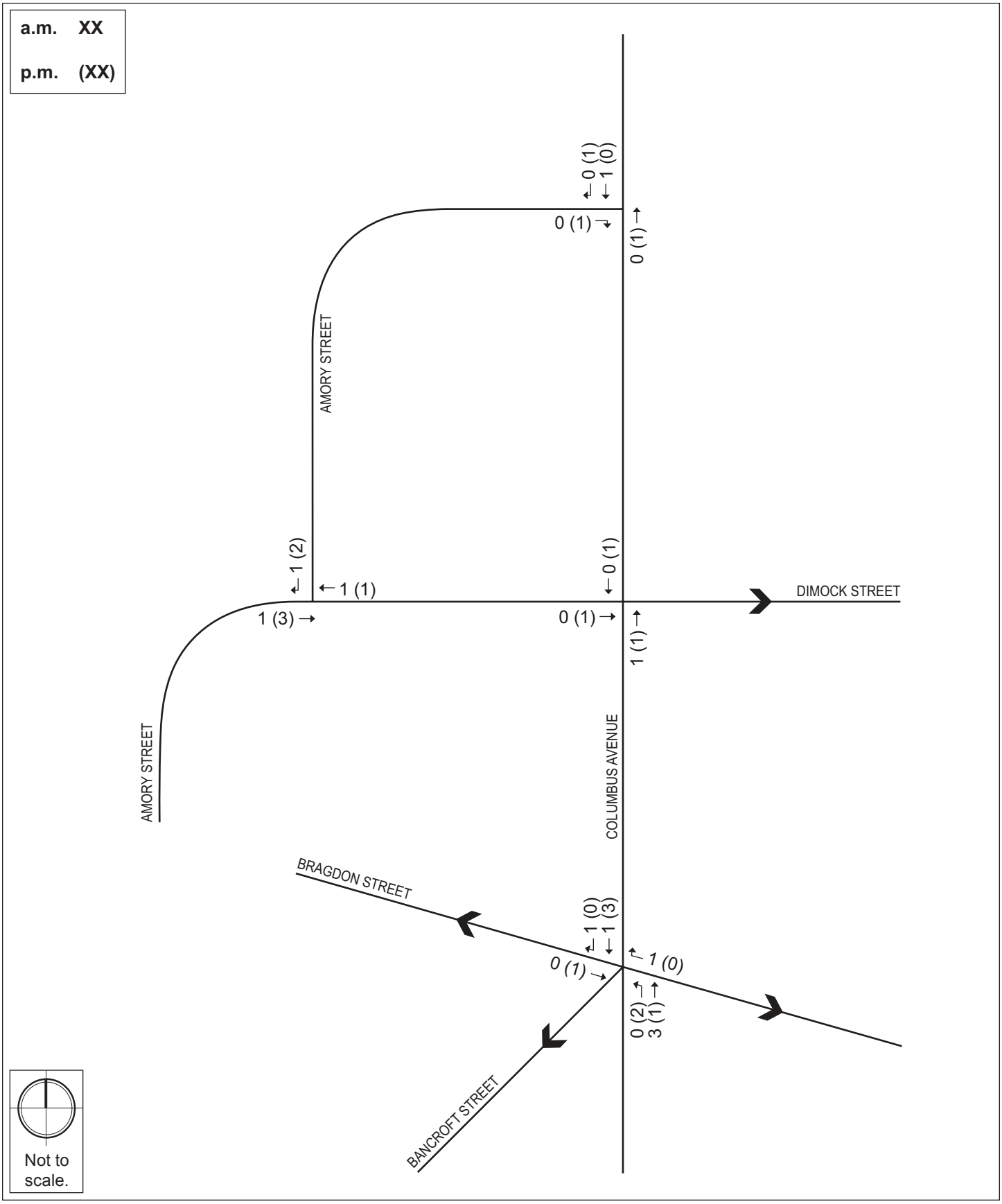

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Figure 2-6

Existing (2016) Condition Bicycle Volumes, a.m. and p.m. Peak hours

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Figure 2-7
Hubway Locations

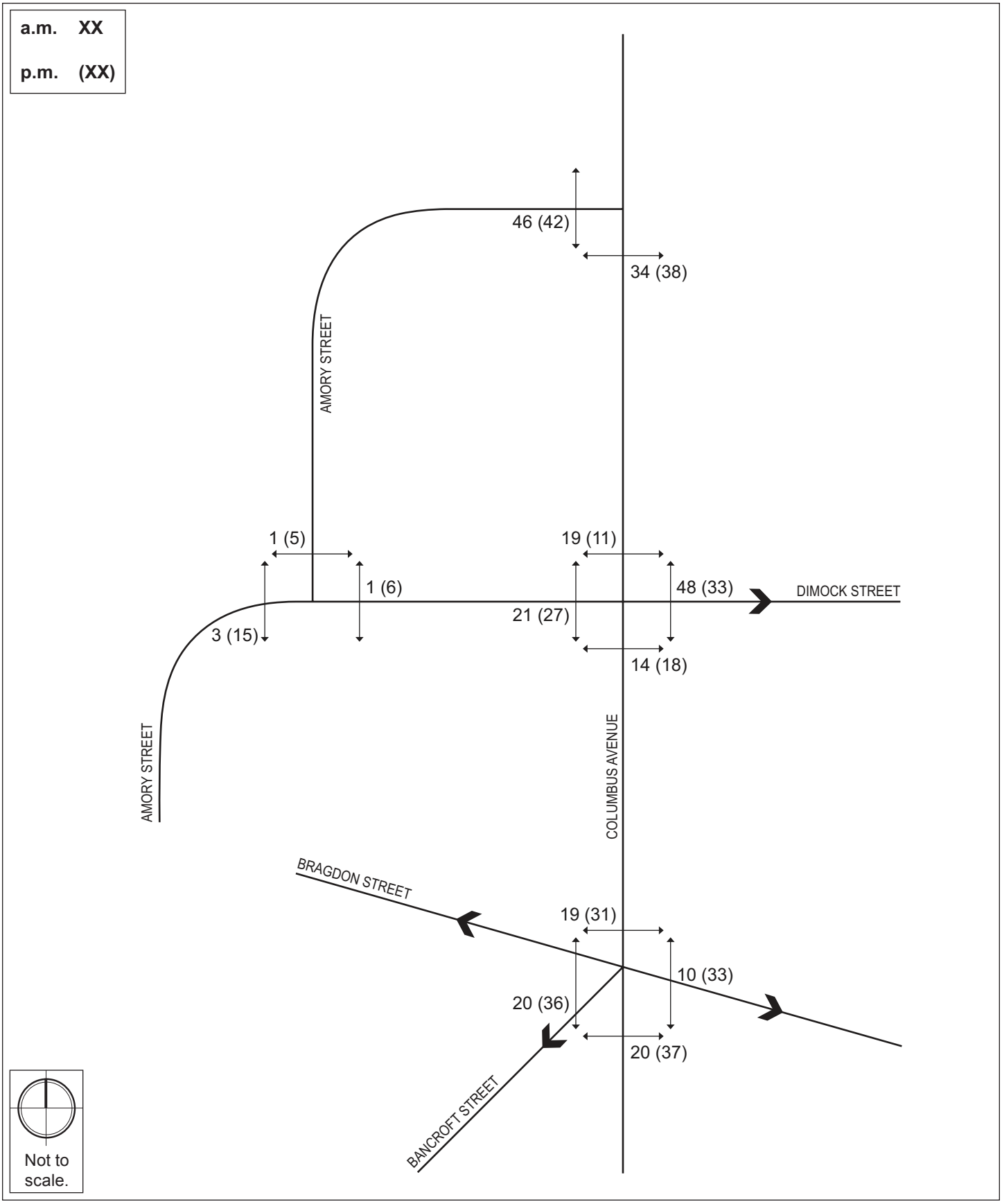

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Figure 2-8

Existing (2016) Condition Pedestrian Volumes, a.m. and p.m. Peak Hours

2.2.7 Existing Public Transportation Services

The Project site is located in Boston's Jamaica Plain neighborhood with reliable public transportation opportunities. The Orange Line and several bus lines provide access throughout the city. The Project site is located approximately 1,000 feet from the Orange Line's Jackson Square Station.

The MBTA operates five bus routes in close proximity to the Project. Figure 2-9 maps all of the public transportation services located in close proximity of the Project site, and Table 2-1 provides a brief summary of all routes.

Table 2-1 Existing Public Transportation Service Summary

Transit Service	Description	Rush-hour Headway (in minutes)*
Bus Routes		
22	Ashmont Station – Ruggles Station via Talbot Avenue & Jackson Square	8
29	Mattapan Station – Jackson Square Station via Seaver Street & Columbus Avenue	16
41	Centre & Eliot Streets – JFK/UMass Station via Dudley Station, Centre Street& Jackson Square Station	20
42	Forrest Hills Station – Dudley Station via Washington Street	12
44	Jackson Square Station – Ruggles Station via Seaver Street & Humboldt Avenue	12

* Headway is the time between buses.

2.2.8 Existing (2016) 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).

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Figure 2-9
Public Transportation

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

Table 2-2 Vehicle Level of Service Criteria

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

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

Table 2-3 and Table 2-4 summarize the Existing (2016) 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 C.

Table 2-3 Existing (2016) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**D**	**46.3**	**-**	**-**	**-**
Dimock St EB left/thru/right	F	104.8	1.06	~381	#588
Columbus Ave NB left/thru | thru/right	C	30.4	0.70	305	383
Columbus Ave SB left/thru | thru/right	C	30.2	0.68	211	283
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**0.3**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.4	0.40	0	0
Columbus Ave SB left/thru | thru/right	A	0.1	0.20	0	m0
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	B	13.5	0.58	-	95
Dimock Street WB thru/right	A	8.2	0.06	-	5
Amory Street SB left/right	A	9.1	0.25	-	25
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	B	11.2	0.04	-	3
Columbus Ave NB thru | thru	A	0.0	0.37	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.26	-	0

Grey Shading indicates LOS E or F.

~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

m Approach is metered by upstream signalized intersection.

Table 2-4 Existing (2016) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**D**	**40.6**	**-**	**-**	**-**
Dimock St EB left/thru/right	F	83.1	0.96	271	#458
Columbus Ave NB left/thru | thru/right	C	27.7	0.67	248	323
Columbus Ave SB left/thru | thru/right	D	36.4	0.87	386	#496
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**0.8**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.7	0.44	0	0
Columbus Ave SB left/thru | thru/right	A	0.9	0.43	1	m5
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	B	13.0	0.51	-	73
Dimock Street WB thru/right	A	9.8	0.23	-	23
Amory Street SB left/right	B	11.3	0.44	-	55
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	C	21.6	0.10	-	8
Columbus Ave NB thru | thru	A	0.0	0.30	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.50	-	0

Grey Shading indicates LOS E or F.

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

m Approach is metered by upstream signalized intersection.

As shown in Table 2-3 and Table 2-4, the majority of intersections and approaches operate well under the Existing (2016) Condition:

- The signalized intersection of **Columbus Avenue/Dimock Street** operates at LOS D during both the a.m. and p.m. peak hours. The longest queues at the intersection occur at the Dimock Street eastbound approach during the a.m. peak hour and at the Columbus Avenue southbound approach during the p.m. peak hour. The Dimock Street eastbound approach operates at LOS F during both the a.m. and p.m. peak hours.

- The signalized intersection of **Columbus Avenue/Bragdon Street/Bancroft Street** operates at LOS A during both the a.m. and p.m. peak hours. There are no queues that occur at this intersection during the a.m. peak hour and the longest queues during the p.m. peak hour occur at the Columbus Avenue southbound approach.

2.3 No-Build (2023) Condition

The No-Build (2023) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

2.3.1 Background Traffic Growth

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

2.3.2 Specific Development Traffic Growth

Traffic volumes associated with known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Three 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 2-10):

75 Amory Avenue – This project calls for the construction of 39 affordable residential units and surface parking for 28 vehicles. This project is currently under construction.

Jackson Square Site III – This project calls for the construction of two buildings, 250 Centre Street and Building M. 250 Centre Street will consist of 99 apartment units, approximately 2,300 sf of ground floor retail space, and 80 parking spaces. Building M will consist of 44 apartment units and 22 parking spaces. This project has been approved.

Amory Street Apartments – This project calls for the redevelopment of the BHA parcel located at 125 Amory Street. The redevelopment includes rehabilitating the current building and the construction of approximately 280 new residential units. This project is in early planning stages.

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Figure 2-10
Specific Background Projects

2.3.3 Proposed Infrastructure Improvements

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

Dimock Street – Dimock Street is currently a two-way roadway with one lane in each direction between Amory Street to the west and Columbus Avenue to the east. This change would convert the two-way section of Dimock Street into a one-way eastbound with two lanes. This change increases the capacity of the signalized intersection of Columbus Avenue/Dimock Street by adding a left-turn lane to the Dimock Street eastbound approach. Additionally, the all-way stop controlled intersection of Amory Street/Dimock Street would be changed to give Amory Street eastbound a free movement and maintain the Amory Street southbound stop control. The initial plan for Dimock Street to become one-way originated from community meeting about the Jackson Square master plan from 2007. This change will be independent of this project.

Plan JP/ROX – The BPDA's ongoing planning study, Plan JP/ROX, is proposing to change the zoning code of the neighborhood, and the Project site overlaps with the planning area. This plan has not been finalized but is nearing approval from the BPDA Board.

2.3.4 No-Build (2023) Condition Traffic Volumes

The one-half percent per year annual growth rate, compounded annually, was applied to the Existing (2016) Condition traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the No-Build (2023) Condition traffic volumes. The No-Build (2023) weekday morning and evening peak hour traffic volumes are shown on Figures 2-11 and Figure 2-12, respectively.

2.3.5 No-Build (2023) Condition Traffic Operations Analysis

The No-Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition capacity analysis. Table 2-5 and Table 2-6 present the No-Build (2023) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

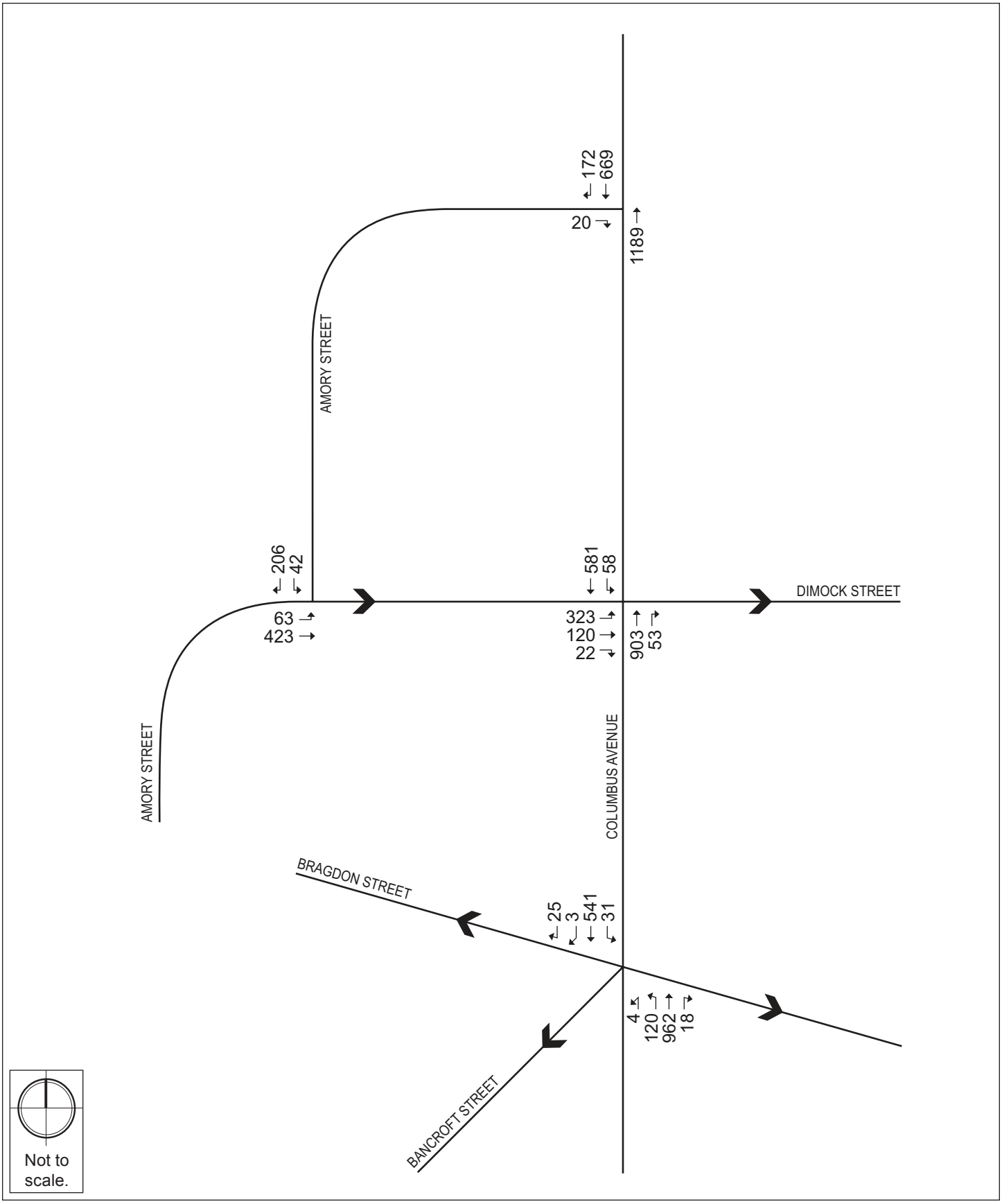

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Figure 2-11

No-Build (2023) Condition Vehicular Traffic Volumes, a.m. Peak Hour

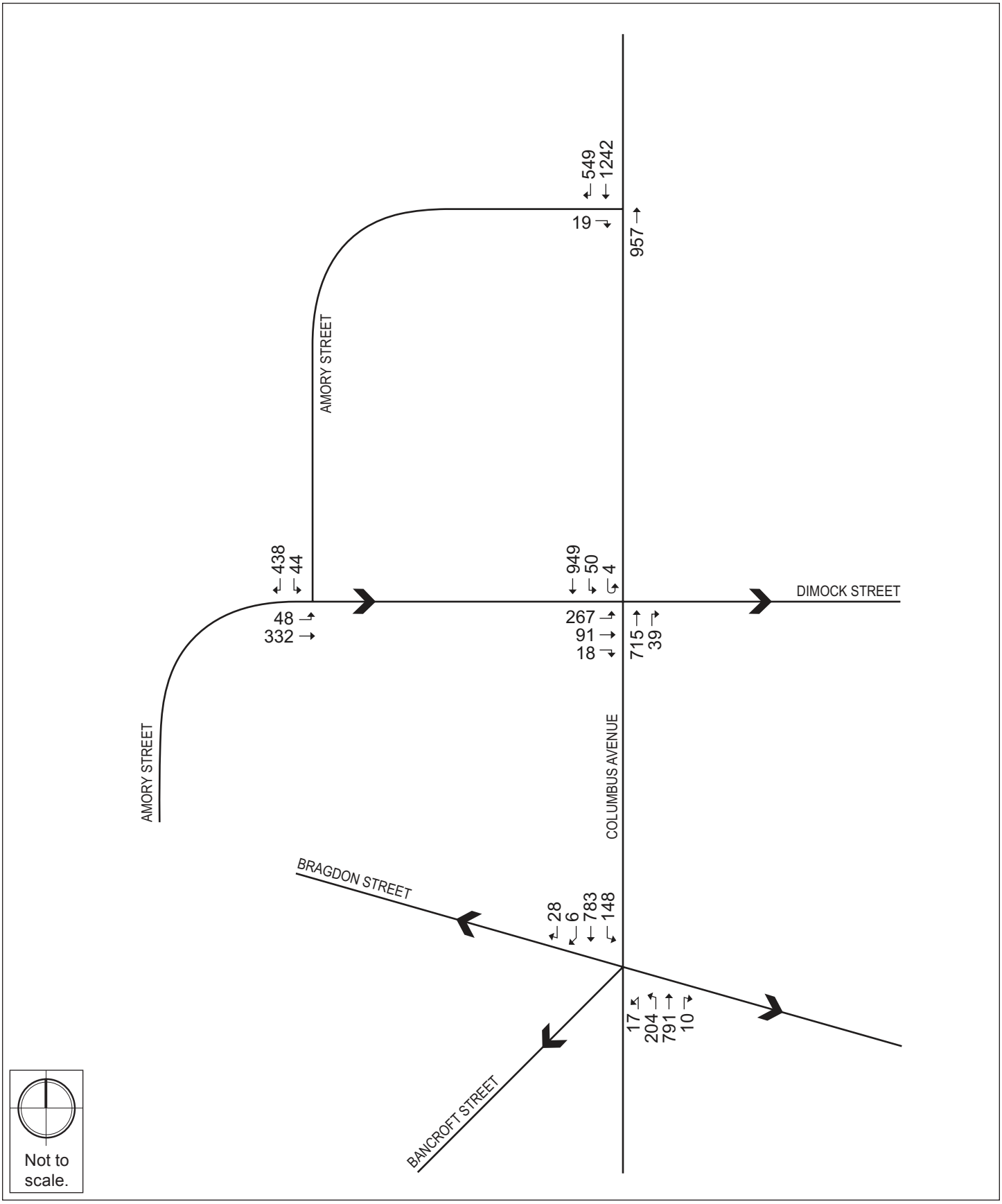

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Figure 2-12

No-Build (2023) Condition Vehicular Traffic Volumes, p.m. Peak Hour

Table 2-5 No-Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**D**	**36.6**	**-**	**-**	**-**
Dimock St EB left	E	74.2	0.92	263	#428
Dimock St EB thru/right	D	39.0	0.39	95	159
Columbus Ave NB left/thru | thru/right	C	28.0	0.66	311	388
Columbus Ave SB left/thru | thru/right	C	28.8	0.66	231	284
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**0.4**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.5	0.42	0	0
Columbus Ave SB left/thru | thru/right	A	0.1	0.21	0	0
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	A	1.3	0.04	-	3
Amory Street SB left/right	B	11.1	0.32	-	35
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	B	11.4	0.04	-	3
Columbus Ave NB thru | thru	A	0.0	0.38	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.26	-	0

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

Table 2-6 No-Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**C**	**32.7**	**-**	**-**	**-**
Dimock St EB left	E	72.1	0.87	211	#329
Dimock St EB thru/right	D	39.8	0.34	71	124
Columbus Ave NB left/thru | thru/right	C	21.6	0.50	213	280
Columbus Ave SB left/thru | thru/right	C	29.7	0.77	339	450
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**1.9**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.8	0.49	0	0
Columbus Ave SB left/thru | thru/right	A	3.0	0.45	42	34
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	A	1.2	0.03	-	2
Amory Street SB left/right	B	12.9	0.53	-	80
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	C	23.1	0.11	-	9
Columbus Ave NB thru | thru	A	0.0	0.31	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.58	-	0

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

As shown in Table 2-5 and Table 2-6, the following traffic operations are expected under the No-Build (2023) Condition:

- The signalized intersection of **Columbus Avenue/Dimock Street** will continue to operate at LOS D during the a.m. peak hour and improve from LOS D to LOS C during the p.m. peak hour. These improvements in delay are due to the increased capacity of the Dimock Street eastbound approach. The longest queues at the intersection will occur at the Columbus Avenue northbound approach and the Dimock Street eastbound left-turn approach during the a.m. peak hour and at the Columbus Avenue southbound approach during the p.m. peak hour. The Dimock Street eastbound left-turn approach will improve from LOS F to LOS E during both the a.m. and p.m. peak hours. The Dimock Street eastbound through/right-turn approach will improve from LOS F to LOS D during both the a.m. and p.m. peak hours.

- The signalized intersection of **Columbus Avenue/Bragdon Street/Bancroft Street** will continue to operate at LOS A during both the a.m. and p.m. peak hours. There will continue to be no queuing the intersection during the a.m. peak hour and the longest queues during the p.m. peak hour will continue to occur at the Columbus Avenue southbound approach.

2.4 Build (2023) Condition

As previously mentioned, the proposed Project will consist of the demolition of the existing site and the construction of a new, seven story building consisting of Horizons for Homeless Children daycare center in approximately 48,000 sf, social service tenants consisting of approximately 87,500 sf, and a small ground floor retail space approximately 1,500 sf. The project will provide parking for 157 spaces in two levels.

2.4.1 Site Access and Vehicle Circulation

Vehicular access to the garage will be provided via two new driveways. The driveway along Amory Street to the west side of the site will provide access to the lower garage level with 81 parking spaces and the driveway along Dimock Street to the south of the site will provide access to the upper garage level with 76 parking spaces. The primary pedestrian entrance into the building will be located on the corner of Dimock Street and Columbus Avenue at the southeastern corner of the site. A small retail use will occupy the southwest corner of the site.

2.4.2 Project Parking

The Project will provide a total of approximately 132 parking spaces for the new on-site uses. Parking will be located on two levels in an underground garage. This results in a parking ratio or 0.98 parking spaces per 1,000 sf. An additional 25 spaces will be provided in the parking garage for the adjacent building to replace the existing parking lot on-site.

