COMPREHENSIVE TRANSPORTATION REVIEW

HANOVER 8TH STREET PUD

WASHINGTON, DC

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Contents

Figures

Tables

EXECUTIVE SUMMARY

The following report is a Comprehensive Transportation Review (CTR) for the Hanover 8th Street development. This report reviews the transportation aspects of the project's Consolidated Planned Unit Development (PUD) Application (Zoning Commission Order 18-21).

The purpose of this study is to evaluate whether the project will generate a detrimental impact on the surrounding transportation network. This report concludes that **the project will not have a detrimental impact** on the surrounding transportation network assuming that all planned site design elements are implemented.

Proposed Project

The subject property (the "Site") is located at 3135-3201 8th Street NE in Ward 5 in the Northeast quadrant of the District. The Site is bounded by a dance school to the north, existing businesses to the south, 8th Street to the west, and the WMATA railroad tracks to east.

The project area covers two (2) parcels and will redevelop an existing one-story industrial building with the following:

- Two (2) residential buildings totaling approximately 377 units.
- 186 parking spaces in an underground garage shared with both buildings.
- One (1) 30-foot loading berth and one adjacent loading platform per building and one (1) 20-foot service space shared between buildings.
- 125 secure long-term and 20 short-term bicycle parking spaces.

Access to the underground parking garage will be from a new curb cut and driveway connecting 8th Street with the north building. Access to the loading facilities within each building will also utilize the new driveway from 8th Street and will occur on the east side of the Site, adjacent to the WMATA tracks. All truck turning maneuvers will occur on the Site, allowing for front-in, front-out access for trucks to the public street.

As part of the development, sections of the roadway network surrounding the Site will be improved. Pedestrian facilities will be installed along the west perimeter of the Site along 8th Street, meeting DDOT and ADA standards. This includes crosswalks at all necessary locations and curb ramps with detectable warnings. The planned improvements will benefit students of the nearby charter school located south of the Site, creating a safer pedestrian environment.

Vehicular parking for the development will be located in an underground parking garage with 186 spaces, accessible from the 8th Street driveway and curb cut. The garage will accommodate the proposed parking for both buildings. The proposed parking supply will meet Zoning Requirements meeting the practical needs of the development.

The development will include one (1) loading berth at 30 feet and one (1) adjacent 100 square foot loading platform within each building and one (1) shared 20-foot service/delivery space, meeting the number of loading berths required by the zoning regulations. The loading facilities will be sufficient to accommodate the practical needs of the development.

The proposed development is expected to generate a maximum of approximately five (5) total truck trips per day. This includes three (3) general deliveries consisting of trash removal, mail, and parcel delivery, and two (2) residential deliveries, calculated based on an average unit turnover of 18 months with two (2) deliveries per turnover (one move-in and one move-out). Based on the expected truck deliveries and the loading management plan provided, the loading plan for the development is adequate and will not adversely affect the local roadway network.

The development will meet the zoning requirements for bicycle parking by including 20 short-term bicycle parking spaces and 125 long-term bicycle parking spaces. The long-term spaces will be provided within the garage and the short-term spaces will be placed curbside along 8th Street. This amount of bicycle parking will meet the practical needs of the development.

Multi-Modal Impacts and Recommendations

Transit

The Site is served by regional and local transit services via Metrobus and Metrorail. The Site is located 0.3 miles from the Brookland-CUA Metrorail station. There is a Metrobus stop that services the G8 WMATA bus route located one (1) block west of the Site on 7th Street. Additional bus routes are available at the Brookland-CUA Metrorail Station.

Although the development will be generating new transit trips, existing facilities have enough capacity to accommodate the new trips.

Pedestrian

The Site is surrounded by a well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and curb ramps, particularly along the primary walking routes. The western frontage of the Site along 8th Street however lacks sidewalks. There are some areas northeast and southeast of the Site which lack sufficient sidewalk buffer length.

As a result of the development, pedestrian facilities along the 8th Street frontage of the Site will be improved such that they meet DDOT requirements and provide an improved pedestrian environment. This includes the construction of missing sidewalks along the 8th Street frontage. The improved pedestrian environment will benefit students walking to/from the nearby Hope Community Public Charter School and dance studio.

Bicycle

Bicycle infrastructure in the vicinity of the Site is plentiful. The Site is adjacent to 8th Street, which functions as a signed route and is an on-street section of the Metropolitan Branch Trail. There are two (2) Capital Bikeshare stations within a quarter-mile of the Site, including a station just south of the Site at 7th Street and Hamlin Street.

The development will provide short-term bicycle parking along the 8th Street frontage of the Site and on-site secure long-term bicycle parking within the garage. The amount of bicycle parking provided will meet Zoning Requirements.

Vehicular

The Site is accessible from several principal and minor arterials such as Michigan Avenue, North Capitol Street, and Rhode Island Avenue (US-1), as well as an existing network of collector and local roadways.

In order to determine the potential impacts of the proposed development on the transportation network, this report projects future conditions with and without the development and performs analyses of intersection delays and queues. These capacity analysis results were compared to the acceptable levels of delay set by DDOT standards, as well as existing queues, to determine if the proposed development will negatively impact the study area.

The vehicular capacity analysis concluded that one (1) intersection would require mitigation. After exploring operations for mitigating impacts at this intersection, this report is recommending a reallocation of green time at the intersection of Monroe Street and Michigan Avenue. This reallocation can reduce delays that meet DDOT's requirements. This report recommends that the Applicant coordinate with DDOT on the implementation of this mitigation measure.

Summary and Recommendations

This report concludes that **the proposed development will not have a detrimental impact on the surrounding transportation network assuming that the proposed site design elements and proposed mitigation measures are implemented.**

The development has several positive elements contained within its design that minimize potential transportation impacts, including:

- The Site's close proximity to Metrorail
- The inclusion of secure long-term bicycle parking.
- The installation of short-term bicycle parking spaces along the frontage of the Site that meet zoning requirements.
- The creation of new pedestrian sidewalks that meet or exceed DDOT and ADA requirements.
- Implementation of a Loading Management Plan (LMP) that minimizes the potential impacts from loading that the proposed development will have on the surrounding intersections and neighborhoods
- A robust Transportation Demand Management (TDM) plan that reduces the demand of single-occupancy, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

INTRODUCTION

This report is a Comprehensive Transportation Review (CTR) of the Hanover 8th Street development. This report reviews the transportation elements of the project's Consolidated Planned Unit Development (PUD) Application (Zoning Commission case number 18-21). The subject property (the "Site"), shown in Figure 1 and Figure 2, is located at 3135-3201 8th Street in Northeast, Washington, DC. It is currently zoned PDR-1, with a map amendment pursued by the Applicant to rezone as MU-4.

PURPOSE OF STUDY

The purpose of this report is to:

1. Review the transportation elements of the development site plan and demonstrate that the Site conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. Provide information to DDOT and other agencies on how the development of the Site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the Site on all major modes of travel and where these trips will be distributed on the network.
3. Determine if development of the Site will lead to adverse impacts on the local transportation network.

PROJECT SUMMARY

The Hanover 8th Street PUD includes the redevelopment of two industrial parcels, one covered by an existing, vacant one-story industrial building and the second by a mix of one-story warehouse and outdoor storage. The Site is located in the Edgewood neighborhood of Northeast, Washington, DC and is bordered by 8th Street to the west, the WMATA rail tracks to the east, and existing businesses to the north and south.

The redevelopment plans call for two (2) multi-story residential buildings, with up to 377 units and 186 parking spaces provided in the underground garage. The parking garage is accessed via a new curb cut and driveway along the northern portion of the Site connecting to 8th Street. This garage will provide parking for both the north and south buildings.

The loading area consists of one (1) 30-foot berth and one (1) adjacent 100 square foot loading platform in each building and one (1) shared 20-foot service space. These facilities are located on the east side of the Site adjacent to the WMATA tracks and are accessible from the proposed driveway and curb cut.

Pedestrian access to the Site is provided by an outdoor plaza which bisects the north and south buildings. Sidewalks along the west frontage of the Site on 8th Street will provide access to the plaza, where residential entry to each building will be provided. There will also be residential entries to individual units that face 8th Street.

Pedestrian facilities along 8th Street will be improved to include sidewalk and buffer widths that meet or exceed DDOT requirements. Notably the removal of two (2) curb cuts along 8th Street will eliminate pedestrian-vehicular conflicts. The final design of these features will be coordinated with DDOT with the public space approval process.

Bicycle facilities will consist of 125 secure long-term spaces provided in the garage and 20 short-term spaces along the Site frontage. The section of 8th Street adjacent to the Site is an on-street section of the Metropolitan Branch Trail, providing convenient access.

CONTENTS OF STUDY

This report contains nine (9) sections as follows:

Study Area Overview
This section reviews the area near and adjacent to the project and includes an overview of the Site location.

Project Design
This section reviews the transportation components of the project, including the site plan and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the Site.

Trip Generation
This section outlines the travel demand of the proposed project. It summarizes the trip generation of the project.

Traffic Operations
This section provides a summary of the existing roadway facilities and an analysis of the existing and future roadway capacity in the study area. This section highlights the vehicular impacts of the project, including presenting mitigation measures for minimizing impacts as needed.

Transit

This section summarizes the existing and future transit service adjacent to the Site, reviews how the project's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.

Pedestrian Facilities

This section summarizes existing and future pedestrian access to the Site, reviews walking routes to and from the project site, outlines impacts, and presents recommendations as needed.

Bicycle Facilities

This section summarizes existing and future bicycle access to the Site, reviews the quality of cycling routes to and from the project site, outlines impacts, and presents recommendations as needed.

Crash Data Analysis

This section reviews the potential safety impacts of the project. This includes a review of crash data at intersections in the study area and a qualitative discussion on how the development will influence safety.

Summary and Conclusions

This section presents a summary of the recommended mitigation measures by mode and presents overall findings and conclusions.

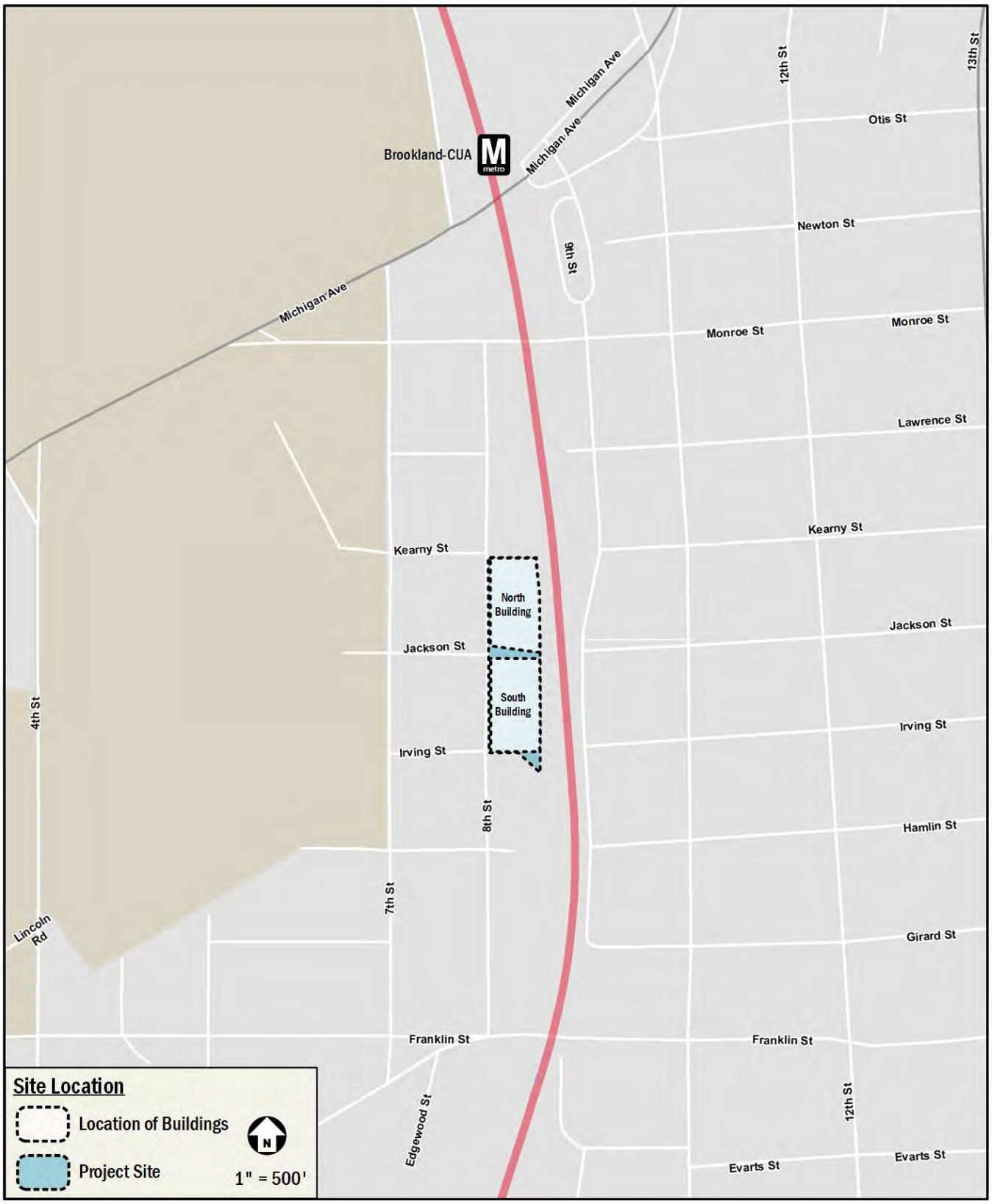

Figure 1: Site Location

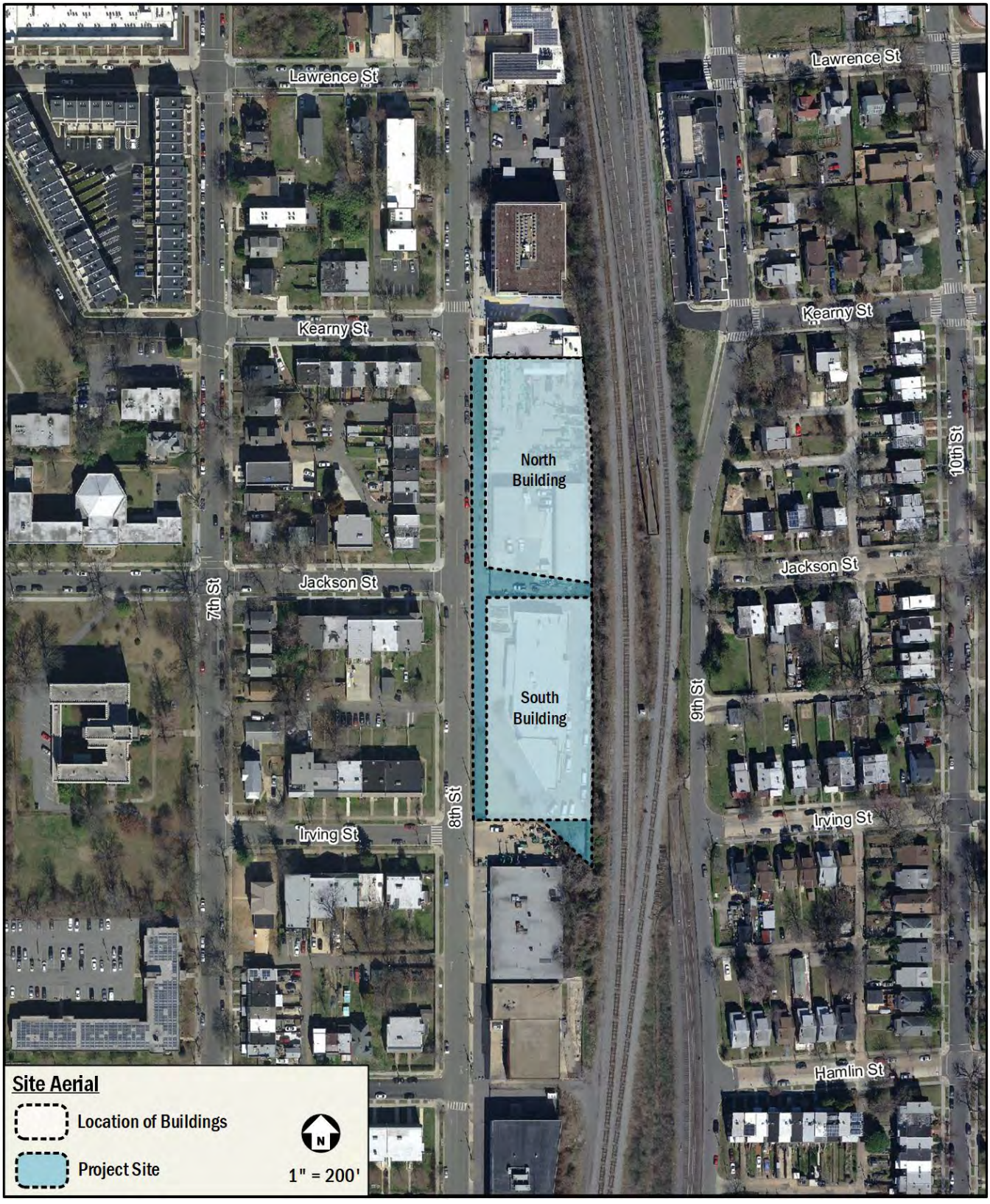

Figure 2: Site Aerial

STUDY AREA OVERVIEW

This section reviews the study area and includes an overview of the Site location, including a summary of the major transportation characteristics of the area and of future regional projects.

The following conclusions are reached within this chapter:

- The Site is surrounded by an extensive regional and local transportation system that will connect the residents of the proposed development to the rest of the District and surrounding areas.
- The Site is served by public transportation with access to Metrorail and 10 local Metrobus lines at the Brookland-CUA station.
- There is bicycle infrastructure in the vicinity of the Site, including shared bicycle lanes along 8th street. This portion of 8th Street functions as an on-street section of the Metropolitan Branch Trail.
- The existing pedestrian infrastructure surrounding the Site provides a good walking environment with the exception of no sidewalks along the 8th Street frontage. There are sidewalks along the majority of the primary routes to pedestrian destinations with some gaps in the system.
- Planned improvements as part of this development and additional improvements that are recommended from the Brookland-Edgewood Livability Study will enhance pedestrian facilities in the vicinity of the Site.

MAJOR TRANSPORTATION FEATURES

Overview of Regional Access

As shown in Figure 4, the Site has ample access to regional, vehicular, and transit-based transportation options that connect the Site to destinations within the District, Virginia, and Maryland.

The Site is accessible from several principal and minor arterials such as Michigan Avenue, North Capitol Street, and Rhode Island Avenue (US-1). These roadways create connectivity to interstates such as I-295, I-395, and the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs, as well as providing connectivity to the District core.

The Site is located 0.3 miles (a six-minute walk) from Brookland-CUA Metrorail station (served by the Red Line). The Red Line connects Shady Grove and Glenmont, MD while providing access to the District core. Of particular importance, the Red Line provides a direct connection to Union Station—a transfer point for MARC, VRE, and Amtrak services—in addition to all Metrorail lines, allowing for access to much of the DC Metropolitan area.

Overall, the Site has access to several regional roadways and transit options, making it convenient to travel between the Site and destinations in the District, Virginia, and Maryland.

Overview of Local Access

There are a variety of local transportation options near the Site that serve vehicular, transit, walking, and cycling trips, as shown on Figure 5. The Site is directly served by a local vehicular network that includes several principal and minor arterials such as Michigan Avenue and Monroe Street. In addition, these roads connect with regional thoroughfares, such as Rhode Island Avenue and North Capitol Street.

The Metrobus system provides local transit service in the vicinity of the Site, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 5, there are 10 bus routes that service the Site area, including the G8 line which runs one block west of the Site. These bus routes connect the Site to many areas of the District, most notably the Brookland-CUA Metrorail station. A detailed review of transit stops within a quarter-mile walk of the Site is provided in a later section of this report.

There are several existing bicycle facilities near the Site that connect to areas within the District. Directly adjacent to the Site along 8th Street is a shared bicycle lane, which functions as an on-street section of the Metropolitan Branch Trail. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later section of the report.

Anticipated pedestrian routes, such as those to public transportation stops, retail zones, schools, and community amenities, provide adequate pedestrian facilities; however, there are some sidewalks and curb ramps that are missing or do not meet DDOT standards. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report, including pedestrian improvements from the recommendations of the Brookland-Edgewood

Livability Study. Additionally, other planned roadway improvements such as the completion of the Monroe Street Bridge over the WMATA Red Line tracks will help increase the walkability and bikeability in the Brookland neighborhood.

Overall, the Site is surrounded by an excellent local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

Carsharing

Four (4) carsharing companies provide service in the District: Zipcar, Maven, Free2Move and Car2Go. All four services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar and Maven have designated spaces for their vehicles. There are two (2) Zipcar locations with three (3) vehicles available near the Site, located at 7th Street and Hamlin Street and at Monroe Street Market.

Carsharing is also provided by Car2Go and Free2Move, which provides point-to-point carsharing. Car2Go currently has a fleet of vehicles located throughout the District and Arlington, with Free2Go located within select areas of the District. Car2Go and Free2Move vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit (RPP) location in any zone throughout the defined "Home Area." Members do not have to pay the meters or pay stations. Car2Go and Free2Move do not have permanent designated spaces for their vehicles; however, availability is tracked through their website and mobile phone application, which provides an additional option for car-sharing patrons.

Walkscore

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions within neighborhoods of the District. Based on this website the planned development is located in the Brookland neighborhood. This project location itself has a walk score of 75 (or "Very Walkable"), a transit score of 68 (or "Good Transit"), and a bike score of 75 (or "very bikeable"). Figure 3 shows the neighborhood borders in relation to the Site location and displays a heat map for walkability and bikeability.

The Site is situated in a neighborhood that encompasses good walk scores because of the abundance of neighborhood serving retail locations that are in close proximity, where most errands can be completed by walking.

The good transit score was based on the proximity to multiple bus lines and the distance to the nearest Metrorail stop which is located 0.3 miles from the Site.

The Site is situated in an area that is very bikeable. The area is very flat with a Capital Bikeshare station located within a quarter-mile of the Site, with convenient access to the Metropolitan Branch Trail.

Overall, the project area has very good walk, good transit, and very good bike scores. Other planned developments and roadway improvements will help increase the walk and bike scores in the Brookland neighborhood.

FUTURE PROJECTS

There are a few District initiatives and approved developments located in the vicinity of the Site. These planned and proposed projects are summarized below.

Local Initiatives

Brookland-Edgewood Livability Study (2015)

The six-month study was undertaken by DDOT in 2015 in order to improve the daily quality of life of residents, patrons, and employees that commute to, from, or through the study area. To meet this goal, DDOT analyzed the local street network and identified actions which could be taken to increase safety and improve connectivity and accessibility. The study goals included:

- Development of a comprehensive approach to traffic calming and operational improvements for all users living in and visiting the area.
- Identifying specific issues that impact safety and comfort of multimodal users while also accommodating freight and delivery needs.
- Designing cost-effective and measurable improvements that benefit all users.
- Investigating and mitigating freight impacts on the area.
- Emphasizing safety and access improvements around neighborhood facilities, including, but not limited to:

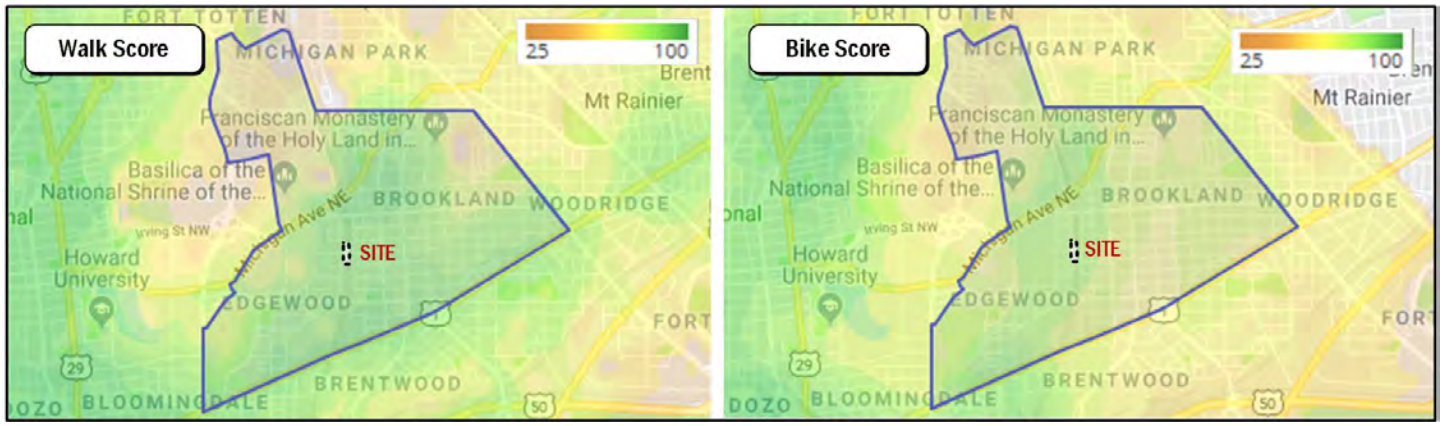

Figure 3: Summary of Walk and Bike Scores

schools, churches, parks, recreation centers, and other key community facilities.

- Enhancing comfort and livability for residents and visitors to the project areas.

The study recommends improvements for pedestrians (visibility, sidewalks), bicyclists (additional facilities and bikeshare locations), and overall safety (signal optimization reviews).

The installation of missing sidewalk along 8th Street adjacent to the Site will meet the pedestrian recommendations laid out in the plan. Gaps in tree coverage along this section of 8th Street will also be remedied with a landscaping to include suitable tree frontage.

Crosstown Multimodal Transportation Study (2015)

The *Crosstown Multimodal Transportation Study* was published by DDOT in 2016, identifying improvements that can be made in east-west travel between Columbia Heights (Ward 1) and Brookland (Ward 5). Targeted for evaluation were areas where improvements addressed multimodal, bicycle, and transit needs throughout the corridor. Included within the Crosstown study area is the business district centered at Michigan Avenue and Monroe Street. With regards to the Site, the study recommended the following measures:

- An intersection reconfiguration at Michigan Avenue and Monroe Street to improve turning radii for buses and improve the bicycle and parking design at the intersection. This improvement has been implemented and is reflected in the traffic operations section of the report.
- The installation of missing bicycle facility movements to connect bicycle facilities east-to-west through Brookland. Recommendations include bicycle lanes on Michigan Avenue from Monroe Street to South Dakota Avenue.
- The installation of a shared-use path and cycle tracks along Irving Street extending from Kenyon Street eastwards to Michigan Avenue. The cycle track would be placed in the median of Irving Street, providing further east-west connectivity with the Site.

Metropolitan Branch Trail Concept Plan (2005)

This report discusses the conceptual plan to guide current and future development of the 10 miles of trail which resides in the District. The Metropolitan Branch Trail (MBT) extends from Union Station north to Silver Spring in Maryland through a variety of shared and dedicated right-of-way along the former rail line. The 2005 report highlights the preferred alignments of the trails as it traverses the Brookland neighborhood. In the vicinity of the Site, 8th Street between Franklin and Monroe Streets is designated an on-street portion of the MBT.

The ultimate plans for this section may convert the shared use street and sidewalks into a shared use path. The design of the development incorporates wider than required sidewalks along the east side of 8th Street in order to accommodate a potential conversion into a shared use path.

