

EASTERN MARKET METRO PARK



M A S T E R P L A N

Final Report

February, 2015

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Barracks Row Main Street

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A. Executive Summary

This Master Plan addresses a historic public square created by the L'Enfant Plan and located along one of the city's most monumental boulevards, Pennsylvania Avenue as it traverses from the east of the Anacostia River to the U.S. Capitol. The site, all publicly owned land along Pennsylvania Avenue SE, from 7th to 9th Streets and between the split D Streets, has never been developed as an attractive, inviting and well-designed park like the other major L'Enfant Plan squares in the District.

This Plan lays out a bold framework for transforming the site's neglected, decayed 1970's landscape into a vibrant, engaging, and functionally improved public space located in the heart of Capitol Hill. The site's role as an important transportation hub for bus and subway lines is significantly enhanced by improvements to pedestrian, bicycle, car-sharing and bus stop facilities supporting the public transit lines.

Each of the site's six parcels are developed with design concepts that optimize the public use of land and improve pedestrian safety, sustainability, and community engagement.

Parcel 1, the northeast corner, re-introduces the historic South Carolina Avenue axis through the site and provides a new unique children's playground for the community.

Parcels 2 and 5, the "Medians", create stormwater filtration gardens to treat and retain stormwater, and encourage pedestrian safety by limiting mid-block crossings.

Parcels 3 and 6, the "Bowties", capture and direct stormwater into planted bioswales while providing new shaded park seating on these parcels.

Parcel 4, the Metro Plaza, creates a vibrant public gathering space at the Metro Station entrance and provides a "once in a lifetime" potential opportunity to expand the historic Southeast Branch Public Library to meet today's DC Public Library's standards.

Created jointly by the Capitol Hill Community and the design team over an eleven month period, this Master Plan has been embraced by the Community, and provides the starting point for a City-sponsored project to implement the Community's goals for this neglected but important open space.



B. Goal & Objectives

1. Project Goal

The goal of this Master Plan study is to engage the Capitol Hill community in determining how to improve their two city blocks of public space located at the Eastern Market Metro Station, and to work with the community to develop these ideas into a blueprint for implementation.

2. Community Objectives

The community-based Task Force reviewed input from an extensive solicitation for community comments, suggestions, and ideas. The Task Force's consensus of the Community Objectives to guide the Master Plan work is as follows:

- To build relationships among Hill neighbors by creating public civic spaces that attract the community to gather and socialize.
- To provide a civic plaza at the Metro Station entrance to welcome, engage, and orient the ever increasing numbers of residents, visitors, commuters, pedestrians, and cyclists.
- To provide a secure active play area for the increasing number of young families in the neighborhood.
- To improve the functional aspects of the site as an active transportation hub, including pedestrian safety, bicycle facilities, and inter-modal transfer.
- To establish connections to the Hill's urban ecology by incorporating sustainability measures throughout the project.
- To engage the Southeast Branch DC Library with the site.
- To increase security in the area both at night and during the day.
- To plan for the long term maintenance of the site by planning an organizational structure and source of funding that will maintain the physical elements as well as address rodent control issues and public hygiene.
- To reinforce the original intent of the L'Enfant Plan by carrying the South Carolina Avenue axis through the site, enhancing Pennsylvania Avenue, and creating engaging civic spaces which mirror the spirit of the District's other L'Enfant Plan open spaces.

C. Study Process & Outreach

1. Study Methodology

The following outlines the Design Team's sequential steps in executing the study:

a. Initial Community Input

Before commencing with analysis and design work, two open public Community Meetings were held to solicit the community's goals, objectives, and ideas for the site's improvement. Additional comments came in through a 4 week open comment period following the Meetings via the project website and blog.

b. Data Gathering

The Design Team undertook an extensive inventory and analysis of the study area's existing conditions. The data gathered included, but was not limited to, the following:

- Community input regarding how the study area is currently used, its strengths and its weaknesses (see Initial Community Input below)
- A detailed certified topological & utility survey by AMT Engineering in 2008
- Eastern Market Metro Station section design documents indicating the below grade WMATA facilities within the study area.
- Capitol Hill and study area traffic data from DC Department of Transportation.
- Traffic counts conducted on site by Kittelson and Associates.
- The history of the study area, researched during a 2010 study.
- Current and proposed DC Zoning, DC Planning, DC Transportation, and Federal Agency planning efforts affecting the Study Area were reviewed.

c. Community Input & Data Analysis

The Community input and data gathered formed the basis for the Team's urban design analysis of the existing conditions, and was presented for comment to the Capitol Hill community in open public meetings, as well as to the Task Force. Diagrams of the existing conditions, presented at these meetings, were also posted on the project website for review and comment.

d. Response to Community & Regulatory Input

The Task Force reviewed all input and data, and provided guidance to the Design Team in the form of programmatic descriptions for each of two alternative concepts to be developed by the Team. While developing the two alternatives, the design team met with several DC and Federal Agencies for further input and guidance.

e. Two Alternative Concepts

The two alternative concepts, based on the programmatic briefs of the Task Force, were presented to the community in two open public meetings. An open Comment Period was held for the 8 weeks following the presentation to allow the community to provide comments, suggestions, and feedback. The Design Team organized all of the community input for review by the Task Force, which deliberated and selected portions of each of the two alternatives to be combined into a final Master Plan concept. In addition, the Task Force emphasized to the Design Team key issues to address while developing the final Master Plan.

f. Final Master Plan

The Design Team developed the final Master Plan concept and sought further guidance from several DC and Federal Agencies for incorporation into the plan. In addition, the Design Team developed a Budget Estimate of the cost of implementing the Master Plan and providing for long term maintenance of the study area.

g. Final Presentation

The Final Master Plan, including the budget estimate, was presented to the Community at two open public meetings, and posted on the Project's website.

2. Community Outreach & Participation

The Design Team built upon both initial and ongoing direct Community input to ensure that the ultimate master plan reflects the Community's goals and objectives.

a. Media Communications with Community:

Print , Blog and Internet Media:

Throughout the course of the project, media coverage by the Hill Rag, the Voice of the Hill, the City Paper, Greater Greater Washington, several local blogs, local listservs and other local news outlets covered the project's progress. Upcoming community-wide meetings were announced in these media, as well as by the distribution of flyers in the immediate neighborhood and postings on the project website. Additionally, Capitol Hill community organizations such as the Capitol Hill Restoration Society and Barracks Row Main Street announced upcoming project meetings and provided newsletter coverage of the study's progress.

Dedicated Project Website:

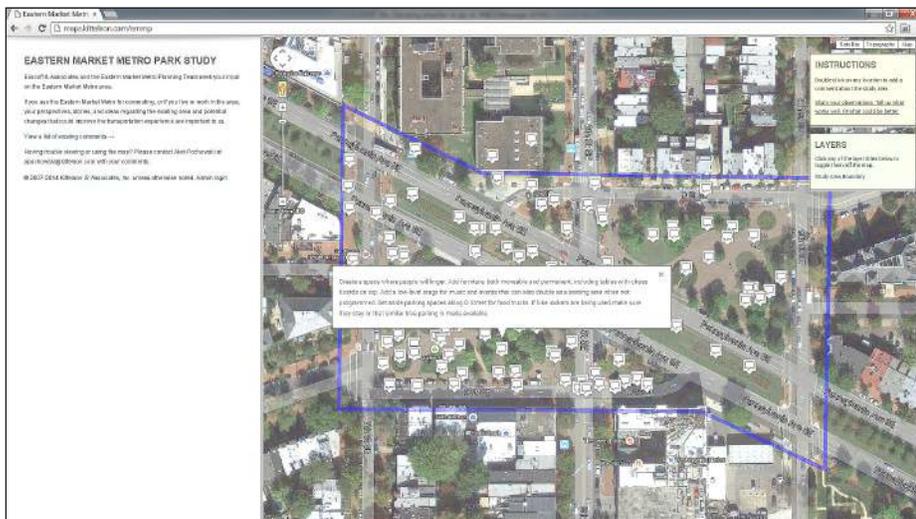
A project website (www.EasternMarketMetroPark.org) designed to facilitate communication and community outreach was created, maintained, and updated throughout the study period. Copies of all presentations and meeting minutes were posted to the website and public comments solicited through an interactive comment component and blog.



Screenshot of Project Website Homepage

Interactive Map:

This innovative tool allowed the public to make comments about specific locations within the overall study area. Visitors to the website could see at a glance where there were areas of concern, and could read the comments for each area and add their own feedback.



Screenshot of Interactive Online Public Comment Tool

b. Community Task Force:

An advisory Task Force was organized by Barracks Row Main Street to distill all issues and input received from the community and then provide guidance to the Design Team regarding program and design direction. The Task Force was comprised of individual representatives from Capitol Hill community groups, Advisory Neighborhood Commission 6B, and individuals representing the immediate surrounding residential neighborhoods (See Appendix III for list of Task Force Members). Task Force members were also available to serve as a conduit for any individual community member wishing to discuss issues of concern.

c. Participants in Study

During the study period, the design team was guided by over 850 individual community comments from community residents and local business owners. In addition to the Community Task Force, meetings were held with community group representatives, other stakeholders, and governmental groups as follows:

Other Stakeholders

The Friends of the Southeast Branch Library
Community Connections (a community mental health provider adjacent to Parcel 3)

Agencies Having Jurisdiction:

The Design Team met with staff members of the following DC agencies:

- DC Department of Transportation
- DC Office of Planning
- DC Historic Preservation Office
- DC Library
- DC Parks and Recreation
- DC Water
- DC Department of the Environment
- Washington Metropolitan Area Transit Authority (WMATA) including Department of Operations Services (Bus)

The Design Team met with staff members of the following federal agencies:

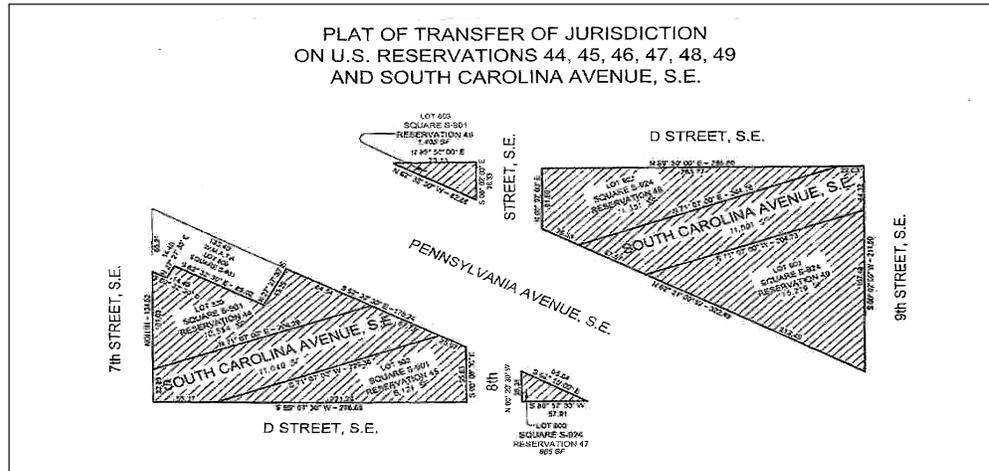
- National Park Service
- U.S. Fine Arts Commission
- National Capitol Planning Commission

D. Existing Conditions

1. Site Jurisdiction and Ownership

The project site is comprised of eight Reservations, originally created as National Park Service Reservations 44, 44A, 45, 46, 47, 47A, 48, and 49. In the mid 1960's, WMATA took control of a portion of Reservation 44 in order to construct and maintain the Eastern Market Metro Station entrance.

In 2010, jurisdiction of Reservations 44, 45, 46, 47, 48, and 49 was transferred to the DC Government by the National Park Service. Ownership of these reservations was retained by the National Park Service. The jurisdiction of these reservations is currently held by the DC Department of General Services. Currently, Reservations 44A and 47A are both owned and under the jurisdiction of the National Park Service.



From Plat of Transfer dated 9/7/2010, D.C. Surveyor's Office

2. Site: Natural and Contextual Conditions

The project is located within the southeast quadrant of Washington DC, and within the Capitol Hill community. The project's study area is defined as the public right-of-ways of 7th, 9th, and D Streets, SE, as well as all land areas inscribed by those right-of-ways as indicated below.



Aerial photo of Study Area

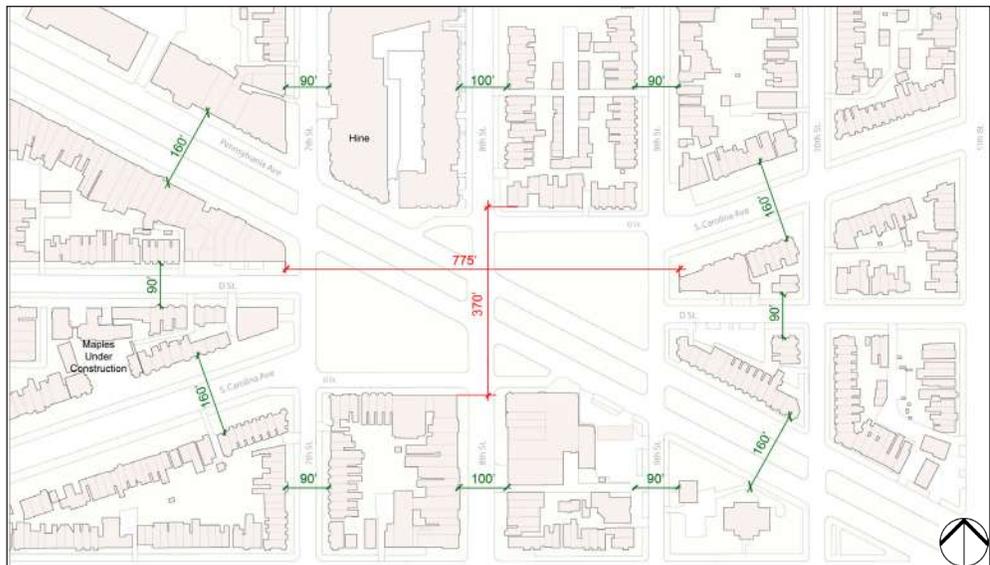
For the purpose of this study, the study area's six parcels are numbered sequentially starting at the northeast corner of the site and moving clockwise. These parcel numbers are used throughout this report for parcel identification:



Study Area with Parcel Numbers

Size & Scale of Study Area

The size of the study area is approximately 7 acres – larger than the aggregation of four football fields. The heights of the surrounding buildings range from the one story CVS store at the west edge to the five story historic Haines Department Store structure at the southeast corner. The predominant building heights defining the square are two, three, and four story structures. This low height relative to the Square's plan dimensions has historically resulted in a lack of visual spatial definition to the open space.