This is consistent with the future parking goals developed by the BTD for this neighborhood as part of the ongoing Plan JP/ROX project.

2.4.3 Loading and Service Accommodations

The Project will construct an off-street loading area in the lower parking level along Amory Street adjacent to the north of the lower garage driveway. The service area will accommodate vehicles as large as an SU-36. The loading and service area is shown on the site plan in Figure 2-13.

Lower Level Parking

Upper Level Parking

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2.4.4 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for employees and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply a minimum of 97 secure bicycle parking/storage spaces within the Project site for employees, as well public bicycle racks throughout the Project site for visitors. This is consistent with the BTD guidelines of 1 secure bicycle storage space per 1,000 sf of commercial space.

2.4.5 Trip Generation Methodology

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

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

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

Land Use Code 820 – Shopping Center. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. Of the ITE retail categories, The Shopping Center LUC best suits the retail component proposed within the Project. Calculations of the number of trips are based on ITE's average rate per 1,000 sf.

Land Use Code 565 – Daycare. A day care center is a facility where care for pre-school age children is provided during the daytime hours. Day care facilities generally include classrooms, offices, eating area, and playgrounds. Some centers also provide after-school care for school aged children.

However, LUC 565 was not used for this project. The trip generation for the daycare component was determined by using specific Horizons for Homeless Children local data provided by the Proponent, since it is likely the unique aspect of this facility serving homeless children will result in lower vehicle trips being generated than a typical daycare center.

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

Land Use Code 710 – General Office Building. The General Office is defined as an office building containing multiple tenants. It is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building typically contains a mixture of professional services. The trip generation estimates are based on average vehicular trip rates per 1,000 sf of office.

While the General Office Building LUC was used for the trip generation, the Proponent is committed to finding social service and not for profit organizations as tenants. However, there is not a specific LUC for social service/nonprofit space.

2.4.6 Mode Share

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in Area 6 – Jamaica Plain. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-7.

Table 2-7 Travel Mode Share

Land Use		Walk/Bicycle Share	Transit Share	Auto Share	Vehicle Occupancy Rate
Daily					
Daycare[1]	In	14%	61%	25%	1.84
	Out	14%	61%	25%	1.84
Office[2]	In	7%	35%	58%	1.13
	Out	7%	35%	58%	1.13
Retail[2]	In	24%	15%	61%	1.78
	Out	24%	15%	61%	1.78
a.m. Peak					
Daycare[1]	In	14%	61%	25%	1.84
	Out	14%	61%	25%	1.84
Office[2]	In	9%	38%	53%	1.13
	Out	6%	56%	38%	1.13
Retail[2]	In	31%	15%	54%	1.78
	Out	24%	28%	48%	1.78

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

Table 2-7 Travel Mode Share (Continued)

Land Use		Walk/Bicycle Share	Transit Share	Auto Share	Vehicle Occupancy Rate
p.m. Peak					
Daycare[1]	In	14%	61%	25%	1.84
	Out	14%	61%	25%	1.84
Office[2]	In	6%	56%	38%	1.13
	Out	9%	38%	53%	1.13
Retail[2]	In	24%	28%	48%	1.78
	Out	31%	15%	54%	1.78

1. Based on survey results from the client
2. Based on mode shares provided by BTD

2.4.7 Existing Trip Generation

Based on traffic at the existing driveway, the existing site uses are currently generating 15 vehicle trips (14 entering and 1 exiting) during the weekday a.m. peak hour, and 16 vehicle trips (3 entering and 13 exiting) during the weekday p.m. peak hour. While these trips are expected to remain on the roadway network, they have been reassigned to the proposed site driveways.

2.4.8 Project Trip Generation

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

Table 2-8 Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Existing Parking Lot[1]	In	0	0	86
	Out	0	0	86
	Total	0	0	172
Day Care Center[2]	In	127	553	123
	Out	127	553	123
	Total	254	1,106	246
General Office[3]	In	38	191	281
	Out	38	191	281
	Total	76	382	562
Retail[4]	In	14	9	19
	Out	14	9	19
	Total	28	18	38

Table 2-8 Project Trip Generation (Continued)

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Net New	In	179	753	423
	Out	179	753	423
	Total	358	1,506	846
a.m. Peak Hour				
Existing Parking Lot[1]	In	0	0	14
	Out	0	0	1
	Total	0	0	15
Day Care Center[2]	In	47	203	120
	Out	32	137	56
	Total	79	340	176
General Office[3]	In	12	52	64
	Out	1	10	6
	Total	13	62	70
Retail[4]	In	1	0	1
	Out	0	1	1
	Total	1	1	2
Net New	In	60	255	185
	Out	33	148	63
	Total	93	403	248
p.m. Peak Hour				
Existing Parking Lot[1]	In	0	0	3
	Out	0	0	13
	Total	0	0	16
Day Care Center[2]	In	32	137	56
	Out	47	203	120
	Total	79	340	176
General Office[3]	In	2	13	9
	Out	11	46	58
	Total	13	59	67
Retail[4]	In	1	1	2
	Out	2	1	1
	Total	3	2	3
Net New	In	35	151	67
	Out	60	250	179
	Total	95	401	246

1. Based on driveway counts.
2. Based on parking spaces and student estimates provided by the Proponent.
3. ITE Trip Generation Rate, 9th Edition, LUC 310 (General Office), 87,500 square feet.
4. ITE Trip Generation Rate, 9th Edition, LUC 820 (Shopping Center), 1,500 square feet.

As shown in Table 2-8, there is expected to be 846 new daily vehicle trips, 1,506 new daily transit trips, and 358 new daily pedestrian/bicycle trips, plus the additional 1,506 new transit trips requiring a walk to or from the site. During the a.m. peak hour, there is expected to be 248 new vehicle trips (185 entering and 63 exiting), 403 transit trips (255 alighting and 148 boarding), and 93 pedestrian/bicycle trips (60 in and 33 out), plus the

additional transit trips requiring a walk to and from the site. During the p.m. peak hour, there is expected to be 246 new vehicle trips (67 entering and 179 exiting), 401 transit trips (151 alighting and 205 boarding), and 95 pedestrian trips (35 in and 60 out), plus the additional transit trips requiring a walk to and from the site. All existing vehicle trips are expected to relocate to the new site driveway.

2.4.9 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 6 – Jamaica Plain and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-14.

2.4.10 Build Traffic Volumes

The vehicle trips were distributed through the study area. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 2-15 and Figure 2-16, respectively. The trip assignments were added to the No-Build (2023) Condition vehicular traffic volumes to develop the Build (2023) Condition vehicular traffic volumes. The Build (2023) Condition a.m. and p.m. peak hour traffic volumes are shown on Figure 2-17 and Figure 2-18, respectively.

2.4.11 Build Condition Traffic Operations Analysis

The Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition and No-Build (2023) Condition analysis. Table 2-9 and Table 2-10 present the Build (2023) 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 (2023) Condition and the Build (2023) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix C.

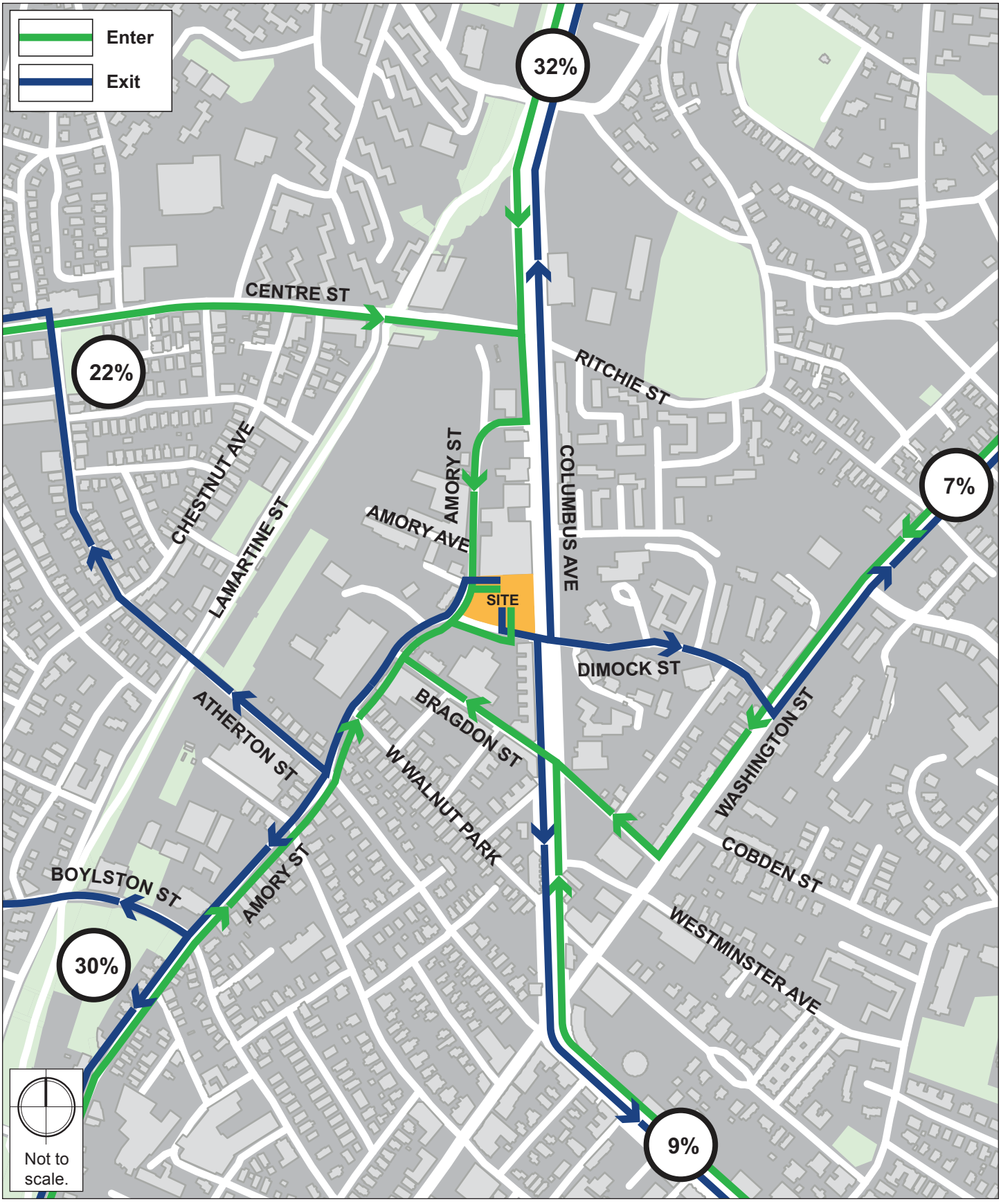

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Figure 2-14
Trip Distribution

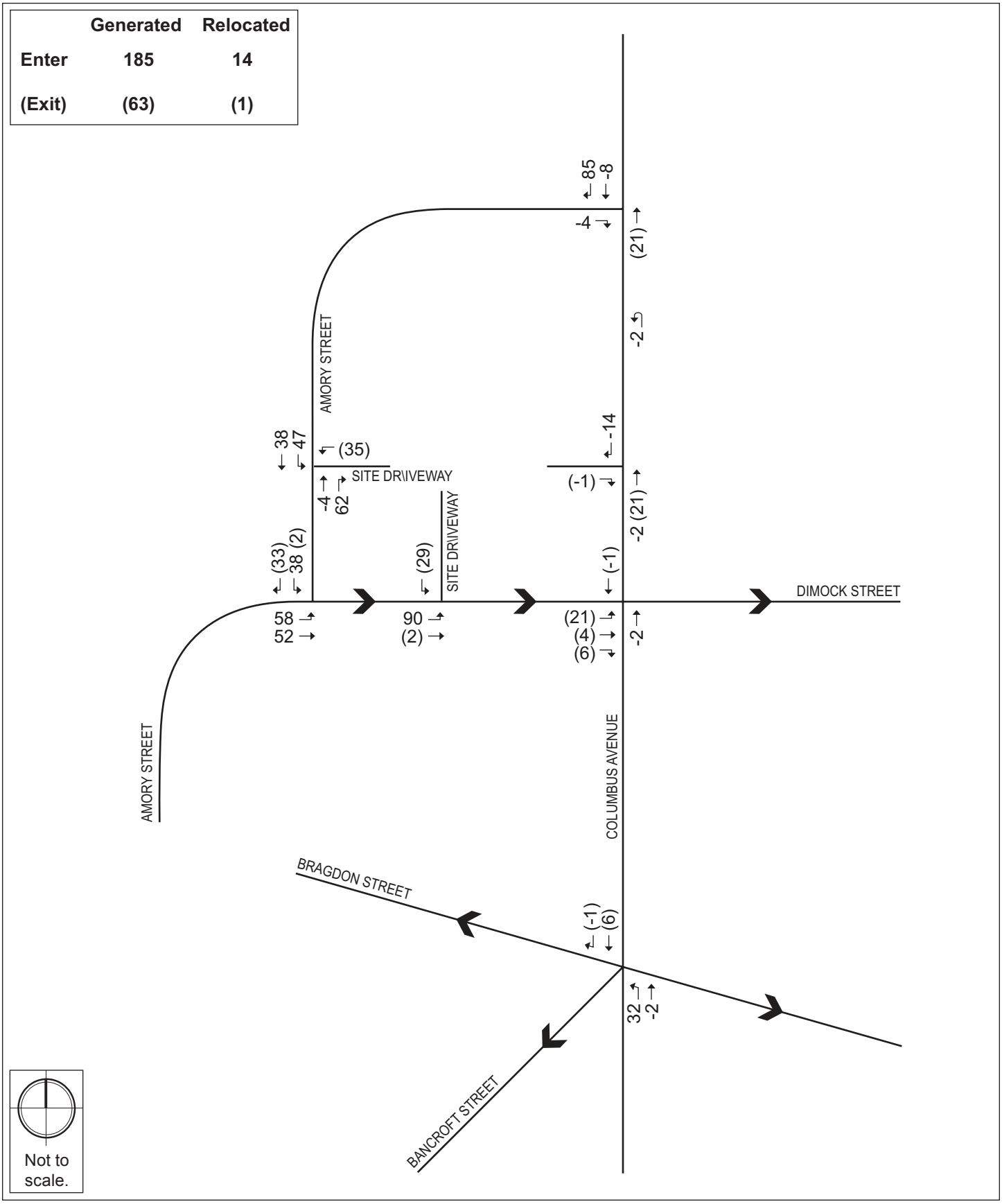

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Figure 2-15
Net Project Trips, a.m. Peak Hour

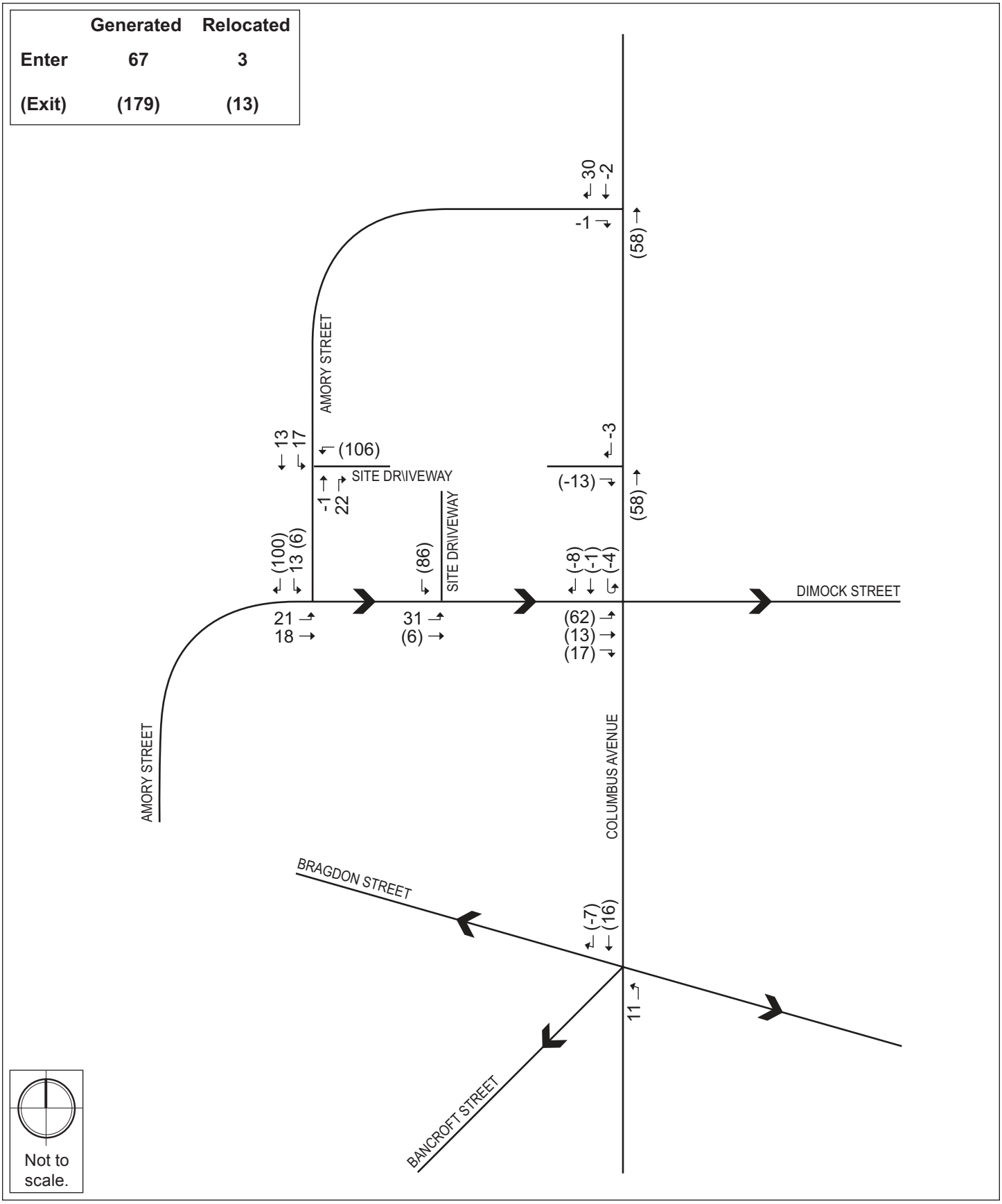

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Figure 2-16
Net Project Trips, p.m. Peak Hour

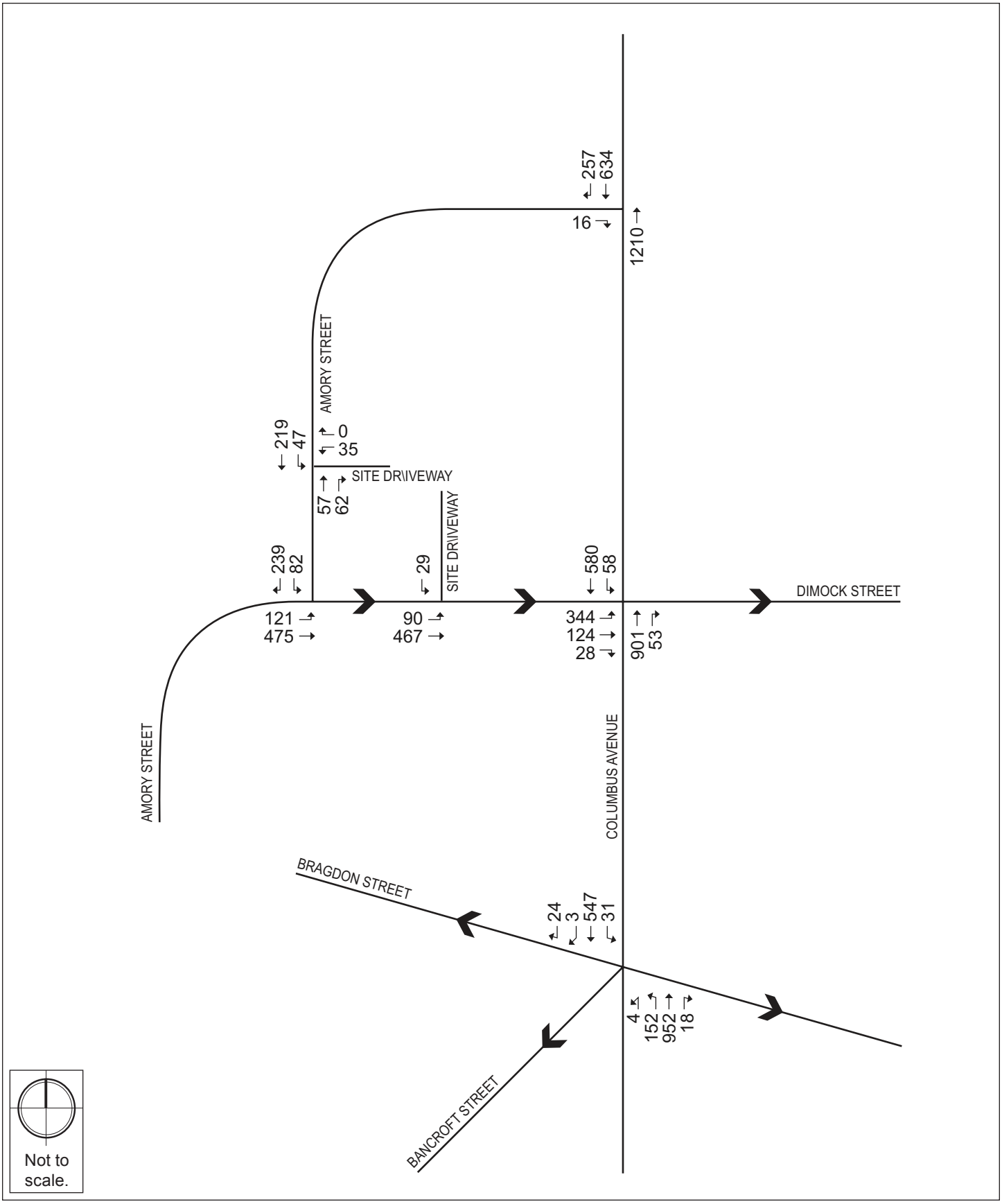

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Figure 2-17

Build (2023) Condition Vehicular Traffic Volumes, a.m. Peak Hour

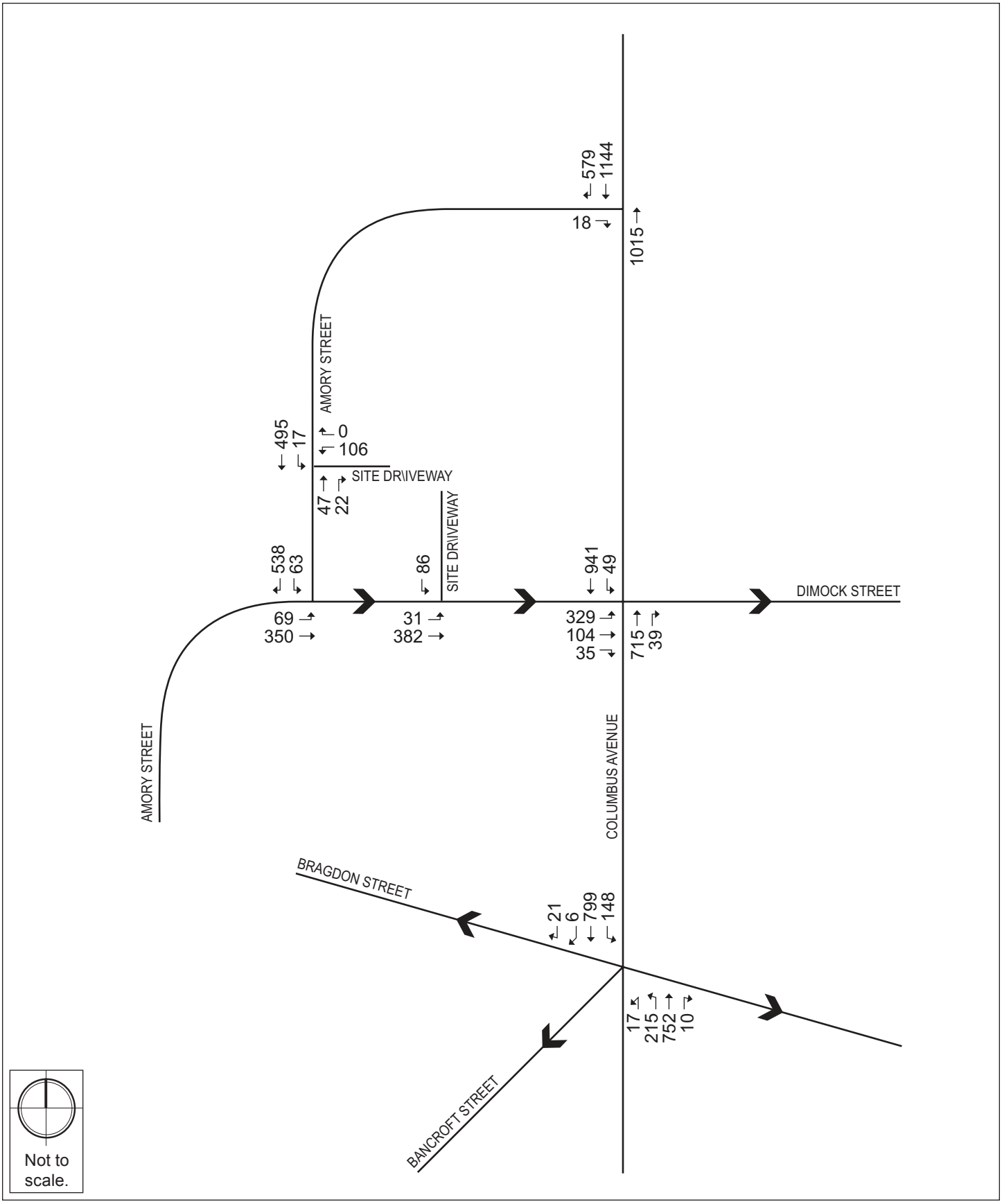

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Figure 2-18

Build (2023) Condition Vehicular Traffic Volumes, p.m. Peak Hour

Table 2-9 Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**D**	**38.0**	**-**	**-**	**-**
Dimock St EB left	E	68.6	0.91	277	#425
Dimock St EB thru/right	D	36.1	0.39	98	159
Columbus Ave NB left/thru | thru/right	C	30.5	0.69	321	412
Columbus Ave SB left/thru | thru/right	C	32.2	0.69	222	306
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**0.4**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.6	0.45	0	0
Columbus Ave SB left/thru | thru/right	A	0.1	0.22	0	0
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	A	2.2	0.08	-	6
Amory Street SB left/right	C	15.7	0.52	-	76
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	B	11.8	0.04	-	3
Columbus Ave NB thru | thru	A	0.0	0.39	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.29	-	0
Amory Street/Lower Garage Driveway	**-**	**-**	**-**	**-**	**-**
Lower Garage Driveway WB left/right	B	12.7	0.08	-	6
Amory St NB thru/right	A	0.0	0.08	-	0
Amory St SB left/thru	A	1.3	0.04	-	3
Dimock Street/Upper Garage Driveway	**-**	**-**	**-**	**-**	**-**
Dimock St EB left/thru | thru	A	1.3	0.20	-	5
Upper Garage Driveway SB left	B	12.6	0.06	-	5