SustainableDC: Sustainable DC Plan (2011)

SustainableDC is a planning effort initiated by the Department of Energy & Environment and the Office of Planning that provides the District with a framework of leading Washington DC to become the most sustainable city in the nation. The 2012 report proposes a 20-year timeframe to answer challenges in

areas of: (1) Jobs & the economy; (2) Health & Wellness; (3) Equity & Diversity; (4) Climate & Environment; (5) Built Environment; (5) Energy; (6) Food; (7) Nature; (8) Transportation; (9) Waste; and (10) Water. With respect to transportation, the sustainability goals targeted in 20 years include:

- Improving connectivity and accessibility through efficient, integrated, and affordable transit systems
- Expanding provision of safe, secure infrastructure for cyclists and pedestrians
- Reducing traffic congestion to improve mobility
- Improving air quality along major transportation routes

A combination of increasing public transit and decreasing vehicular mode shares has been suggested to meet the transportation targets. The transportation demand management (TDM) measures proposed in this CTR will help curtail vehicular mode share.

MoveDC: Multimodal Long-Range Transportation Plan (2014)

MoveDC is a long-range plan that provides a vision for the future of DC's transportation system. As the District grows, so must the transportation system, specifically in a way that expands transportation choices while improving the reliability of all transportation modes.

The MoveDC report outlines recommendations by mode with the goal of having them completed by 2040. The plan hopes to achieve a transportation system for the District that includes:

- 70 miles of high-capacity transit (streetcar or bus)
- 200 miles of on-street bicycle facilities or trails
- Sidewalks on at least one side of every street
- New street connections
- Road management/pricing in key corridors and the Central Employment Area
- A new downtown Metrorail loop
- Expanded commuter rail
- Water taxis

In direct relation to the study area, the MoveDC plan outlines the completion of bicycle facilities along Michigan Avenue and Irving Street to complement east-west travel, high capacity transit along the Michigan Avenue, and completion of missing sections of sidewalk along 8th Street adjacent to the Site. These recommendations would create additional multimodal capacity and connectivity to the proposed development.

Planned Developments

There are four (4) development projects proposed or under construction in the vicinity of the Site. The locations of these developments are presented in Figure 6.

Portrait Square at Brookland

This site at 3112 7th Street will include 22 condominium units and 23 parking spaces. The development is expected to open by 2019.

Monroe Street Market, Block E

The vacant Block E site of the Monroe Street Market development is proposed to include a six-story development with approximately 157 residential units, up to 20,215 square feet of retail, and approximately 99 below-grade parking spaces. The development is expected to open by 2020.

Brookland Place

The project will renovate an existing building, adding 80 affordable residential units. The development is expected to open by 2021.

680 Rhode Island Avenue (Phase 1 and 2)

This planned development is located near the intersection of 4th Street and Rhode Island Avenue. Phases 1 and 2 will consist of approximately 487 residential units, approximately 30,971 square feet of retail, a 950-seat movie theater, and 584 parking spaces. The first two phases are expected to open by late 2020.

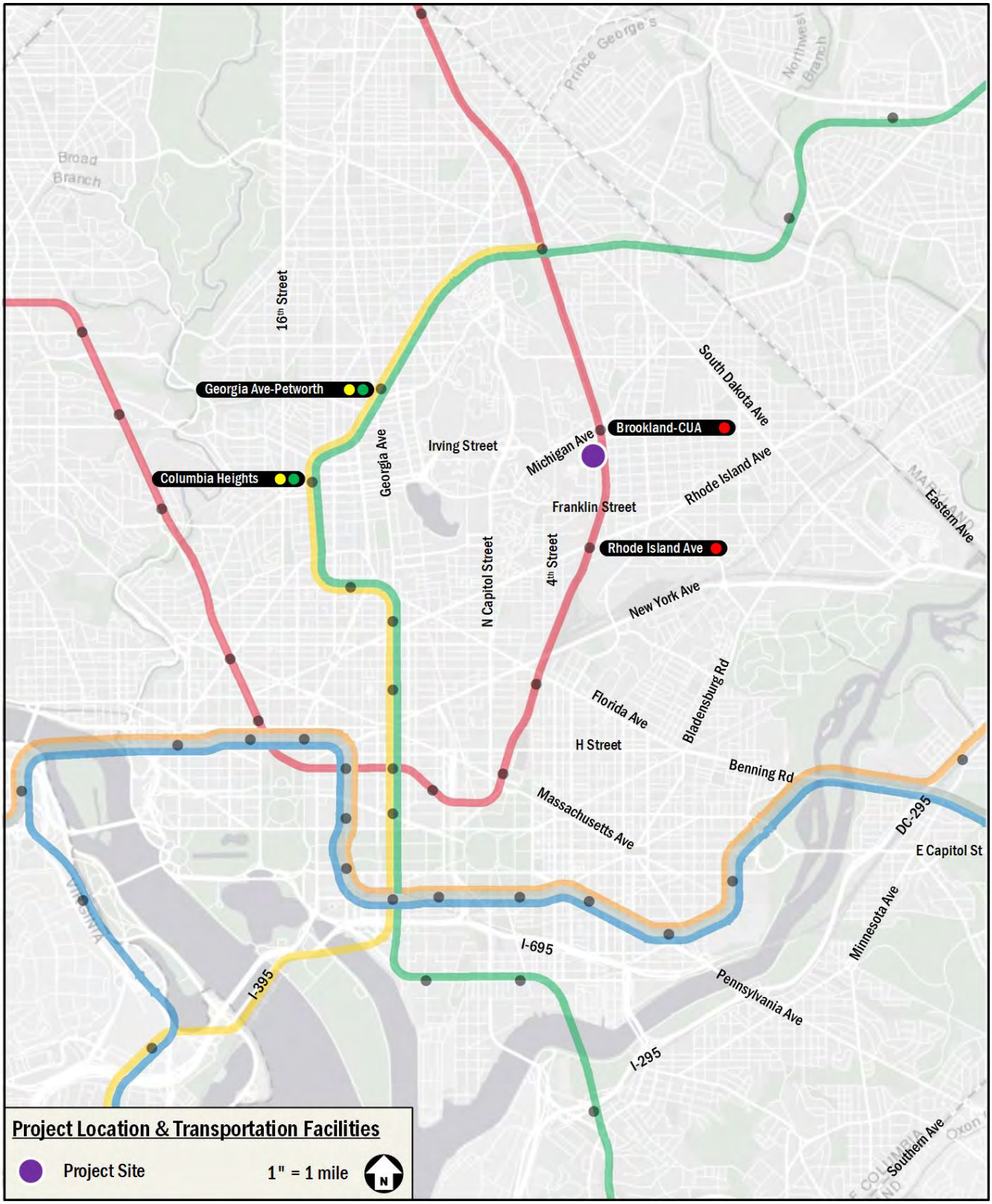

Figure 4: Major Regional Transportation Facilities

Figure 5: Major Local Transportation Facilities

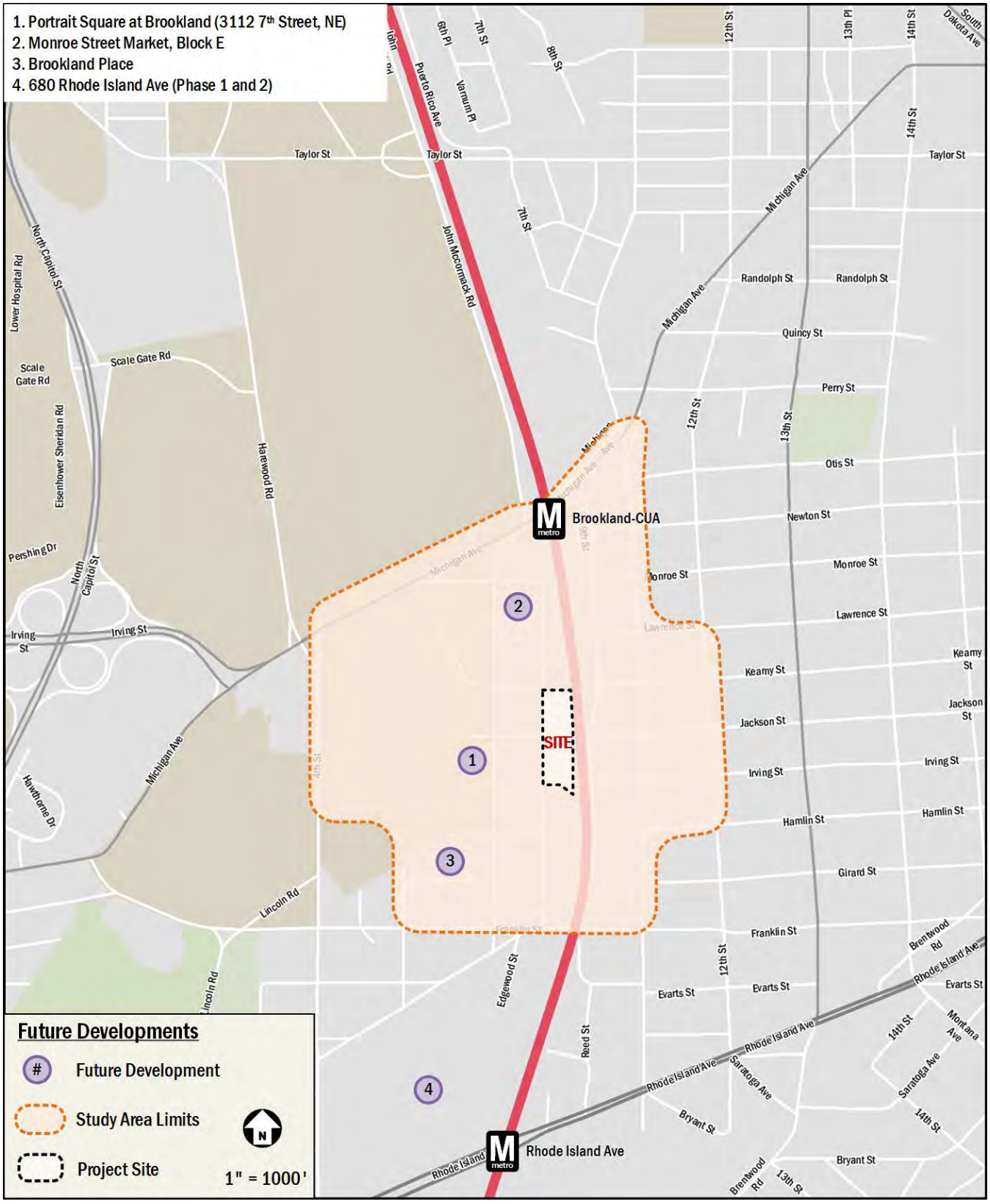

Figure 6: Planned Developments

PROJECT DESIGN

This section reviews the transportation components of the development, including the proposed site plan and access points. It includes descriptions of the proposed development's vehicular access, loading, parking, bicycle and pedestrian facilities, and Transportation Demand Management (TDM) plan.

The subject property (the "Site") is located on the east side of 8th Street. It is bordered a dance studio to the north, existing businesses to south and the WMATA tracks to the east. The Site consists of two parcels.

The development plan proposes redeveloping these parcels into two (2) residential buildings (a north and south building) with up to 377 units and 186 spaces will be provided in an underground parking garage. The parking garage will be accessible to both buildings.

Figure 7 shows an overview of the development program and site plan elements.

SITE ACCESS AND CIRCULATION

Pedestrian Access

Pedestrian access to the development is provided by an outdoor plaza which bisects the north and south buildings. Sidewalks along the west frontage of the Site on 8th Street will provide access to the plaza, where residential entry to each building will be provided. There will also be residential entries to individual units that face 8th Street.

Bicycle Access

Bicycle access to the secure long-term bicycle parking in the garage will utilize the planned driveway connecting the garage to 8th Street. Short-term bicycle parking will be located curbside along 8th Street. Bicycle access to the Site is primarily expected to occur via 8th Street, which is an on-street portion of the Metropolitan Branch Trail.

Figure 8 shows a circulation plan with pedestrian and bicycle routes.

Vehicular Access

All vehicular parking access to the Site will utilize the planned two-way driveway located off 8th Street. This driveway access will be via a 24-foot curb cut running along the northern frontage of the Site. The driveway will connect to the underground garage which provides parking for both the north and south buildings.

Access to the loading facilities, consisting of one (1) 30-foot berth and one (1) 100 square foot loading platform for each building and one shared (1) 20-foot service/delivery space will utilize the same driveway providing access to the garage. The driveway will continue along the northern and eastern frontage of the Site to provide access to the loading facilities within each building.

A circulation plan with vehicular and loading routes is shown on Figure 9.

A curbside management plan detailing the parking restrictions in the vicinity of the Site is provided in Figure 10. No residential parking permits will be issued to the residents as off-street parking is provided.

LOADING AND TRASH

Loading

The proposed loading facilities will accommodate delivery demand without detrimental impacts. Figure 7 shows the locations of the loading berths and the service/delivery space.

Truck routing to and from the Site will be mainly on designated primary truck routes, such as Michigan Avenue, Rhode Island Avenue, and North Capitol Street.

Per zoning regulations, the proposed development is required to provide one (1) loading berth, one (1) adjacent loading platform and one (1) service/delivery space for a residential development of more than 50 units. Consistent with this requirement, the proposed development will include one (1) loading berth at 30 feet and one (1) adjacent 100 square foot loading platform within each building and one (1) shared service/delivery space at 20 feet, thus meeting zoning regulations.

The proposed development is expected to generate a maximum of approximately five (5) total truck trips per day. This includes three (3) general deliveries consisting of trash removal, mail, and parcel delivery, and two (2) residential deliveries, calculated based on an average unit turnover of 18 months with two (2) deliveries per turnover (one move-in and one move-out).

The loading facilities provided by the development will be sufficient to accommodate this demand.

DDOT standards stipulate that truck movements for a site should be accommodated without back-in movements through public space. The ground-floor of each building of the proposed development has been designed to accommodate head-in/head-out loading maneuvers for the 30-foot trucks.

Turning maneuvers into and out of the Site are included in the Technical Attachments and shown in Figure 11 through Figure 14.

Loading Management Plan

The Applicant has proposed the following measures to address any potential impacts the loading activities of the proposed development might have on the surrounding intersections and neighborhoods:

- A loading dock manager will be designated by building management. The dock manager will coordinate with vendors and tenants to schedule deliveries and will be on duty during delivery hours.
- All residents will be required to schedule deliveries that utilize the loading docks – defined here as any loading operation conducted using a truck 20 feet in length or larger.
- The dock manager(s) will schedule deliveries for trucks using the loading berths such that the dock's capacity is not exceeded. In the event that an unscheduled delivery vehicle arrives while the dock is full, that driver will be directed to return at a later time when a berth will be available so as to not impede the drive aisle that passes in front of the loading dock.
- The dock manager(s) will monitor inbound truck maneuvers and will ensure that trucks accessing the loading dock do not block vehicular traffic except during those times when a truck is actively entering the loading facilities.
- Trucks using the loading dock will not be allowed to idle and must follow all District guidelines for heavy vehicle operation including but not limited to DCMR 20 – Chapter 9, Section 900 (Engine Idling), the regulations set forth in DDOT's Freight Management and Commercial Vehicle Operations document, and the primary access routes listed in the DDOT Truck and Bus Route System.
- The dock manager(s) will be responsible for disseminating suggested truck routing maps to residents and to drivers from delivery services that frequently utilize the loading dock. The dock manager(s) will also distribute flyers materials as DDOT's Freight Management and Commercial Vehicle Operations document to drivers as needed to encourage compliance with idling laws. The dock manager(s) will also post these documents in a prominent location within the service area.

Based on the expected number of truck deliveries and the amount of loading facilities provided, this report concludes that the loading plan for the Site is adequate.

Trash

Trash for the development will be accommodated using a trash compactor inside the loading area of each building. No trash will be stored in public space.

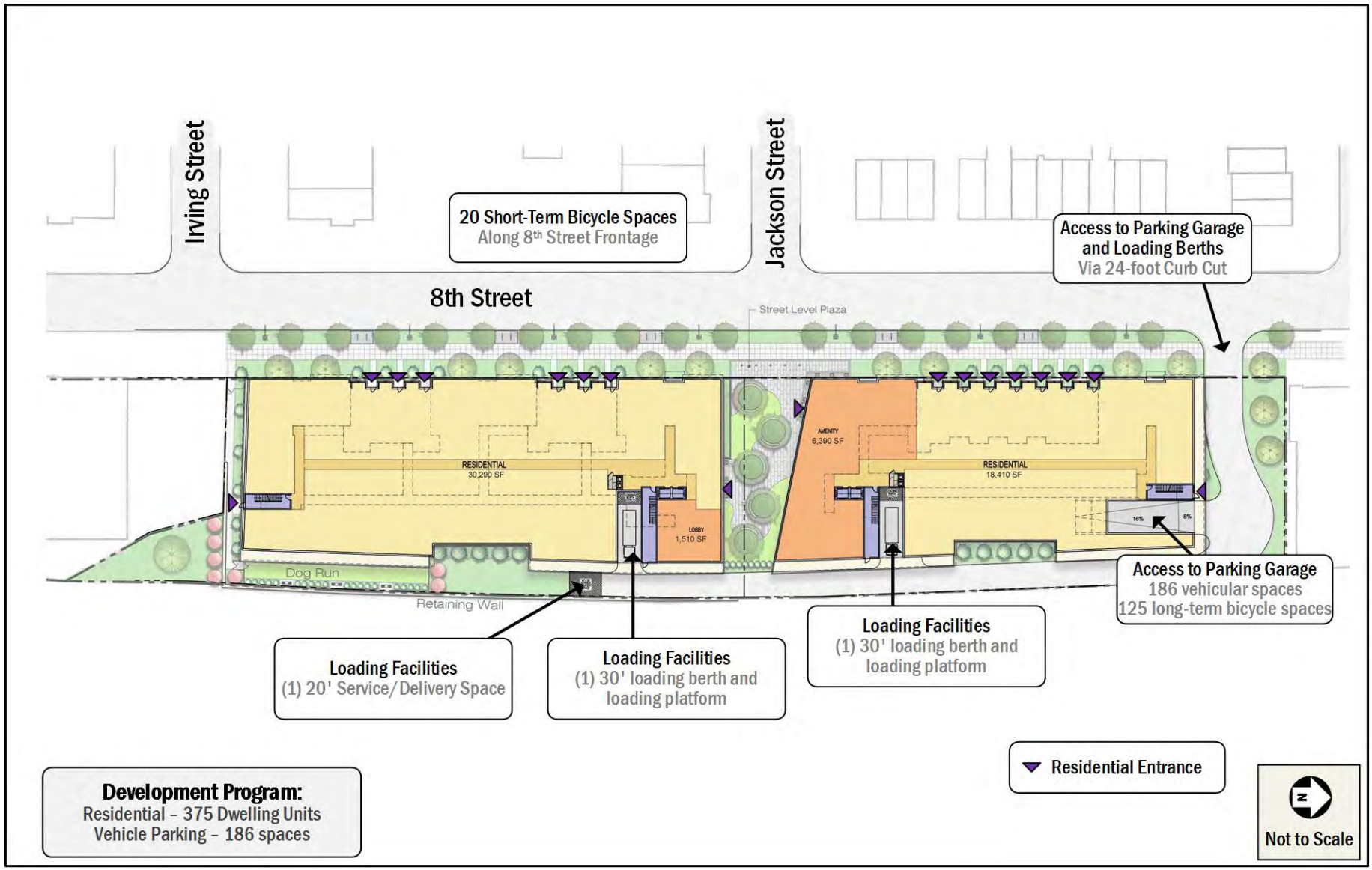

Figure 7: Site Plan

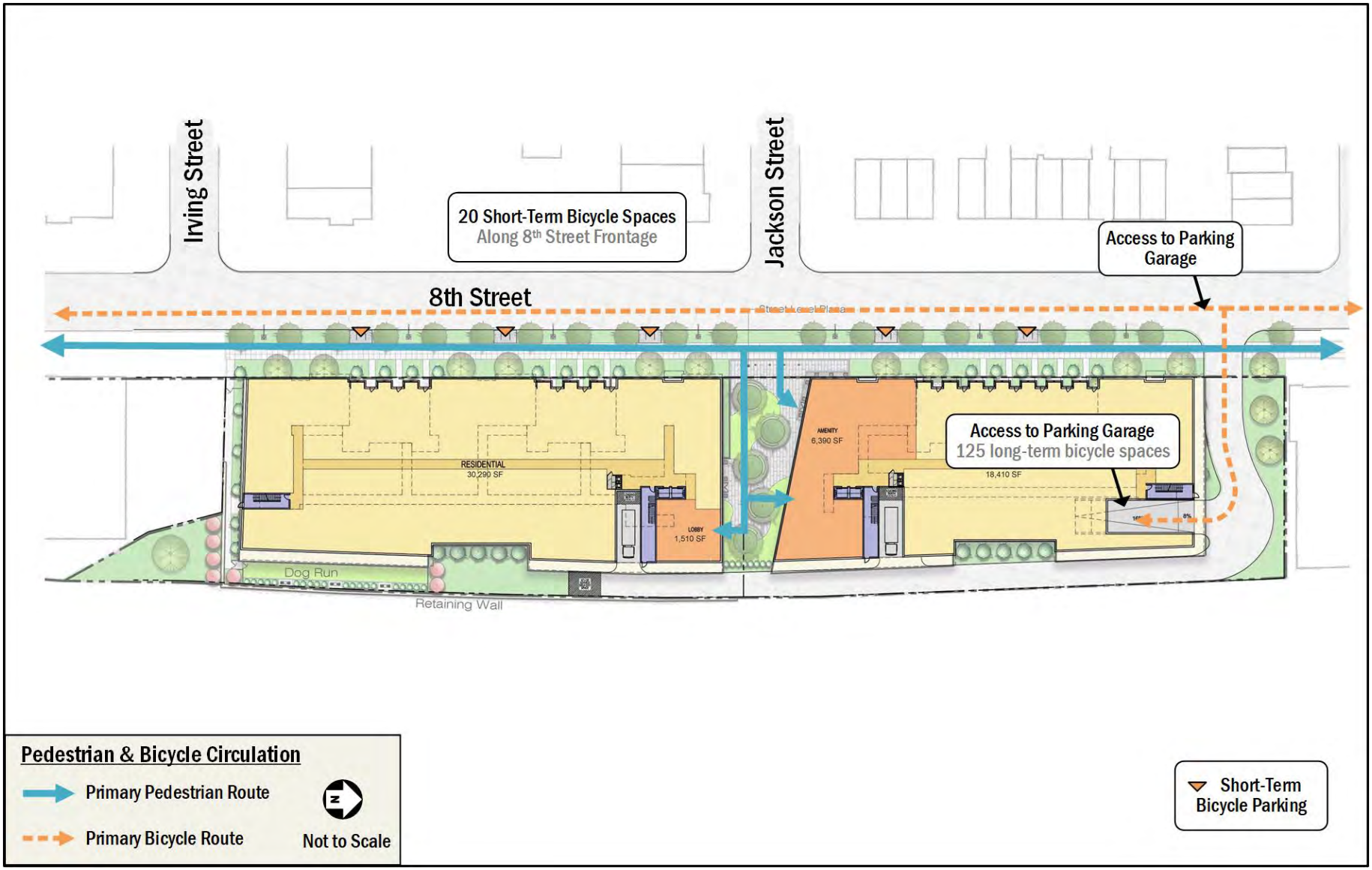

Figure 8: Pedestrian and Bicycle Circulation

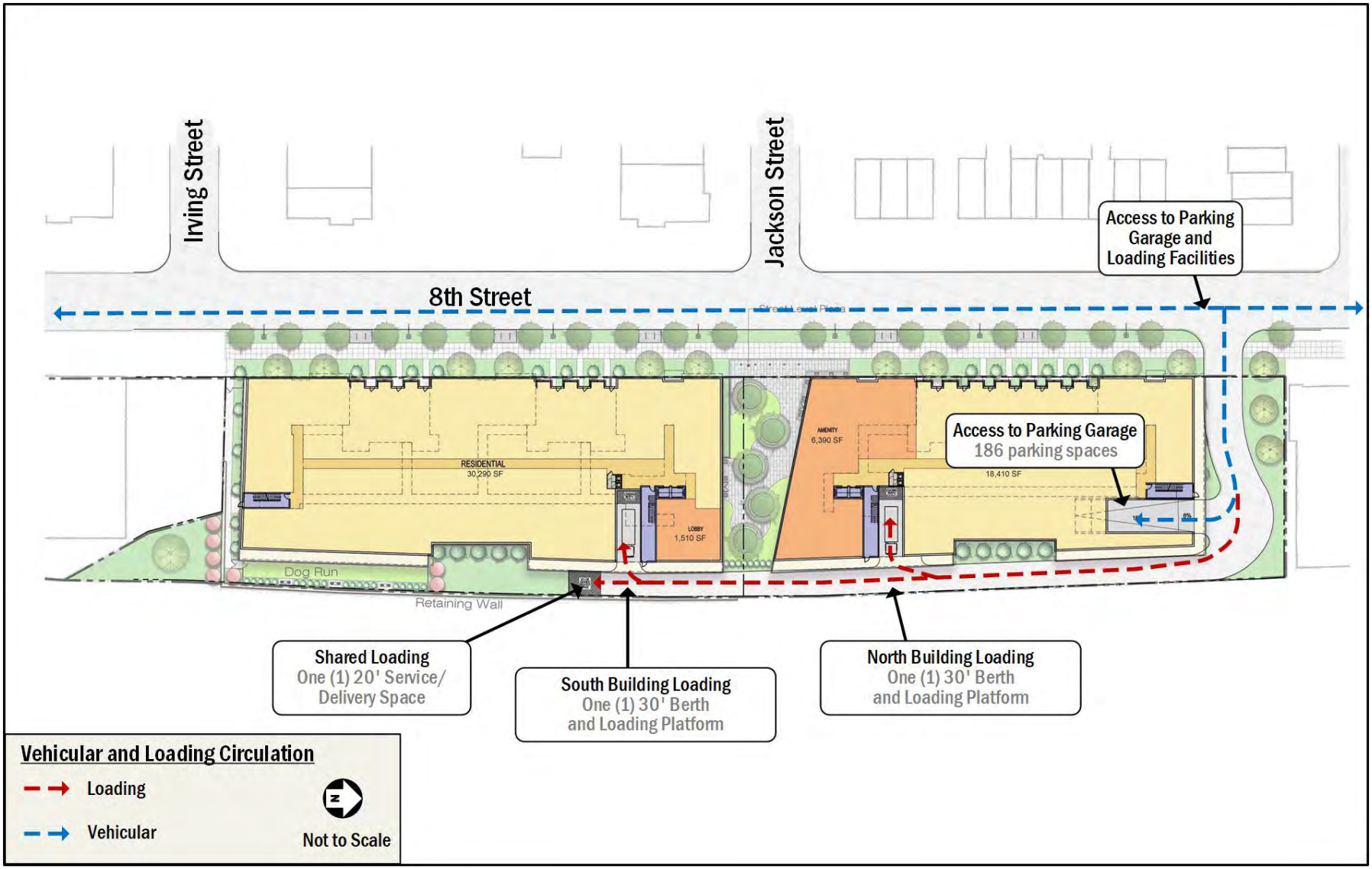

Figure 9: Vehicular and Loading Circulation

Figure 10: Curbside Management Plan

On-Site Parking

The parking provided for the proposed development in the underground garage located off the Site driveway will accommodate all parking needs associated with the project.

