9 Low Impact Development Framework

9 Low Impact Development Framework

EXISTING CONDITIONS: STORMWATER IN MID CITY EAST

A History of Flooding

The area defined by the Mid City East was once the location of the headwaters of Tiber (Goose) Creek, the District's largest stream. By the early 20th century, most of the neighborhoods developed and the stream was diverted into the Northeast Boundary Sewer. This sewer system was expanded and connected throughout the early 20th century. Today the Northeast Boundary Trunk Sewer (NEBT)--a combined sewer/stormwater system--is the major sewer serving the Mid City East area. Flooding occurred soon after the NEBT Sewer was constructed. More than half a dozen studies dating back to the 1950s document the issue of flooding. . The combination of population growth, the unique low-lying topography of the area, and an antiquated sewer system that is too small to accommodate the area today continues to cause problems in this area.

Today the neighborhoods that comprise the Mid City East area are dense urban settings with a high degree of impervious surfaces. Impervious areas include building rooftops, roads, sidewalks, alleys, and paved surfaces such as parking lots. The non-impervious areas within the Mid City East drainage area include open spaces such as lawns (i.e. front and backyards), grass areas, small parks, cemeteries, recreational and sport fields, and above ground rail road system. Each neighborhood has a different degree of impervious surfaces. LeDroit Park has one of the highest amounts of impervious surfaces, with over 69% of the total area being impervious. Bloomingdale's impervious surfaces account for 44% of the entire drainage area. While impervious surfaces have not increased substantially in the last ten years, the population has increased by over 10%, placing increased demand on the sewer system.

Figure 9-1 Drainage Areas, Mayor's Task Force Report

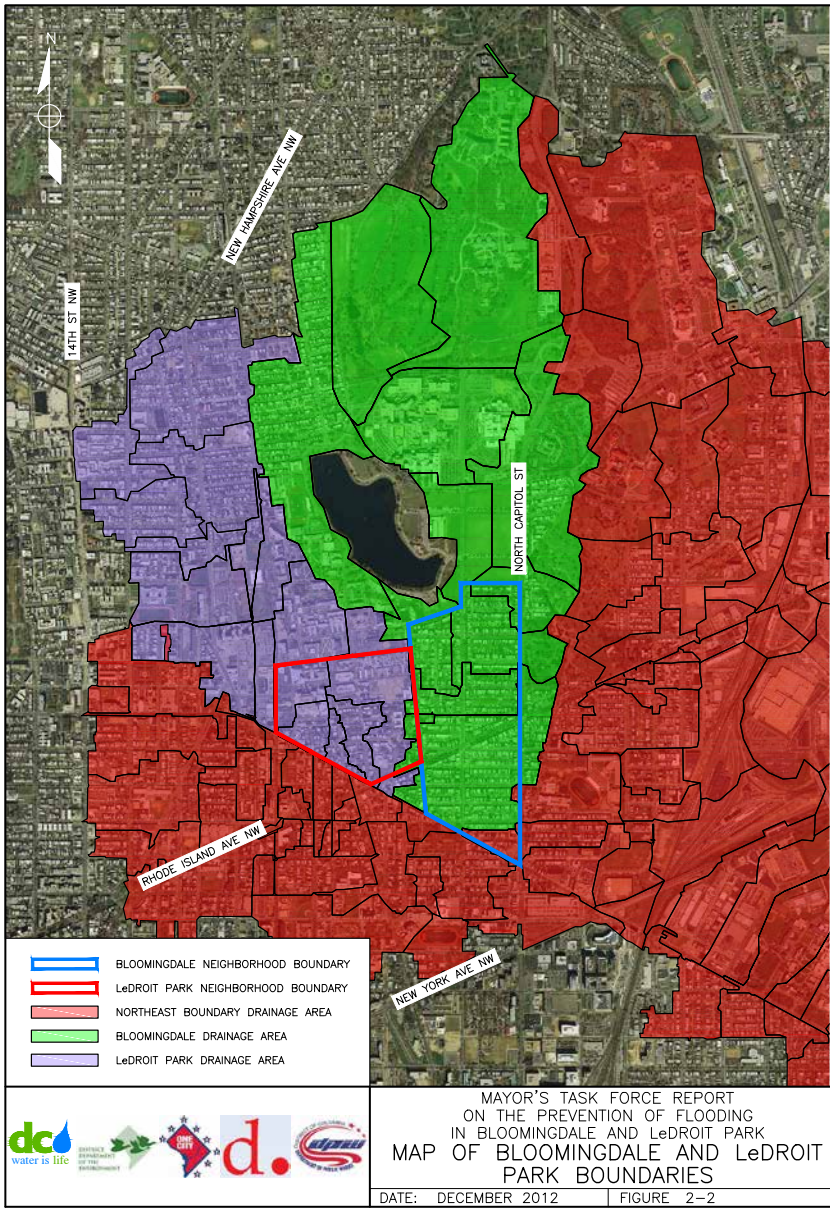


Figure 9-2 Existing Stormwater Conditions in Mid City East


Long runs of impervious surface end in gutters, Eckington

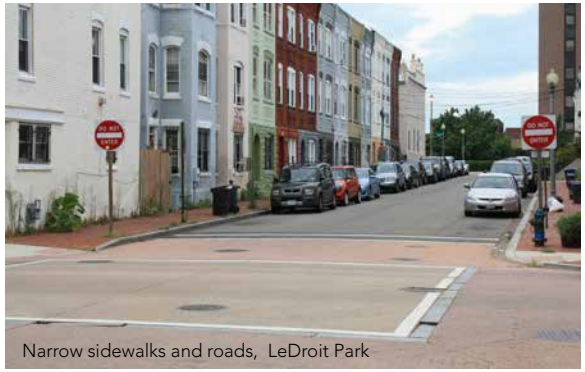

An ad-hoc drainage swale


Water collects at intersection of 5th St & Metro Branch Trail


Curbs prevent green spaces from receiving stormwater.


Clogged drain inlets


Gutters from houses often outflow into impervious alleys


Narrow sidewalks and roads, LeDroit Park

Wide arterial streets provide little space for LID alternatives


Under-utilized green spaces within the right of way

TOOLKIT OF LOW IMPACT DEVELOPMENT OPTIONS

Applying the DDOT Draft Standards In Mid City East

Low impact development (LID) is an approach to stormwater management that emphasizes the use of small scale, natural drainage features integrated throughout the city to slow, clean, infiltrate and capture urban runoff and precipitation, thus reducing water pollution, replenishing local aquifers and increasing water reuse.

The LID Action Plan was mandated by the D.C. City Council in 2008 and completed in 2010. DDOT's draft standards for Low Impact Development provide a clear set of options that can be used in the Mid City East area. The draft standards include a supplement to the Design and Engineering Manual, a set of construction details, and standard specifications. Each of these standards will need to be tailored to fit the requirements of each specific applications.

The neighborhoods that comprise Mid City East contain very limited right of way space that can be dedicated to open planting beds. As a result, strategies should focus on space-efficient LID options that do not impede the flow of pedestrians or vehicles through the right of way. LID practices that require large areas of open, green space such as vegetated swales, wetlands, or detention ponds were not considered. Instead, this study focused on two general types of LID practices: bioretention and permeable pavement. In addition, opportunities for impervious surface removal and tree infill were also considered.

For the Mid City East neighborhoods, three different bioretention strategies were explored, each based on their location within the right of way.

1. Curb Extension Bioretention Planters

   These bioretention planters take unneeded space within the vehicular zone of the right of way. They fit best along corners of the street or for areas where mid-block crossings are appropriate. In addition to their stormwater benefit, they also provide traffic calming and create safer crossing spaces for pedestrians, particularly elderly and children who have a hard time at wide intersections.

2. Tree Box Bioretention Planters

   This bioretention strategy focuses on areas within the pedestrian zone of the right of way. It creates a vegetated buffer between pedestrians and the road.

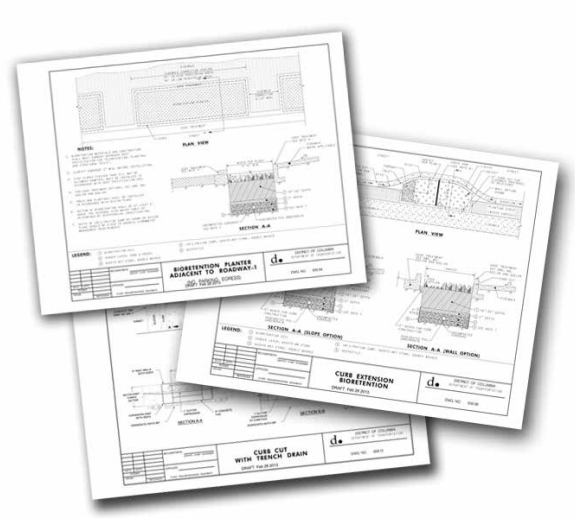
3. Rain Gardens

   This bioretention strategy focuses on "green" or unpaved areas within the right of way.

   In addition to bioretention, permeable paving is another viable LID technique. It is particularly appropriate in urban areas that have little right of way space to dedicate to planting. Permeable paving is best in low use vehicular areas such as alleys or along certain pedestrian sidewalks.

   Finally, while bioretention and permeable paving use subsurface soil or gravel layers to filter or store stormwater, other options exist that do not require heavy excavations. Impervious surface removal and tree infill are cost effective ways of managing stormwater in urban areas.

Potential locations for all of these strategies are identified on the maps in the following pages.



DDOT's Draft LID Standards includes detailed sections for urban appropriate LID techniques.

A check dam inside a tree box bioretention planter slows down the flow of water and encourages infiltration.

TOOLS	APPLICABILITY	CONCEPT IMAGE
1 CURB EXTENSION / BIORETENTION PLANTER	Curb extensions/biorenttion planters are good tools in areas where right of way space is limited. They fit well at four way intersections in neighborhood streets or for mid-block crossings They reduce the walking distance a pedestrian has to cross and they collect storm water off gutters.	 
2 TREE BOX BIORETENTION PLANTER	Tree box bioretention planters are another bioretention technique used to capture storm water off sidewalks and curbs. They fit well along sidewalks with enough width (best if planters are at least 5'w) and those that lack mature canopy trees. Planters can be long or short, depending upon available space and utilities.	 
3 PERMEABLE PAVING	Permeable paving is a highly adaptable technique that can be used almost anywhere hardscape is used. It is most appropriate for alleys and sidewalks when existing utilities are not a major conflict.	 
4 RAIN GARDEN	Rain gardens are planted depressions that allow rainwater to infiltrate into the soil. They fit well in any unpaved right of way spaces such as parks, reservations, and areas behind sidewalks.	 
5 TREE INFILL	Urban trees play a large role in intercepting and slowing down stormwater and cooling high temperatures. A fully leafed tree can intercept up to 60% of a .25" storm. Tree infill is appropriate along planting strips in sidewalks where trees are missing and utilities do not pose a conflict.	 
6 IMPERVIOUS SURFACE REMOVAL	One of the simplest techniques for increasing permeable surfaces is to remove impervious surfaces. This techique is appropriate in sidewalk zones along major arterial and at large intersections where more paving exists than is necessary for pedestrian movement.	

LID OPPORTUNITIES: LEDROIT PARK & BLOOMINGDALE

The tight urban conditions in LeDroit Park and Bloomingdale require LID retrofits to be carefully placed within the right of way.

Curb Extension/Bioretention Planters

One of the better opportunities for adding LID is through the use of curb extension planters located at intersections of neighborhood streets. Since parking is not allowed at intersection corners, curbs can be extended the full width of a parking bay. Many of the intersections on 2nd Street NW and 4th Street NW may be good places depending upon configuration existing First phase opportunies include:

- 6th St at intersections at U St NW, T St NW
- 5th St and T St NW
- 4th St at intersections at T St, U St Florida Avenue NW
- 2nd St at intersection at W, V, T, S and Randolph
- 1st St at intersection at Channing, W, V, U, Randolph, and R St NW
- North Capitol interesections at Channing, Bryant, W, Seaton, Randolph, and Quincy.

Deciding facter should include loading zones, hydrants, adjacent mature trees, and narrow streets.

Tree Box Bioretention Planters

Streets with wide enough sidewalks and that lack mature trees may be good candidates for tree box planters. U Street NW, Seaton Place NW, Randolph Place NW, and First Street NW may be appropriate places for planters.

Permeable Paving

Permeable paving is most appropriate in alleyways throughout this neighborhood. Alleys are most appropriate where existing alleys are in poor condition and utility lines are far enough down to accommodate a reservoir layer. Because many of LeDroit Park's alleys are brick alleys in relatively good condition, we have not recommended placing those. First phase opportunities include:

- Alleys defined by 1st, 2nd, Seaton, and S St NW
- Alleys defined by 1st, 2nd, Randolph, & R
- Alley defined by North Capitol, T, Rhode Island NW
- Alley defined by Flagler, V, 1st, U St.
- Sidewalks along Rhode Island from Florida to 3rd St.
- Sidewalk inside of park area R St from 1st to Florida.

Impervious Surface Removal

Several intersections along North Capitol Street as well as Florida Avenue NW offer places where removing concrete in front of private businesses or homes may be a good alternative. First phase opportunities include:

- 2nd & Florida, NW corner
- Randolph & N. Capitol, NW & SW corner
- 1st & Rhode Island, SW corner
- Bryant & N. Capitol, SW corner
- 1st and U St, SW corner

Rain Gardens

Very few opportunities for rain gardens exist. Crispus Attucks park may be one possible location. Another may be the Elm Street entrance of the Park at Ledroit. First phase opportunties include:

Northwest corner of 2nd St and W St NW.

Tree Infill

Any places identified as places for tree box planters may also qualify for conventional street tree plantings.

4th St NW at intersection of Elm St NW

1st St NW between Seaton Ct & Rhode Island Ave.

Road closure at New York Avenue & N St. NW

Figure 9-3 LID Opportunities in LeDroit Park and Bloomingdale Neighborhoods

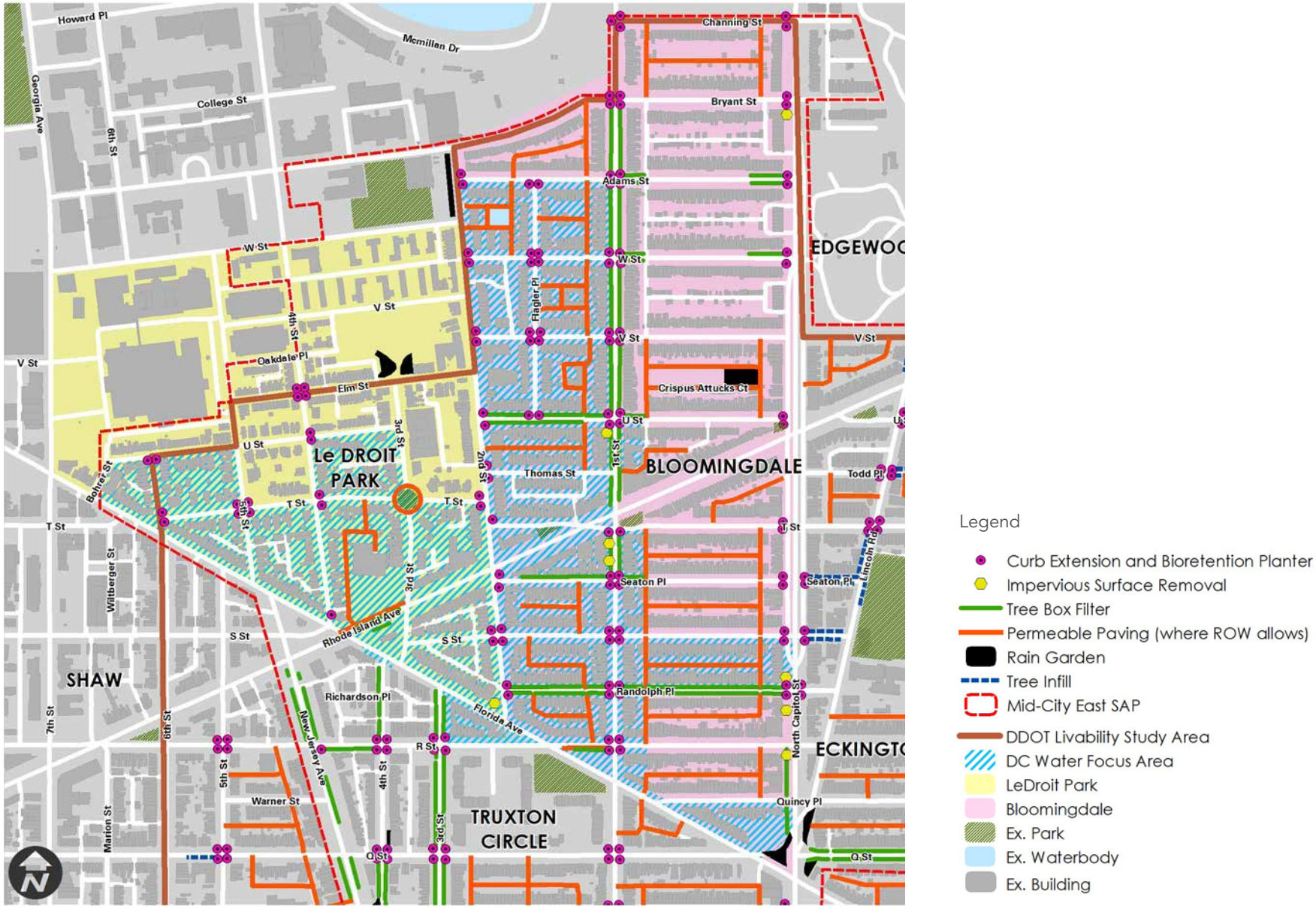


Figure 9-4 Rain Garden, Corner of 2nd St NW and W St NW

Figure 9-5 Bioretention Planter, Alley Entrance at Rhode Island Ave NW and 4th St NW

LID OPPORTUNITIES: ECKINGTON

Eckington's wider streets and industrial edge give it several opportunities for LID within the right of way. Eckington also possesses a large amount of topographic change, making LID options that slow down long gutter runs more valuable.

Curb Extension/Bioretention Planters

Curb extension planters would be well suited for intersections at the bottom of steep hills, capturing and slowing down fast-moving stormwater. First phase opportunies include:

- 4th St at intersections at V St, U St, & W NE
- 3rd St at intersections at T, Seaton Place, S, & Randolph
- 2nd St at intersections of T, Seaton Place, S, & Randolph

Deciding facter should include loading zones, hydrants, adjacent mature trees, and narrow streets.

Tree Box Bioretention Planters

Streets with wide enough sidewalks and that lack mature trees may be good candidates for tree box planters. Streets to focus on include:

- 3rd Street between U and R Street NW
- 1st Street between Q and R Street NW
- Eckington Place (as a part of a possible reconfiguration)

Permeable Paving

Permeable paving is most appropriate in alleyways throughout this neighborhood. Almost all of Eckington's alleys are paved with heavily patched asphalt. First phase alleys should be based on the condition of the alley, the presence of utility lines, and the total amount of stormwater than can be captured.

Impervious Surface Removal

Few places for impervious surface removal exist with the exception of the northeast corner of U St. and Summit Place offers a good place for removing concrete.

Rain Gardens

Opportunities include:

- South side of 5th Street NE between 4th St and the Metro Branch Trail.
- Grounds of Emery Elementary School and Langley High School along T Street.

Tree Infill

Any places identified as places for tree box planters may also qualify for conventional street tree plantings.

5th St NE between 4th St & the Metro Branch Trail

4th St NE at intersection of S St NE

T St NE at intersection of 4th St NE

Figure 9-6 LID Opportunities in Eckington Neighborhoods

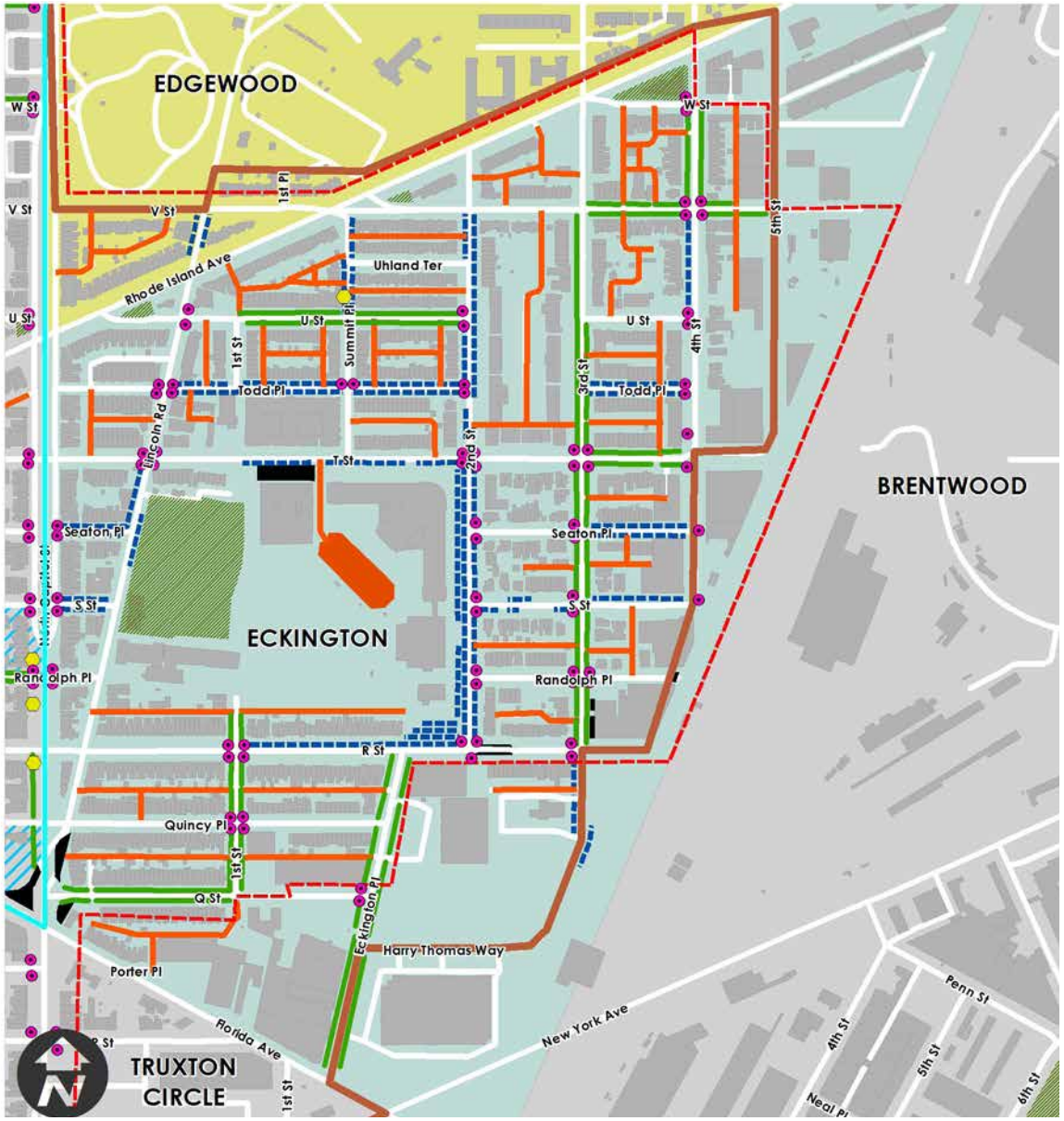


Figure 9-7 Bioretention Planters, Randolph Place NE at the Metro Branch Trail

Figure 9-8 Green Alley Using Permeable Pavers

LID OPPORTUNITIES: TRUXTON CIRCLE, BATES HANOVER, SURSUM CORDA

The southern portion of the Mid CIty East study area has several good opportunities for LID facilities.

CURB EXTENSION/BIORETENTION PLANTERS

Curb extension planters would be well suited for four way neighborhood intersections. First phase opportunies include:

- 5th St at intersections of R, Q, P, & O St NW
- 4th St at intersections at R & Q St NW
- 3rd St at intersections at R & Q St NW
- 1st St at intersections of Q, Bates, & N St NW
- North Capitol at P St NW

Deciding facter should include loading zones, hydrants, adjacent mature trees, and narrow streets.

TREE BOX BIORETENTION PLANTERS

Streets with wide enough sidewalks and that lack mature trees may be good candidates for tree box planters. Streets to focus on include:

- 3rd St between Florida Ave & New Jersey Ave
- 4th St between Richardson Place & R St
- 4th St between Q St & P St.
- New Jersey Ave in discreet locations between Florida Ave & P St
- O St between 4th & 5th Street
- O St between North Capitol & 1st St.
- N St between North Capitol & 1st St.

PERMEABLE PAVING

Permeable paving is most appropriate in alley-ways throughout this neighborhood. First phase alleys should be based on the condition of the alley, the presence of utility lines, and the total amount of stormwater than can be captured. First phase opportunities include:

- Alleys defined by 5th St, P St, New Jersey, & R St
- Alleys defined by 3rd St, North Capitol St, P, & Q St.
- Alleys defined by 1st St, North Capitol St, N St, & P St.