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

Table 2-10 Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Columbus Avenue/Dimock Street	**D**	**37.2**	**-**	**-**	**-**
Dimock St EB left	F	83.3	0.96	267	#450
Dimock St EB thru/right	D	38.8	0.39	88	152
Columbus Ave NB left/thru | thru/right	C	23.4	0.52	221	280
Columbus Ave SB left/thru | thru/right	C	32.0	0.79	343	437
Columbus Avenue/Bragdon Street/Bancroft Street	**A**	**2.1**	**-**	**-**	**-**
Columbus Ave NB left/thru | thru/right	A	0.9	0.50	0	0
Columbus Ave SB left/thru | thru/right	A	3.3	0.46	48	40
Unsignalized Intersections					
Amory Street/Dimock Street	**-**	**-**	**-**	**-**	**-**
Amory Street EB left/thru	A	1.6	0.05	-	4
Amory Street SB left/right	C	16.8	0.68	-	139
Columbus Avenue Southbound/Amory Street	**-**	**-**	**-**	**-**	**-**
Amory St EB right	C	23.5	0.11	-	9
Columbus Ave NB thru | thru	A	0.0	0.32	-	0
Columbus Ave SB thru | thru/right	A	0.0	0.59	-	0
Amory Street/Lower Garage Driveway	**-**	**-**	**-**	**-**	**-**
Lower Garage Driveway WB left/right	C	16.2	0.26	-	26
Amory St NB thru/right	A	0.0	0.04	-	0
Amory St SB left/thru	A	0.4	0.01	-	1
Dimock Street/Upper Garage Driveway	**-**	**-**	**-**	**-**	**-**
Dimock St EB left/thru | thru	A	0.6	0.16	-	2
Upper Garage Driveway SB left	B	11.2	0.14	-	12

Grey Shading indicates a worsening in LOS to LOS E or F.

95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

As shown in Table 2-9 and Table 2-10, the following traffic operations are expected under the Build (2023) Condition:

- The signalized intersection of **Columbus Avenue/Dimock Street** will continue to operate at LOS D during the a.m. peak hour and decreases from LOS C to LOS D during the p.m. peak hour. The longest queues at the intersection occur at the Columbus Avenue northbound approach and the Dimock Street eastbound left-turn

approach during the a.m. peak hour and at the Columbus Avenue southbound approach and the Dimock Street eastbound left-turn approach during the p.m. peak hour. The Dimock Street eastbound left-turn approach will decrease from LOS E to LOS F during the p.m. peak hour.

- The signalized intersection of **Columbus Avenue/Bragdon Street/Bancroft Street** will continue to operate at LOS A during both the a.m. and p.m. peak hours. There will continue to be no queuing at the intersection during the a.m. peak hour and the longest queues during the p.m. peak hour will continue to occur at the Columbus Avenue southbound approach.

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 residents and patrons of the Project 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 Project 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:

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

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

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

- Promote to commercial tenants that, as employers, they can save on payroll-related taxes and provide employee benefits when they offer transportation benefits such as subsidized public transportation;

- Encourage employers to subsidize on-site full-time employees' purchase of monthly transit passes;

- Encourage employers to provide Guaranteed Ride Home during hours in which public transit service is no longer available to employee's home;

- Provide electric vehicle charging stations for 5 percent of the parking spaces in the garage;

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

- The Proponent will explore the feasibility of providing spaces in the garage for a car sharing service such as Zipcar.

2.6 Transportation Mitigation Measures

Although the traffic impacts associated with the new trips are minimal (generating less than four vehicle trips per minute during the peak hours), the Proponent will continue to work with the City of Boston so that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

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

2.7 Evaluation of Short-term Construction Impacts

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

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

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

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

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

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

The proposed Project is seven stories and approximately 92 feet tall at its highest point. However, due to the grade change of the site, the height along Columbus Avenue is closer to 84 feet, and the building steps down along Amory Street. The other buildings in the area range from two to four-stories. The building is designed in a way that will minimize wind impacts. At the third floor, the building is set back three feet along Columbus Avenue, with even larger setbacks on Dimock and Amory streets. These setbacks will help to deflect any winds that may downwash from the upper floors and prevent higher wind speeds from reaching the street.

3.2 Shadow

3.2.1 Introduction and Methodology

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

The shadow analysis presents the existing shadow and new shadow that would be created by the proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14 at the end of this section.

The shadow analysis shows that new shadow from the Project will be limited to nearby streets and sidewalks. No new shadow will be cast onto nearby open spaces or bus stops during any of the fourteen time periods.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest onto Amory Street and its sidewalks, and onto Amory Terrace and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 12:00 p.m., new shadow from the Project will be cast to the north onto a small portion of Amory Street and its eastern sidewalk. No new shadow will be cast onto nearby open spaces or bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west onto Amory Street and its sidewalks. A portion of Amory Street's eastern sidewalk that had previously been in shadows will have sun. No new shadow will be cast onto nearby open spaces or bus stops.

At 12:00 p.m., new shadow from the Project will be cast to the north onto a sliver of Amory Street's eastern sidewalk. No new shadow will be cast onto nearby open spaces or bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the east onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 6:00 p.m., new shadow from the Project will be cast to the east onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., new shadow from the Project will be cast to the northwest onto Amory Street and its sidewalks, and onto Amory Terrace and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 12:00 p.m., new shadow from the Project will be cast to the north a sliver of Amory Street's eastern sidewalk. No new shadow will be cast onto nearby open spaces or bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 6:00 p.m., new shadow from the Project will be cast to the northeast. No new shadow will be cast onto nearby streets, sidewalks, open spaces or bus stops.

3.2.5 Winter Solstice (December 21)

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

At 9:00 a.m., new shadow from the Project will be cast to the northwest onto Amory Street and its sidewalks, Amory Terrace and its sidewalks, and Amory Avenue and its sidewalks. northeast onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 12:00 p.m., new shadow from the Project will be cast to the north onto a small portion of Amory Street and its eastern sidewalk, and a small portion of Columbus Avenue and its western sidewalk. northeast onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby open spaces or bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast onto Columbus Avenue and its sidewalks, and onto Academy Road and its sidewalk. No new shadow will be cast onto nearby open spaces or bus stops.

3.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. New shadow from the Project will be limited to nearby streets and sidewalks. No new shadow will be cast onto nearby open spaces or bus stops during any of the fourteen time periods.

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Figure 3.2-1
Shadow Study: March 21, 9:00 a.m.

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ARCHITECTURE + DESIGN

Figure 3.2-2
Shadow Study: March 21, 12:00 p.m.

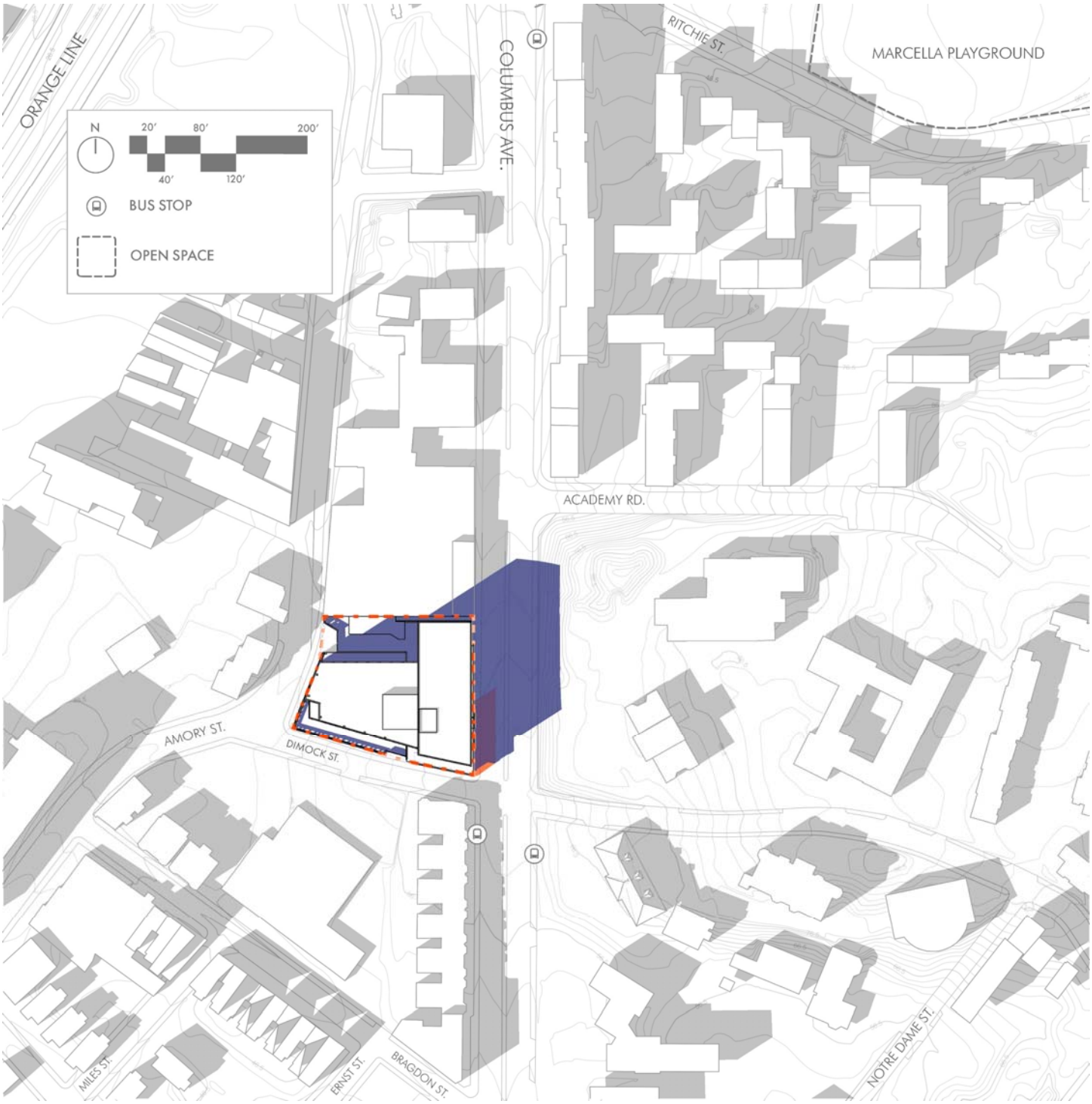

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Figure 3.2-3
Shadow Study: March 21, 3:00 p.m.

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Figure 3.2-4
Shadow Study: June 21, 9:00 a.m.

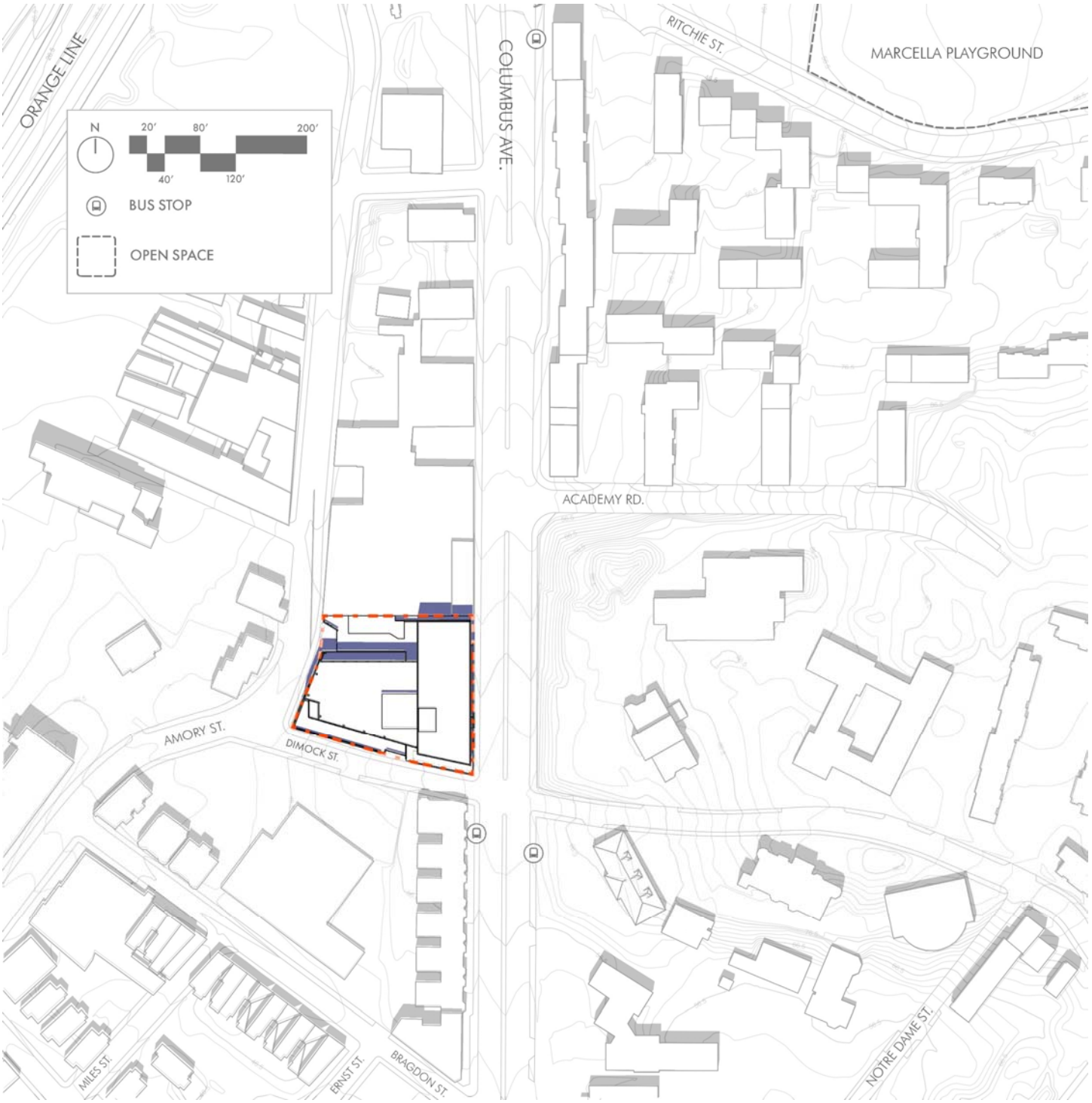

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Figure 3.2-5
Shadow Study: June 21, 12:00 p.m.

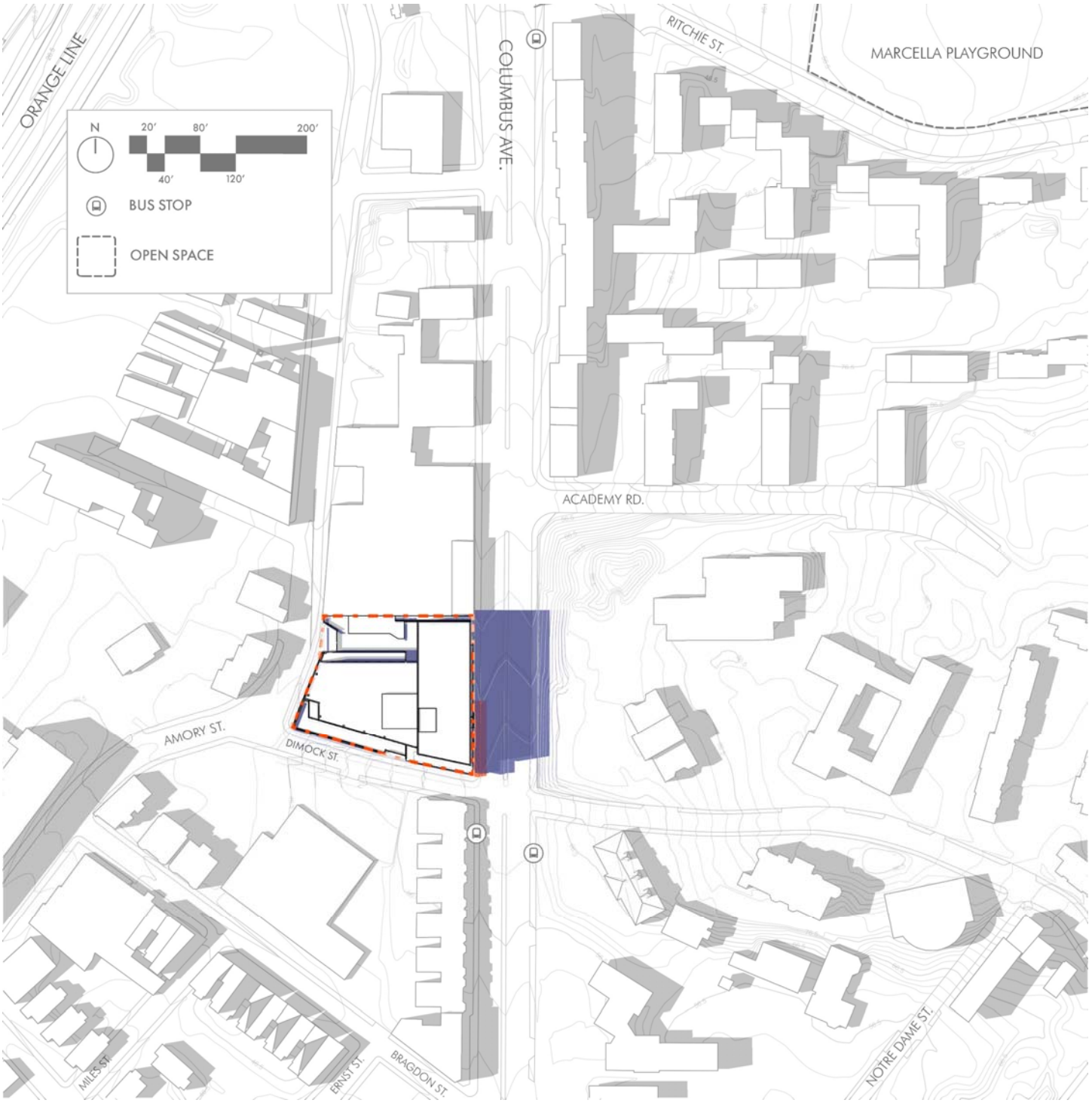

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Figure 3.2-6
Shadow Study: June 21, 3:00 p.m.

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Figure 3.2-7
Shadow Study: June 21, 6:00 p.m.

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Figure 3.2-8
Shadow Study: September 21, 9:00 a.m.

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Figure 3.2-9
Shadow Study: September 21, 12:00 p.m.

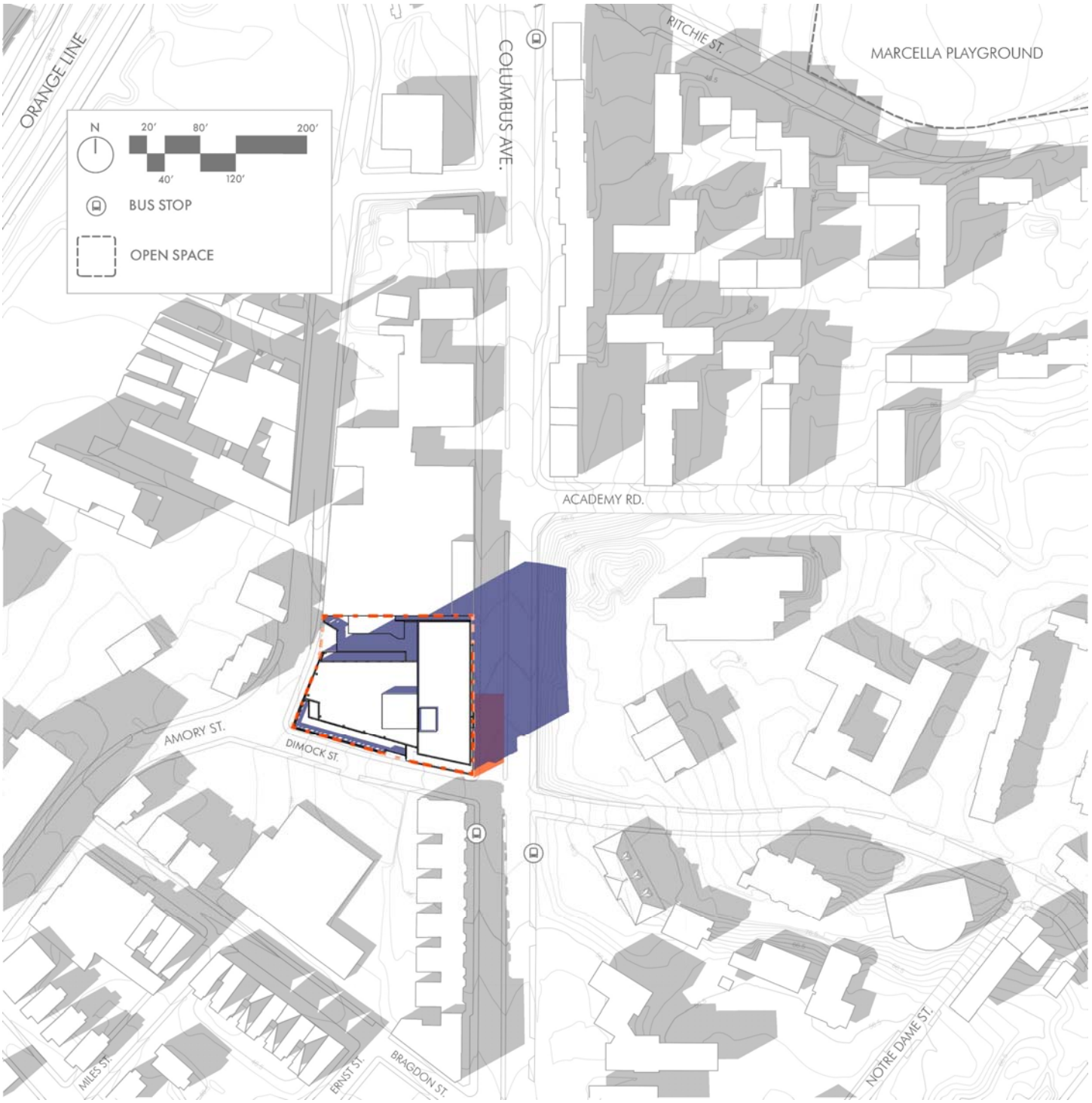

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Figure 3.2-10
Shadow Study: September 21, 3:00 p.m.

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Figure 3.2-11
Shadow Study: September 21, 6:00 p.m.

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Figure 3.2-12
Shadow Study: December 21, 9:00 a.m.

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Figure 3.2-13
Shadow Study: December 21, 12:00 p.m.

1785 Columbus Avenue Boston, Massachusetts

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ARCHITECTURE + DESIGN

Figure 3.2-14
Shadow Study: December 21, 3:00 p.m.

3.3 Daylight Analysis

3.3.1 Introduction

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

Since the Project site currently consists of a surface parking lot and low-rise buildings, the proposed Project will increase daylight obstruction from the existing condition; however, the resulting conditions will be lower than the daylight obstruction values of the context points in the area and lower than in other urban areas.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. This program measures the percentage of "sky dome" that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

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

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

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

---

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

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

1785 Columbus Avenue Boston, Massachusetts

Epsilon Associates Inc.