On-Site Parking

Per zoning regulations, a residential development in a MU-4 zone is required to provide one (1) space per every three (3) units in excess of four (4) units, resulting in 124 spaces. A 50% reduction in the number of spaces may be applied due to the Site's proximity to the Brookland-CUA Metrorail station, resulting in 62 spaces being required.

The Applicant will provide 186 on-site parking spaces in the underground garage, meeting zoning requirements.

Parking Study

As mentioned previously, the Applicant proposes to meet zoning requirements by placing all parking off-street within the parking garage; however, to address Advisory Neighborhood Commissions (ANC) concerns, a parking study was conducted to evaluate existing on-street parking demand and evaluate the potential impacts of parking demands generated by the Site.

Based on a review of the parking demands of the neighborhood, the project will have negligible impact on the surrounding community. The observed supply of on-street parking options will adequately complement the project's provided parking, particularly the Site's central location from local streets in the Brookland neighborhood.

On-Street Parking

To address ANC concerns, parking occupancy counts were conducted on Thursday, October 4, 2018 and Saturday, October 6, 2018 The parking occupancy study consisted of hourly sweeps of nearby streets within a two-block radius of the Site between the hours of 7:00 AM and 9:00 PM.

The results of the study indicate that the on-street parking spaces have the ability to absorb the small anticipated parking demand that the proposed residential development may generate. The parking study area is shown on Figure 15.

A total of 489 spaces were inventoried in the study area with 31 of these spaces were observed to be on private property which prohibited parking, therefore, a total of 458 spaces were available for use. Parking restrictions by block are shown on Figure 16. As seen in the figure, some blocks in the study area are subject to street sweeping regulations on Wednesdays and Thursdays. During the Thursday observations, approximately 184 parking spaces were affected by street sweeping during the 10:00 AM and 11:00 AM hours. In each of those hourly sweeps, vehicles were observed parking illegally in those spaces.

As shown in Figure 17, the highest demand and utilization of spaces observed in the weekday parking sweep was during the 1:00 PM hour, where 298 (65%) of the 458 available parking spaces were occupied.

As shown in Figure 18 during the Saturday sweep, the 11:00 AM hour observed both the highest demand and utilization of spaces when 299 (65%) of the 458 available spaces were occupied.

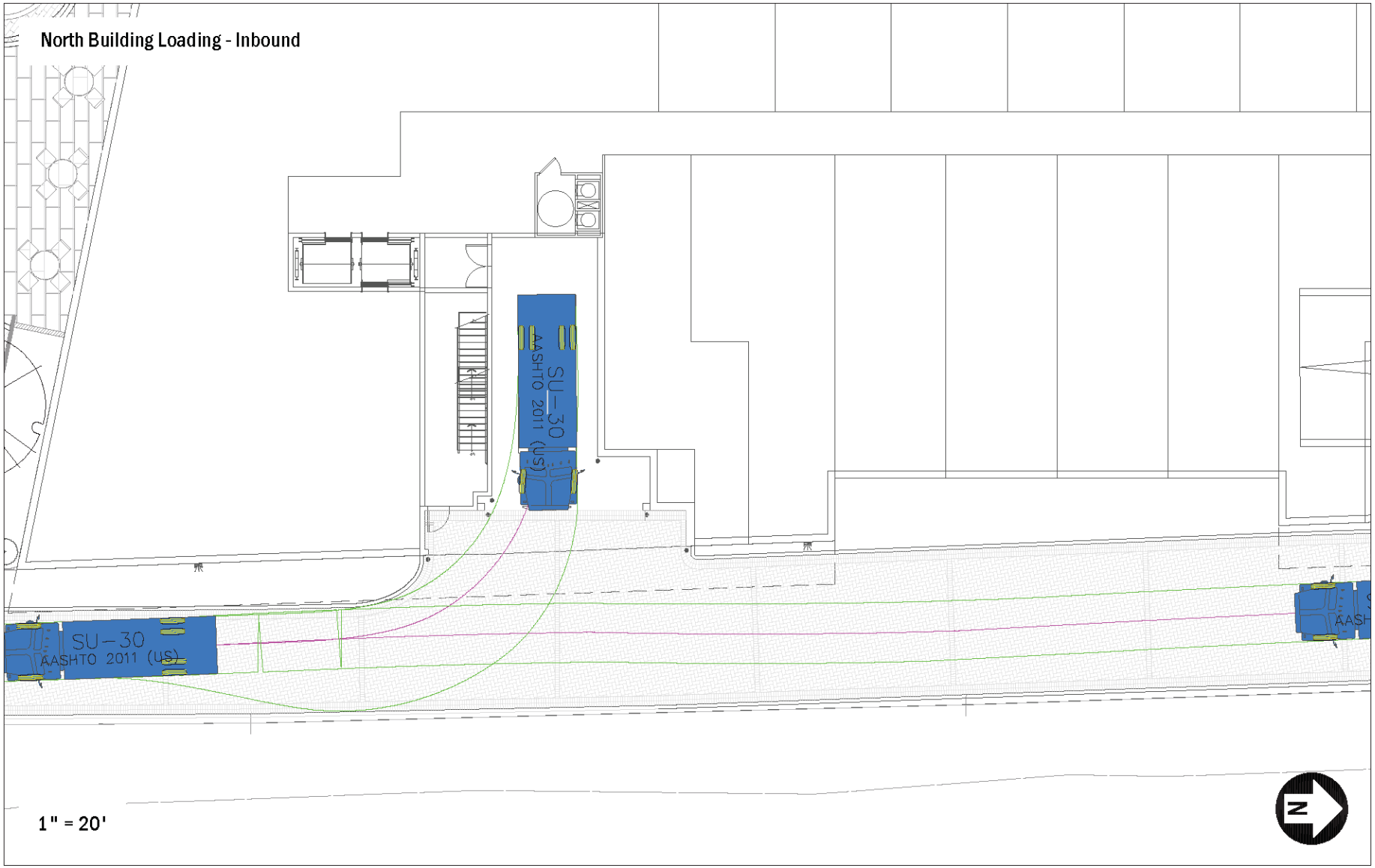

Figure 11: Truck Turning Maneuver (North Building, Inbound)

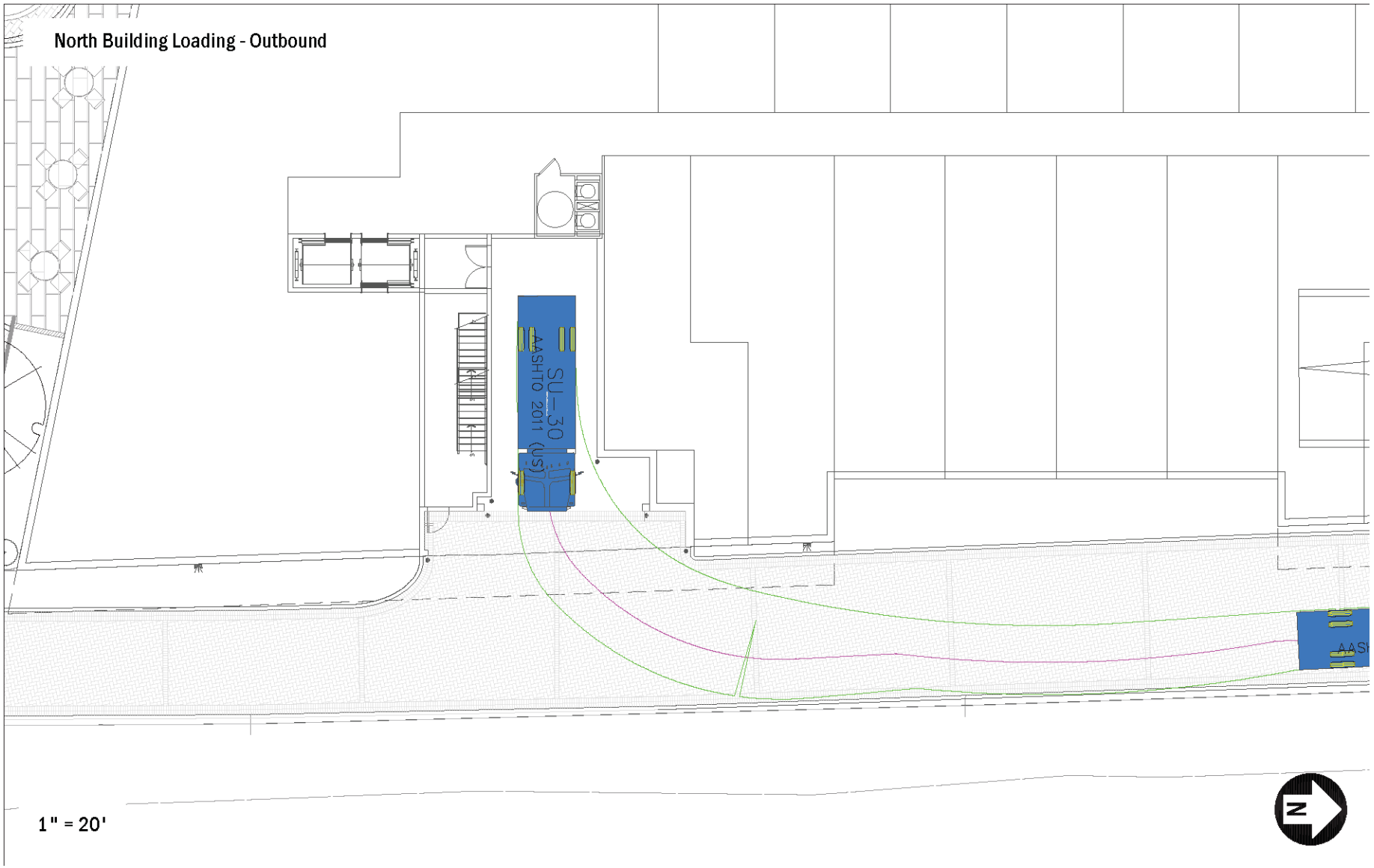

Figure 12: Truck Turning Maneuver (North Building, Outbound)

Figure 13: Truck Turning Maneuver (South Building, Inbound)

Figure 14: Truck Turning Maneuver (South Building, Outbound)

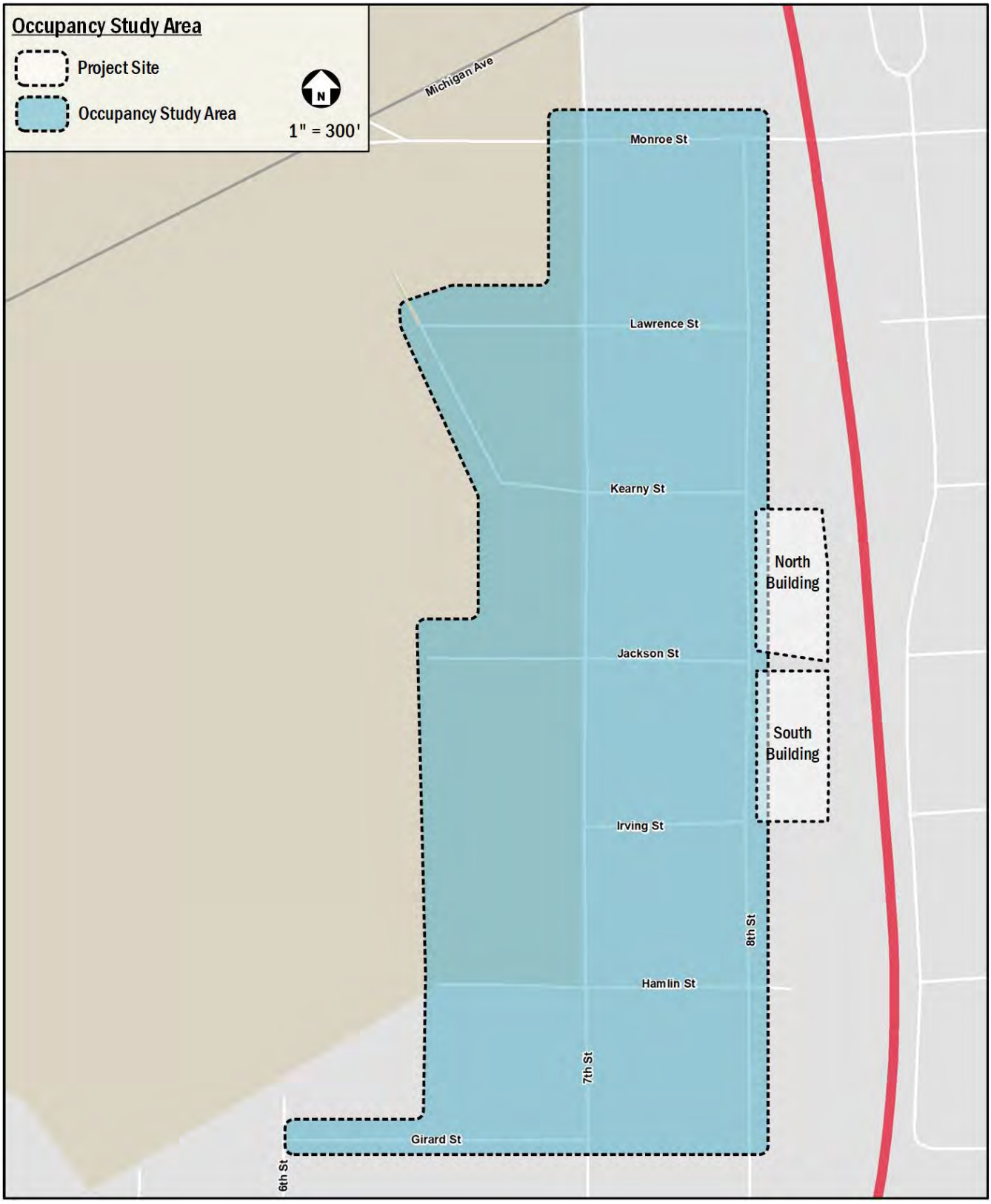

Figure 15: Parking Study Area

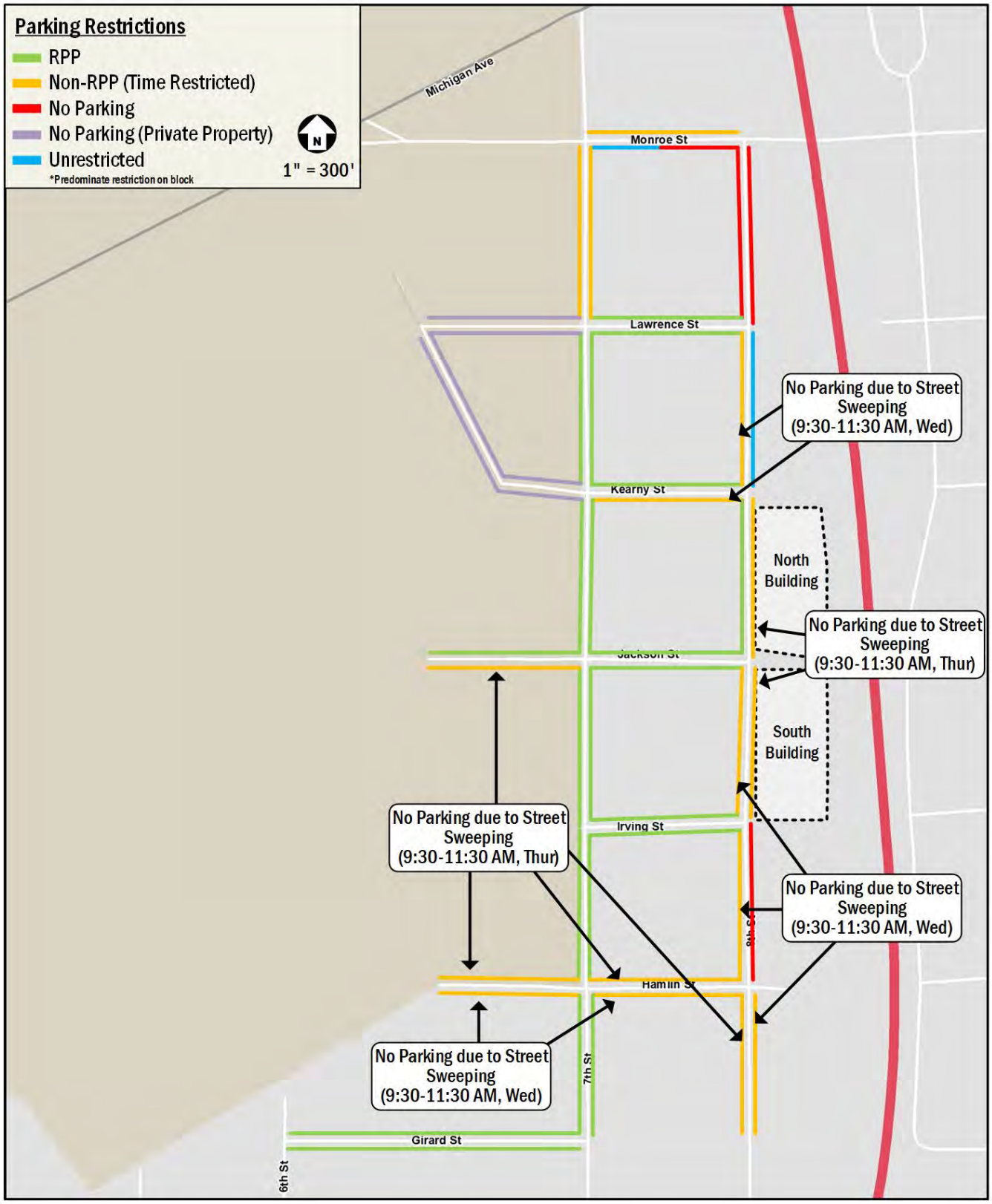

Figure 16: Parking Restrictions by Block Face

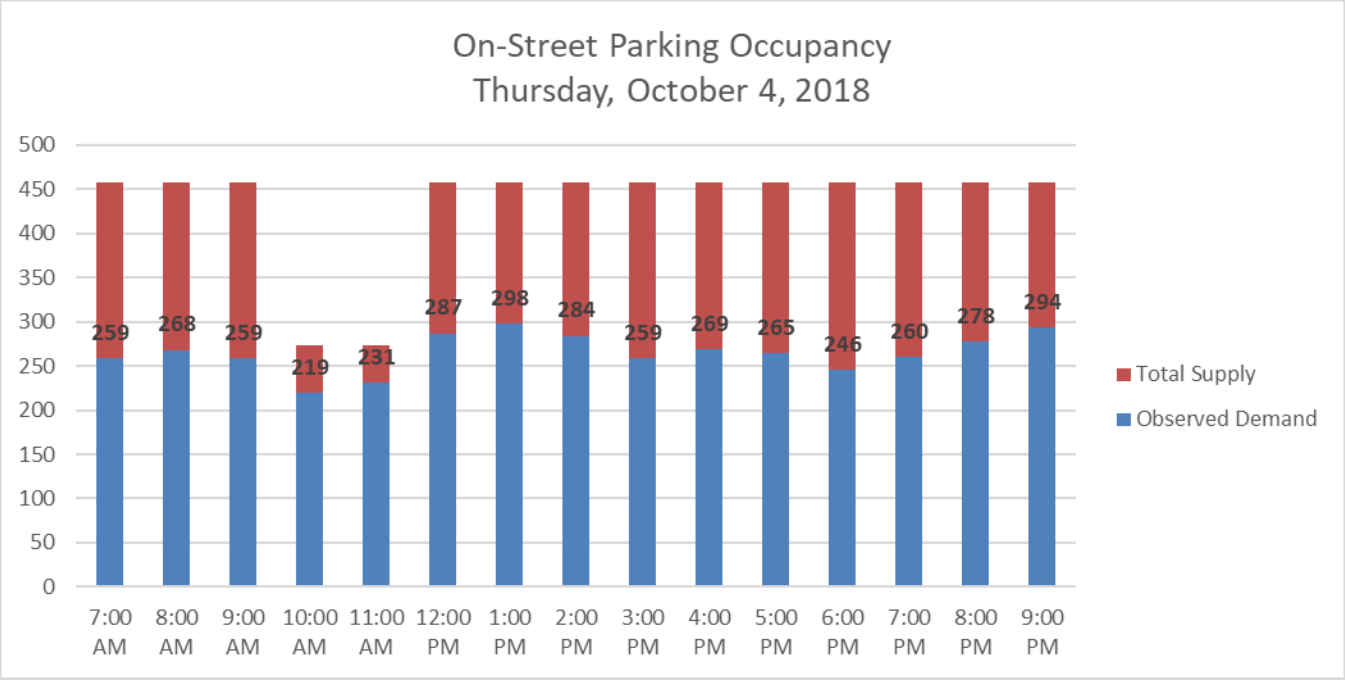

Figure 17: On-Street Parking Occupancy, Thursday, October 4, 2018

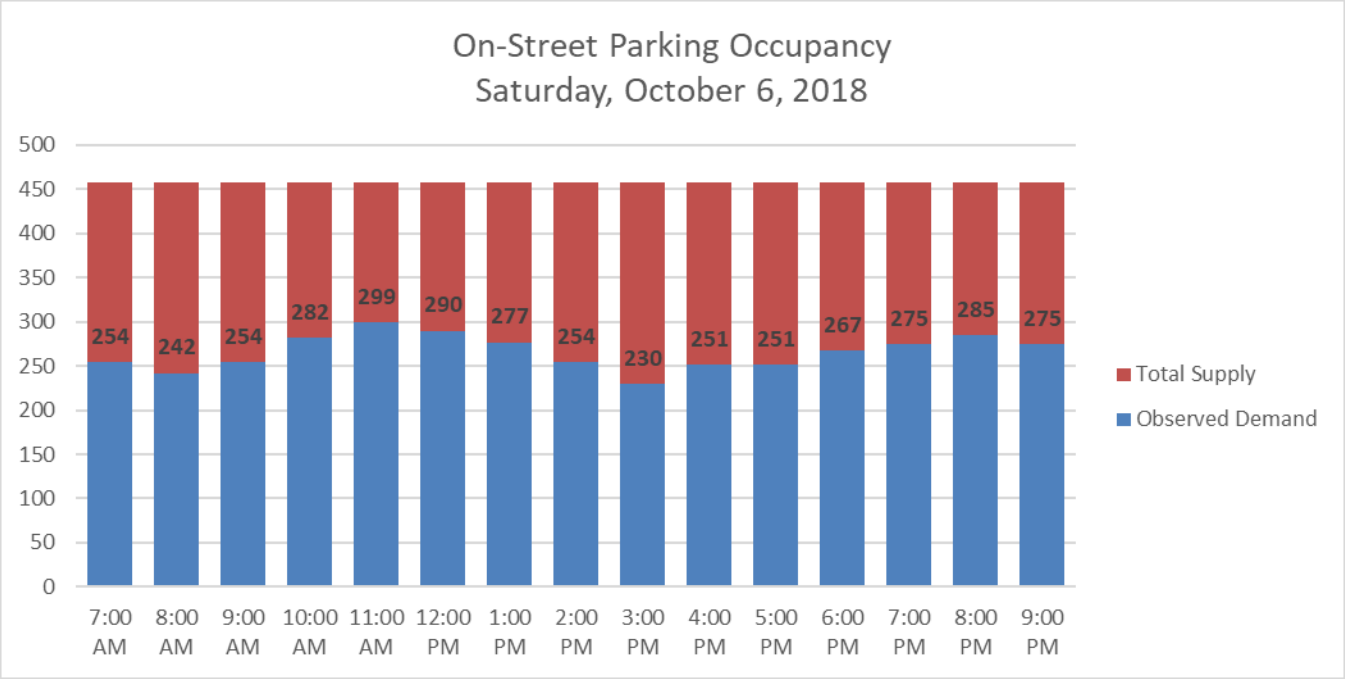

Figure 18: On-Street Parking Occupancy, Saturday, October 6, 2018

The peak period utilization occupancy by block is shown on Figure 19and Table 1 for Thursday, October 4 (1:00 PM). Figure 20 and Table 2 show the peak period utilization occupancy by block for Saturday, October 6 (11:00 AM).

During the Thursday peak period, occupancies by block varied greatly, but generally the most densely occupied street parking blocks were along 7th Street between Monroe Street and Jackson Street. Most of the blocks with occupancy greater than 90 percent were observed on block faces with no restrictions or non-RPP time restrictions.

During the Saturday peak period, the same patterns of higher occupancy levels applied north and west of the site, with occupancies of 90 percent or more occurring on blocks faces along 7th and 8th Streets between Jackson Street and Lawrence Street. Many of these block faces are RPP parking spaces, which restrict non-residents to a two-hour limit from 7:30 AM to 8:30 PM from Monday to Friday, and thus are unrestricted on Saturdays. It should be noted vehicles parked illegally were accounted for in Table 2, resulting in higher utilization factors on Saturday.

As noted on Table 3, the peak period on Thursday generally showed parking occupancies ranging from around 60% in restricted types of spaces, to 85% for unrestricted spaces. On Saturdays, RPP restrictions are lifted, allowing for an additional 329 spaces to become unrestricted. Parking occupancies on Saturday vary from 64% to 72% between unrestricted and restricted spaces, respectively.

On both days inventoried with the exception of the time period in which street sweeping is occurring, 65% of spaces were occupied during the peak occupancy, with a minimum of 159 spaces available for use. Even during the highest occupancy periods, parking of all space types was readily available in the vicinity of the project site.

These observations confirm the observed supply of available on-street parking can serve additional vehicular demand as a result of the development and satisfy the concerns of the ANC.

Table 1: Peak Period Occupancy, Thursday, October 4, 2018

	AM					PM									
	7:00	8:00	9:00	10:00*	11:00*	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00
Occupancy	259	268	259	219	231	287	298	284	259	269	265	246	260	278	294
Total Spaces	458	458	458	274	274	458	458	458	458	458	458	458	458	458	458
Utilization	57%	59%	57%	80%	84%	63%	65%	62%	57%	59%	58%	54%	57%	61%	64%

*Street-Sweeping Regulations in effect during these periods.