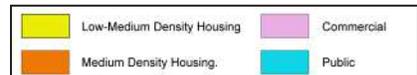
Site Dimensions

Land Use

The existing land uses surrounding the Square include residential, commercial, and public uses. The map below indicates the predominate land use of each lot. The Maples project on South Carolina Avenue that is currently under-construction is shown, as well as the proposed Hine project development in the 700 block of Pennsylvania Avenue, 300 block of 7th Street, and 300 block of 8th Street.

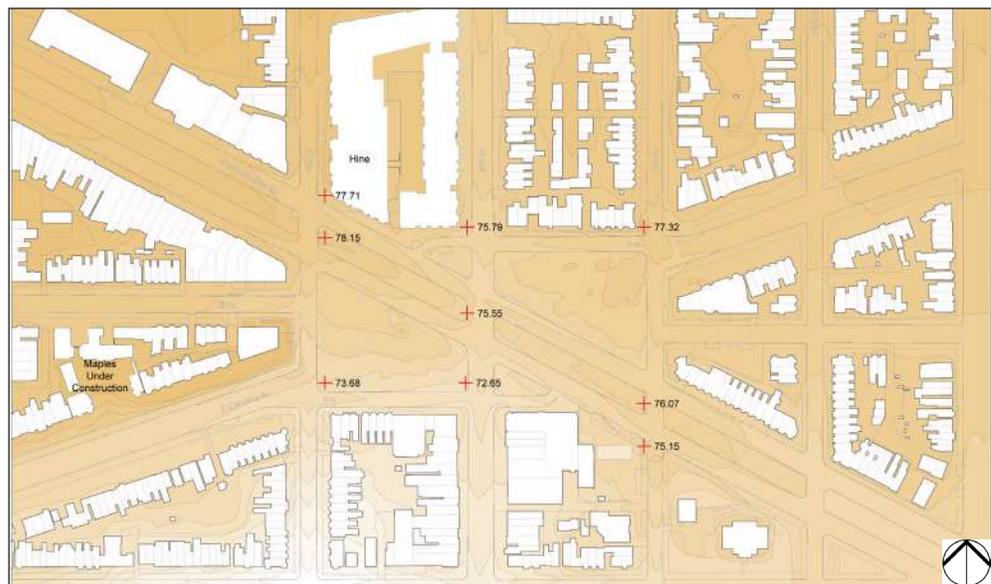


Land Use Map



Topography

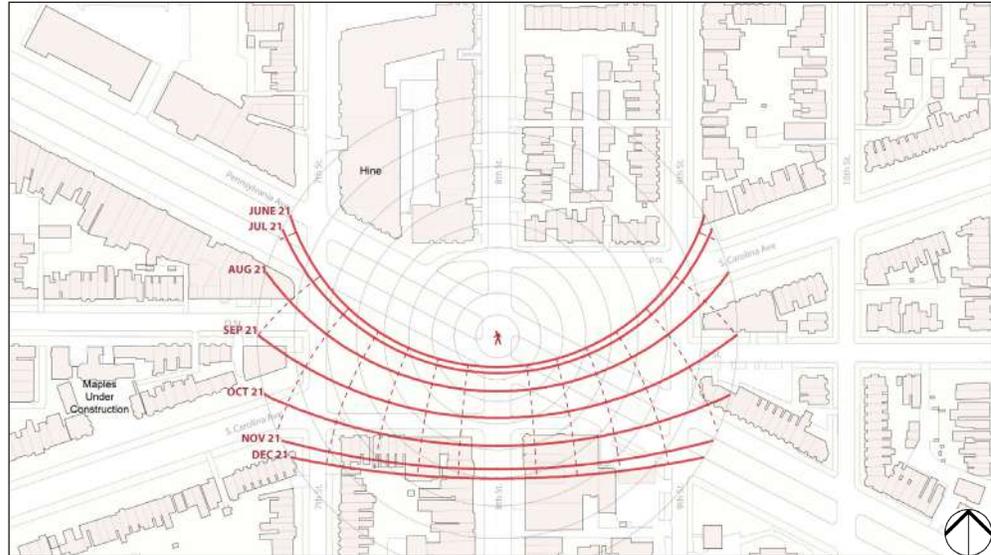
The topography of the study area slopes down from both the east and west borders to 8th Street in the center, and from the north edge to the south edge. This is consistent with the area's original natural slope to the Anacostia River.



Topography

Wind & Sun Exposure

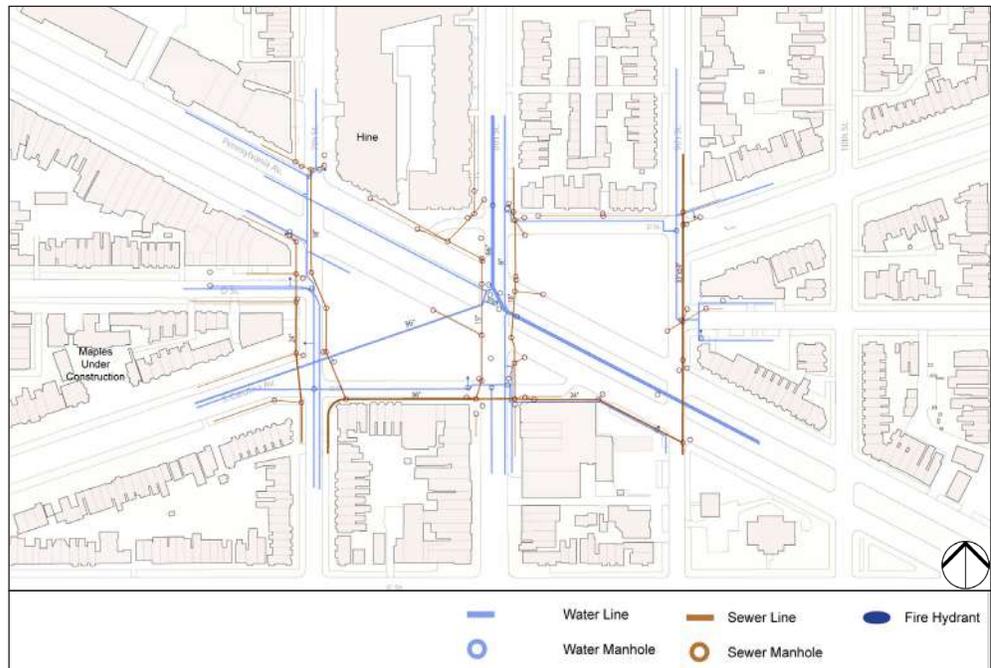
In the Washington DC metropolitan area, summer prevailing winds average 8.1 mph and are predominantly from the south. In the winter, the prevailing winds average 8.7 mph and are predominantly from the south and northwest. The study area, due to its current deficit of large shade trees and the relatively low height of surrounding buildings, experiences the full effects of solar radiation throughout the year. Diagrams below indicate the solar path across the area spanning from the longest day of the year to the shortest.



Site Sun Path

Utilities

In general, the study area's below grade utilities are typical of developed urban areas of the city. Of particular note is a large 66 inch diameter water main running south beneath the 8th Street right-of-way and turning at Pennsylvania Avenue to run eastward under the Parcel 2 median. Pertaining to the potential expansion and addition to the Southeast Branch DC Library, a 36 inch sewer line runs under the former South Carolina Avenue in Parcel 4, and there are smaller sewer and water lines running north-south beneath 7th Street.



Site Underground Utilities

Existing Landscape Conditions

The study area contains a mixture of street trees, flowering understory trees and planting beds with shrubs and lawn. The tree size varies widely from newly planted, two-inch diameter trees to mature trees measuring 24 – 30 inch diameter (when measured 12 inches above the ground). The tree cover on Parcel 4 (refer to aerial photograph below) is limited to the street trees and the small grove of Japanese Pagoda Trees (*Sophora japonica*) in the southeast corner of the site, leaving much of the site open. Parcels 2 and 5 do not contain any trees, only lawn and shrubs. Overall, trees in the study area show significant signs of urban stressors: compacted impervious soils, restricted root penetration, girdled roots, and trunk and limb damage from cars and trucks.

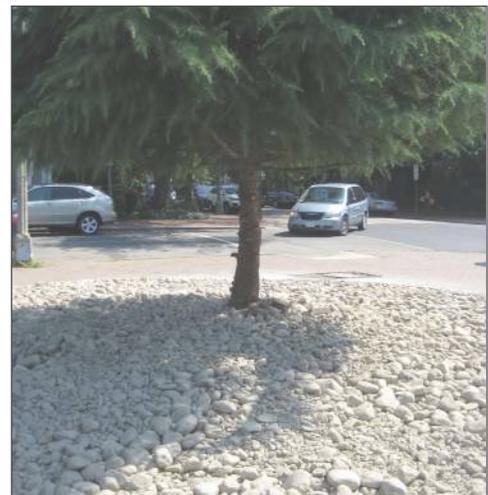
Parcels 1, 2, 3 and 5 have the highest concentration of pervious surfaces (lawn and tree beds) while Parcels 4 and 6 are predominantly paved with impervious materials, heightening stormwater runoff.

In addition, as the neighborhood and adjacent land-uses have changed, sidewalks and hardscape no longer correlate to pedestrian patterns. Pedestrian-made pathways traverse existing lawn and the desire for shade has increased soil compaction under the trees throughout the study area.



Aerial photo of Study Area

During the summer of 2014, in an effort to reduce the rodent population in Parcel 4, the shrub and groundcover plantings in two large planting beds were removed and replaced with large river rock and boulders. An existing Deodar cedar (*Cedrus deodara*) tree was limbed-up significantly to reduce the amount of needed habitat.



Photographs of recent rodent control measures

WMATA Facilities

In addition to five bus stop shelters serving the eleven bus lines crossing the site area, the site also holds the escalator, canopy, and elevator entrance to the Eastern Market Metro Station.

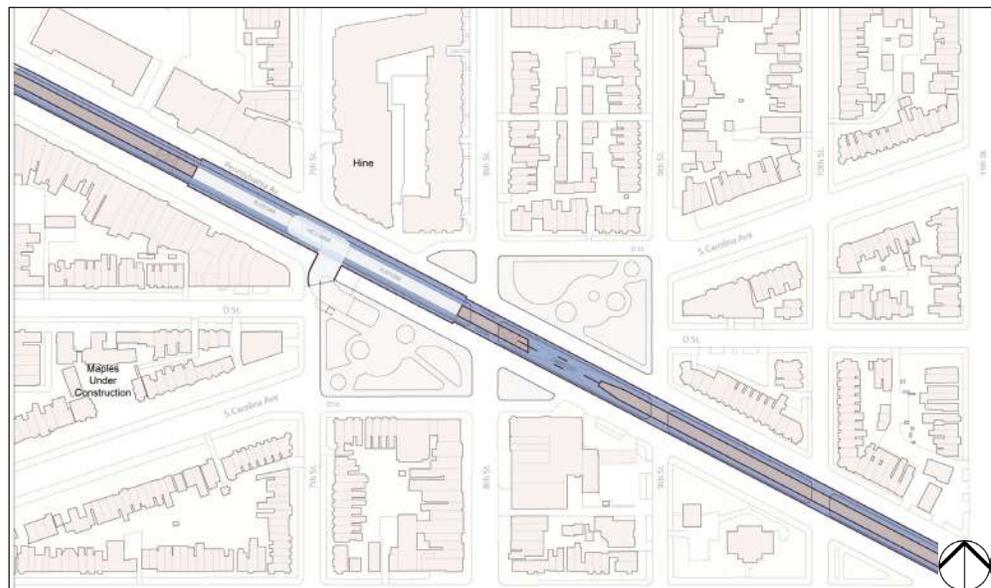
Also of note are six vent grates located along the south edges of Parcels 2 & 5 which serve the Metro Station and its service rooms located below grade. In addition, a large air intake vent is located in the southwest corner of Parcel 2.



WMATA Facilities Above Grade

— Metro Vents
— Bus Shelters, Metro Entry Canopy & Elevator

The below-grade WMATA structures in the study area include the mezzanine connection to the east half of the station itself, the east service rooms, an emergency egress stair at the large air intake vent, a tunnel cross-over, and the tunnels themselves leading eastward to the Potomac Avenue Metro Station and westward to the Capitol South Metro Station.



WMATA Facilities Below Grade

3. Traffic & Transportation

This section documents the current transportation conditions of the study area roadways and intersections, seen in Figure D.1, along with the bicycle, transit and pedestrian facilities.