Figure 3.3-1

Viewpoint and Area Context Locations

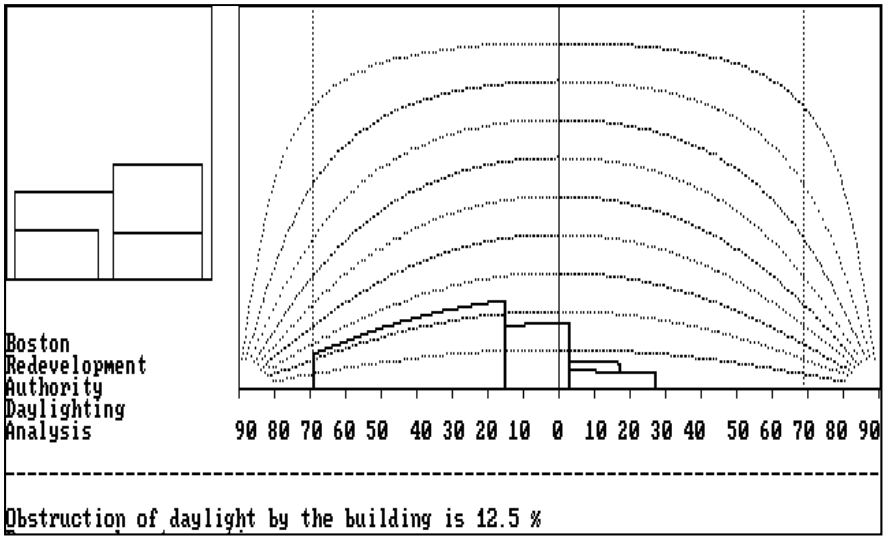
- **Viewpoint 1:** View from the center of Columbus Avenue facing west toward the Project site.
- **Viewpoint 2:** View from the center of Dimock Street facing north toward the Project site.
- Viewpoint 3: View from Amory Street facing east toward the Project site.
- **Area Context Viewpoint AC1:** View from the center of Columbus Avenue facing west toward 1865 Columbus Avenue.
- **Area Context Viewpoint AC2:** View from the center of Amory Street facing northwest toward 125 Amory Street.
- **Area Context Viewpoint AC3:** View from the center of Amory Street facing northwest toward 59 Amory Street.

3.3.3 Results

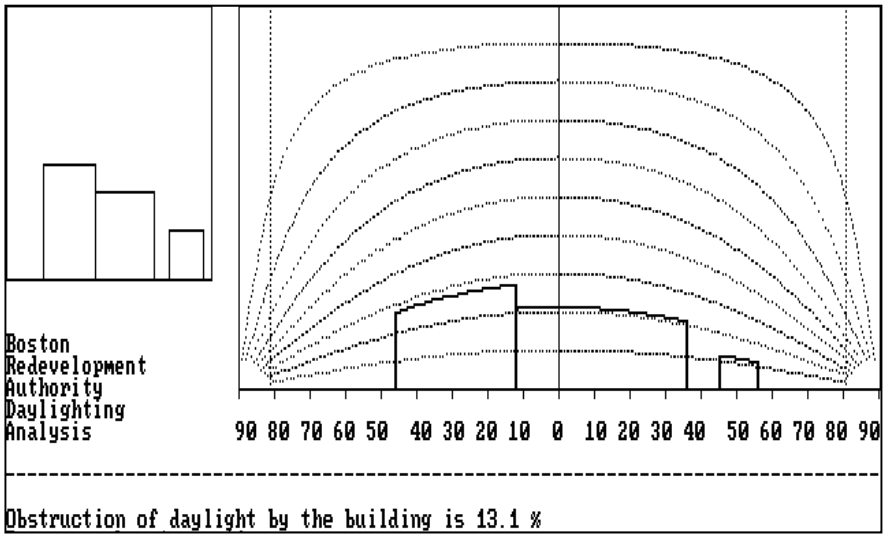
The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-4 illustrate the BRADA results for each analysis.

Table 3.3-1 Daylight Analysis Results

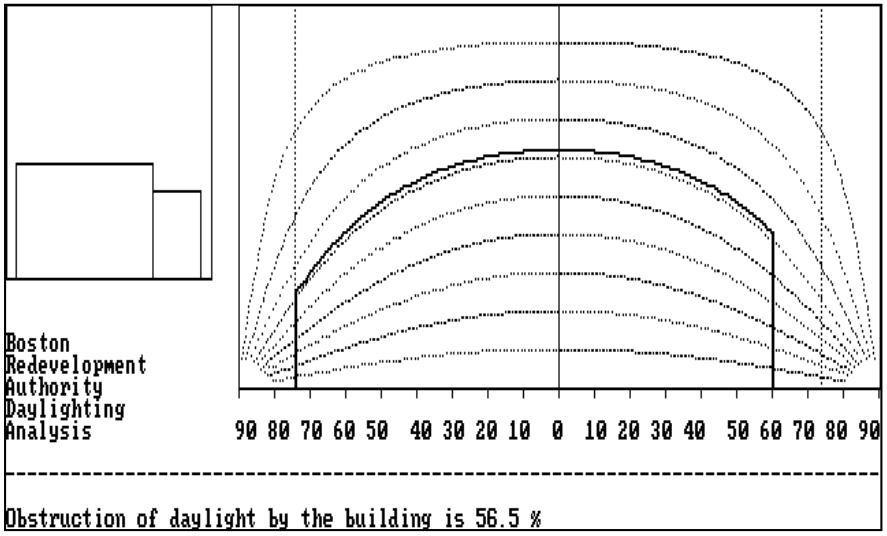
Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from Columbus Avenue facing west toward the Project site	12.5%	74.2%
Viewpoint 2	View from Dimock Street facing north toward the Project site	13.1%	70.4%
Viewpoint 3	View from Amory Street facing east toward the Project site	56.5%	68.7%
Area Context Points			
AC1	View from Columbus Avenue facing west toward 1865 Columbus Avenue	53.5%	N/A
AC2	View from Amory Street facing northwest toward 125 Amory Street	78.8%	N/A
AC3	Amory Street facing northwest toward 59 Amory Street	68.9%	N/A



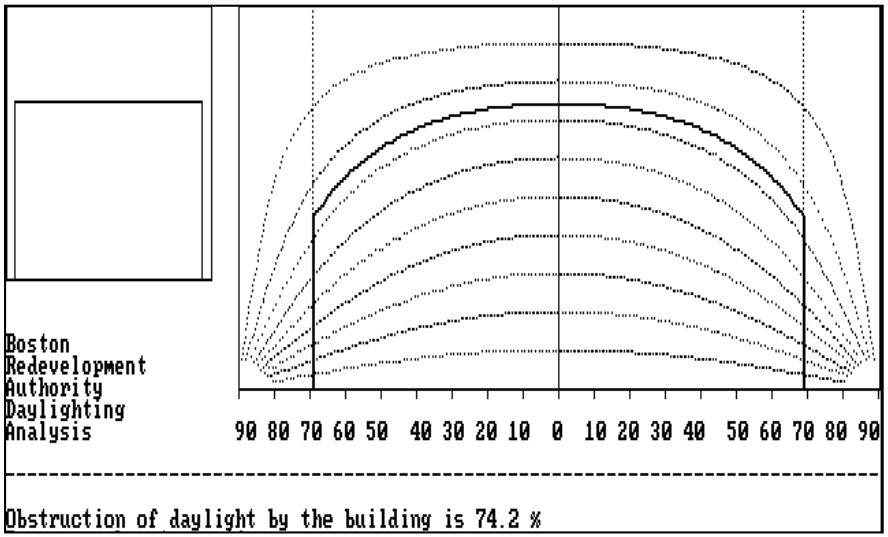
Viewpoint 1 (Existing): View from Columbus Avenue facing west toward the Project site



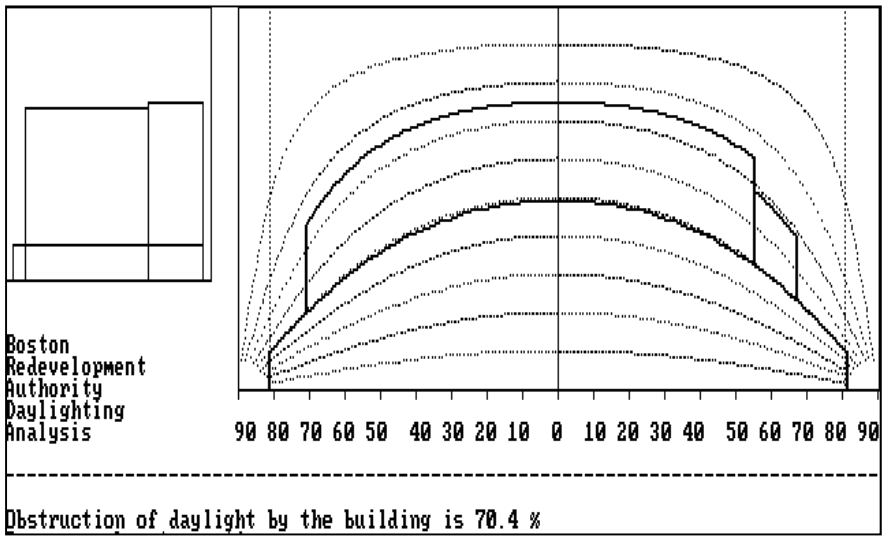
Viewpoint 2 (Existing): View from Dimock Street facing north toward the Project site



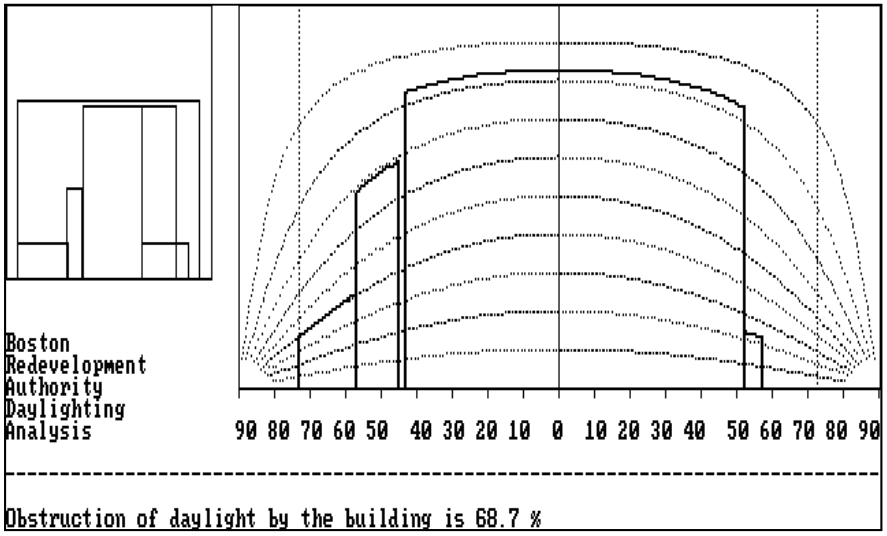
Viewpoint 3 (Existing): View from Armory Street facing east toward the Project site



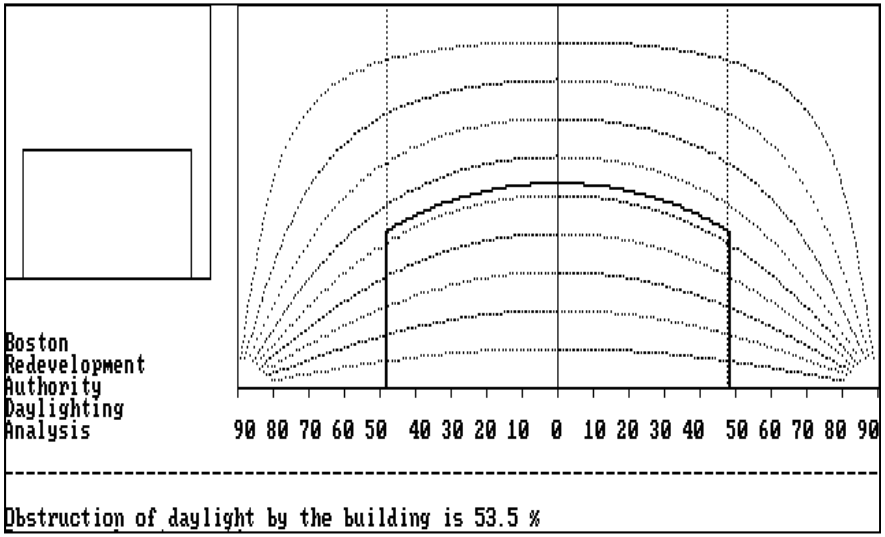
Viewpoint 1 (Proposed): View from Columbus Avenue facing west toward the Project site



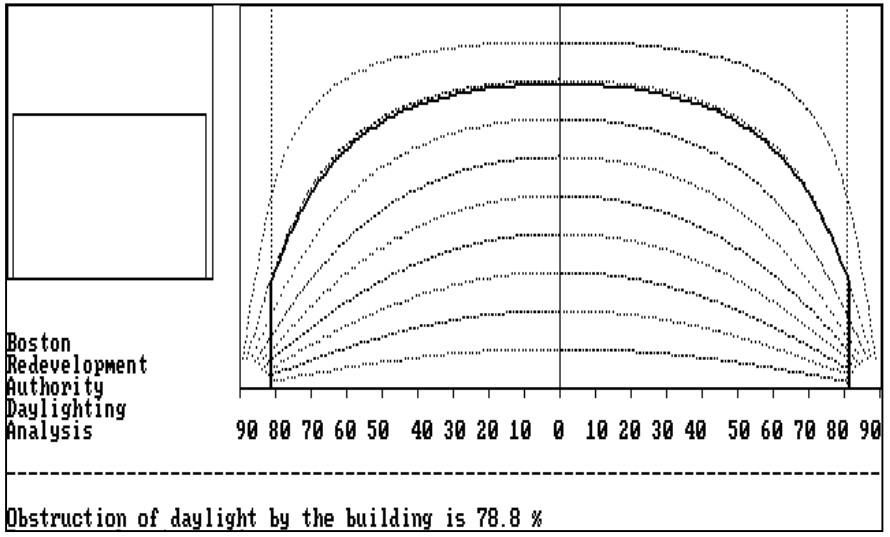
Viewpoint 2 (Proposed): View from Dimock Street facing north toward the Project site



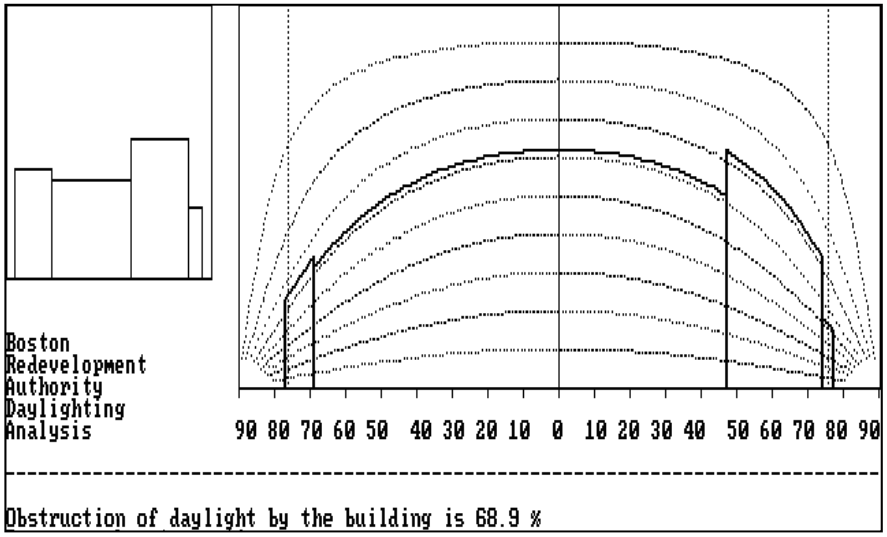
Viewpoint 3 (Proposed): View from Armory Street facing east toward the Project site



AC1: View from Columbus Avenue facing west toward 1865 Columbus Avenue



AC2: View from Armory Street facing northwest toward 125 Armory Street



AC3: View from Amory Street facing northwest toward 59 Armory Street

Columbus Avenue – Viewpoint 1

Columbus Avenue runs along the eastern edge of the Project site. Viewpoint 1 was taken from the center of Columbus Avenue facing west toward the Project site. The Project site has an existing daylight obstruction of 12.5% due to the surface parking lot and low heights of the existing buildings. The development of the Project will increase the daylight obstruction value to 74.2%. The daylight obstruction value is consistent with or less than the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Dimock Street – Viewpoint 2

Dimock Street runs along the southern edge of the Project site. Viewpoint 2 was taken from the center of Dimock Street facing north toward the Project site. The Project site has an existing daylight obstruction of 13.1% due to the low heights of the existing buildings. The development of the Project will increase the daylight obstruction value to 70.4%. The daylight obstruction value is consistent with or less than the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Amory Street – Viewpoint 3

Amory Street runs along the western edge of the Project site. Viewpoint 3 was taken from the center of Amory Street facing east toward the Project site. The Project site has an existing daylight obstruction of 56.5%. The development of the Project will increase the daylight obstruction value to 68.7%. The daylight obstruction value is consistent with or less than the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Area Context Viewpoints

The Project site is located in an area with a mix of relatively low density commercial and residential uses and surface parking lots. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 53.5% for AC1 to 78.8% for AC2. Daylight obstruction values for the Project are consistent with or less than the Area Context values.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to or

less than the daylight obstruction values within the surrounding area. The design includes setbacks from the streets, space between buildings, and a variety of heights that allow for views of the sky.

3.4 Solar Glare

It is not anticipated that the Project will include the use of highly reflective glass or other reflective materials on the buildings facades that would result in adverse impacts from reflected solar glare from the Project.

3.5 Air Quality

An air quality analysis was conducted to determine the impact of pollutant emissions from mobile sources generated by the Project. A microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) due to traffic flow around the Project areas. Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program (ERP).

3.5.1 Background Air Quality and Health Standards

Background air quality concentrations and federal air quality standards were utilized to conduct the air quality impact analyses. Federal National Ambient Air Quality Standards (NAAQS) were developed by US Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The following sections outline the NAAQS standards and detail the sources of background air quality data.

3.5.2 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the US Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 3.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS.

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to property or vegetation. NAAQS have been developed for various durations of exposure. Massachusetts Ambient Air Quality Standards (MAAQS) are codified in 310 CMR 6.04, and

generally follow the NAAQS but are not identical (highlighted in bold in Table 3.5-1. The more stringent of the primary or secondary standards were applied when comparing to the modeling results for this Project.

A one-hour NO_2 standard was promulgated on January 22, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the hourly NO_2 NAAQS was published in the Federal Register on February 9, 2010 and became effective on April 12, 2010. The form of this standard is the three-year average of the 98th percentile of the daily maximum one-hour concentrations.

Similarly, a one-hour SO_2 standard was promulgated on June 2, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the hourly SO_2 NAAQS was published in the Federal Register on June 22, 2010 and became effective on August 23, 2010. The form of this standard is the three-year average of the 99th percentile of the daily maximum one-hour concentrations.

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). In 2006, the annual PM_{10} standard was revoked. However it remains codified in 310 CMR 6.00. EPA also promulgated a Fine Particulate ($PM_{2.5}$) NAAQS, effective December 2006, with an annual standard of 15 micrograms per cubic meter ($\mu g/m^3$) and the 24-hour standard of 35 $\mu g/m^3$. The annual standard has since been strengthened to 12 $\mu g/m^3$ (in 2012).

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

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

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

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

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

3.5.3 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP to EPA in their Annual Air Quality Reports was obtained for 2013 to 2015. Data for all pollutant and averaging time combinations were obtained from the U.S. EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM_{10} standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour $PM_{2.5}$ standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 μg/m3. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. A new 1-hr NO_2 standard was recently promulgated. To attain this standard, the 3-year average of the 98th percentile of the maximum daily 1-hour concentrations must not exceed 188 μg/m3.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at Harrison Avenue in Boston, roughly 1 mile northeast of the Project site. A summary of the background air quality concentrations is presented in Table 3.5-2.

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

Pollutant	Averaging Time	2013	2014	2015	Background Concentration ($\mu g/m^3$)	NAAQS	Percent of NAAQS
SO_2 (1)(6)	1-Hour (5)	28.6	32.2	24.6	28.5	196.0	15%
	3-Hour	25.4	56.3	22.8	56.3	1300.0	4%
	24-Hour	13.1	13.4	11.3	13.4	365.0	4%
	Annual	2.8	2.8	2.1	2.8	80.0	4%
PM-10	24-Hour	34.0	61.0	28.0	61.0	150.0	41%
	Annual	15.1	13.9	12.4	15.1	50.0	30%
PM-2.5	24-Hour (5)	15.9	12.7	19.0	15.9	35.0	45%
	Annual (5)	7.3	6.0	8.8	7.4	12.0	61%
NO_2 (3)	1-Hour (5)	94.0	95.9	99.6	96.5	188.0	51%
	Annual	32.8	29.6	28.1	32.8	100.0	33%
CO (2)	1-Hour	2145.3	1963.1	1560.9	2145.3	40000.0	5%
	8-Hour	1375.2	1489.8	1031.4	1489.8	10000.0	15%
Ozone (4)	8-Hour	115.8	106.0	109.9	115.8	147.0	79%
Lead	Rolling 3-Month	0.006	0.014	0.016	0.016	0.15	10%

Notes:
From 2013-2015 EPA's AirData Website
(1) SO2 reported ppb. Converted to μg/m3 using factor of 1 ppm = 2.62 μg/m3.
(2) CO reported in ppm. Converted to μg/m3 using factor of 1 ppm = 1146 μg/m3.
(3) NO2 reported in ppb. Converted to μg/m3 using factor of 1 ppm = 1.88 μg/m3.
(4) O3 reported in ppm. Converted to μg/m3 using factor of 1 ppm = 1963 μg/m3.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

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

3.5.4 Mobile Sources

Mobile sources of air pollution include emissions from vehicle traffic associated with the Project.

3.5.4.1 BPDA Air Quality Analysis Requirements

BPDA guidelines[2] state:

A mesoscale analysis predicting the change in regional emissions of volatile organic compounds ("VOCs") and nitrogen oxides ("NOx") should be performed for projects that generate more than 10,000 vehicle trips per day. The above analyses shall be conducted in accordance with the modeling protocols established by the Massachusetts Department of Environmental Protection ("DEP") and the U.S. Environmental Protection Agency ("EPA").

For this Project, the vehicle trip threshold is not exceeded. Therefore a mesoscale analysis was not required.

BPDA guidelines also state:

A microscale analysis predicting localized carbon monoxide concentrations should be performed, including identification of any locations projected to exceed the National or Massachusetts Ambient Air Quality Standards, for projects in which: 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 on roadways providing access to a single location.

For this Project, the transportation analysis shows that Project traffic affects one intersection currently operating at LOS D or worse, or projected to operate at LOS D or worse for future cases. Therefore a microscale analysis was required.

3.5.4.2 Methodology

Microscale Analysis

The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections.

[2] Boston Redevelopment Authority, BRA Development Review Guidelines, 2006

The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in U.S. EPA's intersection modeling guidance.[3]

The microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations.

Baseline (2016) and future year (2023) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersection.

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 1.3 ppm (one-hour) and 1.1 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

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

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

Intersection Selection

As stated previously, a "microscale" analysis is typically required for the Project at intersections where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location.

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

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

One signalized intersection included in the traffic study meets the above conditions (see Chapter 2). The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The intersection found to meet the criteria is:

- the intersection of Columbus Avenue and Dimock Street.

Microscale modeling was performed for the intersection based on the aforementioned methodology. The 2016 Existing conditions, and the 2023 No Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

Emissions Calculations (MOVES)

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the existing (2016) and build year (2023) are provided by MassDEP.