Table 2: Peak Period Occupancy, Saturday, October 4, 2018

	AM					PM									
	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00
Occupancy	254	242	254	282	299	290	277	254	230	251	251	267	275	285	275
Total Spaces	458	458	458	458	458	458	458	458	458	458	458	458	458	458	458
Utilization	55%	53%	55%	62%	65%	63%	60%	55%	50%	55%	55%	58%	60%	62%	60%

Table 3: Peak Period Inventory and Occupancy Summary

Space Type	Thursday, Oct 4: Peak Period (1:00 PM)				Saturday, Oct 6: Peak Period (11:00 AM)			
	Spaces	Occupancy	Utilization	Available	Spaces	Occupancy	Utilization	Available
Non-RPP (Time-Restricted)	99	59	60%	40	29	21	72%	8
RPP	259	154	59%	105	0	--	--	--
Unrestricted	100	85	85%	15	429	276	64%	153
Illegal Spaces	--	--	--	--	--	2	--	--
All On-Street Spaces	**458**	**298**	**65%**	**160**	**458**	**299**	**65%**	**159**

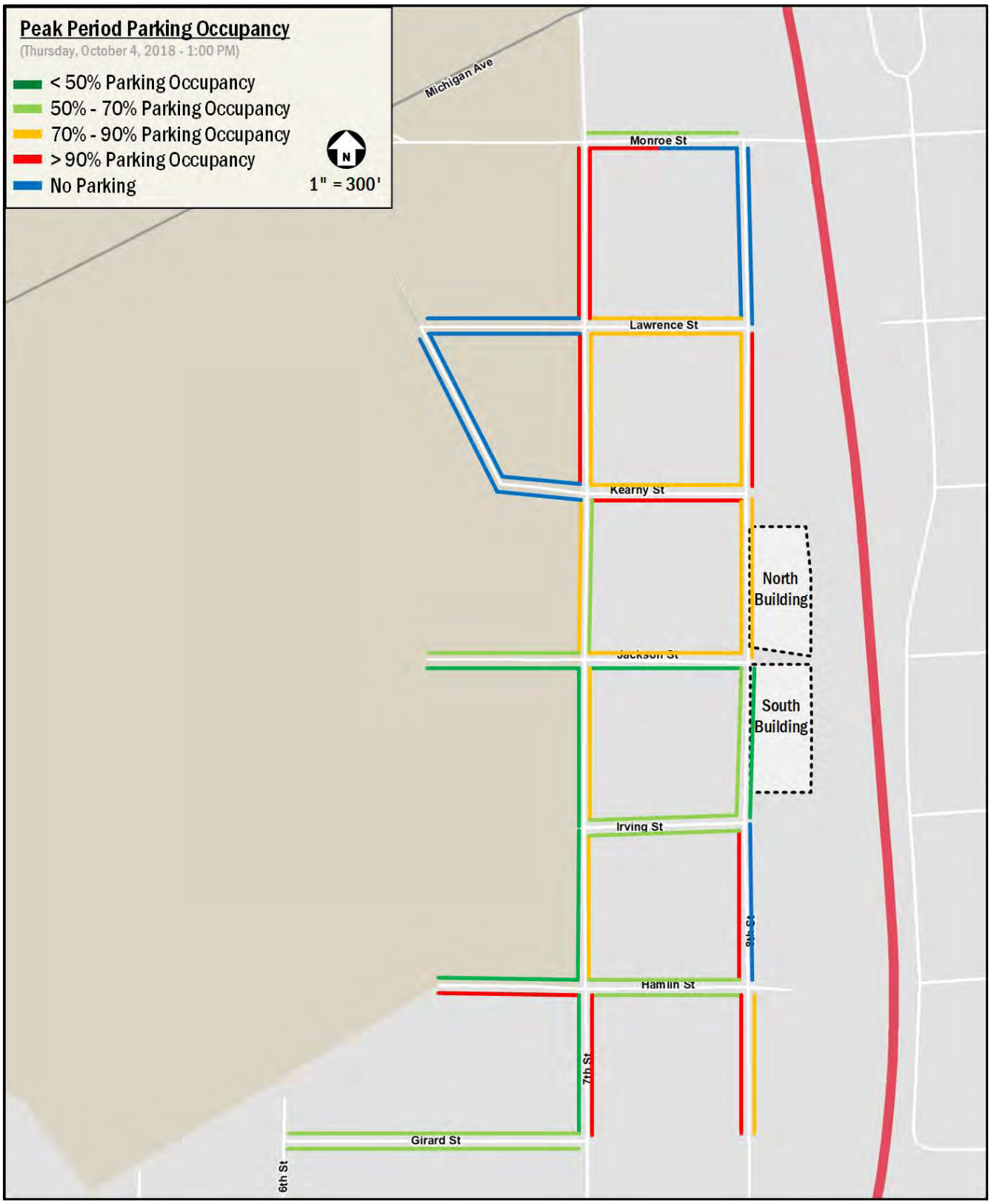

Figure 19: Thursday, October 4, 2018 Peak Period Street Parking Occupancy

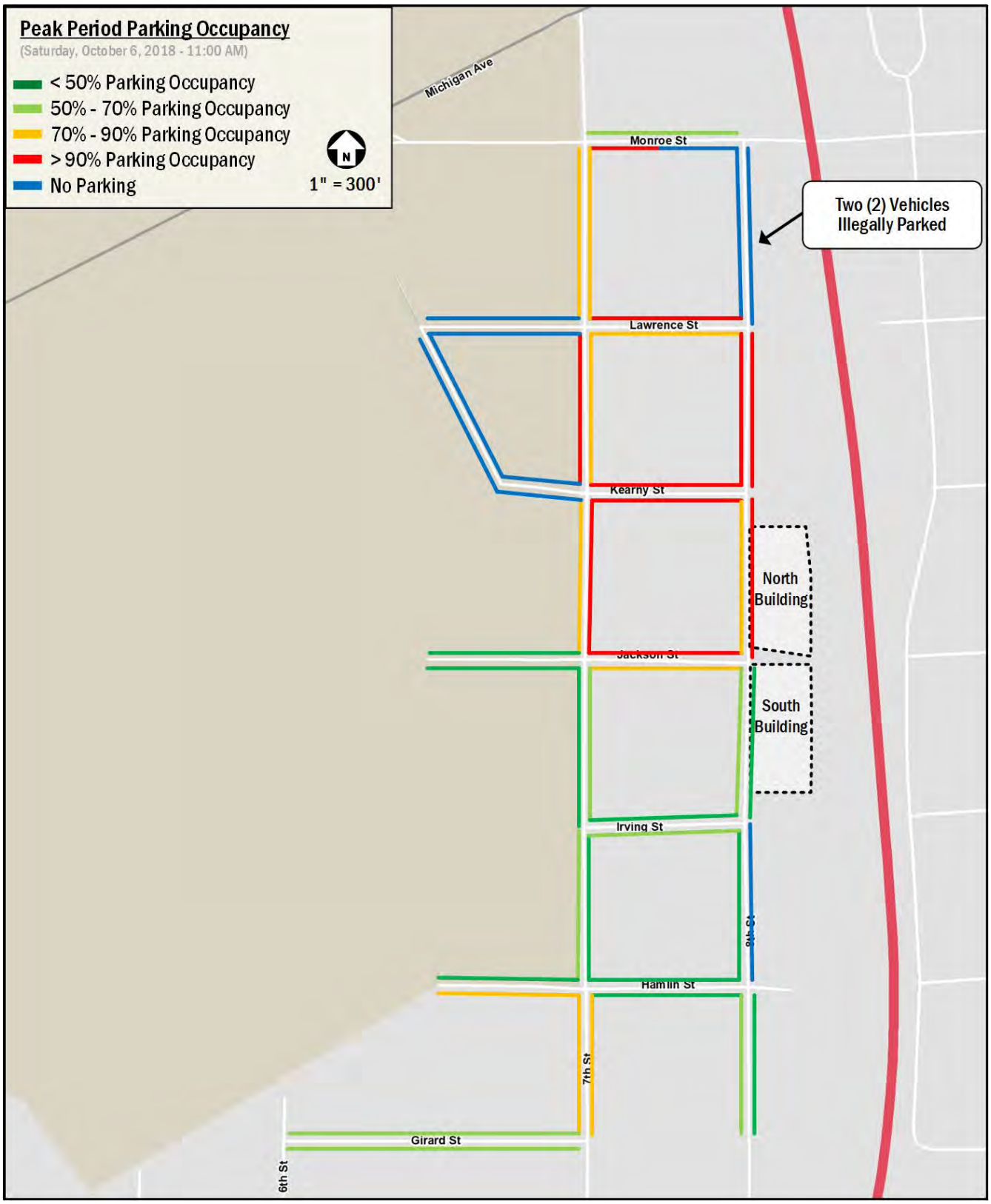

Figure 20: Saturday, October 6, 2018 Peak Period Street Parking Occupancy

Bicycle and Pedestrian Facilities

Bicycle Facilities

Per zoning regulations, a residential development is required to provide one (1) long-term bicycle space per every three (3) dwelling units and one (1) short-term space per every 20 dwelling units. A reduction in the number of long-term spaces required is granted after the first 50 spaces are provided for a use, resulting in additional spaces required per every six (6) dwelling units, resulting in 88 long-term spaces and 19 short-term spaces required. The development will meet these requirements by providing 125 secure long-term spaces within the development garage. The 20 short-term spaces will be placed curbside along 8th Street and will be of the inverted U-rack variety. Figure 8 shows the proposed location for the 20 short-term bicycle spaces and the Applicant will work with DDOT to determine the exact location of bicycle racks in public space.

Pedestrian Facilities

As part of the proposed development, pedestrian facilities along the western perimeter of the Site will be greatly improved such that they meet or exceed DDOT and ADA requirements and provide an improved pedestrian environment. Missing sidewalks and/or curb ramps along 8th Street will be added where needed. The addition of missing sidewalks along the 8th Street will enhance pedestrian safety and comfort, including for students who attend local schools nearby. Two (2) existing curb cuts along 8th Street will be removed, improving the pedestrian experience and reducing pedestrian-vehicular conflicts. The addition of missing sidewalk links along 8th Street will meet recommendations made forth in the Brookland-Edgewood Livability Study.

Transportation Demand Management (TDM)

TDM is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM typically focuses on reducing the demand of single-occupancy, private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

The TDM plan for the Hanover 8th Street project is based on DDOT expectations for TDM programs for developments of this type and size. As such, The Applicant proposes the following TDM measures:

- The Applicant will identify a TDM Leader (for planning, construction, and operations) at the building, who will act as a point of contact with DDOT/Zoning Enforcement with annual updates. The TDM Leader will work with residents to distribute and market various transportation alternatives and options.
- The Applicant will provide TDM materials to new residents in the Residential Welcome Package materials.
- The Applicant will work with DDOT and goDCgo (DDOT's TDM program) to implement TDM measures at the site.
- The applicant will share the full contact information of the TDM Leaders for the site with DDOT and goDCgo (info@godcgo.com).
- The Applicant will post all TDM commitments online for easy reference.
- The Applicant will exceed Zoning requirements by providing 125 long-term bicycle parking spaces in the development garage.
- The Applicant will provide 20 short-term bicycle parking spaces along 8th Street, meeting zoning requirements.
- All parking on site will be priced at market rates, at minimum, defined as the average cost for parking in a 0.25-mile radius from the Site.
- The Applicant will unbundle the cost of residential parking from the cost of lease or purchase of each unit.
- The Applicant will provide a $100 SmartTrip Card for the first two years of occupancy to each incoming unit. A proactive marketing strategy will be provided to ensure residents are aware of this benefit.
- The Applicant will provide a bicycle repair station to be located in the secure long-term bicycle storage room.
- The Applicant will provide an on-site business center to residents with access to internet services.
- The Applicant will install a Transportation Information Center Display (electronic screen) within the residential lobbies containing information related to local transportation alternatives.
- The Applicant will provide a total of at least 4 shopping carts in the residential buildings for residents to use for running errands and grocery shopping.

TRIP GENERATION

This section outlines the transportation demand of the proposed Hanover 8th Street project. It summarizes the projected trip generation of the development by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition. This methodology was supplemented to account for the urban nature of the Site (the *Trip Generation Manual* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Trip generation was calculated based on ITE Land Use 221, Residential, Mid-Rise for the proposed buildings. Trip generation assumptions utilized a conservative estimate of 390 units. Mode splits for were primarily based on data for residential sites from assumptions derived from census data for residents that currently live near the Site. This information was supplemented with data from the WMATA Ridership Survey for residential locations. The vehicular mode split was then adjusted to reflect parking supply and the distance of nearby Metrorail stations.

Table 4: Mode Split Assumptions

Land Use	Mode			
	Auto	Transit	Bike	Walk
Residential	55%	40%	2%	3%

The mode split assumptions are shown in Table 4. A summary of the multimodal trip generation for the development program is provided in Table 5. The development is expected to generate 72 morning peak hour (19 inbound and 53 outbound) trips and 90 afternoon peak hour (55 inbound and 35 outbound) trips.

Table 5: Trip Generation Summary for Development

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	19 veh/hr	53 veh/hr	72 veh/hr	55 veh/hr	35 veh/hr	90 veh/hr
Transit	15 ppl/hr	44 ppl/hr	59 ppl/hr	45 ppl/hr	29 ppl/hr	74 ppl/hr
Bike	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	2 ppl/hr	4 ppl/hr
Walk	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	3 ppl/hr	6 ppl/hr

TRAFFIC OPERATIONS

This section provides a summary of an analysis of the existing and future roadway capacity surrounding the Site. Included is an analysis of potential vehicular impacts of the Project and a discussion of potential mitigation measures.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed Project on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips.

This analysis was accomplished by determining the traffic volumes and roadway capacity for Existing Conditions, Background Conditions, and Total Future Conditions.

The capacity analysis focuses on the weekday morning peak hour and afternoon peak hour, as determined by the existing traffic volumes in the study area.

This chapter concludes that:

- Under Existing Conditions, the majority of intersections in the study area operate at acceptable conditions.
- Future areas of concern for roadway capacity, are primarily along the minor approaches intersecting commuter routes such as Michigan Avenue.
- One (1) study intersection met the threshold for requiring mitigation measures as a result of the development:
  - Monroe Street & Michigan Avenue (AM)
- Mitigation measures were implemented at this intersection in the form of signal timing adjustments.
- The project will not have a detrimental impact to the surrounding vehicular network, assuming the proposed mitigation measure is implemented.

STUDY AREA, SCOPE, & METHODOLOGY

This section outlines the vehicular trips generated in the study area along the vehicular access routes and defines the analysis assumptions.

The scope of the analysis contained within this report was coordinated with DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular capacity analyses are performed to determine whether the proposed development will lead to adverse impacts on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing future scenarios: (1) without the proposed Project (referred to as the Background condition) and (2) with the Project approved and constructed (referred to as the Future condition).

Specifically, the roadway capacity analysis examined the following scenarios:

1. Existing Conditions (Existing Conditions);
2. 2021 Future Conditions without the Project (2021 Background Conditions); and
3. 2021 Future Conditions with the Project (2021 Total Future Conditions).

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses were performed for the scenarios listed above. The set of intersections decided upon during the study scoping process with DDOT are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed Project. Although it is possible that impacts will occur outside of the study area, those impacts are not significant enough to be considered a detrimental impact nor worthy of mitigation measures.

Based on the projected future trip generation and the location of the Site access points, the following intersections were chosen and agreed upon by DDOT for analysis:

1. Michigan Avenue & Monroe Street, NE
2. 7th Street & Michigan Avenue, NE
3. 7th Street & Monroe Street, NE
4. Monroe Street & 8th Street, NE
5. 8th Street & Kearny Street, NE
6. 8th Street/Edgewood Street & Hamlin Street, NE
7. Franklin Street & 7th Street, NE
8. 8th Street and Site Driveway (Future)

Figure 21 shows a map of the study area intersections.

Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses.

Existing Geometry and Operations Assumptions

The geometry and operations assumed in the Existing Conditions scenario are those present when the main data collection occurred. Gorove/Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

The lane configurations and traffic controls for the Existing Conditions are shown on Figure 28.

2021 Background Geometry and Operations Assumptions

Following national and DDOT methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, two (2) background improvements were included in the 2021 Background Conditions.

- The intersection of 8th Street and Monroe Street will be improved as part of the Monroe Street Bridge reconstruction. The existing westbound approach of one travel lane for left and thru turns will be restored into a left turn storage lane and a thru lane.
- In addition to the roadway configuration at 8th and Monroe Streets, a new traffic signal will be installed, replacing the existing two-way stop-control.

The lane configurations and traffic controls for the 2021 Background Conditions are shown on Figure 29.

2021 Total Future Geometry and Operations Assumptions

The configurations and traffic controls for the 2021 Total Future Conditions are based on those for the 2021 Background Conditions, including the two (2) previously described background improvements. In addition, the Total Future Conditions include construction of the driveway located off 8th Street as part of the proposed development.

The lane configurations and traffic controls for the 2021 Total Future Conditions are shown on Figure 30.

Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which was collected on Wednesday, October 10, 2018 and Thursday, November 29, 2018 between the hours of 6:30 and 9:30 AM and 4:00 and 7:00 PM. The results of the traffic counts are included in the Technical Attachments. The existing peak hour traffic volumes are shown Figure 22. For all intersections, the individual intersection morning and afternoon peak hours were used.

2021 Background Traffic Volumes without the project (2021 Background)

The traffic projections for the 2021 Background Conditions consist of the existing volumes with two additions:

- Traffic generated by developments within the vicinity of the Site and expected to be completed prior, or close to 2021 (known as background developments); and
- Inherent growth on the roadway (representing regional traffic growth).

Following national and DDOT methodologies, a background development should meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to that of the Project.

Based on these criteria, and as discussed with and agreed to with DDOT, the following developments were included in the 2021 Background scenario:

1. Portrait Square at Brookland
2. Monroe Street Market, Block E

3. Brookland Place
4. 680 Rhode Island Avenue (Phase 1 and 2)

Existing studies were available for most background developments. Trip generation and distribution assumptions for the background developments were based on their respective studies and altered where necessary based on updated travel patterns. For developments where existing studies were not available, trip generation, mode split, and distributions were established using the same assumptions for this report. Mode split and trip generation assumptions for the background developments are shown in Table 6. The volumes composed of background developments are shown in Figure 23.

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis are derived using the Metropolitan Washington Council of Government's (MWCOG) currently adopted regional transportation model, comparing the difference between the year 2017 and 2020 model scenarios. The growth rates observed in this model served as a basis for analysis assumptions, with a growth rate of 0.25% assumed for 8th Street, which does not have a growth rate within the model. The applied growth rates are shown in Table 7. The volumes composed of background growth are shown in Figure 24.

The traffic volumes generated by the inherent growth along the network and background developments were added to the existing traffic volumes in order to establish the 2021 Background traffic volumes. The traffic volumes for the 2021 Background Conditions are shown on Figure 25.

2021 Total Future Traffic Volumes with the project (2021 Total Future)

The 2021 Total Future traffic volumes consist of the 2021 Background volumes with the addition of the traffic volumes generated by the proposed Project (site-generated trips). Thus, the 2021 Total Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and site-generated trips of the proposed Project.

Trip distribution for the site-generated trips was determined based on: (1) CTPP TAZ data, (2) existing and future travel patterns in the study area, and (3) the location of the parking access.

The residential trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting from the Site's TAZ and adjusted based on traffic volumes and patterns. The flow information showed significant commuting patterns from Northwest, Washington, DC. The origin of outbound and destination of inbound residential vehicular trips was the below-grade parking garage for the building, accessible along the proposed driveway connecting to 8th Street.

The inbound and outbound trip distribution for the Project is shown on Figure 26 and Figure 27, respectively.

The traffic volumes for the 2021 Total Future Conditions were calculated by adding the development-generated traffic volumes for the Project to the 2021 Background traffic volumes. Thus, the future condition with the proposed development scenario includes traffic generated by: existing volumes, background developments through the year 2021, inherent growth on the network, and the proposed Project. The Project-generated traffic volumes are shown on Figure 31. The 2021 Total Future traffic volumes are shown on Figure 32.

Peak Hour Factors

The TRB *Highway Capacity Manual* (HCM) and the AASHTO *Policy on Geometric Design of Highways and Intersections* recommend evaluating traffic conditions during the worst 15 minutes of either a design hour or a typical weekday rush hour. Peak Hour Factor (PHF) is used to convert the hourly volume into the volume rate representing the busiest 15 minutes of the hour. The existing guidelines provide typical values of PHF and advise using the PHF calculated from vehicle counts at analyzed or similar locations. The HCM recommends a PHF of 0.88 for rural areas and 0.92 for urban areas and presumes that capacity constraints in congested areas reduce the short-term traffic fluctuation. The HCM postulates 0.95 as the typical PHF for congested roadways.

For the Existing Conditions analysis, PHF were calculated from the turning movement data that was collected in the field, using a minimum PHF of 0.85.

To account for the significant increase in peak hour traffic generated by local development on side streets, and regional growth along major corridors, a default PHF minimum of 0.92 was assumed in the Background Conditions and Total Future Conditions analyses.

VEHICULAR ANALYSIS RESULTS

Intersection Capacity Analysis

Intersection capacity analyses were performed for the scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. Synchro version 9.1 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro* software). The average delay of each approach and LOS is shown for the signalized and all-way stop-controlled intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments.

Table 8 and Table 9 show the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the study scenarios during the morning and afternoon peak hours, respectively. The capacity analysis results are shown on Figure 33 for the morning peak hour and Figure 34 for the afternoon peak hour.

The study intersections generally operate at acceptable conditions during the morning and afternoon peak hours for all study scenarios. However, four (4) intersections have at least one approach that operates at unacceptable conditions during at least one study scenario and during at least one of the peak hours:

- Monroe Street and Michigan Avenue
  - Northbound approach: AM (Background, Total Future)
- 7th Street/Driveway & Michigan Avenue
  - Northbound approach: AM (Existing)
- 7th Street & Monroe Street
  - Northbound approach: AM (Existing, Background, Total Future); PM (Background, Total Future)
- 7th Street & Franklin Street
  - Southbound approach: AM (Existing, Background, Total Future)

Queuing Analysis

In addition to the capacity analyses presented above, a queuing analysis was performed at the study intersections. The queuing analysis was performed using Synchro software. The 50th and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that is exceeded 5% of the time. For unsignalized intersections, only the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM 2000 calculations. HCM 2000 does not calculate queuing for all-way stops.

Table 10 and Table 11 show the queuing results for the study area intersections. Five (5) of the study intersections have one or more lane groups that exceed the given storage length during at least one peak hour in all of the study scenarios. These intersections are as follows:

- Monroe Street & Michigan Avenue
  - Northbound Left/Right: AM (Existing, Background, Total Future)
- 7th Street/Driveway & Michigan Avenue
  - Eastbound Left/Thru/Right: PM (Existing, Background, Total Future)
  - Westbound Left/Thru/Right: AM (Existing, Background, Total Future)
  - Northbound Left/Thru/Right: AM (Existing, Background, Total Future)
- 7th Street & Monroe Street
  - Eastbound Left/Thru/Right: PM (Existing, Background, Total Future)
  - Westbound Left/Thru/Right: AM (Existing); PM (Existing, Background, Total Future)
  - Northbound Left/Thru/Right: AM/PM (Background, Total Future)

- Southbound Left/Thru/Right: AM/PM (Background, Total Future)
- 8th Street & Monroe Street
  - Eastbound Thru/Right: PM (Background, Total Future)
  - Westbound Thru: AM (Background, Total Future
- 7th Street & Franklin Street
  - Eastbound Left/Thru/Right: PM (Total Future)
  - Northbound Left/Thru/Right: AM/PM (Existing, Background, Total Future

Mitigations and Improvements

Based on DDOT standards, the Project is considered to have an impact at an intersection within the study area if any of the following conditions are met:

- The capacity analyses show a LOS E or F at an intersection or along an approach where one does not exist in the Existing Conditions or Background Conditions;
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than 5 percent when compared to the Background Conditions; or
- There is an increase in the 95th percentile queues by more than 150 feet at an intersection or along an approach in the Total Future Conditions with the proposed development where one does not exist in the Background Conditions.

Following these guidelines, there are impacts to one (1) intersection as a result of the Project. Mitigation measures were tested at this intersection, with results shown on Table 8 and detailed Synchro reports included in the Technical Attachments. The following conclusion was reached:

- *Monroe Street & Michigan Avenue*
  During the morning peak hour, the northbound approach of Monroe Street is projected to operate under LOS E during Background and Total Future Conditions. The delay observed under the Total Future Conditions increases by more than 5 percent when compared to the Background Conditions. Therefore, mitigation measures were evaluated.

  All turning movements are made from a single lane at Monroe Street. The intersection was recently modified, with the lane configuration of the northbound Monroe Street approach narrowed from two (2) lanes (a left turn lane and a left/right turn lane) to a single turn lane. The addition of 15 northbound left site-generated trips onto westbound Michigan Avenue add to an already saturated condition at this approach.

  The impact can be mitigated through signal timing adjustments. Approximately two (2) seconds of green time was moved to the northbound phase of Monroe Street to the from the concurrent eastbound/westbound phase of Michigan Avenue, allowing more vehicles to pass the signal. This mitigation will reduce delays to levels observed in Background Conditions.

  The proposed signal timing adjustments for this intersection can be found in the Technical Attachments.