IMPERVIOUS SURFACE REMOVAL

Few places for impervious surface removal exist with the exception the paving in front of the former Slater and Langston Elementary School on P Street.

RAIN GARDENS

Opportunities include:

- Grounds of Kipp DC: Will Academy along P Street
- Green space on the southeast corner of New Jersey Ave and O St.
- Green spaces along parking lots of Dunbar along 1st St between P St and New York Ave.

TREE INFILL

Any places identified as places for tree box planters may also qualify for conventional street tree plantings.

4th St NW at intersection of Elm St NW

Alley between P & Q St NW

3rd St NW between R & Q St NW

Figure 9-9 LID Opportunities in Truxton Circle, Bates Hanover, Sursum Corda

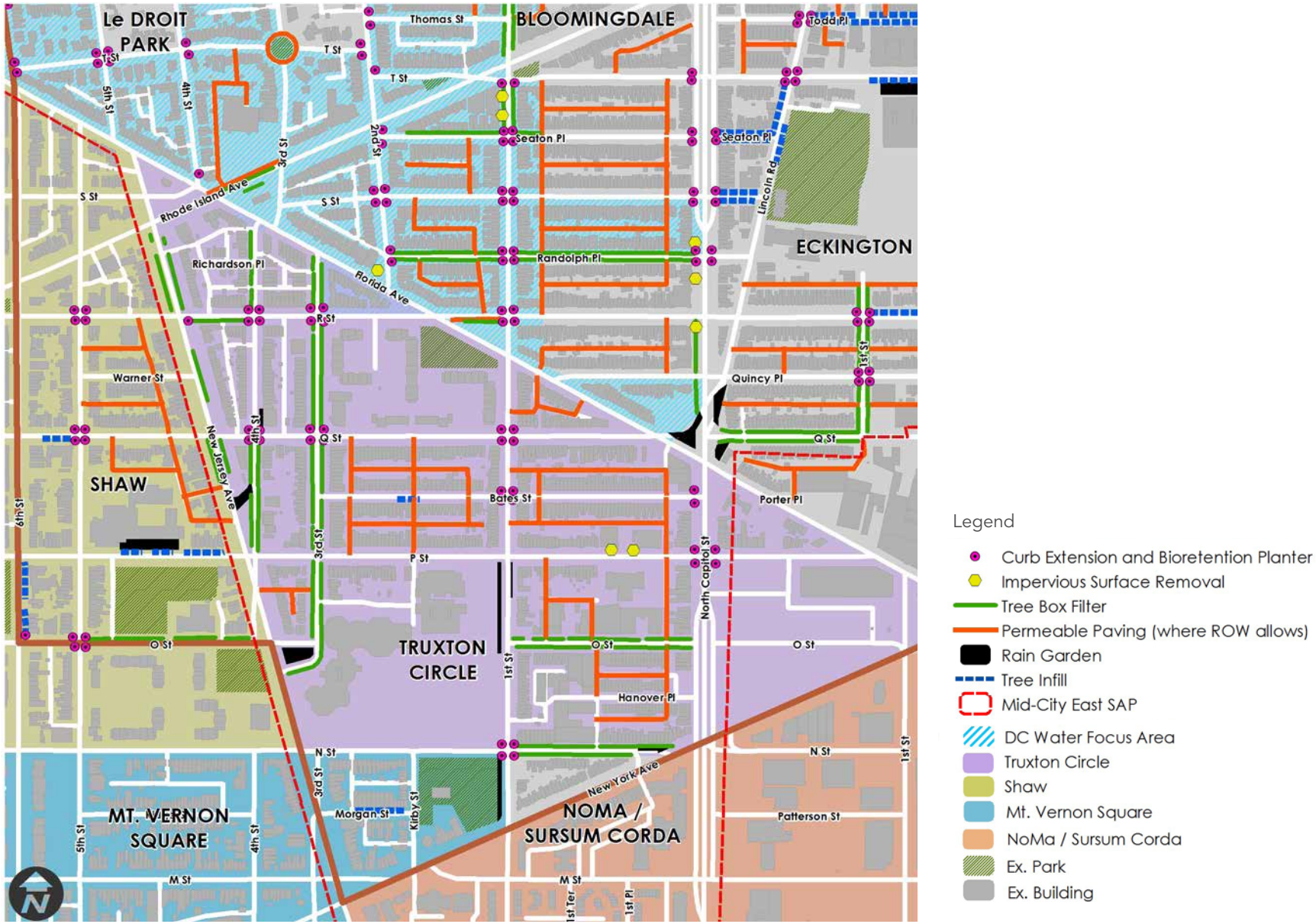


Figure 9-10 Bioretention Tree Planter, M St NW between NY Avenue and First St NW

Figure 9-11 Tree Box Planters and Impervious Surface Removal, North Capitol Street

Figure 9-12 Tree Box Filter, First Street NW between New York Ave and M St NW

SUPPORT STRATEGIES FOR MAINTAINING LID FACILITIES

Like many conventional stormwater systems, Low Impact Development facilities require regular maintenance and upkeep to ensure their long term performance. The following strategies will help DDOT maximize the longevity of LID facilities.

Maintenance Principles:

1. Assign Maintenance Roles & Responsibilities

   Before a project is approved, require maintenance plans and agreements that assign clear roles for maintaining LID facilities. Because LID facilities vary in size and complexity, entities responsible for maintenance should be appropriately matched to the tasks required. Developers or property owners may be responsible for maintaining vegetation, a private permeable driveway, or other small facility, while larger facilities should be maintained by private parties (landscape contractors) or by DDOT staff.

   If property owners are given maintenance responsibilities for small facilties, it is recommended that DDOT train owners in how the system works and what maintenance is required. Periodic inspections by a DDOT inspector are recommended. Maintenance requirements should be conveyed with deed. Failure to properly maintain facilities may result in a jurisdictional lien.

   A maintenance agreement should be prepared with all projects. Agreements should be based on the scale, function, complexity, and unique requirements of each site, as well as the level of expertise of the owner versus DDOT.

DDOT should be responsible for maintaining large facilities and public LID infrastructure such as overflows and drain pipes.

2. Establish Funding Source for Maintenance

   In an era of government budget cuts, establishing a regular source of funding for new public works projects and maintenance is critical. A range of options for funding exist such as fees and assessments on new development, an individualized parcel's drainage fee (Minneapolis charges fees to parcels based on impervious cover), applying for grants, working with public-private partnerships such as Business Improvement Districts, and getting corporate sponsorship for specific LID projects.

3. Provide Regular Inspections

   Regularly scheduled inspections are a critical part of the proper function of LID facilities. Inspectors should be trained in the design, function, and appearance of LID best practices. Inspections should be scheduled seasonally to detect any repairs or issues.

4. Conduct Pilot Projects to Determine Most Effective Maintenance

   Early built projects should be evaluated in order to determine the most effective maintenance practices. For example, the frequency and type of permeable paving cleaning may be based on testing infiltration over a period of a few years. Balancing system-wide maintenance requirements with practices tailored to each individual site will yield the best results.

5. Establish Goals for Vegetation

   Set standards for the way vegetation should look in bioretention plantings. Collect images of properly functioning, aesthetically-pleasing bioretention facilities and use them as models for what facilities should look like. Images can help to establish expectations about what bioretention facilities can look like and should help maintenance staff understand how the plantings work both aesthetically and functionally.

6. Educate the Public About the Function, Benefits, & Responsibilities of Lid Facilities

   Simple, concise messages delivered through the life of a project can educate the public and increase support for projects. Public meetings and charrettes can engage the public during the design process, while interpretive signage can explain the benefits of installed projects. More importantly, recruiting members of the public to volunteer to water, weed, and maintain plantings can create buy-in from the public for specific projects. Incentives can be given for public adoption of LID facilities such as award and recognitions to innovative developers or community groups; technical advice and materials for the proper maintenance of the facilities; reduced stormwater fees for individual homeowners or commercial properties.

LID MAINTENANCE PRINCIPLES & SCHEDULE

Maintenance of LID facilities is necessary for their efficient function and performance. Much of the maintenance required for LID facilities is similar to those performed for conventional stormwater facilities. However, some new approaches and techniques will be necessary for their optimum performance.

The following tables describe a list of both routine and non-routine maintenance activities for LID facilities. Facilities are grouped in two categories: bioretention and permeable pavers.

1. Bioretention Maintenance Schedule

ROUTINE ACTIVITIES:

1. WATERING:

Goal: Establish vegetation with a minimum 80% survival rate.

Action: Water plants in bioretention facilities to promote rooting and first year survival.

Schedule: Once a month during first year from April to November.

2. CLEAN INLETS & CURB CUTS:

Goal: Maintain proper flow of stormwater into bioretention facilities

Action: Remove any accumulation of debris from gutter and inlets.

Schedule: Twice annually, November and May

3. REPLACE VEGETATION:

Goal: Maintain full plant coverage in bioretention facilities

Action: Replant bioretention facilities where vegetation has died. Plant small sizes densely.

Schedule: Once a year during first three years after installation in May.

4. WEEDING:

Goal: Reduce competition for desired vegetation. Improve aesthetic appearance of biorention facilities.

Action: Remove undesired vegetation by hand. Peridoic weeding is necessary until plants are established. Weeding should become less frequent as plants get established. Replanting should

Schedule: Twice annually (May and August).

5. MULCHING:

Goal: Replenish organic matter in soil, reduce erosion, prolong soil moisture, and filter pollutants

Action: Maintain at least one inch of mulch in all facilities. Consider replacing mulch annually in bioretention facilities where high pollutant loading is likely.

Schedule: One annually.

6. PRUNE OVERGROWN VEGEGATION:

Goal: Prevent accumulation of vegetation along gutters and maintain proper flow of water into bioretention facilities.

Action: Remove excess vegetation with a line trimmer, vacuum sweeper, rake or shovel.

NON-ROUTINE ACTIVITES

7. Erosion Control

Goal: Reduce sediment and clogging of facilities. Maintain plants and appearance of facilities. Maintain proper elevations and ponding depths.

Action: Replace soil, plant material, rip rap, or mulch if erosion has occurred. Adjust weirs if possible. In areas where chronic erosion occurs, considering replacing vegetation with rip rap. Re-grade or re-contour slopes where necessary with hand tools; replant exposed areas. If erosion problems persist, assess volume and velocity of water from contributing area.

Schedule: Determined by inspection.

8. Clean Under-Drains

Goal: Maintain the proper subsurface drainage, ponding depths, and de-watering rates.

Action: Jet clean or rotary cut debris/roots from under-drains.

Schedule: Determined by inspection of clean-outs.

9. Replace Soil

Goal: Maintain infiltration, soil fertility, and pollutant removal capability.

Action: Remove vegetation (transplant and re-use if possible) and excavated soil. Replace with new soil. Soil mixes should maintain long term fertility and pollutant processing capability.

Schedule: Determined by inspection (visual, infiltration, pollutant and soil fertility tests).

2. Permeable Paver Maintenance

ROUTINE ACTIVITIES

1. CLEAN PERMEABLE PAVERS:

Goal: Maintain infiltration capacity

Action: Use street cleaning equipment with suction, sweeping or high pressure washing and suction. Adjust vacuum settings to prevent excess uptake of stone from paver joints.

Schedule: Once or twice a year.

2. REMOVE EXCESS SNOW:

Goal: Maintain access.

Action: Use snow plow with skids or rollers to slightly raise blade above pavers.

Schedule: As necessary.

3. PREVENT SEDIMENT ACCUMULATION ON PAVERS

Goal: Minimize sediment inputs to pavement, reduce clogging and maintain infiltration.

Action: Mulch or plant all exposed soils that may erode to paving.

Schedule: Once annually.

NON-ROUTINE ACTIVITIES

4. REPLACE AGGREGATE JOINTS

Goal: Maintain infiltration capacity.

Action: Remove aggregate with suction equipment only to depth of clogging. Replace aggregate between pavers.

Schedule: Determined by inspection

5. MAINTAIN UTILITIES

Goal: Repair utilities; maintain structural integricy of pavement.

Action: Remove pavers individually by hand. Prevent migration of different graded aggregates into different layers.

Schedule: When maintaining utilities.

6. REPLACE BROKEN PAVERS

Goal: Maintain the structural integrity of the pavers

Action: Remove broken pavers by hand. Replace with in-kind pavers.

Schedule: Determined by inspection.

10 Focus Area Recommendations


AMERICAN SIGNATURE
FURNITURE

10 Focus Area Recommendations

Specific areas of concern identified by community members were assessed for alternative solutions to address these concerns, as outlined in the earlier chapter. Recommended alternatives for the focus areas were advanced for implementation or further study.

INTERSECTIONS

New York/North Capitol Street/N St.

The project recommends several changes to this intersection to improve pedestrian conditions and safety. This intersection is highlighted in both the New York Avenue Corridor Study and the New York Avenue – Florida Avenue – Gallaudet University Station Access Improvement Study as needing significant attention to address pedestrian deficiencies. The project team documented insufficient crossing times, small queuing spaces, uncontrolled crosswalks, and unprotected median refuge space as needing attention. Comments from residents also identified this area as having too little green space.

Recommended improvements are to:

- Realign N Street NE from separated access points for ingress off of North Capitol Street/New York Avenue and egress off of New York Avenue to a consolidated point of entry and egress on and off of New York Avenue. Move ingress/egress point further east to provide further relief to the major intersection. Consider permitting left turns from N Street onto New York Avenue in non-peak hours only (this should be further studied and assessed by the proposed development project at New York and N Street NE).
- Landscape the reservation and closed portion of N Street NE at North Capitol Street to create an attractive gateway amenity.
- Extend the sidewalk above lower North Capitol Street to align with New York Avenue.
- Install a sidewalk on the north side of N Street NE concurrent with parcel redevelopment.
- Close slip lane from eastbound New York Avenue to southbound North Capitol Street and adjust curb radii at corner to accommodate an SU 30 design vehicle (30' single unit truck). Install signage directing larger trucks to utilize M Street NW.
- Slightly realign western crosswalk across New York Avenue to reduce crossing distance.
- Install raised median along New York Avenue west of North Capitol Street. Extend beyond crosswalk(s).
- Install a permanent curb and pilot or permanent LID treatment at the location of the currently closed eastbound N Street NW.
- Close unused driveway along north side of New York Avenue NE.
- Coordinate with WMATA to relocate bus stops to the far side of North Capitol Street and New York Avenue intersection.

Items for further study:

- Further assess installation of a new traffic signal at N Street NW and New York Avenue NW tied to the existing North Capitol signal. The spacing between intersections is 374 ft, an adequate signal spacing distance by MUTCD and NACTO guidelines. The purpose of the signal is to protect the relatively high number of pedestrians currently crossing at uncontrolled locations in this vicinity (49 in the PM peak hour).


New York at North Cap SE existing


New York at North Cap SE proposed

Figure 10-1 New York/North Capitol/N St. Existing Conditions

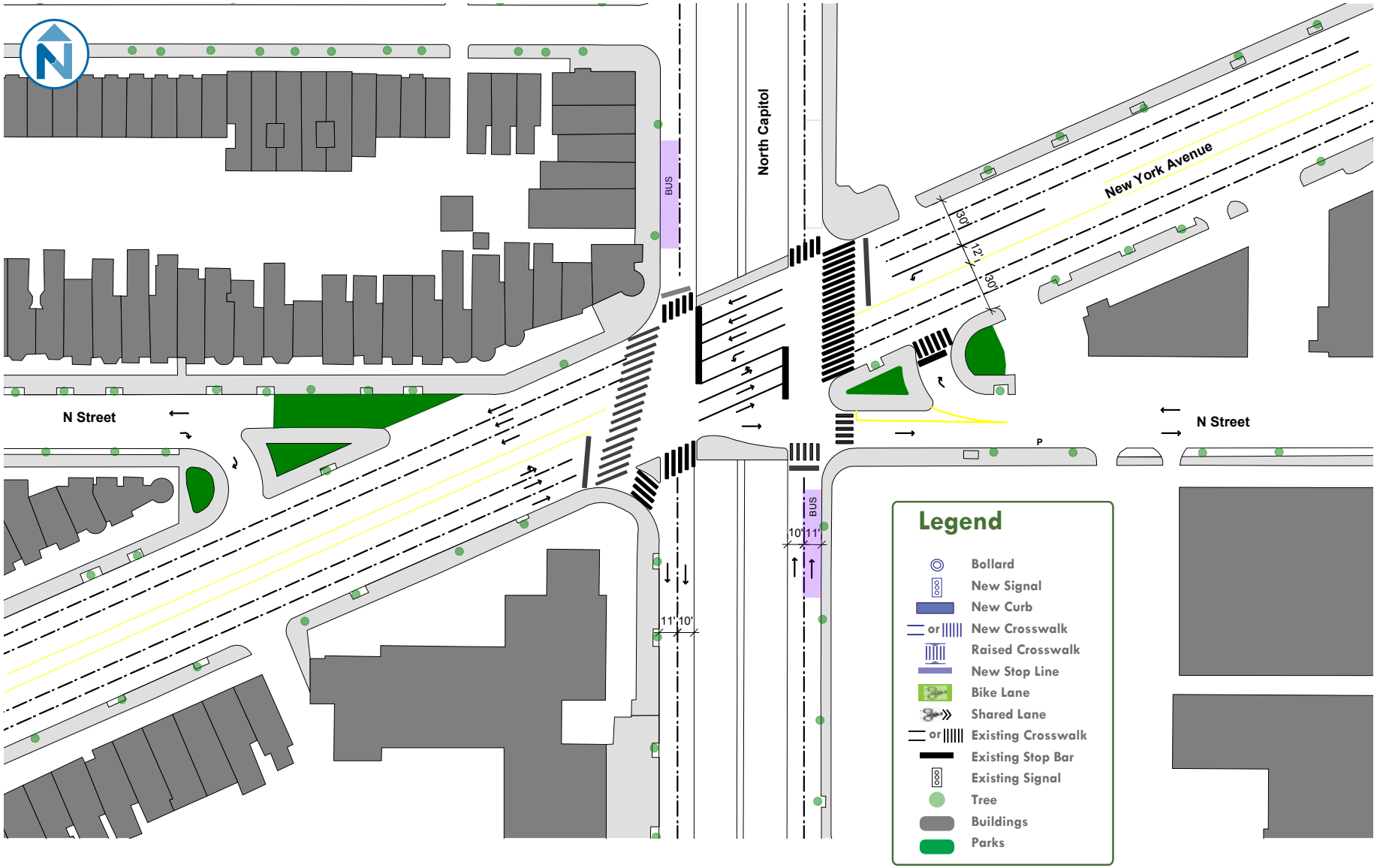
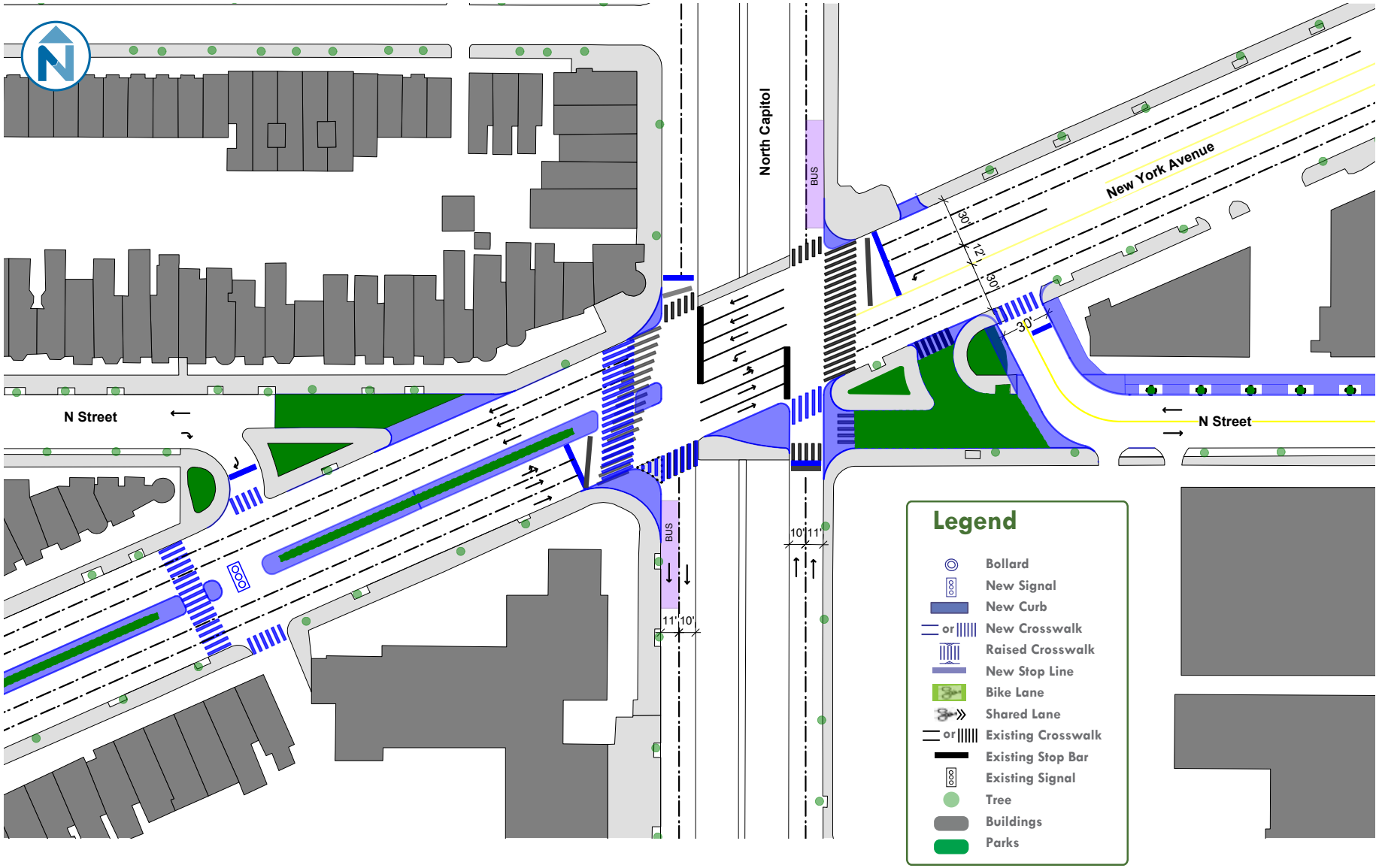


Figure 10-2 New York/North Capitol/N St. Proposed



Florida/North Capitol Street/Q St./ Lincoln Rd.

The study recommends a reconfiguration of this intersection to improve conditions and access for pedestrians and cyclists. The extension of the Q Street NW bicycle lanes to reach Q Street NE was recommended in the 2005 bicycle master plan. This connection has increased in importance to cyclists in the District with the opening of the Metropolitan Branch Trail in 2009. Resident concerns included a strong desire to restore an identifiable place reminiscent of the historic Truxton Circle and fountain which once occupied this location, address pedestrian and public safety concerns, and rationalize the many movements occurring at this location.

Recommended improvements are to:

- Install a new signal at Q Street NW and Florida Avenue NW to permit protected pedestrian and bicycle crossing across Florida Avenue at this location. Tie signal to North Capitol signal to allow for consistent progression along the corridor. Signal spacing is 330 feet, measured centerline to centerline to North Capitol Street and compliant with MUTCD and NACTO guidelines.
- Slightly realign Q Street NW to a closer to 90 degree intersection with Florida Avenue to improve sight lines and safety.
- Install curb extensions on Q Street NW.
- Install high visibility crosswalk and bike box across Q Street NW.
- Install painted bicycle crossing adjacent to Florida Avenue crosswalk.
- Install protected contra flow bike connector from Q Street crossing to North Capitol Street along Florida Avenue and through Truxton Circle Park and behind bus stop.
- Close the slip lane from southbound North Capitol Street to westbound Florida Avenue and relink Truxton Circle Park to the square.
- Widen curb radii at the northwest corner of North Capitol Street and Florida Avenue sufficient to accommodate right turn movements of SU 30 and WB 50 design vehicles (large trucks, tractor trailers, and buses). WB 50 vehicles must turn from the second lane of North Capitol Street onto Florida Avenue in order to navigate the acute angle. Smaller delivery trucks can turn directly from the curb lane of North Capitol Street into the curb lane of Florida Avenue.
- To permit the safe turning movement, right turns should be restricted to "Right On Red Only" during peak hours.
- Slightly shift northern North Capitol Street crosswalk to shorten slightly and accommodate the new curb radii. Install painted bicycle crossing adjacent to crosswalk and move stop bar north to retain setback from the crosswalk.
- Close the short segment of Lincoln Road from Q Street to Quincy Place and expand the green space at the gateway. Maintain alley access for alley between Q Street and Quincy place via connection to Quincy Place.
- Extend North Capitol Street curb between Florida and Q Street NE and tighten Q Street NE curb radii.
- Install protected cycle track from North Capitol Street crossing to and onto new Q Street bike lane.
- Synchronize signals at North Capitol and Quincy Street and Quincy Street and Lincoln Road to permit seamless progression between North Capitol and Lincoln Road NE.