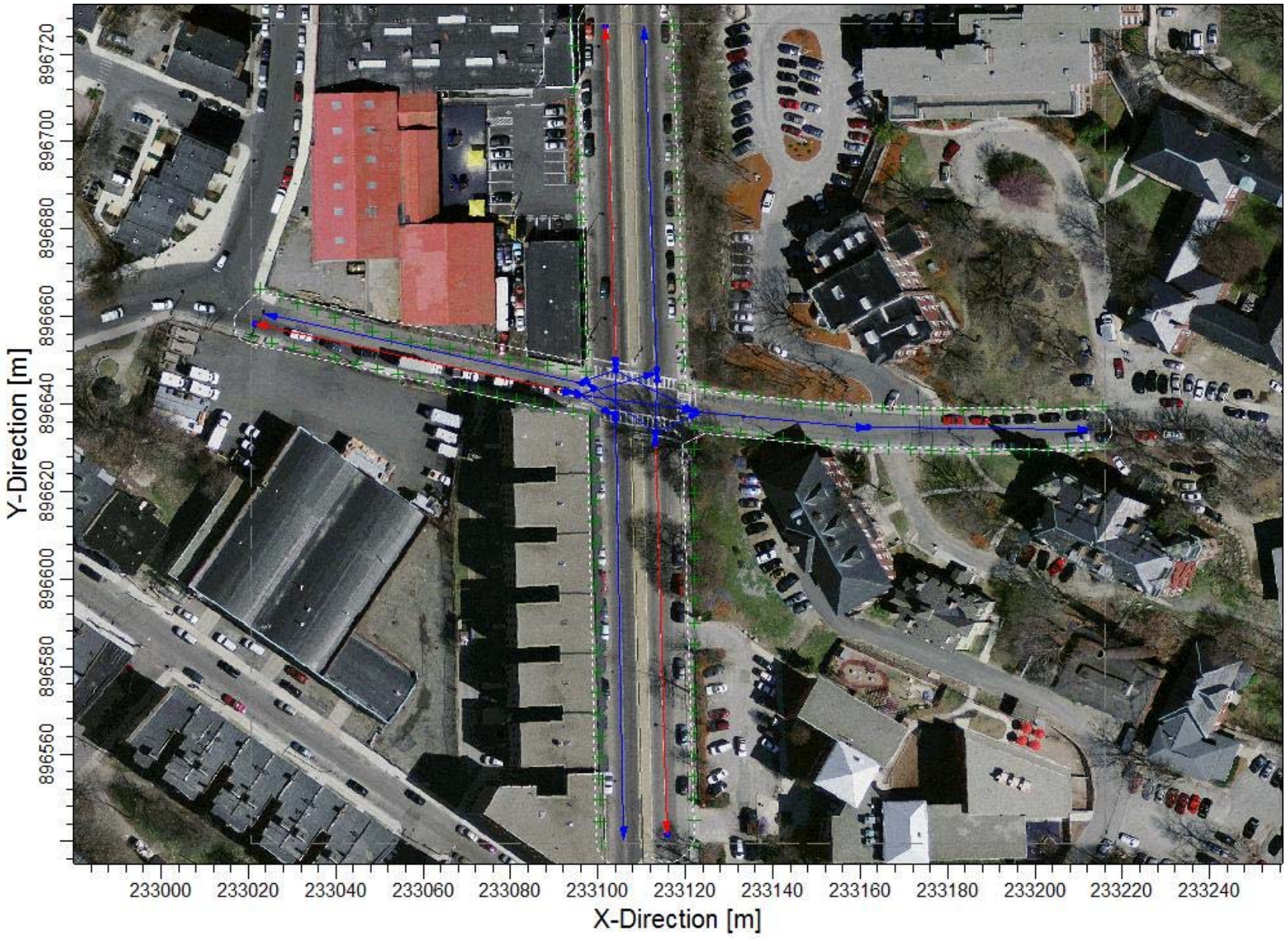
All link types for the modeled intersection were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (SYNCHRO) reports. A speed of 30 mph is used for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[5]

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

Receptors & Meteorology Inputs

A set of 153 receptors was placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersection are presented in Figure 3.5-1.

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



1785 Columbus Avenue, Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.5-1

Intersection of Columbus Ave. and Dimock Street

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[6], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 371 centimeters was selected.[7]

Impact Calculations (CAL3QHC)

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

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.9 ppm (2,145 $\mu g/m^3$) for one-hour and 1.3 ppm (1,490 $\mu g/m^3$) for eight-hour CO.

3.5.4.3 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-5 for the 2016 and 2023 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[9]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.4 ppm) plus background (1.9 ppm) is 2.3 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.4 ppm) plus background (1.3 ppm) is 1.7 ppm. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

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

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

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

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

3.5.4.4 Conclusions

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

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2016)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue & Dimock Street	AM	0.4	1.9	2.3	35
	PM	0.4	1.9	2.3	35
8-Hour					
Columbus Avenue & Dimock Street	AM	0.4	1.3	1.7	9
	PM	0.4	1.3	1.7	9

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

Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue & Dimock Street	AM	0.2	1.9	2.1	35
	PM	0.2	1.9	2.1	35
8-Hour					
Columbus Avenue & Dimock Street	AM	0.2	1.3	1.5	9
	PM	0.2	1.3	1.5	9

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

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Columbus Avenue & Dimock Street	AM	0.2	1.9	2.1	35
	PM	0.2	1.9	2.1	35
8-Hour					
Columbus Avenue & Dimock Street	AM	0.2	1.3	1.5	9
	PM	0.2	1.3	1.5	9

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

3.5.5 Stationary Sources

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

3.5.5.1 Boilers

Building plans may include a number of small condensing boilers for heat and domestic hot water. Typical units will be natural gas-fired and located in a penthouse mechanical area on the roof of the building. The units are typically exhausted through individual stacks.

3.5.5.2 Emergency Generators

Plans likely will include emergency generators to be installed on building to be constructed. The units will provide life safety and standby emergency power to the building. Typically, generators operate for approximately one hour each month for testing and general maintenance and as needed for emergency power. The units will likely be diesel-fired and located in a mechanical area on the roof of the building or in the basements. The generators are to be designed such that exhaust stacks extend at least 10 feet above the individual building roof height above ground level.

3.5.5.3 Cooling Towers

Plans may also call for cooling towers to be installed on the building to be constructed. These units will remove the excess heat generated by the building's mechanical equipment. Typically units will be located on the roof of the building.

3.5.5.4 Parking Garage Exhausts

Any below-grade parking will require mechanical ventilation with carbon monoxide sensors and activation. Mechanical ventilation is not required for parking areas that are above ground.

3.5.5.5 Permitting

It is expected that the majority of stationary sources (boilers, engines, etc) would be subject to the MassDEP's Environmental Results Program (ERP).

Boilers are expected to be within the requirements of the ERP since individual estimated heat inputs are within or below the 10 to 40 MMBtu/hour ERP range.

The ERP regulation applies to new emergency generators greater than 37 kW. The regulation is similar to the boiler ERP in that new engines are subject to emission standards, recordkeeping, certification, and compliance with the MassDEP noise policy. Since the generators' likely maximum rating capacity will be greater than the ERP limit of 37 kW, it will be subject to the ERP program. Per the ERP, the generator owner will limit operation of the generator to less than 300 hours per year and submit a certification form to MassDEP within 60 days of installation.

It is expected that any cogeneration units would also be subject to the MassDEP's ERP program for non-emergency engines and turbines if included in the final design.

3.6 Stormwater Quality

Please refer to Section 7.3.

3.7 Flood Hazard Zones / Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the Project site – Community Panel Numbered 25025C0078G - effective September 25, 2009, indicate the FEMA Flood Zone Designations for the site area. The FIRMs show that the Project is outside of the 500-year flood zone.

The site does not contain wetlands.

3.8 Geotechnical Impacts

This section describes the geotechnical conditions relating to the construction of the Project and discusses the potential impacts that excavation and foundation construction may have on existing adjacent structures.

3.8.1 Site Conditions

The Project site, as described in Section 1.4.1, comprises three parcels with a total area of approximately 39,458 sf. Two of the parcels are occupied by two existing buildings, and the third is currently used as a surface parking lot. Surface grades vary dramatically over the site, and the site generally slopes downward from east to west and downward from south to north. From the high point elevation of approximately 58 feet Boston City Base (BCB), the grades slope downward along Columbus Avenue to an elevation of approximately 55 feet BCB at the northeast corner of the site. Along Dimock Street, the grades slope downward to the west to approximately 43 feet BCB at the Armory Street intersection. Grades along Armory Street are nearly flat and level at elevations between approximately 43 and 44 feet BCB.

3.8.2 Sub-soil Conditions

Eight soil borings were completed on the available portions of the site to determine the generalized subsurface conditions. Borehole locations were established in the field using tape surveying measurements from existing site features. The borings were drilled to depths ranging between approximately 10 and 30 feet below the existing ground surface. In general, samples were taken at five-foot intervals.

Based on the results of the subsurface investigation, the general subsurface profile includes urban fill, sand and gravel, glacial till, weathered rock, and bedrock. The layer of urban fill has a thickness ranging between approximately 7 and 8 feet and is comprised mainly of medium to fine sand with varying proportions of silt, gravel and brick fragments. This fill is underlain by a layer of sand and gravel with a thickness ranging between approximately 8 and 10 feet. This layer is comprised mainly of medium to very dense, coarse to fine sand and gravel, with varying proportions of silt and cobbles. Glacial till was also encountered. The glacial till is a mixture of fine sand and silt with some coarse to medium sand and some coarse to fine gravel. Cobbles and boulders are likely to be present in the glacial till. Weathered rock was encountered at depths ranging from 8 to 18 feet below existing grade, corresponding to elevations between approximately 34.5 and 38.2 feet BCB. The thickness of the weathered rock varies, with no distinct interface between the weathered rock and underlying sound bedrock. Bedrock was encountered at depths ranging between approximately 10 and 25 feet below existing grade, corresponding to approximately 29 and 43 feet BCB.

3.8.3 Groundwater

Short duration groundwater measurements were made using four boreholes during the investigation of conditions on the site. Groundwater monitoring wells were installed which provide the means to measure the stabilized groundwater levels over an extended time period. Both the short duration elevations and the stabilized groundwater elevations for the indicated dates are included in Table 3.8-1.

Note that the Project site is not located within the Groundwater Conservation Overlay District (GCOD) as defined by Article 32 of the Boston Zoning Code.

Table 3.8-1 Measured Groundwater Elevations

Measured Groundwater Elevations (All elevations referenced to City of Boston Datum)								
	B-1 Roadway Box El. = 55.9′		B-2 Roadway Box El. = 56.2′		B-5 Roadway Box El. = 57.0′		B-8 Roadway Box El. = 44.3′	
Date	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)
27 December 2016[1]	17	38.9±	–	–	–	–	–	–
28 December 2016[1]	–	–	–	–	18	39±	–	–
29 December 2016[1]	–	–	16	40.2±	–	–	10	34.3±
5 January 2017[2]	14.8	41.1±	–	–	18.1	38.9±	9.1	34.3±
9 January 2017	15.2	40.7±	17.4	38.8±	[3]	[3]	9.5	34.8±

1. Water levels measured upon completion of each borehole.
2. Wells were purged by OHI several hours before taking measurements
3. Top of monitoring well at B-5 was damaged. No measurement possible.

Groundwater levels vary and are influenced by seasonal changes, local climactic conditions, precipitation and other environmental factors.

3.8.4 Foundation and Below-Grade Construction

Based on the results of the subsurface investigation, it is anticipated that the proposed buildings will be founded on conventional spread footings, with the lowest floor slabs constructed as cast-in-place concrete slabs-on-grade. The footings will be supported on dense glacial till, bedrock (both weather bedrock and intact bedrock) and on structural backfill where the fill extends below the footing subgrade elevation. Interior footings can bear at the highest level compatible with the floor slab elevation. All footings will be placed below the minimal local frost depth as stated in the current edition of the Massachusetts State Building Code. Footings bearing on sound bedrock can be placed at any depth and are not subject to the minimum frost depth requirement.

The building framing, up to the first floor, will consist of concrete foundation walls, steel columns and transfer beams supporting cast-in-place concrete floors for both of the parking levels. Excavation for the parking levels will require some bedrock removal as well as excavation management and handling on urban fill material. The proposed floor grades for the tenant lobby will be approximately 57.75 feet BCB, the upper parking level will be approximately 53.0 feet BCB, and the lower parking level will be approximately 42.5 feet BCB.

Materials used for the subbase and as structural backfill for the Project will be free of organic material, loam, asphalt, snow, ice, frozen soil, and other objectionable material. Prior to construction, a sample of the proposed material obtained from the source location will be tested to assure proper gradation and to verify the material does not contain hazardous material, as defined by the Massachusetts Contingency Plan.

3.8.5 Monitoring

Subject to property owner approvals, elevation reference points will be established on adjacent site buildings and other selected nearby locations prior to construction and monitored during the work to confirm no impact from the construction activities. Vibration and noise monitoring stations will be established to monitor vibrations and noise levels pre-construction and during construction.

A qualified representative (geotechnical engineer or technician) will be on site during the foundation and subsurface construction to confirm compliance of the work with the Project plans and specifications, as well as to monitor geotechnical instrumentation.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

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

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

3.9.2 Operation and Solid Waste Recycling

The Project will generate solid waste typical of office and daycare uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management.

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

3.10 Noise Impacts

New noise associated with development projects are most commonly due to mechanical equipment required for the operation of the buildings. Minimal noise impacts are anticipated as the new equipment will have similar impact as existing conditions on the site. The Project will include appropriate measures to ensure compliance with the City of Boston Zoning District Noise Standards and the MassDEP Noise Policy.

Construction period noise impacts and mitigation are discussed below in Section 3.11.9.

3.11 Construction Impacts

3.11.1 Introduction

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

Construction methodologies, which ensure public safety and protect nearby businesses, will be employed. Techniques such as barricades, walkways and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

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

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

3.11.2 Construction Methodology / Public Safety

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

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

3.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the fourth quarter of 2017

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

3.11.4 Construction Staging / Access

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

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

3.11.5 Construction Mitigation

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

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

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

3.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 124 construction jobs will be created over the length of construction. The Proponent will enter into jobs agreements with the City of Boston.

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

3.11.7 Construction Routes and Deliveries

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

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

3.11.8 Construction Air Quality

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

3.11.9 Construction Noise

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

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;

- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

3.11.10 Construction Vibration

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

3.11.11 Construction Waste

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

3.11.12 Protection of Utilities

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

3.12 Rodent Control

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

3.13 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

4.1 Sustainable Design

Sustainability informs every design decision. Enduring and efficient buildings conserve embodied energy and preserve natural resources. The Project embraces the opportunity to positively influence the urban environment. Its urban location takes advantage of existing infrastructure while some access to mass transportation will reduce dependence on single occupant vehicle trips and minimize transportation impacts.

To measure the results of their sustainability initiatives and to comply with Article 37, the Proponent intends to use the framework of the Leadership in Energy and Environmental Design (LEED) rating system promulgated by the US Green Building Council (USGBC). Although the Project has registered using the LEED for Core and Shell Version 3, the Project will use version 4 (LEED v4 for BD+C: Core and Shell) as the rating system to demonstrate compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and Design Process and Regional Priority Credits.

LEED checklists for both Version 3 and Version 4 are included at the end of this section, and the narrative below outlines how the Project intends to achieve the prerequisites and credits for each credit category for Version 4. These checklists are preliminary, and will be updated regularly as the design develops and engineering assumptions are substantiated. At present, 45 points have been targeted under Version 4, and 61 points have been targeted under Version 3. Additional credits, identified as "Maybe" on the checklist, will be evaluated as the design progresses.

Location and Transportation

The Location and Transportation credit category encourages development on previously developed land, minimizing a building's impact on ecosystems and waterways, regionally appropriate landscaping, smart transportation choices.

The Project site has been previously developed, earning sensitive land protection. The site is also located on a brownfield where soil or groundwater contamination has been identified, and where the local, state, or national authority (whichever has jurisdiction) requires its remediation. The Proponent will perform remediation to the satisfaction of that authority.

The site is in an area with surrounding existing density within a ¼-mile (400-meter) radius of the Project boundary and provides dozens of amenities within 0.5 mile of the Project site.

The Project provides access to quality transit, and is within 0.2 miles from the MBTA Orange Line and has three separate bus lines located adjacent to the site. The Project will provide bicycle facilities and showers for the occupants of the building along with bicycle parking spots for visitors, far exceeding the LEED requirement.

Sustainable Sites

The development of sustainable sites is at the core of sustainable design, stormwater runoff management, and reduction of erosion, light pollution, heat island effect, and pollution related to construction and site maintenance are critical to lessening the impact of development.

The Project will create and implement an erosion and sedimentation control plan for all construction activities associated with the Project. The plan will conform to the erosion and sedimentation requirements of the 2012 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) or local equivalent, whichever is more stringent.

The Project will complete and document a site survey or assessment that will demonstrate the relationships between the site features and topics, Topography, Hydrology, Climate, Vegetation, Soils, Human use. The Project will evaluate compliance with light pollution reduction form the building and the site lighting.

In order to reduce the impact of urban heat island effect, more than 50% of the parking spaces will be below grade under an SRI compliant roof.

Water Efficiency

Buildings are major users of our potable water supply and conservation of water preserves a natural resource while reducing the amount of energy and chemicals used for sewage treatment. The goal of the Water Efficiency credit category is to encourage smarter use of water, inside and out. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-wise landscaping outside. To satisfy the requirements of the Water Use Reduction Prerequisite and credit, the Project will incorporate water conservation strategies that include low flow plumbing fixtures for water closets and faucets. The landscape will be designed so it will not require a permanent irrigation system, and will use plant material that is native and adaptive.

The Project is targeting a minimum 30% indoor water use reduction from the baseline. All newly in-stalled toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling will have the Water Sense label.

The Project will install permanent water meters that measure the total potable water use for the building and associated grounds in addition to water meters for two or more of the following water subsystems, as applicable to the Project: Irrigation, Indoor plumbing

fixtures and fittings, Domestic hot water, Boiler. Metering data will be compiled into monthly and annual summaries; and the resulting whole-Project water usage data will be shared with USGBC.

The Project will evaluate the ability to conserve water used for cooling tower makeup while con-trolling microbes, corrosion, and scale in the condenser water system.

Energy & Atmosphere

According to the U.S. Department of Energy, buildings use 39% of the energy and 74% of the electricity produced each year in the United States. The Energy and Atmosphere credit category encourages a wide variety of energy strategies including: commissioning; energy use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on-site or off-site; and other innovative practices.

The current approach to the HVAC system will be to utilize either a Variable Air Volume (VAV) system or Water Source Heat Pump (WSHP) system to heat and cool the building. The VAV system would consist of multiple evaporative or air cooled rooftop units to supply air. The units would be complete with economizer cycle and variable frequency drives for fan control. The WSHP system would consist of a cooling tower, heat exchanger, pumps (with variable frequency drives) and piping distribution. As part of the WSHP system Energy Recovery Units would be provided to supply ventilation air to the space. Hot water for heating would be provided by gas fired condensing boilers in either system approach. A whole-building energy simulation will be performed for the Project, demonstrating both compliance with ASHRAE 2013 and the Stretch Code. The team will analyze efficiency measures during the design process and account for the results in design decision making. The team will use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings.

Fundamental Commissioning and Enhanced commissioning will be pursued for the Project. Envelope commissioning will also be evaluated as an alternative.

The Project will install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc). The Project will not use chlorofluorocarbon (CFC)-based refrigerants in new heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems.

The Project will evaluate renewable energy production, and if it is not currently feasible, the building will be solar ready.

The Project will select refrigerants that are used in heating, ventilating, air-conditioning, and refrigeration (HVAC&R) equipment to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. The Project will perform the calculations once systems are selected.

The Project will also engage in a contract for 50% or 100% of the Project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

Materials & Resources

During both construction and operations, buildings generate tremendous waste and use many materials and resources. This credit category encourages the selection of sustainable materials, including those that are harvested and manufactured locally, contain high-recycled content, and are rapidly renewable. It also promotes the reduction of waste through building and material reuse, construction waste management, and ongoing recycling programs.

The Project will provide dedicated areas accessible to waste haulers and building occupants for the collection and storage of recyclable materials for the entire building. Collection and storage areas may be separate locations. Recyclable materials will include mixed paper, corrugated cardboard, glass, plastics, and metals. The Project will also take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste.

The Project will develop and implement a construction and demolition waste management plan that will identifying at least five materials (both structural and nonstructural) targeted for diversion. The Project will divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. The Project will also consider completing a life-cycle assessment.

Careful material selection will be performed for the Project. Where possible the Project hopes to integrate products that have Environmental Product Declarations (EPD), Sourcing of raw materials and corporate sustainability reporting, and Material Ingredients disclosures.

Indoor Environmental Quality

The U.S. Environmental Protection Agency estimates that Americans spend about 90% of their day in-doors, where the air quality can be significantly worse than outside. The Indoor Environmental Quality credit category promotes strategies that can improve indoor air through low emitting materials selection and increased ventilation. It also promotes access to natural daylight and views.

The Project will meet the minimum requirements of ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a local equivalent, whichever is more stringent.

The Project will provide enhanced indoor air quality strategies. The Project will provide entryway de-sign systems, interior cross-contamination prevention and filtration. The Project will target low emit-ting materials for all materials within the building interior, defined as everything within the water-proofing membrane. This includes requirements for product manufacturing volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials.

The Project will develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building, meeting or exceeding all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3. The Project will protect absorptive materials stored on-site and installed from moisture damage.

The Project will prohibit the use of all tobacco products inside the building and within 25 feet (8 meters) of the building entrance during construction. Daylight will be evaluated for energy efficiency opportunities and benefits for the occupants.

The Project will achieve a direct line of sight to the outdoors for at least 75% of all regularly occupied floor area. View glazing in the contributing area will provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

Innovation & Design Process

The Innovation in Design and Innovation in Operations credit categories provide additional points for projects that use new and innovative technologies, achieve performance well beyond what is required by LEED credits, or utilize green building strategies that are not specifically addressed elsewhere in LEED. This credit category also rewards projects for including a LEED Accredited Professional on the team to ensure a holistic, integrated approach to design, construction, operations and maintenance. Five credits are being pursued and could include the following.

- Innovation in Design: Exemplary Performance, Quality Transit
- Innovation in Design: Green Housekeeping
- Innovation in Design: Modern Mobility
- Innovation in Design: Integrated Pest Management
- Innovation in Design: Modern Grid (maybe)

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 point is awarded to the project. The Project anticipates two RPCs for High Priority Site and Indoor Water Use, and potentially three more RPCs for Optimize Energy, Renewable Energy, and Building Life-cycle Impact Reduction.

4.2 Climate Change Resilience

4.2.1 Introduction

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

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

4.2.2 Extreme Heat Events

The *Climate Ready Boston* report predicts that in Boston, there may be between 25 to 90 days over 90 degrees by 2070, compared to an average of 11 days per year over 90 degrees between 1971 to 2000. The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- Planting new street trees to provide shade and reduce the heat island effect;
- Installing a high-performance HVAC equipment;
- Installing higher performance light and controls; and
- Specifying high albedo roof tops to minimize the heat island effect.

4.2.3 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable.

4.2.4 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions the landscape design is anticipated to incorporate native and adaptive plant materials which require low or no irrigation and are known for their ability to withstand adverse conditions. Plumbing fixtures will be specified to achieve a reduction in water use through low-flow water-closets, low-flow showers, and low-flow sinks.

4.3 Renewable Energy

The Proponent will evaluate the potential for a roof-mounted solar photovoltaic (PV) system, and the availability of grants and renewables funding. The building will be designed to be PV ready. The Proponent has contacted solar PV providers to assess the feasibility of installing solar panels on the roof. It was estimated that approximately 22,000 sf of rooftop space would be available, which would have the capacity for a 200 kW array. This would produce over 10% of the building energy usage. The feasibility of installing a solar PV system will depend on the incentives available at the time of construction, and the ability of the Proponent to take advantage of these benefits.

LEED v4 for BD+C: Core and Shell

Project Checklist

Project Name: 1785 Columbus Ave
Date: 25-Jan-17

Y	?	N			
	1		Credit	Integrative Process	1

18	1	0	**Location and Transportation**		20
			Credit	LEED for Neighborhood Development Location	20
2			Credit	Sensitive Land Protection	2
2			Credit	High Priority Site	3
6			Credit	Surrounding Density and Diverse Uses	6
6			Credit	Access to Quality Transit	6
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

3	1	6	**Sustainable Sites**		11
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
		1	Credit	Open Space	1
		3	Credit	Rainwater Management	3
1			Credit	Heat Island Reduction	2
	1		Credit	Light Pollution Reduction	1
1			Credit	Tenant Design and Construction Guidelines	1

2	9	0	**Water Efficiency**		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
	2		Credit	Outdoor Water Use Reduction	2
2	4		Credit	Indoor Water Use Reduction	6
	2		Credit	Cooling Tower Water Use	2
	1		Credit	Water Metering	1

8	12	13	**Energy and Atmosphere**		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2		Credit	Enhanced Commissioning	6
2	3	13	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
	3		Credit	Renewable Energy Production	3
	1		Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2

2	10	2	**Materials and Resources**		14
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
	6		Credit	Building Life-Cycle Impact Reduction	6
	2		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
		2	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
	2		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

4	6	0	**Indoor Environmental Quality**		10
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
	3		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
	3		Credit	Daylight	3
1			Credit	Quality Views	1

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

2	2	0	**Regional Priority**		4
	1		Credit	Regional Priority: Optimize Energy	1
1			Credit	Regional Priority: High Priority Site	1
1			Credit	Regional Priority: Indoor Water Use	1
	1		Credit	Regional Priority: Renewable Energy	1

45	42	21	**TOTALS**	Possible Points:	**110**

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

LEED 2009 for Core and Shell Development

Project Checklist

1785 Columbus Avenue

#######

Sustainable Sites — Possible Points: 28

Y	?	N			
24	3	1			
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
2			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	2
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
1			Credit 9	Tenant Design and Construction Guidelines	1

Water Efficiency — Possible Points: 10

7	1	2			
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 37

12	7	18			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
4	2	15	Credit 1	Optimize Energy Performance	3 to 21
	1	3	Credit 2	On-Site Renewable Energy	4
2			Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
3			Credit 5.1	Measurement and Verification—Base Building	3
3			Credit 5.2	Measurement and Verification—Tenant Submetering	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 13

4	3	2			
Y			Prereq 1	Storage and Collection of Recyclables	
		1	Credit 1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 5
2			Credit 2	Construction Waste Management	1 to 2
		1	Credit 3	Materials Reuse	1
1	1		Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Certified Wood	1

Indoor Environmental Quality — Possible Points: 12

8	3	1			
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	Construction IAQ Management Plan—During Construction	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	Controllability of Systems—Thermal Comfort	1
1			Credit 7	Thermal Comfort—Design	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

3	3				
1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
	1		Credit 1.3	Innovation in Design: Specific Title	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
	1		Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

3	1				
1			Credit 1.1	Regional Priority: Brownfield	1
	1		Credit 1.2	Regional Priority: Stormwater Quantity	1
1			Credit 1.3	Regional Priority: Heat Island Non-Roof	1
1			Credit 1.4	Regional Priority: Heat Island Roof	1

Total — Possible Points: 110

61	21	24			

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 bounded by Columbus Avenue to the east, Dimock Street to the south, and Amory Street to the west. The Project proposes to redevelop this underutilized site on the edge between Roxbury and Jamaica Plain into a sustainable, commercial office property consisting of social service tenants. Multifamily residential buildings are located directly across Dimock Street and Amory Street, while to the north of the site directly abutting it are lower height commercial and light industrial buildings.