Table 6: Summary of Background Development Trip Generation

Background Development	Trip Generation Source	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Portrait Square at Brookland	Approved CTR and Transportation Statement	4 veh/hr	13 veh/hr	17 veh/hr	18 veh/hr	9 veh/hr	27 veh/hr
Monroe Street Market Block E	Approved Transportation Statement	12 veh/hr	25 veh/hr	37 veh/hr	37 veh/hr	31 veh/hr	68 veh/hr
Brookland Place	ITE 10th Generation	4 veh/hr	12 veh/hr	16 veh/hr	12 veh/hr	8 veh/hr	20 veh/hr
680 RI Avenue (Phase 1 and 2)	Approved CTR	48 veh/hr	148 veh/hr	196 veh/hr	181 veh/hr	118 veh/hr	299 veh/hr
Net Background Site Trips		**68 veh/hr**	**198 veh/hr**	**266 veh/hr**	**248 veh/hr**	**166 veh/hr**	**414 veh/hr**

Table 7: Applied Annual and Total Growth Rates

Road and Direction of Travel	Proposed Annual Growth Rate		Total Growth between 2018 and 2021	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Franklin Street – Eastbound	0.50%	0.25%	1.51%	0.75%
Franklin Street – Westbound	0.50%	0.25%	1.51%	0.75%
7th Street – Northbound	1.25%	2.00%	3.80%	6.12%
7th Street – Southbound	1.00%	2.00%	3.03%	6.12%
Monroe Street – Eastbound	1.25%	0.50%	3.80%	1.51%
Monroe Street – Westbound	0.50%	0.70%	1.51%	2.11%
Michigan Avenue – Eastbound	1.50%	0.40%	4.57%	1.20%
Michigan Avenue – Westbound	0.50%	0.80%	1.51%	2.42%
8th Street – Northbound	0.25%	0.25%	0.75%	0.75%
8th Street – Southbound	0.25%	0.25%	0.75%	0.75%

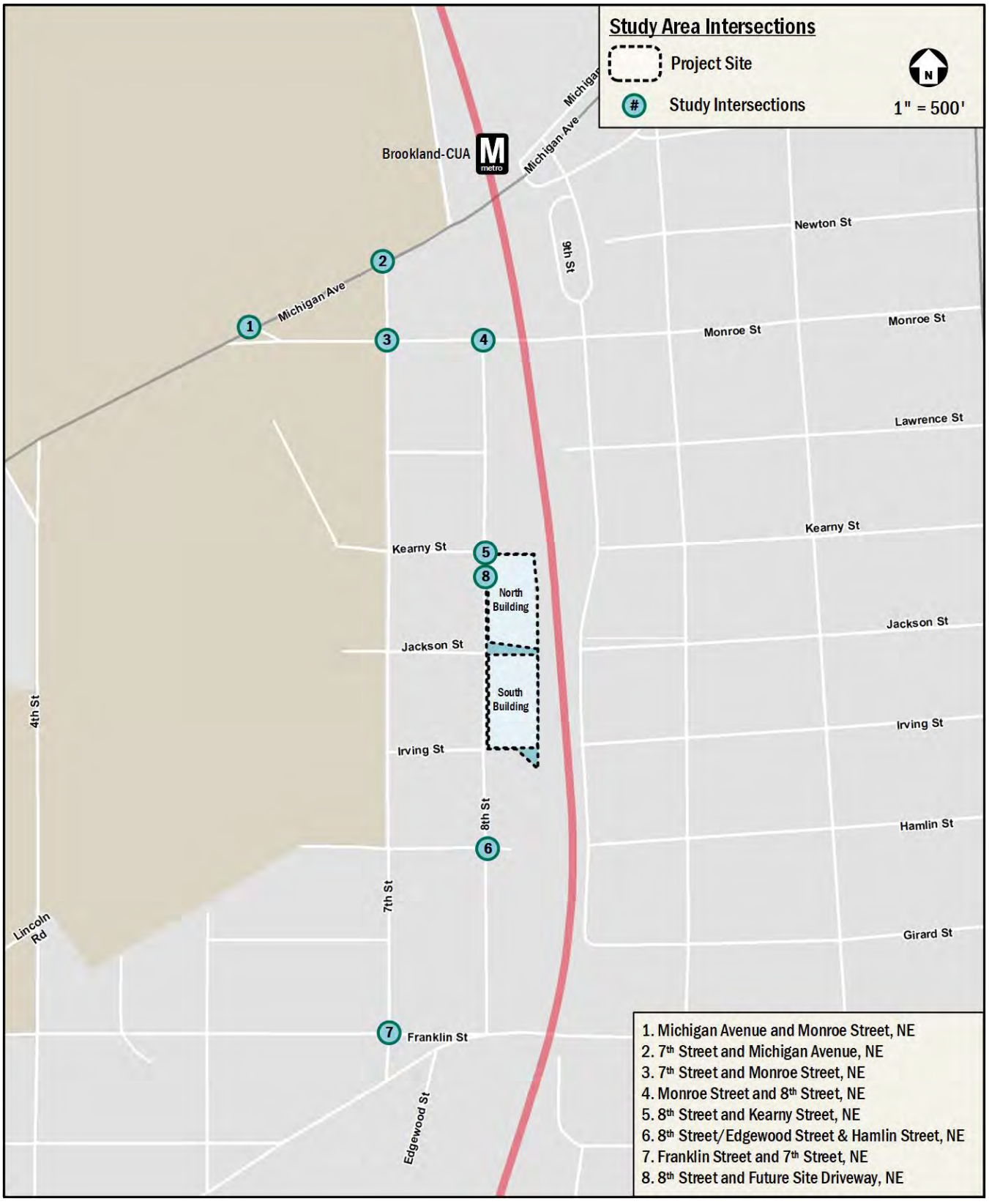

Figure 21: Study Area Intersections

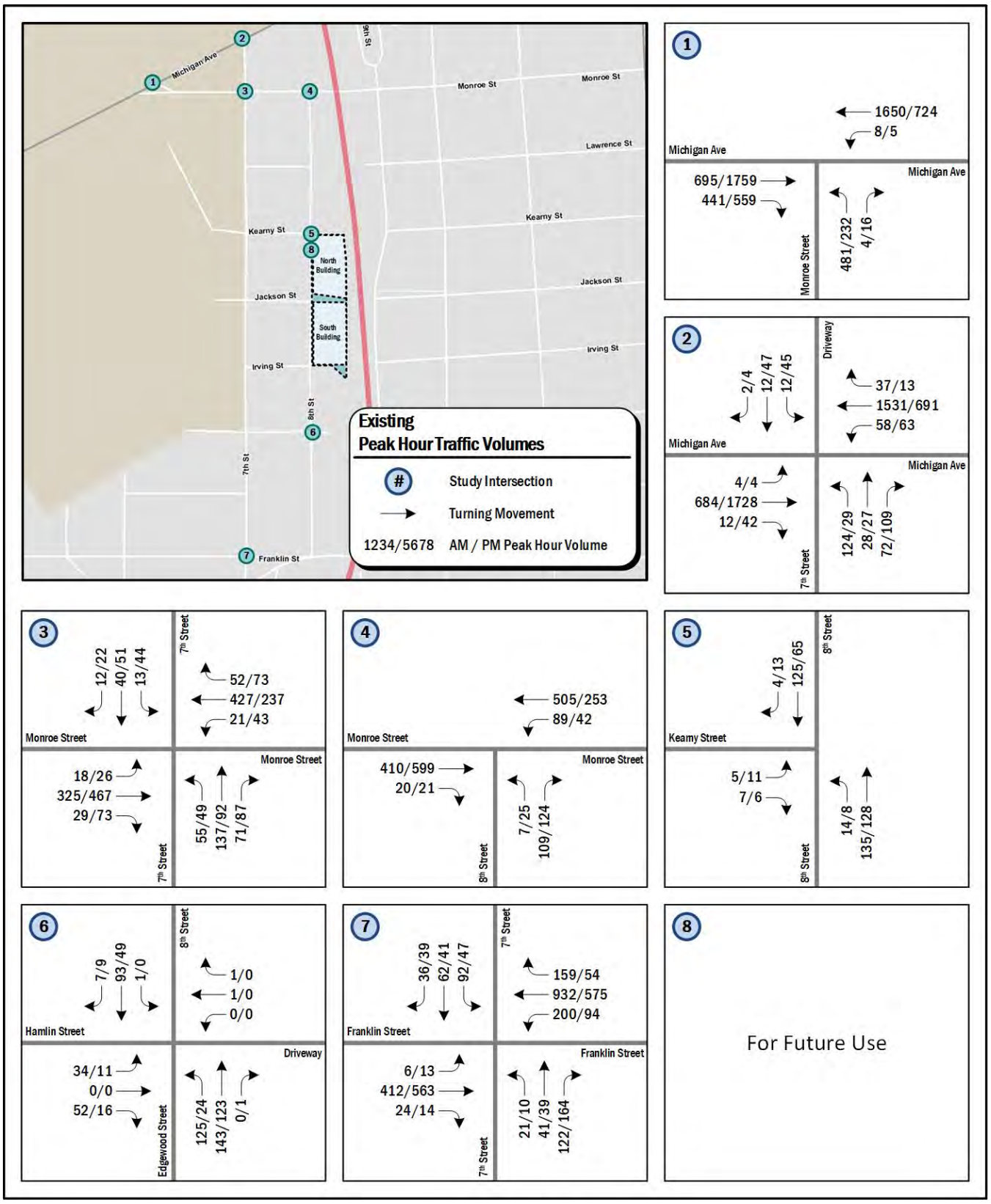

Figure 22: Existing Peak Hour Traffic Volumes

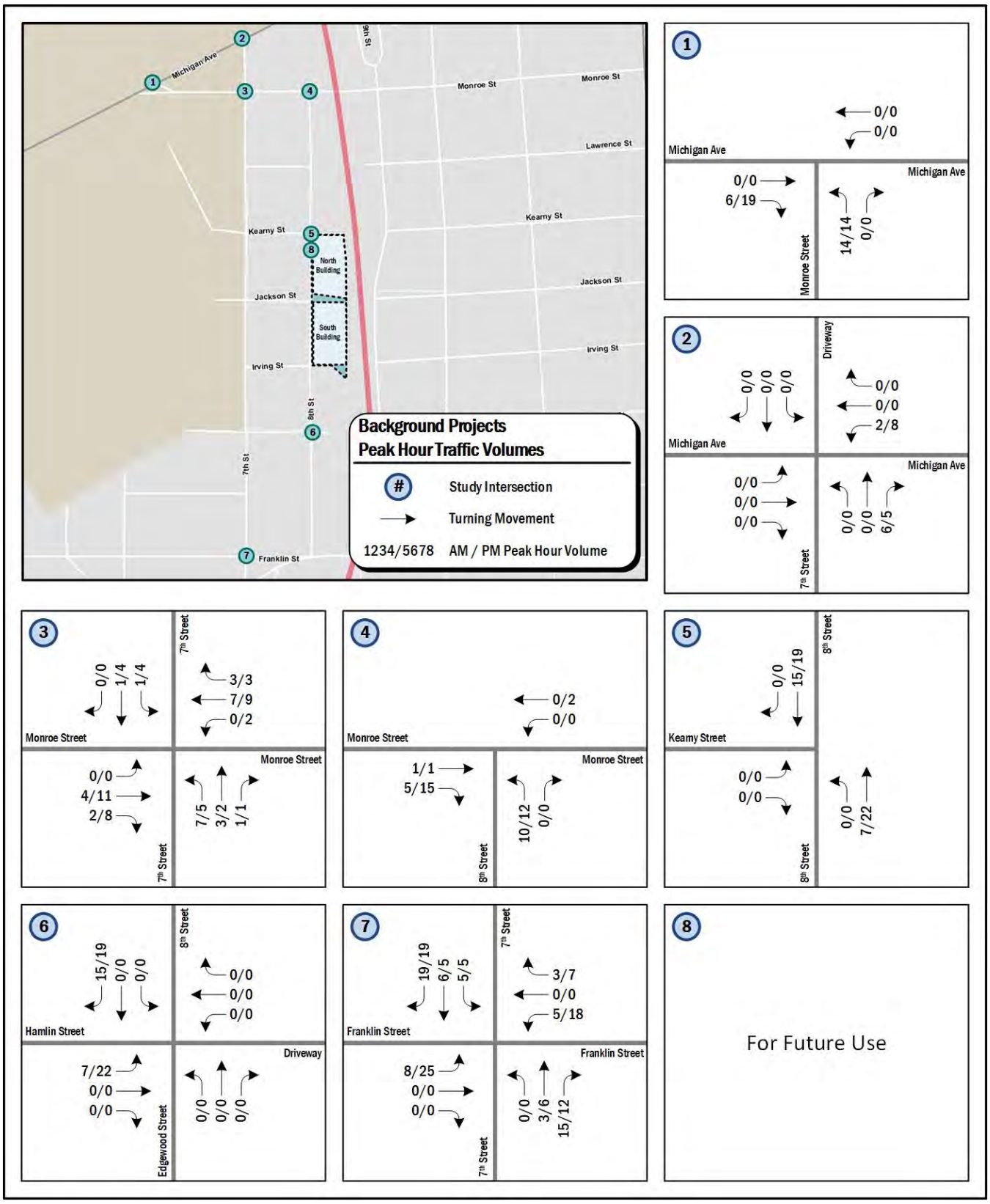

Figure 23: Background Projects Peak Hour Traffic Volume (2021)

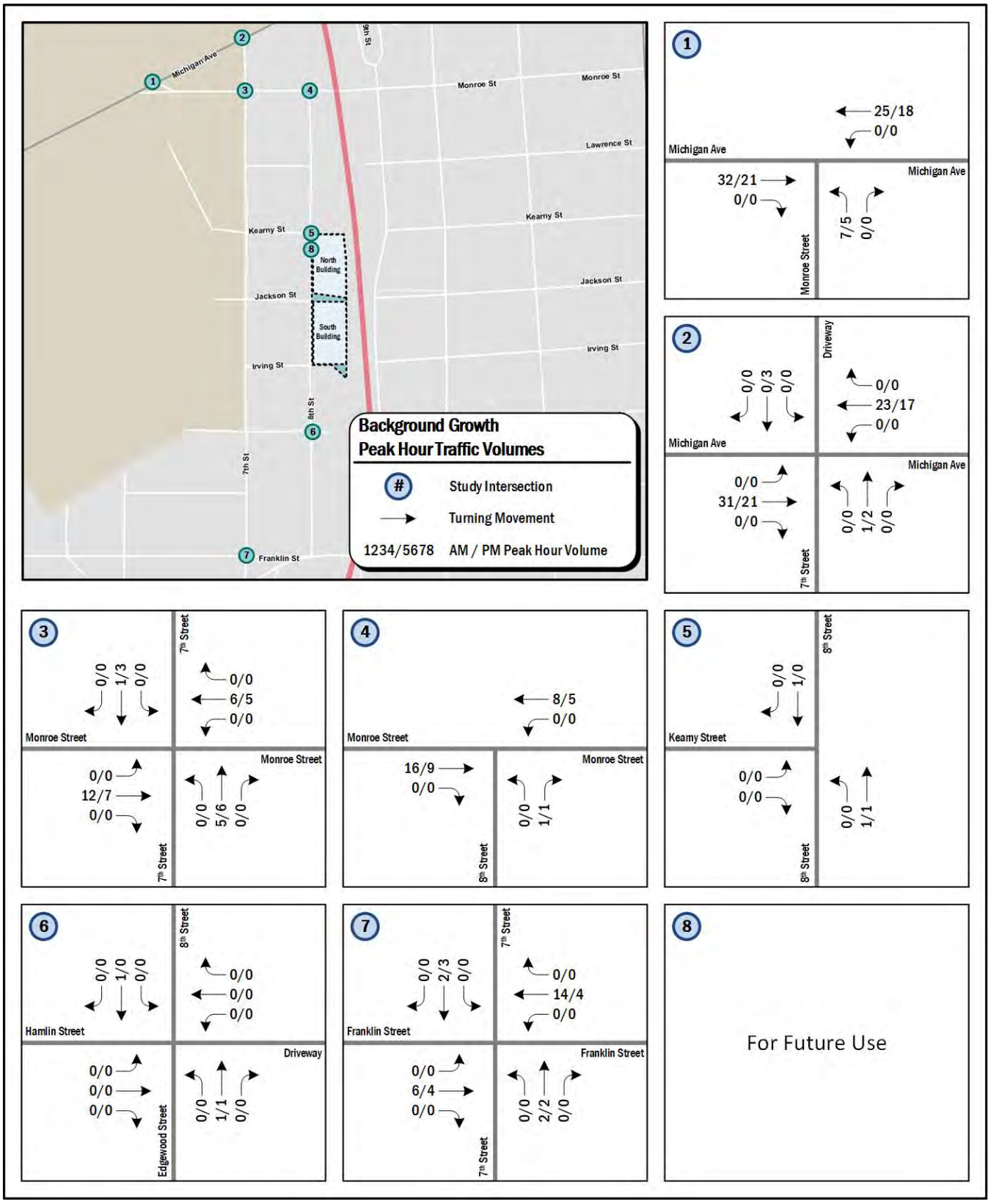

Figure 24: Background Growth Peak Hour Traffic Volumes (2021)