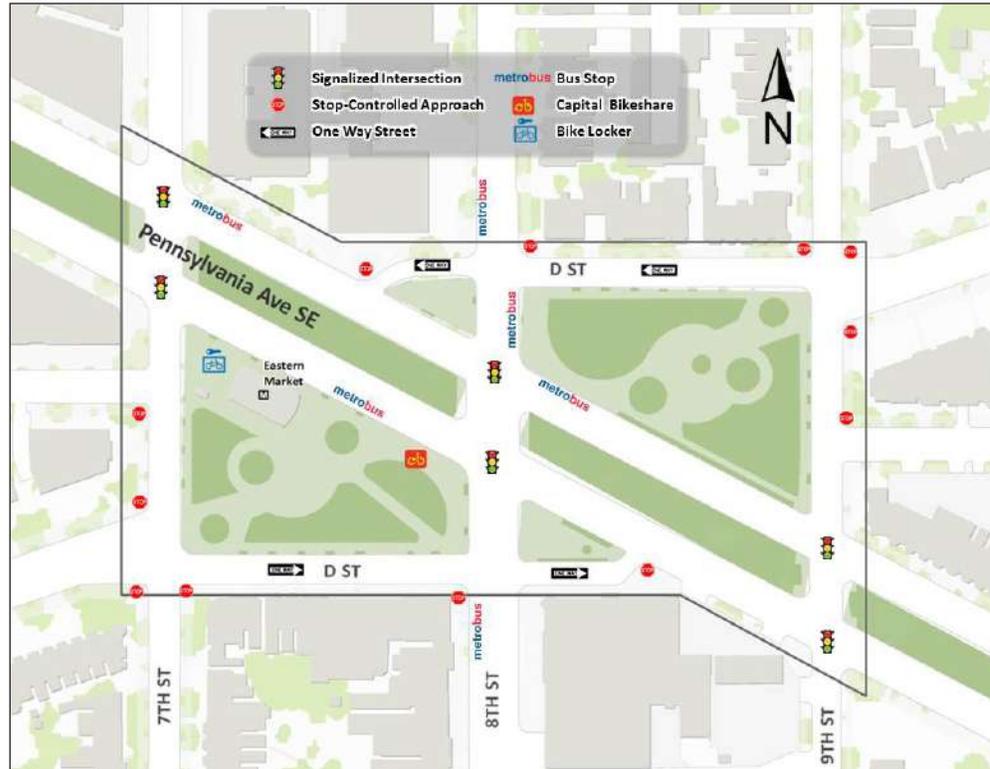


Figure D.1 - Transportation Study Area

a. Data Collection Methods:

The design team coordinated with the District Department of Transportation (DDOT) to conduct an inventory of transportation conditions within and immediately adjacent to the project site. The data collected and used to perform the existing conditions analysis in the study area includes traffic counts, transit data, site visit information, and crash data.

Traffic counts were conducted in July 2013 when Congress was in session to collect traffic data representative of a typical midweek day. The counts recorded the number of vehicles making each movement at an intersection during weekday a.m. and p.m. peak hours. The traffic counts also included the number of study area pedestrian and bicycle movements during the same time periods, and were collected at all nine study area intersections.

In addition, a site visit was conducted in July 2013, during a representative weekday p.m. peak period to document existing conditions and highlight observations that would not be easily ascertained from other collected data.

The site visit observations and analysis were complemented by comments provided by the public through the community engagement process described in the Study Process & Outreach section of this report.

b. Roadways, Traffic Control, and Lane Configuration

The study area roadways include Pennsylvania Avenue SE, 7th Street SE, 8th Street SE, 9th Street SE, and D Street SE. The study area roadways, intersection lane configurations, and traffic control devices are displayed in Figure D.2.

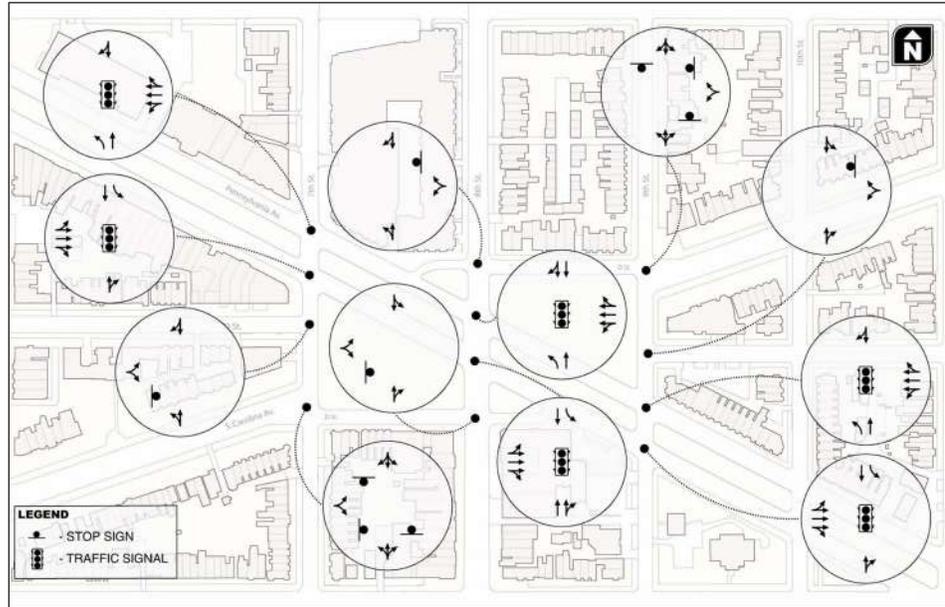


Figure D.2 - Study Area Lane Configuration and Traffic Control Devices

Twenty-four hour traffic counts were collected on Pennsylvania Avenue SE between 7th Street SE and 8th Street SE. Figure D.3 displays the hourly volume profile for vehicles in the eastbound (outbound) and westbound (inbound) directions. Consistent with expectations, traffic is heavier in the westbound direction (towards downtown Washington DC) in the morning and the reverse is true in the evening.

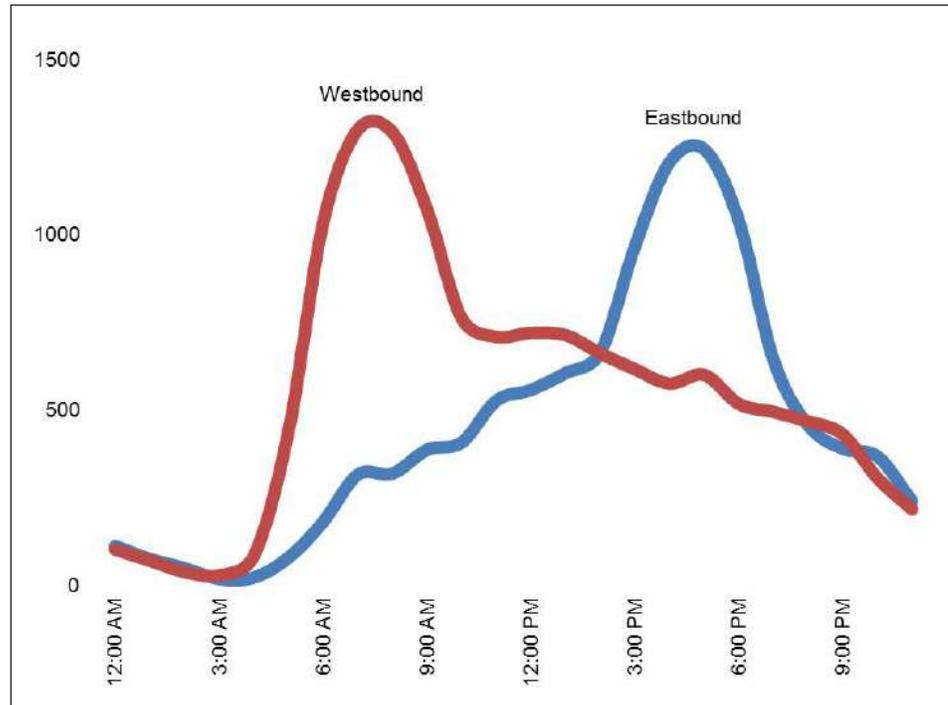


Figure D.3 - Hourly Pennsylvania Avenue, SE Traffic Volume Profiles

c. **Vehicular Traffic Conditions**

The July 2013 traffic counts were used to conduct an operations analysis of the study area intersections. The operations analysis represents a worst case scenario typical of a midweek peak hour. Traffic conditions during all other weekday time periods and throughout the weekend will likely operate under better conditions than described in this report.

The average vehicle delay, volume-to-capacity (v/c) ratio, and level of service (LOS), for each intersection during the morning and evening peak hours, respectively, is indicated in Figures D.4 and D.5 below. See descriptions of LOS. in Appendix I, page 38. As seen in the two figures, all of the study area signalized intersections operate at LOS C or better, and with the exception of the 8th Street/D Street SE (south) intersection, all of the unsignalized intersections operate at LOS D or better. The 8th Street/D Street SE (south) intersection operates at LOS F during the a.m. and p.m. peak hours, with a v/c ratio of 0.70 during the a.m. peak hour, and at capacity during the p.m. peak hour.

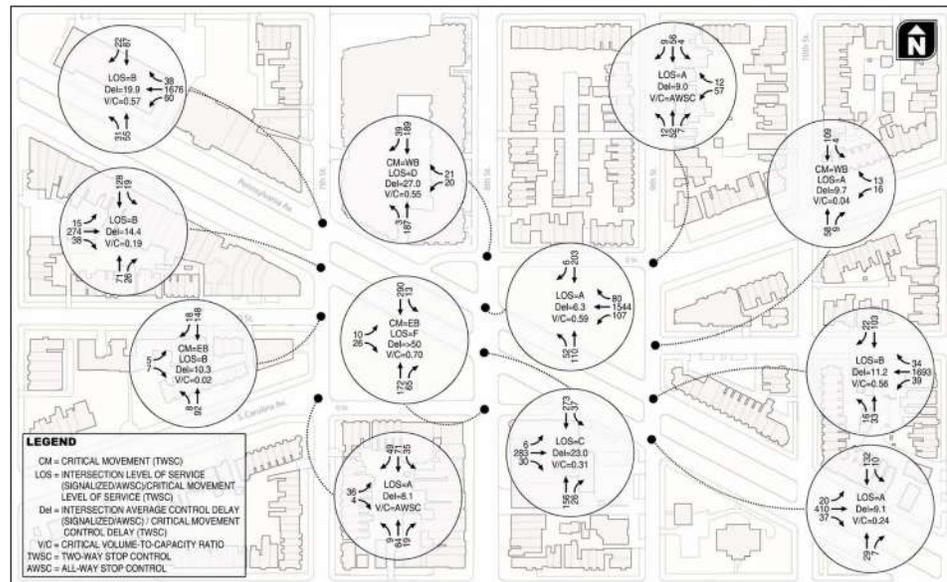


Figure D.4 - Existing Weekday AM Peak Hour Traffic Volumes and Intersection Operations

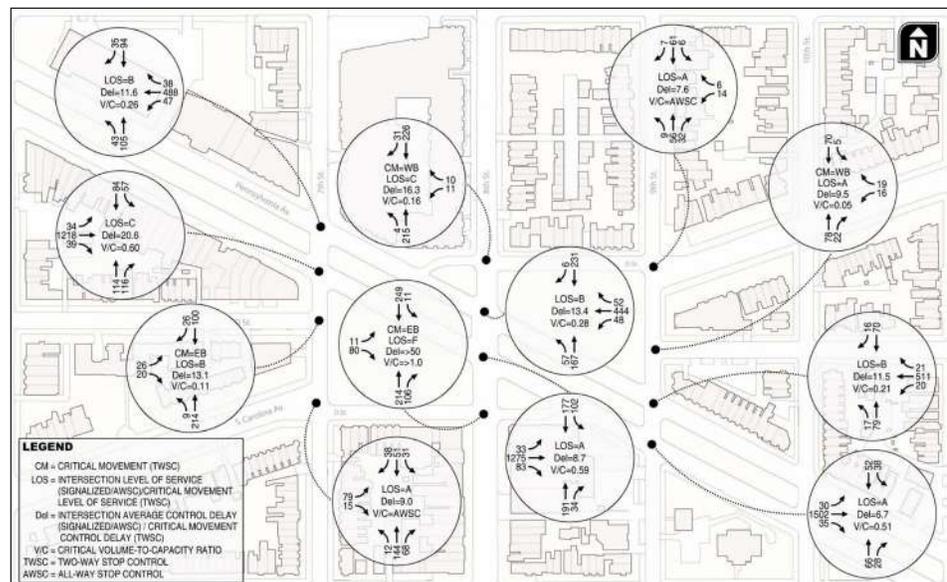


Figure D.5 - Existing Weekday PM Peak Hour Traffic Volumes and Intersection Operations

d. Pedestrian Conditions

The number of pedestrians making roadway crossings at the study area intersections, and making a mid-block crossing on Pennsylvania Avenue between 7th Street SE and 8th Street SE, were counted in July 2013 during the weekday a.m. and p.m. peak hours. Figure D.16 displays the peak-hour pedestrian volumes.

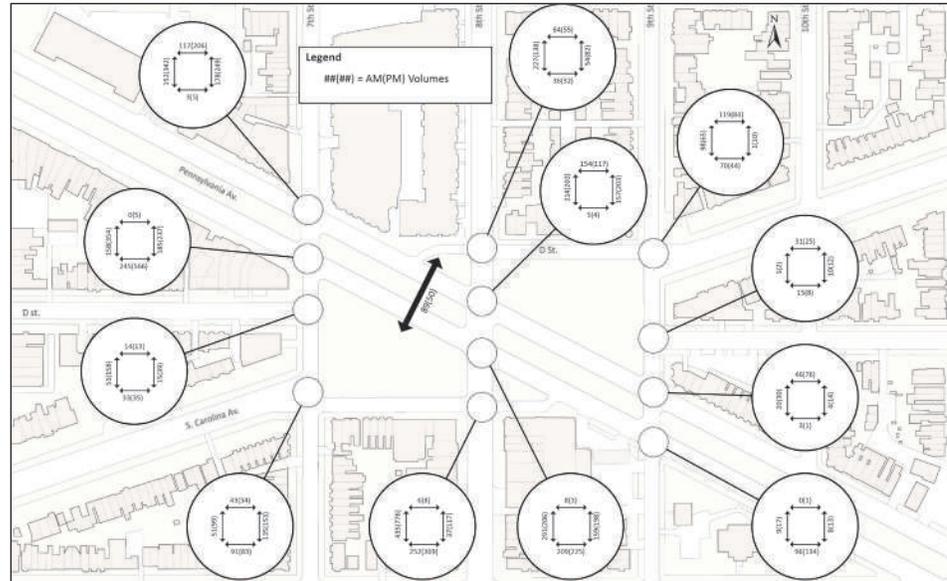


Figure D.6 - Peak Hour Pedestrian Volumes

The counts and site observations identified the Metro Station as the primary pedestrian generator in the study area. In addition, public feedback, observations, and counts, showed pedestrians frequently cross Pennsylvania Avenue SE midblock between 7th and 8th Streets near the Metro Station. These mid-block crossings tend to occur in waves consistent with the arrival of Metro trains.