The Project will fill in the surface parking lot and create an urban edge along Columbus Avenue, as well as Dimock Street and Amory Street. However, the building face itself is set back from the property line to ensure that twelve foot sidewalks are maintained along Columbus Avenue and Dimock Street and a nine-foot sidewalk is maintained along Amory Street. The primary entry for the building will be on Columbus Avenue, and a small retail space will be located on the corner of Dimock and Amory streets, activating the corner facing the multi-family residential neighborhood.

5.2 Height, Massing and Façade Treatment

The building has three primary public faces and a fourth face that is internal to the block. The massing is tallest along the four-lane wide Columbus Avenue. The building is seven stories along this face and is comprised of two primary elements. The first and lower element is an extension of the massing of the three-story townhomes to the south of the site (see Figures 5-1 and 5-2). The height of the townhouses informs the height of the lower brick portion of the Project which also contains the Horizons for the Homeless program on the second and third floors. Above that and set back three feet are the remaining four floors of tenant space (see Figure 5-3). That volume steps back across Dimock Street as well so as to not overcrowd the adjacent townhomes or overpower Dimock Street.

As the building façade and massing turn the corner onto Dimock Street, the brick band which ties into the townhomes also turns, continuing to reflect the townhomes. At the raised childcare entry, which is roughly at the same point as the back of the town homes, the brick band ends and a glass entry rises to connect the lower and upper volumes (see Figure 5-4). There is a full story of grade change along Dimock Street and, as a result, the topmost tenant floor is eliminated to the west of this point toward Amory Street, becoming a six-story building as the topography drops. The upper tenant floors are also stepped back 20 feet to break down the mass along the street and to create a series of outdoor play spaces for the children in the Horizons program.

Continuing around the Dimock and Amory corner, the brick base and upper levels of tenant floor continue (see Figure 5-5). On the north side of the building contained within the block will be a large play space for children.

The primary materials include the brick which creates a base and demarcates the institutional program of the Horizons Center for the Homeless and above that, the tenant office floors clad in a fiber cement panel which is meant to evoke the industrial past of the area to the north of the site.

5.3 Open Space/Landscape

The proposed landscape plan will support the goals of Grow Boston Greener and the Boston Complete Streets initiative. A landscape plan is presented in Figure 5-6.

Based on Boston Complete Streets Guidelines, Columbus Avenue is classified as a "Neighborhood Connector Street" because it is one of Boston's "through streets that traverse several neighborhoods and form the backbone of Boston's multimodal street network. They provide continuous walking and bicycling routes and accommodate major bus routes." Large stature Red Maple (*Acer rubrum*) trees were chosen as street trees along Columbus Avenue. They will be spaced 30 feet apart and create a continuous canopy. The trees are sited to complement first-floor entrances to the Project. These trees will be planted in 5-foot-wide covered trenches in the sidewalk, which will provide maximum rooting space for the trees while maintaining accessible sidewalks for the public.

Dimock and Amory streets are classified as both "Neighborhood Residential Streets" and "Industrial Streets". They provide immediate access to a semi-residential neighborhood in Jamaica Plain, are used for local trips, and have much less vehicle traffic than Columbus Avenue. These streets are also home to some of the City's industry and need to accommodate loading and distribution needs of the businesses in the neighborhood. Medium stature American Hornbeam (*Carpinus carolinana*) trees are proposed to be planted 25 feet apart along these streets. Open tree trenches are proposed along Dimock Street. Due to the 10-foot-width of the sidewalk on Amory Street, tree pits (3'x 8') are proposed for the American Hornbeams, allowing for sufficient sidewalk space for pedestrian traffic. The groundcover inside the trenches will be planted with native Pennsylvania sedge (*Carex pensylvanica*), which can be mowed regularly or allowed to naturalize. The sedge will improve drainage and reduce storm water runoff.

The proposed street trees will improve the streetscape along Columbus Avenue, Dimock Street, and Amory Street by increasing canopy cover, improving air quality, and mitigating the urban heat island effect.

1785 Columbus Avenue Boston, Massachusetts

EMBARC ARCHITECTURE+DESIGN STUDIO

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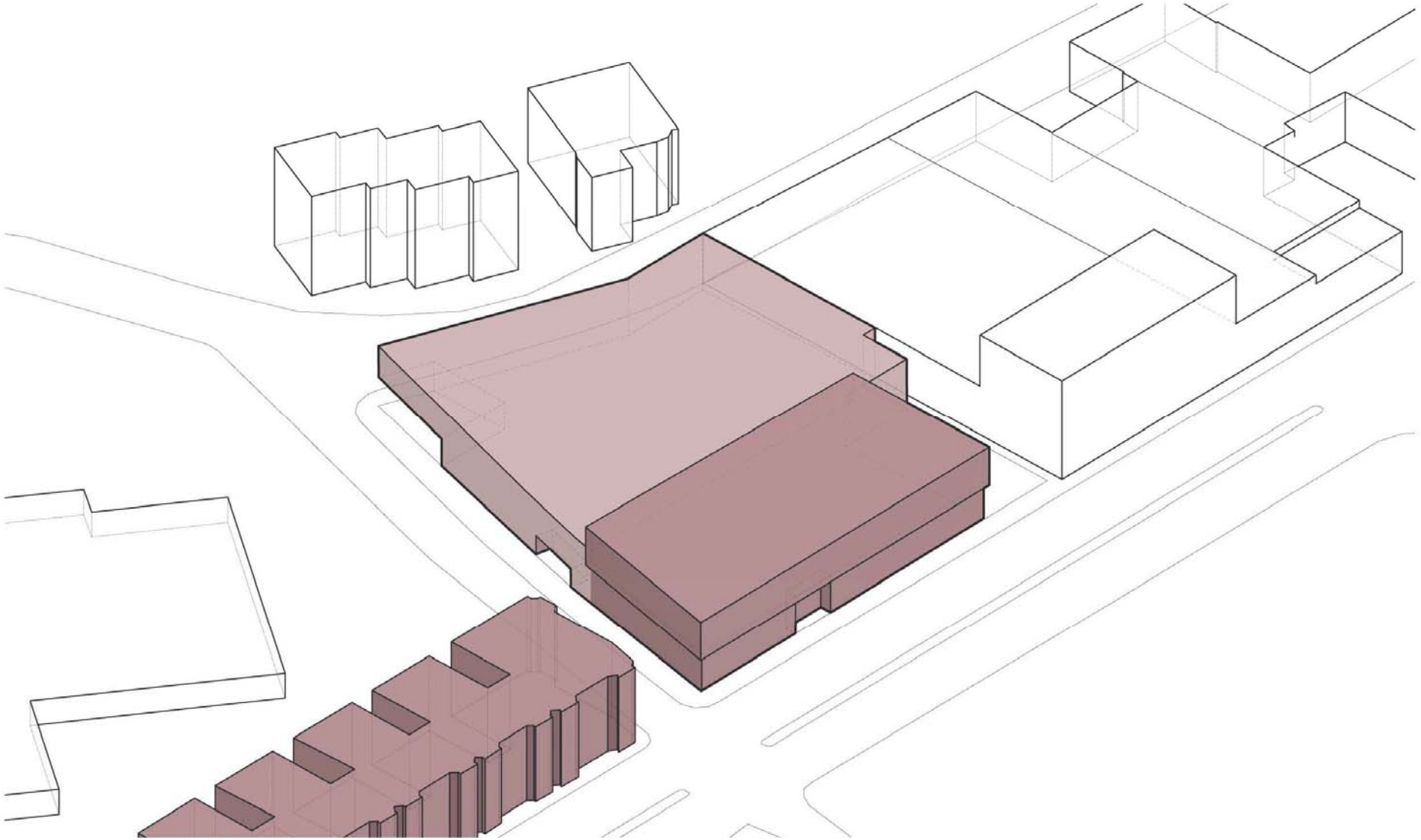
Figure 5-1
Perspective from Columbus Avenue



1785 Columbus Avenue Boston, Massachusetts

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Figure 5-2
Extended Brick Volume

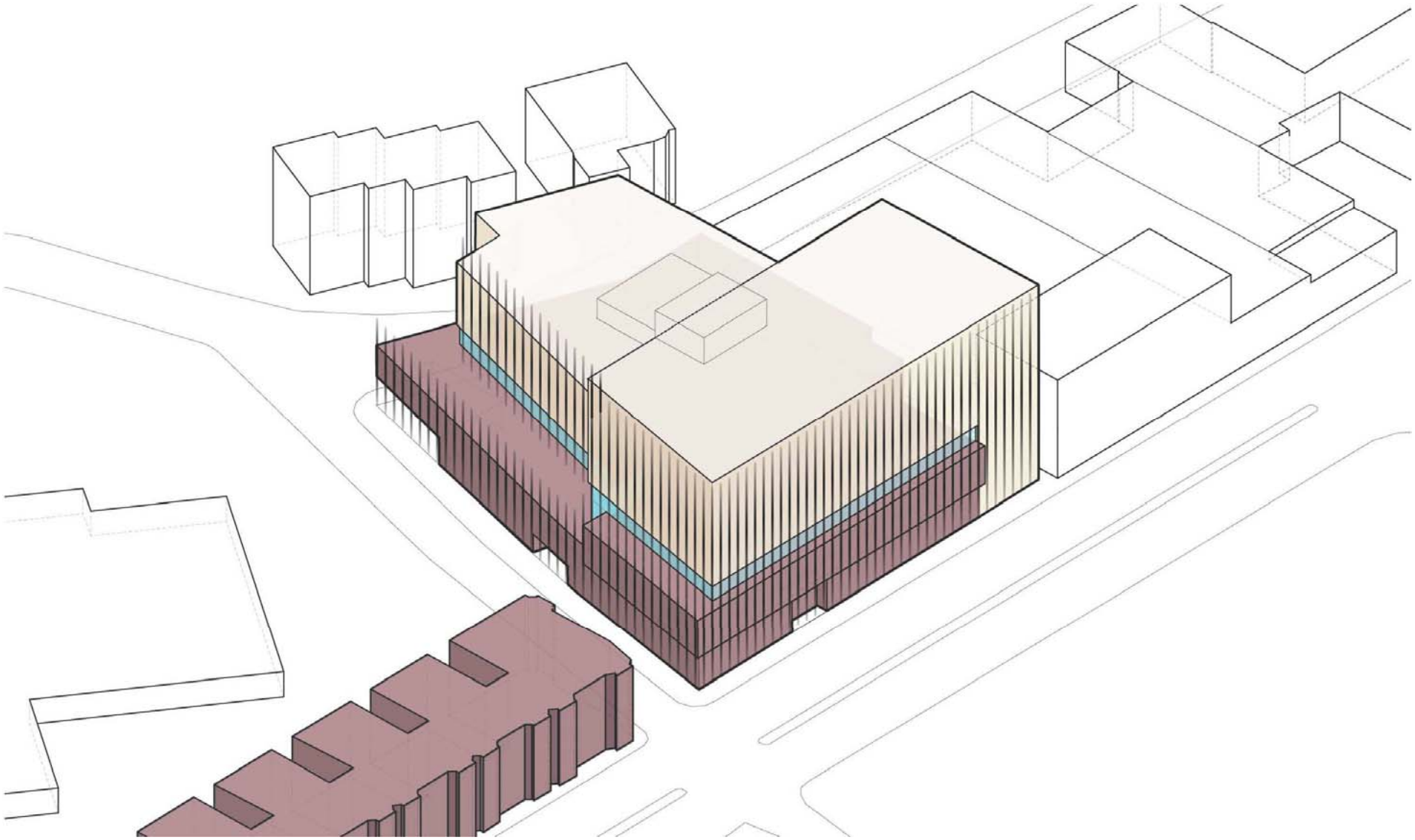

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Figure 5-3
Upper Floors Above Brick Base

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Figure 5-4
Perspective Looking up Dimock Street

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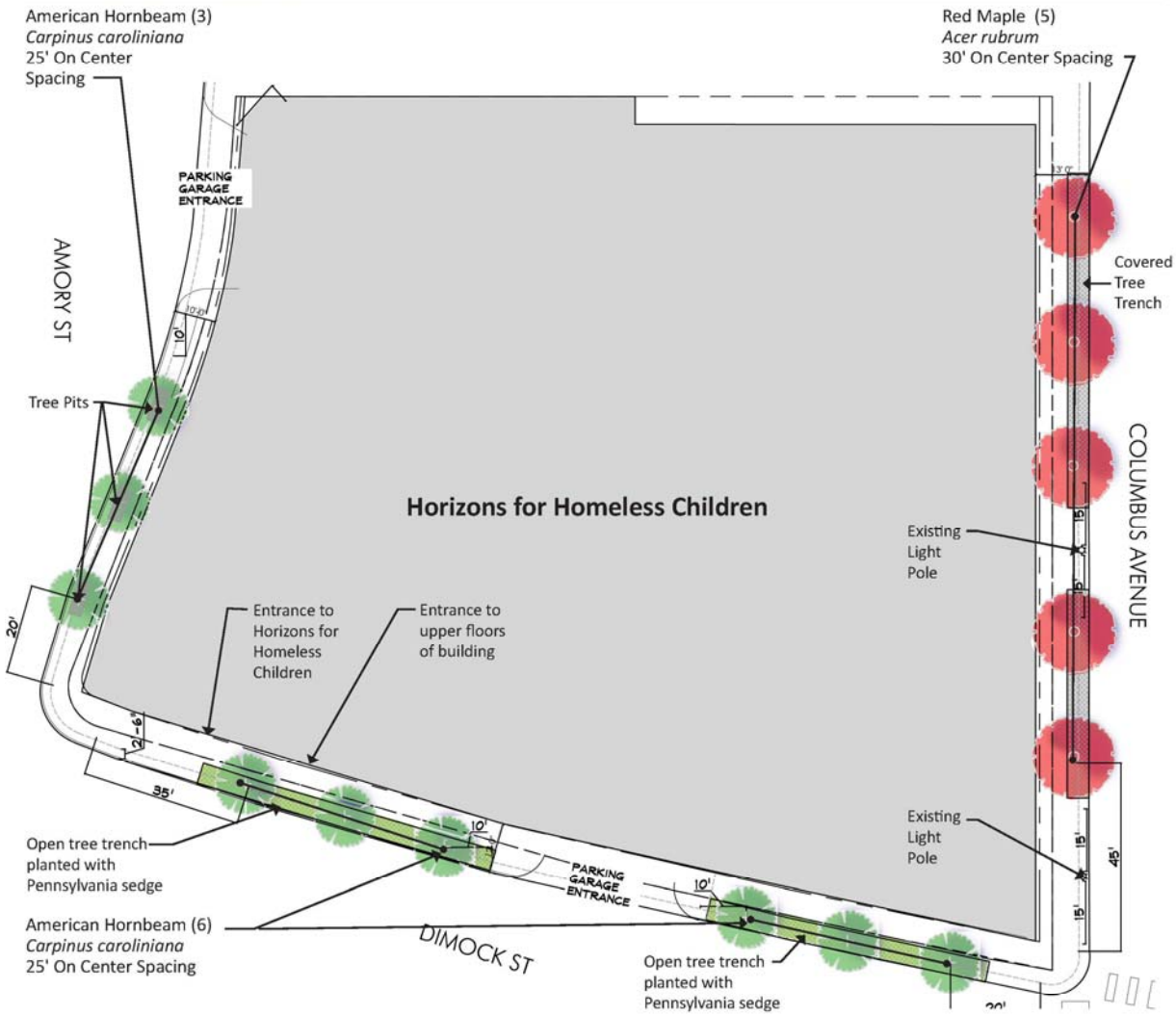
Figure 5-5
Perspective from Amory Street

STREET TREE CONCEPT



PLANT IMAGES

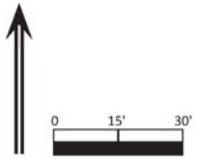
Red Maple (Fall color)
Acer rubrum

American Hornbeam
Carpinus caroliniana

Pennsylvania sedge
Carex pensylvanica

TREE SITING AND SPACING

- Large stature shade trees (Red Maple) are to be planted 30' on center. Medium stature trees (American Hornbeam) are to be planted 25' on center.
- No overhead wires are located along these streets
- Trees are offset:
  - 2'-6" from curb
  - 15' from light poles
  - 10' from driveways
  - at least 20' from intersections



1785 Columbus Avenue Boston, Massachusetts

studio MLA ARCHITECTS

Figure 5-6
Landscape Plan

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and in the vicinity of the Project site and describes the potential project-related impacts to these resources.

6.1 Project Site

The Project site is located on Columbus Avenue in the Jamaica Plain/Roxbury section of Boston, east of Jamaica Pond and northwest of Franklin Park. The surrounding contains a mix of late nineteenth century institutional and early twentieth century residential developments co-existing in proximity to mid-twentieth century light-industrial and commercial structures.

In addition to a surface parking lot, the Project site includes one masonry building and two metal storage buildings. The masonry building, at 1837 Columbus Avenue, was built in 1922 and commissioned by the owner Margaret G. Hinckley. The architects of record were S. C. Sperry Co., Inc., of Cambridge. The building permit indicates that the building was to be occupied for manufacturing purposes but provides no more specific information.

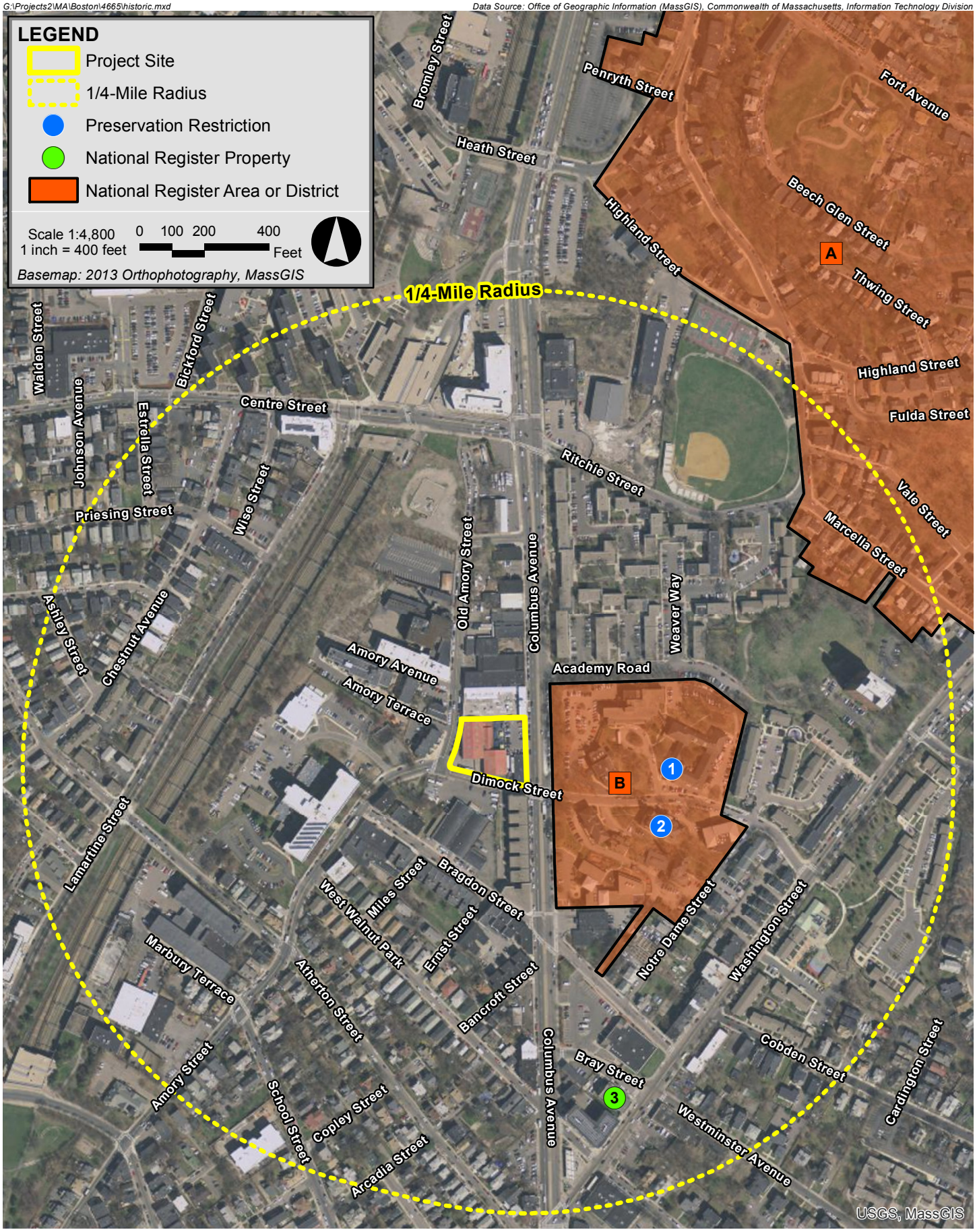
The building is not included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory), nor is the building included in the State or National Registers of Historic Places.

6.2 Historic Resources in the Project Vicinity

Several historic resources included in the State and National Registers of Historic Places exist within a quarter-mile radius of the Project site. These include: the Sewall Maternity Building and Dr. Marie E. Zakrzewska Medical Building of the former New England Hospital for Women and Children, now known as the Dimock Community Health Center; Abbotsford, also known as the Center for Afro-American Arts, at 300 Walnut Avenue; the Boston Elevated Railway Egleston Substation at 3025 Washington Street. Also within the vicinity are the Roxbury Highlands Historic District and Harriswood Crescent.

Table 6-1 lists State and National Register-listed properties and historic districts located within a quarter-mile radius of the Project site. The individually listed properties are assigned numbers, which correspond to Figure 6-1. Figure 6-1 also identifies the locations of the State and National Register-listed historic districts within a quarter mile of the Project site; these are indicated by letters.

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



1785 Columbus Avenue Boston, Massachusetts

Epsilon Associates Inc.

Figure 6-1

Historic Resources Map

Table 6-1 State and National Register Resources in the Vicinity

No.	Historic Resource	Address	Designation
1	Sewall Maternity Building	55 Dimock St.	NRDIS, NHL, PR
2	Dr. Marie E. Zakrzewska Medical Building	55 Dimock St.	NRDIS, NHL, PR
3	Abbotsford	300 Walnut Ave.	NR, PR
4	Boston Elevated Railway Egleston Substation	3025 Washington St.	NR
A	New England Hospital for Women and Children	Dimock Community Health Center	NRDIS, NHL, PR
B	Roxbury Highlands Historic District	Columbus Ave., Washington & Dudley Sts.	NRDIS
C	Harriswood Crescent	Harold, Monroe & Townsend Sts.	NR

Designation Legend:
NR - Individually listed on the National Register of Historic Places
NRDIS - National Register of Historic Places historic district
NHL - National Historic Landmark
PR - Preservation Restriction

Named for an early administrator of the New England Hospital for Women and Children, the **Sewall Maternity Building** at 55 Dimock Street was completed in 1892 to the designs of Dorchester architect John Fox. Constructed of red brick, its cubic central mass is capped by a hipped roof culminating in a louvered cupola; one- and two-story wings extend to the side and rear, creating courtyards. Colonial Revival in style, the building's asymmetrical front elevation balances an entry with broken-pediment surround to the left with a tall chimney to the right. The subject of a preservation restriction in 1986, the Sewall Maternity Building was designated a National Historic Landmark in 1991.

An elaborate example of the Ruskin Gothic style, the **Dr. Marie E. Zakrzewska Building** occupies a prominent hillside site from which its corner turret surveys the historic complex of the former New England Hospital for Women and Children. Maintained today as the centerpiece of its successor institution, the Dimock Community Health Center, the Zakrzewska Building is named for one of the founding physicians of the former hospital. As completed in 1872 to the designs of noted Boston architects Cummings & Sears, the building is a lively composition of sandstone-trimmed red brick crowned by a polychrome slate roof. Although chiefly of aesthetic interest today, its tiered porches overlooking Dimock Street originally provided a healthful, open-air therapeutic environment for the hospital's inpatients. Subject to a preservation restriction established in 1986, the Zakrzewska Building was designated a National Historic Landmark in 1991.

