



NoMa / Mount Vernon Triangle Bicycle Network Study

April 2018



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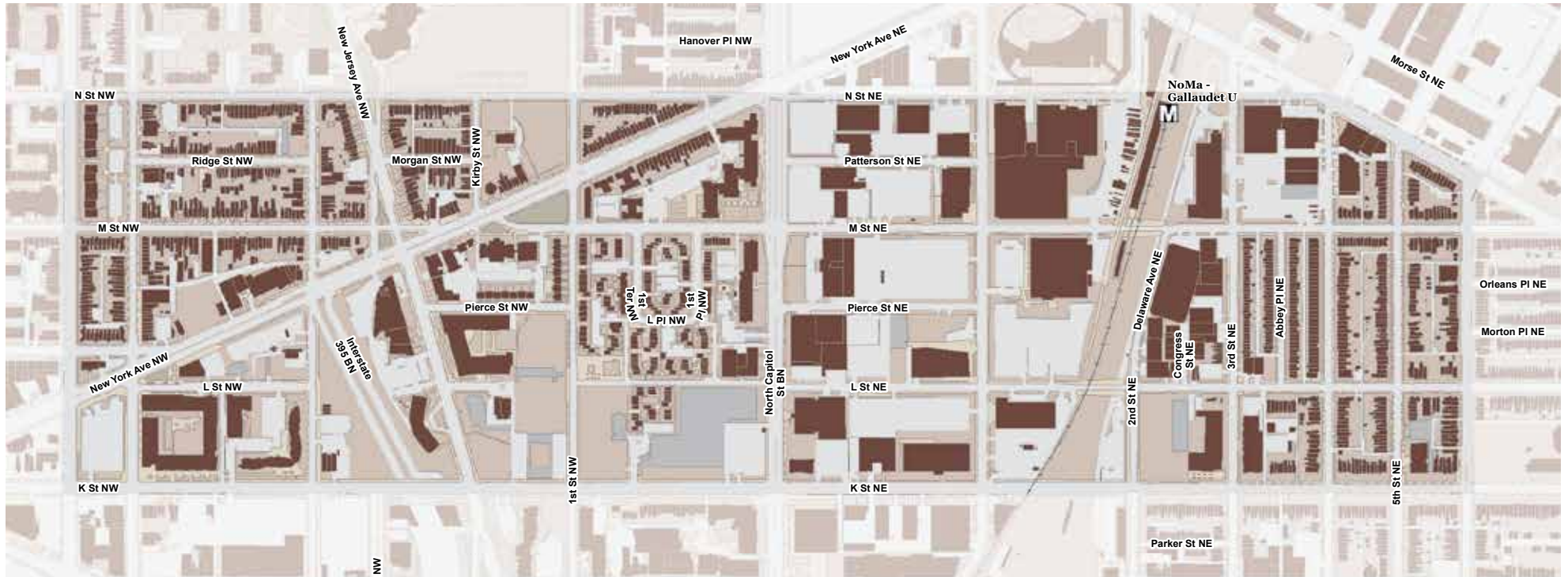
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Introduction

Study Area



NoMa Study Area



The NoMa/ Mount Vernon Triangle Bicycle Network Study area (also referred to as the “NoMA study area” and the “NoMa Area”) is from 6th Street, NW to 6th Street, NE as limits on the west and east sides respectively, with N Street NW to K Street NW as the northern and southern boundaries respectively. “NoMa” is generally described as the residential and business area of the District of Columbia north of Massachusetts Avenue and between Union Station, the U.S. Capitol, the Shaw neighborhood, and the H Street NE corridor. There is some overlap between the NoMa area, this study area, the Mount Vernon Triangle Community Improvement District, and the NoMa Business Improvement

District (BID) (see NoMa Study Area). The study area is within Ward 6 of the District of Columbia. Priority corridors within the study area for consideration included K, L, and M Streets; 4th and 6th Streets (NE and NW); and New Jersey Avenue.

Important destinations within the study area include infill commercial development near L street and 5th street and the Gonzaga College High School just south of K Street at North Capitol Street. Destinations that are important to connect to outside the study area include: Florida market, Gallaudet University, and Mount Vernon Square.

Study Objectives

Current bicycle facilities in the NoMa area primarily follow north-south corridors. Furthermore, there is no intuitive and low-stress route between NoMa and the eastern part of downtown DC, New York Avenue, the Center Leg Freeway (I-395), North Capitol Street, and the Amtrak railroad departing Union Station are all significant barriers to east-west bicycle travel.

The District Department of Transportation (DDOT) established multiple plans for bicycle improvements that include the NoMa area. The DC 2005 Bicycle Plan described options for safe and convenient on-street facilities for bicycling. DDOT's 2014 moveDC long-range multimodal transportation plan updated the recommendations for bicycle facilities and included recommendations for most of the major corridors in the NoMa area. Some of these recommendations are in the process of being designed or implemented, but some have significant challenges warranting further study.

The NoMa/ Mount Vernon Triangle Bicycle Network Study examined the recommendations for the NoMa area in moveDC, along with other studies and development, to create a new refined and feasible bicycle facility plan for the NoMa area.

Study Approach

DDOT, in consultation with VHB and an advisory team representing the study area, began the process by identifying key destinations for cyclists and the corridors that access those destinations. DDOT then mapped obstacles or barriers to a connected bicycle network across the study area, and solicited public input on identified routes and constraints. DDOT identified priority network options based on these known obstacles and public preferences, and then the team described the feasibility for making bicycle improvements along each of the priority corridors.

The team conducted additional traffic analysis and stakeholder outreach to further refine which corridors were most suitable for bicycle improvements. Finally, DDOT described the proposed conceptual improvements for each segment or corridor that was identified as a primary route across the study area.

NoMa/ Mount Vernon Triangle Bicycle Network Study Objectives

- **At least one low-stress and direct connection across the east-to-west bounds of the study area**
- **Logical connections between current and future planned bicycle projects, both inside and outside the study area**

Public Outreach and Engagement

Advisory Committee

The NoMa study advisory committee first met on January 25, 2017. The committee included members from the NoMa Business Improvement District (BID), the Mount Vernon Community Improvement District (CID), and residents of neighborhoods in the study area. The committee helped DDOT summarize current conditions in the study area, evaluate each of the east-west corridors, and identify important activity centers in or near the study area. The advisory committee also helped share news of upcoming public workshops with stakeholders.

The advisory committee met again on July 11, 2017. The committee discussed the results of the public workshop and responses to the website mapping tool. The committee also discussed preliminary route preferences based on current conditions and public preferences. DDOT worked with the committee to consider obstacles to implementing separated bicycle facilities for the primary corridors.

The advisory committee met in October 2017 and February 2018 to review recommendations for the final report. The committee reviewed final route options for bicycle improvements, a planning-level traffic analysis of future traffic conditions, and public preferences shared in recent community meetings.

Public Workshops

DDOT hosted a public workshop on May 4, 2017 in the NoMa BID office building lobby. Over 30 people attended, including area residents, cyclists, and church leaders. Participants reviewed maps showing existing conditions for cycling in the study area, and they were invited to provide comments and preferences for which routes should be improved for cycling. DDOT distributed a draft report for public review and comment in Spring 2018.



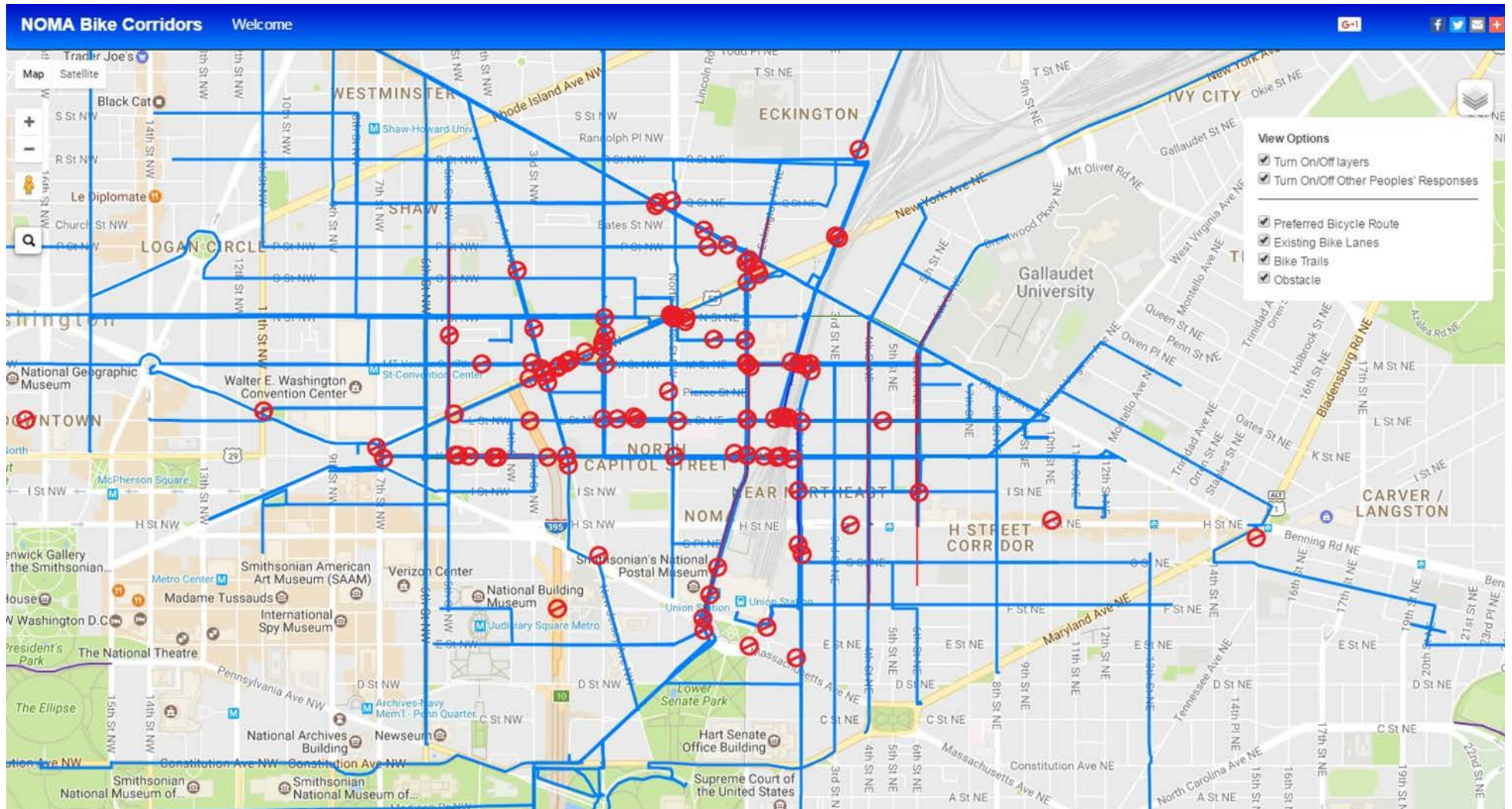
May 2017 Public Workshop Attendees

Website and Online Mapping Tool

During the May 2017 workshop, DDOT launched a project website where information about the study was made available to the public. The website included an interactive mapping tool where the public could mark the routes that they prefer for cycling, add notes about preferred routes, and identify key barriers to bicycle connectivity and safety through the study area. The website (www.NoMabicyclestudy.com) posted updates about public workshops and plan documents.



NoMa/ Mount Vernon Triangle Bicycle Network Study Website



Online Mapping Tool NoMa Study Area



This image displays inputs from residents and other stakeholders, describing preferred routes (blue lines) for cycling through and near the NoMa study area. The image also includes noted barriers or obstacles (red circles) to cycling through the study area. These inputs helped inform priority corridors for bicycle improvements.

The public added over 130 entries on the interactive mapping tool. They were invited to draw a preferred route, post comments about the preferred route, and drop points into the map with notes about barriers or obstacles to bicycling in the study area. Entries included comments like the following:

"A bike lane on M St NW would help people get from NW of NoMa into the neighborhood."

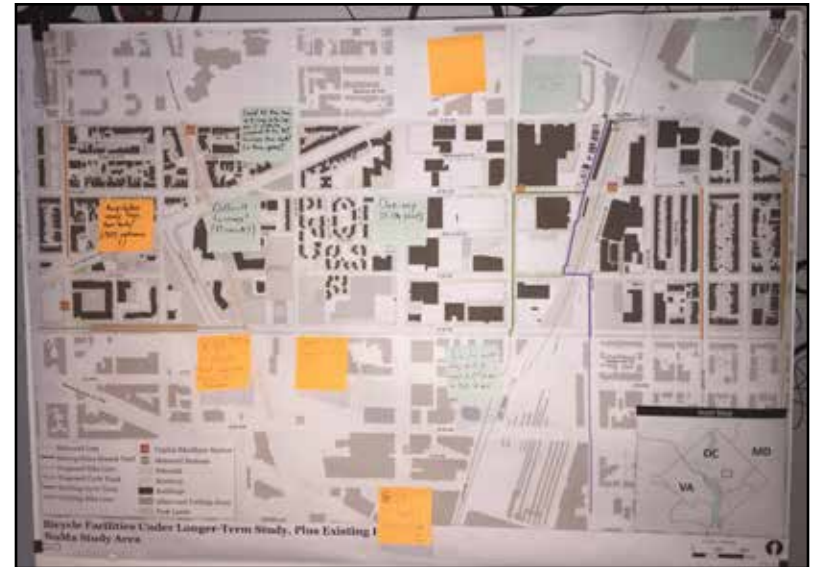
"M Street is the most direct route through NoMa, and it connects to existing facilities to the east and west."

"A bike lane on K St NW/NE would be ideal for getting from downtown (Metro Center/Farragut) to NoMa."

"Would prefer a better setup around Mt. Vernon Square and a new onramp for the MBT at L. Bike lane along K would be a major improvement though."

"Please put a bike lane down the length of K St. Constrain K st to two lanes (not 3/4) of traffic. this is a major cross-neighborhood thoroughfare - should be equally accessible for cars and bikes. The perfect alternative to H St since that can't be used."

Participants at the workshop and via the online tool favored K Street and M Street most often, with K Street being the strongest preference. Online map entries also mentioned needed connectivity along Florida Avenue, 6th Street (NE), New Jersey Avenue, and over I-395 along L Street.



Posted Comments at 2017 Public Workshop



Participants at 2017 Public Workshop

Existing Conditions

This summary reviews current bicycling conditions in the study area, long range transportation plans for included corridors, and development trends that may impact bicycling conditions in the future. Current cycling conditions are described according to their general roadway characteristics, available bicycle data, crash reports, and socioeconomic features of the study area. Move DC (the District's most recent and adopted plan for multimodal transportation) is a key reference document. This summary also reviews other plans affecting the study area including streetcar and transit, proposed trail connections, and two-way street conversion studies.

Regional Influences

The NoMa area is a crossroads for commuters and other D.C. traffic. Cyclists pass through the study area to job centers near the NoMa commercial area (1st Street NE and M Street NE), and they also travel through the study area to employment centers toward Mt. Vernon Square and Downtown D.C. The Union Market near Florida Avenue, Dupont Circle, and Union Station are also important destinations for shopping and travel. The Shaw and Carver/Langston neighborhoods, in addition to residential areas along M Street and N Street, generate bicycle traffic to and through NoMa. The study area is also bordered by multiple high schools and Gallaudet University which draw additional traffic and bicycle demand.