Figure 10-3 Florida/North Capitol Street/Q St./Lincoln Rd. Existing Conditions

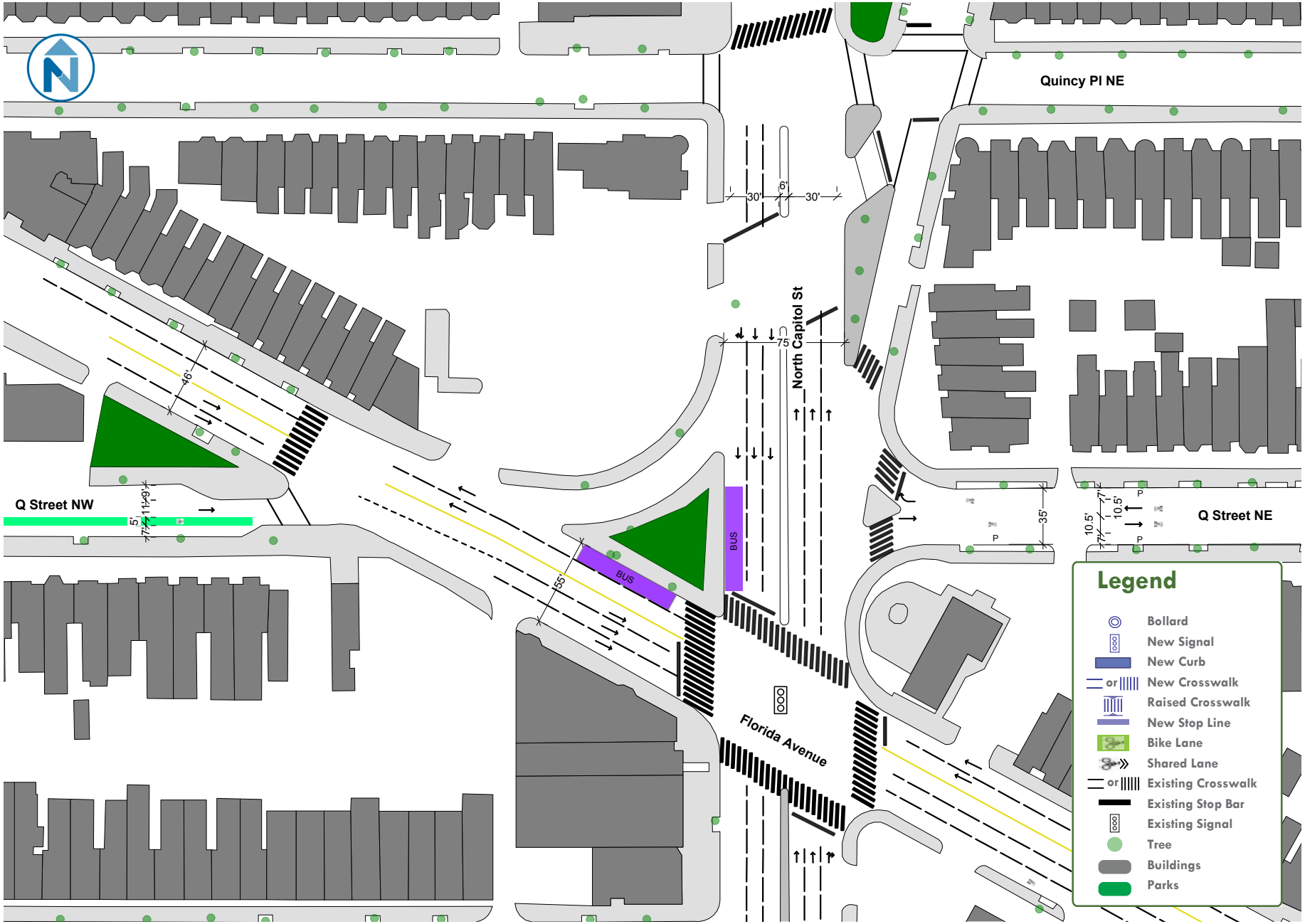
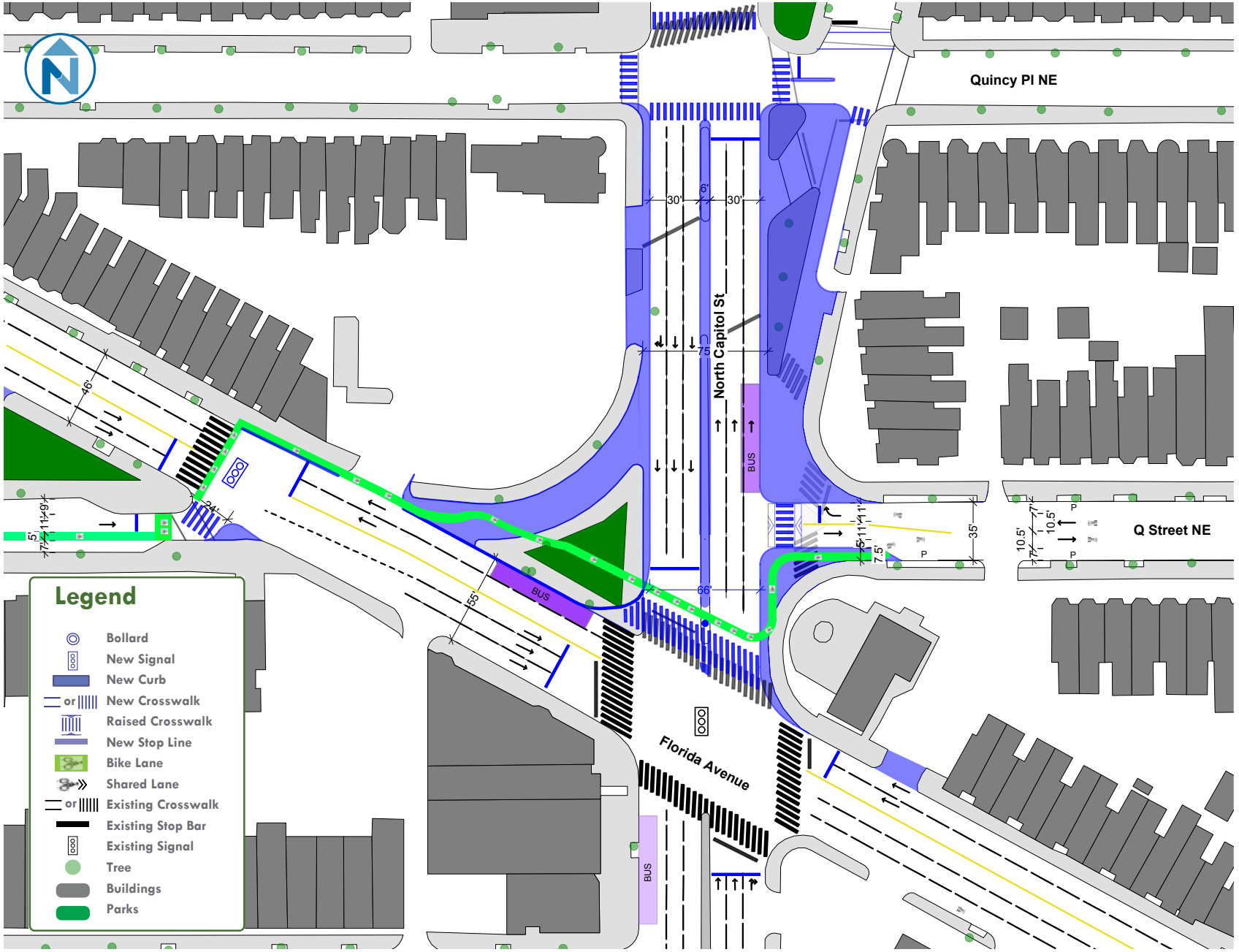


Figure 10-4 Florida/North Capitol Street/Q St./Lincoln Rd. Proposed



Florida/New Jersey/Rhode Island/S Street/4th Street

The project team was instructed to consider a significant redesign of the multi-corridor, multi-intersection area at the convergence of Florida Avenue, Rhode Island Avenue and New Jersey Avenue. Community concerns are that this intersection lies squarely in the middle of many very walkable neighborhoods, but presents many barriers to walking and cycling. Traffic movements are confusing and not intuitive to many users. Transit users are stranded on a literal island. Several intersections lack crosswalks on all approaches.

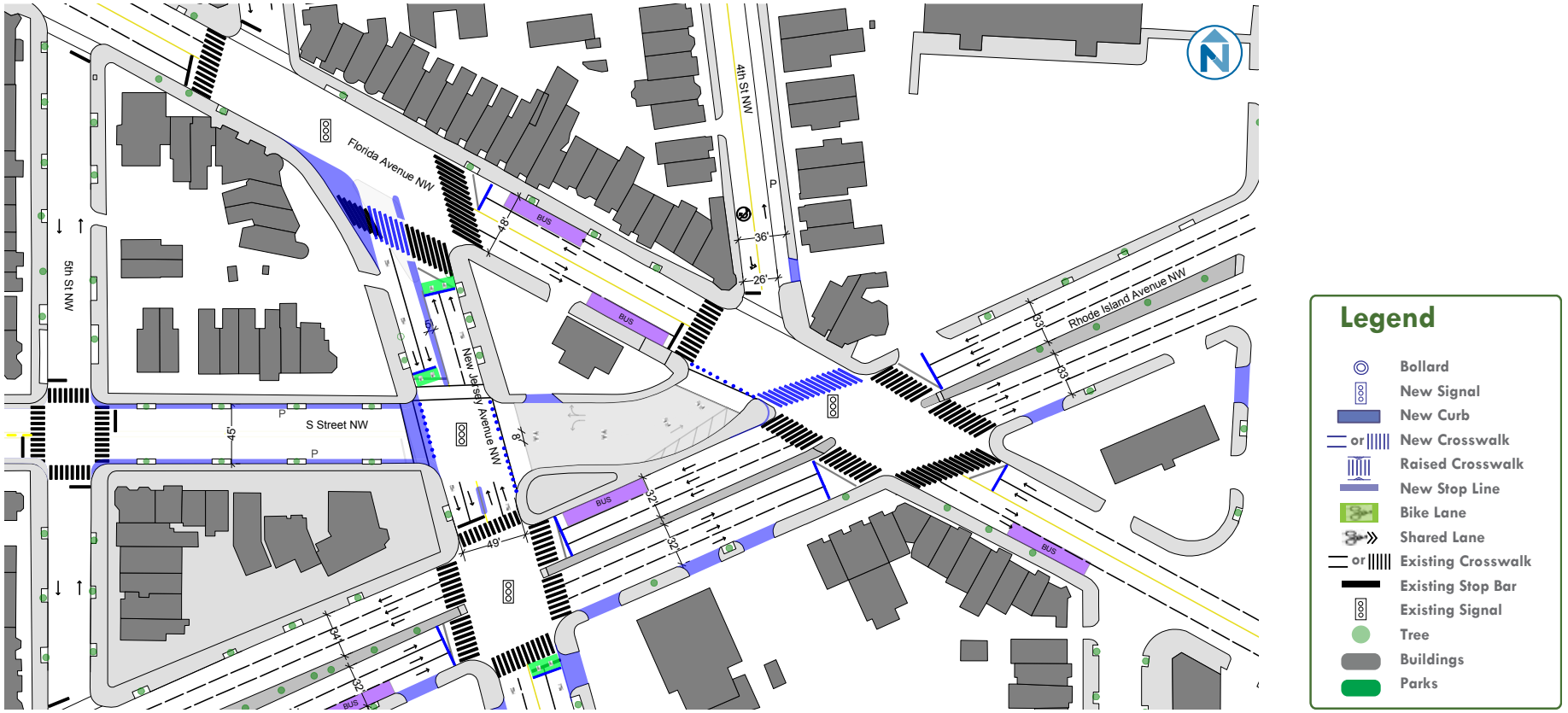
Alternative recommended for further study:

- Close S Street NW between New Jersey Avenue and Florida Avenue for vehicular traffic.
- Permit left turns from southbound 4th Street onto eastbound Florida, facilitated through signalization.
- Permit right turns from southbound 4th Street to southwest-bound Rhode Island Avenue through the use of signalization and directional pavement marking.
- Close S Street at New Jersey Avenue to create a cul de sac.
- Extend curbs 4-feet into S Street to allow tree planting space, except in the new cul de sac to permit vehicles to navigate a 3-point turn.

Figure 10-5 Florida/New Jersey/Rhode Island/S Street/4th Street Existing Conditions

- Tighten radii at southwest corner of Florida Avenue and New Jersey Avenue.
- Narrow the existing New Jersey Avenue median refuge to four feet to make it consistent for the full block between Florida and New Jersey Avenues
- Close curbcuts located near the intersection. Consider acquiring or swopping property of existing curbcut from 4th Street to north-south alley behind in order to close alley access directly onto Rhode Island Avenue.

Figure 10-6 Florida/New Jersey/Rhode Island/S Street/4th Street Proposed



New Jersey Avenue Corridor

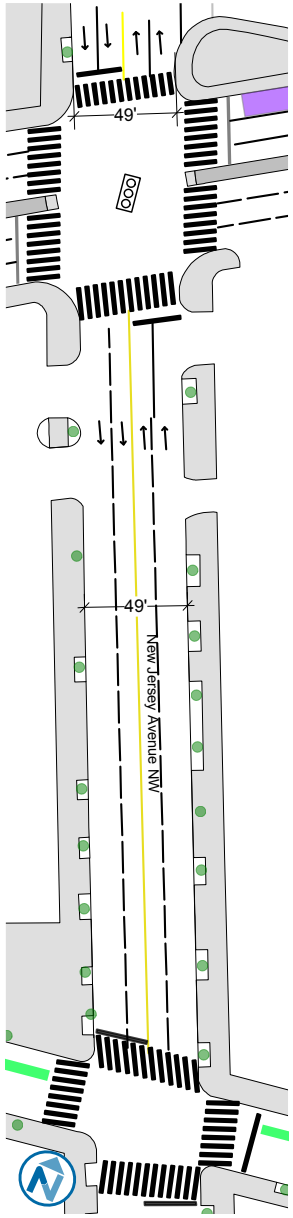
The study recommends that New Jersey Avenue be retrofit with new lane widths between N Street NW and Florida Avenue NW that better accommodate cycling on this corridor, and connect to planned bike lanes on New Jersey Avenue between H Street NW and N Street NW.

The existing lane designations and temporal conditions are to remain unchanged, thus keeping two peak period travel lanes in the primary direction of travel, while the opposite side of the avenue would retain a single travel lane and parking. During off-peak periods, both directions will have a single travel lane and parking.

Recommended improvements include:

- Change lane widths to provide 13.5 feet of width for the right-hand lane, enough space to function as a shared travel lane for automobiles and bicycles.
- Install shared lane "sharrow" pavement markings to widened lane. Under most conditions, parked vehicles would occupy only 8 feet of width, leaving 5.5 feet of width to serve as a de-facto shared bicycle space.
- Close unused or redundant curbcuts along the New Jersey Avenue corridor.
- Refresh high visibility crosswalk markings.

Figure 10-7 New Jersey Avenue Corridor Existing Conditions



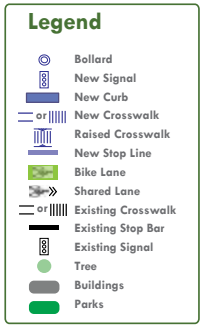
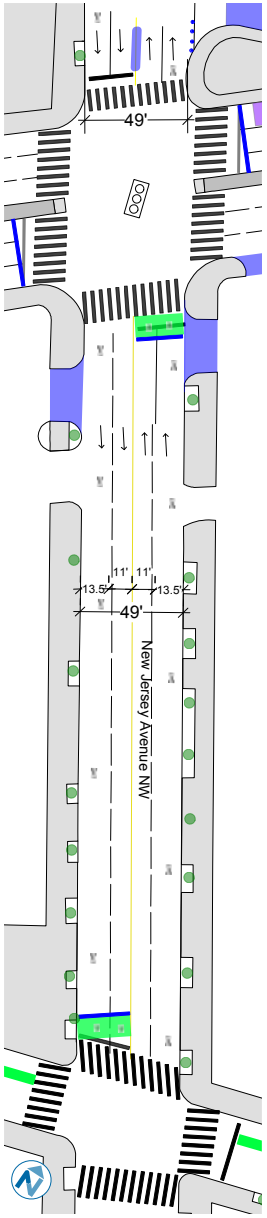


Figure 10-8 New Jersey Avenue Corridor Proposed



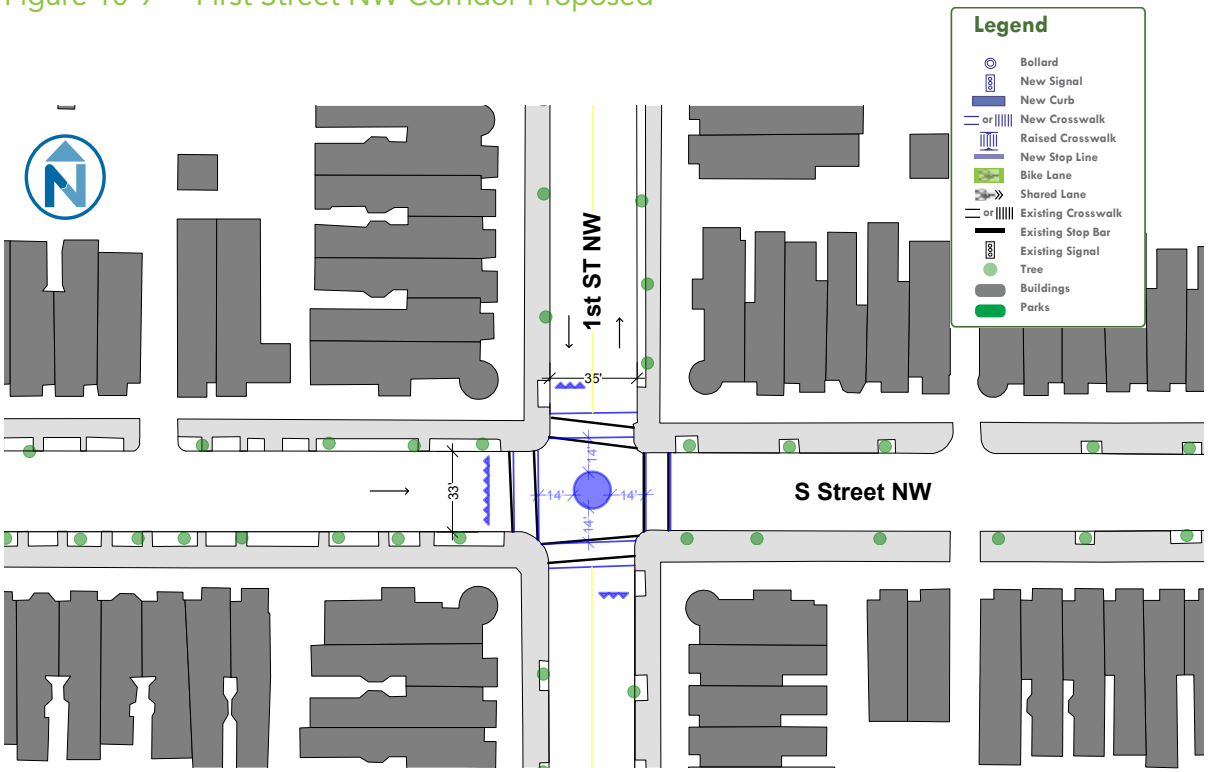
First Street NW Corridor

First Street NW is an important multimodal north-south corridor in the study area. Although a collector, the street has a preponderance of longer distance vehicle trips more appropriately accommodated on parallel arterials, low compliance at existing stop-controlled intersections, and speeds inhospitable to community bicycling.

Recommended improvements are to:

- Replace all existing stop controlled intersections with landscaped mini roundabouts. Mini roundabouts should have trees or other vertical elements in them to interrupt sightlines to distant horizons. The de sign speed of the mini-circles is 20 MPH. Mini-circles are designed with a 15 foot diameter which accommodates an SU-30 truck design vehicle.
- Remove existing stop signs and replace with yield and directional arrows.
- Crosswalks should be clearly marked across all legs leading to mini roundabouts.
- Signalized intersections remain unchanged.

Figure 10-9 First Street NW Corridor Proposed



Eckington Place NE Corridor

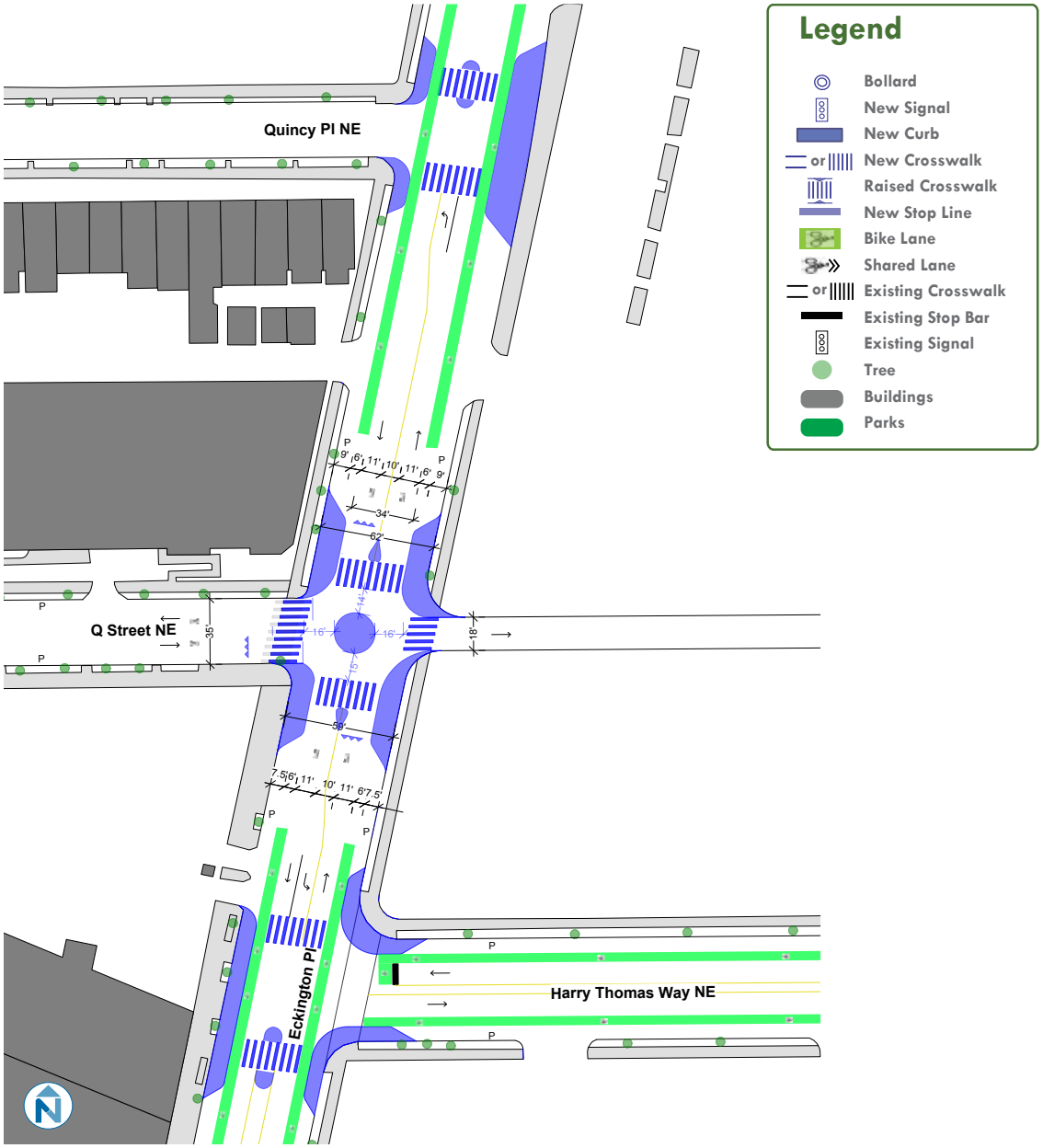
The primary purpose of improvements to Eckington Place NE are to slow speeds and remove excess impervious surface, improve safety for pedestrians, and expand green space and tree cover for the neighborhood.