Dating also from 1872, **Abbotsford** at 300 Walnut Avenue was originally known as Oakbend when built as the residence of local banker Aaron Williams, Jr. Designed in the High Victorian Gothic style by Boston architect Alden Frink, the building's exterior walls are of Roxbury puddingstone quarried nearby; the same material is also used for the retaining walls encircling the property. Notable for its soaring tower, the building's roof also features ornamental gables, dormers and chimneys. Used by the City of Boston as a boys' reformatory after 1924, the mansion-scaled building had been vacant for some time when acquired by the National Center for Afro-American Artists in 1976. Listed on the National Register of Historic Places since 1987, Abbotsford has been subject to a preservation restriction since 2012.

Completed in 1909, the former **Egleston Substation** of the Boston Elevated Railway is located at 3025 Washington Street. The powerhouse for the former mass-transit system displays of an early Renaissance basilica appearance. Set on a raised water table of cast stone, its stucco elevations are bordered by red brick; the same material defines the colossal entry arch of the narrow front elevation. The Egleston Substation was listed on the National Register of Historic Places in 2010.

Operated today as the Dimock Community Health Center, the **New England Hospital for Women and Children** was first established in 1862. In addition to its individually designated Sewall and Zakrzewska buildings noted above, the health center complex comprises eight major buildings built on a nine-acre parcel over a 58-year period. These include other works by John Fox and Cummings & Sears in the Stick and Georgian Revival systems. Dotted by mature trees and outcroppings of Roxbury puddingstone, the health center's topography presents a picturesque, campus-like appearance. The Property was designated a National Register Historic District in 1995.

Listed in the National Register in 1989, the **Roxbury Highlands Historic District** is bounded roughly by Roxbury Street, Anita Terrace, Centre, Highland, Marcella and Washington Streets. Its approximately 170 acres is laid out in streets whose winding contours correspond to the hilly topography.

Architecturally the area is particularly rich in the residential building types and styles fashionable in the century between 1830 and 1930, although a handful of significant earlier resources are also present. Among these are the Federal-style First Church of Roxbury, completed in 1804, and several nearby houses of the same period in John Eliot Square. Greek Revival houses both small and substantial exist throughout the district, including several temple-fronted examples with monumental pediments and columned porticoes. A small number of steep-roofed, cottage-scaled Gothic Revival houses are also located throughout the area. More commonly represented are examples of the Italianate style, indicated by their bracketed cornices and entry porches. The Second Empire style, with its distinctive double-pitched mansard roof, is also common in both frame and masonry examples. Single- and multi-family houses in the Queen Anne and Classical Revival styles were built in the closing years of the nineteenth century. After 1900 large masonry

apartment blocks began to appear throughout the Highlands. Typically of red or buff brick, these often include round or angled bay projections and columns, pilasters and projecting cornices.

Facing rocky Horatio Harris Park on Harold Street between Monroe and Townsend Streets, **Harriswood Crescent** is a contiguous row of fifteen related houses. Representative of the Romanesque and Tudor styles, these residences feature brick, half-timbered stucco and stone. Completed in 1890 to the specifications of the prolific Boston architect J. Williams Beal, this row has been regarded as a successor to the Tontine Crescent, Charles Bulfinch's early nineteenth-century speculative development which once stood on Franklin Street in Boston's central business district. Harriswood Crescent was included in the National Register of Historic Places in 1986.

6.3 Impacts to Historic Resources

The Project includes the demolition of the buildings which now partially occupy the site. The masonry building at 1837 Columbus Avenue is a purpose-built manufacturing facility dating from 1922. Its single-story form and minimal detailing are undistinguished. Essentially a red brick box, seven bays wide along Columbus Avenue and three bays deep on Dimock Street, its utilitarian appearance is ornamented only by the modest projection of the piers that organize the elevations. The minimal fenestration could be original or may reflect the sealing of original openings. Neither it nor the adjacent metal buildings, which appear to date from the fourth quarter of the twentieth century, is included in the Inventory or the State or National Registers.

6.3.1 Demolition of Existing Buildings

In that one of the buildings now partially occupying the Project site (1837 Columbus Avenue) is greater than 50 years old, its removal will require Article 85/Demolition Delay review by the Boston Landmarks Commission. Given the undistinguished character of the building at 1837 Columbus Avenue, a finding of significance is not anticipated.

6.3.2 Urban Design

The proposed Project will introduce a distinctive presence within the context, where it will enjoy three street-facing elevations, along Columbus Avenue, Dimock and Amory Streets. Responding to the primacy of Columbus Avenue within the context, the building rises to six stories along this major arterial street. This height is mitigated by a setback as the façade turns down Dimock Street, whose grade descends to that of Amory Street, the equivalent of a story below Columbus Avenue. The apparent scale is also effectively diminished by a change in materials: whereas the lower two floors are expressed in brick to relate to the early 20th century residential buildings to the south of the site, the upper floors are clad in fiber cement panels intended to evoke the industrial buildings elsewhere within the Project area. The asymmetrical massing of the Dimock and Amory Street elevations responds

effectively to both the irregular topography and the heterogeneous built character of this mixed-use neighborhood. At the same time, the setbacks provide secure open-air play spaces for children served by Horizons for Homeless Children programs.

6.3.3 Shadow Impacts

Shadow impact analyses were undertaken to demonstrate the anticipated impacts from the Project. These consisted of standard shadow studies done for March 21, June 21, September 21, and December 21 at 9:00 a.m., 12:00 p.m. and 3:00 p.m., as well as 6:00 p.m. for June and September 21. The studies demonstrate minor shadow extending across the extreme northwest portion of the New England Hospital for Women and Children/Dimock Community Health Center at 3:00 p.m. on March 21, June 21, and September 22. Moderate shadow is cast more deeply onto that institution's campus at 3:00 p.m. on December 21, and at 6:00 p.m. on June 21 and September 21. The studies indicate no shadow impacts to the Dimock Community Health Center at other dates or times. Similarly, there are no anticipated shadow impacts on any other historic resources within a quarter-mile radius of the Project site.

The results of these shadow studies are depicted in Figures 3.2-1 to 3.2-14.

6.3.4 Conclusion

The Project has been sensitively designed to be responsive to the challenging grade conditions of its site and harmonious with the diverse residential, institutional and industrial buildings that comprise its densely-developed context.

6.4 Archaeological Resources on the Project Site

The Project site is a previously developed urban parcel. There are no known archaeological resources listed in the State and National Registers of Historic Places or included in the Inventory within the Project site.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

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

7.1 Sewer System

7.1.1 Existing Sewer System

The Boston Water and Sewer Commission (BWSC) owns the existing sanitary sewer system in the Project area. There are existing sanitary sewer lines in all three of the abutting streets: a 12″ line in Columbus Avenue, a 12″ line in Dimock Street, and a 30″ line in Amory Street.

The existing warehouse building does not have a sanitary connection. The existing body shop building connects to the sanitary sewer in Columbus Avenue, however, there are few occupants and existing sanity sewer flows are minimal. This service connection will be cut and capped at the main in accordance with BWSC requirements when the building is demolished.

7.1.2 Projected Generated Sanitary Sewer Flow

As shown in Table 7-1 below, the Project is expected to generate 11,003 gallons per day (GPD). This anticipated sanitary flow was estimated based on the design criteria in the State Environmental Code, Title 5 (310 CMR 15), which lists typical sewage generation values for the proposed building use.

Table 7-1 Proposed Project Wastewater Generation

Use	Size			310 CMR Value (gpd/Unit)	Total Flow (Gpd)
Office	87,500	sf	75	/1000 Sf	6,563
Daycare	374	People	10	gpd/Person	3,740
Café	20	Seats	35	gpd/Seat	700
				Total Proposed Flow	**11,003**

7.1.3 Sanitary Sewer Connection

Two new sanitary sewer connections are proposed for the new building: one connection to the 12″ line on Columbus Avenue and one connection to the 30″ line on Amory Street. All sanitary sewer infrastructure will be designed according to BWSC requirements and

standards. The proposed sanitary sewer connections will be subject to BWSC's Site Plan Review and will require a General Service Application. Proposed sewer and water connections are presented in Figure 7-1.

7.2 Water System

7.2.1 Existing Water Service

The water distribution system in the Project area is owned by BWSC. There are existing eight-inch water mains within Columbus Avenue and Dimock Street, and an existing 16″ water main in Amory Street.

The existing warehouse building does not have running water. The existing body shop building draws water from the main on Dimock Street. This service connection will be cut and capped at the main in accordance with BWSC requirements.

7.2.2 Anticipated Water Consumption

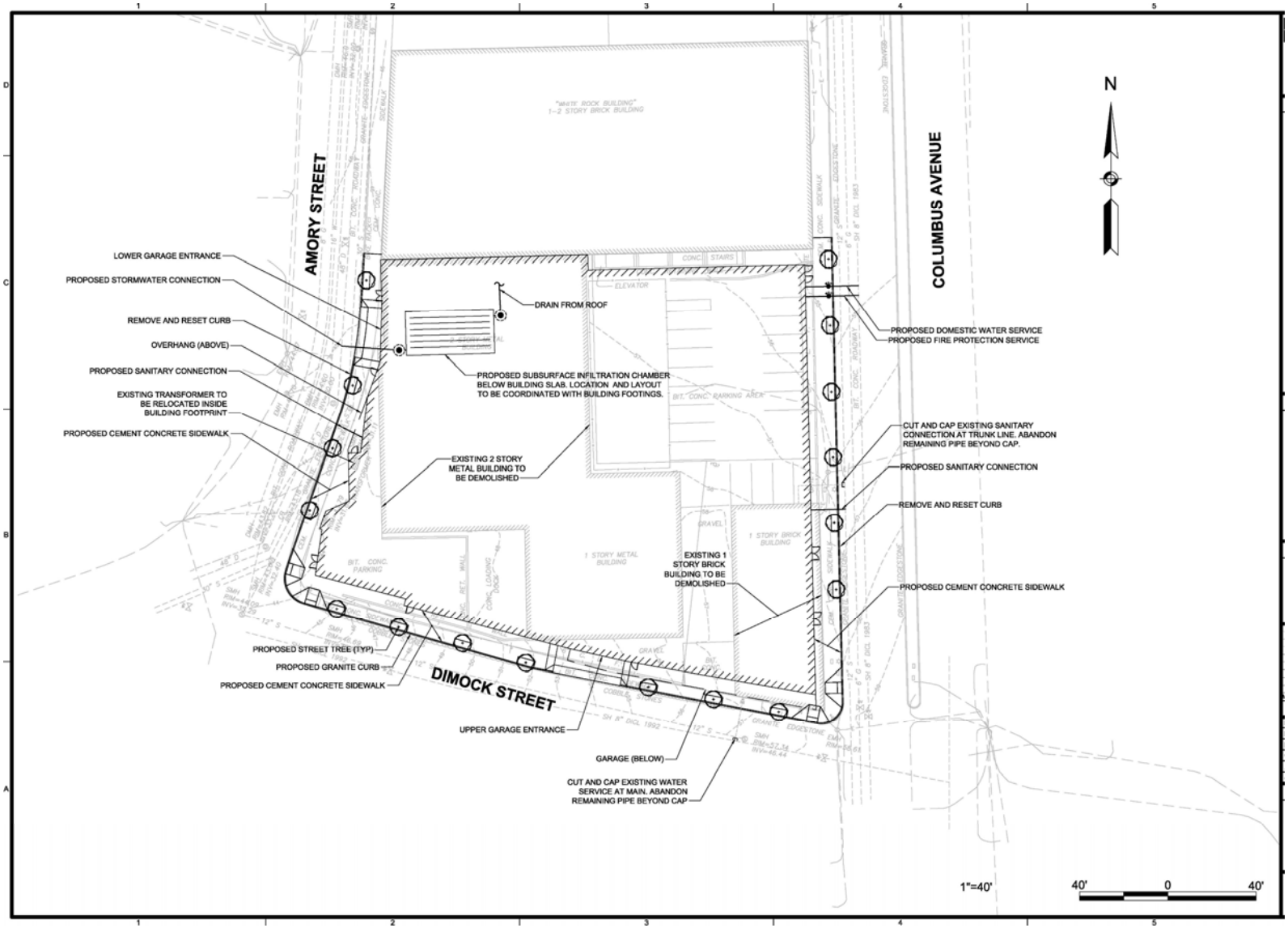
The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 310 CMR 15.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is approximately 12,103 gpd.

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

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

7.2.3 Proposed Water Service

An estimated 4″ domestic water service connection and a 4″ fire protection service connection are proposed to connect to the existing main in Columbus Avenue. The sizes of these connections will be updated as needed as the building's design advances. All domestic water and fire protection services will be designed according to BWSC rules and regulations, and the proposed water service connections will be subject to review and approval through the same BWSC Site Plan Review and General Service Application processes required for the proposed sanitary and stormwater connections. During the Site Plan Review process, the Proponent will confirm with BWSC that the existing water distribution system can provide the required flow.



1785 Columbus Avenue **Boston, Massachusetts**

Figure 7-1
Site Plan

7.3 Storm Drainage System

7.3.1 Existing Storm Drainage System

There is no existing stormwater collection system on site. A small planting area (~400 sf) and an unused gravel area (~2,300 sf) may provide some small amount of infiltration, but otherwise all stormwater currently sheet-flows off the site and is collected by BWSC-owned catch basins on Columbus Avenue or Amory Street. The storm sewer's trunk line on Amory Street is 48 inches in diameter. On Columbus Avenue, drainage structures connect to a 42″x54″ storm drain near the east curb line. No storm sewer is present in the section of Dimock Street abutting the site.

7.3.2 Proposed Storm Drainage System

The proposed building will occupy virtually the entire site, so all stormwater runoff will come from the roof or patio areas created by the building step-backs. To provide groundwater recharge, a subsurface infiltration chamber is proposed underneath the building. The chamber will be sized to recharge one inch of runoff from the site's impervious surface area.

During storm events that exceed the infiltration chamber's capacity, any stormwater that is not recharged will be discharged to the BWSC storm drain in Amory Street.

A small increase in impervious area on the site is proposed, so the subsurface detention chamber will also be used to attenuate the stormwater flow leaving the site. The Project will not increase the peak discharge rate.

7.3.3 Groundwater Overlay District

According to City of Boston zoning maps, the project site is not located in Boston's Groundwater Conservation Overlay District and so is not subject to the associated Conditional Use permitting requirements.

7.3.4 State Stormwater Standards

The Project is subject to the State's Stormwater Management Standards as enforced by the Boston Water and Sewer Commission. To demonstrate compliance, a Site Plan (with associated calculations and supporting documentation) will be prepared for BWSC's review and approval.

Compliance with the stormwater standards as will be achieved as follows:

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

Compliance: This standard will be fully met. All stormwater will be infiltrated on site or discharged to the existing BWSC stormwater system.

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: This standard will be fully met. A subsurface infiltration/detention chamber is proposed to attenuate peak runoff rates.

Standard 3: The annual post-development recharge shall approximate the annual recharge from pre-development conditions based on soil type.

Compliance: This standard will be fully met. The subsurface infiltration chamber will be sized to provide the required recharge volume.

Standard 4: Stormwater management systems will be designed to remove 80% of the post-construction load of total suspended solids (TSS).

Compliance: This standard will be fully met. With pretreatment, the proposed subsurface infiltration chamber will provide 80% TSS removal. Appropriate pretreatment BMPs will be identified as the design progresses.

Standard 5: For land uses with higher potential pollutant loads (LUHPPL), source control and pollution prevention measures shall be implemented.

Compliance: The site is not a LUHPPL. This standard does not apply.

Standard 6: Stormwater discharges within Zone II or Interim Wellhead Protection Areas, or other critical areas require the use of source control and pollution prevention measures.

Compliance: The site is not located in any of the applicable water supply protection areas. This standard does not apply.

Standard 7: Redevelopment projects are required meet the following standards to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural BMP requirements of Standards 4, 5, and 6. Existing outfalls must comply with Standard 1 only to the maximum extent practicable.

Compliance: This standard does not apply. The Project is not considered a redevelopment project due to a small proposed increase in impervious surface area.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources, shall be developed and implemented.

Compliance: This standard will be fully met. A stormwater pollution prevention plan will be prepared for the contractor to follow during construction.

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

Compliance: This standard will be fully met. An O&M plan will be prepared for the building's owner.

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

Compliance: This standard will be fully met. The closed stormwater system is not expected to provide the opportunity for illicit discharges, and an Illicit Discharge Compliance Statement will be signed by the owner.

7.4 Electrical Service

Power to the site is currently provided by Eversource. The existing electrical service drops connect to underground power duct banks under both the Amory Street and Columbus Avenue. An existing transformer is located on the site near the Amory/Dimock intersection.

The proposed building will draw power from Amory Street, but the existing transformer will be relocated or replaced to accommodate the new construction. The proposed transformer location has not yet been designed, but it will be located in accordance with the applicable codes.

7.5 Telecommunication Systems

An existing overhead telephone/data line connects the existing buildings to the adjacent building at 1705 Columbus Avenue. This overhead line will be removed when the existing buildings are demolished and a new connection will be made to the existing Comcast duct bank within Amory Street.

7.6 Gas Systems

National Grid-owned gas lines exist within both Columbus Avenue and Amory Street. The line in Columbus Avenue is six inches in diameter; the line in Amory Street is 8″ in diameter.

Existing buildings on site are fed from the main on Columbus Avenue. It is anticipated that gas service will be available from either Columbus Avenue or Amory Street as needed, though the proposed heating system has not yet been designed.

7.7 Utility Protection During Construction

The contractor will notify utility companies and call "Dig Safe" prior to excavation. During construction, infrastructure will be protected using sheeting and snoring, temporary relocations and construction staging as required. The construction 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 construction contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the construction contractor will be required to coordinate the shutdown with the utility owners and Project abutters to minimize impacts and inconveniences.

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 designed to comply with the standards of the Americans with Disabilities Act. See Appendix F for the Accessibility Checklist.

8.2 Massachusetts Environmental Policy Act

The Project is not subject to review under the Massachusetts Environmental Policy Act (MEPA), 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; (c) projects involving state financial assistance; and (d) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR 11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations. (301 CMR 11.03.) As noted above, the Project does not appear to require state action.

8.3 Massachusetts Historical Commission

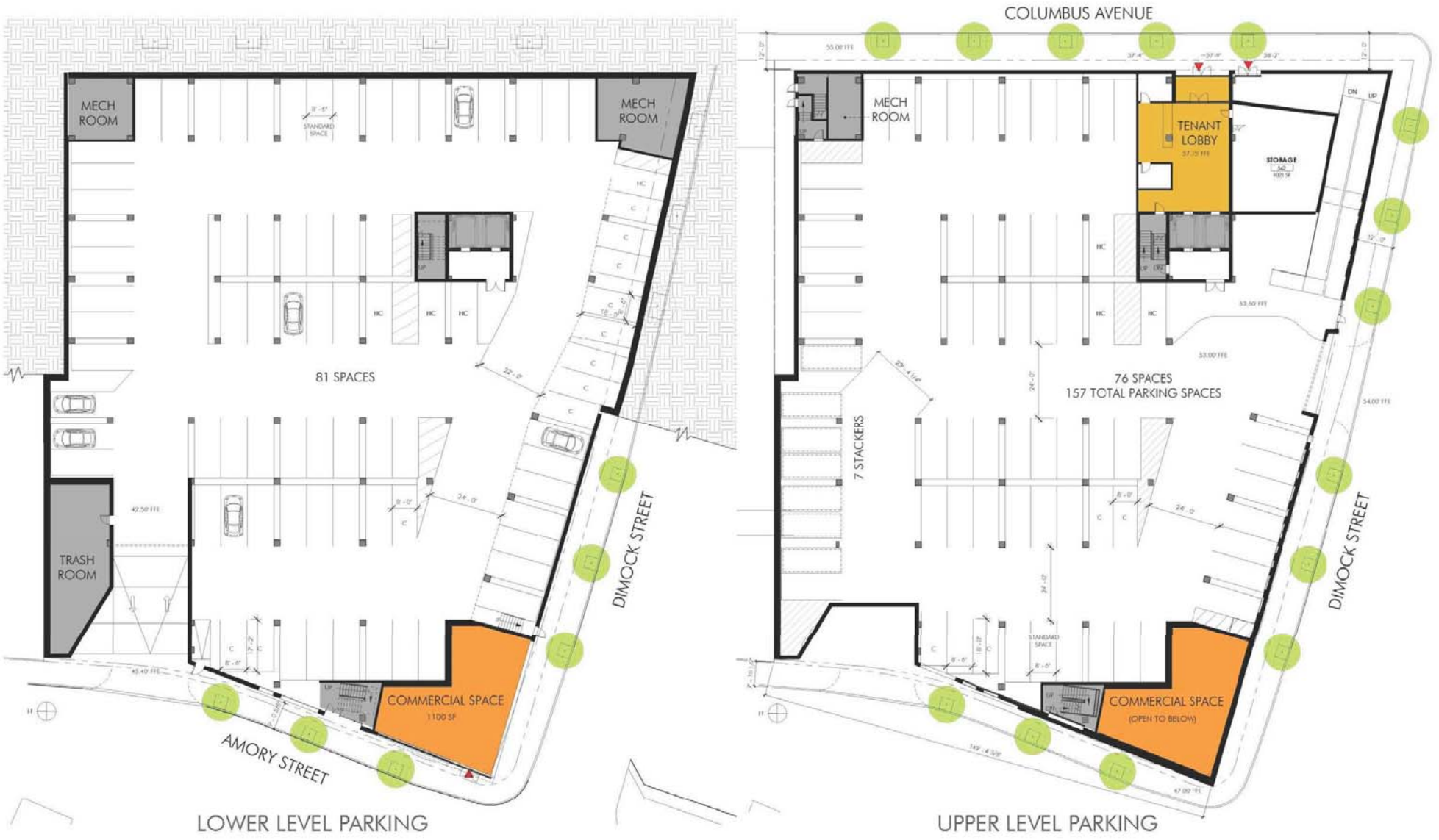
The Massachusetts Historical Commission (MHC) has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places. The Project does not require state action that triggers MHC review under Chapter 9 of the Massachusetts General Law (MGL), Sections 27-27c, as amended by Chapter 254 of the Acts of 1988. Should this change, MHC's review of the Project under the State Register Review process would be initiated through the filing of an MHC Project Notification Form

8.4 Boston Civic Design Commission

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

Appendix A

Floor Plans and Sections



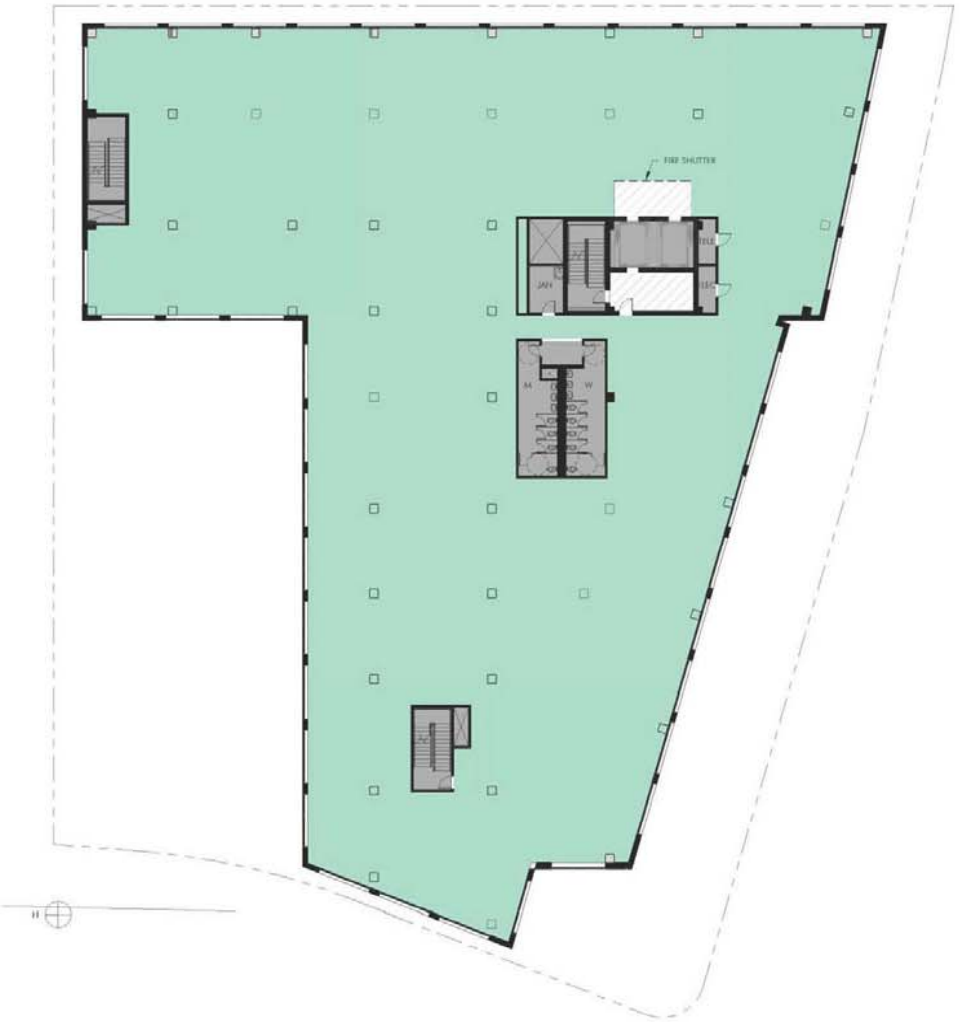
1785 Columbus Avenue Boston, Massachusetts