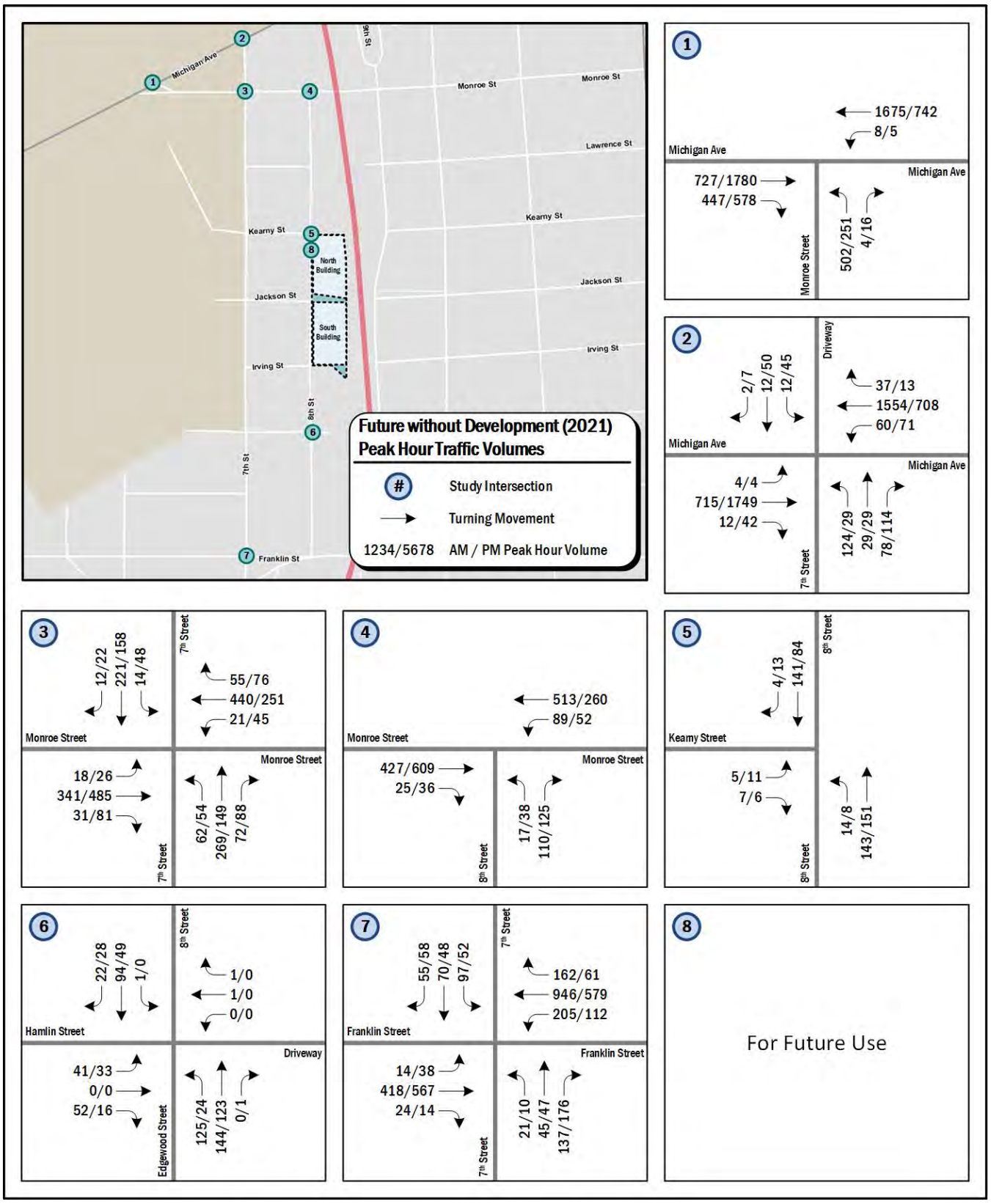

Figure 25: Future without Development (2021) Peak Hour Traffic Volumes

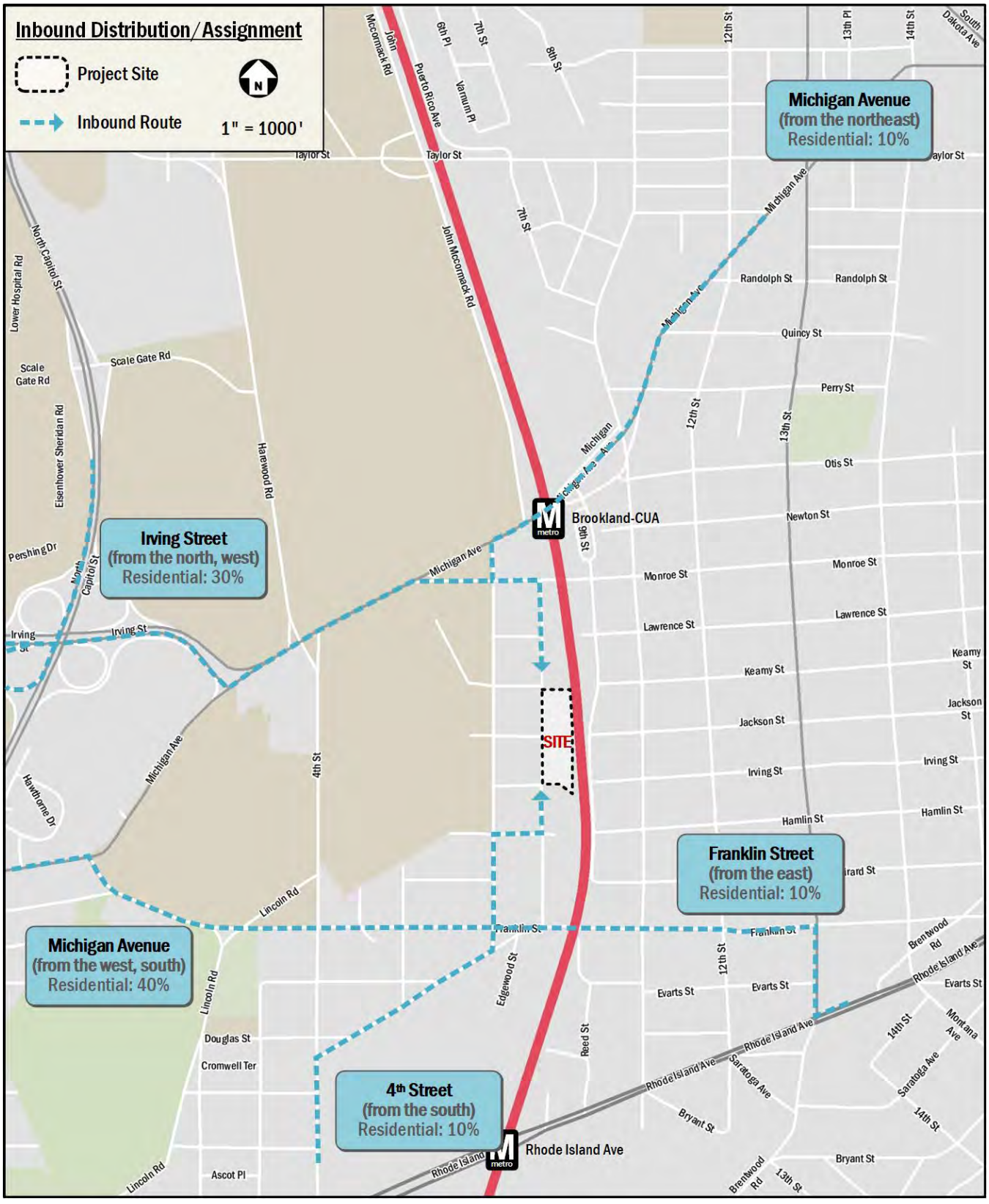

Figure 26: Inbound Trip Distribution and Routing

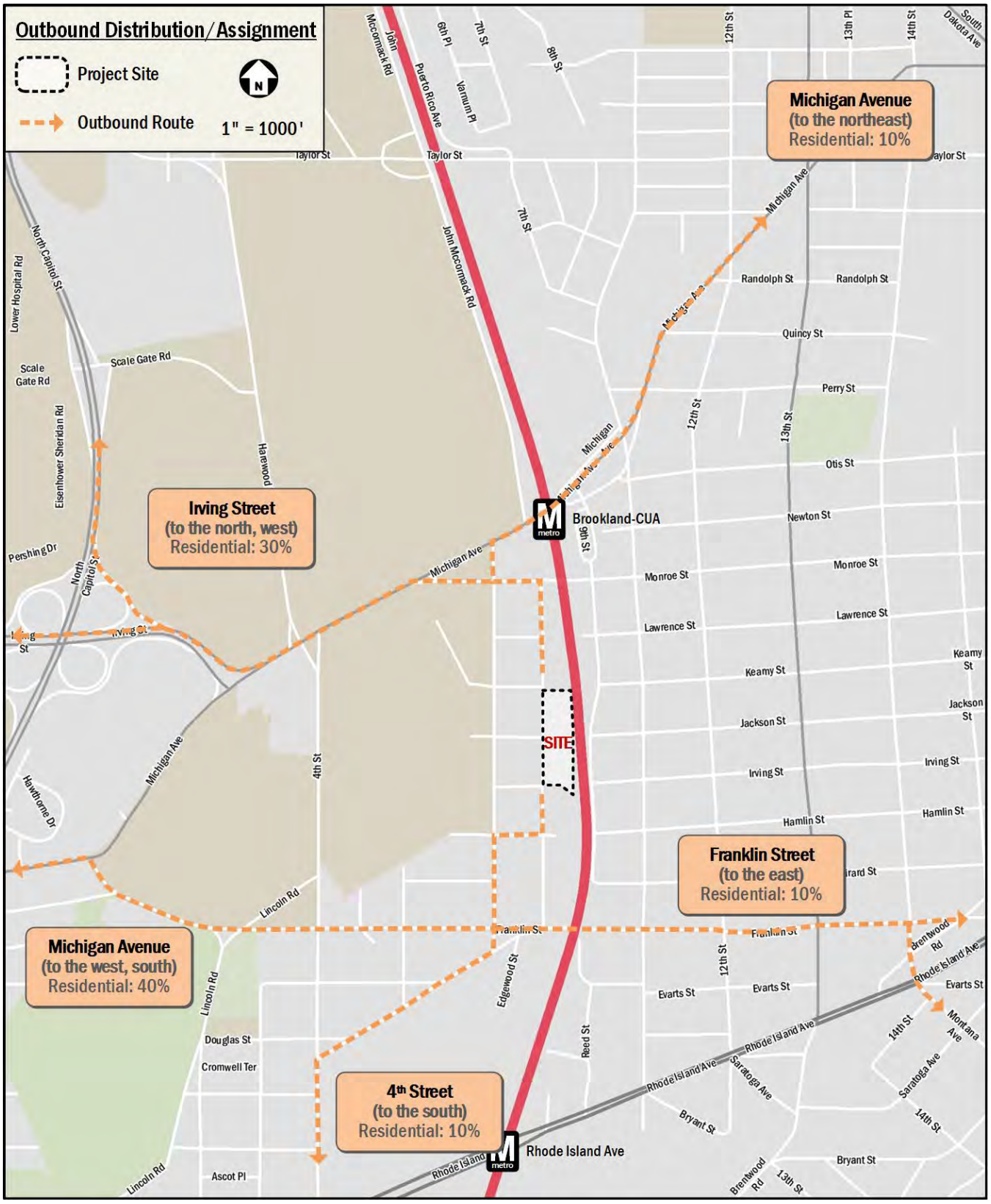

Figure 27: Outbound Trip Distribution and Routing

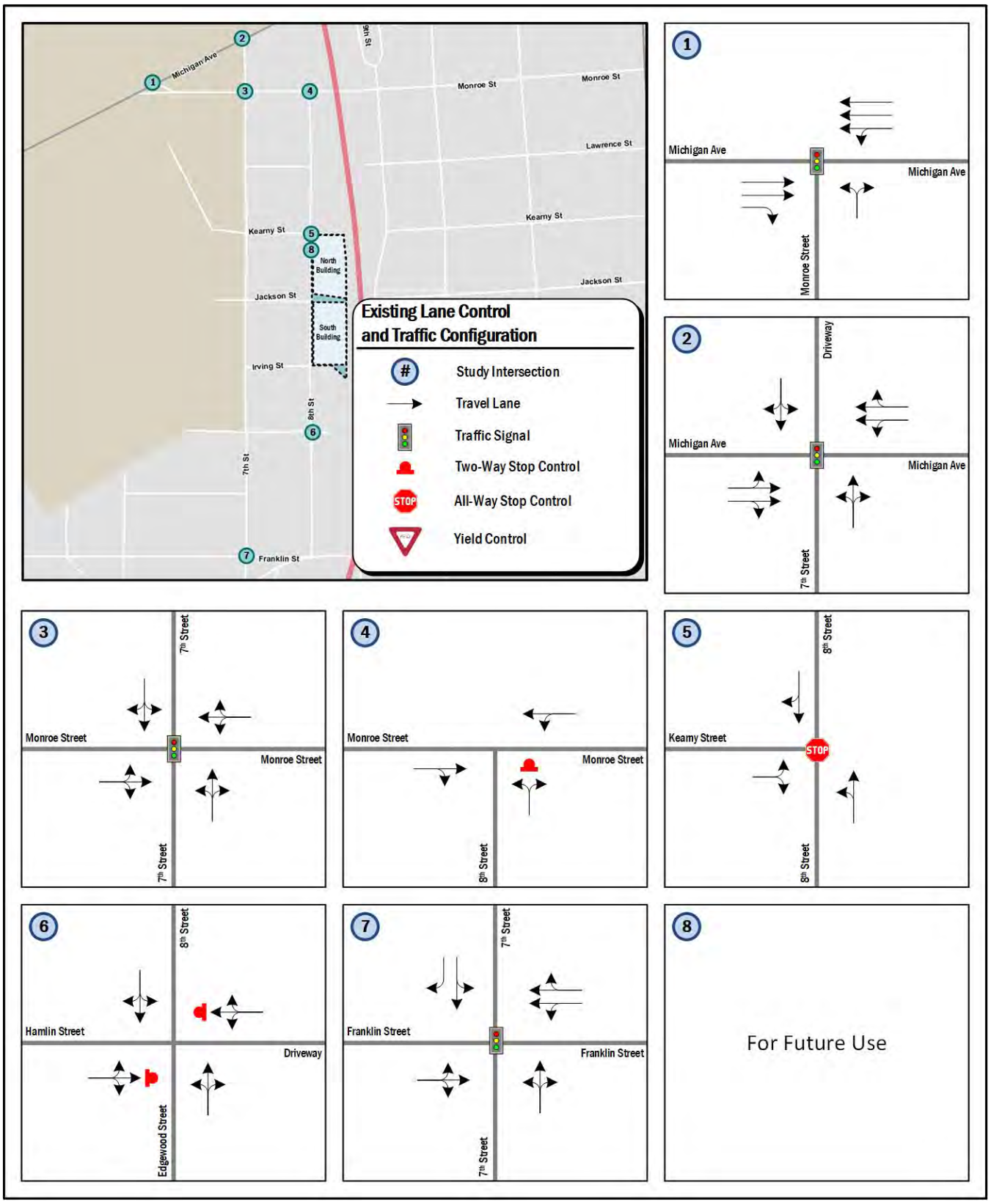

Figure 28: Existing Lane Configuration and Traffic Control

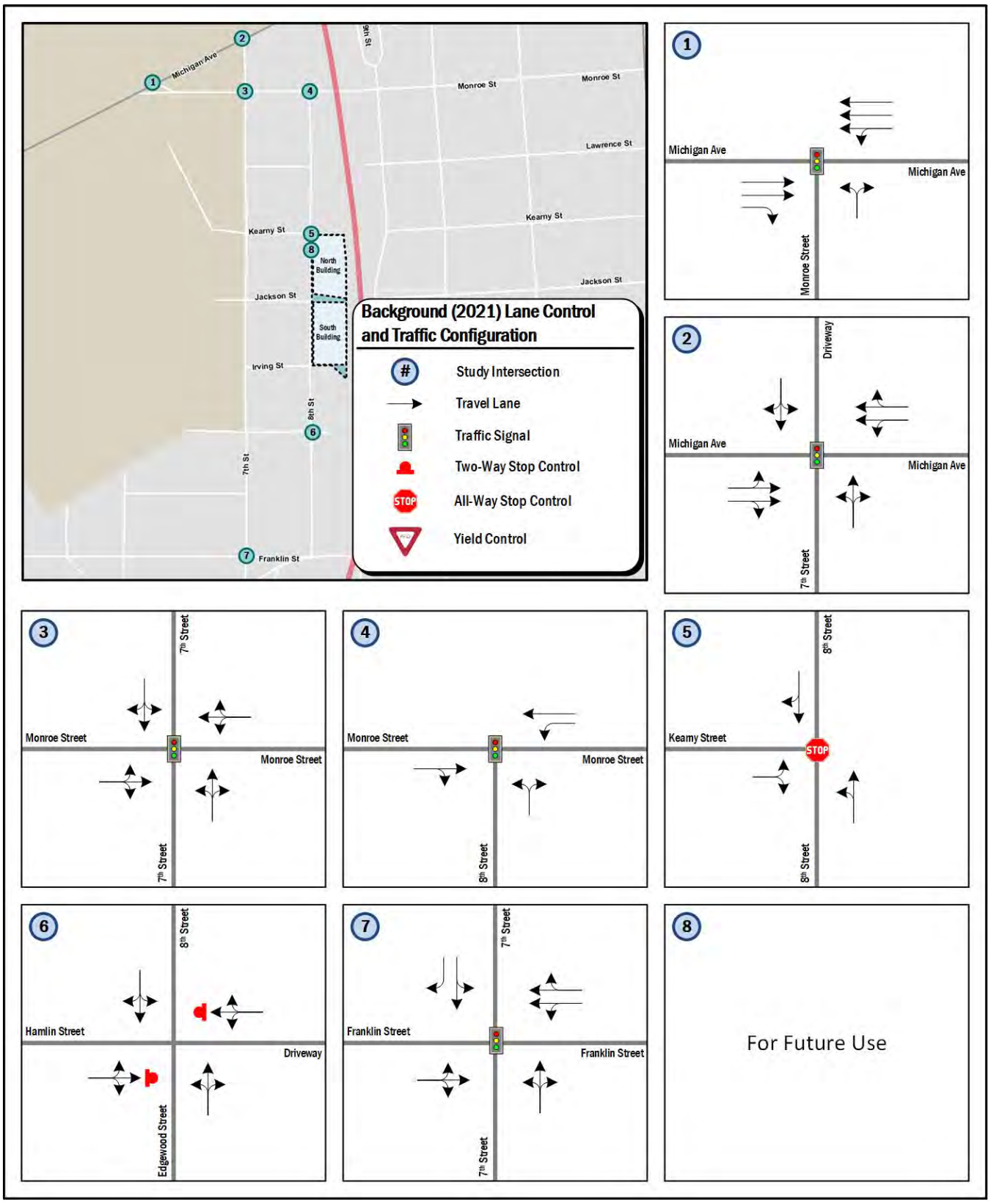

Figure 29: Background Lane Configuration and Traffic Control (2021)

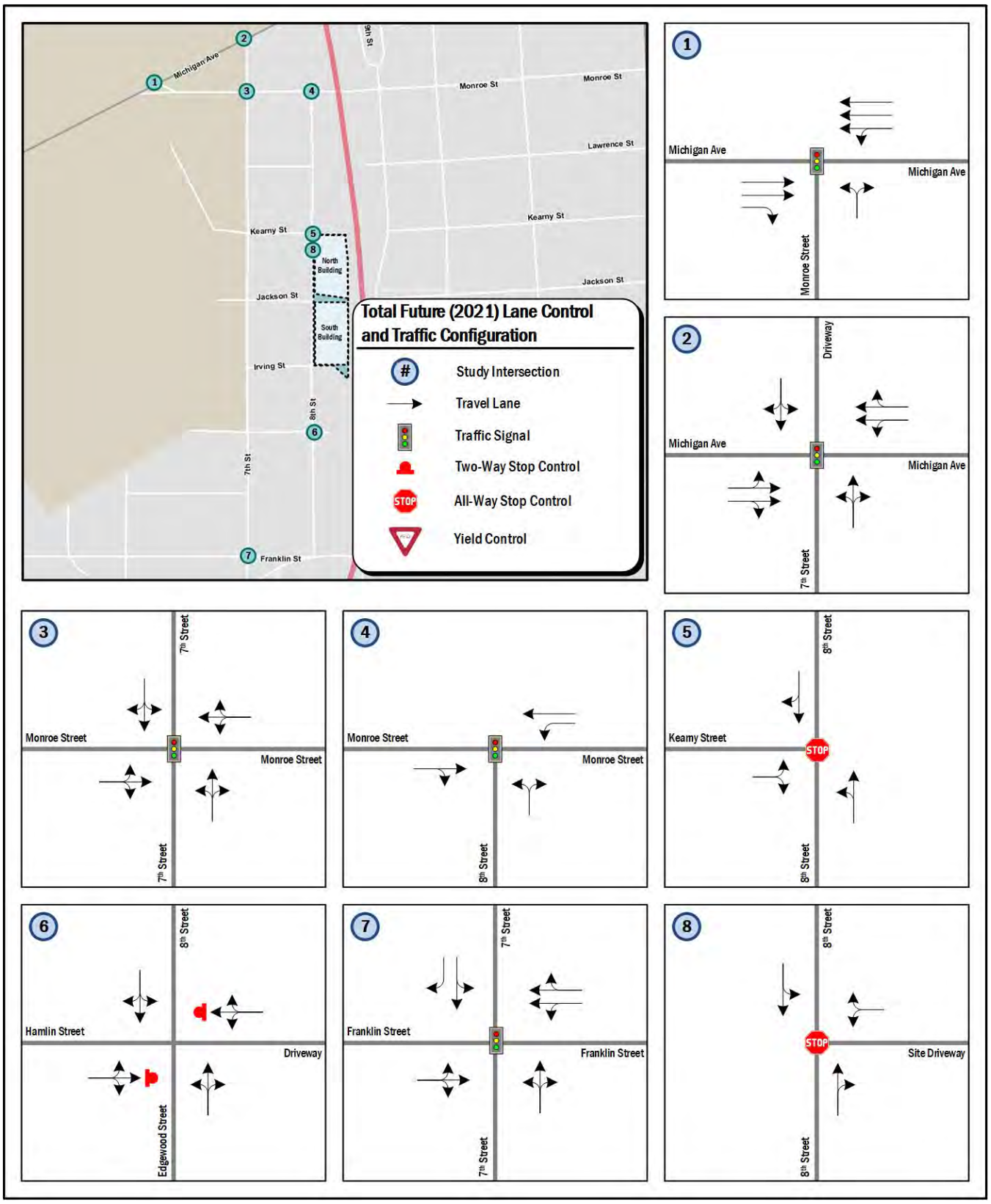

Figure 30: Future Lane Configuration and Traffic Control (2021)

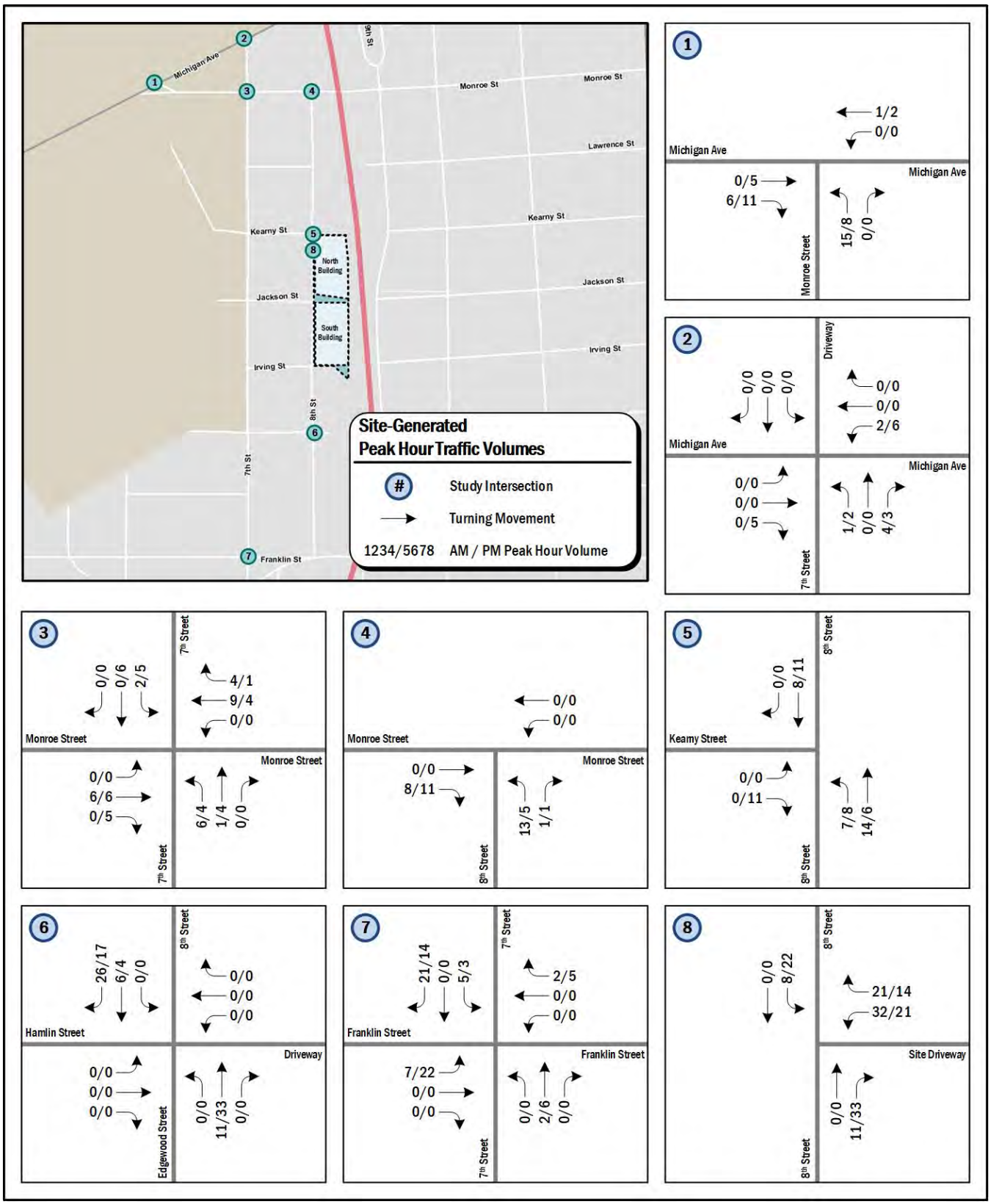

Figure 31: Site-Generated Peak Hour Traffic Volumes

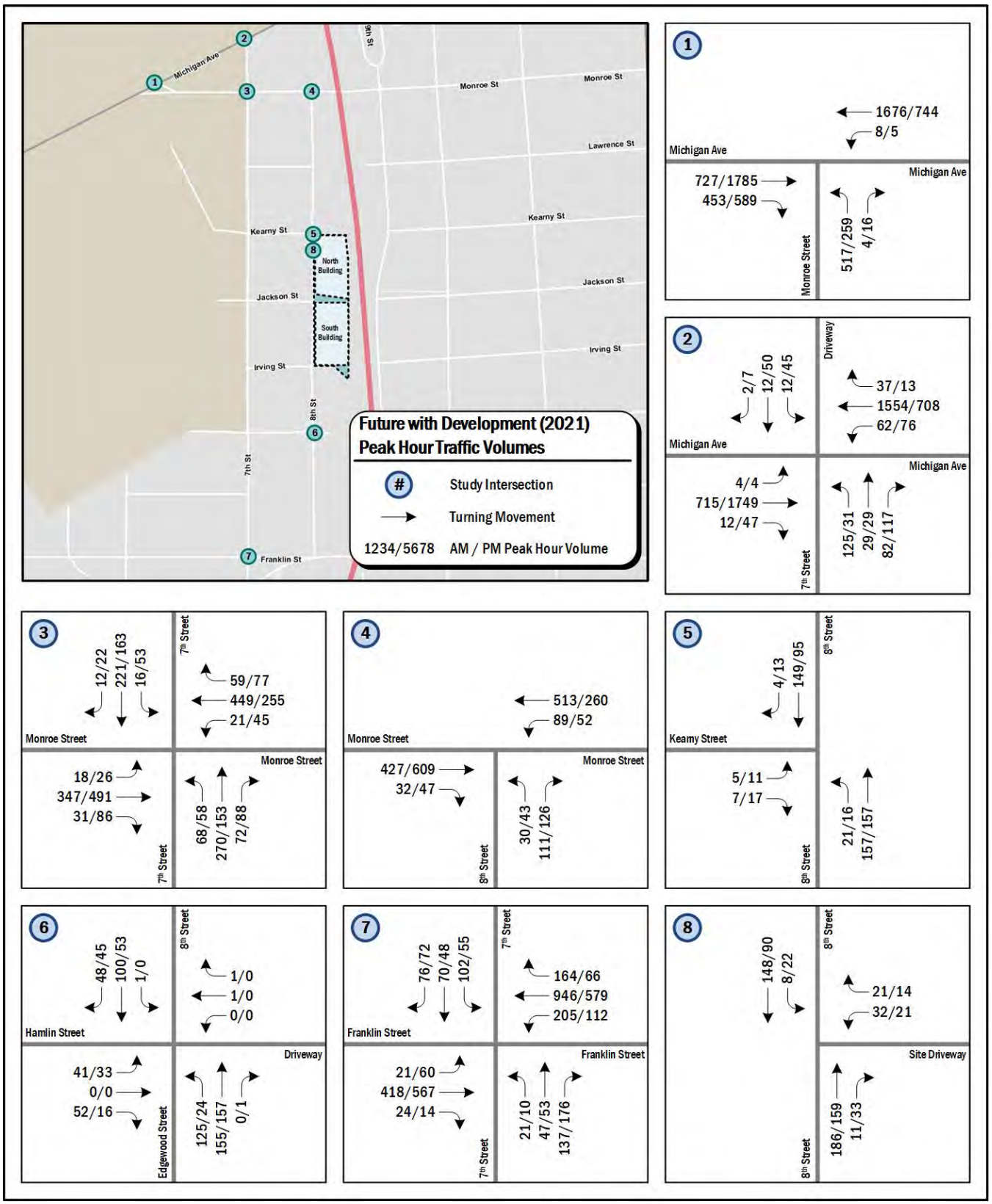

Figure 32: Future Peak Hour Traffic Volumes (2021)

Table 8: LOS Results, AM Peak Hour

Intersection	Approach	Existing Conditions (2018)		Future Without Development Conditions (2021)		Future With Development Conditions (2021)		Future With Development Conditions (2021), with Mitigations	
		AM Peak Hour							
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Monroe Street & Michigan Avenue	**Overall**	**19.9**	**B**	**20.9**	**C**	**21.7**	**C**	**21.8**	**C**
	Eastbound	17.0	B	17.2	B	17.2	B	18.4	B
	Westbound	12.7	B	13.0	C	13.0	B	14.7	B
	Northbound	51.9	D	56.3	E	60.3	E	52.5	D
7th Street/Driveway & Michigan Avenue	**Overall**	**22.3**	**C**	**23.0**	**C**	**23.6**	**C**	**No Mitigations Needed**	
	Eastbound	1.2	A	0.9	A	0.9	A		
	Westbound	26.4	C	28.4	C	29.0	C		
	Northbound	56.9	E	54.0	D	54.9	D		
	Southbound	35.6	D	35.5	D	35.5	D		
7th Street & Monroe Street	**Overall**	**20.0**	**B**	**24.3**	**C**	**25.5**	**C**	**No Mitigations Needed**	
	Eastbound	8.2	A	13.2	B	13.9	B		
	Westbound	9.6	A	3.3	A	7.1	A		
	Northbound	52.8	D	59.1	E	58.9	E		
	Southbound	31.4	C	28.1	C	27.4	C		
8th Street & Monroe Street	**Overall**	**--**	**--**	**18.4**	**B**	**19.1**	**B**	**No Mitigations Needed**	
	Eastbound	0.0	A	12.7	B	14.1	B		
	Westbound	2.6	A	20.4	C	20.4	C		
	Northbound	17.2	C	28.8	C	29.3	C		
8th Street & Kearny Street	**Overall**	**8.1**	**A**	**8.0**	**A**	**8.2**	**A**	**No Mitigations Needed**	
	Eastbound	7.4	A	7.4	A	7.5	A		
	Northbound	8.2	A	8.1	A	8.3	A		
	Southbound	8.0	A	8.0	A	8.1	A		
Edgewood Street/8th Street & Hamlin Street/Driveway	Eastbound	16.0	C	15.9	C	16.5	C	**No Mitigations Needed**	
	Westbound	12.5	B	12.3	B	12.6	B		
	Northbound	4.2	A	4.2	A	4.1	A		
	Southbound	0.1	A	0.1	A	0.1	A		
7th Street & Franklin Street	**Overall**	**28.5**	**C**	**28.2**	**C**	**29.7**	**C**	**No Mitigations Needed**	
	Eastbound	34.0	C	34.2	C	37.6	D		
	Westbound	21.1	C	20.0	C	20.2	C		
	Northbound	37.1	D	38.3	D	38.7	D		
	Southbound	55.3	E	55.4	E	57.6	E		
8th Street & Future Site Driveway	Westbound	**For Future Use Only**				10.8	B	**No Mitigations Needed**	
	Northbound					0.0	A		
	Southbound					0.5	A		

Table 9: LOS Results, PM Peak Hour

Intersection	Approach	Existing Conditions (2018)		Future Without Development Conditions (2021)		Future With Development Conditions (2021)	
		PM Peak Hour					
		Delay	LOS	Delay	LOS	Delay	LOS
Monroe Street & Michigan Avenue	**Overall**	**25.8**	**C**	**26.7**	**C**	**27.2**	**C**
	Eastbound	28.6	C	30.0	C	30.5	C
	Westbound	9.7	A	9.8	A	10.1	B
	Northbound	44.1	D	43.7	D	44.1	D
7th Street/Driveway & Michigan Avenue	**Overall**	**14.7**	**B**	**14.6**	**B**	**15.0**	**B**
	Eastbound	10.7	B	10.3	B	10.4	B
	Westbound	12.7	B	13.9	B	14.5	B
	Northbound	44.6	D	43.0	D	44.5	D
	Southbound	48.9	D	47.9	D	48.1	D
7th Street & Monroe Street	**Overall**	**21.5**	**C**	**30.1**	**C**	**30.8**	**C**
	Eastbound	10.2	B	12.5	B	13.4	B
	Westbound	9.4	A	11.7	B	12.4	B
	Northbound	63.3	E	76.3	E	75.4	E
	Southbound	36.8	D	46.5	D	48.2	D
8th Street & Monroe Street	**Overall**	**--**	**--**	**25.1**	**C**	**25.8**	**C**
	Eastbound	0.0	A	28.2	C	29.3	C
	Westbound	2.5	A	16.9	B	17.0	B
	Northbound	31.2	D	29.0	C	29.2	C
8th Street & Kearny Street	**Overall**	**7.8**	**A**	**7.9**	**A**	**8.0**	**A**
	Eastbound	7.5	A	7.5	A	7.5	A
	Northbound	7.9	A	8.1	A	8.3	A
	Southbound	7.5	A	7.7	A	7.8	A
Edgewood Street/8th Street & Hamlin Street/Driveway	Eastbound	10.4	B	11.2	B	11.6	B
	Westbound	0.0	A	0.0	A	0.0	B
	Northbound	1.4	A	1.4	A	1.2	A
	Southbound	0.0	A	0.0	A	0.0	A
7th Street & Franklin Street	**Overall**	**20.6**	**C**	**23.1**	**C**	**26.5**	**C**
	Eastbound	24.9	C	28.8	C	36.2	D
	Westbound	7.3	A	7.7	A	7.7	A
	Northbound	38.6	D	41.5	D	43.2	D
	Southbound	42.2	D	44.9	D	46.9	D
8th Street & Future Site Driveway	Westbound	**For Future Use Only**				10.3	B
	Northbound					0.0	A
	Southbound					1.6	A

Table 10: Queueing Results (in feet), AM Peak Hour

Intersection	Lane Group	Storage Length (ft)	Existing Conditions (2018)		Future without Development Conditions (2021)		Future with Development Conditions (2021)		Future with Development Conditions (2021), with Mitigations	
			AM Peak Hour		*AM Peak Hour*		*AM Peak Hour*		*AM Peak Hour*	
			50th	95th	50th	95th	50th	95th	50th	95th
Monroe Street & Michigan Ave	Eastbound Thru	810	167	212	177	224	177	224	185	233
	Eastbound Right	810	0	57	0	59	0	59	0	64
	Westbound LT	310	150	203	156	m201	159	m200	173	m215
	Northbound LR	350	366	#556	389	#595	406	#622	395	#599
7th Street/ Driveway & Michigan Avenue	Eastbound LTR	315	9	4	8	3	8	3	**No Mitigations Needed**	
	Westbound LTR	300	560	709	584	#772	591	#829		
	Northbound LTR	165	178	#265	167	#282	170	#289		
	Southbound LTR	250	17	40	16	41	16	41		
7th Street & Monroe Street	Eastbound LTR	310	98	199	142	246	~150	250	**No Mitigations Needed**	
	Westbound LTR	250	141	283	13	20	54	75		
	Northbound LTR	265	160	228	253	#385	256	#401		
	Southbound LTR	165	33	59	134	192	132	193		
8th Street & Monroe Street	Eastbound TR	250	--	0	107	m140	243	m174	**No Mitigations Needed**	
	Westbound LT	300	--	9	--	--	--	--		
	Westbound Left	100	--	--	35	72	35	73		
	Westbound Thru	300	--	--	245	357	245	357		
	Northbound LR	290	--	33	9	55	16	65		
8th Street & Kearny Street	Eastbound LR	275	***HCM Does Not Analyze All-Way Stop Controlled Intersections (AWSC)***						**No Mitigations Needed**	
	Northbound LT	330								
	Southbound TR	275								
Edgewood Street/8th Street & Hamlin Street/Driveway	Eastbound LTR	260	--	23	--	23	--	24	**No Mitigations Needed**	
	Westbound LTR	25	--	0	--	0	--	0		
	Northbound LTR	600	--	9	--	8	--	9		
	Southbound LTR	315	--	0	--	0	--	0		
7th Street & Franklin Street	Eastbound LTR	585	280	376	266	397	278	#452	**No Mitigations Needed**	
	Westbound LTR	980	259	328	254	324	257	325		
	Northbound LTR	80	60	136	68	149	71	152		
	Southbound LT	270	109	#206	110	#230	115	#242		
	Southbound Right	50	0	7	0	23	3	41		
8th Street & Site Driveway	Westbound LR	50	**For Future Use Only**				--	7	**No Mitigations Needed**	
	Northbound RT	250					--	0		
	Southbound LT	50					--	1		

m = Volume for 95th percentile queue is metered by upstream signal

 # = 95th percentile volume exceeds capacity, queue may be longer

~ = Volume exceeds capacity, queue is theoretically infinite

Table 11: Queueing Results (in feet), PM Peak Hour

Intersection	Lane Group	Storage Length (ft)	Existing Conditions (2018)		Future without Development Conditions (2021)		Future with Development Conditions (2021)	
			PM Peak Hour		*PM Peak Hour*		*PM Peak Hour*	
			50th	95th	50th	95th	50th	95th
Monroe Street & Michigan Ave	Eastbound Thru	810	638	774	655	794	658	#801
	Eastbound Right	810	0	#422	0	#445	0	#457
	Westbound LT	310	71	82	72	87	72	93
	Northbound LR	350	189	263	206	308	214	319
7th Street/Driveway & Michigan Avenue	Eastbound LTR	315	831	923	837	925	842	927
	Westbound LTR	300	163	224	178	249	184	258
	Northbound LTR	165	74	154	68	155	73	m159
	Southbound LTR	250	78	131	74	134	74	134
7th Street & Monroe Street	Eastbound LTR	310	230	385	258	m423	274	m442
	Westbound LTR	250	117	223	136	265	143	276
	Northbound LTR	265	167	240	227	310	233	317
	Southbound LTR	165	73	m102	151	m229	160	m248
8th Street & Monroe Street	Eastbound TR	250	--	0	343	502	353	518
	Westbound LT	300	--	6	--	--	--	--
	Westbound Left	100	--	--	21	55	21	56
	Westbound Thru	300	--	--	105	162	105	162
	Northbound LR	290	--	83	20	73	23	78
8th Street & Kearny Street	Eastbound LR	275	***HCM Does Not Analyze All-Way Stop Controlled Intersections (AWSC)***					
	Northbound LT	330						
	Southbound TR	275						
Edgewood Street/8th Street & Hamlin Street/Driveway	Eastbound LTR	260	--	4	--	7	--	7
	Westbound LTR	25	--	0	--	0	--	0
	Northbound LTR	600	--	2	--	1	--	1
	Southbound LTR	315	--	0	--	0	--	0
7th Street & Franklin Street	Eastbound LTR	585	315	458	342	508	381	#624
	Westbound LTR	980	86	113	90	118	91	118
	Northbound LTR	80	44	121	64	151	76	166
	Southbound LT	270	59	110	64	#138	67	#148
	Southbound Right	50	0	10	0	27	0	38
8th Street & Site Driveway	Westbound LR	50	**For Future Use Only**				--	4
	Northbound RT	250					--	0
	Southbound LT	50					--	1