Recommended improvements are to:

- Eliminate center turn lane from Harry Thomas Way NE to R Street NE and realign existing two travel lanes at center of the street.
- Extend curb lines 6' toward the center of the street to expand green space planting zone between street and sidewalk.
- Plant additional trees and potentially install significant low impact design feature for stormwater retention and infiltration along the corridor.
- Replace existing four-way stop at Q Street NE and Eckington with signature roundabout. Roundabout is designed with 22-foot diameter. Accompanying curb extensions and channelizing medians utilize a DL-23 design vehicle (23 foot long, 8.5 feet wide delivery truck).[1]
- Install median refuges at the two "T" intersections where there is some surplus median space to improve pedestrian crossings.

1 As recommended by both CDOT and NACTO guides.

Figure 10-10 Eckington Place NE Corridor Proposed



SPOT LOCATIONS

There are several spot locations throughout the Mid City East area which have existing deficiencies that need to be addressed to improve livability, connectivity and access for the community.

5th Street and Rhode Island Avenue NW

- Install crosswalks and curb ramps across Rhode Island Avenue and median along the 5th Street NW alignment.
- Extend the existing 5th Street bike lanes from Rhode Island Avenue to Florida Avenue. These lanes would serve as a substitute to the 6th Street bike lanes recommended in the 2005 Bicycle Master Plan.

5th Street and R Street NW

- Install curb ramps at 5th and R Streets to bring intersection crossing up to ADA standard.

New Jersey Avenue, 4th Street and S Street NW

- Install four curb ramps at 4th Street, S Street, and New Jersey Avenue NW to bring intersection crossing up to ADA standard. This project can be wrapped into intersection upgrades recommended in the previous section.

Rhode Island Avenue at Florida Avenue and Rhode Island Avenue at Lincoln Road

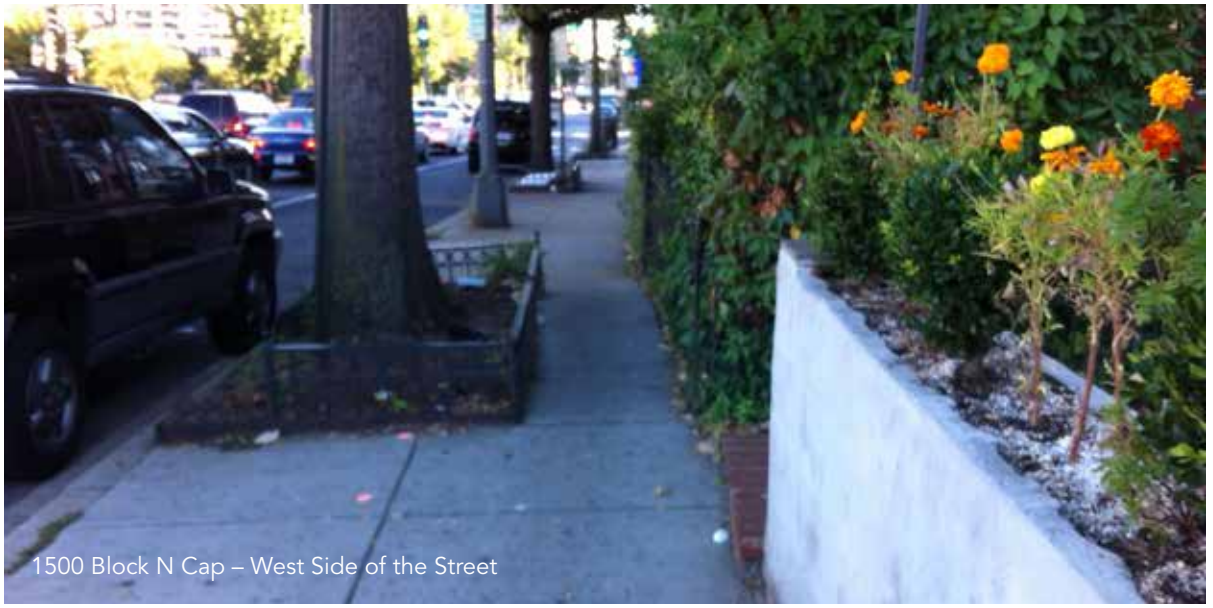
In both identified locations (and other segments along Rhode Island Avenue) the sidewalk of Rhode Island Avenue is dramatically heaved by a mature trees. Trees should be preserved and solutions implemented that restore and widen sidewalk above tree roots.

- Work with adjacent properties to relocate fence line within the public space.
- Explore available modern sidewalk technologies such as rubber or permeable pavement to allow sidewalk restoration over tree roots.
- Widen sidewalk to meet minimum standards for access.

North Capitol Street

Many locations along North Capitol Street have sub-standard sidewalk widths due to mature trees, and narrow space between them and the walls and fences separating the public parking areas in front of rowhouses. The most pronounced examples are along the 1500 block and the 1900 – 2200 blocks of North Capitol Street on the west side of the roadway.

- Work with property owners to relocate fences in the public space further away from the curbline.
- Replace treebox fences with tree grates with removable rings to enable trees to grow without girdling.
- Explore available sidewalk materials and techniques to sustainably span or traverse over tree roots to provide sidewalk widths and grades that meet ADA standards.


1500 Block N Cap – West Side of the Street

New York Avenue at North Capitol Street

The sidewalk along the north side of New York Avenue is constrained by the size of a mature tree and the presence of a fence dividing the public parking area of a rowhouse from the sidewalk.

- Work with property owner to move the fence in public space further from the street edge.
- Expand sidewalk to meet acceptable standards.

11 Implementation


WARNING
NO DUMPING
ALLOWED

11 Implementation

Capital construction projects such as intersection reconfigurations and moving curbs take time to design, fund and construct. Even relatively low cost projects such as restriping and minor modifications require time for implementation.

Five phases or types of implementation are recommended:

1. Immediate safety improvements and maintenance requests
2. Temporary installations
3. Near and mid-term improvements
4. Longer term projects
5. Projects for further study

IMMEDIATE IMPROVEMENTS

Actions recommended for immediate action include:

- Retiming signal at New York Avenue and North Capitol Street to ensure sufficient pedestrian clearance interval to address major safety concerns at that intersection
- Public space enforcement and restoration of sidewalk along north side of the unit block of N Street NE
- Increased lighting levels along the Metropolitan Branch Trail
- Installation of permanent curb at New York Avenue and N Street NW
- Design and installation of wayfinding signage from the Metropolitan Branch Trail to multiple amenities and destinations in the MidCity East area (such as McKinnley Technical High School and First Street NW retail and dining nodes)

TEMPORARY INSTALLATIONS

Temporary installations of the recommended intersection and corridor designs permit the community and DDOT to "test drive" improvements and make any necessary adjustments prior to permanent installation.

To be effective, temporary installations should have:

1. A clearly defined and broadly communicated timeline. Three to six months is recommended to enable travelers to adapt and adjust to new patterns.
2. A clear and complete monitoring plan including who is responsible for monitoring and the precise data to be collected and protocols for collection.
3. Measurement data collected should be transparent, understandable and made publically available at pre-established intervals.
4. A phone number and/or other contact information should be posted together with the temporary installation for users to register their concerns or appreciation. This may be on a simple sign or a variable message board.
5. Installations must be reliably removed at the conclusion of the defined pilot period. This builds trust among all stakeholders that temporary means temporary.
6. A final monitoring report should be posted and distributed shortly after removal of the installation for public and stakeholder consumption.
7. If the temporary installation is removed and the permanent installation does not immediately follow, monitoring should continue for three months post-removal to assess changes again.

Many cities have utilized temporary installations. New York City and St. Louis, have used this approach to demonstrate the efficacy of reconfiguring roadway space to include pedestrian, bicycle, and transit amenities, as well as to recapture public space for plazas and parks. Temporary installations can make use of innovative new materials and technologies. These materials can often be reused in multiple different installations.

Source: Zicla, Accessed 9-5-13 (http://en.zicla.com/products/74/bus-boarder-boarding-plataform-accessibility)

Temporary installations are recommended at:

- **New York Avenue/North Capitol Street/ N Street**. This intersection can be reconfigured using pavement markings, bollards, planters, and flex posts. Given the heavy traffic at this location, a bell bollard is recommended. This is a heavy iron cone which can protect pedestrians in vulnerable positions, such as the median of New York Avenue. Pavement paint should also be installed to redirect vehicles even prior to extending the pedestrian space.

Figure 11-1 Temporary Curb Extensions in South Grand Road Diet Project, St. Louis, MO

- **Florida Avenue/North Capitol Street/Q Street NE & NW/Lincoln Road NE**. Temporary closure of the short block of Lincoln Road could be especially valuable in addressing concerns of neighborhoods worried that significant volumes of traffic would redirect to the North Capitol Street ramp up to Rhode Island Avenue from their current utilization of Lincoln Road. Traffic monitoring should occur at both Lincoln Road and this ramp to assess both the volume and impact of any potential rerouting.
- **First Street NW**. This corridor lends itself especially well to temporary treatments given the pending disruptions of the corridor associated with the planned DC Water First Street Tunnel project. Temporary mini roundabouts could be installed prior to that construction project – complete with potted trees and plants (see suggested design) – and assessed for permanent implementation concurrent with DC Water's reconstruction of the corridor.
- **Eckington Place NE**. A temporary roundabout could also be quickly constructed on Eckington Place pending the longer term recommended curb realignments.
- **Parklets at identified gateways or nodes**. Parklets temporarily (or permanently) convert one or more on-street parking spaces to a mini park or community seating or art location. Parklets can increase visibility and vitality of emerging retail nodes in the study area. Parklets are most effective when "sponsored" or supported by a local retail business or stakeholder group.

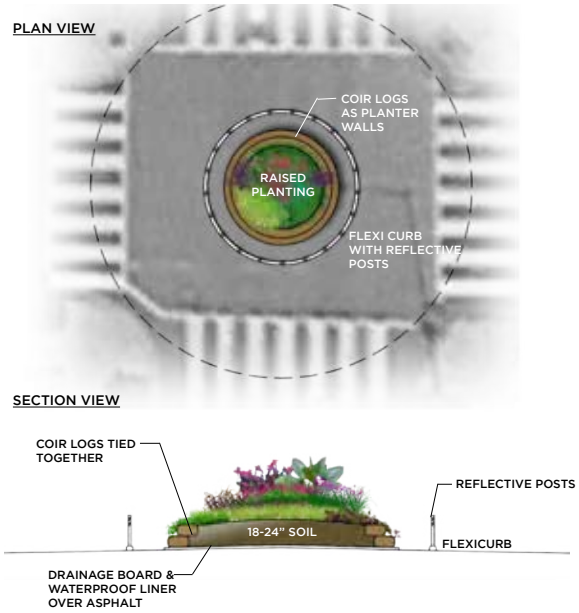
Long Island City at Pulaski Bridge & Jackson Ave, Queens, NY

NEAR AND MID-TERM IMPROVEMENTS

Projects feasible for near term implementation include:

- Traffic calming, lighting and pedestrian crossing enhancements along all designated pedestrian priority corridors
- Spot improvements to address narrow and/or heaving sidewalks in the study area
- LID or parklet conversion of existing N Street NW deadend. The type of improvement here should respond to the level of community enthusiasm and involvement anticipated to participate in minor daily maintenance and stewardship of the site.
- Multiple identified LID improvements in Bloomingdale and potential other sites in adjacent neighborhoods.
- New Jersey Avenue restriping
- Eckington Place restriping and roundabout (curb realignment may require longer term capital programming)
- New York Avenue and North Capitol Street – while this may require significant engineering, the urgent safety concerns at this intersection warrant project acceleration.
- Mini roundabouts on First Street NW (or concurrent with DC Water project) – ideally mini roundabouts should have sponsorship by local residents, gardening groups, schools, or other local associations to ensure sufficient watering, remove any litter, and assist with routine weekly maintenance. Cities such as Seattle, WA have created neighborhood competitions for the most beautiful mini roundabouts with awards of recognition. This has created tremendous neighborhood pride in these small, but highly identifiable places.
- Establish a mini roundabout policy and process for other locations that wish to convert stop controlled intersections to mini roundabout treatments.

TEMPORARY MINI-CIRCLES



Source: Rhodeside+Harwell


COIR LOGS USED AS "PLANTER WALLS"


FLEXI CURB SYSTEM WITH HIGH VISIBILITY REFLECTIVE POSTS


COIR LOGS


PLANTINGS: BRIGHTLY COLORED ANNUALS, GRASSES, TROPICALS, AND PERENNIALS

LONGER TERM IMPROVEMENTS

Some of the more significant improvements contemplated may require more time to permit full capitol funding and complete the project development process.

- Florida Avenue/North Capitol Street/Lincoln Road/Q Street intersection reconfiguration and operational changes
- Eckington Place NE curb realignment

PROJECTS FOR FURTHER STUDY

Two areas recognized to be in need of improvement will require either more focused analysis and consideration or evaluation in the context of the larger corridor or network. These are:

- Rhode Island Avenue bicycle accommodation
- Rhode Island Avenue/Florida Avenue/ New Jersey Avenue/S Street/4th Street NW intersection(s)

Estimated Timeline	Agency(ies)	Stakeholders
Immediate (1-6 months)	▪ Public space enforcement (N Street NE) ▪ Pedestrian crossing time adjustment (North Capitol and New York Ave) ▪ Minor maintenance improvements along pedestrian priority corridors ▪ Mini-roundabout demonstration(s) – First Street NW – Eckington Place NE (@ Q Street)	▪ Organize partnerships and structures for park management and maintenance ▪ Organize "adopt a circle" groups for mini-roundabouts
Near Term (6-12 months)	▪ LID demonstration projects ▪ Wayfinding signage from MBT to area destinations ▪ Restriping and temporary curbs at New York and North Capitol Street NW ▪ Temporary installation and monitoring of Lincoln Road at North Capitol Street reconfiguration ▪ Bus stop enhancements at Florida and North Capitol Street	▪ Register "walking or bicycle school buses" for new or existing schools ▪ Pedestrian safety training events at schools
Mid Term (1-2 years)	▪ Restripe New Jersey Avenue ▪ Install permanent First Street mini-roundabouts (concurrent with completion of DC Water project) ▪ Reclassify Lincoln Road as collector ▪ N Street @ North Capitol reconfiguration (permanent) ▪ Lincoln Road at North Capitol reconfiguration ▪ Southbound North Capitol to westbound Florida Avenue ramp reconfiguration ▪ Pilot S Street NW reconfiguration (at New Jersey Avenue NW) ▪ Application process and phasing plan for mini-roundabouts in place of 4-way stops	▪ Apply for mini-roundabouts, including landscape and maintenance plan
Long term or items for further study	▪ Bus queue jump lanes on North Capitol ▪ Florida Avenue and North Capitol Street intersection reconfiguration ▪ Rhode Island and Florida Avenue (including New Jersey Avenue and S Street NW) intersection reconfiguration ▪ Rhode Island Avenue bicycle accommodation	

Appendices

Appendix A Public and Stakeholder Input

NEIGHBORHOOD WALKING TOURS

Six neighborhood walking tours were conducted on Friday April 26 and Saturday April 27. Approximately two dozen neighborhood residents participated on the tours sharing information about areas of concern and opportunity.

Walking Tour 1 – Eckington and McKinley Educational Campus (Friday at 3:30pm)

The walking tour focused on travel to and around the McKinley campus. The campus is part of a hub of community amenities including the elementary, middle and high school, Harry Thomas Recreation Center and play fields. The area includes some significant hills, which also afford beautiful views, especially from the rear of the educational campus. Traffic at school release time (and presumably at school drop off) could be somewhat chaotic with the mixing of many pedestrians, autos and school buses.

The area appeared to provide many opportunities for green infrastructure/low-impact development including possibilities for green alleys, pervious parking areas, performance landscaping in the green space areas, and optimizing the odd triangular parcels formed by the junction of angle streets with the regular street grid.

Challenges were identified on Lincoln Road including volumes of traffic using it as a by-pass to avoid North Capitol congestion, speeding traffic, and the lack of on-street parking next to the sidewalk on the west side of the street.

East of the school, sidewalks are quite narrow adjacent to the historic wall along 2nd Street while the street appears to be fairly wide given the observed traffic volumes. Parking is allowed along this lengthy 4-block frontage but unzoned and unregulated. This balance between free parking and pedestrian space deserves further evaluation.

The team observed that the two-block stretch of S Street NE between 2nd and 4th Street is quite wide and may be a promising opportunity for low impact development and the reduction of impervious surfaces in the area.

Despite multiple speed humps along it, R Street NE between Eckington Place and Lincoln Road appeared to be a well used by-pass around Florida Avenue and North Capitol Street for regional traffic trying to leave the area.

Walking Tour 2 – South Eckington to Bates/Hanover/Truxton Circle (Friday at 4:30pm)

The second walking tour focused on the lower half of Eckington and the Truxton Circle area, including access to the New York Avenue Metro Station.

Meeting on Eckington Place at Q Street NE, the team observed that, despite a recent road diet of Eckington Place, the scale of the street was still very wide. While the street does service some wholesale activities at its north end and provides access to the industrial uses along Harry Thomas Way – including the FedEx distribution – trucks were still a significant minority of the traffic on the street. The wide cross section of the street seemed to encourage passenger cars to travel at an observable higher rate of speed and may also contribute to cars nearly missing the 4-way stop sign at the intersection of Q Street and Eckington Place, as was repeatedly observed during the brief time the group was at this location. Sidewalks on Eckington Place were generous, but green space was generally lacking, especially given the increasing number of residential units in the area.

Traveling west along Florida Avenue, the group observed very narrow and unbuffered sidewalks adjacent to the busy corridor – so narrow that the bus stop on the north side of the unit block of Florida Ave NE cannot accommodate a shelter or seating despite ridership volumes that would warrant such. Pedestrian crossings remain circuitous and challenging to navigate to the south side of the intersection and to the Metro station and destinations there.

P Street NW provided a reasonably comfortable walking environment, although apparent disinvestment in the properties along the block make the area feel unsafe from a crime perspective.

North Capitol Street is a difficult pedestrian street. Traffic is heavy, sidewalks are narrow, especially at treebox locations – sometimes insufficient to meet ADA requirements. The vacant lots convey a sense of personal exposure and vulnerability. Street character and landscaping is poor, and in many places, particularly along the 1500 block, there is room for additional street trees or green infrastructure, which business owners have requested. The ramps that bring North Capitol Street up to the intersection with New York Avenue are congested and buses trying to serve the corridor were seen advancing only painfully slowly up the corridor. Bus stops at the intersection of North Capitol and Florida Avenue, although well utilized with many waiting passengers, appeared to

have insufficient seating, shelter or shade. Wide curb radii, long crossing distances, and eager traffic made pedestrian crossings on all approaches intimidating.

The intersection of New York Avenue and North Capitol was also seen as a major challenge. The group observed significant numbers of pedestrians – many disabled, children or elders – at the intersection. Waiting space on the small traffic island in the southwest corner of the intersection was insufficient for the number of pedestrians waiting to cross forcing some people to stand in the street (very dangerous!) or wait on the main sidewalk. When the crossing signal was activated it provided only 18 seconds for pedestrians to cross six travel lanes (the standard crossing rate of 3.5 feet per second would indicate a minimum crossing time of 21 seconds). Right turning vehicles jockeyed with crossing pedestrians, impatient to allow the crosswalk to clear. The odd cut out of the North Capitol median on the southeast corner of the intersection positioned the stop bar in such a way that the line of sight for northbound ramp traffic was blocked by the ramp parapet and fencing. Vehicles encroached on the crosswalk forcing pedestrians into the traffic lanes in order to cross.

The north side of N Street NW - the route from the intersection to the Metro station – lacks a sidewalk on the north side and is carved up by multiple curbcuts and parking areas. Fortunately the south side of the street provides a comfortable sidewalk to the Metro.

The tour continued west into the Bates, Hanover and Shaw neighborhoods in the vicinity of Dunbar High School. Narrow streets and alleys appeared to have good potential for some low impact design treatments. Substantial traffic was noted on First Street NW where , again, the limited street width restricted on-street parking to only one side of the street (west side) leaving the sidewalk on the other side of the street exposed to adjacent moving traffic.

The angle of New Jersey Avenue leaves many small triangle parcels at various locations along the corridor. Most are solid planes of paved surface but were identified as potential greening opportunities. The street was observed as somewhat chaotic with vehicles merging back and forth to maneuver around those waiting to turn. The number of turning vehicles meant that there was rarely more than one moving lane of traffic despite the striping for two travel lanes.

Interior neighborhood streets were generally quiet and green with generous tree canopies, minimal traffic, and fine sidewalks.

Walking Tour 3 –Upper Bloomingdale and North Eckington (Friday at 5:30pm)

The third tour commenced at the intersection of Bryant Street and North Capitol Street. Approximately eight residents participated in the tour.

At the outset of the tour, several residents stated that they are very concerned about the pedestrian and bicycle safety at and around North Capitol Street. The group split into two at this point, with one group focused on planning issues, and the other on transportation issues. The transportation group traveled the area along the following route: North along North Capitol Street to Channing Street, West on Channing to First Street, South to Adams Street, back East to North Capitol Street, and then South along North Capitol, concluding the tour along Rhode Island Avenue near North Capitol.

Along North Capitol and Rhode Island Avenue, there were many spots where the mature trees had heaved the sidewalks and made them difficult to walk along. On North Capitol, this condition was even more treacherous due to the narrowness of certain sidewalks, in some places the space between the elevated tree roots and an adjacent front yard wall

Figure A-1 North Capitol Between U and W Street (West Side)

West Sidewalks along North Capitol Street between U and W Streets
Source: Google Streetview (May 2012)

was only twenty-two inches wide. During the tour, the transportation group noted several times where a pedestrian walking towards the group stepped into the street to walk around a tree rather than squeeze by in the narrow space. The width throughout the corridor would make it all but impassable for anyone in a wheelchair or using other mobility aides (see Figure 2).

The residents also said that they avoid North Capitol as much as possible rather than walk, bike, or drive on it. The existing sidewalks are also too narrow for bus stop amenities, such as shelters or benches, to be installed, even though the busy WMATA 80s line serves as a transit lifeline to many residents of the corridor.

While walking along First Street, residents noted that commuters from the Washington Hospital complex use this street as a cut through to avoid North Capitol, and at times of day it is very busy with aggressive drivers, leading it to feel less safe than it should. Residents want First Street to feel like a local road with a neighborhood feel and a better comfort level for walking and biking, including some pavement markings or extra space allocated for bicyclists.

The tour paused for a few minutes at Bryant Street, and Rebecca Mills, who bikes through the area to reach her home, said she would like Bryant to function as a bike route. Diane Barnes, the area ANC, described the community's efforts in the past to make Bryant a one-way street with speed humps to eliminate cut-through traffic diverting off of North Capitol, and Ms. Mills noted that the road is wide enough to use a contra-flow lane configuration, sharrows, and bike lanes to allow east-west bicycle travel on Bryant between Georgia Ave and North Capital. Residents agreed that speed bumps on both Bryant and Adams were welcomed by the neighbors, and did a reasonable job controlling vehicle speed.

Overall, this neighborhood is characterized by tidy historic homes on green, tree-lined, quiet streets. However, these quieter areas abut the busy and congested North Capitol and Rhode Island corridors, which act as moat of traffic separating neighbors on either side of the divides. First Street mostly functions well as a neighborhood street except during times of day where North Capitol is congested, and then the street starts behaving more like its busy arterial neighbor.

Walking Tour 4 – Lower Bloomingdale and LeDroit Park (Friday at 6:30pm)

Beginning at the emerging neighborhood retail hub at First and Rhode Island Avenue NW, the final tour of the day met on the Northwest corner at 6:30. Seven residents attended this tour, and the group followed a route South along First Street NW, West along R Street NW, and then North along Second Street NW.

While waiting for the group to assemble, several neighbors engaged the project team about Rhode Island Avenue livability issues, noting that the avenue is very busy with vehicular traffic, and that pedestrians have trouble safely using crosswalks due to box-blocking at rush hours. This comment is backed up by data showing a pattern of accidents along Rhode Island, between cars, between cars and cyclists, and between cars and pedestrians.

While walking down First Street, many neighbors remarked how pleased they were to see the area becoming a more entertainment and dining oriented street. They were happy to support the new businesses with their patronage, and noted the extra foot traffic and street level activity has helped reduce speeding and added some eyes-on-the-street throughout the evening for crime prevention. As the tour reached R street, neighbors noted that drivers don't stop at the stop sign at R Street, saying "if they see the green light at Florida, they often run the stop sign", and indeed, while watching a traffic cycle, one driver executed that maneuver as described.

The tour lingered around the Florida Avenue triangle park across the street from Big Bear Café, and many attendees shared the view that Florida Ave is very dangerous to cross at any of the uncontrolled crosswalks in the corridor between North Capitol and Ninth Street NW. This condition is especially bad for transit users since if they use the same bus stop to board and later disembark, they will have to cross the street, likely at an uncontrolled intersection. This condition is evident at the newly relocated bus stop at the Florida Ave. Post Office, the current location forces everyone to cross at least one street at the busy confluence of Florida, Rhode Island, New Jersey, S Street, and Fourth Street. Understandably, the residents who rode the 90s bus in this area wanted the stops moved back to previous locations that didn't force them to cross the street as often. Bicycle and pedestrian relations along the Avenue are somewhat strained, pedestrians don't like sharing the sidewalk with cyclists, rightfully saying the sidewalk is too narrow. Cyclists don't like sharing the roadway with cars and trucks, rightfully saying that it is too dangerous to safely ride in the lane with car traffic.