The site visits also revealed that all of the study area pedestrian ramps provide access to existing sidewalks, but many are non-compliant with the latest ADA standards. These non-compliant ramps would need to be modified in conjunction with alterations to the roadway or sidewalks in the study area.

e. Bicycle Conditions

The number of study area bicyclists and bicycle facilities were obtained from the July 2013 traffic counts and site visit observations. As displayed in Figure D.7, the study area includes a Capital Bikeshare station on the southwest corner of the Pennsylvania Avenue/8th Street SE intersection, and bike lockers and bike parking at the southeast corner of the Pennsylvania Avenue/7th Street SE intersection. The bicycle counts identified the two Pennsylvania Avenue/8th Street SE intersections as having the most bicycle activity in the study area, which is consistent with the current placement of the bicycle facilities, especially the bike share station.

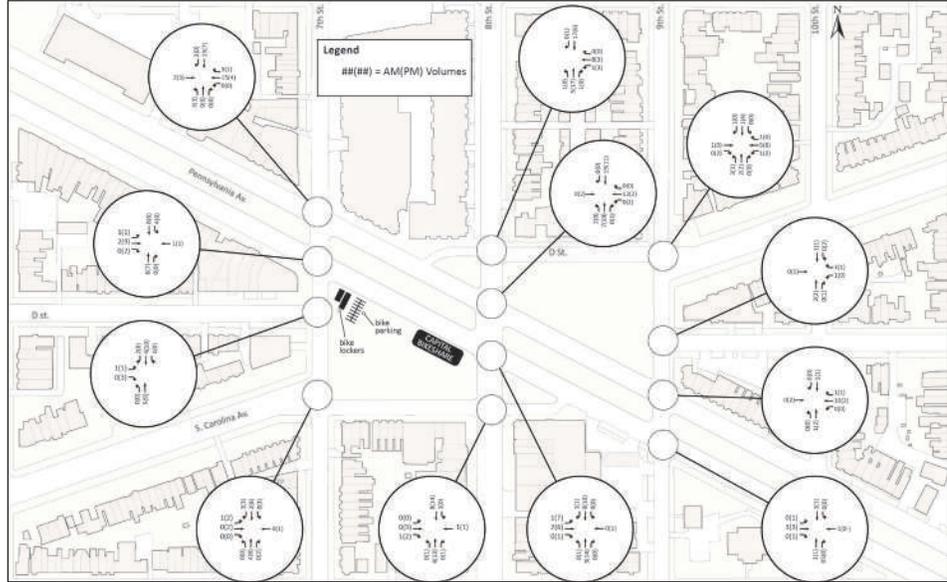


Figure D.7 - Study Area Bicycle Facilities and Peak Hour Bike Volumes

f. Public Transit Synopsis

A total of nine Washington Metropolitan Area Transit Authority (WMATA) bus routes and two D.C. Circulator routes pass through the study area. WMATA provided boarding and alighting information for the bus stops located within and adjacent to the study area, along with boarding and alighting information for the Eastern Market Metro Station. Figure D.8 displays the study area bus facilities and daily passenger volumes.

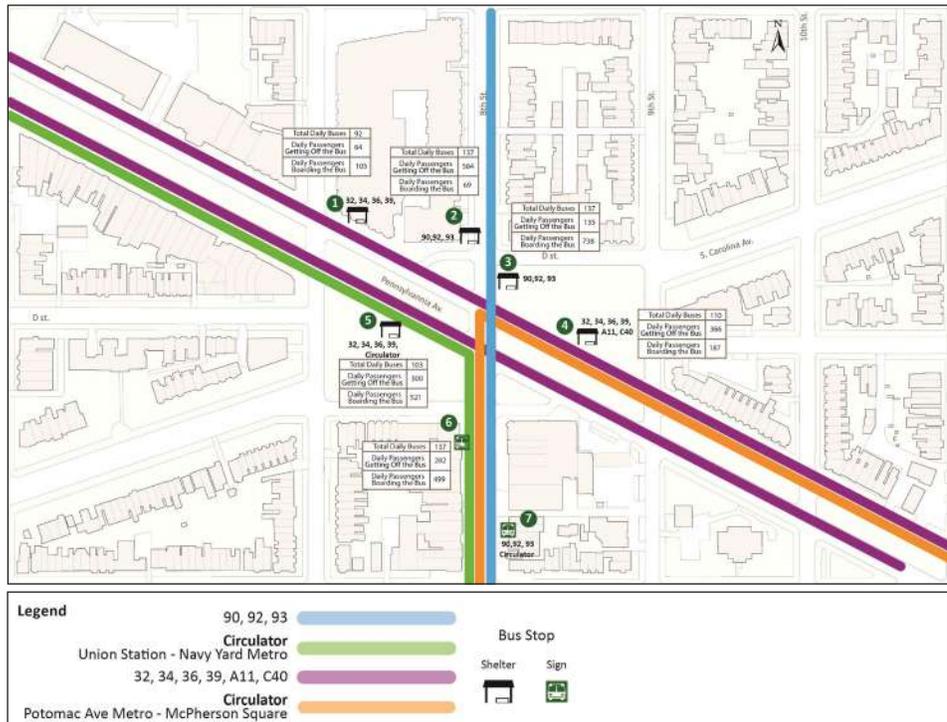


Figure D.8 - Study Area Bus Facilities and Daily Passenger Volumes

The Eastern Market Metro Station serves Metrorail's Blue, Orange, and Silver Lines. The Metro Station entrance is located on the south side of Pennsylvania Avenue SE between 7th and 8th Street SE. Ridership data for the Eastern Market Metro stop was provided by WMATA. As an order of magnitude comparison, during the month of May 2013 on an average weekday, approximately 6,600 daily passengers exited from the Metro Station, and 6,400 daily passengers entered the Metro Station. This is approximately ten times more passenger activity than the bus stop activity immediately adjacent to the Metro Station.

g. Safety - Crash Data Synopsis

Crash data over a five-year period for the study intersections was collected from the DC Department of Transportation (DDOT). The crash data was reviewed with respect to location, crash severity, crash type and vehicle type. Over the five year period, approximately four out of every five crashes resulted in property damage only, and there were no fatal crashes.

The intersections of Pennsylvania Avenue/8th Street SE and Pennsylvania Avenue/7th Street SE each accounted for approximately one third of the study area crashes, with the remaining intersections cumulatively accounting for the remaining one third. As shown in the preceding figures, these intersections have the most auto and pedestrian activity, and therefore have the most opportunities for collisions.

E. Two Alternative Concepts

After the initial community input was reviewed by the Task Force in June 2013, the Task Force used the input to define the program for which two alternative master plan concepts were to be developed by the Design Team. The Team was directed to maintain the existing Pennsylvania Avenue SE roadbed configuration in both concepts. The Program was defined specifically in some areas, and generally as “important goals” in others. The Task Force indicated to the Design Team that, in addition to their instructions, the Team was to take into account the totality of the individual community comments received as the Concepts were developed. Below is a summary of the Task Force’s guidance:

Task Force Program Guidance

Public Safety

- A redesign of Parcels 2 and 5 to prevent mid-block crossings
- A redesign of sidewalks at intersections to increase public safety
- Design of lighting for security
- Design rodent control into the project

Sustainability

- Design of rain-gardens in the bow-tie parcels
- Engagement with the goals of the Anacostia Watershed Initiative

Multigenerational design

- Design spaces that encourage all age groups to interact with each other, forming community bonds.

Community Amenities

- Include an interactive water feature located on Parcel 4
- Improve visibility of the existing historic Southeast Branch DC Library
- Include a play area located on Parcel 1

In general, the principal traffic characteristics of the streets were to be retained: the current alignment of Pennsylvania Avenue, the existing pattern of two-way and one-way street operations, the existing arrangement of traffic control devices, and the location of curb lane parking. The Team was asked to study the two D Street “spurs” to assess feasibility of modifications to improve circulation and potential for usable park space.

Traffic/Transportation guidance included:

- Improve the multimodal transportation hub efficiency and user friendliness
- Relocation and expansion of the bicycle facilities
- Relocation of bus stops to improve access
- Improve 8th & D Streets intersections
- Relocation of southbound Bus stops at 8th & D Streets (south).
- Study curbside utilization for carshare, retail parking, loading.
- As an alternate to a median design that precludes mid-block crossing, the Team was asked to study a signalized midblock crossing to safely allow pedestrians to cross at the Pennsylvania Avenue natural desire line.

1. Alternate Concept 1: Bosque Scheme



Concept 1 Aerial View



- ① Playground & Landscaped Buffer
- ② Bioswale
- ③ Bioswale & Seating
- ④ Bosque and Lawn
- ⑤ Bioswale
- ⑥ Bioswale & Seating

Concept 1 Site Plan

Concept 1 Summary

Parcel 1

The northeast parcel for the Bosque Concept is split into two triangular areas by a pedestrian path. The northern triangle consists of a landscaped panel composed of existing, healthy Sophora trees. Both sides of the path are lined with 4 foot length benches. The southern triangle contains a low-fenced play area. The play area creates a mini-Capitol Hill with movable playhouses on a Capitol Hill city grid. Also proposed are low berms representing the Anacostia Hills and a small water feature representing the Anacostia Watershed. The play area is surrounded by a Capitol Hill iron hoop fence and, just outside, a continuous perennial planting bed. Additional tree plantings would provide shade for pedestrians and for people within the play area.

Parcels 2 & 5

The medians would each be converted into bioswales with small trees, shrubs and perennial plantings, surrounded by a Capitol Hill iron hoop fence along the perimeter. Pennsylvania Avenue would be regraded so that half of the roadbed would slope into the medians, thereby increasing the amount of stormwater captured. Overflow pipes, draining to the combined storm/sewer system would be provided to handle exceptional storm events.

Parcels 3 & 6

The bowties would each consist of a central rain garden planted with trees, shrubs, and herbaceous plants. A continuous outward-facing bench would enclose each planted area to provide shaded seating.

Parcel 4

The southwest parcel would be dominated by a large tree Bosque located at the southern end of the site. The 20 tree bosque would be furnished with 100 pieces of movable furniture, and a large double sided bench. The fully accessible Bosque would be paved with finely crushed stone. At the west edge of the parcel, a lawn panel opposite the historic library entry would lead to a raised mid-block pedestrian crossing. At the east edge of the parcel, an interactive water feature with a curved bench would be located near the Pennsylvania Avenue and 8th Street intersection.

2. Alternate Concept 2 (Library Scheme)



Concept 2 Aerial View



- ① Playground & Landscaped Buffer
- ② Raised Planters
- ③ Bioswale & Seating
- ④ Metro Plaza & Library
- ⑤ Raised Planters
- ⑥ Bioswale & Seating

Concept 2 Site Plan

Concept 2 Summary

Parcel 1

The northeast parcel for the Library Concept is split into two triangular areas by a pedestrian path aligned with the historic South Carolina Avenue axis. Along the path would be a series of 4 foot length benches. The northern triangle consists of a lawn panel and a landscaped buffer composed of existing, healthy Sophora trees. The southern triangle contains a play area, modeled after the nearby historic Navy Yard. Play equipment would consist of large mechanically operable pieces. Also proposed are berms representing the Anacostia Hills and a small water feature representing the Anacostia Watershed. The play area would be surrounded by a Capitol Hill iron hoop fence and, just outside, a continuous perennial planting bed. Additional tree plantings would provide shade for pedestrians and for people within the play area.

Parcels 2 & 5

The medians would each be converted into raised planters with trees, shrubs and herbaceous plants. The planter structure would be a brick and stone corbelled retaining wall along the perimeter.

Parcels 3 & 6

The bowties would each consist of a central rain garden planted with trees, shrubs, and herbaceous plants. A continuous outward-facing bench would enclose each planted area to provide shaded seating.

Parcel 4

The southwest parcel for the Library Concept includes a new Library entrance pavilion on the South Carolina Avenue axis. The pavilion provides entry to a 13,000 square foot underground library addition that connects below grade under 7th Street to the original, historic library. The library pavilion and an adjacent interactive water feature would be bracketed by lawn panels along 7th Street and D Street. The interactive water feature would be located at a natural gathering point between the metro entrance and the library pavilion entrance.

3. Proposed Traffic and Transportation Modifications

The traffic and transportation modifications were studied independently from Concept 1 and 2 designs since they do not impact the feasibility of either design. The following lists the proposed traffic and transportation modifications.

Improve Multimodal Transportation Hub

Parcel 4's role as a multimodal transportation hub would be augmented by relocating bike facilities, and 8th Street SE bus stops, both described below.

Consolidation and Expansion of Bicycle Facilities

Existing bicycle amenities, including a bike share station and bike racks would be consolidated and relocated to provided expanded facilities in the southeast quadrant adjacent to the 7th Street/Pennsylvania Avenue intersection.

Relocation of Bus Stops

A common transit park is proposed on Parcel 4 through the relocation of 8th Street bus stops to locations adjacent to the parcel.

Improve the Pedestrian Experience

The construction of curb extensions and ADA accessible ramps will help improve the pedestrian experience within the study area.

Relieve Pressure on the 8th Street/D Street SE (south) and 8th Street/D Street SE (north) Intersections

Reversing the direction of D Street SE (south) and D Street SE (north) will help relieve pressure on the 8th Street/D Street SE (south) and 8th Street/D Street SE (north) intersections, and address safety concerns related to the relocated southbound 8th Street SE bus stop.

Remove the D Street (south) Extension

Removing the D Street (south) extension between 8th Street and Pennsylvania Avenue allows the existing public space to be connected with the community south of the street.

4. Other Modifications Not Included

Some of the Task Force's Traffic and Transportation requested program elements were studied, but ultimately not included. The following lists the modifications not included, and the reasons for their exclusion.