m = Volume for 95th percentile queue is metered by upstream signal

 # = 95th percentile volume exceeds capacity, queue may be longer

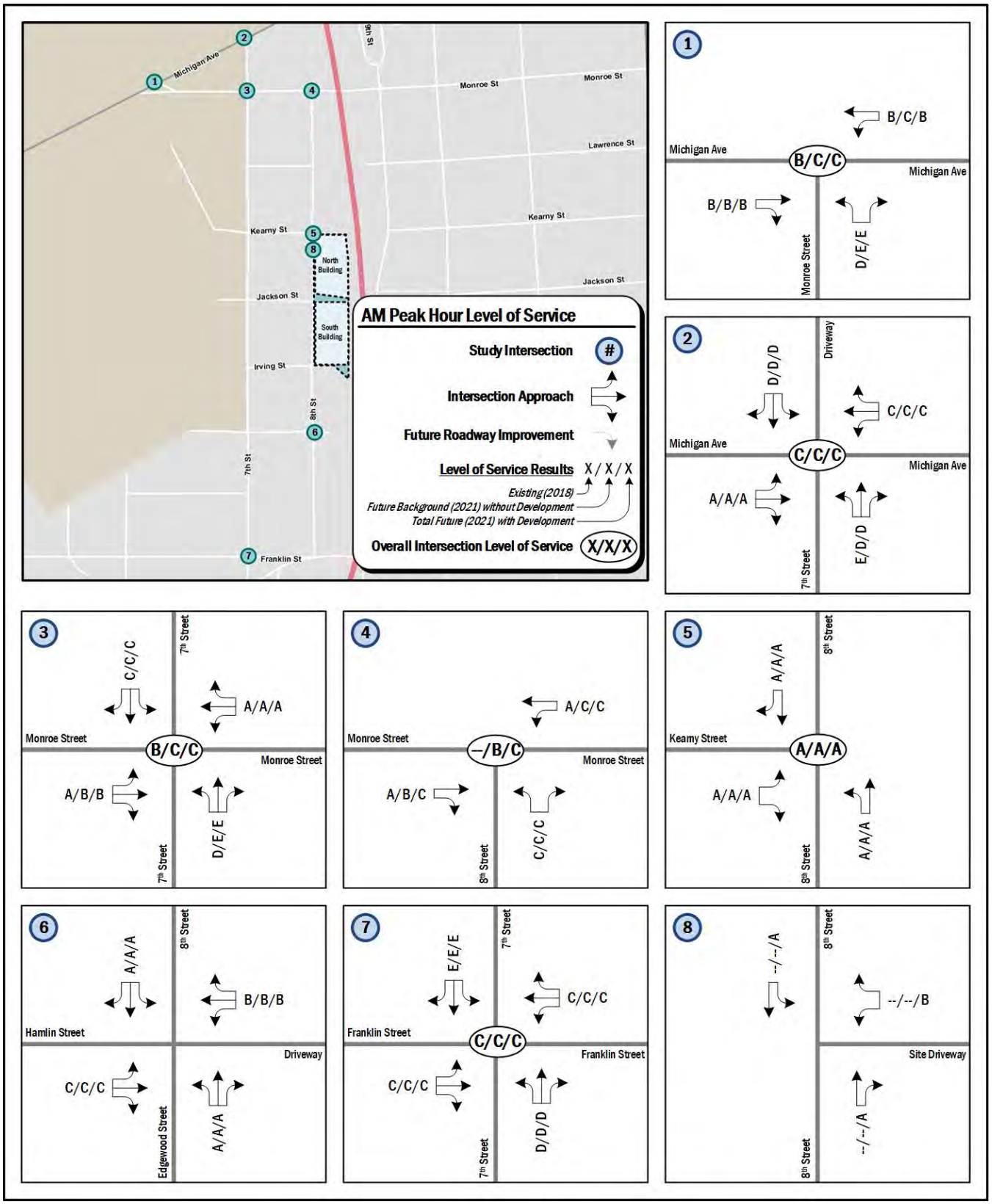

Figure 33: AM Peak Hour Level of Service Results

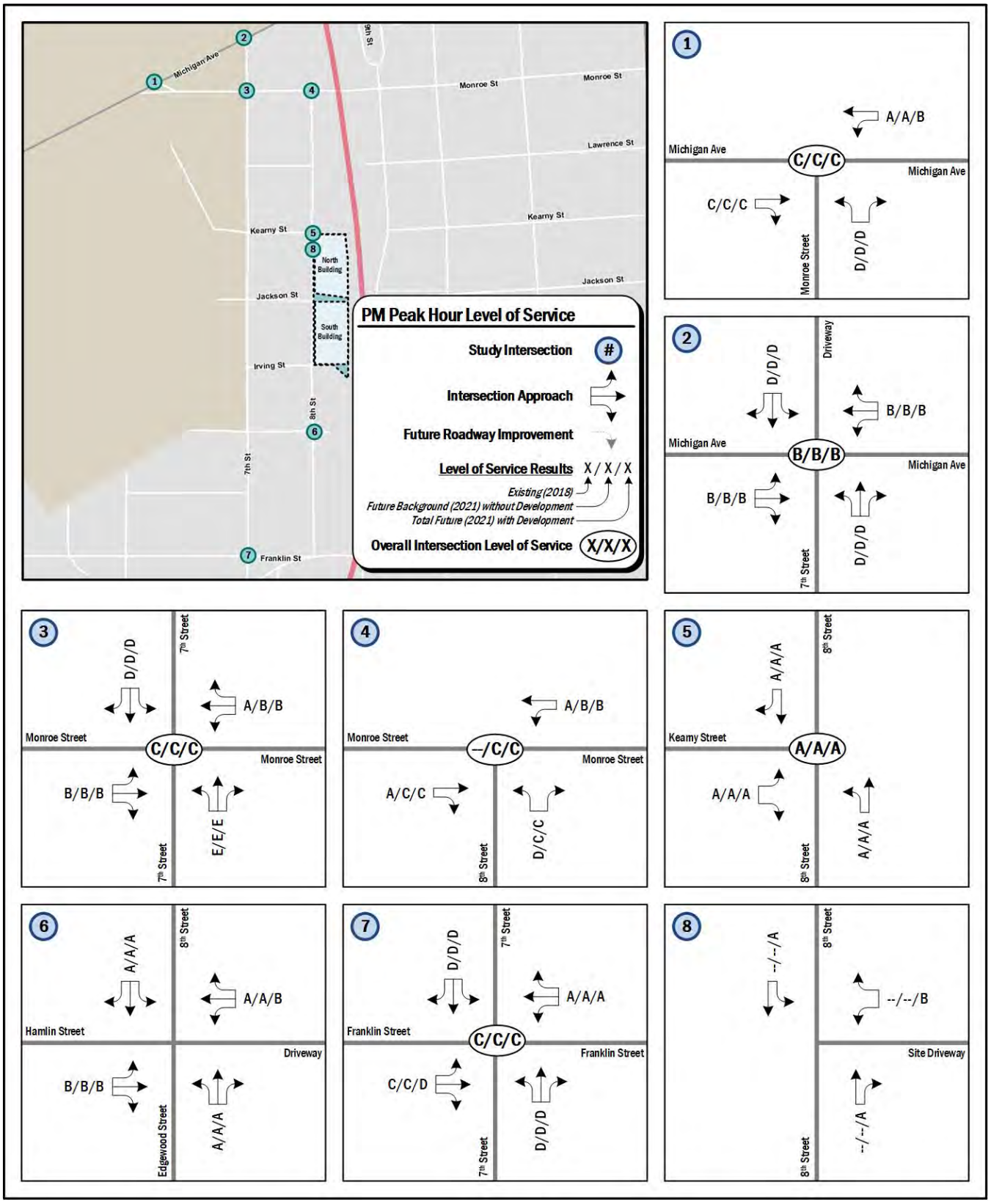

Figure 34: PM Peak Hour Level of Service Results

TRANSIT

This section discusses the existing and proposed transit facilities in the vicinity of the Site, accessibility to transit, and evaluates the overall transit impacts of the project.

The following conclusions are reached within this chapter:

- The development has excellent access to transit.
- The development is located 0.3 miles from the Brookland-CUA Metrorail station.
- The development is adjacent to the G8 line, with nine (9) additional lines available at Brookland-CUA station.
- The development is expected to generate a manageable number of transit trips and the existing service is capable of handling these new trips.

EXISTING TRANSIT SERVICE

The Site is well served by Metrobus and within walking distance of Metrorail. Combined, these transit services provide local, city wide, and regional transit connections and link the Site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 35 identifies the major transit routes, stations, and stops in the study area.

The Site is located approximately 0.3 miles from the Brookland-CUA Metrorail station. The station is serviced by the Red Line, which provides direct connections to areas in the District and Montgomery County, Maryland. The Red Line travels south from Shady Grove, travels through downtown DC, and continues north to Glenmont. Red Line trains run every four to eight minutes during the weekday morning and afternoon peak hours between 5:00 AM to 9:30 AM and 3:00 PM to 7:00 PM, approximately every 12 minutes during the weekday midday hours from 9:30 AM to 3:00 PM, approximately every 8 to 12 minutes during the weekday evening hours from 7:00 PM to 9:30 PM, and every 12 to 20 minutes during the weekday off-peak periods and on weekends. The Red Line provides direct service to Union Station, where transfers can be made to MARC, VRE, DC Streetcar, and Amtrak services.

The nearest bus servicing the Site is the G8 line, which is located one block west on 7th Street. Additional buses servicing the Site area are available at the Brookland-CUA Metrorail Station, where 10 lines meet. The H1, H2, H3, and H4 Crosstown lines provide an alternative to the Red Line, servicing the Dupont Circle (H1), Cleveland Park and Tenleytown-AU (H2, H3, H4) stations. Together, these routes provide connectivity to the downtown core and other areas of the District, Maryland, and Virginia. Table 11 shows a summary of the bus route information for the routes that serve the Site, including service hours, headway, and distance to the nearest bus stop.

Figure 35 shows a detailed inventory of the existing Metrobus stops within a quarter-mile walkshed of the Site. Each stop is evaluated based on the guidelines set forth by WMATA's *Guidelines for the Design and Placement of Transit Stops,* as shown in Table 13. A detailed breakdown of individual bus stop amenities and criteria for standards is included in the Technical Attachments.

PLANNED TRANSIT SERVICE

MoveDC

The MoveDC report outlines recommendations by mode with the goal of having them complete by 2040. The plan hopes to achieve a transportation system for the District that includes:

- 70 miles of high-capacity transit (streetcar or bus)
- 200 miles of on-street bicycle facilities or trails
- Sidewalks on at least one side of every street
- New street connections
- Road management/pricing in key corridors and the Central Employment Area
- A new downtown Metrorail loop
- Expanded commuter rail
- Water taxis

As part of the 2-year outline plan, the MoveDC report outlines the need for a high capacity transit along Michigan Avenue, connecting Brookland and Tenleytown via Mount Pleasant and Columbia Heights. This recommendation would create additional multi-modal capacity and connectivity to the Site.

WMATA and DDOT Transit Studies

WMATA studied capacity of Metrorail stations in its *Station Access & Capacity Study (2008).* The study analyzed the capacity of Metrorail stations for their vertical transportation, the capacity of the station at elevators, stairs, and escalators to shuttle patrons between the street, mezzanine, and platforms. The study also analyzed stations capacity to process riders at fare card gates. For both analyses, vertical transportation and fare card gates, volume-to-capacity ratios were calculated for existing data (from 2005) and projections for the year 2030.

According to the study, the Brookland-CUA station can currently accommodate future growth at all access points.

WMATA has also studied capacity along Metrobus routes. DC's *Transit Future System Plan* (2010) lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). A load factor is considered unacceptable if it is over 1.2 during peak periods or over 1.0 during off-peak or weekend periods. According to this study, the H1, H2, H3, and H4 Metrobus routes that travel near the Site operate at a load factor that is above capacity (1.45) during all parts of the day.

WMATA and DDOT have published the Metrobus North Capitol Street Line Study: Route 80 in October 2013. The study evaluated additional express route considered for the 80 Line. This route would likely have 15-minute headways, which would add four (4) new buses per hour to the North Capitol Street corridor. If implemented, the bus would operate during peak periods on weekdays, with the potential to add midday, late night, and weekend service in the future.

WMATA and DDOT also published the Metrobus Service Evaluation Study for the H1, H2, H3, and H4 lines in October 2013. The study evaluated proposed service and physical improvement modifications for the Brookland-Potomac Park (H1) and Crosstown (H2, H3, and H4) lines. Goals identified in the evaluation included an all-day two-way connection from downtown Washington to the H lines' service area and providing more service which bypassed the Hospital Center. As identified in Table 12, all-day service is prevalent along the Crosstown lines and the H3 line bypasses the Washington Hospital Center, located west of the 8th Street Residential Site.

SITE IMPACTS

Transit Trip Generation

The Hanover 8th Street development is projected to generate 59 transit trips (15 inbound, 44 outbound) during the morning peak hour and 74 transit trips (45 inbound, 29 outbound) during the afternoon peak hour.

US Census data was used to determine the distribution of those taking Metrorail and those taking Metrobus. The Site lies in TAZ 20220 and data shows that approximately 55 percent of transit riders used Metrobus and the remainder use Metrorail. That said, approximately 32 people will use Metrobus and 23 will use Metrorail during the morning peak hour and approximately 41 people will use Metrobus and 33 will use Metrobus during the afternoon peak hour.

The development is expected to generate a manageable number of transit trips and the existing service is capable of handling these new trips.

Table 12: Metro Bus Route Information

Route Number	Route Name	Service Hours	Headway	Walking Distance to Nearest Bus Stop
80	North Capitol Street Line	Weekdays: 4:29 AM – 2:10 AM Weekends: 4:40 AM – 2:15 AM	7-36 min	0.2 miles, 4 minutes
G8	Rhode Island Avenue Line	Weekdays: 4:52 AM – 12:34 AM Weekends: 5:26 AM – 1:31 AM	5-52 min	0.1 miles, 3 minutes
H1	Brookland-Potomac Park Line	Northbound: 5:17 PM – 7:04 PM Southbound: 6:28 AM – 8:50 AM	15-30 min	0.2 miles, 4 minutes
H2, H3, H4	Crosstown Line	Weekdays: 4:40 AM – 1:59 AM Weekends: 4:50 AM – 2:05 AM	5-40 min	0.2 miles, 4 minutes
H6	Brookland-Fort Lincoln Line	Weekdays: 5:01 AM – 12:26 AM Weekends: 5:22 AM – 12:12 AM	12-50 min	0.3 miles, 6 minutes
H8	Park Road-Brookland Line	Weekdays: 5:07 AM – 12:35 AM Weekends: 6:06 AM – 1:53 AM	12-39 min	0.3 miles, 6 minutes
H9	Park Road-Brookland Line (School Only)	Westbound: 7:35 AM – 7:45 AM	10 min	0.3 miles, 6 minutes
R4	Queens Chapel Road Line	Weekdays: 5:25 AM – 11:22 PM Weekends: 6:55 AM – 8:40 PM	13-72 min	0.3 miles, 6 minutes

Table 13: Transit Stop Requirements

Feature	Basic Stop	Enhanced Service Bus Stop	Transit Center
Bus Stop Sign	Yes	Yes	Yes
ADA 5'x8' Landing Pad - at a minimum, a clear, unobstructed, paved boarding area that is 8 feet deep (perpendicular to the curb) by 5 feet wide (parallel to the curb) and compliant with the ADA Accessibility Guidelines (ADAAG)	Yes	Yes	Yes
Sidewalk - connected by a paved sidewalk that is at least 4 feet wide	Yes	Yes	Yes
Lighting - adequate lighting either from street lights, lights from an adjacent business, or shelter lighting (particularly stops that are served in the evenings)	Evening Service	Yes	Yes
Seating	Trip Generator Based	Yes	Yes
Information Case - detailed schedule information on services	Yes	Yes	Yes
Trash Receptacle - trash receptacle (particularly at locations that are close to fast food establishments and convenient stores)	Site Specific	Yes	Yes
Shelter(s) - shelter with interior seating if there are 50 or more boardings per day (including transfers)	1 (50+ boardings/day)	1	2+
System Map	Contingent on Shelter	Yes	Yes
Real-time Display (LED + Audio)	Optional	Yes	Yes
Interactive Phone System On-Site - real time bus arrival information through an interactive phone and push button audio system	No	No	Yes
Expanded Boarding & Alighting Area (Rear-door Access)	No	Site Specific	Yes
Bus Bay (Pull Off)	No	Site Specific	Yes

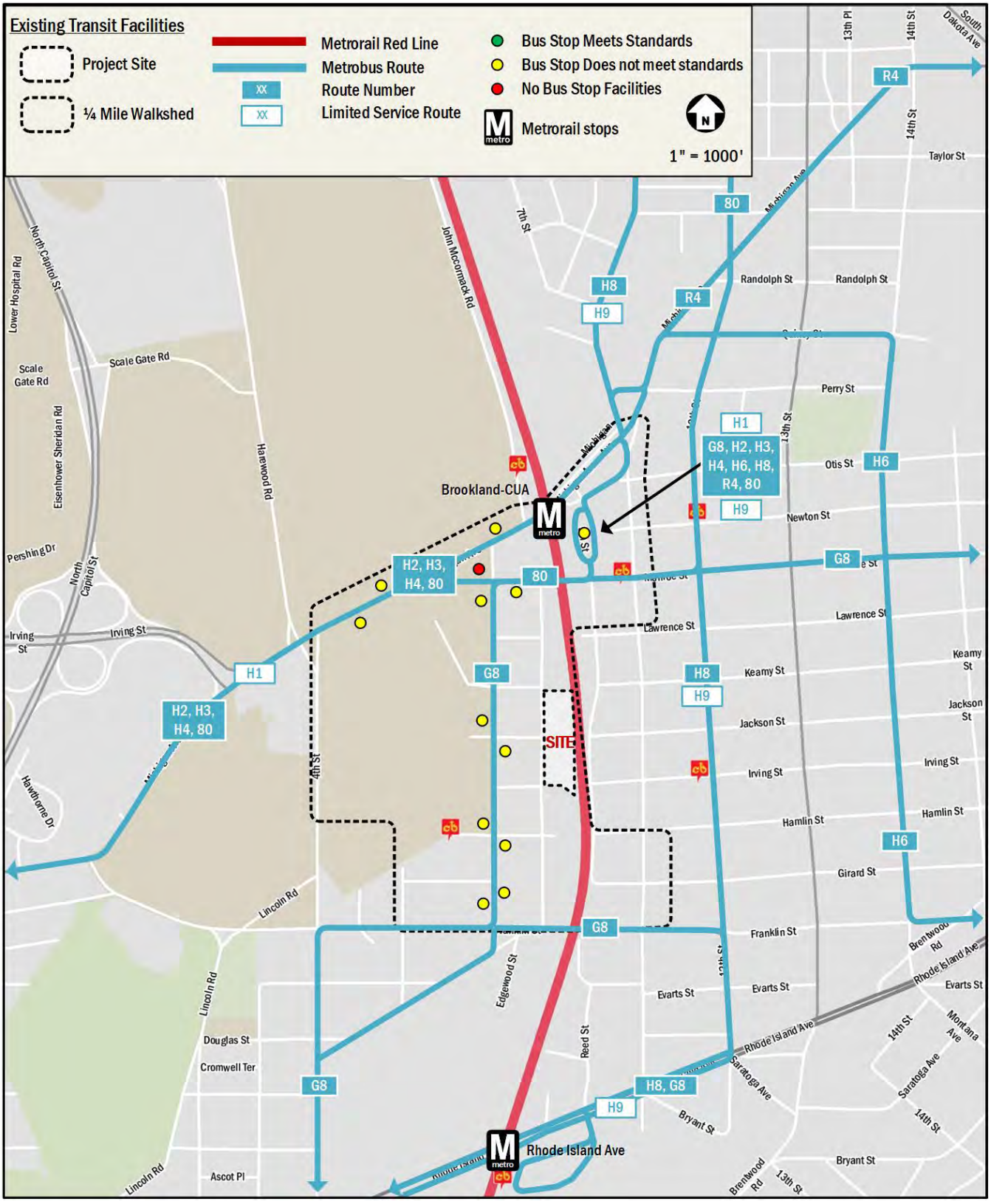

Figure 35: Existing Transit Facilities

PEDESTRIAN FACILITIES

This section summarizes the existing and future pedestrian access to the Site and reviews walking routes to and from the Site.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the Site provides a good walking environment. There are sidewalks along the majority of primary routes to pedestrian destinations with some gaps in the system, including a lack of sidewalks on the western frontage of the Site.
- The development is expected to generate a minimal number of pedestrian trips; however, the pedestrian trips generated by walking to and from the nearby transit facilities will be more substantial.
- Improvements to the pedestrian infrastructure surrounding the Site will improve pedestrian comfort and connectivity, including for students of nearby schools in the area.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the Site were evaluated as well as routes to nearby transit facilities and prominent retail and neighborhood destinations, including the Brookland-CUA Metrorail station. The Site is accessible to transit options such as the bus stop one block west along 7th Street. There are some areas of concern within the study area that negatively impact the quality of and attractiveness of the walking environment. This includes the Metrorail Red Line tracks limiting east-west connectivity, roadway conditions that reduce the quality of walking conditions, narrow or nonexistent sidewalks, and incomplete or insufficient crossings at busy intersections. Figure 36 shows suggested pedestrian pathways, walking time and distances, and barriers and areas of concern.

PEDESTRIAN INFRASTRUCTURE

This section outlines the existing and proposed pedestrian infrastructure within the pedestrian study area.

Existing Conditions

A review of pedestrian facilities surrounding the proposed development shows that most facilities meet DDOT standards, resulting in a well-connected pedestrian network and good walking environment.

Figure 37 shows a detailed inventory of the existing pedestrian infrastructure surrounding the Site. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by DDOT's *Design Engineering Manual (2019)* in addition to ADA standards. Sidewalk widths and requirements for the District are shown below in Table 14.

Within the area shown, the majority of roadways west of the Site are low-density residential and roadways closer to Michigan Avenue and Monroe Street are commercial areas featuring retail corridors. Although some of the sidewalks northeast and southwest of the Site (particularly near the Metrorail station) do not meet DDOT standards, this is a consequence of insufficient sidewalk and buffer widths rather than sidewalks of poor quality. All primary pedestrian destinations are accessible via routes with sidewalks, most of which met DDOT standards.

ADA standards require that curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks are not desired. As shown in Figure 37, under Existing Conditions crosswalks and curb ramps with detectable warnings are generally absent along portions of 7th Street and 10th Street.

Table 14: Sidewalk Requirements

Street Type	Min. Buffer Width	Min. Sidewalk Unobstructed Width	Total Min. Sidewalk Width
Low- to Moderate-Density Residential	4-6 ft	6 ft	10 ft
High-Density Residential	4-8 ft	8 ft	13 ft
Central DC and Commercial Areas	4-10 ft	10 ft	16 ft

Pedestrian Infrastructure Improvements

As a result of the development, pedestrian facilities along the west frontage of the Site along 8th Street will be improved to meet DDOT and ADA standards. This includes the construction of new sidewalk to meet or exceed width requirements, crosswalks at all necessary Site driveway locations, and curb and detectable warnings. Additional design elements such as plantings and streetscaping will result in further improvements over Existing Conditions. The improved pedestrian environment will benefit students walking to/from the nearby Hope Community Public Charter School south of the Site and the dance studio located immediately north of the Site.

Additionally, improvements made to the pedestrian streetscape as a result of the development will enhance the on-street 8th Street portion of the Metropolitan Branch Trail.

The future pedestrian facilities included with the development and improvements from other developments are shown in Figure 38.

SITE IMPACTS

Pedestrian Trip Generation

The Hanover 8th Street development is expected to generate four (4) walking trips (1 inbound, 3 outbound) during the morning peak hour and six (6) walking trips (3 inbound, 3 outbound) during the afternoon peak hour. The origins and destinations of these trips are likely to be:

- The location of resident's employment;
- Retail locations outside of the Site; and
- Neighborhood destinations such as schools, libraries, and parks in the vicinity of the Site.

Additional pedestrian trips are expected from the nearby transit facilities (Metrorail and Metrobus). The pedestrian network will have the capacity to absorb the newly generated trips from the Site.