In a universally shared view, tour participants are grateful for new signal at R and Florida. Among those residents who bicycle, the new R Street bike lanes and sharrows that extend to Metropolitan Branch Trail are very popular, and most expressed enthusiasm for continued trail development to reach destinations to the North and South of existing termini.

One resident shared an interesting account of the new gate system for the public park on the South side of Florida Ave: the one-way pedestrian gate on the east side of Florida Ave park has resulted in a big reduction in public drinking in the park since inebriates would then have to walk a block from the liquor

store to the entrance on the west side of the park. Surprisingly, all residents supported keeping the high fence and turnstile gates for the park, citing the previous history of public intoxication as the reason they didn't want an open access park.

The tour moved on to Second Street NW where the talk was about a new condo coming in on Florida and Second. Residents said the city should proactively try to promote transit and bike use for the new residents because parking is already difficult. Contributing to this apparent parking shortage, none of the many businesses on Florida have any adjacent curbside parking, so customers divert into neighborhoods to find spots. There were also some missing curb ramps on west side of 2nd and Randolph intersection, which was a problem for residents with children in strollers, and presumably for anyone with a disability.

As the tour concluded, the group discussed how the neighborhood needs more green space in general, and how little of it was close by. Several neighbors dreamed of covering portions of North Capital Street with green space to make the trenched sections less apparent, and to open up access for the neighborhood.

Walking Tour 5 – Bates, Hanover and Truxton Circle (Saturday at 9:00am)

Two residents participated in this weekend morning tour. The issues they identified focused on First Street traffic issues, New York Avenue property issues, and areas along Third Street NW. The tour started at First and P Streets NW and headed South on First, Southwest on New York Avenue, North on Third Street, and East on P Street.

Residents noted that along First Street, traffic ignores the stop sign at N street. A contributing factor is that congestion from New York Ave spills back for several blocks on First during the rush hours and other busy periods, making it a challenging street to interact with on foot or on a bike. The residents said that New York Avenue is really busy all the time, degrading their enjoyment of their neighborhood by producing pollution, noise & vibration that was a constant nuisance. Very close to this area and just beyond the project boundaries, New York Ave carries a lot of traffic just trying to reach the 395 tunnel rather than any neighborhood destination. Tour attendees noted the irony of all this traffic being stopped at lots of lights even when the tunnel is wide open.

There was one parcel along New York Ave and Third Street NW which used to have a library kiosk, but it's been removed and covered with sod. One of the residents noted it could be added to the city park along N Street to provide more contiguous green space.

The neighborhood at-large suffers from being in the closest residential area ringing downtown, meaning the maximum number of possible commuters is trying to pass through their neighborhood, even though those drivers aren't interested in stopping in the neighborhood. From a driver's perspective, this neighborhood is a barrier to be bypassed as soon as possible to get to the business district, while from the resident's point of view, these commuters have no business being in their neighborhood at all.

Walking Tour 6 – Bates, Hanover and Truxton Circle (Saturday at 1:00pm)

Following the public open house meeting, approximately seven residents participated in this weekend day tour. The issues they identified focused on both planning and transportation issues, including the large number of vacant public buildings on P Street, street lighting on P Street, the North Capitol and New York Avenue intersection, and Hanover Place and it's adjacent alley network. The tour group met on P Street at First Street NWt, and proceeded East along P, turning South at North Capitol, and then turning West again on Hanover Place, through the alley network, and concluding the tour on First Street NW near N Street and Dunbar High.

The area along P Street is an attractive, tree-lined street, but the Eastern end of it is characterized by several large underutilized or vacant public school buildings that need immediate repair. Longer term plans for this area are for a nexus of public schools, which would create a dense node of educational campuses between O Street, P Street, Third Street, and North Capitol Streets. Some residents mentioned that they have some concern that school dropoff traffic could be very bad in the future, their immediate concern is for the city to repair these buildings before they are damaged beyond repair by the elements. Residents noted that the street feels dangerous at night because not enough streetlight gets through the dense tree canopy, and there is a history of drug dealing in the area. The streetlight issue is due in part to the choice of directional streetlights over the roadbed, as opposed to the "Washington globe" style streetlights which cast a more omni-directional light on sidewalks and building faces from a lower elevation.

Moving through the area, residents brought the group to the New York and North Capitol intersection, and described it's various dangers and pedestrian hazards: not enough crossing time for pedestrians, not enough turning space for re-routed 90s buses, lots of inebriated people lingering at the corner liquor store, and inadequate space on the

Figure A-2 Conditions On P Street NW and Hanover Place NW

An abandoned public building on P Street. Residents noted that plants were growing on the roof, and windows had been boarded up for years.

pedestrian islands. In contrast to what the project team heard at other tours, these residents did not like the idea of decking over some of North Capitol Street here because they were certain it would just become another area for rampant public intoxication.

The group then retraced our steps back to Hanover Place where many of this tour's residents live. The first block of Hanover Pl. is a standard residential block with sidewalks, attractive street lights, street trees, parking regulations, and a neighborhood fee. At the next block, Hanover Pl. changes to a warehouse area with no sidewalks, no public lights, no parking regulation, and a dangerous blind alley system with a long history of drug use and illicit activities happening both in the alley and inside the vacant warehouse. These neighbors were eager for something to be done about these conditions, and noted that this was a spot where Dunbar high school students would come to use drugs out of sight of law enforcement since the alley network is accessible from First and N Streets near Dunbar. The configuration of the alley and some telecom utility poles means that only the smallest cars can turn into it, precluding police cruisers from going in and patrolling for illicit activity. Residents recommended the city buy the vacant warehouse, raze it, and replace it with a small park or community garden. Residents also supported adding sidewalks and streetlights to the portion of Hanover place that is currently warehouse-oriented as a way to improve public safety.

The blind alley network (in red) and warehouse (in yellow) at the end of the Hanover Place Alley network are a magnet for drug use and illicit activities, according to neighbors. Their idea was to have the city acquire the vacant warehouse, raze it, replace it with a park or community garden, and to upgrade the alley's streetscape to be consistent with the block just east of the warehouse.
44 P Street NW; aerial view of Hanover Pl. NW. Source: Google Streetview & Google Maps (May 2012)

This tour ended on a positive note, with residents very appreciative of the city's efforts, but yearning for safety improvements as soon as possible.

Public Open House and Meeting

A joint District Department of Transportation and DC Office of Planning open house and visioning session was held at the Capital City Public Charter School (First and P Street NW) from 10am to 1pm on Saturday April 27. Over 60 residents and stakeholders representing a diversity of ages, races, and study area neighborhoods participated in the meeting. Some had lived in the neighborhood for generations, others were relative new comers to the communities. Most were residents.

The open house featured five different interactive exercises:

1. A welcome station where participants identified the places in the local community and larger city where they lived, worked, played, and shopped
2. An "issues and opportunities" station where participants located and commented on areas under the topics of historic preservation, commercial activity, parks and open space, transportation, and urban design.
3. A BINGO game educating participants on a range of traffic calming and low impact design tools and techniques.
4. A mapping station where participants charted out the corridors and pathways they typically use to get around their community(s) and the modes they frequently use to travel.
5. A science station demonstrating how LID features hold and filter stormwater.

A station with kids' activities was also provided for the youngest participants.

Rich feedback was garnered from participants on these many topics.

Issues and opportunities documented included:

ISSUES	OPPORTUNITIES
Cut through commuter traffic causes gridlock on narrow streets; First Street NW is used as a commuter by-pass even though it is a residential collector street	Replace 4-way stops (which many people ignore) with mini-circles to create more green space and improved safety
Connections to MetroRail stations (particularly New York Avenue station) are difficult if not impossible	Four metro stations reasonably close by – two different transit lines.
Buses are caught in North Capitol congestion. Stops in study area have minimal accommodations and comforts	Evaluate and improve bus stop locations and amenities
Florida Avenue! – sidewalks are too narrow, many dangerous intersections or crossings	Good transit usage and demand. Opportunities for better bus connections to downtown – a Circulator maybe?
Florida and Rhode Island intersection is too auto-oriented/too complicated with many intersecting streets	Explore opportunities for streetcar on major transit streets (Florida and Rhode Island Avenues)
Florida and New York Avenue intersection is very problematic and causes problems on other streets as people try to avoid it	Metropolitan Branch Trail is a significant and unique amenity
Florida and R Street intersection has a lot of bicycles but is very difficult and dangerous to cross. The crosswalk is far too long, especially with a playground nearby.	Many opportunities for more bicycle connections in the neighborhood and to downtown. Bicycling should be safe for all ages.
It is difficult to travel south from Eckington	Good street grid, mature street trees and nearly complete sidewalk network
Many streets are rush-hour restricted, but rush hour traffic does not belong on them.	Improve pedestrian crossings to make them more visible, shorter and better protected
The North Capitol Street trench divides neighborhoods	Explore decking over North Capitol Street. Great views are possible of the Capitol dome.
On-street parking is challenging for some residents	

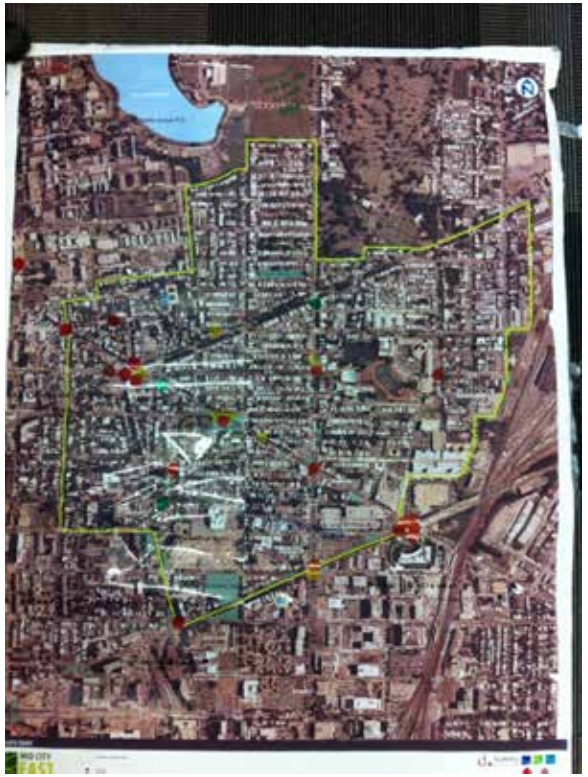
Mobile Design Workshops

The project team facilitated two mobile design workshop meetings on June 8th and June 12th in order to engage the public in their neighborhoods. The mobile workshop consisted of a large panel truck with interactive maps and project information affixed to the side, and a pop-up canopy and tables for people to sit and work with project team members to understand the transportation issues that affect them on a daily basis. The maps on the side of the truck allowed individuals to place stickers on a map of the project area describing what particular interventions were needed at those locations. Sticker options were: bike lane, crosswalk, traffic calming/speed bump, mini-circle, pavement removal, street tree, LID/bioswale, green space.

A second map was intended to identify problem spots for different modes of transportation and stormwater, and each sticker color corresponded to pedestrian problem spot, bicycle problem spot, transit problem spot, or stormwater problem spot. Many people participated in these two community mapping exercises, and at the end of each day of meetings, there were dozens of stickers on each map identifying problems within the project area.

First Mobile Design Workshop – June 8th, 2013

The first location for the mobile workshop was the pocket park between Florida Avenue, R Street, and First Street NW. The project team spoke to 15 – 20 people at this location, most of whom were on foot, with a few having just parked their bicycles nearby. A large number of comments were directed towards the crossing of R Street at Florida (which is now signalized), and how the existing configuration was substandard, and made access to the park challenging. Comments also focused on the environment around First Street NW, and the perception that vehicles speed and do not cede the right-of-way to pedestrians in the crosswalks. The project team 0bserved several instances of cars failing to yield to pedestrians in the crosswalk, and instances of cars running the stop sign at First and R Streets.



The second location was adjacent to the Windows café at First Street NW and Rhode Island Avenue. The team spoke with eight individuals at this location, but then decided to move across Rhode Island Avenue to the busier corner of First Street and T Street NW, where a large volume of people were passing by. Comments here also focused on First Street, echoing what the project team learned at the R Street location. Other comments discussed a contra-flow bike lane along T Street NW as a means to extend the existing bike lanes through LeDroit Park and to Eckington.

The third location was the Park at Ledroit on V Street NW. The team spoke to a few individuals who were happy with the addition of park space to their neighborhood (this park was recently constructed on the location of a derelict school building), and they were also in favor of additional bus transit service running through LeDroit Park, saying that walking

to Florida or Georgia Avenues was often a long trip. This location had lower foot traffic than anticipated, and after only speaking with three individuals over the course of 45 minutes, the project team decided to move on to the next location, and add a fifth location for later in the day.

The fourth location was at the Metropolitan Branch trailhead at R Street NW. At this location, the project team spoke with dozens of cyclists, walkers, and runners using the trail. Many of their comments had to do with the security of the trail, but that concern did not stop the widespread enthusiasm for this trail. Many comments had to do with the urgency of expanding the trail to reach both Union Station and Silver Spring Maryland. Many comments revealed that individuals chose the trail as a route option, even if it made their total trip longer, thus indicating a strong preference for separation from cars at the expense of distance traveled.

The fifth location was at the post office on Florida Avenue between New Jersey Avenue and Fourth Street. The project team interviewed approximately twelve pedestrians and six cyclist at this location. Comments were focused on the difficulty of walking and cycling along Florida Avenue, and the need for more green space in the vicinity in general. The project team observed the many substandard crossings and interruptions to the sidewalk which are concentrated in this area.

Second Mobile Design Workshop – June 12th, 2013

The first location was N Street adjacent to the intersection of North Capitol Street and New York Avenue. The comments at this location were very impassioned, and nearly all focused on the individual's perception of danger at this intersection. One man said he had known six pedestrians killed in collisions while crossing New York Avenue during his 25 years living in the nearby Robert Taylor Homes. A woman who lived in a rowhouse on New York Avenue said that she had seen many people killed here (referring to both violent crime and traffic collisions). A surprising number of cyclists passed this intersection, and the few which stopped and spoke to the team said they would prefer a safer route, but nothing else was as direct. The team observed many substandard conditions, such as insufficient crossing time, small pedestrian refuges, and vehicles turning at speed across unsignalized crosswalks.

The second location was N Street at First Street NW, across the street from Dunbar High School. There were hundreds of schoolchildren present at the playfields and parks, and they were escorted by their teachers across N Street and First Street. Several neighborhood residents stopped by and comments concerned the traffic backups on First Street, and the congestion on North Capitol Street and New York Avenue having a significant and negative impact on quality of life in the area.

The third location was on T Street NE in front of the McKinley Tech campus. The project team spoke to parents on their way to and from school pickup. One parent commented that Edgewood and Eckington were very safe neighborhoods to walk around, but that leaving them required crossing very busy streets like North Capitol, Florida, and Rhode Island Avenues. Another parent asked if the project team could improve the underpass of Rhode Island under the railroad tracks, saying it was narrow, smelled bad, and felt dangerous.

The fourth location was on Rhode Island Avenue at 5th Street NE. This location was adjacent to a bus stop, and many transit riders spoke to the project team while waiting for the bus. Many comments said they needed more frequent transit service. One woman said she had been mugged and assaulted two blocks from our location, and said the city should have a stronger police presence throughout the area. One mother with her child said she had moved to the area because it had better schools and transit than

her previous neighborhood, but that crossing the streets in that area felt dangerous. Several cyclists stopped to chat with the team, and described their desire to have a safer bicycle route along Rhode Island Avenue. The project team observed a surprising number of cyclists riding along Rhode Island Avenue (approximate time was 4:30 to 6:30) at this location. Two people described specific crossing problems due to short signal cycles at Fourth Street NE.

Online Engagement and Participation

In an effort to engage members of the community who could not attend community meetings or missed the mobile workshops, a website with online tools for feedback and community mapping provided opportunities to participate in the discussion of the issues and opportunities within the neighborhoods of the study area.

MidCityEast.com

The project website MidCityEast.com announced upcoming public meetings, focus groups, workshops and direct contact information with DDOT program managers. A general project overview described the study area and the scope of the study and a calendar outlined upcoming events. Other features of the website included:

- A mapping portal for community designation for work, play and home, and travel routes between destinations
- SeeClickFix to report locations to DC's 311 system for municipal repairs on streets and sidewalks
- Links to the projects active MindMixer public engagement site

Of the strategies employed online the study's MindMixer page was significantly used by the community to identify issues relating to transportation, storm-water management, public safety and neighborhood beautification.

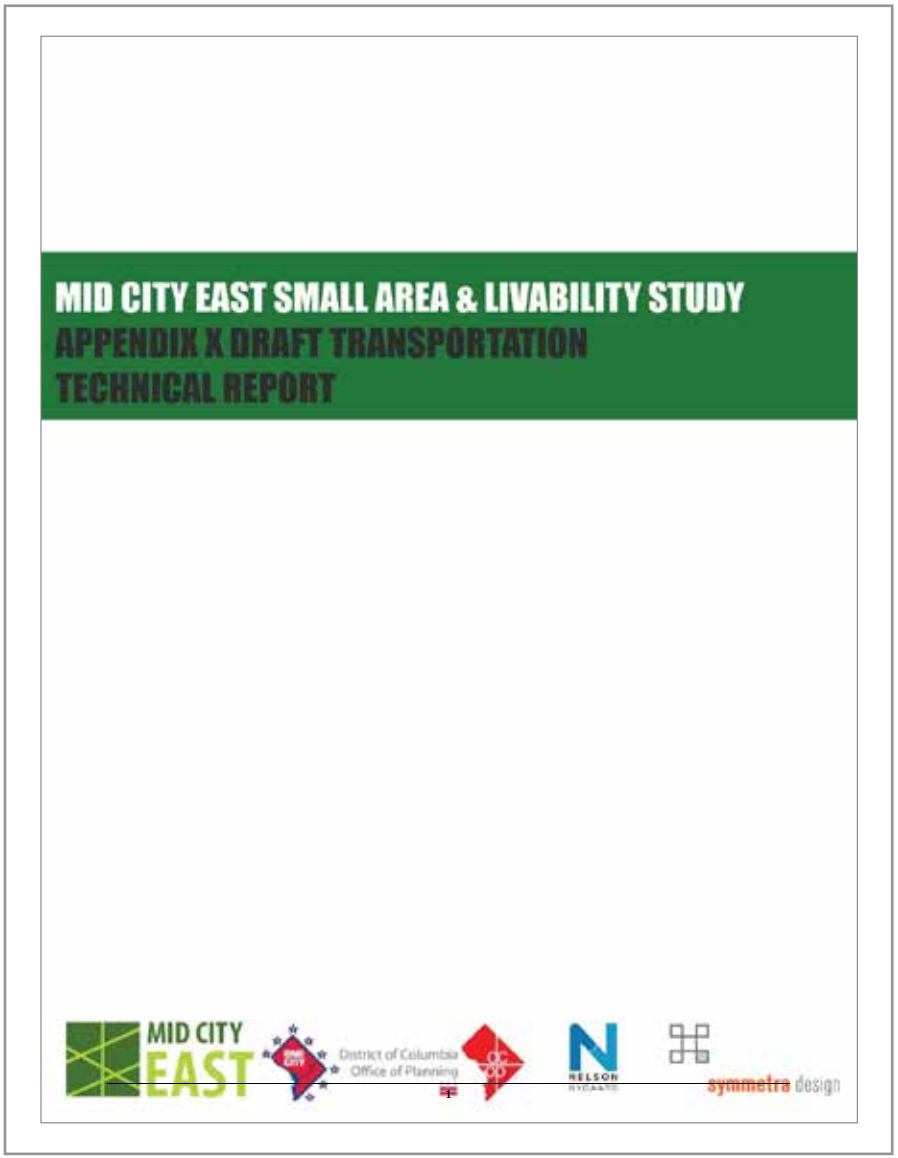
MindMixer

Over 100 ideas for community improvements were proposed through MindMixer. The online community engagement showed a desire to improve public safety, access to transportation, neighborhood beautification and transformation of abandoned properties. The most popular posts and ideas from community members on the Mid City East MindMixer page were:

- Discussion of North Capitol and New York Avenue intersection as dangerous and an impediment to accessing Metro.
- Proposal to create a deck over the North Capitol Street underpass and add a park on top.
- Transforming North Capitol Street as a landscaped corridor and gateway to the community serving motorists and pedestrians alike.
- Addition of more bikeshare stations around public and commercial spaces.
- Guiding development in the community to address abandoned school lots along P Street NW.

In addition to proving a forum to map and discuss key issues, MindMixer allows users to upload photos and add tags for how they feel about the image. Community members submitted nearly 20 photos of locations around Mid City East. Looking at pictures of local street art and green spaces community members expressed "surprise" through tags. Other images throughout the neighborhood of commercial business, homes and parks were tagged as making people feel "proud" and "at home."

Appendix B Technical Report



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INTRODUCTION

The District Department of Transportation (DDOT) and the Office of Planning undertook the Mid-City East Small Area and Livability Study (MCE Study) to evaluate multi-modal traffic flows throughout the network and identify tangible, on-the-ground solutions that will foster safe and balanced management of the transportation system. The following Transportation Technical Report (TTR) is an appendix to the Mid-City East Small Area and Livability Study and provides the results of transportation analysis associated with proposed improvements.

The MCE Study includes improvements at six focus areas within the MCE study area:

- New York Avenue/North Capitol Street/N Street
- North Capitol Street/Florida Avenue/Q Street/Lincoln Road (Truxton Circle)
- Rhode Island Avenue/Florida Avenue/New Jersey Avenue/S Street/4th Street
- New Jersey Avenue Corridor
- First Street, NW Corridor
- Eckington Place Corridor

SCOPE OF STUDY

The TTR includes transportation analysis for four of the six focus areas:

- New York Avenue/North Capitol Street/N Street
- North Capitol Street/Florida Avenue/Q Street/Lincoln Road (Truxton Circle),
- Rhode Island Avenue/Florida Avenue/New Jersey Avenue/S Street/4th Street
- First Street, NW Corridor

Based on the relatively low level of existing traffic volumes on New Jersey Avenue and Eckington Place, transportation analysis was not performed for the New Jersey Avenue or Eckington Place corridors.

The transportation analyses provided in this TTR were intended to inform the feasibility of improvements proposed as part of a planning-level study. In some cases it may be prudent to conduct additional analysis, including a cost-benefit analysis, prior to implementation of improvements.

DATA COLLECTION

To understand existing transportation conditions within the Mid-City East study area collection of multi-modal data including vehicular, pedestrian and bicycle counts were conducted. Input from the community outreach process helped to prioritize the selection of intersections where existing data was collected.

Field observations and weekday AM (7:00 to 9:30) and PM (4:00 to 6:30) counts were conducted in April of 2013 at the following locations:

- Rhode Island Avenue/ 2nd Street/ Seaton Place NW
- Florida Avenue/6th Street, NW/ T Street NW
- Florida Avenue/New Jersey Avenue NW
- North Capitol Street/Florida Avenue/ Q Street
- New Jersey Avenue/ P Street NW
- New Jersey Avenue/ Rhode Island Avenue, NW

- New Jersey Avenue/ S Street NW
- New Jersey Avenue / R Street NW
- New York Avenue/New Jersey Avenue/M Street NW
- North Capitol Street/New York Avenue and N Street
- Rhode Island Avenue/R Street NW
- North Capitol Street /Quincy Place/Lincoln Road

Available traffic data was also obtained for the following locations.

- Florida Avenue/ Rhode Island Avenue
- Florida Avenue/4th Street/S Street
- First Street/ U Street

Spot counts were also performed in September 2013.

Pedestrian counts were conducted along with vehicle counts. In addition, peak hour pedestrian counts were conducted crossing New York Avenue to quantify mid-block crossings.

Raw traffic, pedestrian and bicycle data and heavy vehicle counts are included as Attachment A to this TTR.

Signal timing plans for the studied intersections were obtained from DDOT. Signal timing plans are included as Attachment B.

An analysis of crash history was also conducted as part of this assessment. Available crash data over a three-year period was reviewed from DDOT's Traffic Accident Reporting and Analysis System (TARAS). Crash reports are included as Attachment C.

ANALYSIS METHODOLOGY

Analysis for this TTR was prepared in accordance with industry standards and *the District Department of Transportation Design and Engineering Manual* guidelines.