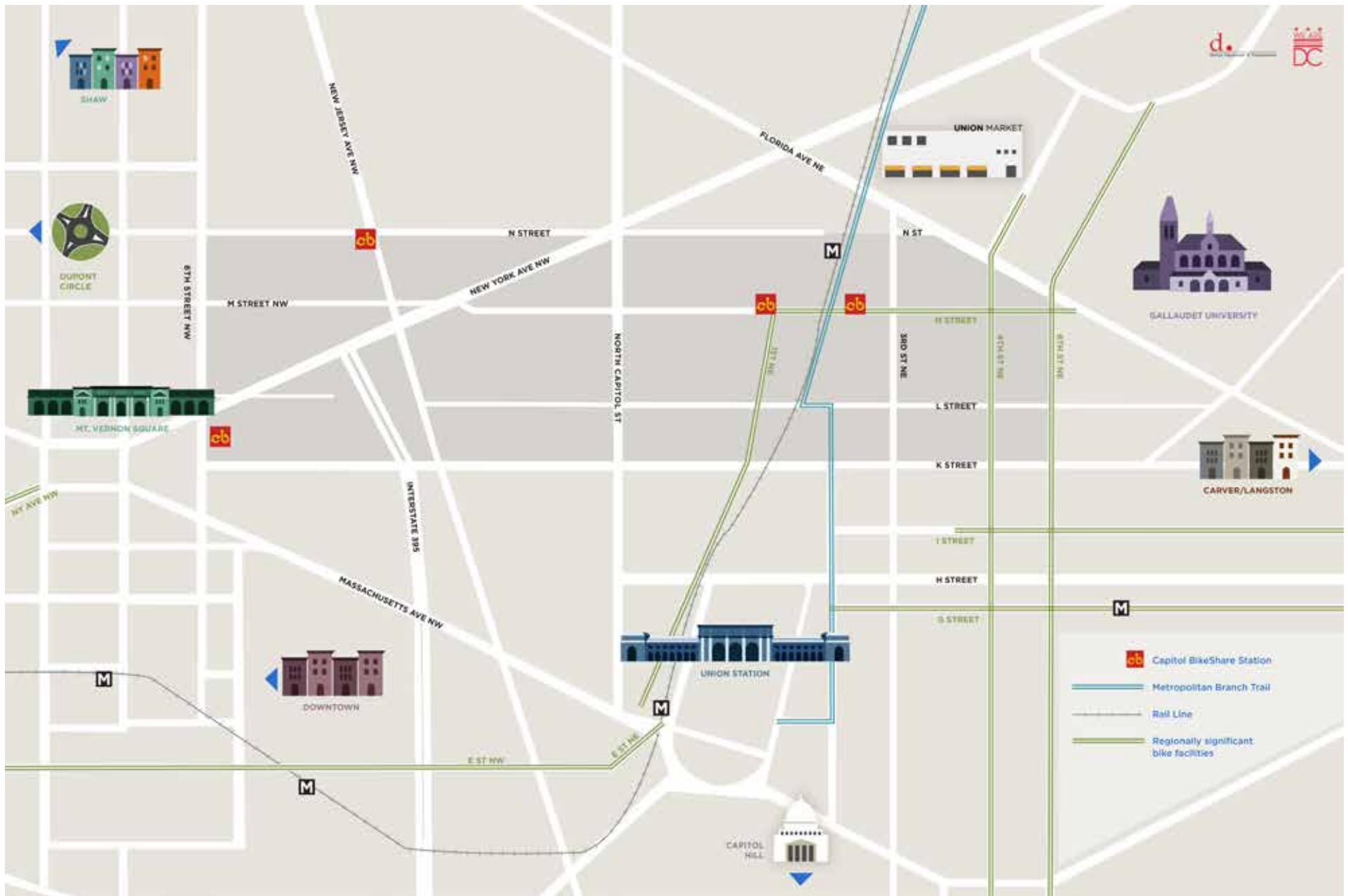
The study area also includes several regionally significant bicycle routes and networks. The Metropolitan Branch Trail runs north-south along the Amtrak and Metro line, and then it parallels low traffic streets toward Union Station. The 1st Street NE and M Street NE cycletracks, coupled with bike lanes along 4th Street and 6th Street NE, connect to important east-west bicycle routes along I Street NE and E Street NW.

Neighborhood and Resident Characteristics

This specific study area is comprised of parts of four specific neighborhoods: Truxton Circle, Sursum Corda, Mt. Vernon Square, and Near Northeast. Neighborhoods in and near the NoMa district are growing rapidly. Blocks south of New York Avenue NE and north of K Street NE are growing at the fastest pace. Blocks that are crossed by a major highway, such as New Jersey Avenue and I 395, or rail tracks are growing at the slowest rates.

North of New York Avenue the Truxton Circle neighborhood is slightly more dense and centered around Dunbar High School. To the east, between the Sursum Corda neighborhood and the rail line, is the core of the NoMa high-density commercial district. NoMa includes several large office buildings, retail centers and apartments. Development east of the rail line is a mix of residential and commercial land uses, with destinations such as the Florida Market and Gallaudet University north of Florida Avenue. Further east and south of Florida Avenue, the study area is composed of the mid-density Near Northeast neighborhood and retail along K Street. Charter schools, libraries, churches and small-scale institutional uses are dispersed through the study area.

The study area is comprised of multiple land uses. The area between 6th Street NW and North Capitol Street, and between New York Avenue and K Street is mid-density residential (Sursum Corda). This area is bisected by the section of I-395 connecting to New York Avenue. Infill commercial development near L Street and 5th Street and the Gonzaga College High School campus just south of K Street and North Capitol Street are important destinations within this area.



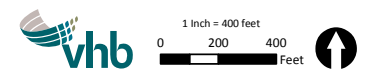
Regional Influences
NoMa Study Area





Residential Population Density (2010 Census Blocks)
NoMa Study Area

Date Created: 01/22/2017



Population Density

The population density in the study area is highest in the area west of North Capitol Street NW, north of K Street NW and south of M Street NW. Population density is lowest in neighborhoods east of North Capitol Street NW.

According to 2010 U.S. Census, neighborhoods in the study area have varying motor vehicle ownership rates. Less than 25% of households in neighborhoods immediately west of North Capitol Street NW own a vehicle; more than 75% of households east of New Jersey Avenue NW and north of New York Avenue NE own a vehicle. Other neighborhoods have more typical ownership rates for DC, with 50% of households owning a vehicle.

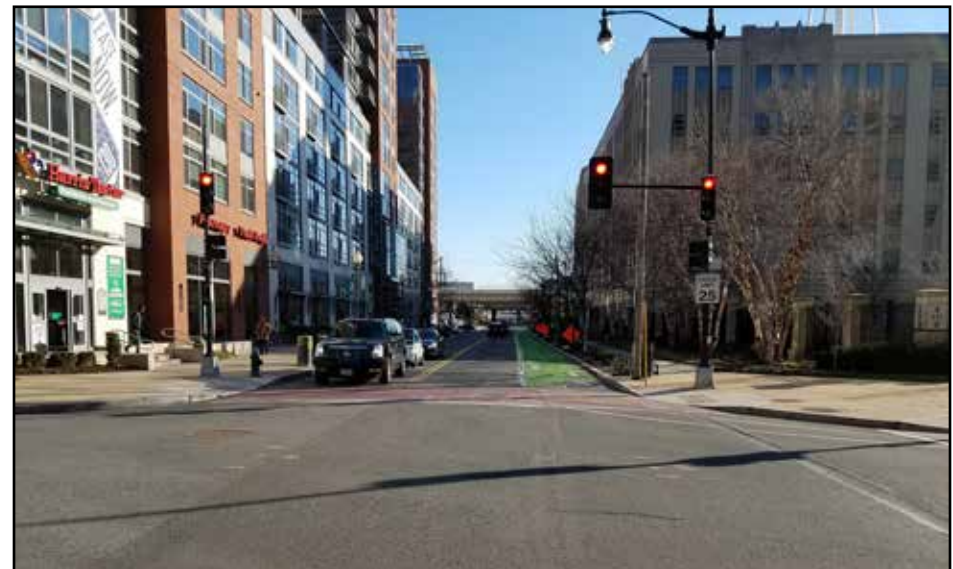
The neighborhoods that report highest rates of bicycle commute mode share are in areas north of New York Avenue NW. Other neighborhoods in the study area have more dominant transit mode-share rates. This can be explained by proximity of neighborhoods east of New York Avenue NE to Metrorail stations, and lower vehicle ownership rates. Also, neighborhoods north and west of New York Avenue NW are better connected to Downtown DC by bicycle-friendly roadways and accommodations.

Age Distribution

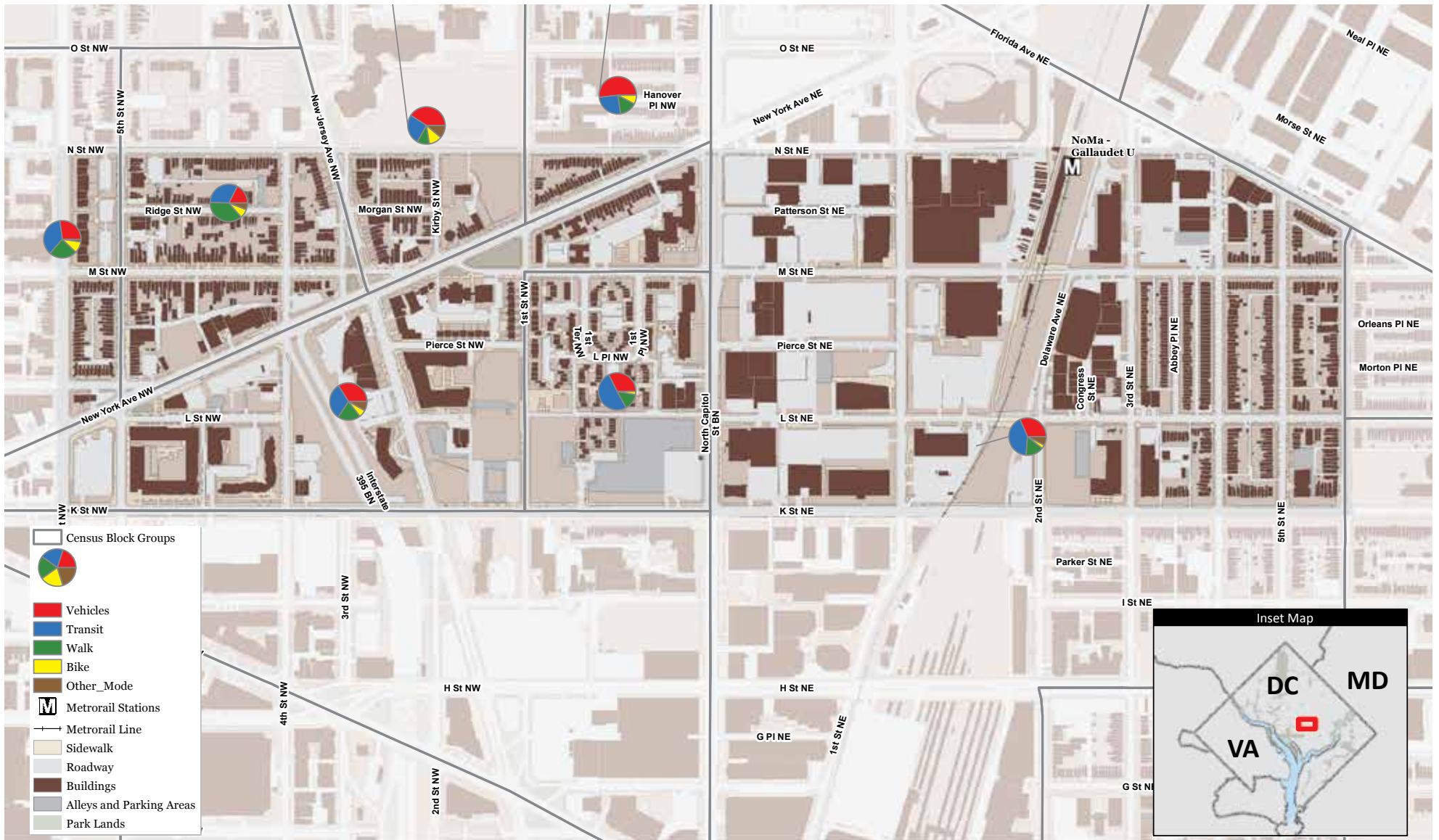
Neighborhoods with a higher proportion of non-driving or relatively vulnerable residents (aged less than 18 or over 65) are generally located between New Jersey Avenue NW and North Capitol Street NW. Neighborhoods east of North Capitol Street NW are dominated by young adults, largely explainable by newer, high-density residential developments.



Neighborhood along 5th Street NW

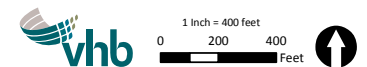


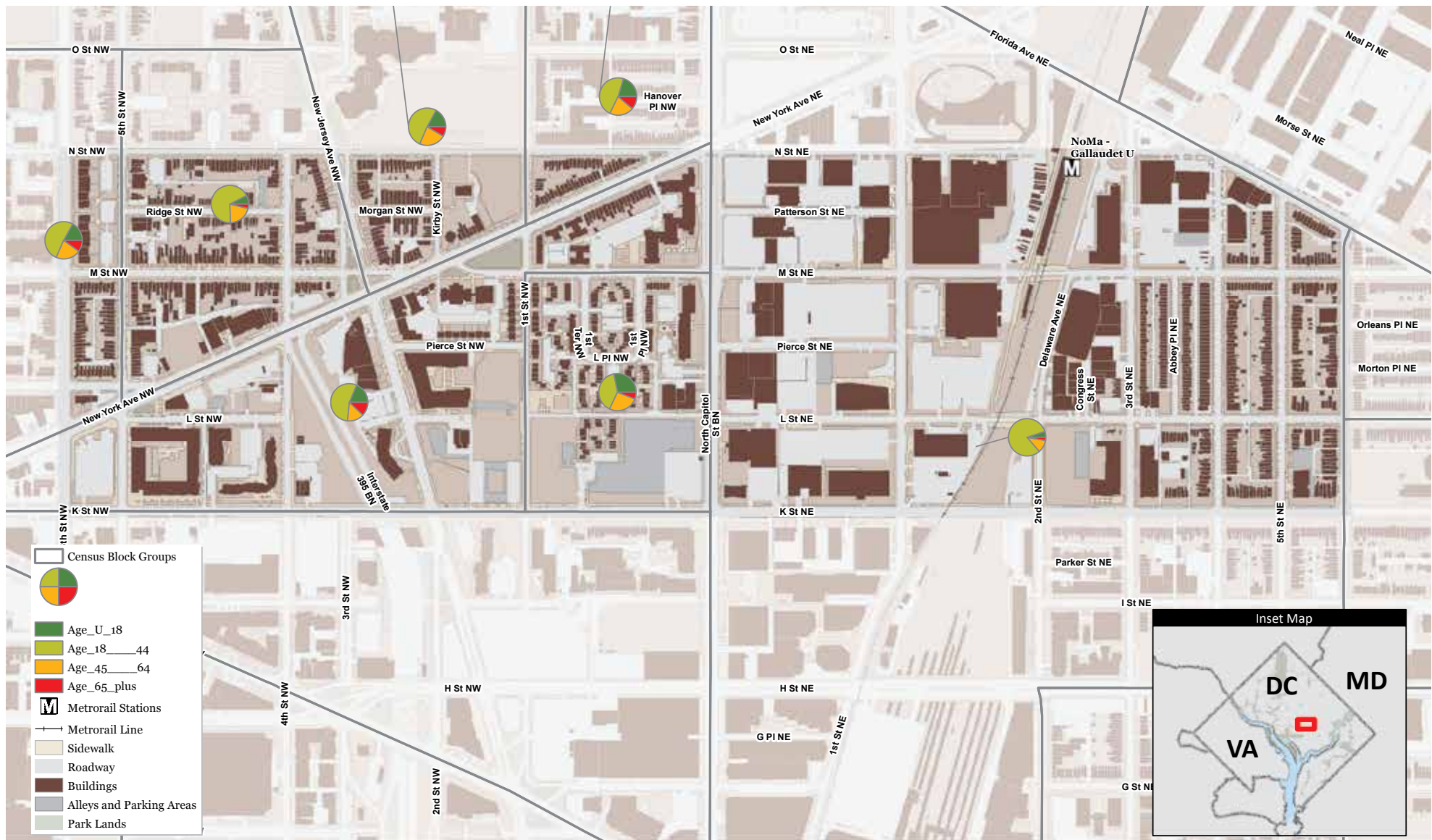
Mixed-Use Neighborhood along M Street NE



Method of Commuting by Census Block Group
NoMa Study Area

Date Created: 01/24/2017





Age Distribution by Census Block Group
NoMa Study Area

Date Created: 01/24/2017



Land Use and Development Context

Land uses in the study area are fairly segregated. Established neighborhoods are low-moderate density residential uses. Properties between the rail corridor and North Capitol Street are largely high-density commercial (office) or mixed uses. Churches and schools are interspersed across the study area.