CHILD CARE LEVEL

HORIZONS ADMINISTRATION

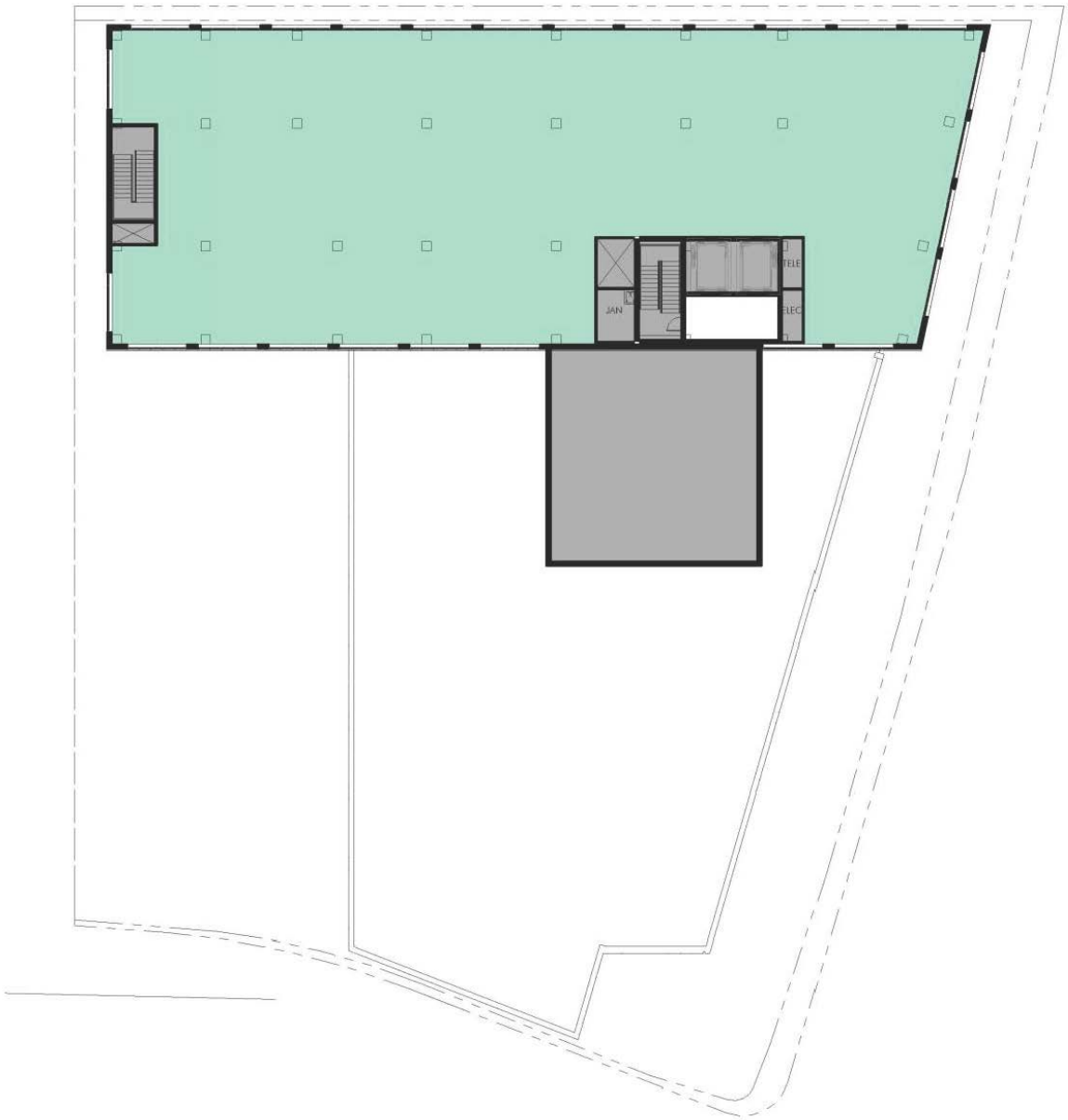
1785 Columbus Avenue Boston, Massachusetts

MULTI-TENANT LAYOUT

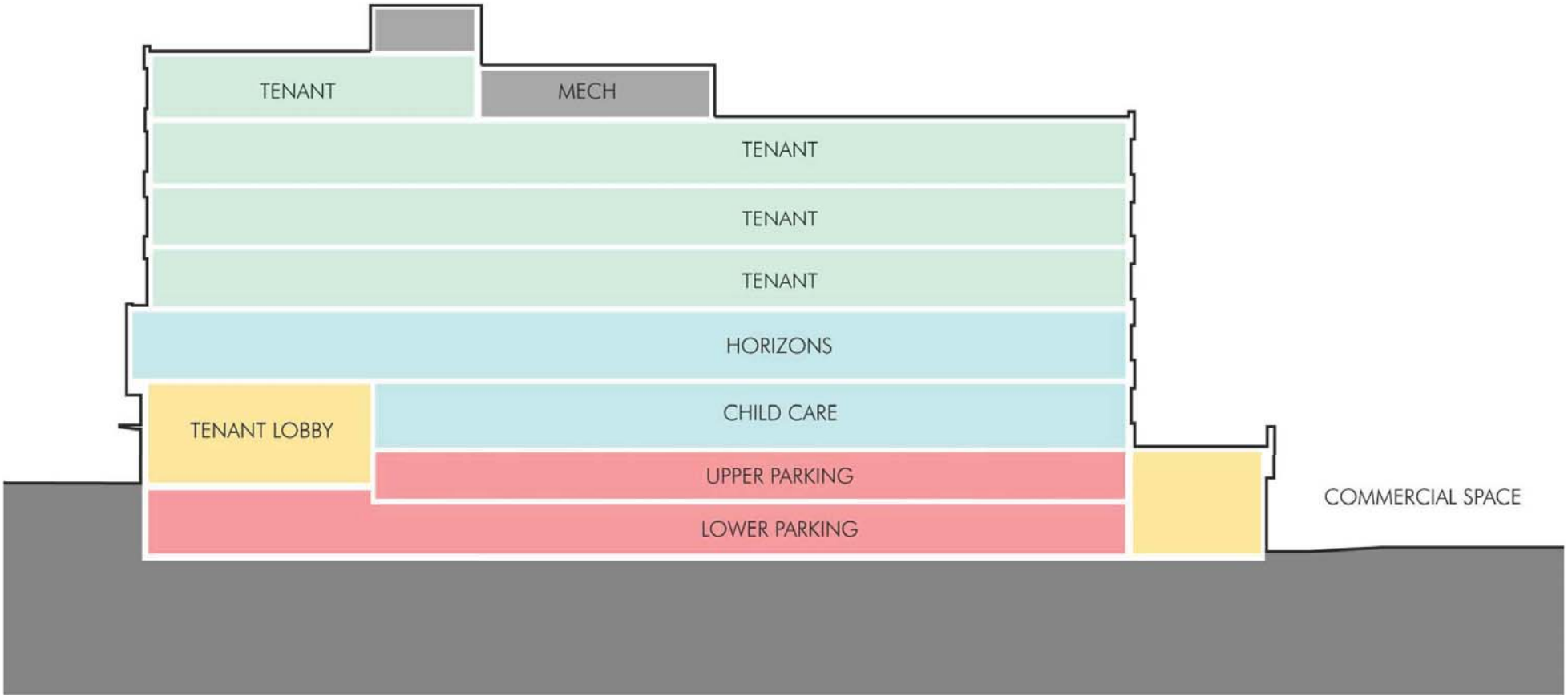


SINGLE TENANT LAYOUT

1785 Columbus Avenue Boston, Massachusetts



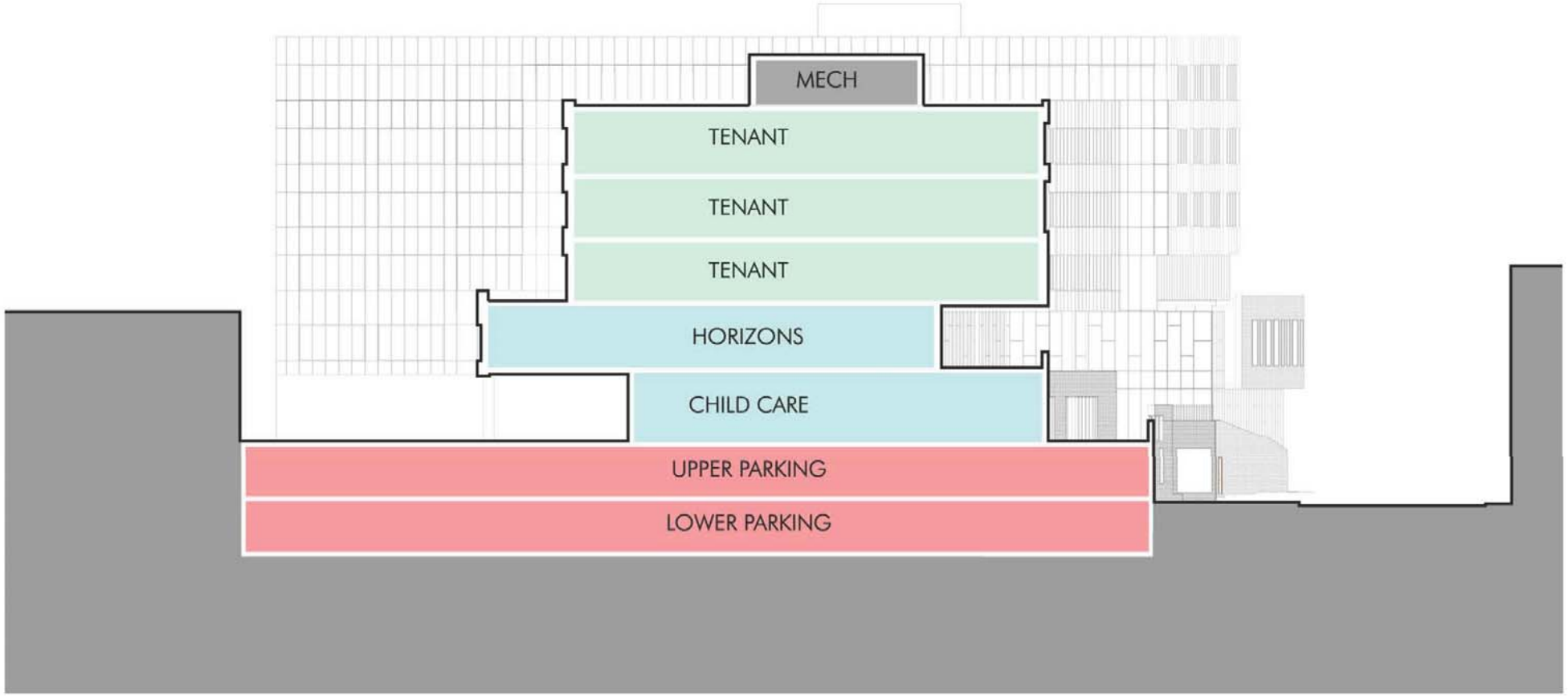
1785 Columbus Avenue Boston, Massachusetts



1785 Columbus Avenue Boston, Massachusetts

EMBARC STUDIO ARCHITECTURE+DESIGN studio MLA ARCHITECTS

East-west Section



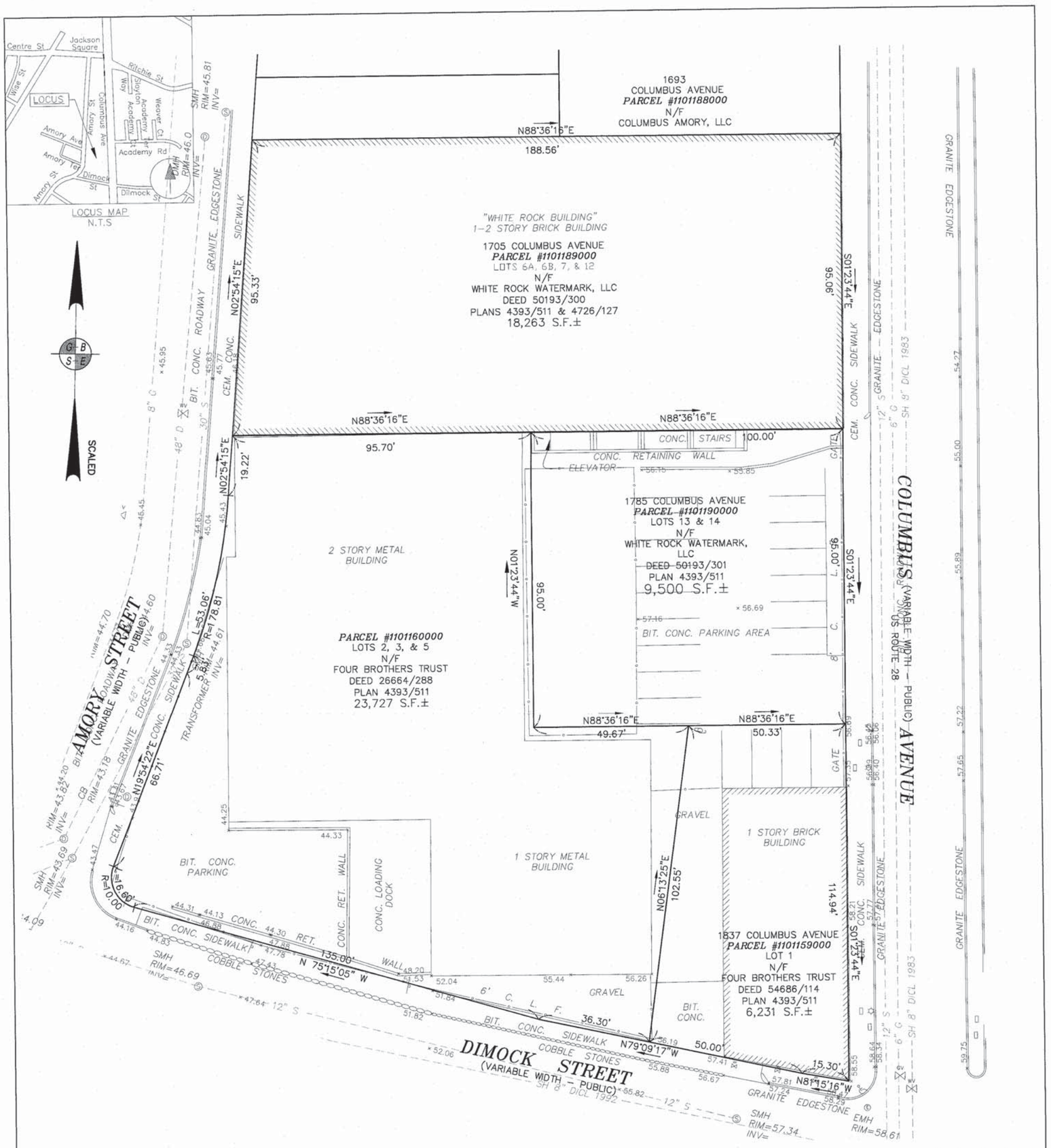
1785 Columbus Avenue Boston, Massachusetts

EMBARC STUDIO ARCHITECTURE+DESIGN studio MLA ARCHITECTS

North-south Section

Appendix B

Survey



COMMONWEALTH OF MASSACHUSETTS
PAUL J. TYRELL
No. 47809
PROFESSIONAL
LAND SURVEYOR
9.21.16

PLAN OF LAND
1785, 1837 COLUMBUS AVENUE & PARCEL 1101160000
BOSTON, MASSACHUSETTS
(ROXBURY DISTRICT)

PREPARED FOR
LEE GOODMAN
1705 COLUMBUS AVENUE
BOSTON, MA 02119
617-212-8583

GREATER BOSTON SURVEYING AND ENGINEERING
19 FREDITH ROAD
WEYMOUTH, MA 02189
(781) 331-6128

CALC BY: PJT	DATE: SEPTEMBER 21, 2016	SCALE: 1"=10'

Appendix C

Transportation

Available Upon Request

Appendix D

Air Quality

AIR QUALITY APPENDIX

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2016 and 2023 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2016	2023
Free Flow	30 mph	2.697	1.844
Right Turns	10 mph	4.447	2.956
Left Turns	15 mph	3.823	2.586
Queues	Idle	9.997	4.102

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 371 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 30 mph were used for right turn, left turn, and free flow links, respectively.

Watermark Development - 1785 Columbus Avenue
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2013	2014	2015	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2013-2015 Background Concentration ($\mu g/m^3$)	Location
SO_2 [1][6]	1-Hour [5]	99th %	10.9	12.3	9.4	ppb	2.62	28.5	Harrison Ave., Boston
	3-Hour	H2H	9.7	21.5	8.7	ppb	2.62	56.3	Harrison Ave., Boston
	24-Hour	H2H	5	5.1	4.3	ppb	2.62	13.4	Harrison Ave., Boston
	Annual	H	1.1	1.1	0.8	ppb	2.62	2.8	Harrison Ave., Boston
PM-10	24-Hour	H2H	34	61	28	$\mu g/m^3$	1	61	Harrison Ave., Boston
	Annual	H	15.1	13.9	12.4	$\mu g/m^3$	1	15.1	Harrison Ave., Boston
PM-2.5	24-Hour [5]	98th %	15.9	12.7	19	$\mu g/m^3$	1	15.9	Harrison Ave., Boston
	Annual [5]	H	7.3	6.0	8.8	$\mu g/m^3$	1	7.4	Harrison Ave., Boston
NO_2 [3]	1-Hour [5]	98th %	50	51	53	ppb	1.88	96.5	Harrison Ave., Boston
	Annual	H	17.4	15.8	15.0	ppb	1.88	32.8	Harrison Ave., Boston
CO [2]	1-Hour	H2H	1.9	1.7	1.4	ppm	1146	2145.3	Harrison Ave., Boston
	8-Hour	H2H	1.2	1.3	0.9	ppm	1146	1489.8	Harrison Ave., Boston
Ozone [4]	8-Hour	H4H	0.059	0.054	0.056	ppm	1963	115.8	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.006	0.014	0.016	$\mu g/m^3$	1	0.016	Harrison Ave., Boston

Notes:
From 2013-2015 EPA's AirData Website

[1] SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.

[2] CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.

[3] NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.

[4] O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.

[5] Background level is the average concentration of the three years.

[6] The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

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

Appendix E

Climate Change Preparedness and Resiliency 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:	**1785 Columbus Ave**
Project Address Primary:	**1785 Columbus Ave**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	**Lee Goodman/Horizons Watermark LLC/617.445.1900/lgoodman@watermarkinc.us**

A.2 - Team Description

Owner / Developer:	**Horizons Watermark LLC**
Architect:	**EMBARC Studio**
Engineer (building systems):	**AHA Consulting Engineers**
Sustainability / LEED:	**Soden Sustainability Consulting**
Permitting:	**Epsilon Associates**
Construction Management:	**TBD**
Climate Change Expert:	**AHA Consulting Engineers**

A.3 - Project Permitting and Phase

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

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

A.4 - Building Classification and Description

List the principal Building Uses:	Commercial, Office
List the First Floor Uses:	*Daycare*

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

☐ Wood Frame	☐ Masonry	☑ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*39,458 SF*	Building Area:	*139,200 SF*
Building Height:	*92 Ft.*	Number of Stories:	*7 Flrs.*
First Floor Elevation (reference Boston City Base):	*63.5' Elev.*	Are there below grade spaces/levels, if yes how many:	*Yes* *Number of Levels* *1*

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

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

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

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

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

B - Extreme Weather and Heat Events

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

B.1 - Analysis

What is the full expected life of the project?

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

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

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

What time span of future Climate Conditions was considered?

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

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

8/91 Deg.	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:	***10%***
How is performance determined:	Energy Model

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

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

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

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

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

	☐ On-site clean energy / CHP system(s)	☐ Building-wide power dimming	☐ Thermal energy storage systems	☐ Ground source heat pump
	☐ On-site Solar PV	☐ On-site Solar Thermal	☐ Wind power	☑ None
Describe any added measures:	The Proponent is exploring the feasibility of on-site solar PV			

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?

	Yes	If yes, for how long:	*3 Days*
If Yes, is building "Islandable?	No		
If Yes, describe strategies:			

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

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

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

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

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

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

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

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

C - Sea-Level Rise and Storms

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

C.1 - Location Description and Classification:

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

No

Describe site conditions? The site is located on the western face of a hill with grades sloping down approximately 14 feet from east to west. The site area is fully developed with two existing buildings, a parking lot, and a loading dock. The surrounding area is urban with residential, commercial, and institutional land uses.

Site Elevation – Low/High Points:	*44.00 to 58.50 Boston City Base Elev.(Ft.)*	
Building Proximity to Water:	*5000 Ft.*	Nearest watery bodies: Jamaica Pond, Leverett Pond, and Muddy River

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

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

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

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

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

4,600 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):

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

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

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

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

Yes / No

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

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

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

Yes / No

If Yes, describe:

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

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

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

C.4 - Building Resilience and Adaptability

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

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

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

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

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

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

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

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

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

Appendix F

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:	1785 Columbus Avenue
Project Address Primary:	1785 Columbus Avenue
Project Address Additional:	N/A
Project Contact (name / Title / Company / email / phone):	Lee Goodman / Watermark Development / Lgoodman@watermarkinc.us / 617.445.1900

Team Description

Owner / Developer:	Horizons / Watermark LLC
Architect:	Embarc Studio LLC.
Engineer (building systems):	MEPFP Engineer: AHA Consulting Engineers, Inc.
Sustainability / LEED:	Soden Sustainability Consulting
Permitting:	Epsilon Associates, Inc.
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:

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Building Classification and Description

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

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

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	☑Steel Frame	☑Concrete

Describe the building?

Site Area:	*39,458 SF*	Building Area:	*139,200 GSF*
Building Height:	*92'-0" Ft.*	Number of Stories:	*7 Floors.*
First Floor Elevation:	*63.5' Elev.*	Are there below grade spaces:	*One level*

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 proposed site is in the Jamaica Plain/Roxbury Neighborhood of Boston, located approximately 0.2 miles from the intersection of Columbus and Center Street and the Jackson Square Orange Line T Stop. The site lies on the border of a block of commercial buildings along Columbus Avenue which lie to the east of the site and residential buildings to the west.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Orange Line, Jackson Square stop lies 0.2 miles to the south of the site with access off of Centre Street. Three bus routes stop at the corner of Columbus and Dimock and include routes 22, 29, 44.
List the surrounding institutions: hospitals, public housing and	Dimock Hospital lies immediately across the street. Elderly housing includes 125 Amory Street located to the west of the site, Academy Homes lies to the south of

elderly and disabled housing developments, educational facilities, etc.	the site and Boston Housing Authority properties consist of Bromley-Heath and Heath Street developments.
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.	There is a Boston Police District E-13 Station in the neighborhood and there is YMCA at in Egleston Square.

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.	Existing sidewalks are concrete with granite curbs and the sidewalks will be replaced as part of the new construction on the three sides of the building that border the public way.
Are the sidewalks and pedestrian ramps existing-to-remain? **If yes,** have the sidewalks and pedestrian ramps been verified as compliant? **If yes,** please provide surveyors report.	No.
Is the development site within a historic district? **If yes,** please identify.	No.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of

pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	No. The sidewalks range from 8'-10" along Columbus Avenue to 6'-3" wide along Dimock Street to 7'-2" wide along Amory Street.
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.	12 feet total along Columbus Avenue, 12 feet along Dimock and 9 feet along Amory Street.
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?	Cement concrete is proposed for pedestrian and furnishing zones between tree grates on Columbus, Dimock and Amory Street. The sidewalk will occur both on City of Boston property and extend onto the development property.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	Yes
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	A small portion of outdoor seating for a potential food service use is being considered at the corner of Amory and Dimock. If any seating occurs outside the building a minimum of a 7' clear sidewalk in the Public Right of Way will be maintained.
If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	7'.

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?	157
What is the total number of accessible spaces provided at the development site?	6 Accessible spaces with one of those 6 being Van Accessible.
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?	Within the parking garage.
Has a drop-off area been identified? **If yes,** will it be accessible?	Yes, within level 2 of the garage and it will be accessible.
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.	Attached.

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

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

Provide a diagram of the accessible route connections through the site.	See attached Exhibits 1 and 2.

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Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	The Office Building entry along Columbus will be a Flush Condition. The entry to the Child Care Center from Columbus will be by way of a Ramp. The elevation of the Child Care Facility is elevated above the sidewalk elevation for security purposes. Access from the Garage to the Office Building elevator core will be Flush. Access from the Garage to the Child Care center will be by way of a ramp and elevator.
Are the accessible entrance and the standard entrance integrated?	Yes.
If no above, what is the reason?	N/A
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, TBD.

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
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 1

EMBARC STUDIO
ARCHITECTURE + DESIGN

EXHIBIT 2

EMBARC STUDIO
ARCHITECTURE + DESIGN