Traffic analysis was conducted for two scenarios: Existing Conditions (2013) and Future Conditions. The Future Conditions scenario includes traffic projections associated with displaced traffic movements and rerouted traffic volumes. The Future Conditions scenario does not include regional traffic growth or traffic growth associated with planned land development projects. In some cases DDOT may consider performing additional analysis, based on local and regional growth, prior to implementation of improvements.

To assess traffic conditions, it is necessary to collect traffic data at the intersections during peak periods of traffic flow and operations (i.e. morning and evening rush hour periods). The data collected is in the form of turning movement counts for through, left and right movements at the intersection. This existing data, along with other operational parameters such as the number of lanes, heavy vehicle percentages, and information on traffic signal timing, is entered into traffic software and analyzed using Highway Capacity Manual 2010 (HCM) methodology employed through SYNCHRO version 8.0. The capacity analysis provides results in the form of Level of Service and delay. Level of Service (LOS) is a measure of the average control (i.e. stop sign) delay experienced by all motorists arriving to an intersection. There are six representative levels of service defined for intersections and they are designated using letters "A" through "F", with LOS "A" representing the best operating conditions and LOS "F" representing the worst. Safety of the intersection is not included in the measures used to calculate LOS.

Level of Service is defined separately for signalized intersections and unsignalized intersections. For signalized intersections, delay is evaluated for the overall intersection; while at unsignalized intersection delay is analyzed for each movement separately (i.e. northbound, southbound, eastbound or westbound traffic). The thresholds for the intersection levels of service are shown in Table 1.

Table 1 Intersection Level of Service Thresholds

Level of Service Threshold for Delay (seconds/vehicle)		
LOS	**Signalized**	**Unsignalized**
A	0-10 sec	0-10 sec
B	> 10-20 sec	> 10-15 sec
C	> 20-35 sec	> 15-25 sec
D	> 35-55 sec	> 25-35 sec
E	> 55-80 sec	> 35-50 sec
F	> 80 sec	> 50 sec

The HCM 2000 guidelines were used in lieu of the recent HCM 2010 methodology at most of the study intersections as the recent update does not analyze cluster of signals (more than one signals controlled by one signal controller).

The TTR also reports Volume to Capacity ratio (v/c ratio). Capacity is defined as the maximum rate at which vehicles can pass through a given point in an hour. The v/c ratio, also referred to as degree of saturation, represents the sufficiency of an intersection to accommodate vehicular demand. V/C ratio is measured on a point scale system between 0.0 and 1.0. Adequate capacity is generally represented with a v/c ratio of 0.85 or less. As the v/c ratio approaches 1.0, traffic flow is increasing congested and queuing conditions may occur. Once the demand exceeds the capacity (a v/c ratio greater than 1.0), excessive delay and queuing is expected.

Queue length s, or the accumulated stack of vehicles that are in-succession waiting to proceed at a particular movement, were calculated using Synchro and reported as an additional Measure of Effectiveness (MOE).

Pedestrians volumes were input into the Synchro model and analyzed based on HCM 2010 methodology. Pedestrian LOS has also been reported which is based on crosswalk score at each leg of an intersection. The reported pedestrian crosswalk score was based on number of lanes in the roadway, volume and speed of auto traffic, pedestrian travel speed, and the circulation area (based on pedestrian flow and effective sidewalk widths). The software does not provide pedestrian LOS for stop controlled intersections or roundabouts.

Intersection crash rates were calculated where information was available. The crash rate[1] is the number of accidents that occur at an intersection in one year multiplied by 10^6 and then divided by the daily (24 hours) total traffic volume entering the intersection multiplied by 365 days. The calculation is based on Average Annual Daily Traffic (AADT) volumes listed on DDOT's 2010 Traffic Volume Map and estimated AADT's from DDOT's Traffic Accident Reporting and Analysis System (TARAS) Reports. The crash rates are expressed in terms of crashes per million entering

[1] ITE's - *Transportation Engineering Handbook,* 6th Edition - R_{spot} *Equation*

vehicles (MEV). A crash rate of 1.00 MEV is typically the threshold per industry standards. As noted in the Traffic Engineering Handbook, studies have shown that traffic crashes often increase proportionate to vehicle or pedestrian volumes. The crash rate can also be used to help prioritize intersections for safety studies.

NEW YORK AVENUE/ NORTH CAPITOL STREET/N STREET

Proposal Description

The proposed improvements at the New York Avenue/North Capitol Street/N Street intersections have been recommended to improve walkability and safety, eliminate pedestrian-vehicular conflicts points, incorporate additional green space and better accommodate demand for pedestrians crossing New York Avenue and North Capitol Street. Generally, pedestrian improvements include the following:

- Increase storage area for pedestrians between northbound North Capitol Street and New York Avenue and at the south west corner of the intersection between southbound North Capitol Street and New York Avenue
- Create pedestrian refuge crossing New York Avenue with introduction of traffic signal between North Capitol Street and First Street, NW
- Reduce crossing distances across New York Avenue at intersection of North Capitol Street through modification of curb radius and realignment of crosswalks.
- Install two new mid-block crosswalks along New York Avenue and new crosswalks
- Continue sidewalk segment along the north side of N Street, NE to NoMA Metrorail station

Key elements of the proposal that have impact to traffic circulation and therefore have been analyzed as part of this assessment are as follows:

- ***Closure and relocation of existing eastbound access to N Street, NE (east of North Capitol Street)*** – N Street, NE provides pedestrian access for residents within the project area traveling to/from the NoMa Metro station, and as part of the effort to improve walkability, the existing eastbound access to N Street from North Capitol Street will be closed.

- ***Closure of channelized right turn lane along eastbound New York Avenue to southbound North Capitol Street*** - The existing channelized right turn lane is proposed to be eliminated and the small triangular traffic island would be removed. The channelized right turn would be replaced by a new curb extension with a standard turn radius. The crosswalk on New York Avenue at this location would be slightly realigned to reduce the crossing distance.

- ***Installation of new traffic signal along New York Avenue at N Street, NW -*** This signal is tied to the existing signal at North Capitol Street and New York Avenue. The spacing between intersections is 374 feet, from center to center, and is in accordance with MUTCD and NACTO guidelines. The signal is being proposed to accommodate existing mid-block crossings. The new crossing/signal would also support children whom currently cross New York Avenue as a short cut route to/from the Dunbar Senior High School located at the corner of First Street, NW and N Street, NW.

- ***Elimination of driveway along New York Avenue***- An existing driveway along New York Avenue to a parking lot will be closed. The parking lot is adjacent to the City Center Public Charter School Building. The School building appears to be newly constructed and does not appear to be in operation. The parking lot is currently used by construction workers during daytime hours. Along the north side of New York Avenue another driveway is also planned to be closed. This driveway does not support any existing use.

- ***Option to Permit Buses to turn left from eastbound New York Avenue onto North Capitol Street.*** – Currently no left turns are allowed from eastbound New York Avenue to northbound North Capitol Street. With this option the Metrobus route that currently accesses northbound North Capitol Street via M Street would be allowed to turn left at North Capitol Street.

Site Access Impacts

- As a result of the closure and relocation of existing eastbound access to N Street, NE vehicular traffic along New York Avenue would need to continue east (past the current access point) to the modified two-way access to/from New York Avenue in the future. This intersection currently provides one-way egress to New York Avenue. The modified two-way intersection would be slightly widened to accommodate proposed access and turn maneuvers.

- With the closure of the channelized right turn lane along eastbound New York truck traffic would no longer be permitted to turn right onto southbound North Capitol Street. Eastbound truck traffic would instead need to turn right from New York Avenue upstream (west of North Capitol Street) at M Street, NW and then make a right at the M Street/ North Capitol Street intersection to continue southbound along North Capitol Street.

- Access to/from New York Avenue for users of the existing surface parking lot along the south side of New York Avenue would be eliminated. Patrons would still be able to access the parking lot via N Street, NE.

Scope of Analysis

This assessment included analysis of existing conditions as well as future conditions for the following locations:

- New York Avenue/ North Capitol Street
- New York Avenue/ N Street (west of North Capitol Street)
- New York Avenue/ N Street (east of North Capitol Street)

A future option was analyzed of conditions with left turn movements for buses along eastbound New York Avenue to northbound North Capitol Street. This movement is currently prohibited.

The analysis results section of this report provides vehicular and pedestrian LOS and delay, v/c ratio, 95th percentile queue lengths.

Safety Assessment

The safety assessment included review of crash data covering a three-year period from January 1, 2010 to December 31, 2012 from DDOT's Traffic Accident Reporting and Analysis System (TARAS) for the North Capitol Street/ New York Avenue intersection. The data summarized information such as location, type of collision and type of injury. TARAS reports do not identify site specific information or notes recorded that may be in the actual accident report (documented at the time of the accident in a police report). The following assessment provides conclusions solely based on the available information rendered in the TARAS report. The intersection experienced 206 accidents between January 2010 and December 2012. Of these accidents, 61 involved injuries with 29 in 2010, 21 in 2011 and 11 in 2012. Sideswipe collisions, accounted for 36.9% of the crashes, and were the predominant crash pattern. Rear end collisions were second most prevalent and accounted for 21.4% of the recorded accidents. A total of five collisions involved pedestrians (4 in 2010 and 1 in 2011).

The Institute of Transportation Engineers (ITE) Traffic Engineering Handbook 5th Edition[2] lists excessive vehicle speed and inadequate pavement markings and signing as some of the possible causes for sideswipe collisions. Safety enhancements listed to consider include reducing speed limit (if justified by a spot speed study), installing median devices, improving centerlines, lane lines and edge lines and installation of advance direction and warning signs.

Some possible causes for rear-end collisions at an unsignalized intersection include high volume of turning vehicles, driver unawareness of intersection control and pedestrian crossings. The listed safety enhancements include options such as limiting/modifying permitted turn movements and installing/improving warning signs.

In regards to collisions involving pedestrians, the reference notes inadequate protection, lack of crossing opportunity, long distances to nearest crossing and sidewalks located to close to the travelway as causative factors. Some enhancements to consider include adding a pedestrian refuge island, installation of traffic/pedestrian signals, crosswalk and signs and re-design of sidewalks away from the roadway.

Existing Conditions Overview

A summary of existing pedestrian and bicycle data for the study area intersections is provided below. Figures 1 and 2 are illustrations of AM and PM peak hour traffic volumes at the New York Avenue/North Capitol Street/N Street intersection.

- There were 493 pedestrians and 55 bicyclists in the AM peak hour and 455 pedestrian and 69 bicyclists during the PM peak hour that traveled through the New York Avenue/North Capitol Street/ N Street intersection.
- Left turns are prohibited from eastbound New York Avenue to northbound North Capitol Street

[2] Table 7-14 Accident Pattern Countermeasures

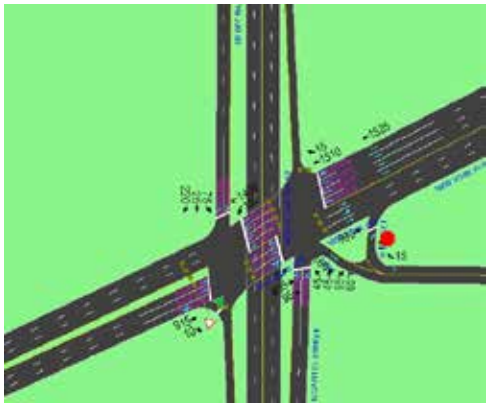

Figure 1 Existing AM Peak Hour Volumes - New York Avenue/North Capitol Street/N Street

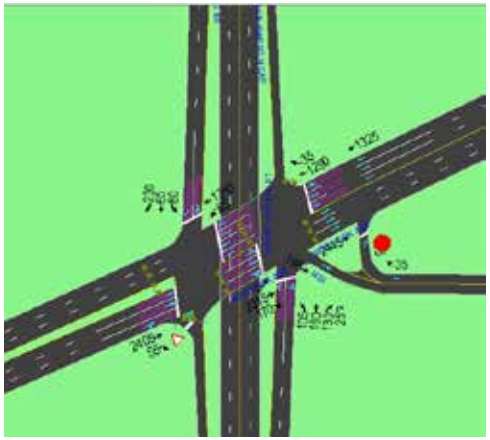

Figure 2 Existing PM Peak Hour Volumes - New York Avenue/North Capitol/N Street

Volume Rerouting

Traffic analysis results for the proposed improvements are based on the following rerouting assumptions:

- Along eastbound New York Avenue a total of 95 AM and 170 PM vehicles that currently merge to N Street, NE will need to access N Street further east via the modified two-way intersection at New York Avenue.
- Sixty-five (65) AM and 25 PM vehicles along North Capitol Street that currently turn right onto N Street, NE will need to continue north to New York Avenue and then turn right at the modified two-way intersection at New York Avenue to access N Street, NE
- Four new buses will make a left from eastbound New York Avenue onto northbound North Capitol Street during both the AM and PM peak hours. Currently, there are four buses per hour along the P6 route that travel from eastbound New York Avenue to northbound North Capitol Street via M Street, NW. These buses are projected to turn left from New York Avenue to North Capitol Street under the proposed improvement.
- With the proposal, all trucks will need to make a right from New York Avenue upstream (west of North Capitol Street) at M Street prior to the New York Avenue/ North Capitol Street intersection. Currently, there are no trucks making right turn from New York Avenue to North Capitol Street during the AM or PM peak hours. However, there were trucks observed making right turns from eastbound New York Avenue to North Capitol Street during the three-hour AM and PM peak periods.
- Approximately 22 AM and 49 PM pedestrians that currently cross mid-block during the peak hours along New York Avenue between North Capitol Street and N Street, NW would use the new signal at New York Avenue and N Street, NW to cross New York Avenue.

The future volumes are shown in Figures 3 and 4.

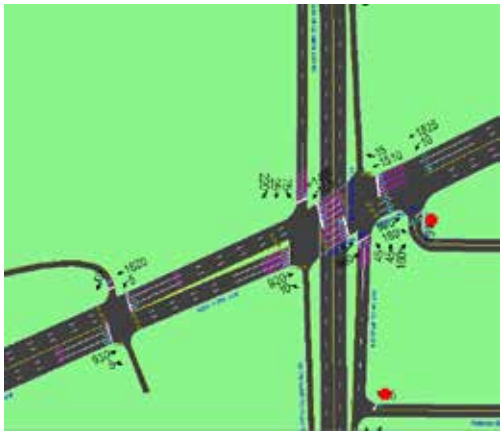

Figure 3 Future AM Peak Hour Volumes - New York Avenue/North Capitol/N Street

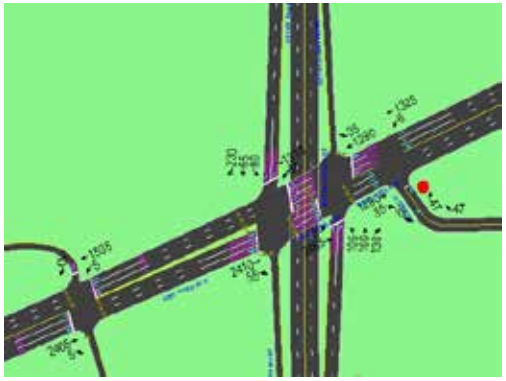

Figure 4 Future PM Peak Hour Volumes - New York Avenue/North Capitol/N Street

Analysis Results

This assessment included vehicular and pedestrian LOS, delay, v/c ratio and 95th percentile queue for Existing and Future Conditions (with proposed improvements). The existing analyses are shown in Tables 2 and 3.

Table 2 Existing Conditions Analysis Results New York Avenue/ North Capitol Street/ N Street

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)
North Capitol Street NB/New York Avenue	**Overall**	**B**	**13.3**	**0.56**	**N/A**	**D**	**50.6**	**0.93**	**N/A**
	Eastbound	A	3.9	0.47	43	E	69.0	1.14	961
	Westbound	A	7.0	0.38	170	A	7.1	0.39	189
	Northbound	F	89.2	0.90	263	E	78.6	0.85	436
North Capitol Street SB/New York Avenue	**Overall**	**C**	**20.4**	**0.59**	**N/A**	**E**	**61.0**	**0.91**	**N/A**
	Eastbound	C	23.6	0.44	264	F	87.8	1.09	1184
	Westbound	A	2.7	0.45	39	A	4.8	0.38	54
	Southbound	F	97.3	0.97	357	F	94.2	0.98	375
New York Avenue / N Street NE	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	0.0	0.22	0	A	0.0	0.53	0
	Westbound	A	0.0	0.25	0	A	0.0	0.29	0
	Northbound	A	9.1	0.02	1	B	12.1	0.07	6

Note:
N/A – not available
For locations in which there are more than one lane group in an approach both the longest queue and worst V/C ratio is reported.

As shown in Table 2, the North Capitol Street SB/New York Avenue intersection currently operates at LOS "E" during the PM peak hour. The North Capitol Street NB/New York Avenue and the North Capitol Street SB/New York Avenue intersections have failing approaches during the AM and PM peak hours.

The queue analysis indicates the eastbound approach of New York Avenue at North Capitol Street currently experiences queuing that exceeds the available storage by 334 feet during the PM peak hour.

Table 3 Existing Conditions New York Avenue/ North Capitol Street/ N Street Pedestrian LOS

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
North Capitol Street NB/New York Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.95	C	3.12
	Westbound	C	2.95	C	3.05
	Northbound	A	1.86	A	1.94
North Capitol Street SB/New York Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.86	C	3.08
	Westbound	C	2.95	C	3.12
	Southbound	A	1.89	A	1.91

The proposed conditions analysis results are summarized in Tables 4 and 5. Signal timings were adjusted at the North Capitol Street/New York Avenue intersection to allow increased time for pedestrians crossing New York Avenue. The phasing for North Capitol Street was adjusted from 32 seconds to 40 seconds in the AM and from 32 seconds to 50 seconds in the PM. The southbound approach has an 8 second lead pedestrian phase during the AM and PM. Signal offsets were optimized and modified where needed.

Table 4 Future Conditions Analysis Results New York Avenue/ North Capitol Street/ N Street

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)
North Capitol Street NB/New York Avenue	**Overall**	**B**	**10.7**	**0.47**	**N/A**	**C**	**27.6**	**0.91**	**N/A**
	Eastbound	A	4.0	0.48	43	C	33.0	1.06	1181
	Westbound	A	9.3	0.48	276	B	11.1	0.43	296
	Northbound	D	46.1	0.24	133	D	48.8	0.63	335
North Capitol Street SB/New York Avenue	**Overall**	**B**	**16.4**	**0.56**	**N/A**	**C**	**32.8**	**0.85**	**N/A**
	Eastbound	B	15.4	0.44	116	D	42.7	0.99	983
	Westbound	A	7.8	0.35	44	A	6.1	0.42	100
	Southbound	F	86.2	0.90	312	E	66.8	0.80	251
New York Avenue / N Street NE	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	0.0	0.26	0	A	0.0	0.34	0
	Westbound	A	0.1	0.40	1	A	0.1	0.35	1
	Northbound	A	9.1	0.02	1	B	13.2	0.11	9
New York Avenue	**Overall**	**A**	**6.4**	**0.41**	**N/A**	**A**	**6.5**	**0.58**	**N/A**

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)
/ N Street NW	Eastbound	A	8.5	0.29	148	A	5.5	0.65	322
	Westbound	A	5.0	0.54	110	A	2.0	0.44	34
	Southbound	D	43.8	0.01	7	E	59.5	0.01	0

All intersections would operate within acceptable Levels of Service under the proposed conditions. The southbound approaches of the North Capitol Street SB/New York Avenue intersection and the New York Avenue/N Street, NW intersection are projected to operate at LOS "E" or worse. The overall intersection level of service for the New York Avenue/North Capitol Street intersections improves under proposed conditions when compared to existing conditions. Notably, the level of service improves from LOS "E" to LOS "C" during the PM peak hour for the North Capitol Street SB/New York Avenue intersection.

Table 5 Future Conditions New York Avenue/ North Capitol Street/ N Street Pedestrian LOS

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
North Capitol Street NB/New York Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.95	C	3.13
	Westbound	C	2.88	C	3.08
	Northbound	A	1.86	A	1.92
North Capitol Street SB/New York Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.86	C	3.08
	Westbound	C	2.95	C	3.13
	Southbound	A	1.89	A	1.91
New York Avenue / N Street NW	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.87	C	3.09
	Westbound	C	2.87	C	3.09
	Southbound	A	1.46	A	1.46

Summary of Findings

The following is a summary of findings for the proposed North Capitol Street/New York Avenue/N Street intersection improvements:

- All intersections currently operate at LOS "E or better.

- With the proposed improvements, all of the study area intersections would operate at LOS "C" or better.
- Intersection approaches that currently operate at LOS "E" and "F" currently would improve under the proposed conditions. The southbound approach of the North Capitol Street/New York Avenue intersection would continue to operate at LOS "F" during the AM peak hour but the delay per vehicle would improve from 97.2 sec/vehicle to 86.2 sec/vehicle.
- The queue lengths along eastbound New York Avenue at North Capitol Street SB will decrease by approximately 200 feet during the PM peak hour when compared to existing conditions. Queue lengths along northbound North Capitol Street decrease by approximately 100 feet during both the AM and PM peak hours and decrease by approximately 100 feet along southbound North Capitol Street during the PM peak hour. Queue length along westbound New York Avenue are projected to increase by approximately 100 feet at the North Capitol Street NB intersection during both AM and PM peak hours.
- The traffic signal at New York Avenue/N Street, NW will provide a safe pedestrian crossing for the residential uses on the south side of New York Avenue and the educational destinations on N Street, NW.
- The proposed improvements would not adversely affect the New York Avenue/North Capitol Street intersection.

NORTH CAPITOL STREET/FLORIDA AVENUE/Q STREET/LINCOLN ROAD (TRUXTON CIRCLE)

Proposal Description

A number of improvements have been proposed at the Florida Avenue/North Capitol Street/Q Street/Lincoln Road/Quincy Place intersections. The proposals are intended to allow for improved pedestrian and bicycle circulation and safety along Florida Avenue and North Capitol Streets. Generally, pedestrian improvements include the following:

- Increase storage area for pedestrians along North Capitol Street between Q Street, NE and Quincy Place, NE
- Increase storage area for pedestrians and expand the Truxton Circle Park at the northwest corner of the intersection with the closure of the channelized right turn lane at southbound North Capitol Street
- Reduce the number crossings and crossing distances along the east and west sides of North Capitol Street and along Florida Avenue with the closure of several existing curb cuts
- Improve safety of the existing crossing along Florida Avenue at Q Street, NW with the installation of a traffic signal
- Provide a new bicycle crossing that would connect the Q Street, NW bicycle lane to Q Street, NE

Key elements of the proposal that have impact to traffic circulation and therefore have been analyzed as part of this assessment are as follows:

- ***Eliminate Channelized Right Turn lane along southbound North Capitol Street*** – The existing channelized right turn lane from southbound North Capitol Street to westbound Florida Avenue will be closed. As part of this closure, the existing crosswalks between Truxton Circle Park and the curb along the northwest corner of the intersection would also be eliminated.

- ***Modified Access System for Quincy Place, Q Street and Lincoln Road, NE*** – A segment of Lincoln Road, NE would be closed from North Capitol Street/Q Street to Quincy Place. Northbound vehicles on North Capitol Street currently use this section of Lincoln Road to access Quincy Place, NE or to continue northeast along Lincoln Road towards Rhode Island Avenue. Lincoln Road also provides access to a public alley easement for residents along Quincy Place, NE and Q Street. Alley access would be maintained for residents via a one-way northbound extension of the alley easement to the modified Quincy Place/Lincoln Road intersection. With the proposed improvement a section, of Quincy Place between Lincoln Road, NE and North Capitol Street would become two-way (Quincy Place would remain one-way east of Lincoln Road). The North Capitol Street/Lincoln Road intersection would no longer exist and the existing North Capitol Street and Quincy Place intersection would be modified to accommodate the movements from Lincoln Road.

- ***New Traffic Signal at Florida Avenue, NW and Q Street, NW*** - A new signal is proposed at the Florida Avenue/ Q Street intersection. The signal has been proposed to accommodate pedestrians and bicycles crossing Florida Avenue, particularly given the proposed contra-flow bicycle lane. The proposed signal would be spaced 330 feet (measured center to center) from the existing North Capitol Street/ Florida Street intersection and the signal would be coordinated.

Site Access Impacts

Site access impacts as a result of the proposed improvements are as follows:

- An existing curb cut along the north side of Florida Avenue (just east of North Capitol Street) would be closed. The driveway currently supports patrons of the New York Pizza restaurant and used as a cut-through for access north of Florida Avenue. Access to the New York Pizza restaurant would be maintained as there is a secondary access from Q Street, NE.
- As a result of the closure of a section of Lincoln Road, NE access to the public alley easement for residents of Quincy Place, NE and Q Street would be relocated via an extension of the alley easement to the modified Quincy Place/Lincoln Road intersection. Residents could also access the alley via the existing curb cut along Q Street, NE.