Most planned development is occurring at sites on the east side of Union Station or near the intersection of New York Avenue and North Capitol Street. As of November 2016, over 15 million square feet of residential and commercial development is planned for the NoMa business district. Most of this new development is proposed as office space. This is in addition to 3 million square feet of new construction underway.

The Mount Vernon Square neighborhood (west and north of New York Avenue NW) is a designated historic district. The historic character of the neighborhoods streets (M and N Streets NW) are generally low volume or lower speed corridors. Several schools and warehouse structures have also been designated as local historic landmarks. In some cases, the structures have been redeveloped into new commercial or mixed use centers. For example, the Uline Ice Company and Arena is now the flagship store for REI in Washington, D.C.

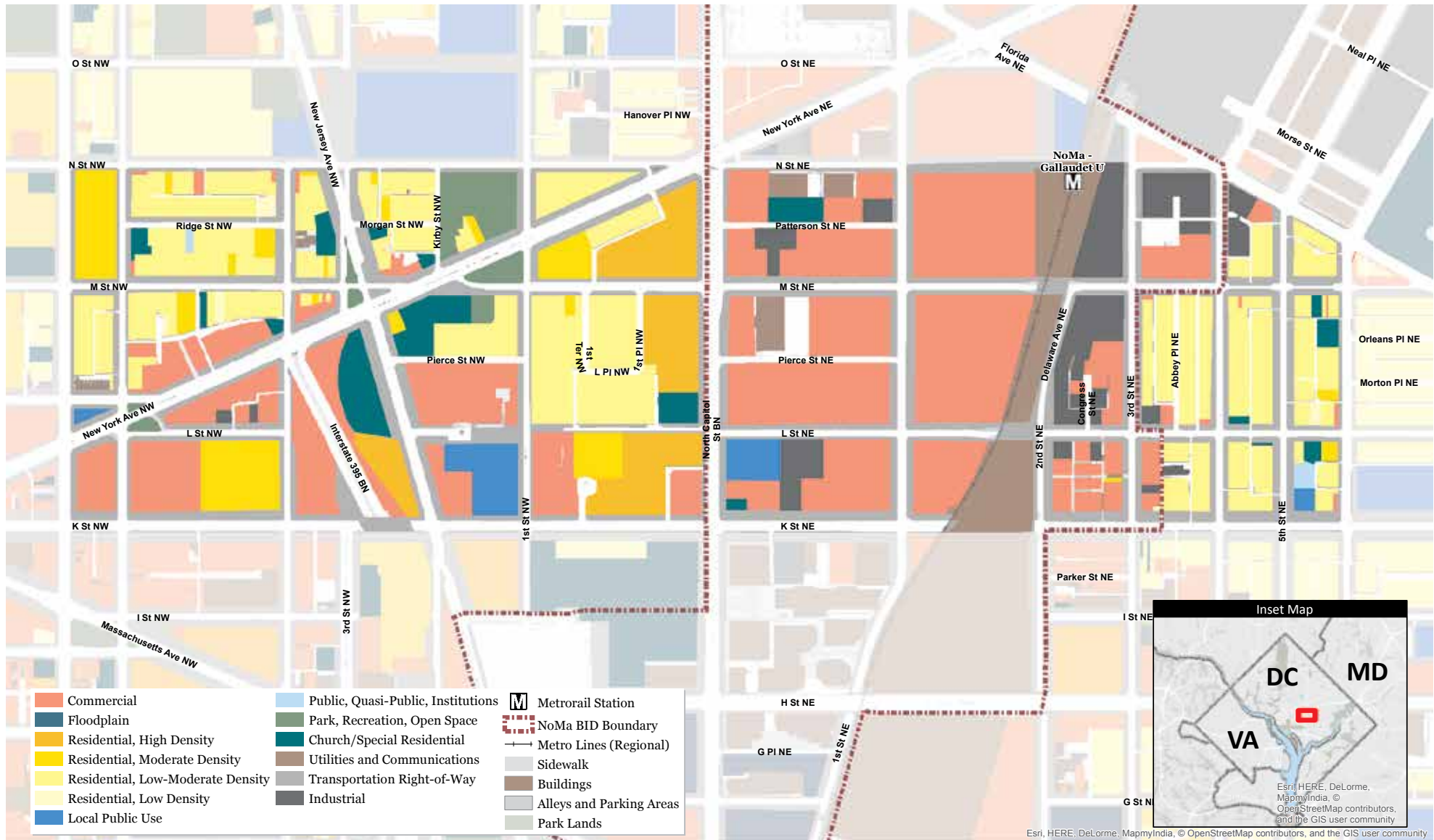
The study area is flanked to the north and south by large public schools, including Dunbar High School on N Street NW and Gonzaga College High School on K Street NW. Several private and charter schools in the study area have reused existing storefronts or church buildings. Student drop-off and pick-up at K-12 public schools in and near the study area frequently congest neighborhood streets and necessitate some on-street parking restrictions.

On-street parking along neighborhood streets in the NoMa area is largely available as zone (resident permit) or with 2-hour time limits. There are sections of metered parking along M and N Streets NE. Sections of L and N Streets NW are available for open parking. Most of New York Avenue, New Jersey Avenue and North Capitol Street do not permit any on-street parking. Residential on-street parking is scarce in most parts of the study area, so the best opportunities for removing on-street parking for bicycle improvements is along commercial land uses with meter or rush-hour restricted parking.

DEVELOPMENT SUMMARY						
Building Type	Office (SF)	Retail (SF)	Residential (units)	Hotel (rooms)	Total (SF)	% of Total
Commercial	12,990,258	404,126	0	-	13,394,384	36%
Residential	-	155,750	3,836	-	3,991,750*	11%
Hotel	-	20,000	-	622	455,400*	1%
Under Construction	539,000	181,700	2,553	-	3,251,700*	9%
Planned	7,886,897	532,456	6,218	1,261	15,525,426	43%
TOTAL	21,416,155	1,294,032	12,607	1,883	36,786,405	

* Estimate

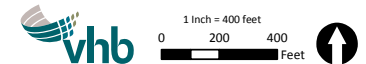
2016 Summary of Development Planned for the NoMa BID Area

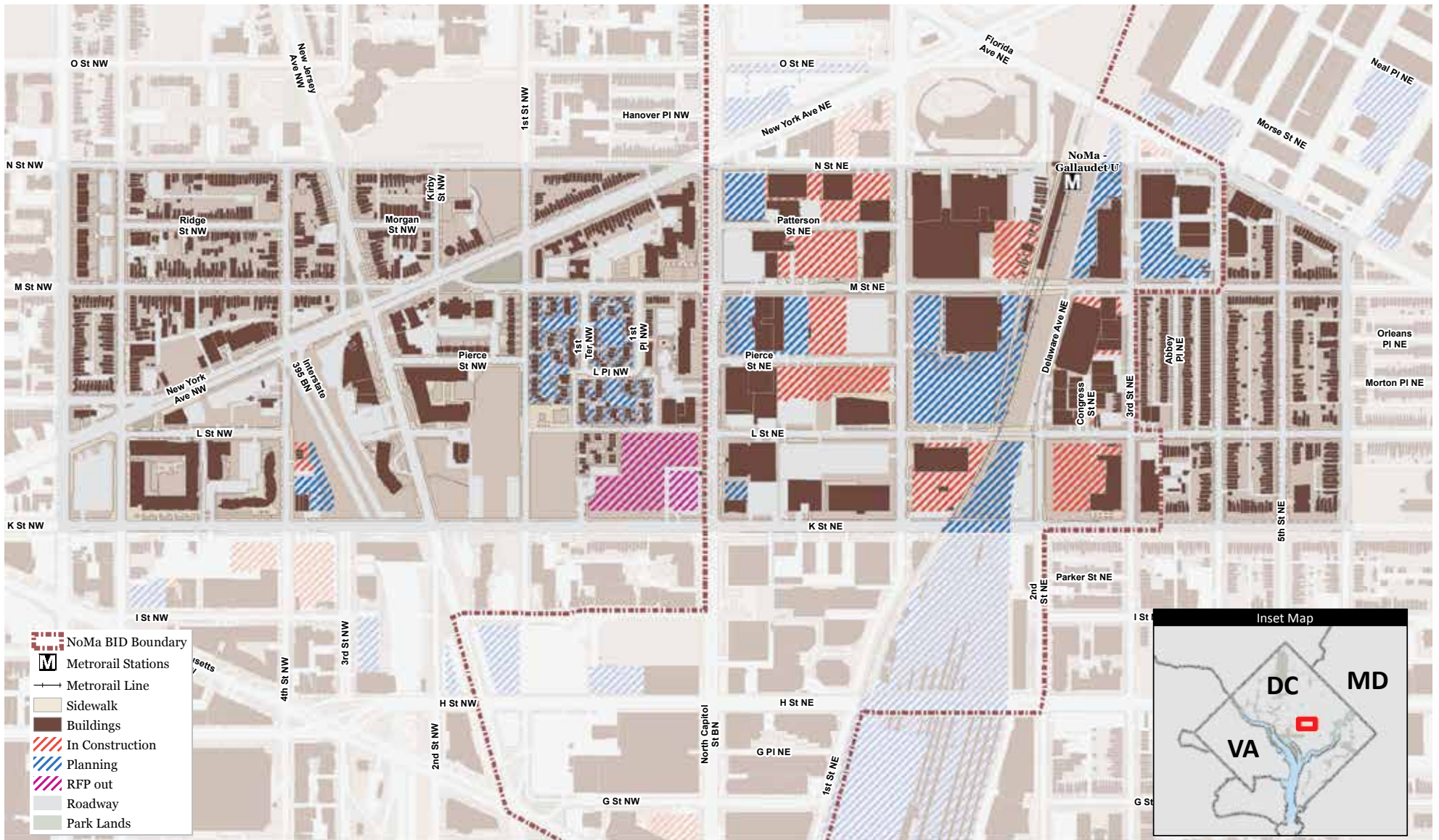


Existing Land Use Classification

NoMa Study Area

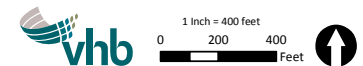
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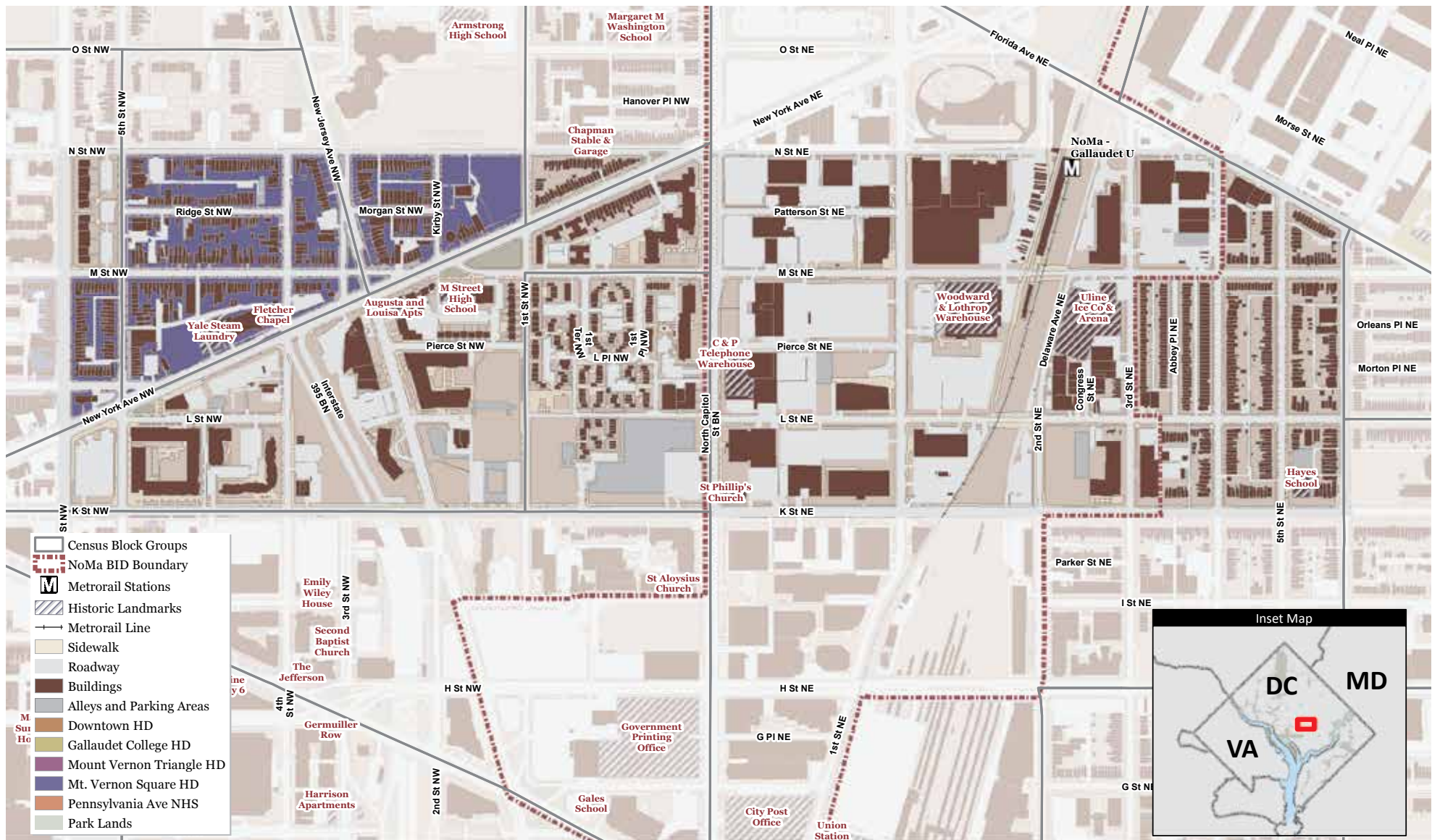