Bike Lanes on Pennsylvania Avenue SE

No designated bicycle lanes currently exist within the study area. However, the 2005 Bicycle Master Plan, and the MoveDC Long Range Transportation Plan identify future bicycle facilities along Pennsylvania Avenue SE through the study area. Numerous community suggestions to incorporate bicycle lanes into the project were received early in the process. Accordingly, alternatives were developed incorporating bicycle lanes within the Pennsylvania Avenue SE right-of-way. After a review of alternatives with DDOT during subsequent meetings, DDOT informed the Design Team that DDOT had not yet developed a comprehensive Bicycle Plan for Pennsylvania Avenue SE. DDOT directed the Design Team to not include any modifications to the Avenue's roadbed for bicycle purposes. For this reason, the Final Master Plan does not include bicycle lanes in the Pennsylvania Avenue SE right of way.

Provide a Signalized Midblock Crossing

A signalized midblock crossing would provide a direct connection across Pennsylvania Avenue SE to the Eastern Market Metro station, and decrease out of distance travel time by pedestrians. Because of concerns related to queued vehicles at the mid-block crossing stacking up into adjacent Pennsylvania Avenue, SE intersections, DDOT recommended the development of other options for addressing the safety concerns related to the mid-block pedestrian crossings.

F. Final Master Plan

Based on community comments and Task Force guidance after presentation of the two alternatives, the Final Master Plan was developed. The major items addressed for the Final Master Plan include maintaining the South Carolina Avenue axis through the site, the inclusion of an entry Library Pavilion and Bosque, and the medians composed of bioswales.



Final Master Plan - Birdseye View



Final Master Plan - Rendered Site Plan

Parcel 1

The northeast parcel is split into two triangular areas by a pedestrian path aligned with the historic South Carolina Avenue axis. The northern triangle contains a lawn panel and a landscaped buffer composed of existing, healthy Sophora trees. The southern triangle includes a play area.

The Community expressed a strong desire to create an engaging play area with connections to the natural world. The resulting design uses the Anacostia River watershed to provide a vibrant framework for the play area. Children can climb the “Anacostia Hills,” low mounds of varying heights which provide different vantage points and opportunities for imaginative play. Multi-stem river birches with peeling bark provide tactile interest and shade for the play areas. Children can cooperate to pump the water at the head of the Anacostia and play in the stream as it flows down to the low point, where the water is captured for recirculation. A tree house and slide built around a new tree provide a high lookout point.

Swings and play equipment for younger and older children are nestled within the mounds. The rubber play surfacing in shades of green is marked with large leaves of native trees under the play equipment so that kids jump on the leaves when they hop off of play equipment.



Axonometric of Northeast Parcel



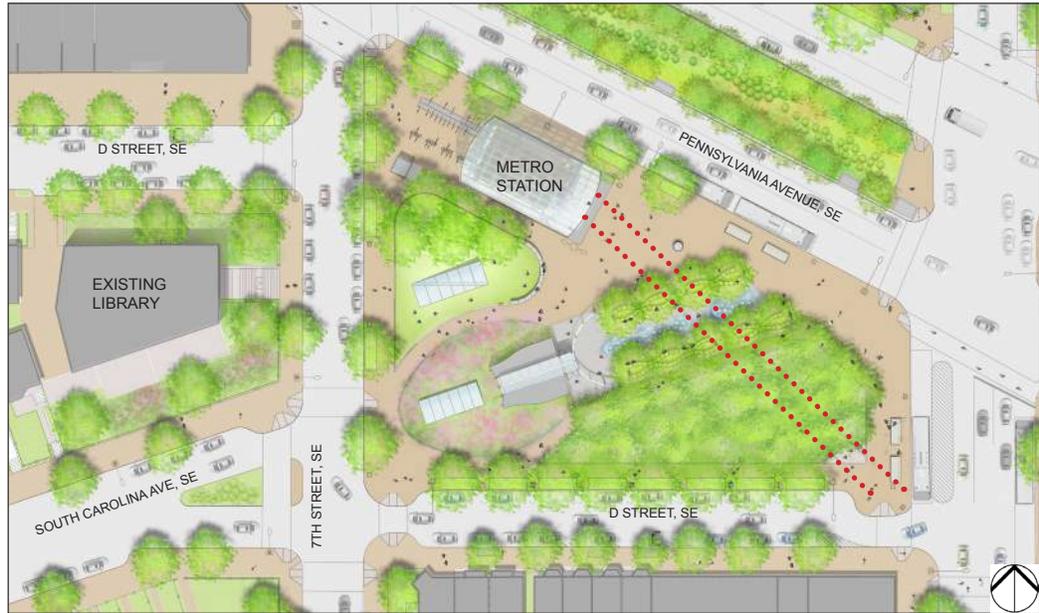
Perspective looking southeast along South Carolina Axis

Parcel 4

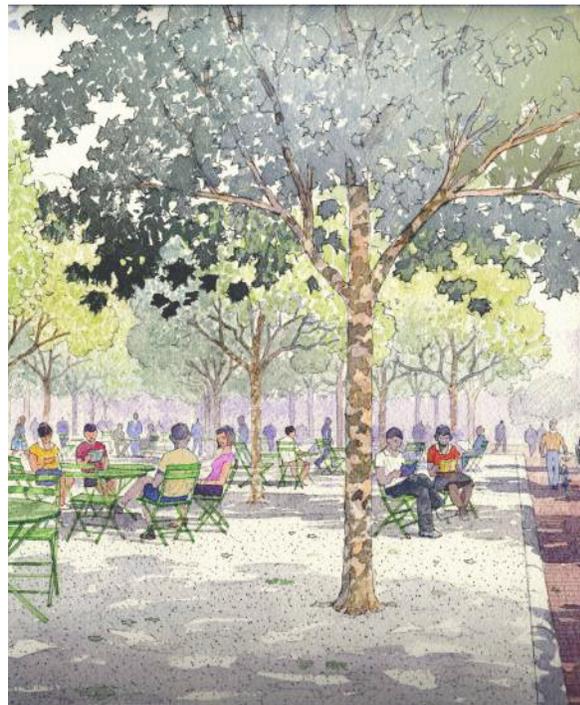
At the entrance to the Metro Station, a paved area with a digital information hub for orientation is created. Bus stops & bicycle facilities are relocated and rearranged to improve connectivity to the Station entrance as detailed below. An expansion opportunity is proposed for the existing undersized Southeast Branch DC Library - an historic Carnegie library across 7th Street from Parcel 4. A proposed below grade addition under 7th Street includes a new library entrance pavilion on the plaza. Both the pavilion and the forecourt are placed directly on the South Carolina Avenue axis. The fountain jets are surrounded on both sides by shaded double-sided benches, creating a central gathering space for all who pass through the site.

Bosque

To the south of the fountain forecourt, a bosque of London Plane trees provides shaded seating as a tranquil gathering space with moveable furniture and a transition connecting the Metro Station with the 8th Street commercial corridor. The grid of bosque trees is arranged to allow the natural pedestrian desire path to flow to the Metro Station Entrance.

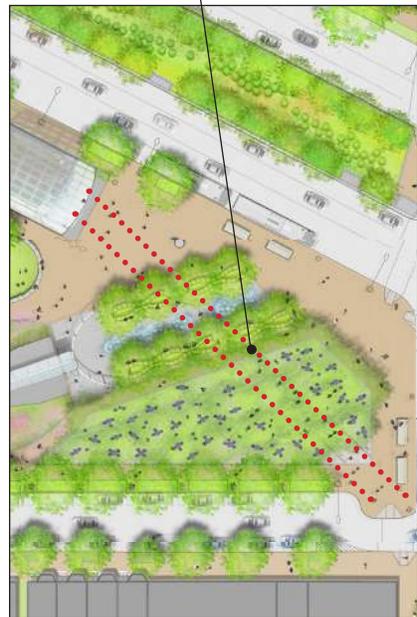


Parcel 4 Rendered Site Plan



Perspective showing Bosque with moveable furniture

PEDESTRIAN NATURAL DESIRE LINE FROM 8TH STREET COMMERCIAL CORRIDOR TO METRO STATION ENTRANCE



Library Expansion

Built in 1922, the site's adjacent Southeast Branch DC Library is one of the city's busiest but also among the smallest of the library system's branches. Built on a small tight lot, DC Library has been stymied in finding a way to expand the building to accommodate the current standard library program.

Inspired by the community's suggestion to engage the library more with the plaza, the design team approached the DC Library staff with the idea of expanding below grade under 7th Street and creating a new entrance on the plaza. This idea was then further developed with the entrance pavilion providing a focal point along the South Carolina Avenue axis while augmenting the institution's civic presence. The new library pavilion is encircled by a planting bed with roses and perennial plants.



Below Grade Plan: Library Expansion

BELOW GRADE LIBRARY EXPANSION



Ground Floor Plan - Library Expansion

SOUTH CAROLINA AVENUE AXIS

NEW LIBRARY ENTRANCE PAVILION



Second Floor Plan - Library Expansion



Section thru Library Expansion



Perspective of new Library Entry Pavilion and fountain forecourt

Parcels 2 & 5 (The Medians)

The Pennsylvania Avenue medians are developed as stormwater filtration gardens. A careful study of bioswale horticulture and a review of D.C. guidelines was conducted to select plant materials that are both appropriate to the monumental avenue and optimal for stormwater filtration. The design provides a potential prototype for the rest of the mile-long median stretching from the Anacostia River to the U.S. Capitol.



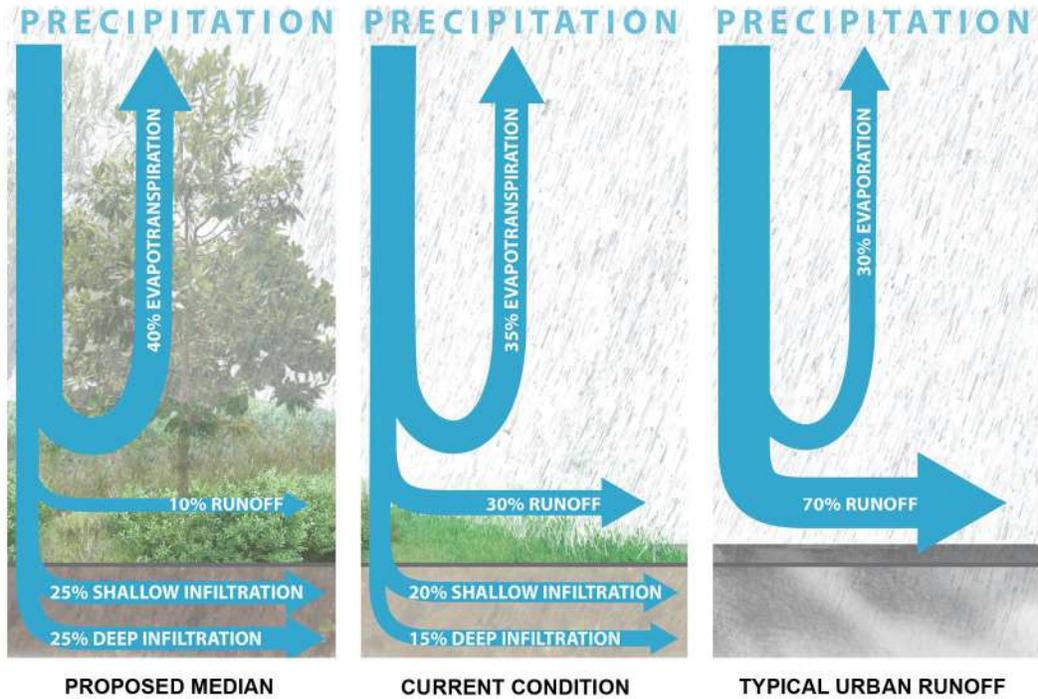
Rendered Site Plan - Medians

Portions of the Pennsylvania Avenue roadbed would be re-graded to direct stormwater into the medians, where it would be treated, filtrated, and retained before entering the aquifer. In the event of an extreme storm rainfall causing the swale to reach its holding capacity, any excess stormwater will flow thru overflow drains into the city's storm sewer system.



Filtration Swale Plantings and Operation

The choice of bioswale vegetation, carefully selected to perform in this environment while maintaining the character of the monumental avenue, includes two rows of Sweet Bay Magnolia trees and a continuous hedge of Inkberry Holly running parallel to Pennsylvania Avenue. Each median is surrounded by a granite curb and low iron picket fence appropriate to the Historic District.



Comparative Stormwater Treatments presented to the Community

Parcels 3 & 6

Parcel 3 captures stormwater from Pennsylvania Avenue and directs it into a planted bioswale with a bench surrounding it. With the removal of the D Street roadbed, there is opportunity for additional planting beds along the Haines building which will capture runoff from the paving and provide shade for the long benches. Parcel 6 will have a central rain garden surrounded by a continuous, outward-facing bench.



Parcel 3 - SE Corner of the Site



Parcel 6 - NW Corner of the Site

Final Master Plan Traffic and Transportation Summary

This section describes the proposed modifications to traffic and transportation facilities within the study area. Additional detailed information pertaining to analysis of the existing conditions is included in Appendix I.

One of the major goals of this project was to improve the site's multimodal transportation hub and to improve pedestrian, bicycle, and vehicular safety in the area. Many proposed improvements were studied, and the ones identified as most feasible are described below. This study strongly recommends that the DC Department of Transportation undertake a study period that would include mocking up on-site these potential modifications (i.e. reversing traffic flows, curb extensions, etc.).

The Site Plan below summarizes the proposed modifications:



Improve the Pedestrian Experience

Through the construction of curb extensions and refuge islands at some study area intersections, along with ADA accessible ramps, the pedestrian experience within the study area will be noticeably improved without degrading the performance of other modes of travel.