- Eliminating the southbound North Capitol Street channelized right turn lane would not preclude site access as planned for the 1600 North Capitol Planned Unit Development. The site is located at the northwest corner of the North Capitol Street/Florida Avenue intersection.

Scope of Analysis

Existing and Future Conditions were analyzed for the following intersections:

- North Capitol Street and Florida Avenue
- Florida Avenue, NW and Q Street, NW
- North Capitol Street and Q Street, NE
- North Capitol Street and Quincy Place
- North Capitol Street and Lincoln Road, NE
- Lincoln Road, NE and Quincy Place, NE

The analysis results section of this report provide vehicular LOS and delay, v/c ratio and 95th percentile queue lengths for the above noted intersections.

Safety Assessment

The safety assessment includes a review of crash data over a three-year period from January 1, 2010 to December 31, 2012 from DDOT's Traffic Accident Reporting and Analysis System (TARAS) for the Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place intersections.

The data includes summary information by location for type of collision and type of injury. TARAS reports do not identify site specific information or notes recorded that may be in the actual accident report (documented at the time of the accident in a police report). A summary of crash history (over a three-year observation period) based on the available information rendered in the TARAS report is as follows:

- North Capitol Street and Florida Avenue - The intersection experienced 56 crashes. Of these crashes, 23 involved an injury. Sideswipe crashes (20), which accounted for 36% of the crashes, were the predominant crash pattern. There were a total of 2 crashes involving pedestrians and 3 crashes involving bicycles. The crash rate at this location is 0.79 MEV.
- Florida Avenue and Q Street – No accident data was provided for this location.
- North Capitol Street /Q Street/Lincoln St: The intersection experienced 8 crashes. Of these crashes, 1 involved an injury. Rear end crashes (4), which accounted for 50% of the total crashes, were the predominant crash pattern. No crash involved pedestrians or bicycles. The crash rate at this location is 0.16 MEV.
- Lincoln Road /Quincy Street: The intersection experienced 2 crashes. No crash involved pedestrians or bicycles. The crash rate at this location is 0.36 MEV.

Existing Conditions Overview

A summary of existing pedestrian and bicycle data for the study area intersections is provided below. Figures 5 and 6 are illustrations of AM and PM peak hour traffic volumes at the Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place intersections.

- Florida Avenue and Q Street- There were 36 pedestrians and 26 bicyclists that crossed Florida Avenue and Q Street during the AM peak hour and 40 pedestrians and 19 bicyclists during the PM peak hour.
- North Capitol Street and Quincy Place - There were 50 pedestrians and 9 bicycles observed during the AM peak hour and 35 pedestrians with 7 bicycles during the PM peak hour.
- North Capitol Street and Lincoln Road - There were 2 pedestrians and 4 bicycles that crossed North Capitol Street and Lincoln Road during the AM peak hour and 5 pedestrians during the PM peak hour.

- Lincoln Road and Quincy Place - There were 40 pedestrians and 6 bicycles observed during the AM peak hour and 54 pedestrians during the PM peak hour. No bicycles were observed during the PM peak hour.
- North Capitol Street and Q Street - There were 4 pedestrians and 4 bicycles observed during the AM peak hour and 41 pedestrians and 9 bicycles during the PM peak hour.

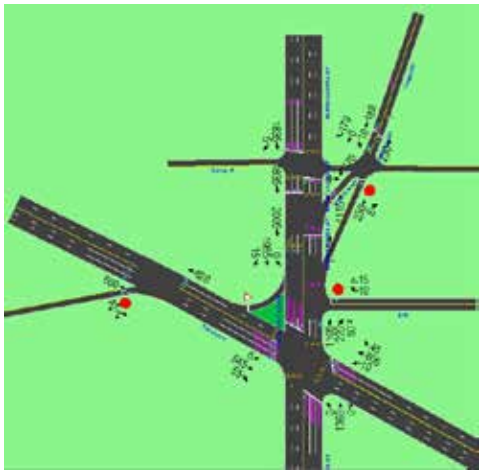

Figure 5 Existing AM Peak Hour Volumes - Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

Figure 6 Existing PM Peak Hour Volumes - Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

Volume Rerouting

As a result of the closure of a section of Lincoln Road, NE the following traffic movements would be rerouted:

- Traffic that currently accesses Lincoln Road, NE from North Capitol Street will need to continue north along North Capitol Street, make a right onto Quincy Place, and then make a left turn to gain access to Lincoln Road, NE. Two hundred thirty-five (235) vehicles are projected to follow this routing during the AM peak hour and 350 vehicles are projected to follow this routing during the PM peak hour.
- Traffic on southbound Lincoln Road, NE that currently makes a left turn at North Capitol Street will need to access North Capitol Street via Quincy Place, NE. A total of 170 AM and 120 PM vehicles are projected to make this new movement.

Figures 7 and 8 provide an illustration of the rerouted vehicular traffic at the Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place intersections with the proposed improvements.

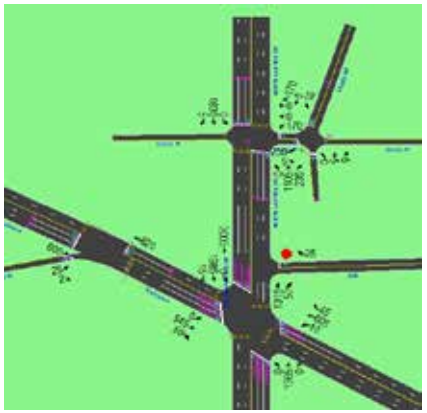

Figure 7 Proposed AM Peak Hour Volumes - Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

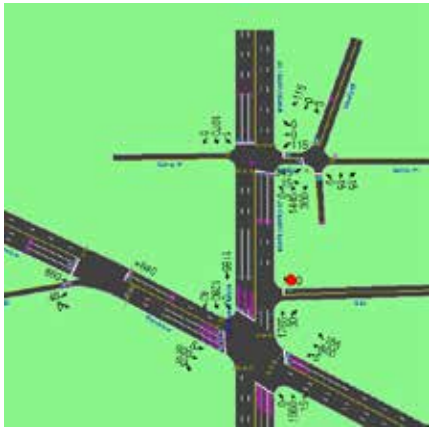

Figure 8 Proposed PM Peak Hour Volumes - Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

Analysis Results

This assessment included vehicular and pedestrian LOS, delay, v/c ratio and 95th percentile queue for Existing and Future Conditions (with proposed improvements). The existing analyses are shown in Tables 6 and 7.

Table 6 Existing Condition Analysis Results for the for the Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)
North Capitol Street/Florida Avenue	**Overall**	**C**	**26.8**	**0.72**	**N/A**	**C**	**28.1**	**0.80**	**N/A**
	Eastbound	C	21.9	0.34	138	C	23.4	0.37	169
	Westbound	D	43.4	0.57	327	C	34.6	0.80	473
	Northbound	C	20.5	0.57	432	C	26.4	0.79	533
	Southbound	C	27.0	0.83	582	C	28.0	0.53	396
North Capitol Street/Q Street NE	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Westbound	A	9.3	0.03	2	B	10.4	0.05	4
	Northbound	A	0.0	0.34	0	A	0.0	0.46	0
	Southbound	A	0.0	0.44	0	A	0.0	0.26	0
Florida Avenue / Q Street NW	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	0.0	0.13	0	A	0.0	0.14	0
	Westbound	A	0.0	0.20	0	A	0.0	0.27	0
	Northbound	C	17.8	0.10	8	C	18.4	0.16	14
North Capitol Street/ Lincoln Road	**Overall**	**A**	**7.6**	**0.58**	**N/A**	**B**	**12.5**	**0.43**	**N/A**
	Northbound	A	16.9	0.40	197	C	21.1	0.50	345
	Southbound	A	2.1	0.66	19	A	1.5	0.37	17
	South-westbound	B	6.7	0.40	13	A	6.2	0.27	12
North Capitol Street/ Quincy Place	**Overall**	**A**	**8.7**	**0.56**	**N/A**	**A**	**4.8**	**0.39**	**N/A**
	Northbound	A	0.1	0.26	0	A	0.1	0.32	0
	Southbound	B	14.0	0.67	338	A	11.2	0.40	183
Quincy Place/ Lincoln Road	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Northbound	B	10.6	0.27	27	B	12.2	0.44	58
	Southbound	C	32.2	0.23	170	D	36.1	0.27	137

Note:
N/A – not available
For locations in which there are more than one lane group in an approach both the longest queue and worst V/C ratio is reported.

As shown in Table 6, all study intersections currently operate within acceptable thresholds for LOS, delay and v/c ratio during the AM and PM peak hours.

The queue analysis indicates the following intersections along North Capitol Street currently experience queuing that exceeds the available storage[3].

- Southbound approach of the North Capitol Street/ Florida Avenue intersection during the AM and PM peak hours. The available storage is 160 feet however the 95th percentile queue is 582 feet and 396 feet during the AM and PM peak hours.
- Northbound approach of the North Capitol Street/ Lincoln Road intersection. There is 200 feet of storage between the Lincoln Road intersection and Florida Avenue. The 95th percentile however exceeds this capacity during the PM peak hour by 145 feet (approximately 7 car lengths).

Table 7 Existing Condition Pedestrian Crosswalk LOS for North Capitol Street, Florida Avenue, Lincoln Road and Quincy Place

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		LOS	Crosswalk Score	LOS	Crosswalk Score
North Capitol Street /Florida Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.53	B	2.59
	Westbound	B	2.53	B	2.61
	Northbound	C	2.98	C	2.95
	Southbound	C	2.98	C	2.97
North Capitol Street / Lincoln Road	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Northbound	C	2.97	C	2.92
	Southbound	C	2.97	C	2.85
	South-westbound	A	1.91	A	1.95
North Capitol Street / Quincy Place	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	1.44	A	1.45
	Westbound	A	1.44	A	1.45
	Northbound	C	2.91	C	2.85
	Southbound	C	2.91	C	2.85

The proposed conditions analysis results are summarized in Tables 8 and 9. Signal timings and offsets were optimized and modified where needed.

[3] Available storage is the distance that vehicles have available for queuing without impeding the operation of other traffic movements.

Table 8 Future Conditions Analysis Results for the Florida Avenue/ North Capitol Street/ Q Street/ Lincoln Road/ Quincy Place

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue
North Capitol Street and Florida Avenue	**Overall**	**B**	**16.7**	**0.72**	**N/A**	**C**	**23.7**	**0.80**	**N/A**
	Eastbound	B	15.2	0.34	138	B	17.6	0.37	80
	Westbound	D	43.4	0.57	327	C	34.6	0.80	473
	Northbound	C	20.5	0.57	432	C	26.4	0.79	533
	Southbound	A	5.8	0.83	68	B	14.9	0.56	176
North Capitol Street and Q Street NE	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	Westbound	A	9.3	0.03	2	B	10.4	0.05	4
	Northbound	A	0.0	0.34	0	A	0.0	0.46	0
	Southbound	A	0.0	0.44	0	A	0.0	0.26	0
Florida Avenue and Q Street NW	**Overall**	**A**	**4.1**	**0.24**	**N/A**	**A**	**4.1**	**0.31**	**N/A**
	Eastbound	A	6.8	0.20	70	A	5.9	0.20	77
	Westbound	A	0.4	0.30	2	A	0.8	0.37	11
	Northbound	C	31.3	0.07	39	D	38.9	0.12	64
North Capitol Street and Quincy Place	**Overall**	**B**	**15.3**	**0.58**	**N/A**	**A**	**5.6**	**0.54**	**N/A**
	Westbound	B	18.2	0.27	79	D	33.6	0.32	83
	Northbound	A	1.7	0.61	9	A	2.0	0.61	36
	Southbound	C	25.0	0.82	459	A	8.8	0.37	159
Quincy Place and Lincoln Road	**Overall**	**B**	**10.1**	**0.23**	**N/A**	**B**	**11.9**	**0.29**	**N/A**
	Eastbound	A	2.4	0.31	25	A	1.2	0.34	8
	Northbound	B	18.7	0.01	14	D	35.6	0.05	38
	Southbound	C	20.2	0.14	48	D	37.7	0.11	55

As shown in Table 8, under the Future Conditions scenario the studied intersections would continue to operate within the acceptable thresholds for LOS, delay and v/c ratio during the AM and PM peak hours.

A noteworthy improvement is the vehicle storage will increase at North Capitol Street and Quincy Place (as Lincoln Road is closed south of Quincy Place). Vehicle queuing would thereby be maintained within available storage at all intersections. Analysis of the new traffic signal at the Florida Avenue/ Q Street intersection indicates queuing at the westbound approach would not impact the upstream intersection at Florida Avenue and North Capitol Street. The new signal would have 200 feet of available storage from the North Capitol Street intersection and the 95th percentile queue length for westbound traffic ranges from 11 to 22 feet.

Table 9 Proposed Conditions Pedestrian Crosswalk LOS for the intersections with North Capitol Street with Florida Avenue, Lincoln Road and Quincy Place

Intersection	Approach	AM Peak		PM Peak	
		LOS	Crosswalk Score	LOS	Crosswalk Score
North Capitol Street and Florida Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.53	B	2.59
	Westbound	B	2.53	B	2.61
	Northbound	C	2.98	C	2.96
	Southbound	C	2.98	C	2.98
Florida Avenue and Q Street NW	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	1.46	A	1.49
	Westbound	B	2.43	B	2.50
	Northbound	B	2.53	B	2.59
North Capitol Street and Quincy Place	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	1.44	A	1.45
	Westbound	A	1.91	A	1.95
	Northbound	C	2.97	C	2.92
	Southbound	C	2.91	C	2.85

Summary of Findings

A summary of findings regarding transportation conditions with the proposed improvements are as follows:

- Queuing conditions will improve due to access modification and increased spacing between signals compared to current conditions.
- The analysis indicates vehicular queuing at the proposed Florida Avenue/Q Street traffic signal will not adversely impact the downstream traffic signal at the North Capitol Street/Florida Avenue intersection.
- As a result of the closure of a section of Lincoln Road, NE access to the public alley easement for residents of Quincy Place, NE and Q Street would be relocated via an extension of the alley easement to the modified Quincy Place/Lincoln Road intersection. Residents could also access the alley via the existing curb cut along Q Street, NE.
- All intersections studied currently operate within acceptable Levels of Service. Intersections would continue to operate within acceptable threshold limits considering proposed improvements.

RHODE ISLAND AVENUE/ FLORIDA AVENUE/ NEW JERSEY AVENUE/ S STREET/ 4th STREET

Proposal Description

The proposed improvements at this location include the elimination of a segment of S Street, to vehicular traffic, in order to improve the pedestrian environment. The plan also includes the relocation of stop bars to accommodate bicycle boxes at intersections on New Jersey Avenue. Proposed improvements at the Florida Avenue/New Jersey Avenue/Rhode Island Avenue/4th Street/S Street intersections include the following:

- ***S Street closure:*** The segment of S Street, between New Jersey Avenue and Florida Avenue, is proposed to be eliminated for vehicular traffic. As a result, the direct connection from 4th Street, NW to S Street, NW would be eliminated.
- ***Continued pedestrian access through new public space:*** The design maintains pedestrian and bicycle access through the new triangle of public space by allowing cyclists to follow existing pedestrian crossings, curb ramp accommodations, and signals.
- ***New movement from 4th Street to Rhode Island Avenue:*** Right turns from southbound 4th Street onto westbound Rhode Island Avenue is proposed to be permitted and facilitated through signalization and pavement markings. Left turns from southbound 4th Street onto Florida Avenue would continue to be prohibited.
- ***Reduced turning radius at Florida Avenue/New Jersey Avenue:*** The curb line at the southwest corner of the Florida Avenue/New Jersey Avenue intersection is proposed to be modified in order to reduce the turning radius for right turns at the intersection and reduce the pedestrian crossing at the south crosswalk of the intersection. The existing median refuge/island would be eliminated and a five-foot median would be installed along New Jersey Avenue between Florida Avenue and Rhode Island Avenues.
- ***Removal of curb cuts:*** A number of curb-cuts on Rhode Island Avenue, Florida Avenue, New Jersey Avenue, 4th Street and 3rd Street are proposed to be eliminated in order to reduce the number of pedestrian-vehicular conflict points along sidewalks.

Site Access Impacts

Site access impacts in the vicinity of the proposed improvements are described below:

- The business located at the northeast quadrant of Florida Avenue and 4th Street has existing curb cuts along 4th Street and Rhode Island Avenue. The business can also be accessed by curb cuts along 3rd street (via a parking lot through another property) and T Street (via an alley).
- Access to the post office from S Street would be eliminated as a result of eliminating the segment of S Street between 4th Street and New Jersey Avenue. Access to the post office would be maintained from Florida Avenue.
- The gas station located south of Rhode Island Avenue and east of Florida Avenue, has two curb cuts along both Rhode Island Avenue and 3rd Street and one along 4th Street. Proposed improvements would examine closing some of the curb cuts.
- The gas Station located at the southeast quadrant of New Jersey Avenue and Rhode Island Avenue has three curb cuts along Rhode Island Avenue and two curb cuts along of New Jersey Avenue. Proposed improvements would examine closing some of the curb cuts.

NOTE: The curb cut closures will be confirmed and coordinated on a case-by-case basis for both existing conditions and any future redevelopment scenario. The initial plan is to identify the potential curb cuts that can be closed, but not necessarily all of them would be closed to reconfigure the study area.

Scope of Analysis

For this proposal the following intersections were analyzed for both existing and proposed conditions:

- Florida Avenue and Rhode Island Avenue
- Florida Avenue and 4th Street/S Street
- Rhode Island Avenue and New Jersey Avenue
- New Jersey Avenue and S Street
- Florida Avenue and New Jersey Avenue
- Florida Avenue and 5th Street (east)

The analysis results section of this report provides vehicular LOS and delay, v/c ratio and 95th percentile queue lengths for the above noted intersections.

Safety Assessment

The safety assessment included review of crash data covering a three-year period from January 1, 2010 to December 31, 2012 for all intersections included in the study area. The data summarized crash data by severity type, crash type, date, time, presence of inclement weather (rain/fog/snow/crosswind), etc. TARAS reports do not identify site-specific information or notes recorded that may be in the actual accident report (documented at the time of the accident in a police report). A summary of crash history (over a three-year observation period) based on the available information rendered in the TARAS report is as follows:

New Jersey Avenue and Rhode Island Avenue: The intersection experienced 37 crashes between January 2010 and December 2012. Of these crashes, 16 involved an injury. Crashes while vehicles turning left (8), which accounted for 22% of the crashes for both types, were the predominant crash pattern. Total three crashes involved pedestrians and one crash involved a bicycle. The crash rate for this intersection is 0.57 MEV.

New Jersey Avenue and Florida Avenue: The intersection experienced 19 crashes between January 2010 and December 2012. Of these crashes, 8 involved an injury. Rear end crashes (total 13), which accounted for 67% of the crashes, were the predominant crash pattern. The crash rate for this intersection is 0.60 MEV.

Florida Avenue and Rhode Island Avenue: The intersection experienced 49 crashes between January 2010 and December 2012. Of these crashes, 25 involved an injury. Rear end crashes and crashes while vehicles turning left (both 13), which accounted for 26% of the crashes for both types, were the predominant crash patterns. Total three crashes involved pedestrians and five crashes involved bicycles. The crash rate for this intersection is 0.71 MEV.

Florida Avenue and 4th/S Street: The intersection experienced 10 crashes between January 2010 and January 2012. Of these crashes, 5 involved an injury. Rear end crashes (total 4), which accounted for 40% of the crashes for both types, were the predominant crash pattern. The crash rate for this intersection is 0.25 MEV.

New Jersey Avenue and S Street: The intersection experienced 9 crashes between January 2010 and January 2012. Of these crashes, 3 involved an injury. Rear end crashes (total 3), which accounted for 30% of the crashes for both types, were the predominant crash pattern. The crash rate for this intersection is 0.60 MEV.

Existing Conditions Overview

Rhode Island Avenue and New Jersey Avenue

- Left turns are prohibited at this intersection (For north eastbound approach restriction is limited to peak period, for other approaches restrictions are applicable for the entire day). Illegal left turn movements where observed at the intersection at all approaches.
- There were 102 pedestrians observed during the AM peak hour and 128 pedestrians observed during the PM peak hour.
- There were 16 bicycles observed during the AM peak hour and 64 observed during the PM peak hour.

Rhode Island Avenue and Florida Avenue

- Left turns are prohibited at this intersection (For Florida Avenue restrictions are limited to peak period, for Rhode Island Avenue restrictions are applicable at all times). Illegal left turn movements where observed at the intersection. The westbound Florida Avenue was the most predominant.
- There were 160 pedestrians observed in AM peak hour and 130 pedestrians observed in PM peak hour.

Florida Avenue and New Jersey Avenue

- There were 7 pedestrians observed in AM peak hour and 51 pedestrians observed in PM peak hour.
- There were 33 bicycles observed during the AM peak hour and 20 observed in the PM peak hour.

Florida Avenue and S Street/4th Street

- Left turns are prohibited at this intersection at all times. Illegal left turn movements where observed at the intersection.
- There were 150 pedestrians observed during the AM peak hour and 126 pedestrians observed in the PM peak hour.

New Jersey Avenue and S Street

- There were 7 pedestrians observed during the AM peak hour and 51 pedestrians observed in the PM peak hour.
- There were 33 bicycles observed during the AM peak hour and 20 observed in the PM peak hour.

Figures 9 and 10 below provide an illustration of AM and PM peak hour traffic at the study area intersections.

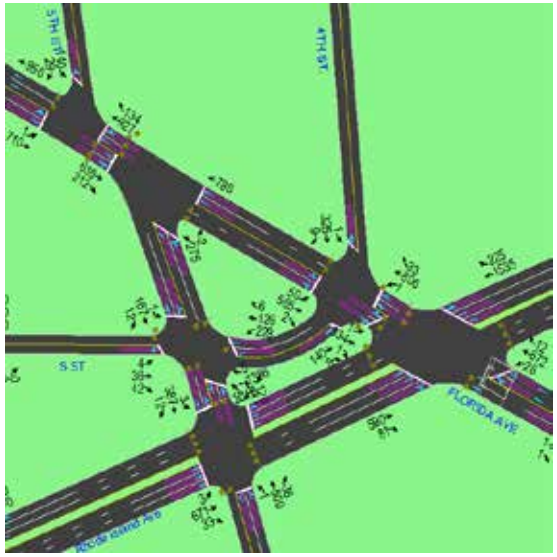

Figure 9 Existing AM Peak Hour Volumes – Rhode Island Avenue/ New Jersey Avenue/ Florida Avenue

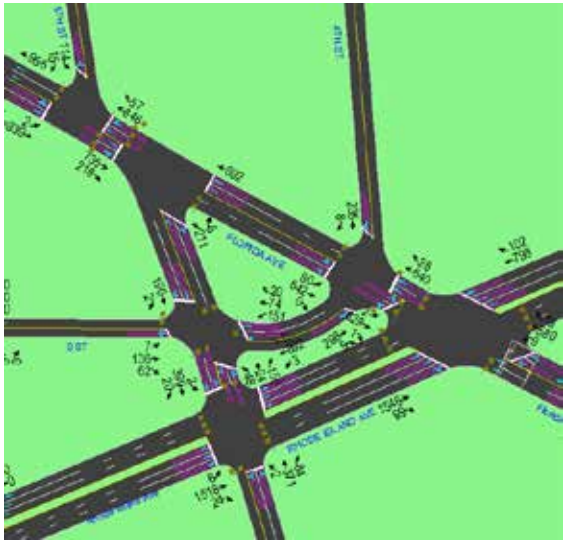

Figure 10 Existing PM Peak Hour Volumes– Rhode Island Avenue/ New Jersey Avenue/ Florida Avenue

Volume Rerouting

The removal of the section of S Street between New Jersey Avenue and Florida Avenue and closing the intersection for automobiles will trigger volume rerouting in different locations. The following movements will no longer exist in the study location

- All movements to and from S Street at the intersection of Florida Avenue and 4th Street/S Street
- All movements at the intersection of New Jersey Avenue and S Street, except for the through volume along New Jersey Avenue

Traffic volumes have been rerouted on the proposed network based on elimination of certain movements at the intersections and the potential for alternate routes. It is reasonable to assume that the origin of the trip and the final destinations extend beyond the study area and thus it is assumed that some vehicles will not impact the study area intersections in the future

Rerouted volumes are shown in the Figure 11 and 12. A summary of assumptions for rerouting traffic volumes is described below:

- From southbound 4th Street to westbound S Street: Direct access from southbound 4th Street to westbound S Street would be eliminated in the future. As an alternate route to access westbound S Street, southbound motorists on 4th Street could turn right onto Rhode Island Avenue, then right onto northbound 5th Street and then left onto westbound S Street. The right turn onto Rhode Island Avenue (via a slight left jog onto Florida Avenue) would be facilitated with the assistance of a modified signal at the Florida Avenue and 4th Street intersection. Considering this is a very circuitous route to S Street it is assumed that the majority of motorists would find a more attractive route to westbound S Street, (such as via U Street/T Street and 6th Street) , which is outside of the study area. As a conservatively high estimate for this analysis, 50% of southbound 4th Street motorists headed to westbound S Street (i.e. 63 AM and 37 PM) were assumed to shift to the circuitous route to S Street via Rhode Island Avenue and northbound 5th Street. This would mean 63 AM and 37 PM hourly trips will be added in DC roadway network beyond the study area

- From southbound 4th Street to southbound New Jersey Avenue via westbound S Street: Direct access from southbound 4th Street to southbound New Jersey Avenue (via S Street) would be eliminated in the future. Southbound 4th Street motorists would need to use an alternate route, such as 5th Street, to access southbound New Jersey Avenue. There are a number of westbound streets that would provide access from 4th Street to 5th Street, including T Street. As a conservatively high estimate 90% (i.e. 206AM and 136 PM) of vehicles that currently travel southbound on 4th Street to access southbound New Jersey Avenue were relocated to the southbound through movement at the 5th Street and New Jersey Avenue intersection. It was assumed that the remaining 10% would use an alternate southbound route, such as (6th Street), which is outside of the project study area.