Development Projects Planned or Under Construction NoMa Study Area

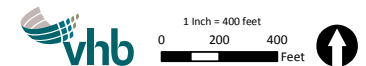
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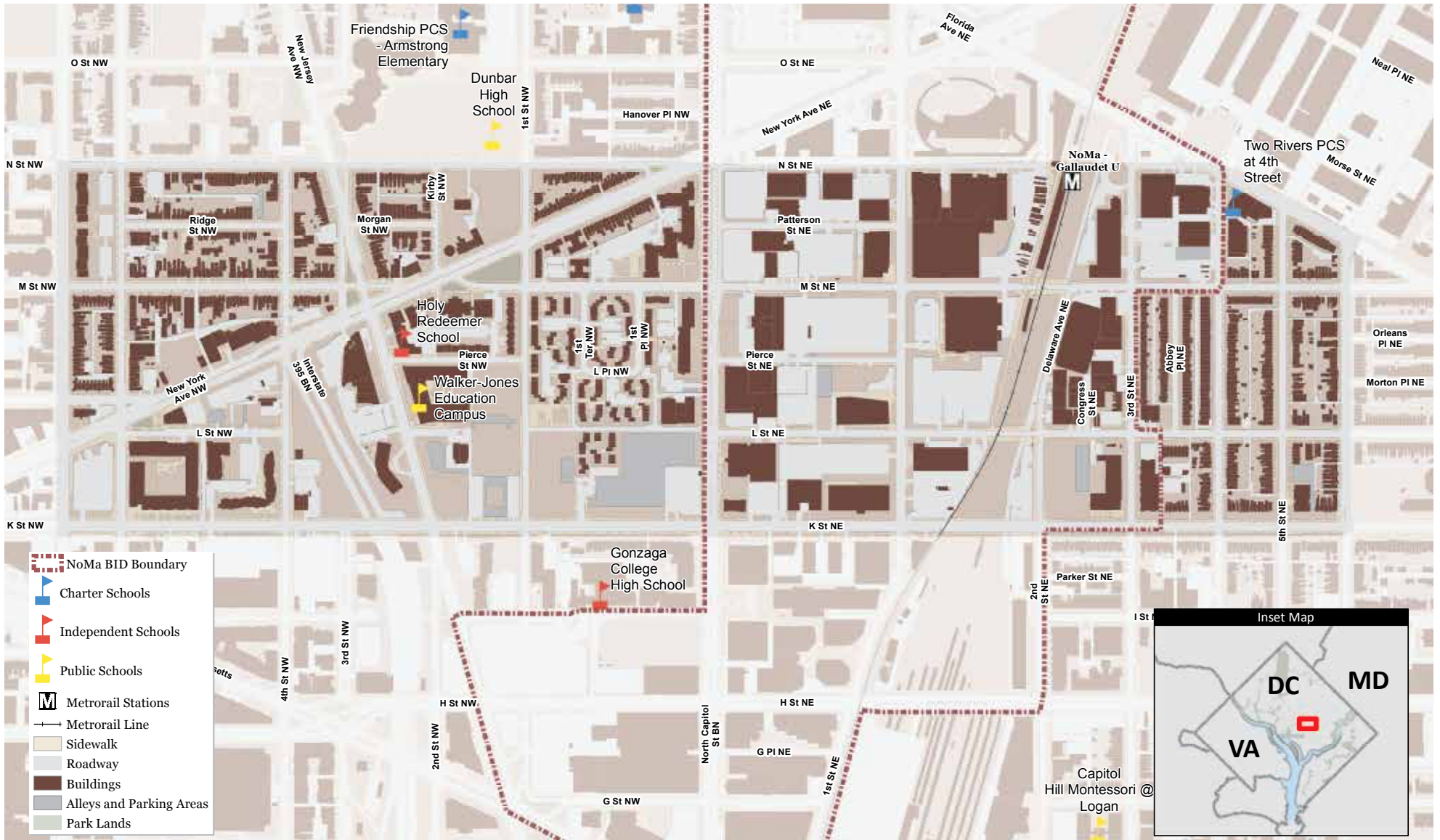




Historic Districts NoMa Study Area

Date Created: 01/24/2017

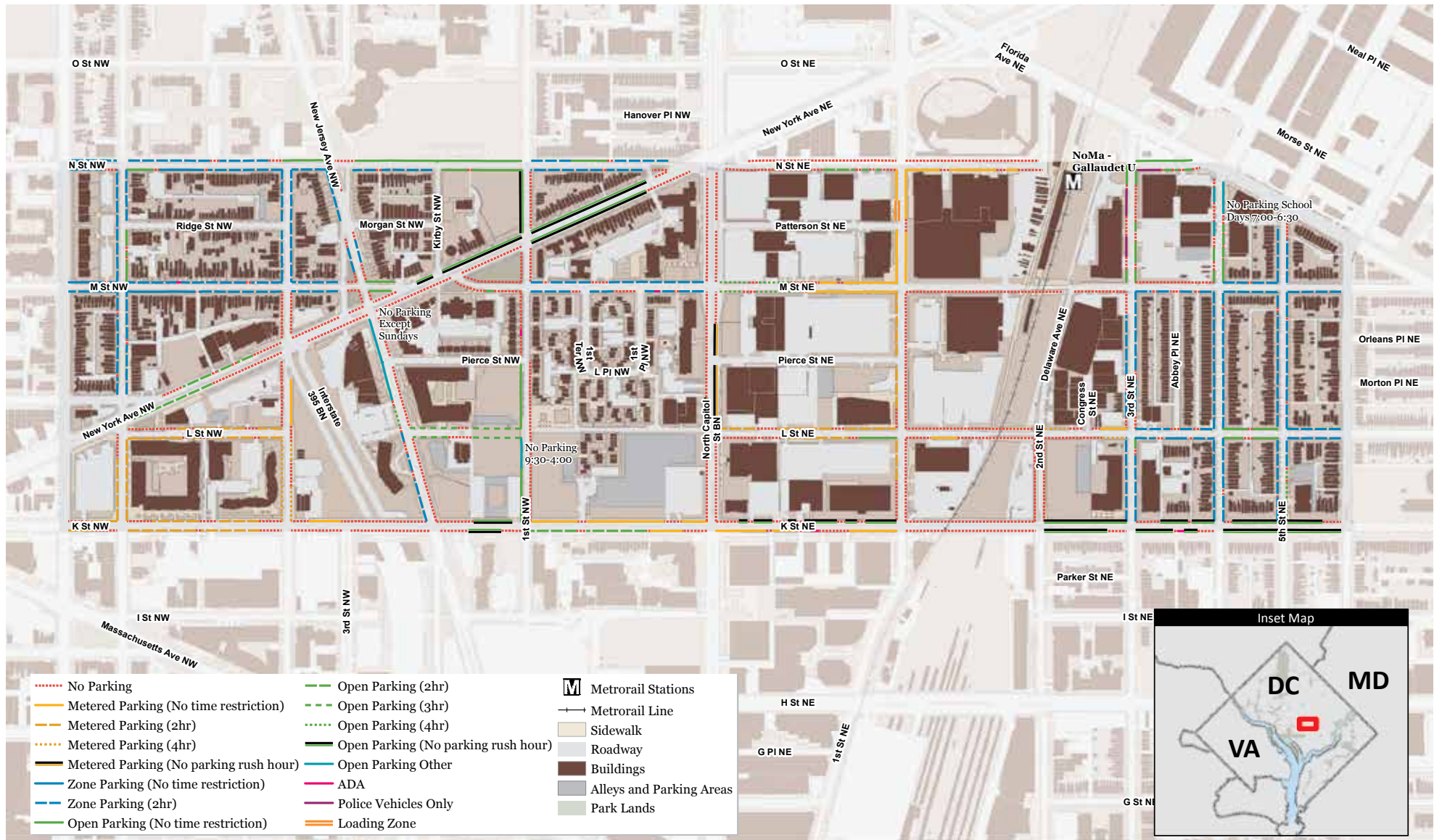




Public, Private, and Charter Schools
NoMa Study Area

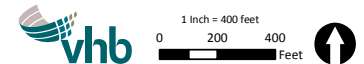
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Parking Inventory NoMa Study Area

Date Created: Date Created:
01/24/2017



Multimodal Transportation System

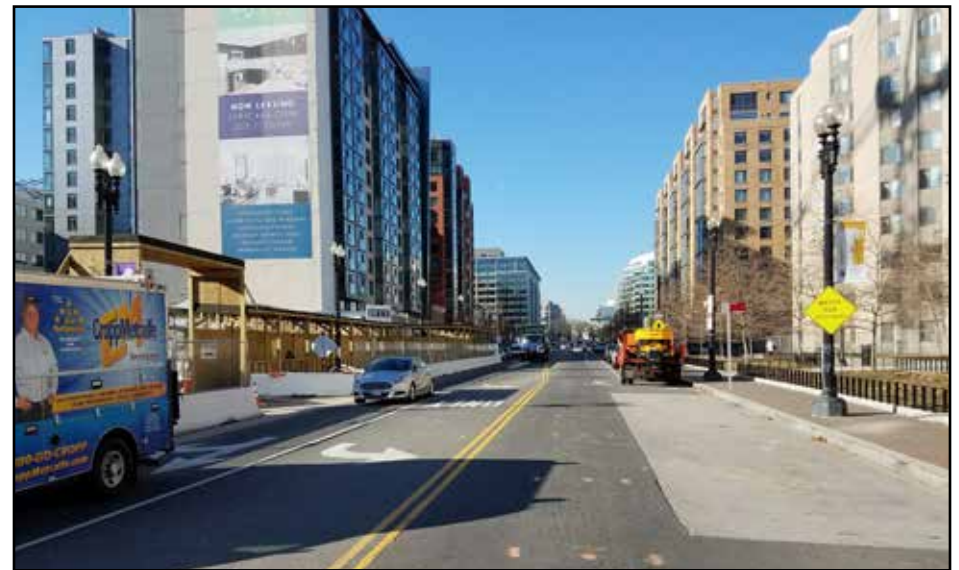
The transportation system in the study area is disconnected by physical barriers. The Amtrak rail line and the passenger rail system supporting Union Station limits the number of connections between the study area and downtown. Multi-lane highways such as North Capitol Street, New York Avenue, New Jersey Avenue, Florida Avenue and I-395 all present additional barriers to cycling across the study area. K Street is a relatively high volume roadway, but traffic control and congestion tend to limit vehicle speed in the study area.

I-395 and New York Avenue are the highest-volume roadways in the study area. North Capitol Street and New Jersey Avenue NW have sections where volumes are relatively heavy. The section of M Street NW between New York Avenue and North Capitol Street functions as a major connector between the New York Avenue/ I -395 corridor and North Capitol Street. Traffic along K Street is consistently moderate to heavy. Intersection and other operational improvements are under consideration by DDOT; vehicular operations are the focus of the NoMa/ Mount Vernon Triangle Bicycle Network Study.

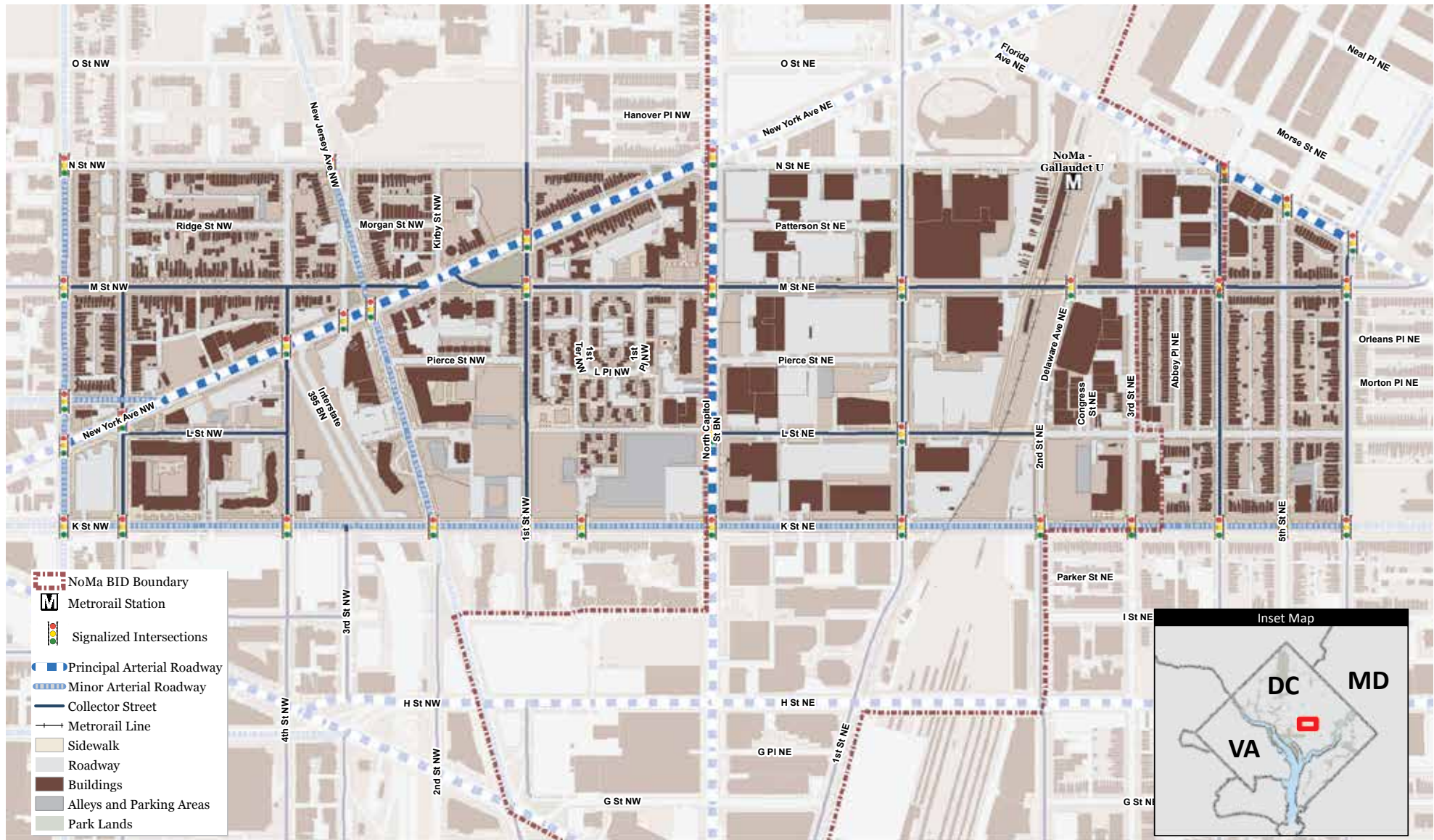
The NoMa area is well supported by public transit. The NoMa – Gallaudet and Union Station stops for Metrorail connect to all parts of DC. Metro bus lines run along New Jersey Avenue, North Capitol Street, Florida Avenue, and K Street. Streetcar service is available along H Street NE, to the south of the study area.