South Carolina Avenue / D Street (south)



South Carolina Avenue / D Street (north)

Relieve Pressure on the 8th Street/D Street SE (south), and 8th Street/D Street SE (north) Intersections

To reduce the number of vehicles using the 8th Street/ D Street (north and south) intersections, two modifications are proposed. One modification changes the direction of D Street (south), between 7th and 8th streets from an eastbound street to a westbound street. This reversal of D Street (south) assists in the mitigation of sight issues associated with the relocation of the southbound WMATA bus stop and converts the 8th and D Street intersection from LOS F to LOS A..

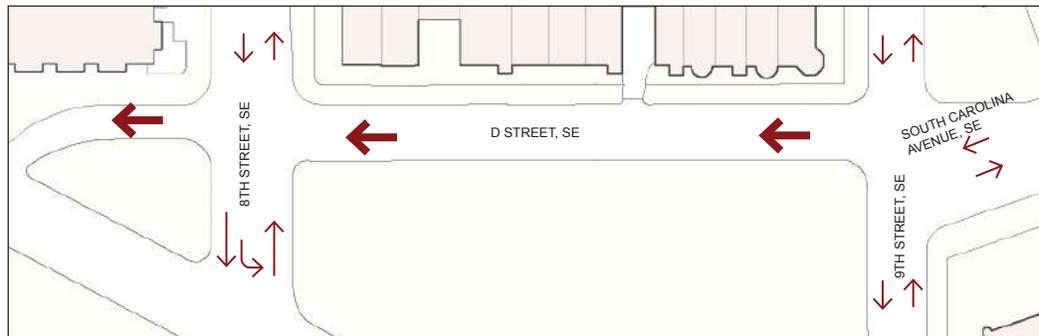


Existing Conditions - 8th Street and D Street (south).



Final Master Plan - Reverse Direction of D Street (south) and provide turning lane on 8th Street (northbound).

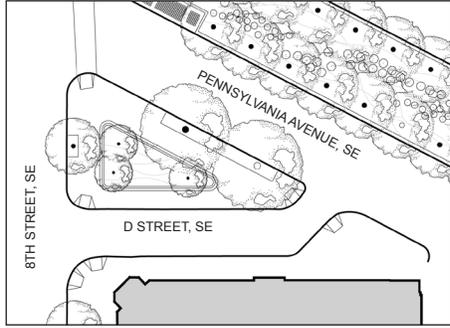
The other modification changes the direction of D Street (north) from a westbound street to an eastbound street. This converts the 8th and D Street (north) intersection from LOS C/D to LOS A.



Existing Conditions - 8th Street and D Street (north).



Final Master Plan - Reverse Direction of D Street (north).



Concept 1: Parcel 3 with D Street Extension Remaining



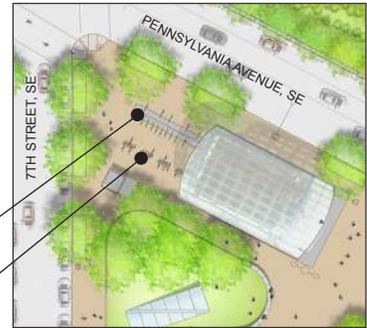
Final Master Plan - Removal of D Street Extension

Removal of D Street (south) Extension

The D Street SE (south) extension separates the public space in the northeast quadrant of the 8th Street/D Street SE (south) intersection. Removing the D Street (south) extension allows the public space to be connected with the community south of the street, simplifies the 8th Street/D Street SE intersection, and allows the northbound 8th Street/E Street SE bus stop to be relocated to this corner.

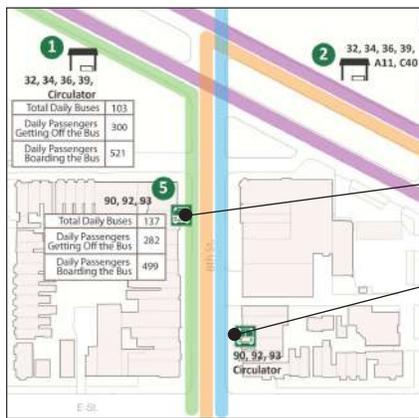
Consolidation and Expansion of Bicycle Facilities

The consolidation and expansion of Parcel 4 bicycle amenities will provide a bicycle amenity area adjacent to the 7th Street and Pennsylvania Avenue intersection. The relocation will allow both the bike share station and the number of bicycle racks to be expanded.



Relocated and Expanded Bikeshare (30 Stations)
Relocated and Expanded Bikeracks

Final Master Plan - Bike Facilities



Existing Bus Stop Locations



WMATA buses to be relocated to Parcel 4 (Southbound).

Bus Stop to be relocated to Parcel 3 (Northbound)

Final Master Plan - Relocated Bus Stops

Relocation of Bus Stops

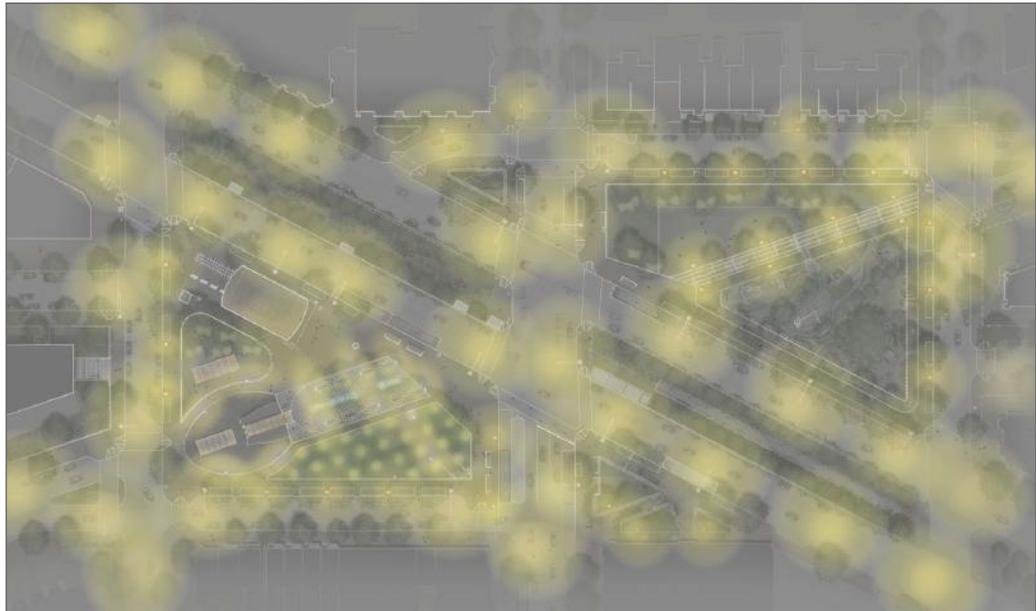
Bus stop improvements are proposed on Parcel 4 through the relocation of the farside southbound 8th Street/D Street SE (south) WMATA bus stop to the nearside of the intersection, and the relocation of the northbound 8th Street/E Street SE bus stop to the nearside of the 8th Street/Pennsylvania Avenue SE intersection.

G. Public Health & Safety

Public Safety

During the initial Community input phase of the project, the Community requested that the Master Plan address the issue of public safety. The result is the design of spaces that both encourage community presence from early morning to evening and are observable (both informally and formally) with clear sightlines. In addition, there are clearly legible pedestrian routes throughout the areas, and significant lighting improvements to enhance safety.

The Design Team has utilized a variety of light fixture types to achieve enhanced lighting of park and plaza spaces. A combination of Cobra fixtures and Washington Globe fixtures provide the street, sidewalk, and Parcel 1 path lighting. Elsewhere, modern pole lights are used in the area of the Library expansion, fountain forecourt and the pedestrian path through the Bosque. In-ground and staked uplights enhance the landscape materials throughout the site.



Site Plan indicating night lighting

Rodent Control

Due to the proximity of many restaurants in the 400 and 500 blocks of 8th Street SE, and the lack of a public alley in the 400 block for trash pickup from rear trash rooms or dumpsters, there is a persistent rodent control problem in the study area. Rodents are attracted to constant food sources, constant water sources, and certain types of vegetation. The Design Team has included the following strategic design features in the Master Plan, including the budget cost estimate, to discourage rodent presence in the study area:

- Food Source: Solar-powered trash compactors, in lieu of open trash receptacles, have been specified to limit access to food waste. It is envisioned that daily food and trash sweeps will be performed by a non-profit organization.
- Water Source: Both of the Master Plans water features are designed so that water never stands on the site. When the fountain jets in the Library forecourt are turned off, all water is held below grade in re-circulating tank. Similarly, in the play area, water only flows when a child pumps it into the "Anacostia River" from where it immediately flows back into a below grade re-circulating tank.
- Vegetation: Plants that do not promote rodent burrowing have been specified, and needed evergreens have been excluded from the plant pallet.
- Maintenance Endowment: Allows for a continuous integrated pest management regime with bait & trap, sterilization, and the maintenance of the solar trash compactors.

H. Long Term Maintenance

This project will require ongoing landscape maintenance by a staff hired by a non-governmental organization such as a “Friends of the Park” organization, Barracks Row Main Street, a Business Improvement District (BID), or another entity. This organization will be responsible for contracting with a private company to continuously provide full landscape maintenance services for the project.

It is envisioned that an endowment created prior to construction completion of the Parks and Plaza will fund the long-term maintenance. The Budget Estimate includes a landscape maintenance endowment of \$1,700,000 which is anticipated to provide \$80,000 annual income to fund the following work:

- Lawn Mowing & Weed Control
- Leaf Removal (as needed) & Mulch (twice per year)
- Turf Maintenance Tree and Shrub Maintenance (fertilization, pruning, etc.)
- Irrigation System Maintenance
- Integrated Pest Management Regime
- Water Feature Maintenance

Additionally, the endowment is anticipated to provide sufficient income for additional allotments of the following at five-year increments:

- Plant Replacement as needed
- Furniture Replacement as needed
- Lawn Replacement as needed

Further and not included in the Landscape Maintenance Endowment, it is envisioned that a non-profit organization would provide daily food sweep and trash pickup.

I. Conceptual Budget Cost

A conceptual budget cost for the Final Master Plan was developed by DMS Construction Consulting Services, the Design Team's cost consultant. The conceptual budget was derived from quantity survey of the Design Team's conceptual drawings and detailed discussions with the Design Team regarding levels of finish and quality. The budget was completed in June 2014.

The budget estimate was developed in seven sections: the six parcels plus the Library renovation and expansion work. The costs for the renovation of the existing library were determined as described below. All other portions of the project budget estimate were derived from quantity survey by trade.

The level of pricing in the budget cost estimate is representative of June 2014 costs of construction in the Washington DC area, and assumes that the project would be procured by a general contractor. The budget also assumes that all parcels and all Library work will be bid and constructed concurrently by a single general contractor and that the Library Expansion & Renovation project will achieve LEED Silver. It assumes a fair and reasonable rate of return for overhead and profit for the general contractor and subcontractors, and a design contingency of 10% to each of the parcels & new library for items that are not yet designed.

The budget estimate includes an escalation contingency for each of the parcels & new library for inflation of construction costs from now until the midpoint of construction (5 years @ 2.5% per year is 12.5%). The budget cost for the renovation of the existing SE Branch DC Library structure is based on information given to the Design Team by DC Public Library staff for a recently renovated library bid in 2012. This \$738 per SF was escalated to the midpoint of construction (2 years + 5 years @ 2.5% per year is 17.5%) and produced a rate of \$867 per SF for the renovation portion of the library project.

The budget estimate does not include "soft costs" such as design fees or other consultant fees, permit fees, swing space/FFE (Furniture, Fixtures, & Equipment) for the library, nor potential Hazmat handling.

Parks & Plaza Budget Estimate

A summary of the Conceptual Budget Cost for the Parks and Plaza portion of the Final Master Plan is below:

PARCEL 1	\$ 2,864,867	PLAYGROUND PARCEL
PARCEL 2	\$ 1,182,171	MEDIAN PARCEL
PARCEL 3	\$ 650,025	BOWTIE PARCEL
PARCEL 4	\$ 3,552,693	METRO PLAZA PARCEL
PARCEL 5	\$ 1,025,737	MEDIAN PARCEL
PARCEL 6	\$ 168,181	BOWTIE PARCEL
BY TRADE SUBTOTAL COSTS	\$ 9,443,674	
	\$ 944,367	10% DESIGN CONTINGENCY
SUBTOTAL	\$10,388,041	
	\$ 1,298,505	12.5% ESCALATION
SUBTOTAL	\$ 11,686,547	
	\$ 233,731	2% BONDS/INSURANCE
SUBTOTAL	\$11,920,278	
	\$ 953,622	8% CONTRACTOR'S O&P
SUBTOTAL	\$12,873,900	
	\$ 643,695	5% CONSTRUCTION CONTINGENCY
TOTAL HARD COSTS	\$13,517,595	
	\$ 2,703,519	20% DC AGENCY MANAGEMENT FEE
SUBTOTAL	\$16,221,114	
	\$ 486,633	3% MAINTENANCE OF TRAVEL BUDGET
SUBTOTAL	\$16,707,747	
	\$ 1,700,000*	LANDSCAPE MAINTENANCE ENDOWMENT
TOTAL PARKS/PLAZA BUDGET	\$18,407,747	

* Maintenance Budget increased from \$1,540,000 in June, 2014.

Library Expansion Budget Estimate

Below is a summary of the Conceptual Budget Cost for the Library renovation and expansion portion of the Final Master Plan:

BY TRADE SUBTOTAL COSTS	\$10,453,211	
	\$ 1,045,321	10% DESIGN CONTINGENCY
SUBTOTAL	\$11,498,532	
	\$ 1,437,317	12.5% ESCALATION
SUBTOTAL	\$12,935,849	
	\$ 258,717	2% BONDS & INSURANCE
SUBTOTAL	\$13,194,566	
	\$ 1,055,565	8% CONTRACTOR'S O & P
SUBTOTAL	\$14,250,131	
	\$ 712,507	5% CONSTRUCTION CONTINGENCY
NEW CONSTRUCTION	\$14,962,637	
	\$ 2,244,395	15% DC LIBRARY MANAGEMENT FEE
SUBTOTAL	\$17,207,032	
	\$ 7,803,000	EXISTING LIBRARY RENOVATION
TOTAL LIBRARY HARD COSTS	\$25,010,032	
	\$ 750,301	3% MAINTENANCE OF TRAVEL (MOT)
TOTAL LIBRARY EXPANSION & RENOVATION BUDGET	\$25,760,333	

Appendix I. Transportation Existing Conditions Analysis

Level-of-Service Concept¹

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F".

a. Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table I.1. Additionally, Table I.2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Table I.1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

Table I.2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤ 20
C	>20 and ≤ 35
D	>35 and ≤ 55
E	>55 and ≤ 80
F	>80

¹ Adapted from: Transportation Research Board, Highway Capacity Manual, (2000)

b. Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2010 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table I.3. A quantitative definition of level of service for unsignalized intersections is presented in Table I.4.