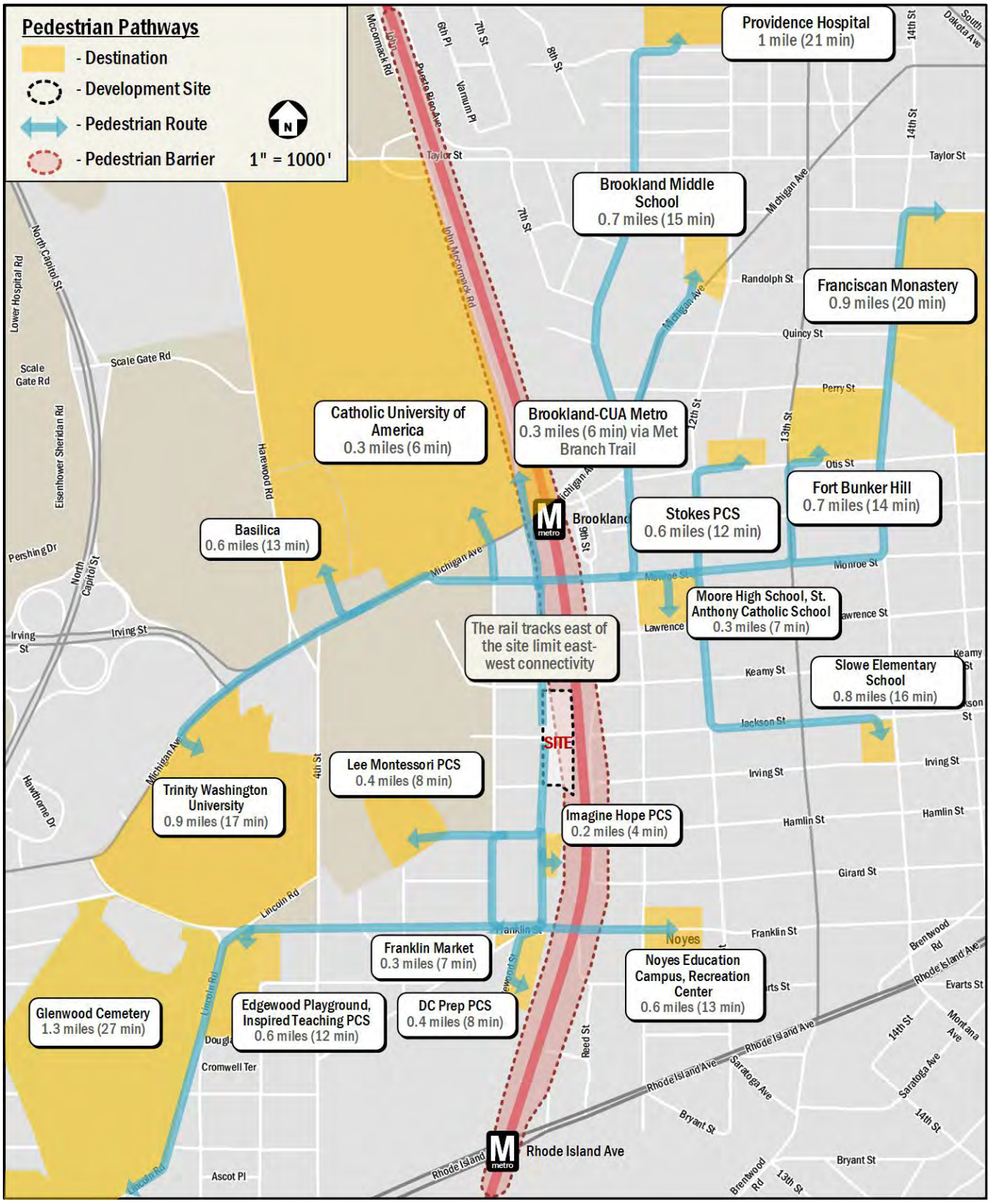

Figure 36: Pedestrian Pathways

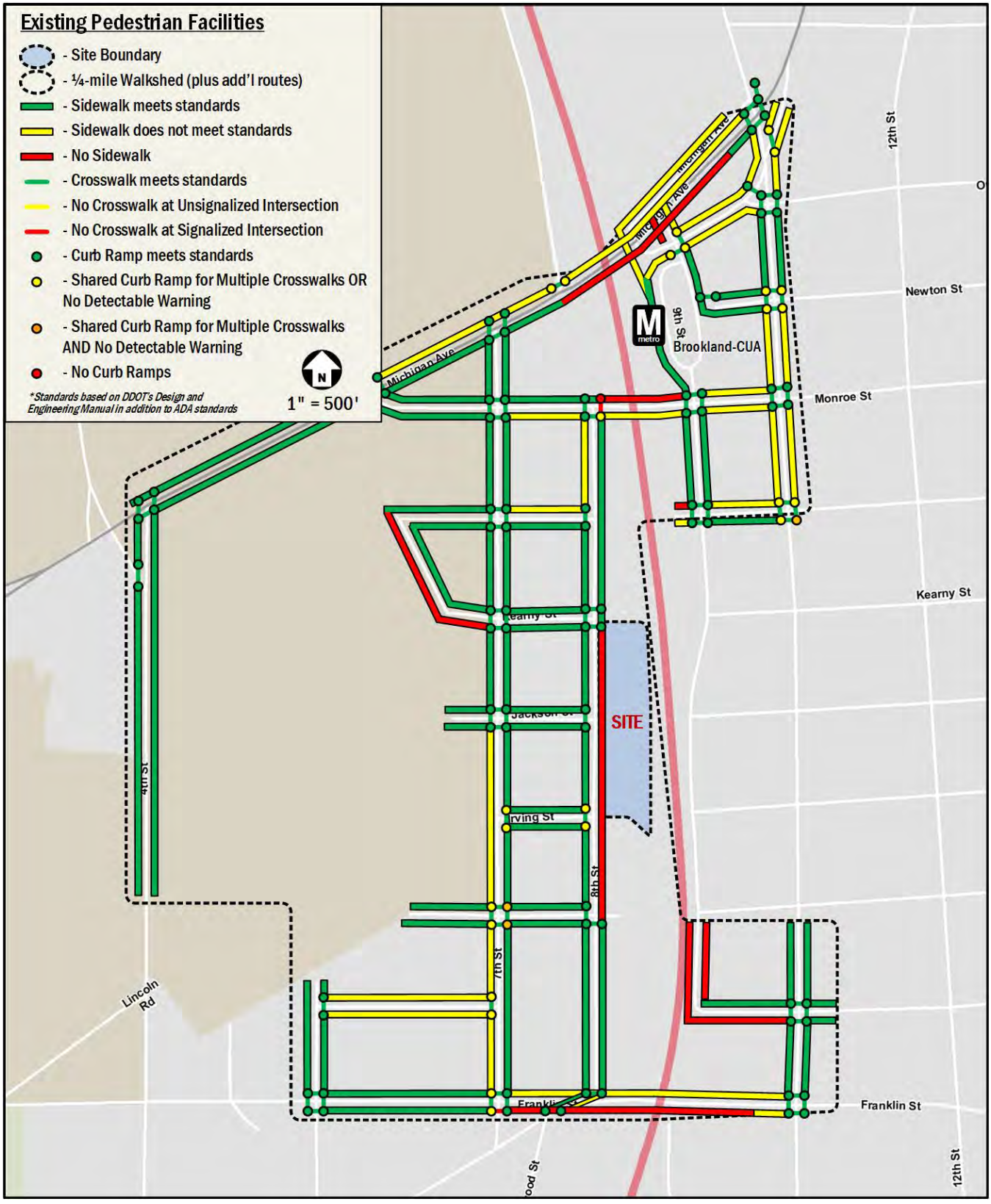

Figure 37: Existing Pedestrian Facilities

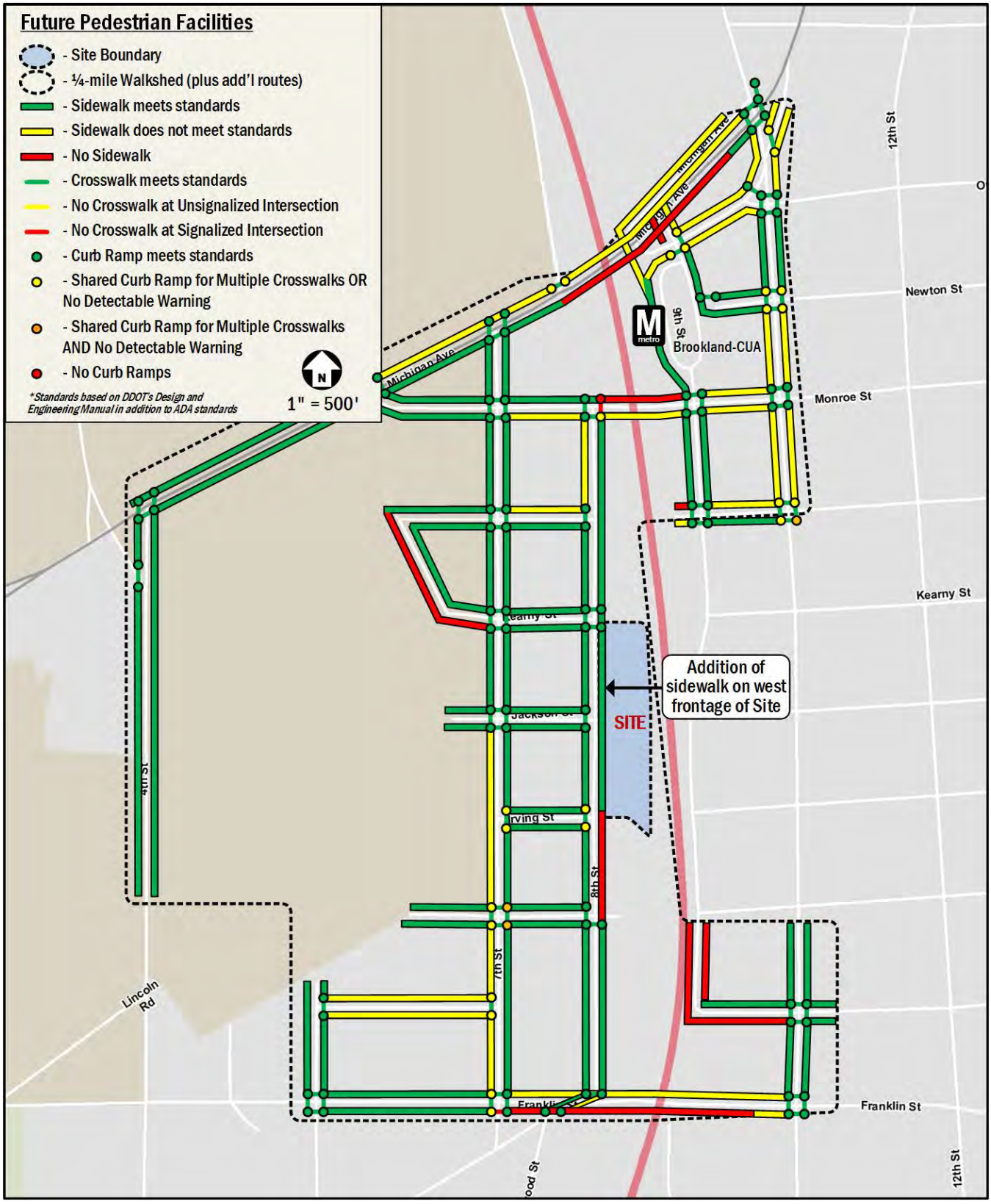

Figure 38: Future Pedestrian Facilities

BICYCLE FACILITIES

This section summarizes existing and future bicycle access, reviews the quality of cycling routes to and from the Site, and presents recommendations.

The following conclusions are reached within this chapter:

- The Site has direct access to nearby bicycle facilities including the Metropolitan Branch Trail along 8th Street.
- The development is expected to generate a minimal number of bicycle trips; therefore, all site-generated bike trips can be accommodated on existing infrastructure.
- Future plans in the vicinity of the Site include cycle tracks along Irving Street as part of the Crosstown Multimodal Study.
- The development will include secure long-term bicycle parking within the garage, exceeding Zoning Requirements.
- The development will include short-term bicycle racks along the 8th Street frontage of the Site.

EXISTING BICYCLE FACILITIES

The Site has north-south connectivity to existing on- and off-street bicycle facilities. Along the western frontage of the Site lies a signed route along 8th Street. This route is an on-street section of the Metropolitan Branch trail and provides north-south connectivity. The Metropolitan Branch Trail, which travels parallel to the Red Line northbound towards Silver Spring, using a combination of on-road and off-road trails connects the Site with Union Station to the south and Maryland to the north. East-west connectivity is achieved through bicycle lanes on Monroe Street and signed routes along Newton Street and Randolph Street.

Some short-term bicycle parking exists in the vicinity of the Site, particularly surrounding recently developed properties to the north. However, no bike parking is currently provided along the perimeter of the Site.

In addition to personal bicycles, the Capital Bikeshare program provides additional cycling options for residents, employees, and patrons of the planned development. The Bikeshare program has placed over 500 Bikeshare stations across Washington, DC, Arlington, and Alexandria, VA, Montgomery County, MD, and most recently Fairfax County, VA, with 4,300 bicycles provided. There are two (2) existing Capital Bikeshare stations within a quarter-mile of the Site. The stations are located at Hamlin Street and 7th Street (just south of the Site with 14 available bicycle docks) and 10th Street and Monroe Street (northeast of the Site with 11 available bicycle docks).

Figure 39 illustrates the existing bicycle facilities in the study area.

PLANNED BICYCLE FACILITIES

MoveDC

The MoveDC plan outlines several bicycle improvements in the vicinity of the Site. These improvements are broken up into four tiers that rank the priority for implementation. The four tiers are broken down as follows:

Tier 1

Investments should be considered as part of DDOT's 6-year Transportation Improvement Program (TIP) and annual work program development if they are not already included. Some projects may be able to move directly into construction, while others become high priorities for advancement through the Project Development Process.

There is one (1) Tier 1 addition that will positively affect bicycle connectivity to and from the Site. A 1.2-mile cycle track is planned in the median of Irving Street, NW/NE from Park Place, NW to Monroe Street, NE replacing the current signed route along the sidewalk of eastbound Irving Street. This upgrade will increase east-west connectivity to the Brookland area and separate bicyclists from pedestrians.

Tier 2

Investments within this tier are not high priorities in the early years of MoveDC implementation. These investments could begin moving through the Project Development Process if there are compelling reasons for their advancement.

There are no Tier 2 additions planned within the vicinity of the Site.

Tier 3

Investments within this tier are not priorities for DDOT-led advancement in the early years of MoveDC's implementation. They could move forward earlier under circumstances, such as real estate development initiatives

and non-DDOT partnerships providing the opportunity for non-District-led completion of specific funding.

Tier 4

Generally, investments within this tier are not priorities for DDOT-led advancement and are lower priority for project development in the early years of implementation.

Due to the timeline of the proposed development, this report will focus on the Tier 1 and Tier 2 recommendations within the vicinity of the Site.

Although these projects are discussed in the MoveDC plan, they are not currently funded nor included in DDOT's Transportation Improvement Plan thus they will not be assumed as complete for the proposes of this CTR.

In addition to investments recommended in the MoveDC plan the aforementioned Crosstown Multimodal Transportation Study recommended the shared-use path (long-term investment) and cycle tracks (short-term investment) along Irving Street, NW/NE from Kenyon Street, NW to Michigan Avenue, NE. Other recommendations made in the vicinity of the Site area include a cycle track/bicycle lane installation along Michigan Avenue, with a cycle track from the eastern terminus of the Irving Street cycle track to Monroe Street and bicycle lanes from Monroe Street, NE eastwards. These future improvements will allow for better east-west connectivity.

On-Site Bicycle Elements

Per zoning regulations, a residential development is required to provide one (1) long-term bicycle space per every three (3) units and one (1) short-term space per every 20 units. This results in 88 long-term spaces and 19 short-term spaces being required. The development will meet these requirements by providing 125 secure long-term spaces within the development. 20 short-term spaces will be placed curbside along 8th Street adjacent to the development and will include inverted U-racks placed in high-visibility areas.

SITE IMPACTS

Bicycle Trip Generation

The Hanover 8th Street development is expected to generate three (3) bicycle trips (1 inbound, 2 outbound) during the morning peak hour and four (4) bicycle trips (2 inbound, 2 outbound) during the afternoon peak hour. As the bicycle trip generation indicates, bicycling to/from the Site will be of minimal impact, and the existing and planned bicycle facilities can absorb this impact.

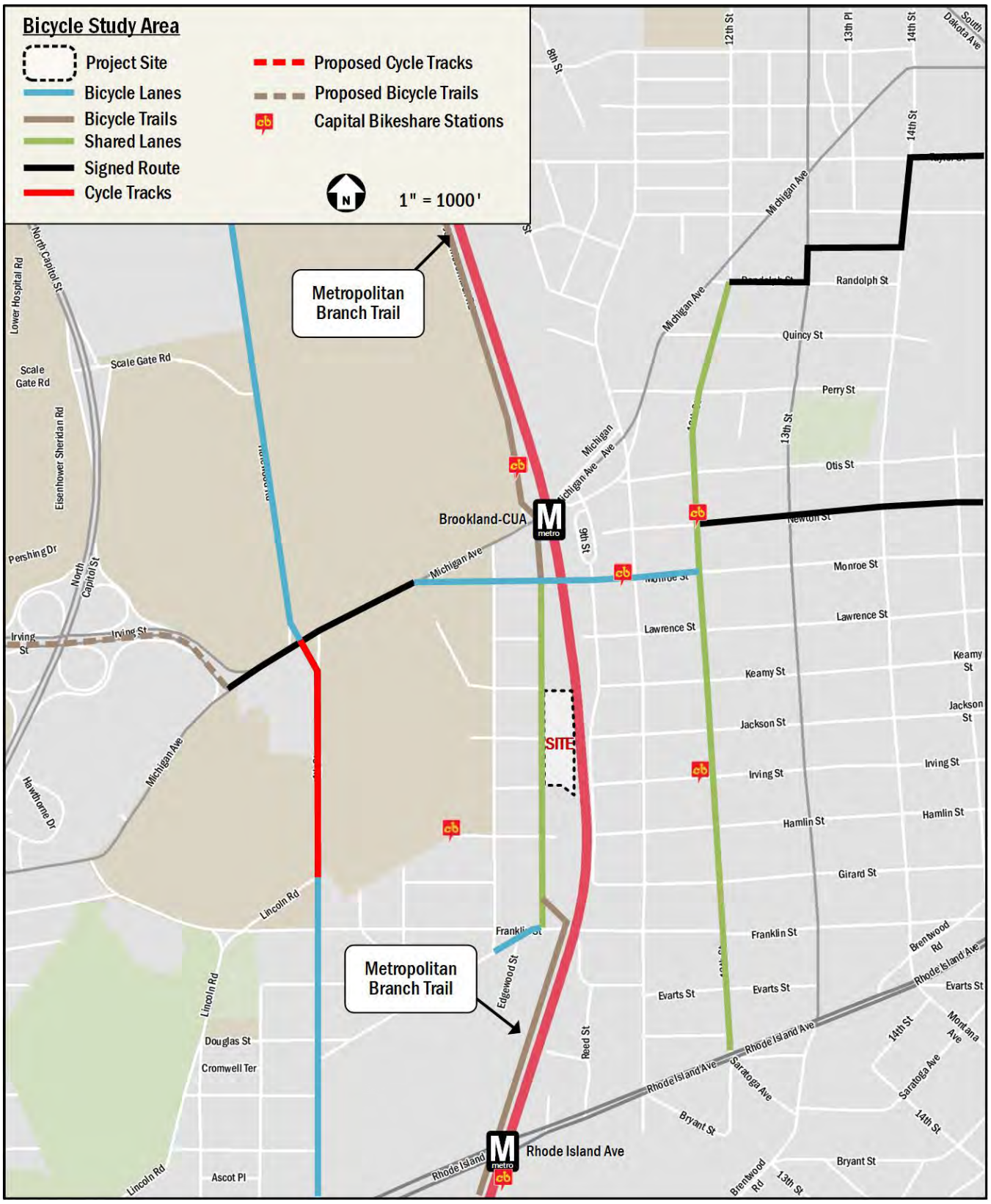

Figure 39: Existing Bicycle Facilities

CRASH DATA ANALYSIS

This section of the report reviews available crash data within the study area, reviews potential impacts of proposed development on crash rates, and makes recommendations for mitigation measures where needed.

SUMMARY OF AVAILABLE CRASH DATA

A crash analysis was performed to determine if there was an abnormally high crash rate at any study area intersection. DDOT provided the last three years of intersection crash data, from 2015 to 2017, for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections the crash rate is measured in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 15.

According to the Institute of Transportation Engineers' *Transportation Impact Analysis for Site Development*, a crash rate of 1.0 or higher is an indication that further study is required. As shown in Table 15, two (2) intersections in this study area meets this criterion. The Project should be developed in a manner to help alleviate, or at a minimum not add to, the conflicts at this intersection.

A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other deficiencies. Additionally, the crash data does not provide detailed location information. In some cases, the crashes were located near the intersections and not necessarily within the intersection.

For the two (2) intersections with elevated crash rates, the crash type information from the DDOT crash data was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate possible causes. Table 16 contains a breakdown of crash types reported for the two (2) intersections with a crash rate over 1.0 per MEV.

Table 15: Intersection Crash Rates

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
1. Michigan Avenue & Monroe Street, NE	39	1	0	0.83
2. 7th Street & Michigan Avenue, NE	28	0	1	0.73
3. 7th Street & Monroe Street, NE	18	2	3	**1.03**
4. Monroe Street & 8th Street, NE	9	0	3	0.57
5. 8th Street & Kearny Street, NE^	-	-	-	-
6. 8th Street/Edgewood Street & Hamlin Street, NE	9	1	1	**1.90**
7. Franklin Street & 7th Street, NE	22	5	0	0.82
8. 8th Street & Future Site Driveway^	-	-	-	-

** - Million Entering Vehicles; Volumes estimated based on turning movement count data*

^ - Crash Data Unavailable

Table 16: Crash Type Breakdown

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Non-Collision	Under/Over Ride	Unspecified	Total
7th Street & Monroe Street, NE	**1.03**	0	1	0	2	7	0	1	0	0	0	0	0	0	7	**18**
		0%	*6%*	*0%*	*11%*	*39%*	*0%*	*6%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*39%*	
8th Street/Edgewood Street & Hamlin Street, NE	**1.90**	0	0	0	0	3	0	2	0	0	0	0	0	0	4	**9**
		0%	*0%*	*0%*	*0%*	*33%*	*0%*	*22%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*44%*	

POTENTIAL IMPACTS

This section reviews the two (2) locations with existing crash rates over 1.0 MEV and reviews potential impacts of the proposed development.

- *7th Street & Monroe Street, NE*

  This intersection is just over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.03 crashes per MEV over the course of the 3-year study period. Of the 11 specified crashes at this intersection, seven (7) were of the sideswipe variety. Sideswipe crashes can often occur when a vehicle makes a last-second lane change or in a location with a significant presence of on-street parking.

  The safety concerns at this signalized intersection are primarily due to the existing lane configurations and operations. All approaches use a single travel lane to make a left, thru, or right turn, with on-street parking present on all approaches. The site-generated traffic at this intersection is minimal with a maximum of 13 vehicles per hour passing through one of the intersection approaches. No improvements are recommended as part of the proposed development. The installation of a traffic signal at the intersection of 8th Street & Monroe Street as part of the Monroe Street Bridge reconstruction may calm traffic approaching this intersection and allow vehicles to park on-street with greater ease, reducing the likelihood of sideswipe crashes.

- *8th Street/Edgewood Street & Hamlin Street, NE*

  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.90 crashes per MEV over the course of the 3-year study period. Of the five (5) specified crashes reported, the majority of crashes at this intersection were of the sideswiped and parked vehicle variety. Sideswipe crashes can often occur when a vehicle makes a last-second lane change or in a location with a significant presence of on-street parking.

  The safety concerns at this intersection are primarily due to the existing lane configurations and operations. All approaches use a single travel lane to make a left, thru, or right turn and on-street parking is present along both sides of Hamlin Street. The site-generated traffic at this intersection is generally routed to make southbound right and northbound thru movements. Enforcement of existing "no parking" areas will help mitigate sideswipe crashes.

SUMMARY AND CONCLUSIONS

This report presents the findings of a Comprehensive Transportation Review (CTR) for the Hanover 8th Street development. This report reviews the transportation aspects of the project's Consolidated Planned Unit Development (PUD) Application (Zoning Commission Order 18-21).

The purpose of this study is to evaluate whether the project will generate a detrimental impact on the surrounding transportation network. This report concludes that **the project will not have a detrimental impact** on the surrounding transportation network assuming that all planned site design elements are implemented.

Proposed Project

The subject property (the "Site") is located at 3135-3201 8th Street NE in Ward 5 in the Northeast quadrant of the District. The Site is bounded by a dance school to the north, existing businesses to the south, 8th Street to the west, and the WMATA railroad tracks to east.

The project area covers two (2) parcels and will redevelop an existing one-story industrial building with the following:

- Two (2) residential buildings totaling approximately 377 units.
- 186 parking spaces in an underground garage shared with both buildings.
- One (1) 30-foot loading berth and one adjacent loading platform per building and one (1) 20-foot service space shared between buildings.
- 125 secure long-term and 20 short-term bicycle parking spaces.

Access to the underground parking garage will be from a new curb cut and driveway connecting 8th Street with the north building. Access to the loading facilities within each building will also utilize the new driveway from 8th Street and will occur on the east side of the Site, adjacent to the WMATA tracks. All truck turning maneuvers will occur on the Site, allowing for front-in, front-out access for trucks to the public street.

As part of the development, sections of the roadway network surrounding the Site will be improved. Pedestrian facilities will be installed along the west perimeter of the Site along 8th Street, meeting DDOT and ADA standards. This includes crosswalks at all necessary locations and curb ramps with detectable warnings. The planned improvements will benefit students of the nearby charter school located south of the Site, creating a safer pedestrian environment.

Vehicular parking for the development will be located in an underground parking garage with 186 spaces, accessible from the 8th Street driveway and curb cut. The garage will accommodate the proposed parking for both buildings. The proposed parking supply will meet Zoning Requirements meeting the practical needs of the development.

The development will include one (1) loading berth at 30 feet and one (1) adjacent 100 square foot loading platform within each building and one (1) shared 20-foot service/delivery space, meeting the number of loading berths required by the zoning regulations. The loading facilities will be sufficient to accommodate the practical needs of the development.

The proposed development is expected to generate a maximum of approximately five (5) total truck trips per day. This includes three (3) general deliveries consisting of trash removal, mail, and parcel delivery, and two (2) residential deliveries, calculated based on an average unit turnover of 18 months with two (2) deliveries per turnover (one move-in and one move-out). Based on the expected truck deliveries and the loading management plan provided, the loading plan for the development is adequate and will not adversely affect the local roadway network.

The development will meet the zoning requirements for bicycle parking by including 20 short-term bicycle parking spaces and 125 long-term bicycle parking spaces. The long-term spaces will be provided within the garage and the short-term spaces will be placed curbside along 8th Street. This amount of bicycle parking will meet the practical needs of the development.

Multi-Modal Impacts and Recommendations

Transit

The Site is served by regional and local transit services via Metrobus and Metrorail. The Site is located 0.3 miles from the Brookland-CUA Metrorail station. There is a Metrobus stop that services the G8 WMATA bus route located one (1) block west of the Site on 7th Street. Additional bus routes are available at the Brookland-CUA Metrorail Station.

Although the development will be generating new transit trips, existing facilities have enough capacity to accommodate the new trips.

Pedestrian

The Site is surrounded by a well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and curb ramps, particularly along the primary walking routes. The western frontage of the Site along 8th Street however lacks sidewalks. There are some areas northeast and southeast of the Site which lack sufficient sidewalk buffer length.

As a result of the development, pedestrian facilities along the 8th Street frontage of the Site will be improved such that they meet DDOT requirements and provide an improved pedestrian environment. This includes the construction of missing sidewalks along the 8th Street frontage. The improved pedestrian environment will benefit students walking to/from the nearby Hope Community Public Charter School and dance studio.

Bicycle

Bicycle infrastructure in the vicinity of the Site is plentiful. The Site is adjacent to 8th Street, which functions as a signed route and is an on-street section of the Metropolitan Branch Trail. There are two (2) Capital Bikeshare stations within a quarter-mile of the Site, including a station just south of the Site at 7th Street and Hamlin Street.

The development will provide short-term bicycle parking along the 8th Street frontage of the Site and on-site secure long-term bicycle parking within the garage. The amount of bicycle parking provided will meet Zoning Requirements.

Vehicular

The Site is accessible from several principal and minor arterials such as Michigan Avenue, North Capitol Street, and Rhode Island Avenue (US-1), as well as an existing network of collector and local roadways.

In order to determine the potential impacts of the proposed development on the transportation network, this report projects future conditions with and without the development and performs analyses of intersection delays and queues. These capacity analysis results were compared to the acceptable levels of delay set by DDOT standards, as well as existing queues, to determine if the proposed development will negatively impact the study area.

The vehicular capacity analysis concluded that one (1) intersection would require mitigation. After exploring operations for mitigating impacts at this intersection, this report is recommending a reallocation of green time at the intersection of Monroe Street and Michigan Avenue. This reallocation can reduce delays that meet DDOT's requirements. This report recommends that the Applicant coordinate with DDOT on the implementation of this mitigation measure.

Summary and Recommendations

This report concludes that **the proposed development will not have a detrimental impact on the surrounding transportation network assuming that the proposed site design elements and proposed mitigation measures are implemented.**

The development has several positive elements contained within its design that minimize potential transportation impacts, including:

- The Site's close proximity to Metrorail
- The inclusion of secure long-term bicycle parking.
- The installation of short-term bicycle parking spaces along the frontage of the Site that meet zoning requirements.
- The creation of new pedestrian sidewalks that meet or exceed DDOT and ADA requirements.
- Implementation of a Loading Management Plan (LMP) that minimizes the potential impacts from loading that the proposed development will have on the surrounding intersections and neighborhoods
- A robust Transportation Demand Management (TDM) plan that reduces the demand of single-occupancy, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.