Heavy congestion at M Street NW and New York Avenue

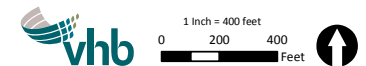


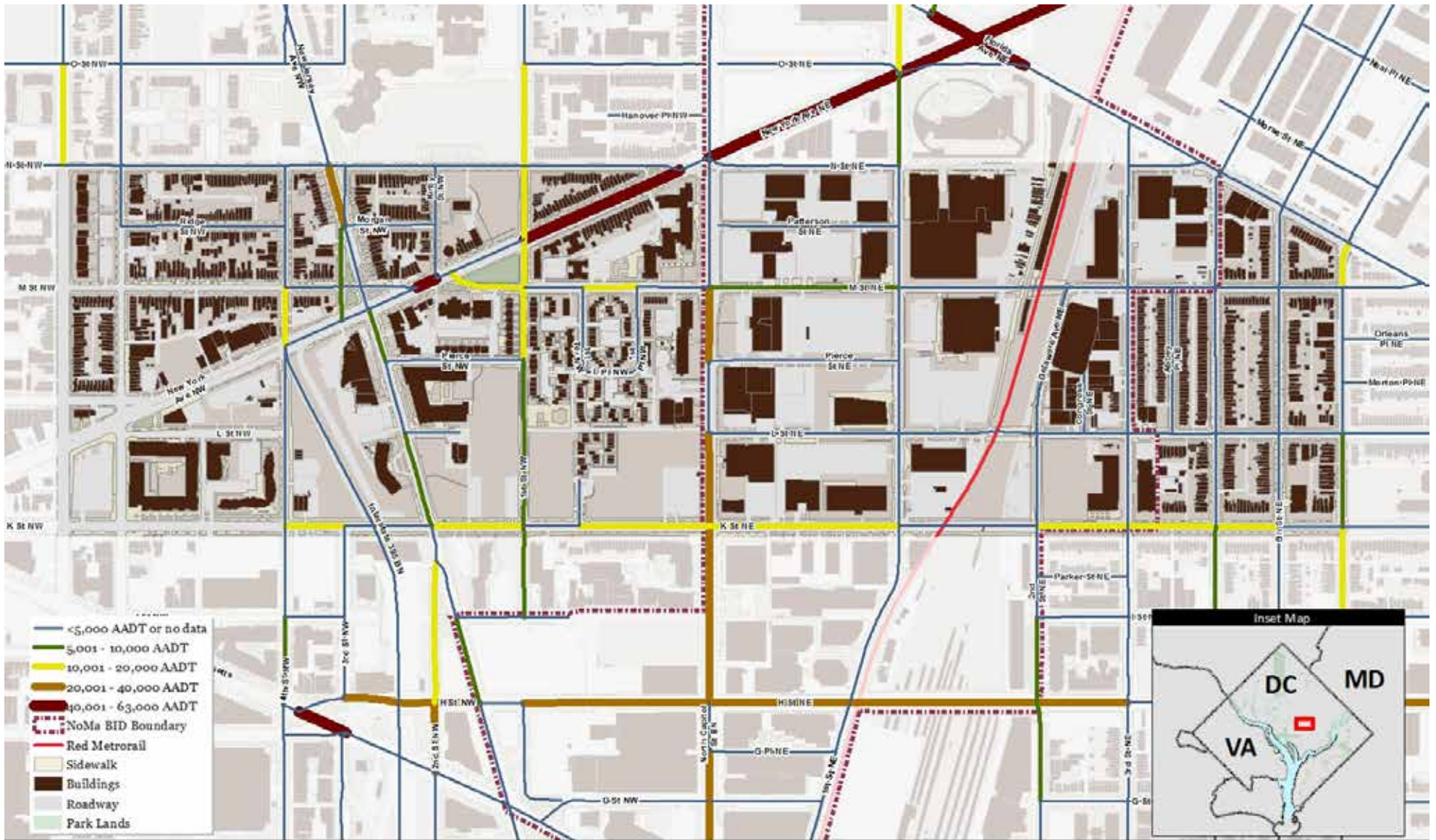
K Street NW over I-395



Street Functional Classifications NoMa Study Area

Date Created: 01/24/2017

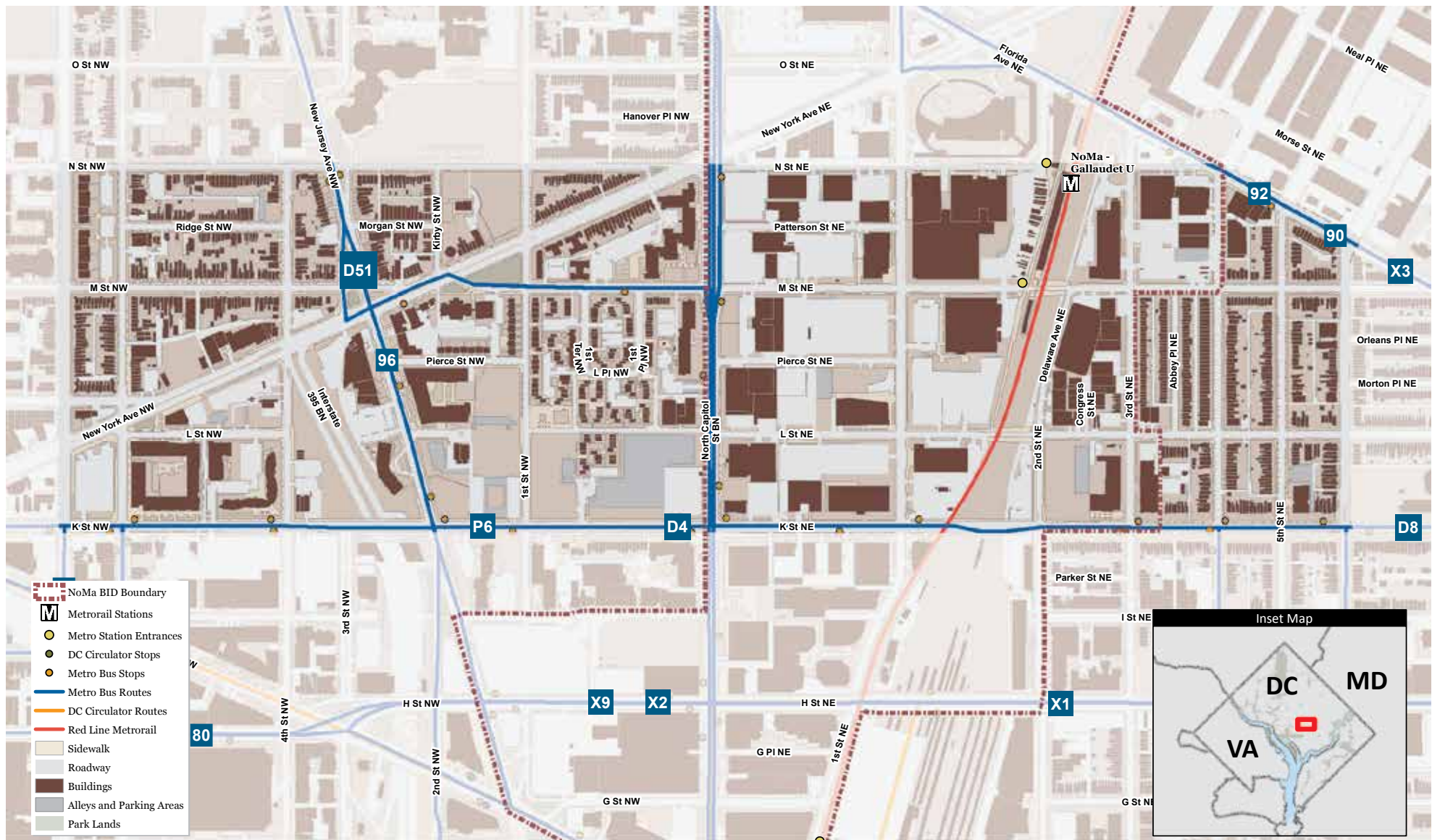




2007 AADT Values
NoMa Study Area

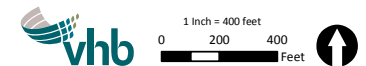
Date Created: 01/10/2018





Transit Infrastructure NoMa Study Area

Date Created: 01/22/2017



Existing and Planned Bicycle Network

Experienced DC commuters and recreational cyclists have published a map showing preferred routes for bicycle travel. Roadways marked as commuter routes included New Jersey Avenue, 1st Street NE, and K Street in the study area. (Downtown Bike Commute Routes map - www.bikewashington.org)

A popular online forum called Strava receives and compiles data submitted by athletes and cyclists, including frequent commuters in the DC area. Roadways and bicycle networks in the study area that show the highest volumes of cycling activity are as follows:

- Metropolitan Branch Trail north of M Street NE
- M Street NE between 1st and 2nd Streets NE
- 1st Street NE (cycletrack south of M Street NE)
- 2nd Street NE south of M Street
- 6th Street NW
- 5th Street NW
- K Street NW and NE
- N Street NW between 6th Street NW and 1st Street NW

Roadways in DC have been rated per their relative Level of Traffic Stress (LTS). This rating measures comfort of roadways for cyclists of varying capabilities and comfort levels.

Most LTS measures use a 1-4 rating system:

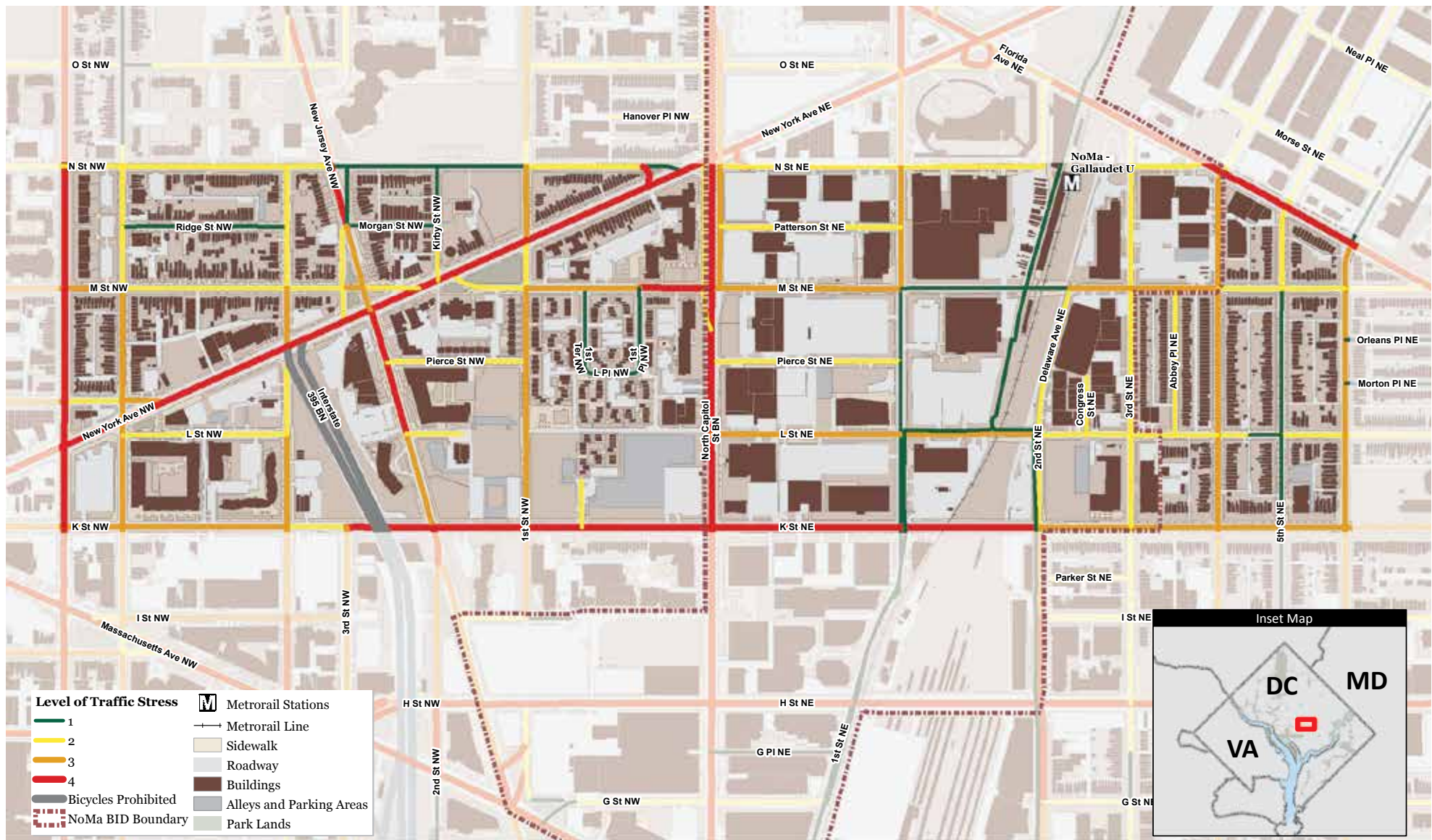
LTS 1 - A relaxing bike ride that is suitable for almost all cyclists, including children. Linkages are usually physically separated from other traffic, or cyclists are riding on very low traffic street. Intersections are easy to navigate and cross.

LTS 2 – Some stress for adult cyclists. Children should exercise caution at crossings. Cyclists are either physically separated from traffic, in an exclusive bike lane, or riding along a street with very little traffic and low speeds.

LTS 3 - Adult or experienced cyclists are generally comfortable riding in the travel lane or in an exclusive bike lane along-side vehicles travelling at moderate speeds. Crossings are more challenging to navigate or cross higher speed roadways. Not generally suitable for young children.

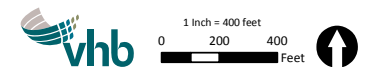
LTS 4 – A level of stress beyond LTS3.

The higher volume roadways in the study area are all classified as a LTS 4. The only LTS 1 roadways are residential sections of N Street NW and 5th Street NE. LTS 1 is also applied to the separated bike lanes along 1st Street NE and the Metropolitan Branch Trail. N Street has the best overall LTS classification of the 4 east-west corridors in the study area.



Level of Traffic Stress NoMa Study Area

Date Created: 01/24/2017



An examination of crash data from 2010– 2015 revealed several bicycle crash “hotspots” in the study area. These hotspots are generally located on or near roadways that feature higher traffic volumes, higher posted/ observed speeds, and multiple travel lanes.

- 37 bicyclists or pedestrians were involved in a crash near the intersection of New York Avenue and North Capitol Street
- 32 bicyclists or pedestrians were involved in a crash near the intersection of New York Avenue and 6th Street NW / K Street NW
- 9 bicyclists or pedestrians were involved in a crash near the intersection of K Street and North Capitol Street
- 3 bicyclists or pedestrians were involved in a crash near New York Avenue, west of the intersection with New Jersey Avenue

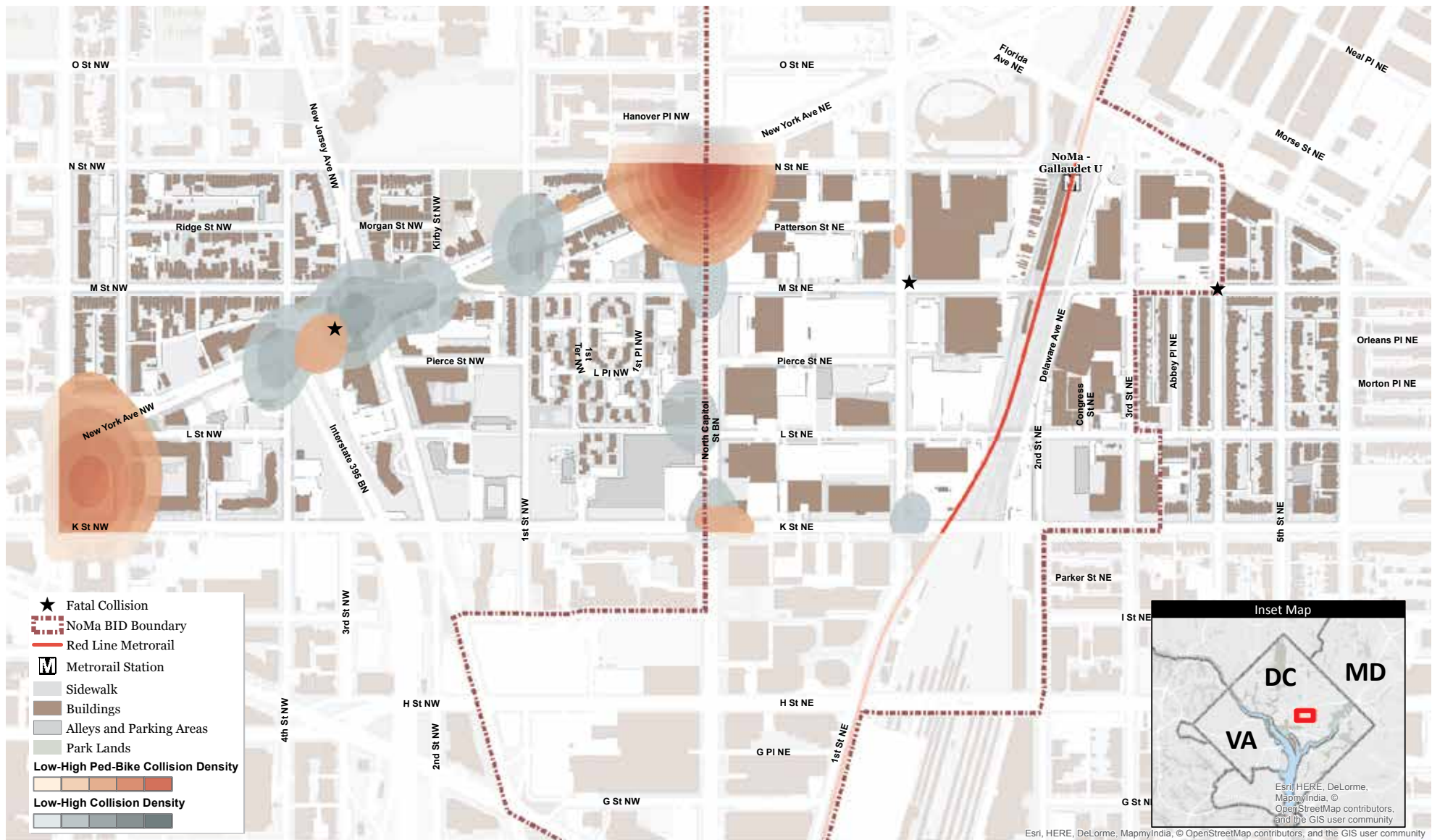
Vehicular crash “hotspots” were most significant along New York Avenue, near the intersections with New Jersey Avenue and I-395. The intersections of North Capitol Street and L Street and K Street also saw relatively high volumes of vehicular crashes.