Table I.3 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	Nearly all drivers find freedom of operation. Very seldom is there more than one vehicle in queue.
B	Some drivers begin to consider the delay an inconvenience. Occasionally there is more than one vehicle in queue.
C	Many times there is more than one vehicle in queue. Most drivers feel restricted, but not objectionably so.
D	Often there is more than one vehicle in queue. Drivers feel quite restricted.
E	Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. There is almost always more than one vehicle in queue. Drivers find the delays approaching intolerable levels.
F	Forced flow. Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table I.4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

The level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less frustrating than at unsignalized intersections. For example, drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts, while drivers at signalized intersections are able to wait for the green interval. For these reasons, the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

c. **Traffic Counts**

Traffic counts for the Eastern Market Metro Park were conducted by Quality Counts, LLC in July 2013 when congress was in session, in order to collect traffic data representative of a typical midweek day. Turning movement counts were collected at all study intersections, and included the number of vehicles, pedestrians and bicycles making each movement at intersections. The counts also included vehicle class data. The counts identified the morning peak as occurring between 7:30 and 8:30 a.m., and the evening peak occurring between 4:45 and 5:45 p.m. In addition, twenty-four hour tube counts were collected on Pennsylvania Avenue SE between 7th Street SE and 8th Street SE. The tube counts collected the number of vehicles, vehicle class, and vehicle speed.

d. **Study Area Roadways**

The roadways adjacent to the Eastern Market Metro Park include Pennsylvania Avenue SE, 7th Street SE, 8th Street SE, 9th Street SE, and D Street SE. Table I.5 summarizes the study area roadways.

Table I.5 Summary of Study Area Roadways

Roadway	Functional Classification ¹	ADT/AADT	Posted Speed Limit (mph)	Number of Lanes	Bicycle/Pedestrian Facilities	Transit
Pennsylvania Avenue, SE	Principal Arterial	24,190 ²	30	4 EB, 4 WB	Pedestrian	6 WMATA routes, and 2 Circulator routes
7th Street, SE	Local Street	16,400 ³	25	1 NB, 1 SB	Pedestrian	None
8th Street, SE	Minor Arterial: (south of Pennsylvania Ave), Collector: (north of Pennsylvania Ave)	10,500 ³ 10,300 ³	Not Posted	1 NB, 1 SB	Pedestrian	3 WMATA routes, and 2 Circulator routes
9th Street, SE	Local Street	N/A	25	1 NB, 1 SB	Pedestrian	None
D Street, SE (south)	Local Street	N/A	Not Posted	1 EB	Pedestrian	None
D Street, SE (north)	Local Street	N/A	Not Posted	1 WB	Pedestrian	None

AADT –Annual Average Daily Traffic

B – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound.

¹ DDOT. Functional Classification Map 2011.

²Volume data collected in July 2013

³ DDOT. Traffic Volume Map 2010.

- **Pennsylvania Avenue SE**

Pennsylvania Avenue SE, is designated by the DC Functional Classification Map as a principal arterial, and connects Independence Avenue to the Eastern Market Metro Station before crossing the Anacostia River as it continues towards Maryland. In general, between the U.S. Capitol and the Anacostia River, Pennsylvania Avenue SE has four lanes each in the eastbound and westbound directions, with a wide median strip.

Traffic data collected in July 2013 counted approximately 24,190 daily vehicles in both directions on Pennsylvania Avenue SE, with the majority of traffic heading westbound, towards central Washington DC during the weekday a.m. peak hour, and the majority of traffic heading out of the city during the weekday p.m. peak hour.

Six Metrobus transit routes (32, 34, 36, and 39, A11, C40) and two Circulator routes (Union Station-Navy Yard Metro and Potomac Avenue Metro-Skyland via Barracks Row) run along Pennsylvania Avenue SE through the study area. Sidewalks are provided on both sides of Pennsylvania Avenue SE, and there is a significant amount of pedestrian use along the roadway, especially at the intersections with 7th and 8th Street SE, near the Metro Station, and at bus stops. In addition, a significant number of pedestrians were observed crossing Pennsylvania Ave SE between 7th and 8th Streets.

- **7th Street SE**

7th Street SE forms the western boundary of the study area, running north-south with one lane in each direction. 7th Street SE is mostly residential south of the intersection with Pennsylvania Avenue SE. Ground level retail fronts 7th Street SE north of the intersection, and Eastern Market, after which the Metro Station and Park is named, is located a few blocks north of the study area along 7th Street SE. As observed during the site visit, there is heavy pedestrian activity at 7th Street/Pennsylvania Avenue SE and 7th Street/D Street/South Carolina Avenue SE, with the Metro Station serving as the primary destination. Transit service is not provided along 7th Street SE.

- **8th Street SE**

8th Street SE is designated as a minor arterial south of Pennsylvania Avenue SE and a collector north of Pennsylvania Avenue SE. The road connects Washington Navy Yard to the south with Gallaudet University to the north, and operates with one lane in each direction. WMATA routes 90, 92, and 93 travel along 8th Street SE through the Eastern Market Metro Park. Additionally, two Circulator routes travel on 8th Street SE south of Pennsylvania Avenue SE. There is a nearside bus stop in the southbound direction at the intersection of 8th Street/Pennsylvania Avenue SE and a farside stop in the northbound direction. Commercial activity fronts 8th Street SE south of the Eastern Market Metro Park with restaurants, bars, retail outlets, a theater, and other small businesses along the street. As observed during the site visit, 8th Street SE has a very high level of pedestrian activity, especially at the intersections with Pennsylvania Avenue SE and D Street (south).

- **9th Street SE**

9th Street SE forms the eastern boundary of the study area. 9th Street SE is mostly residential and runs north-south with one lane in each direction. Pedestrian activity was observed to be lower on 9th Street SE than on 7th or 8th Streets. Transit service is not provided along 9th Street SE.

- **D Street SE (south)**

D Street SE (south) is a local, one-way, eastbound street between 7th and 8th Street SE. There is on-street parking on both sides of the street with the Park north of the street and commercial frontage south of the street. Site observations revealed southbound buses stopping at the 8th Street/D Street SE (south) bus stop blocking the intersection of D Street/8th Street SE. The 2010 Urban Design Study identified the pedestrian crossings on D Street SE (south) as "dangerous" because of poor crosswalk visibility and lack of signal control at the intersections.

- **D Street SE (north)**

D Street SE (north) is a local one-way westbound street between 8th and 9th Streets. There is on-street parking on both sides of the street with residences north of the street and a Park to the south. No buses travel along D Street SE (north); however, there are nearside bus stops on 8th Street SE on either side of the intersection with D Street SE (north). The largest pedestrian movement at D Street SE (north) is at the western crosswalk at the intersection with 8th Street SE. Other crosswalks along D Street SE (north) have considerably less pedestrian traffic.

e. Intersections

Intersections within the study area are controlled through a combination of traffic signals and stop signs. There are six stop controlled intersections and six signalized intersections. The stop controlled intersections include:

- 7th Street/D Street SE
- 7th Street/D Street/South Carolina Avenue SE
- 8th Street/D Street SE (north)
- 8th Street/D Street SE (south)
- 9th Street/D Street SE
- 9th Street/D Street/South Carolina Avenue SE

The traffic signals located within the Eastern Market Metro Park study area operate on a 100-second cycle during the weekday a.m. and p.m. peak hours. The signalized intersections include:

- 7th Street/Pennsylvania Avenue SE (eastbound)
- 7th Street/Pennsylvania Avenue SE (westbound)
- 8th Street/Pennsylvania Avenue SE (eastbound)
- 8th Street/Pennsylvania Avenue SE (westbound)
- 9th Street/Pennsylvania Avenue SE (eastbound)
- 9th Street/Pennsylvania Avenue SE (westbound)

For the analysis of study area intersections, adjustments were made to the intersection lane configurations to reflect the configuration as experienced by drivers in the study area. Along Pennsylvania Avenue SE, although the road has four lanes in each direction, because the outside lane is used primarily as a parking/bus stop lane, the analyzed lane configuration uses three lanes in each direction.

- **Operations Analysis**

The intersections operations analysis was performed using Synchro 7 in accordance with the procedures stated in the 2000 Highway Capacity Manual. To ensure that this analysis was based on a reasonable worst-case scenario, the peak 15 minute flow rate during each of the study periods was used in the evaluation of all intersection levels of service. For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during all other weekday time periods and throughout the weekend will likely operate under better conditions than described in this report.

f. Pedestrian and Bicycle Facilities

- **Bicycles**

No designated bicycle lanes exist within the study area, but the 2005 Bicycle Master Plan, and the MoveDC Long Range Transportation Plan have identified future bicycle facilities along Pennsylvania Avenue SE through the study area.

The bicycle counts identified the two Pennsylvania Avenue/8th Street SE intersections as having the most bicycle activity in the study area, which is consistent with the placement of the bicycle facilities, especially the bikeshare station. The counts identified 37 to 40 cyclists using the intersections during the a.m. peak hour and 16 to 41 cyclists using the intersection during the p.m. peak hour.

- **Pedestrians**

Pedestrian facilities within the study area include sidewalks along all roadways, pedestrian ramps, and pedestrian signal heads and signal phases.

As expected, the pedestrian counts and site visit identified the Metro Station as the primary pedestrian generator in the study area. Pedestrians frequently cross Pennsylvania Avenues SE midblock between 7th and 8th Streets, with 89 pedestrians crossing midblock during the a.m. peak hour, and 50 pedestrians crossing during the p.m. peak hour. The site visit showed that the crossings tend to occur in waves, consistent with the arrival of Metro trains at the Metro Station.

The two intersections with the highest pedestrian volumes are Pennsylvania Avenue/8th Street SE and Pennsylvania Avenue/7th Street SE, which is consistent with the location of the Metro Station between the two intersections, and several bus stops and transfers along Pennsylvania Avenue and 8th Street SE.

More specifically, a large number of pedestrians were observed using the southern crosswalk of 7th Street and Pennsylvania Avenue SE (eastbound) with many of these pedestrians observed going to or from the Metro Station. This is supported by the pedestrian counts which recorded 566 pedestrians in the p.m. peak hour, the highest pedestrian recording in the study area.

g. Transit

A total of nine WMATA bus routes and two DC Circulator routes pass through the Eastern Market Metro Park study area. Route information is displayed in Tables I.6 and I.7. The Eastern Market Metro Station on the Metro’s Blue, Orange and Silver lines is located on the south side of Pennsylvania Avenue between 7th and 8th Street SE. Metrorail service is summarized in Table I.8.

Table I.6 Summary of WMATA Bus Routes in Eastern Market

Route Number	Route	Service Time	Peak Hour Headway
32	<ul style="list-style-type: none"> Westbound: Southern Avenue Station to Friendship Heights Station via Wisconsin Avenue and Pennsylvania Avenue¹ Eastbound: Friendship Heights Station to Southern Avenue Station via Pennsylvania Avenue and Wisconsin Avenue Additional rush hour service provided to Tenleytown-AU Station and the State Department 	24-hours	7 to 15 minutes
34	<ul style="list-style-type: none"> Westbound: Archives Station to Naylor Road Station Eastbound: Naylor Road Station to Archives Station² 	4:30 AM – 1:30 AM Monday – Friday; 5:30 AM – 1 AM Saturday; 7 AM – 8:30 PM Sunday	15 minutes
36	<ul style="list-style-type: none"> Same as Route 32 but with Naylor Road as western terminus 	24-hours	13 to 20 minutes
39	<ul style="list-style-type: none"> Westbound: Naylor Road Station to State Department via Pennsylvania Ave Eastbound: State Department to Naylor Road Station via Pennsylvania Ave³ 	6 – 10 AM, 3:30 – 7:30 PM; Monday – Friday	16 to 17 minutes
90	<ul style="list-style-type: none"> Northbound: from Anacostia to Gallaudet University and westbound on Florida Avenue to the Reeves Municipal Center and Adams Morgan Southbound: eastbound Florida Avenue to southbound North Capitol Street, eastbound New York Avenue to eastbound O Street, returning to eastbound Florida Avenue⁴ 	5:30 a.m. - 12:30 a.m., Monday - Friday; limited on weekends	8 to 10 minutes
92	<ul style="list-style-type: none"> Same as Route 90 but with southern extension to Congress Heights Metro Station via Alabama Avenue 	24-hours	8 to 10 minutes
93	<ul style="list-style-type: none"> Same as Route 90 but with a southern extension to Congress Heights Metro Station via Stanton Road 	Early morning	30 minutes
A11	<ul style="list-style-type: none"> Only operates Saturdays to 11th & E Streets prior to Metrorail operation⁵ 	Saturday early morning	N/A
C40	<ul style="list-style-type: none"> Clockwise loop between Pennsylvania Ave, 3rd St, Massachusetts Ave, and 13th St⁶ 	8:20-8:40 AM, 3:15-3:35 PM Monday - Friday	N/A

¹ WMATA. Routes 32, 36 Timetables. Jun. 2013

² WMATA. Route 34 Timetables. Jun. 2013

³ WMATA. Route 39 Timetables. Dec. 2012

⁴ WMATA. Routes 90, 92, 93 Timetables. Mar. 2013

⁵ WMATA. Routes A11, A12 Timetables. Dec. 2011

⁶ WMATA. Route C40 Timetables. Dec. 2007

Table I.7 Summary of D.C. Circulator Bus Routes in Eastern Market

Route	Service Time	Peak Hour Headway
Union Station – Navy Yard Metro	<ul style="list-style-type: none"> Winter Hours (October 1-March 31): Weekdays 6am - 7pm Summer Hours (April 1-September 30): Weekdays 6am - 9pm; Saturdays 7am - 9pm *Extended service on Nationals game days 	10 minutes ¹
Potomac Avenue Metro – Skyland via Barracks Row	<ul style="list-style-type: none"> Winter Hours (October 1-March 31): Weekdays 6am - 7pm Summer Hours (April 1-September 30): Weekdays 6am - 9pm; Saturdays 7am - 9pm 	10 minutes

¹ D.C. Circulator Route Map. 2013

Bus routes 90 and 92, which run north-south on 8th Street SE, generate more passenger activity than the east-west routes on Pennsylvania Avenue SE in the study area. For the Pennsylvania Avenue SE routes, the heaviest passenger alighting movement is in the westbound direction, and the heaviest passenger boarding movement is in the eastbound direction. This is further highlighted in Figure I.1, which displays the daily number of passengers boarding and alighting by bus route in the study area. As seen, WMATA routes 90 and 92 have more passenger activity than the other routes for the entire day. Route 90 has 566 daily passengers board and 519 alight, while Route 92 has 735 daily passengers board and 477 alight at bus stops in the study area.