- From eastbound S Street (west of New Jersey Avenue) to 4th Street: Direct access from eastbound S Street to northbound 4th Street would be eliminated in the future. Alternate northbound routes include S to Georgia Avenue and 6th Street, both of which are outside of the study area. It was assumed that a small percentage of traffic (10%) would take eastbound S Street to northbound 5th Street to T Street to access 4th Street. Left turns are prohibited from Florida Avenue onto northbound 4th Street so no traffic was assumed to use 5th Street to eastbound Florida Avenue. This would mean 32 AM and 122 PM peak hour trips would be redistributed to other area intersections beyond the study area.

- From northbound New Jersey Avenue to northbound 4th Street via S Street: Motorists who currently use northbound New Jersey Avenue to northbound 4th Street (via S Street) were rerouted as follows: 20% (25 trips in AM and 32 trips in PM) were assumed to take 4th street (east) then turn left onto Florida Avenue and then turn right to 4th Street (west) northbound; 50% (63 trips in AM and 79 trips in PM) would continue on New Jersey Avenue, then turn left onto Florida then right onto northbound 5th (west) Street and then turn right on to T Street to get to 4th Street; 20% (25 trips in AM and 32 trips in PM) would turn right to Rhode Island Avenue to then left onto First Street; and the remaining 10% would take alternative routes (13 trips in AM and 16 trips in PM) outside of the study area.

- From northbound New Jersey Avenue to westbound S Street: Motorists would take northbound New Jersey to westbound Q Street or R Street and then use 5th Street or 6th Street to get to S Street. That means 54 AM peak hour trips and 48 PM peak hour trips would be rerouted to intersections beyond the study area.

- From S Street (west of New Jersey Avenue) to southbound New Jersey Avenue: As an alternate route in the future motorists from S Street could use 6th Street to access Rhode Island Avenue and then turn right on New Jersey Avenue. As a conservatively high estimate

100% of traffic was assumed to use this route. S Street to 6th Street to R Street to southbound New Jersey Avenue is also a reasonable route.

With the rerouting assumptions outlined above, future additional analysis should be conducted to determine impacts on nearby streets such as 6th Street, T Street and 4th Street (east).

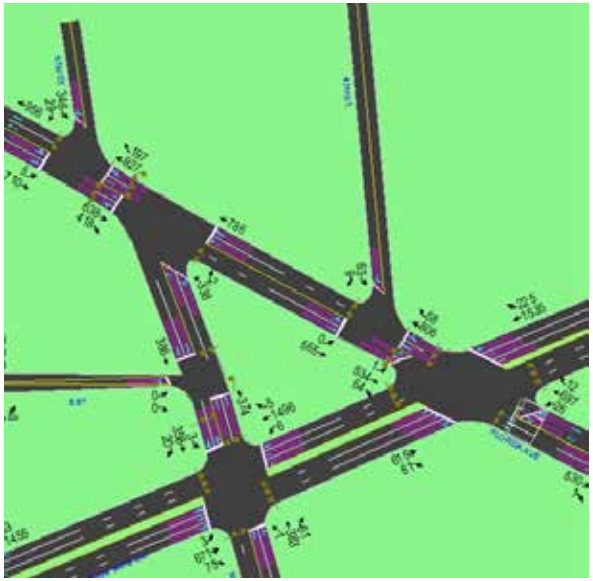

Figure 11 Future AM Peak Hour Volumes – Rhode Island Avenue/New Jersey Avenue/Florida Avenue

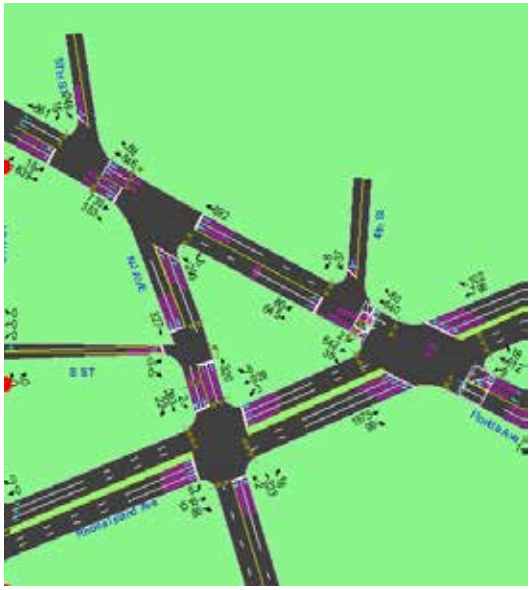

Figure 12 Future PM Peak Hour Volumes – Rhode Island Avenue/New Jersey Avenue/Florida Avenue

Analysis Results

As a part of the evaluation process, the following MOE's were considered: LOS, delay and v/c ratio by overall intersection operation and by approach for the study intersections. Approaches which experience operational deficiencies are highlighted in the table. Intersections are analyzed for both existing configuration and proposed configuration, and the results are summarized in Tables 10 and 11.

Table 10: Existing Conditions Capacity and Queuing Analysis

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue
New Jersey Avenue and Florida Avenue	**Overall**	**A**	**8.8**	**0.41**	**N/A**	**B**	**11..9**	**0.37**	**N/A**
	Eastbound	A	0.8	0.41	0	A	0.8	0.46	10
	Westbound	B	14.0	0.59	223	B	16.7	0.49	310
	Northbound	B	19.1	0.24	169	D	44.8	0.21	129
New Jersey Avenue and S Street	**Overall**	**A**	**7.8**	**0.41**	**N/A**	**B**	**10.1**	**0.34**	**N/A**
	Eastbound	B	13.3	0.08	41	B	15.0	0.23	124
	Westbound	A	1.5	0.33	10	A	1.8	0.29	32
	Northbound	A	8.9	0.51	240	A	6.1	0.40	60
	Southbound	B	14.8	0.21	84	C	25.1	0.20	64
New Jersey Avenue and Rhode Island Avenue	**Overall**	**B**	**12.7**	**0.59**	**N/A**	**B**	**17.4**	**0.60**	**N/A**
	Eastbound	B	15.3	0.34	111	C	21.8	0.71	386
	Westbound	A	1.3	0.64	7	A	2.4	0.41	19
	Northbound	C	28.8	0.49	235	C	27.6	0.42	197
	Southbound	C	26.5	0.37	154	C	21.8	0.37	146
Florida Avenue and 5th Street	**Overall**	**B**	**14.5**	**0.53**	**N/A**	**B**	**13.3**	**0.52**	**N/A**
	Eastbound	C	22.7	0.49	271	C	20.8	0.55	307
	Westbound	A	0.5	0.43	0	A	0.5	0.37	1
	Southbound	E	67.7	0.75	247	D	53.6	0.61	174
Florida Avenue and 4th Street/S Street	**Overall**	**B**	**13.1**	**0.52**	**N/A**	**B**	**14.6**	**0.50**	**N/A**
	Eastbound	A	1.4	0.38	7	A	4.9	0.42	51
	Westbound	A	4.9	0.42	84	A	3.1	0.32	38
	Northbound	C	34.9	0.30	199	D	44.0	0.60	350
	Southbound	D	45.4	0.70	368	D	38.5	0.50	258
Florida Avenue and Rhode Island Avenue	**Overall**	**B**	**19.8**	**0.71**	**N/A**	**B**	**19.5**	**0.63**	**N/A**
	Eastbound	B	12.7	0.32	73	C	20.6	0.89	417
	Westbound	C	31.7	0.85	550	C	25.9	0.49	243
	North-westbound	A	6.3	0.53	29	B	17.6	0.39	202
	South-east bound	A	7.9	0.38	43	A	9.5	0.40	87

Based on the above table, the following intersection operates with an approach of LOS "E" or worse:

- Florida Avenue and 5th Street (southbound AM)

The peak hour queue exceeds the storage capacity at the following locations:

- Florida Avenue and New Jersey Avenue (The northbound approach has a queue length of 169 feet during the AM peak and 129 feet during the PM peak. The available storage is 90 feet. The westbound approach has a queue length of 310 feet during the PM peak. The available storage is 200 feet.)
- New Jersey Avenue and S Street (The northbound approach has a queue length of 240 feet during the AM peak and 60 feet during the PM peak. The available storage is 30 feet)
- Rhode Island Avenue and New Jersey Avenue (The southbound approach has a queue length of 154 feet during the AM peak and 146 feet during the PM peak. The available storage is 50 feet)
- Florida Avenue and Rhode Island Avenue (The south-eastbound approach has a queue length of 87 feet during the PM peak. The available storage is 35 feet. The eastbound approach has a queue length of 417 feet during the PM peak. The available storage is 200 feet)
- Florida Avenue and 4th Street/S Street (The westbound approach has a queue length of 84 feet during the AM peak. The available storage is 55 feet. The northbound approach has a queue length of 199 feet during the AM peak and 350 feet during the PM peak. The available storage is 140 feet)

Table 11: Existing Condition Pedestrian LOS

Intersection	Approach	AM Peak		PM Peak	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
New Jersey Avenue and Florida Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.67	B	2.57
	Westbound	B	2.54	B	2.48
	Northbound	B	2.26	B	`2.25
New Jersey Avenue and S Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	1.86	A	1.88
	Westbound	B	2.12	B	2.12
	Northbound	B	2.36	B	2.34
	Southbound	B	2.27	B	2.26
New Jersey Avenue and Rhode Island Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.79	C	2.84
	Westbound	C	2.79	C	2.85
	Northbound	B	2.25	B	2.23
	Southbound	B	2.25	B	2.33
Florida Avenue and 5th Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.53	B	2.54
	Westbound	B	2.58	B	2.57
	Southbound	A	1.87	A	1.82
Florida Avenue and 4th Street/S Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.48	B	2.46
	Westbound	B	2.47	B	2.45
	Northbound	B	2.10	B	2.12

Intersection	Approach	AM Peak		PM Peak	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
	Southbound	A	1.99	B	2.03
Florida Avenue and Rhode Island Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.81	C	2.84
	Westbound	C	2.83	C	2.85
	Northbound	B	2.48	B	2.45
	Southbound	B	2.45	B	2.45

For the future condition (with the proposed reconfigured network) the network was analyzed. Considering traffic rerouting many locations have different volumes than existing conditions. Signal timings and offsets were optimized and modified within the study area.

Table 12: Future Conditions Capacity and Queuing Analysis

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue
New Jersey Avenue and Florida Avenue	**Overall**	**A**	**8.7**	**0.47**	**N/A**	**B**	**19.1**	**0.46**	**N/A**
	Eastbound	A	0.5	0.50	0	A	0.1	0.51	0
	Westbound	B	13.3	0.59	117	D	43.7	0.54	293
	Northbound	C	23.6	0.44	211	C	31.1	0.32	190
New Jersey Avenue and S Street Ped/Bike Crossing	**Overall**	**B**	**16.5**	**0.14**	**N/A**	**B**	**17.6**	**0.12**	**N/A**
	Northbound	A	7.2	0.35	130	B	12.8	0.30	135
	Southbound	C	25.5	0.44	211	C	22.4	0.35	160
New Jersey Avenue and Rhode Island Avenue	**Overall**	**A**	**9.8**	**0.58**	**N/A**	**C**	**20.5**	**0.59**	**N/A**
	Eastbound	B	15.5	0.36	146	C	33.3	0.87	468
	Westbound	A	3.5	0.69	28	A	3.9	0.50	24
	Northbound	C	27.5	0.41	192	C	23.1	0.28	114
	Southbound	A	2.6	0.35	11	A	1.1	0.25	0
Florida Avenue and 5th Street	**Overall**	**C**	**20.2**	**0.67**	**N/A**	**C**	**20.9**	**0.57**	**N/A**
	Eastbound	C	22.8	0.50	274	C	30.2	0.68	382
	Westbound	A	0.9	0.54	14	A	2.9	0.45	0
	Southbound	E	73.2	0.94	513	D	54.2	0.78	333
Florida Avenue and Rhode Island Avenue	**Overall**	**C**	**20.1**	**0.76**	**N/A**	**B**	**19.1**	**0.70**	**N/A**
	Eastbound	B	13.5	0.34	83	C	20.1	0.90	215
	Westbound	C	32.7	0.86	553	C	25.9	0.49	243
	North-westbound	A	7.6	0.67	36	C	25.3	0.50	260
	South-eastbound	A	6.2	0.44	28	**A**	**2.1**	**0.44**	**20**

Intersection	Approach	AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue
Florida Avenue and 4th Street	**Overall**	**A**	**7.4**	**0.36**	**N/A**	**B**	**13.4**	**0.48**	**N/A**
	Eastbound	A	6.8	0.34	110	C	21.2	0.78	360
	Westbound	A	6.5	0.48	84	A	4.6	0.40	41
	Southbound	C	23.0	0.11	72	C	24.9	0.07	48

Based on the above table, the following intersection is projected to operate with an approach of LOS "E" or worse:

- Florida Avenue and 5th Street (southbound AM)

At the peak hour queue will exceed the storage capacity at the following locations:

- Florida Avenue and New Jersey Avenue (The northbound approach has a queue length of 211 feet during the AM peak and 190 feet during the PM peak. The available storage is 90 feet. The westbound approach has a queue length of 293 feet during the PM peak. The available storage is 200 feet.)
- New Jersey Avenue and S Street (The northbound approach has a queue length of 130 feet during the AM peak and 135 feet during the PM peak. The available storage is 30 feet)
- Florida Avenue and Rhode Island Avenue (The eastbound approach has a queue length of 215 feet during the PM peak. The available storage is 200 feet)
- Florida Avenue and 4th Street (The westbound approach has a queue length of 84 feet during the AM peak. The available storage is 55 feet. The eastbound approach has a queue length of 360 feet during the PM peak. The available storage is 175 feet)

Table 13: Future Condition Pedestrian LOS

Intersection	Approach	AM Peak		PM Peak	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
New Jersey Avenue and Florida Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.64	B	2.62
	Westbound	B	2.47	B	2.48
	Northbound	B	2.32	B	2.30
New Jersey Avenue and S Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	A	1.74	A	1.74
	Westbound	B	2.32	B	2.30
	Northbound	B	2.32	B	2.30
New Jersey Avenue and Rhode Island Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.82	C	2.86
	Westbound	C	2.81	C	2.85
	Northbound	B	2.35	B	2.31

Intersection	Approach	AM Peak		PM Peak	
		LOS	Pedestrian Crosswalk Score	LOS	Pedestrian Crosswalk Score
	Southbound	B	2.33	B	2.30
Florida Avenue and 5th Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.53	B	2.54
	Westbound	B	2.64	B	2.61
	Southbound	A	2.00	A	1.90
Florida Avenue and 4th Street	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	B	2.46	B	2.46
	Westbound	B	2.49	B	2.46
	Southbound	A	1.79	A	1.82
Florida Avenue and Rhode Island Avenue	**Overall**	**N/A**	**N/A**	**N/A**	**N/A**
	Eastbound	C	2.82	C	2.85
	Westbound	C	2.83	C	2.85
	North-west bound	B	2.50	B	2.47
	South-eastbound	B	2.46	B	2.46

Summary of Findings

The following is a summary of findings for the proposed Rhode Island Avenue/Florida Avenue/New Jersey Avenue/S Street/4th Street intersection improvements:

- All of the study area approaches are projected to operate at acceptable conditions except the southbound approach at the Florida Avenue/ 5th Street intersection during the AM peak hour.
- The total number of traffic signals in the study area would be reduced.
- The removal of the vehicular connection of S Street at New Jersey Avenue and Florida Avenue would provide a better pedestrian environment within the study area by reducing the number of conflicts with vehicles.
- A significant amount of traffic (206 vehicles during the AM peak and 136 vehicles during the PM peak) are projected to be added 5th Street southbound due to the rerouting of 4th Street southbound traffic. Currently there are 169 vehicles in the AM peak and 129 vehicles in the PM peak using southbound 5th Street.
- A total of 122 AM peak hour trips and 201 PM peak hour trips that are currently routed through the study area intersections are projected to use alternative routes outside of the study area.
- 6th street, 4th Street (east), T Street and 3rd Street should be considered for future analysis.
- Florida Avenue and Rhode Island Avenue should be considered for future corridor analysis.

FIRST STREET, NW

Proposal Description

The consultant team identified the need to reduce speeds of drivers, increase driver compliance with traffic controls, create some deterrence from using the First Street corridor as an alternative to North Capitol Street and improve conditions for pedestrians and cyclists. The proposed improvements include modifying several stop sign controlled intersections to include traffic mini-circles. Vehicles within the circle would have priority while vehicles approaching the traffic mini-circle along First Street would be controlled by yield signs. The following intersections along the First Street, NW corridor were identified as potential locations for mini-circles:

- N Street, NW
- R Street, NW
- Randolph Place, NW
- S Street, NW
- Seaton Place, NW
- U Street, NW
- W Street, NW

The mini-circles would be designed with a 15-foot and would be mountable to help accommodate a single unit truck. Although use of First Street is prohibited for through truck traffic north of Rhode Island Avenue the collector is still used by local delivery trucks and emergency vehicles.

Site Access Impacts

The proposed locations of the mini-circles would not impact existing vehicular or pedestrian access to adjacent sites. Emergency vehicle access would be maintained.

Scope of Analysis

Seven intersections along the First Street corridor were identified as potential locations for the proposed traffic mini-circles. Existing traffic data was available for one of the seven intersections, thus this location was selected and analyzed as part of this assessment:

- First Street, NW/ U Street, NW

The analysis results section of this report provides vehicular LOS and delay, v/c ratio and 95th percentile queue lengths for the above noted intersection.

Analysis results for the First Street/U Street intersection was thought to be a good indicator of analysis results for the other mini-circle locations on First Street.

Existing Conditions Overview

The following is an overview of transportation conditions along the First Street corridor:

- Existing intersection traffic control is all-way stop along First Street at the intersections with W, U, S, R and N Streets and Randolph and Seaton Place.
- There were 93 pedestrians and 18 bicycles in the AM peak hour and 155 pedestrians and 12 bicycles during the PM peak hour at the First Street/ U Street intersection.

Figure 13 provides an illustration of peak hour traffic at the First Street/U Street intersection.

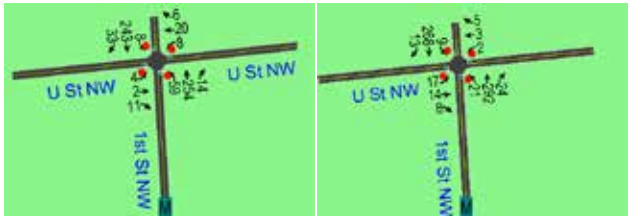

Figure 13 AM Peak Hour (left) and PM Peak Hour (right) turn movement counts

Safety Assessment

The safety assessment includes a review of crash data over a three-year period from January 1, 2010 to December 31, 2012 from DDOT's Traffic Accident Reporting and Analysis System (TARAS) for all seven identified locations along First Street, NW.

The data includes summary information by location for type of collision and type of injury. TARAS reports do not identify site specific information or notes recorded that may be in the actual accident report (documented at the time of the accident in a police report). A summary of crash history (over a three-year observation period) based on the available information rendered in the TARAS report is as follows:

- First Street/ W Street - There were 10 accidents over a three year period of which two involved injuries. About half (50%) of the recorded accidents were sideswipes. A range of other types of collisions were recorded including left turns, accidents with parked vehicles and accidents with a fixed object. In one of the accidents a pedestrian was hit.
- First Street/ U Street - A total of 16 crashes were reported. No collision type was identified for six of the collisions from the TARAS report. Three crashes involved an injury and there was one crash were a pedestrian was hit. The predominant collision pattern was sideswipes which accounted for 25% (4) of the total. A range of other types of collisions occurred such as parked vehicle, right angle, head-on and backing into a moving vehicle.
- First Street/ Seaton Place: A total of 10 crashes occurred at this intersection. One collision involved an injury and there was one collision in which a pedestrian was hit. Sideswipe collisions accounted for 50% of the reported accidents. Two other types of accidents were recorded including right angle and backing into a parked vehicle.
- First Street/ S Street - There were 6 crashes over the three-year observation period. Approximately 33% (2) of the reported collisions involved hitting a parked vehicle and one crash was injury-related.
- First Street / Randolph Street – Two of the three reported crashes at this intersection were with a fixed object. None of the crashes involved an injury or pedestrian.
- First Street / R Street - Sideswipe made up 50% of the total crashes (10) and was the predominant crash pattern. There were also 2 rear-end, 1 parked vehicle, 1 head-on and 1 right turn collision at this intersection.
- First Street / N Street – There were a total 12 crashes. Of these crashes, 4 involved an injury. Approximately 25% of the accidents were right angle.

Rear-end and angle accidents typically have a higher rate of occurrence at stop controlled intersections. Similar to roundabouts, mini-circles could be expected to decrease the occurrence

of angle accidents and rear end accidents involving higher speed. In addition, the path required to traverse a mini-circle would require drivers to reduce travel speed.

The crash rate for the First Street/ U Street intersection is 1.85 MEV. A crash rate of 1.00 per million equivalent vehicles (MEV) is an industry standard. The crash rate is only reported at the First Street/ U Street intersection where traffic data was collected. Existing traffic data was not available at the other intersections with First Street therefore crash rates could not be calculated.

Analysis

Analysis of the proposed traffic mini-circle at the First Street/ U Street intersection was conducted using SYNCHRO 8 following the HCM 2010 roundabout analysis methodology.

Default values were typically used for analysis input parameters. Traffic data that was available for the First Street/U Street intersection did not include number of heavy vehicles. A conservatively high estimate of parking maneuvers per hour was assumed (five per hour), considering on-street parking is primarily residential.

Table 14 provides a summary of LOS, delay, v/c ratio and 95th percentile queue for the overall intersection operation and by approach for the First Street/ U Street intersection.

Table 14 First and U Street LOS, Delay, V/C Ratio and 95th Percentile Queue Length

		AM Peak				PM Peak			
		LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)	LOS	Delay (second/ vehicle)	V/C Ratio	95th Percentile Queue (feet)
Existing All-Way Stop	**Overall**	**B**	**10.5**	**N/A**	**N/A**	**B**	**10.6**	**N/A**	**N/A**
	EB	A	8.3	0.03	57.5	A	8.8	0.07	60
	WB	A	8.7	0.06	2.5	A	8.4	0.02	5
	NB	B	11.0	0.45	5	B	11.0	0.46	0
	SB	B	10.2	0.39	45	B	10.4	0.40	47.5
Proposed Mini-circle	**Overall**	**A**	**6.6**	**N/A**	**N/A**	**A**	**6.5**	**N/A**	**N/A**
	EB	A	4.5	0.02	0	A	4.9	0.04	0
	WB	A	5.1	0.04	0	A	4.9	0.01	0
	NB	A	6.6	0.27	25	A	7.0	0.28	50
	SB	A	6.8	0.25	25	A	6.3	0.24	25

95th Percentile queue length calculated based on 25-foot car length referenced in Synchro 8

As shown in Table 14, all approaches of the intersection currently operate at acceptable LOS and v/c ratio.

The 95th percentile queue length indicates a maximum queue length of about two cars along the eastbound and southbound approaches during the AM and PM peak hours. This queue is nominal and does not impact any adjacent intersections.

With the proposal improvement, intersection operations would slightly improve with a reduction in overall intersection delay of 3.9 seconds per vehicles (from 10.5 to 6.6 in the AM and from 10.6 to 6.5 in the PM). Both the northbound and southbound approaches would also experience

improved conditions from LOS B to LOS A, compared to existing conditions during the AM and PM peak periods.

Summary of Findings

With the proposed traffic mini-circle intersection configuration the First Street/ U Street intersection would improve slightly compared to existing traffic conditions. The proposed traffic mini-circles could allow for a number of safety improvements including reducing driver speed traversing intersections along First Street and reducing the occurrence of rear-end and angle accidents.