On-road bicycle facilities are along several streets throughout the study area, include the following:

- 2nd Street NE between L and M Streets NE - Shared Lane Markings
- 5th Street NW exiting study area to the north from L Street: one-way street (northbound) – bike lanes
- M Street NE between 1st Street NE and Delaware/2nd Street NE – bike lanes

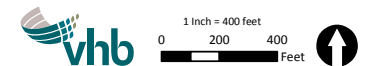
- K Street NW between 5th Street NW and 4th Street NW -bike lanes
- 4th Street NE between Florida Ave NE and south from study area: one-way street (southbound); marked bike lane in direction of traffic – bike lanes
- 6th Street NE between Florida Ave NE and south from study area: one-way street (northbound); marked bike lane in direction of traffic – bike lanes
- 1st Street NE between M Street NE and south from study area- separated bike lanes
- 2nd Street NE between L Street and south from study area- separated bike lanes

DDOT has studied several improvements to the bicycle network for short-term and longer-term implementation. The maps “Existing Bicycle Facilities and Facilities Under Study” and “Existing Bicycle Facilities and Facilities Under Longer-Term Study” show what the bicycling network may look like if near term projects planned by DDOT are implemented.



Traffic Collision Density, 1/2010-6/2015
NoMa Study Area

Date Created: 01/22/2017

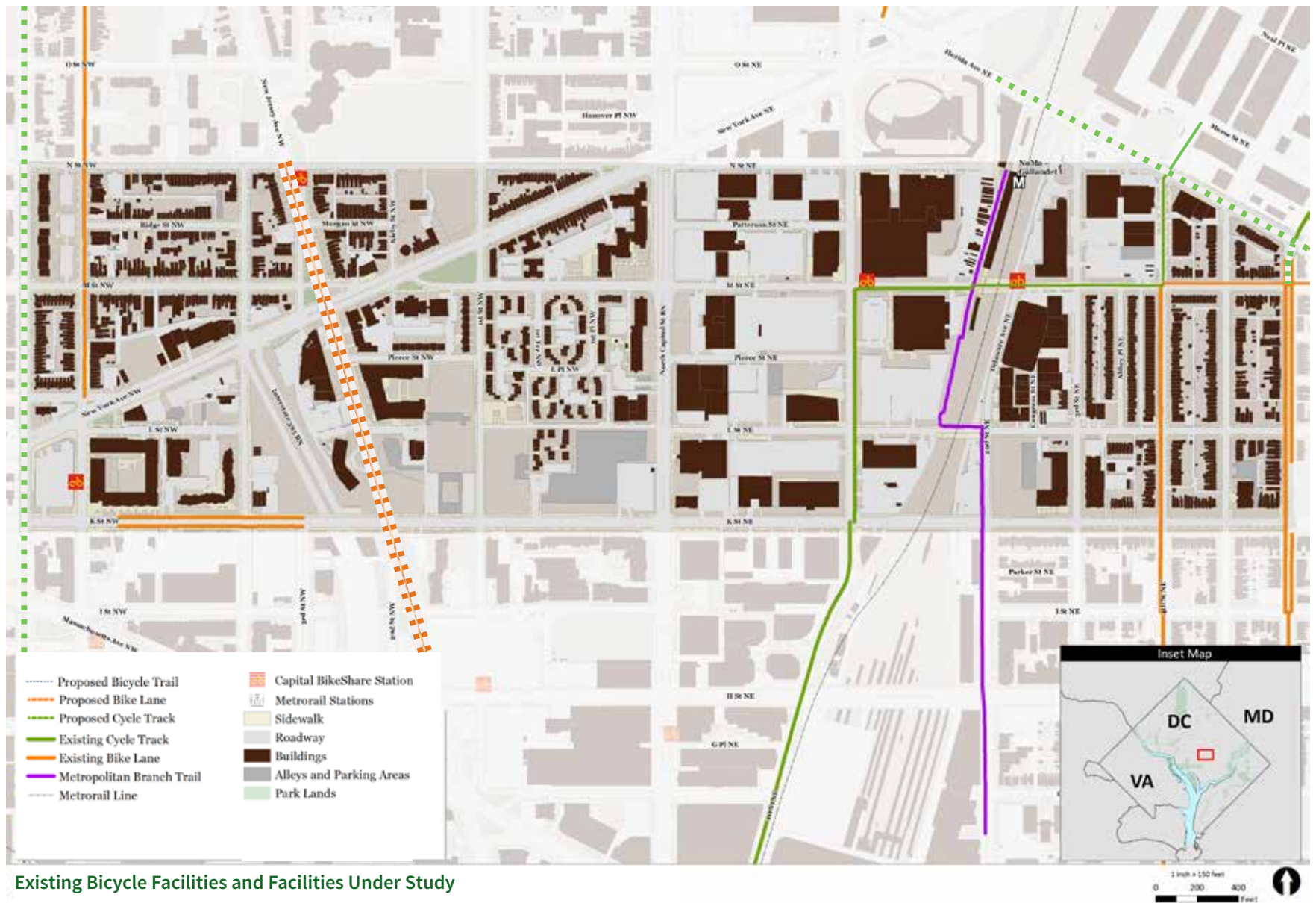




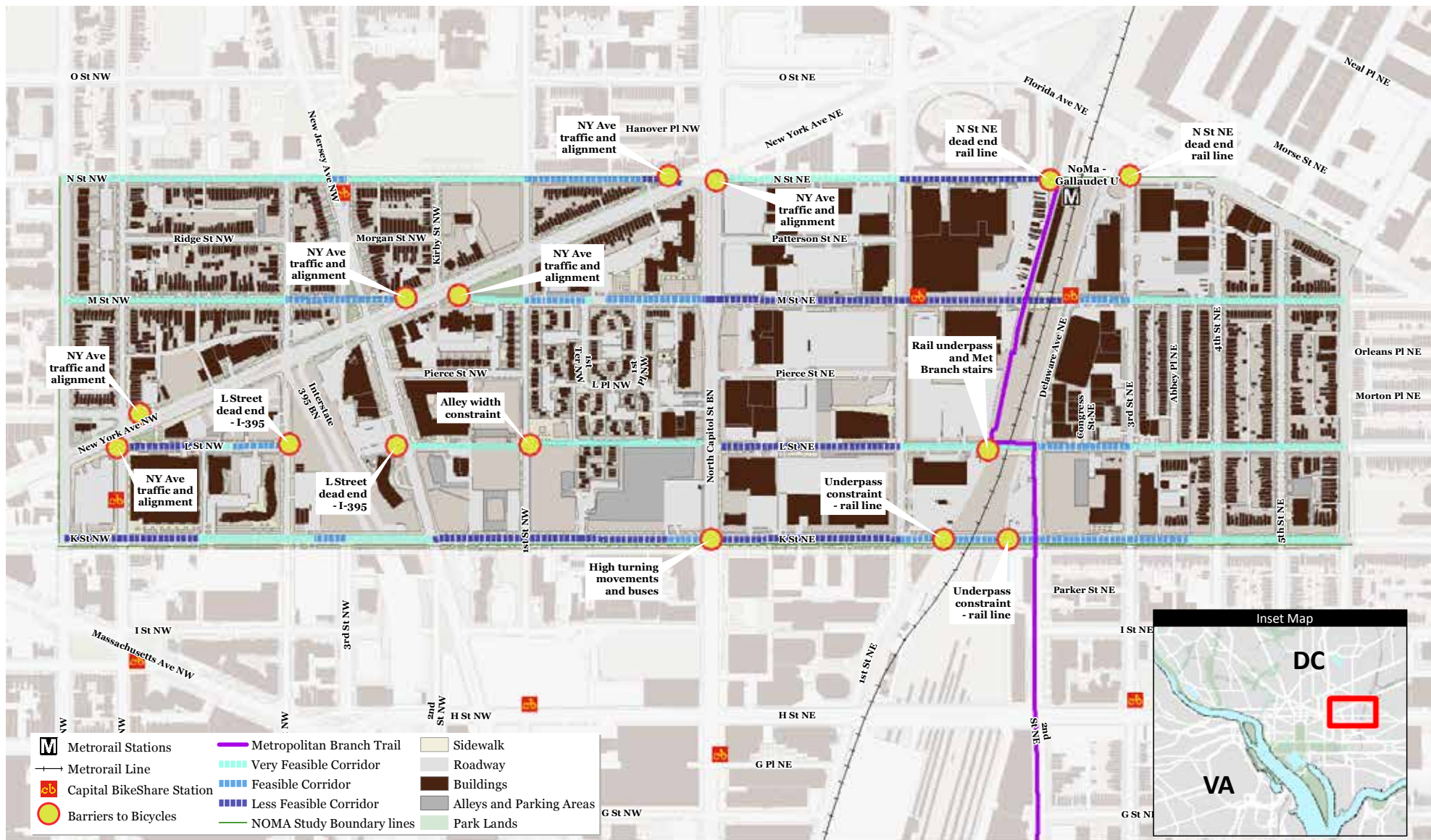
Bicycle Infrastructure by Facility Type as of 2016
NoMa Study Area

Date Created: 04/27/2017





Existing Bicycle Facilities and Facilities Under Study
NoMa Study Area



East-West Corridors: Feasibility and Barriers to Cycling NoMa Study Area

Date Created: 04/27/2017



The map "East-West Corridors: Feasibility and Barriers to Cycling" summarizes many of the known limitations to comfortable cycling or connectivity across the study area. Many of these same barriers were noted by the public and identified as poor-performing intersections as part of traffic analysis conducted later in the planning process..

Summary of Current Plans and Initiatives

MoveDC is the primary plan reference for this study. However, several other plans developed over the past 5-10 years also address the study area and include recommendations for the future bicycling network. The following is a summary of issues described and recommendations in those plans and studies.



MoveDC also recognizes the challenges and opportunities of effectively managing curbside uses including loading and unloading, general parking, residential parking, visitor parking, Americans with Disability Act (ADA) accessible parking, commercial parking, valet parking, vending, motorcycle and motorscooter parking, transit, transportation network carriers, and bicycles. Parking must be balanced with the creation of a complete transportation network that provides many choices for every trip. MoveDC recognizes that, in some corridors, bicycle lanes compete for space with other curbside uses.

MoveDC (2014) is the District of Columbia's multimodal long-range transportation plan and it describes a vision for the city's future transportation network. The plan outlines an implementation strategy, including specific projects by transportation mode. Priority tiers (Tier 1 is most urgent and Tier 4 is lesser of a priority) are also listed for the proposed improvements. For the purposes of this study, MoveDC will supercede former DC bicycle master plans. MoveDC recommends the following improvements in or adjacent to the study area:

- A shared use path or trail along New York Avenue from M Street NE north beyond the study area (Tier 1)
- Bike lanes along Florida Avenue from New York Avenue to West Virginia Avenue
- Bike lanes along New Jersey Avenue NW across the length of the study area (Tier 3)
- Cycletrack along M Street NE from Florida Avenue westward beyond the study area (Tier 1)
- Cycletrack along N Street NW from 1st Street NW to 5th Street NW
- Cycletrack along 5th and 6th Streets NW across the study area (Tier 2)
- Cycletrack along 4th and 6th Streets NE south from M Street NE (Tier 4)
- Cycletrack along L Street NE west from 5th Street beyond the study area (Tier 3)
- Bike lanes along K Street NE east from 2nd Street NE (Tier 3)

NoMa BID 2016-2021 Strategic Plan

This plan included as a major goal to “ensure pedestrian, bicycle, vehicular and transit connections between NoMa and other neighborhoods” that are visually appealing and safe. This work may focus on bicycle connections along K, M, Q and R Streets in the study area.

The Metropolitan Branch Trail Safety & Access Study (2015)

considered public safety and connectivity to the spine route of the trail parallel to the Red Metro line in DC. The terminus of the off-street portion of the Trail in NoMa, the L Street NE access point, is currently built only to accommodate pedestrians. This study recommended working with properties to reconstruct the L Street connection to the Metropolitan Branch Trail. It also recommended adding a midblock connection at Pierce St to the Trail through the 1100 block of First Street NE.



The New York Avenue Trail and Streetscape Project (Ongoing)

This study is reviewing a connection to the Metropolitan Branch Trail as a sidepath along New York Avenue NE north of Florida Avenue NE (south side).

Alternatives Analysis for Premium Transit Service from Union Station to Georgetown (2016)

This study analyzed options for integrating streetcar service, among other options for improved transit, between the Georgetown neighborhood and Union Station. A streetcar alternative (#1, typical section 14) shows 4 foot-wide bike lanes between the streetcar and on-street parking along New Jersey Avenue NW between H and I Streets.

Mid City East Small Area Plan (2015)

This plan recommended several broad improvements, including improved mobility and physical connectivity between Mid City East and surrounding neighborhoods. This would require removing barriers to safe pedestrian and bicycle access to schools, transit and parks.

Florida Avenue Multimodal Corridor Study (2015)

This study reflected on the lack of east-west bicycle facilities in the study area. It recommended constructing bike lanes along Florida Ave, West Virginia Ave, and 6th St NE. These improvements would better support north-south bicycle travel in NoMa.

New Jersey Avenue, NW Multi-Modal Improvements Project (2013)

This plan proposed to add bike lanes to New Jersey Avenue, between L Street and Morgan Street NW. The project did not offer accommodations for cycling on M Street or New York Avenue.

Far Northeast Livability Study: Livability Action Agenda for Far Northeast (2011)

This study recommended filling gaps in the bicycle network connecting to schools and other public buildings, Metrorail stations, commercial and employment areas, parks and trail networks. The study recommended using connected, low-volume streets as a safer alternative for bicycle travel than higher volume roadways.

The NoMa Neighborhood Access Study and Transportation Management Plan (2010) included recommendations for short-term, mid-term, and long-term bicycling improvements. The plan provided additional notes about implementation of the proposed M Street cycletrack. The cycletrack would likely require eliminating on-street parking on one side of the M street and other on-street parking restrictions. This alternative may degrade traffic operations at the intersection of North Capitol Street and M Street (projected to be a LOS "F" in both peaks). However, the impact to traffic operations can be mitigated with the two-way conversion of New Jersey Avenue and the K and L Street one-way pair, providing drivers more options to reach northbound North Capitol Street. Specific recommendations included the following:

Short term: Convert Pierce, Patterson, L, and M Streets to two-way between First Street, NE and North Capitol Street. Lane reduction and addition of bike lanes along K Street. Add a shared-use path on First Street and connected to the Metropolitan Branch Trail. This trail connector is critical for access to the Union Station Bike Station

Medium Term: develop a connected network of bicycle facilities throughout the study area.