Figure I.1 - Daily Number of Passengers Boarding & Alighting by Bus Route in the Study Area

Based on public feedback, the bus stops at the intersections of 8th Street/D Street SE (north) and 8th Street/D Street SE (south) were given closer looks. As seen in Figure I.2, southbound passengers using either 8th Street/D Street SE stop tend to alight the bus at the stop north of Pennsylvania Avenue SE, and board the bus at the stop south of Pennsylvania Avenue SE.

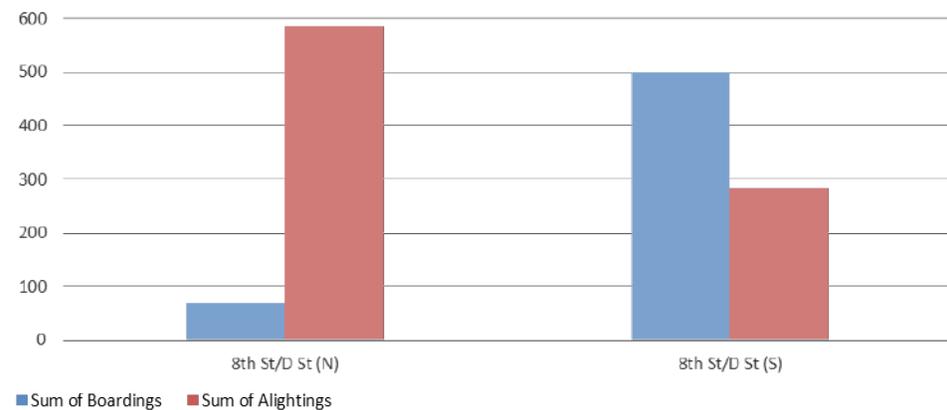


Figure I.2 - 8th Street/ D Street SE Bus Stops Daily Boardings and Alightings

The Eastern Market Metro Station is located between 7th and 8th Street SE south of Pennsylvania Avenue and serves the WMATA Metrorail Orange, Blue, and Silver Lines, connecting Eastern Market with downtown Washington, DC, northern Virginia, and Maryland.

Table I.8 Summary of Metrorail Routes in Eastern Market

Route	Service Time	Peak Hour Headway
Orange Line (Vienna to New Carrollton)	5 AM – 12 AM Monday – Thursday; 5 AM – 3 AM Friday; 7 AM – 3 AM Saturday; 7 AM – 12 AM Sunday	< 12 minutes (12 minutes off-peak) ¹
Blue Line (Franconia-Springfield to Largo Town Center)	5 AM – 12 AM Monday – Thursday; 5 AM – 3 AM Friday; 7 AM – 3 AM Saturday; 7 AM – 12 AM Sunday	< 12 minutes (12 minutes off-peak) ¹
Silver Line (Wiehle Avenue – Reston East to Largo Town Center)	5 AM – 12 AM Monday – Thursday; 5 AM – 3 AM Friday; 7 AM – 3 AM Saturday; 7 AM – 12 AM Sunday	< 12 minutes (12 minutes off-peak) ¹

¹ WMATA Metrorail Timetable Weekday Mid-Day, 2014

h. Safety Review

- **Crash Data**

DDOT provided the project team with five years of crash data, broken into two three year segments (2008 – 2010, and 2010 – 2012).

The crash data was reviewed with respect to location, crash severity, crash type and vehicle type. Because the crash data overlaps in year 2010 and the data is provided by DDOT in summary form, it was not possible to combine the two data sets when looking at crash type or crash severity.

The number of crashes at each intersection is displayed in Figure I.3. The intersections with the most crashes are the Pennsylvania Avenue/8th Street SE intersections, followed by the Pennsylvania Avenue/7th Street SE intersections. As previously identified, these intersections have the most auto and pedestrian activity as well, and therefore have the most opportunities for collisions.

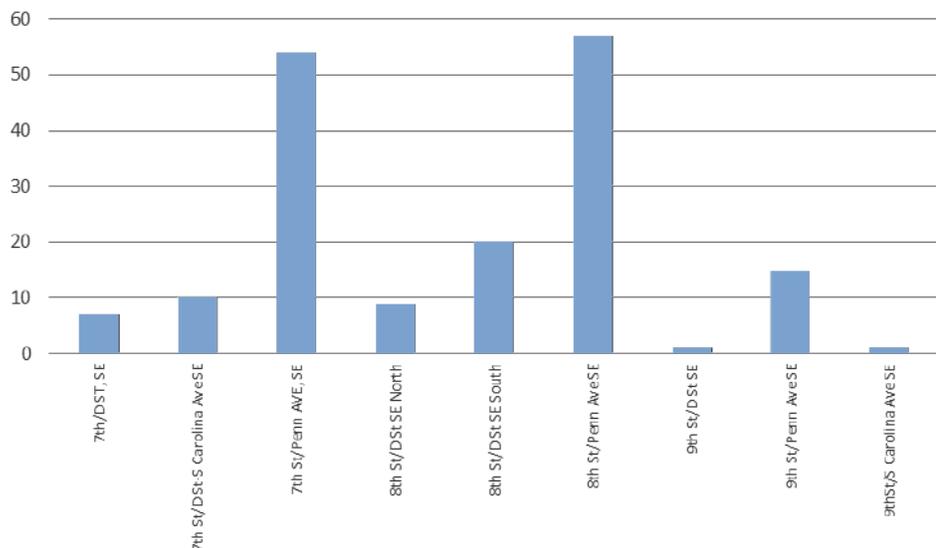


Figure I.3 - Crashes by Intersection (2008 to 2012)

The number of crashes by severity is displayed in Figure I.4. As seen, the majority of crashes resulted in property damage only (78 of 102 (76%) in 2008-2010 and 83 of 104 (80%) in 2010-2012) with no fatal crashes during the five-year time period. This is consistent with site visit observations, which identified cars generally operating at lower speeds in the study area, which assists in reducing the severity of crashes when they do occur.

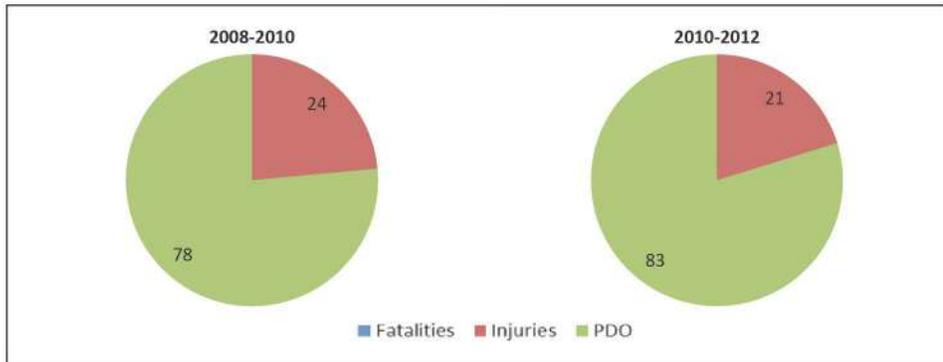


Figure I.4 - Study Area Crashes by Severity

The percentage of crashes by type is displayed in Figure I.5. The most frequent crash type was side swipe (33% in 2008-2010 36% in 2010-2012), and right angle and rear-end crashes were the second and third most frequent, respectively. The side swipe and right-angle crashes were concentrated on the signalized Pennsylvania Avenue SE intersections. The wide median on Pennsylvania Avenue SE which causes the intersections to operate as two separate intersections is a likely contributor to the number of side swipe and right-angle crashes.

A review of crashes by vehicle type show the number of pedestrian crashes to be relatively consistent between the two time periods, with seven crashes involving pedestrians between 2008 and 2010 and eight involving pedestrians between 2010 and 2012. The number of bicycle crashes increased from one crash between 2008 and 2010 to five crashes between 2010 and 2012. Although historic bicycle counts were not available for the study area, anecdotal evidence suggests that the amount of bicycle activity in the study area has increased over the past few years, especially after the bike share station was installed in 2010. The increase in the number of bicycles involved in crashes could be related to the increase in bicycle activity in the area.

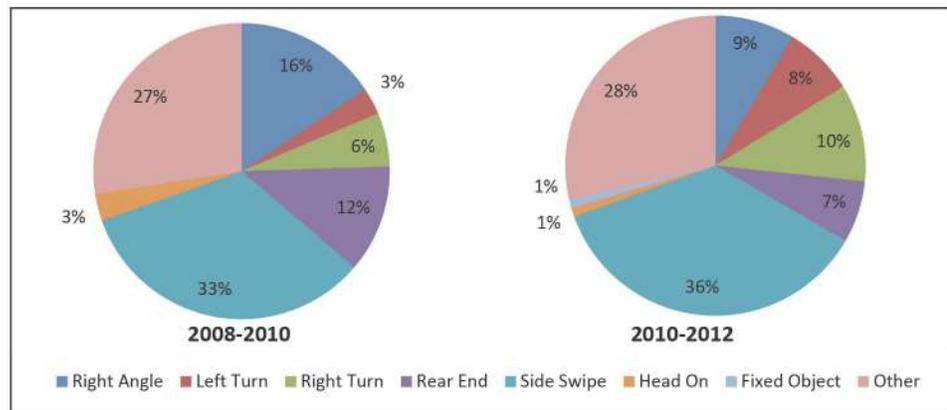


Figure I.5 - Crashes by Type

Appendix II. Chronology of Project Meetings

June 18, 2013

Immediately adjacent landholder meeting hosted by Tommy Wells, Ward 6 Councilman.

June 19, 2013

Community Task Force Meeting to plan community outreach.

June 25, 2013

Meeting with WMATA staff to discuss bus stop locations & midblock crossings.

July 8 & 13, 2013

Open Community Forums to request community input over the next month before design work begins.

August 8, 2013

Community Task Force Meeting to review Community's comments/suggestions and provide guidance to Design Team.

October 13 & 30, 2013

Meetings with staff of DC Historic Preservation Office to review design concepts.

November 01, 2013

Meeting with DC Library staff to discuss below-grade library expansion.

November 4, 2013

Meeting with DC Department of Transportation staff and WMATA staff to review traffic and transportation issues.

December 7 & 11, 2013

Open Community Forums to present alternative design concepts and request community feedback during the next month.

January 28, 2014

Community Task Force Meeting to review comments received from Community and provide further guidance to Design Team.

February 4, 2014

Meeting with DDOT staff and WMATA staff to discuss Community's traffic and transportation issues.

February 18, 2014

Meeting with DDOT staff and WMATA staff to discuss traffic and transportation issues and Community input obtained from project's related Online Survey.

February 26, 2014

Community Task Force Meeting to present updated status report of process and WMATA/DDOT input.

April 8, 2014

Meeting with DC Water staff to discuss construction adjacent to water mains.

April 25, 2014

Meeting with DC Department of General Service to review site jurisdiction issues and provide Community input summary.

April 25, 2014

Meeting with staff of DC Department of the Environment to review environmental review procedures and potential related programs.

May 2, 2014

Meeting with staff of U.S. Commission of Fine Arts and the National Capitol Planning Commission to review design concepts.

May 8, 2014

Meeting with staff of DGS, HPO, OP, and DDOT to discuss next steps at completion of project.

May 23, 2014

Meeting with staff of DDOT Policy, Planning and Sustainability Administration to review bicycle issues.

June 5, 2014

Barracks Row Main Street Meeting to review project status.

June 16, 2014

Task Force Meeting to review Final Master Plan Concepts.

June 21 & 23, 2014

Open Community Forums to present Final Master Plan Concepts.

Appendix III. Task Force Members

Sharon Ambrose

Former Ward 6 Councilmember

Sendra Benaissa

Resident, 800 Block D Street

Nicky Cymrot

Capitol Hill Community Foundation

Steve Cymrot

Capitol Hill Community Foundation

Don Denton

Barracks Row Main Street

Monte Edwards

Capitol Hill Restoration Society

Linda Elliot

Resident, 400 Block, 7th Street SE

Harrison Flakker

Resident, 400 Block, 7th Street SE

Ivan Frishberg

ANC 6B Commissioner

Jon Genderson

Capitol Hill Merchant

Neal Gregory

Friends of the Southeast Library (President)

Juliet Main

National Community Church

Margaret Missiaen

Capitol Hill Garden Club

Kirsten Oldenburg

ANC 6B Commissioner

Brian Pate

ANC 6B Commissioner

Philip Peisch

ANC 6B Commissioner

David Perry, Chair

Barracks Row Main Street

Susan Perry

Capitol Hill Business Improvement District

Barbara Reihle

Resident, 800 Block D Street

Donna Scheeder

Eastern Market Community Advisory
Committee