Long Term: convert K Street and L Streets into a one-way pair with cycle-tracks between West Virginia Avenue and 1st Street NW. L Street should be extended over I-395 interchange via a pedestrian and bicycle bridge. Add a cycle track along the south side of M Street. Extend Pierce Street between 1st Street NW and North Capitol Street. Add new connection between K and M Streets (parallel to 1st Street NW and N Capitol Street).

New York Avenue – Florida Avenue – Gallaudet Study (2010)

This study recommended adding bicycle facilities along Delaware Avenue and L Street NE to increase connectivity to the New York Avenue station.

NoMa Vision Plan and Development Strategy (2006)

This strategic plan explained how neighborhood traffic calming and other measures may help discourage large truck traffic along Florida Avenue and 3rd St. This document also called for more amenities along and connections to nearby streets and the Metropolitan Branch Trail.



Vision Zero Action Plan

Vision Zero is a new philosophy and approach to traffic safety. Under Vision Zero, the design, operation, and support of our transportation network will reflect the fact that humans are not perfect. Travelers inevitably make mistakes resulting in traffic crashes; however, we do not need to accept that those crashes will inevitably lead to fatalities. Washington DC's Vision Zero Action Plan commits to eliminate fatalities and serious injuries to travelers of our transportation system by the year 2024 through more effective use of data, education, enforcement, and engineering.

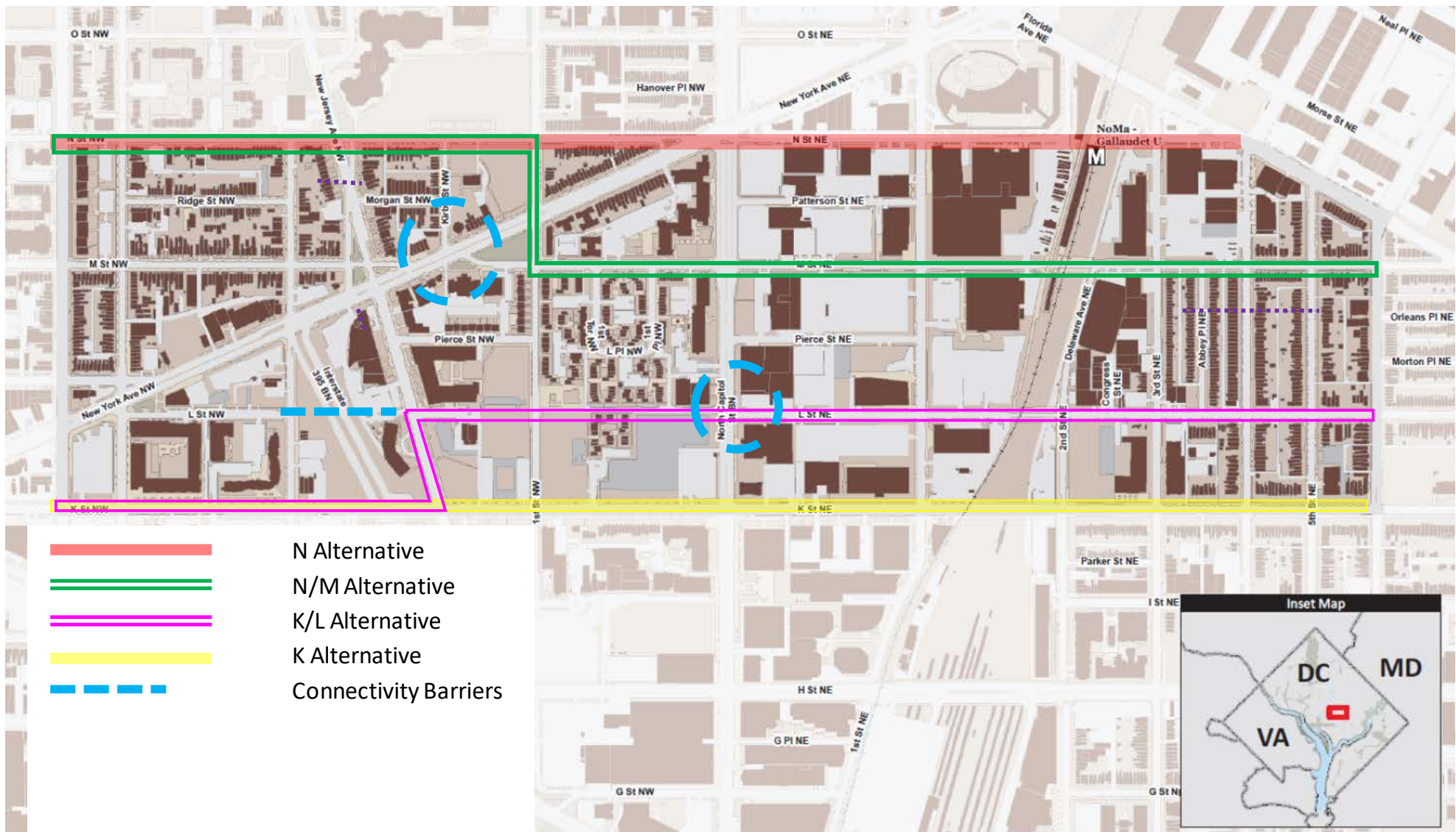
Network Evaluation

Network Alternatives

Following the first public workshop, DDOT identified four primary network alternatives for potential bicycle improvements across the study area.

- The first alternative included the full length of K Street between 6th Street NW and 6th St NE.
- The second alternative included K Street NW between 6th Street NW and New Jersey Avenue, connecting to L Street via New Jersey Avenue, and following L Street eastward toward 6th St NE. The primary barrier to considering the full length of L Street was the gap over I-395.
- The third alternative included N Street NW between 6th Street NW and 1st Street NW, connecting to M Street via 1st NW, and then following M Street eastward toward 6th Street NE. The intersection of M Street with New York Avenue was the primary barrier to considering the full length of M Street.
- The fourth alternative considered the full length of N Street between 6th St NW and 6th St NE.

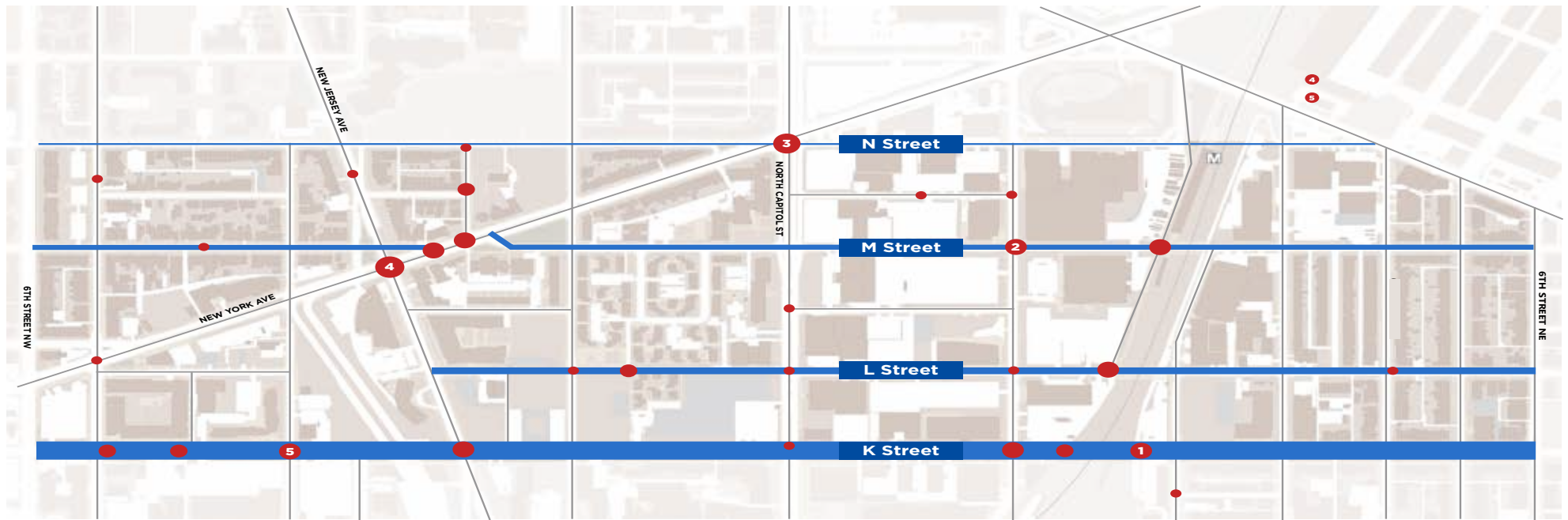
Of the four east-west corridors crossing the study area, workshop attendees and online map entrees indicated a strong preference for the K Street corridor, with L Street and M Street as secondary preferences. The barriers to connectivity or bicycle safety most often cited included all intersections with New York Avenue and North Capitol Street, most crossings under the rail line, and most signalized intersections along K Street. The gap over I-395 along the L Street corridor was frequently cited as a concern.



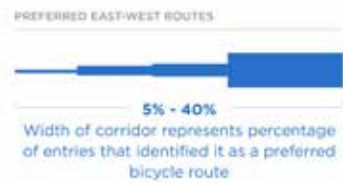
Network Alternatives
NoMa Study Area

Date Created: 12/22/2017





- 1 K St Underpass
- 2 M St and 1st St NE
- 3 New York Ave and North Capitol Blvd
- 4 New York Ave at New Jersey Ave and M St
- 5 K St Before 4th and 5th St NW



Preferred Network Alternatives and Barriers or Obstacles NoMa Study Area

Date Created: 12/22/2017

Corridor Feasibility Issues

DDOT further analyzed the potential impacts of making bicycle facility improvements along the primary corridor alternatives. The team used a planning-level analysis approach to describing traffic impacts expected by replacing an outside vehicle travel lane with a separated bicycle lane at signalized intersections. As described in the NCHRP Report 825: Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual, the team evaluated critical crossing and turning movements of vehicles, pedestrians and heavy truck traffic. This planning-level analysis reviewed intersection geometry and vehicle turn phases, but does not study signal timing in detail. This approach delivered a summary of relative impacts, not requiring extensive data collection.

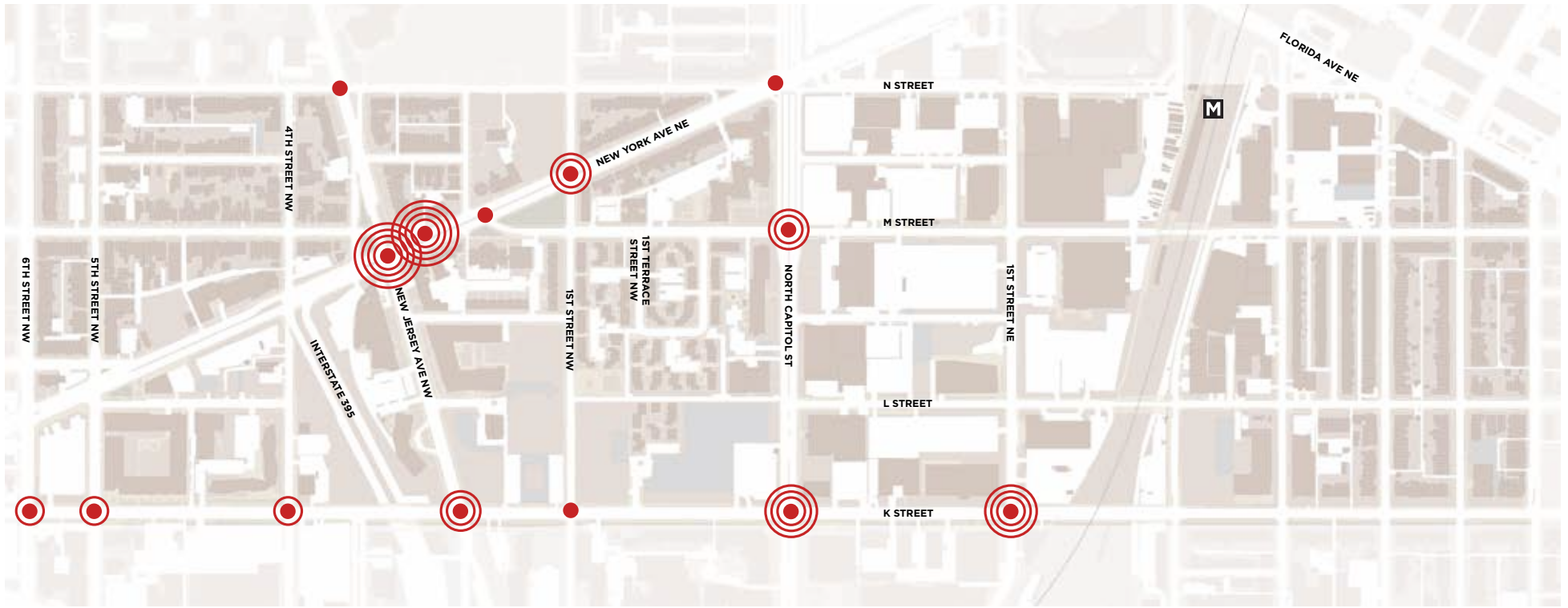
Signalized intersections along K Street and M Street (within the bounds of the study area) were evaluated. The analysis compared the traffic delays expected as a result of implementing bicycle facility improvements along these corridors, with special attention paid to the intersections with New Jersey Avenue, New York Avenue, and North Capitol Street.

The analysis describes more significant AM delay where K Street intersects with North Capitol Street and 1st Street NE, as a result of replacing outside thru lanes or turn lanes with separated bike lanes. The analysis also described more significant AM and PM delay at the intersection of New Jersey Avenue at M Street, if a dedicated bike crossing is constructed on M Street near the intersection with New York Avenue (as noted in the New Jersey Avenue traffic analysis table for Bike Treatment #2). This crossing would connect new bicycle facilities created by removing on-street parking along sections of M Street. The M Street intersections with New Jersey Avenue and New York Avenue are tightly spaced (roughly 200 feet apart), and a bike crossing near M Street and New York Avenue would impact vehicle queues spilling back

into the New Jersey Avenue intersection with M Street. These impacts are multiplied if outside through or turn lanes were removed along the length of New Jersey Avenue to accommodate new bike lanes (as noted in the New Jersey Avenue traffic analysis for Bike Treatment #1), as under current consideration by DDOT.

DDOT further considered the feasibility of removing on-street parking along the network options. This assessment assumed that residential permit parking, especially where residences do not have alternative alley access, would be left in their current condition. The assessment also assumed that on-street parking reserved for use during regular services by nearby places of worship would be maintained.

The team also determined that on-street parking needs along N Street NW near Dunbar High School should be further evaluated relative to school traffic. Multiple development projects along M Street between 1st Street NW and 1st Street NE may provide opportunity for changed traffic conditions. DDOT evaluated removing on-street parking on one side of these blocks on M Street. Reduced parking on one side of K Street NE (east of the rail line) was also considered. The most feasible changes to on-street parking were along K Street NE, with further study required to consider accommodations for bus stops and intersecting roads near the rail line.



The size of the symbol represents the relative traffic impact as a result of bicycle improvements. Larger symbols reflect longer delay at intersections.

Network Alternatives

NoMa Study Area



Date Created: 12/22/2017

Multimodal Level of Service Analysis

An improvement for one mode of travel may positively or negatively impact operations or access for other modes of travel. For example, removing a travel lane to include bicycle lanes can shorten the distance a pedestrian has to cross traffic. The team considered how proposed bicycle treatments along K Street and M Street would impact vehicle traffic, and pedestrian and bicycle mobility. Parking and transit impacts were considered in other elements of the planning process.

Traffic level of service (LOS) is described according to the average controlled delay (measured in seconds per vehicle). LOS is categorized by an A-F rating for motor vehicle congestion and mobility. LOS was applied to each intersection analyzed along sections of K Street or M Street proposed for change by the NoMa study area.

Bicycle level of service is describe according to the Level of Traffic Stress (LTS) system. The LTS system was used to evaluate each road segment in the study area (see page 26 for more information).

For the purposes of the NoMa study, pedestrian level of service is measured by crossing distance (in feet). A pedestrian crossing a longer distance is at more risk to crash with a motor vehicle. A longer crossing distance may also discourage pedestrians from using marked crosswalks at intersections.

The following “heat map” is a matrix comparing bicycle treatment options for the K Street and M Street corridors in the NoMa study area. A red cell is generally a poor LOS for the measured mode of travel; a green cell is a good LOS.

K Street Multimodal Level of Service

Facility Type	Right-of-Way	Corridor	Bicycle Impacts		Pedestrian Impacts		Traffic Impacts	
			Existing	Treatment	Existing	Treatment	Existing	Treatment
Separated Bike Lanes	K Street: Median No parking	6th St NW & K St NW	LTS 3	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	B	B
		5th St NW & K St NW	LTS 3	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	C	C
		4th St NW & K St NW	LTS 4	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	C	C
		First St NW & K St NW	LTS 4	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	B	C
		N. Capitol & K St	LTS 4	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	D	F
		First St NE & K St NE	LTS 4	LTS 1	Crossing: 50ft	Crossing: 22ft Pedestrian Refuge: 11ft	C	D
Separated Bike Lanes	K Street: No median Parking one side	6th St NW & K St NW	LTS 3	LTS 1	Crossing: 50ft	Crossing: 32ft	B	B
		5th St NW & K St NW	LTS 3	LTS 1	Crossing: 50ft	Crossing: 32ft	C	C
		4th St NW & K St NW	LTS 4	LTS 1	Crossing: 50ft	Crossing: 32ft	C	C
		First St NW & K St NW	LTS 4	LTS 1	Crossing: 50ft	Crossing: 32ft	B	C
		N. Capitol & K St	LTS 4	LTS 1	Crossing: 50ft	Crossing: 32ft	D	F
		First St NE & K St NE	LTS 4	LTS 1	Crossing: 50ft	Crossing: 32ft	C	D

M Street Multimodal Level of Service

Facility Type	Right-of-Way	Corridor	Bicycle Impacts		Pedestrian Impacts		Traffic Impacts	
			Existing	Treatment	Existing	Treatment	Existing	Treatment
Bike Lane	First St NW	First St NW & NY ST	LTS 2	LTS 2	Crossing: 30ft	Crossing: 22ft	C	C
Cycle track	M Street: No median Parking one side	N. Capitol & M St	LTS 3	LTS 1	Crossing: 30ft	Crossing: 22ft	C	C
		First St NE & M St NE	LTS 3	LTS 1	Crossing: 30ft	Crossing: 22ft	N/A	N/A

Recommendations

Priority Corridors

Per the analysis and public input, DDOT focused on two networks alternatives for developing conceptual bicycle improvement options. The top priority is K Street between 6th St NW and 1st Street NE, following the 1st Street NE cycletrack to L Street, and then taking the low-traffic and low speed option of L Street NE option eastward toward 6th Street NE. K Street east of 1st Street NE will be further studied in the future by DDOT.

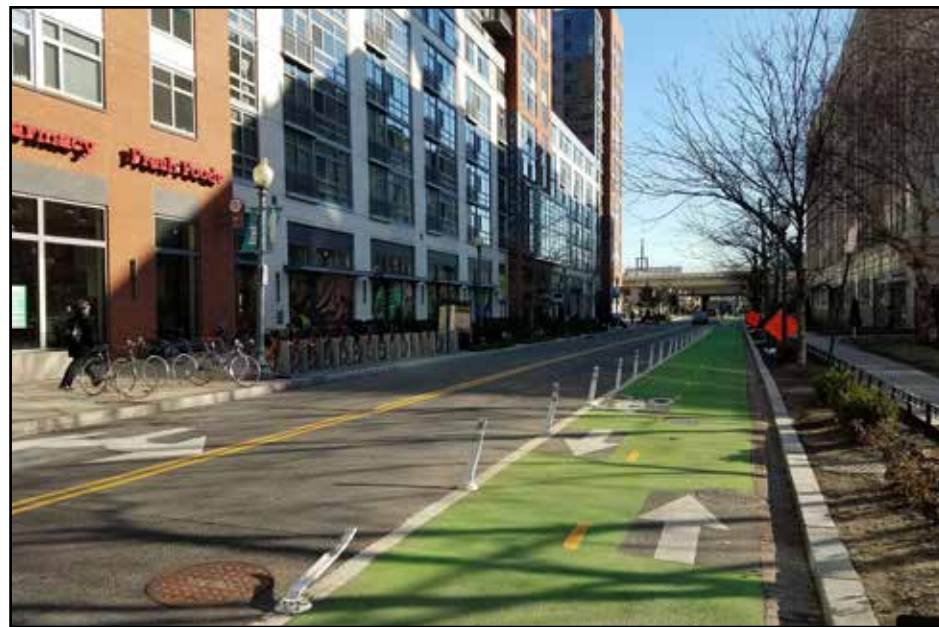
The secondary priority is the low-traffic and low-speed section of N Street NW between 6th Street NE and 1st Street NW, following 1st Street NW to M Street, and then following M Street to the eastern edge of the study area. Several improvements would be required along this network option, making it less viable for short-term implementation. School traffic impacts along N Street NW should be further evaluated

near Dunbar High School, roadway improvements will be required along 1st Street NW to include bike lanes and safer crossing at New York Avenue, and parking would be removed to accommodate an extension of a cycletrack along the south curb of M Street.

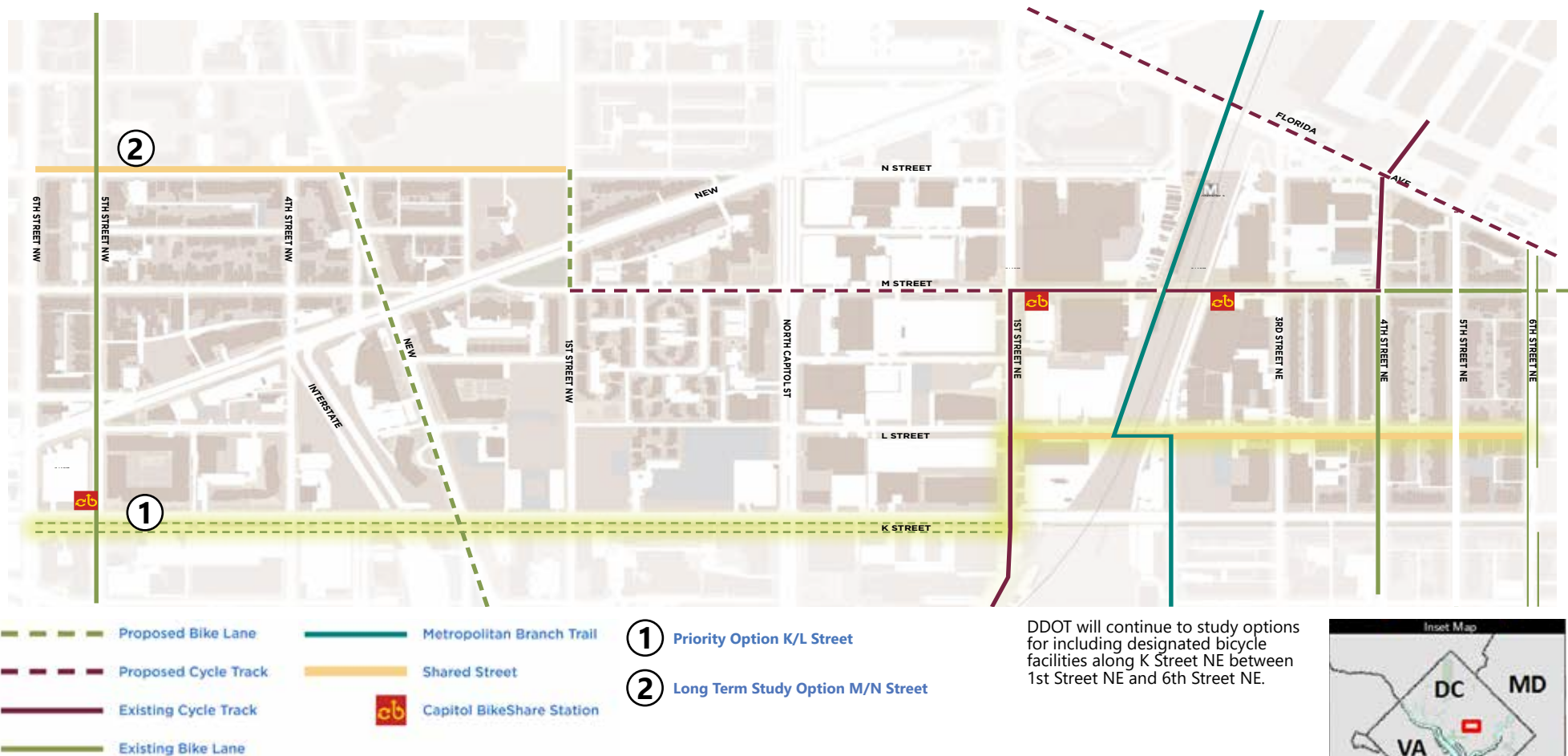
The top priority is K Street between 6th St NW and 1st Street NE, following the 1st Street NE cycletrack to L Street, and then taking the low-traffic and low speed option of L Street NE option eastward toward 6th Street NE.



K Street at 1st Street NE



M Street NE at 1st Street NE



Priority Corridors NoMa Study Area

Date Created: 04/27/2018

K Street, between 6th St NW and 1st St NE, is the top priority for DDOT to consider for bicycle improvements. The NoMa Bicycle Network Study recommends bike lanes on either side of the street separated by buffer markings and delineators. On-street parking on at least one side should be removed to provide space for this accommodation. Space permitting, the new roadway cross section may also allow for a raised median to enhance traffic safety along the corridor. This new bicycle network would connect to L Street via the exiting 1st Street NE cycletrack, and continue eastward from the study area along the low-traffic sections of L Street NE. L Street NE east of 1st Street NE should be enhanced with shared-lane markings and signage indicating bicycle travel. DDOT should continue to evaluate K Street NE as a longer-term route for bicycle improvements.

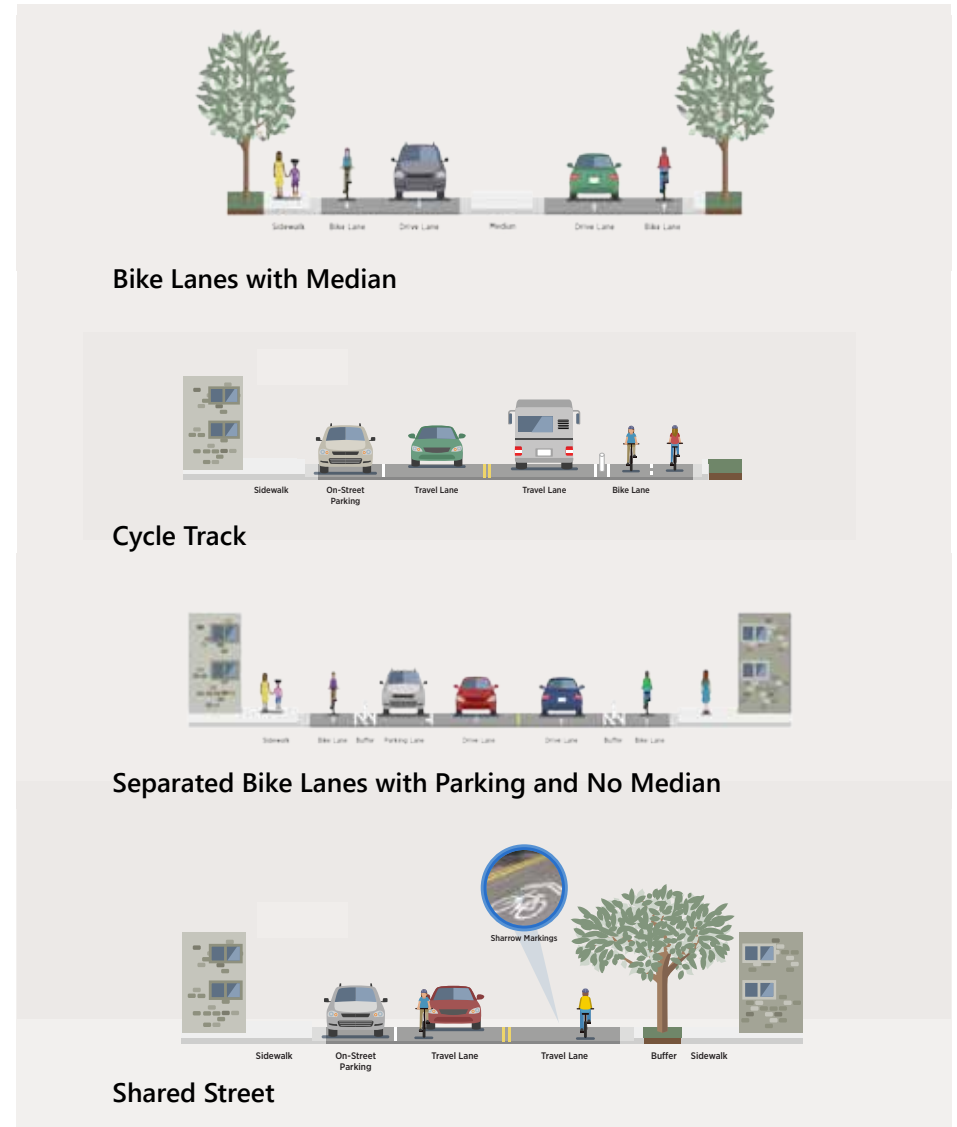
Facility Type Options

The goal of the NoMa/ Mount Vernon Triangle Bicycle Network Study is to identify opportunities for continuous and consistent bicycle accommodations through the study area, but the network will be built using several facility types. Bicycle facility types are selected according to the roadway conditions and parking impacts. For instance, the K Street and L Street network considered replacing outside travel and turn lanes along K Street NW with separated bike lanes (in the direction of traffic). This facility type is referred to as a Separated Bike Lane. The study considered two options: one version including a center median and no on-street parking, and the second version did not include a center median but kept on-street parking on one-side of K Street. Either option provides opportunity to implement separated bike lanes along K Street NW.

Special attention should be paid to intersections such as North Capitol St and at 1st St NE. The K St separated bike lanes would connect to the existing Cycletrack on 1st St NE. At that point, cyclists can either share the road with traffic along L St, or continue north to M St to use the existing separated bike lanes. Shared streets have low speeds and traffic volumes, so cyclists can comfortably travel in the lane with vehicles.

The N Street NW option also uses a shared street option to connect to the proposed bike lane improvements along 1st St NW. DDOT should pay careful attention to the intersection with New York Avenue. This network option would consider removing on-street parking along the south curb of M Street between 1st St NW and the existing cycletrack along M Street NE. The existing cycletrack and the recent extension will connect cyclists to the eastern edge of the study area at 6th St NE.

DDOT should further evaluate K St NE (east of 1st St NE) for implementing marked or separated bike lanes. Close attention should be paid to curbside use (parking, rideshare, delivery trucks, etc) and bus stop accommodations.



Cross Sections

Note: A narrowed median may provide space for buffer and posts between travel lanes and bike lanes to create Separated Bike Lanes with Median option.

Next Steps

DDOT will review these concept recommendations and develop preliminary designs for the priority corridors, in consultation with decision-makers, local leaders, and residents. The appendix for this report includes illustrations for how the segments of K Street west of 1st Street NE may appear, in plan view, if the bicycle improvements recommended were implemented. DDOT will continue to assess feasibility of converting on-street parking into bike lanes or cycletracks along K Street, east of the rail line, and M Street, between 1st Street NW and 1st Street NE.



Facility Type Illustration of K Street NW (500 Block NW)