



CHAPTER 2: EXISTING CONDITIONS DATA COLLECTION AND MAPPING

To have a clear understanding of the issues and constraints in the Study Area, the Study Team collected existing conditions information for analysis through readily available Baltimore City GIS layers, existing available biennial Baltimore City bridge inspection reports, other state and local agencies, and via field collection and verification. Area master plans were obtained to ensure compliance with any previous recommendations and studies. Existing conditions information will be used as a basis for evaluating how the Hanover Street corridor will operate under future conditions, with and without improvements. The Existing Conditions data collection process is described below in more detail.

Review of Area Master Plans

To understand the body of planning work completed prior to the Hanover Street Corridor Study, and ensure consistency with previous and ongoing efforts, the Study Team has evaluated and documented background information on the previous Baltimore City master plan documents that are directly applicable to the Study Area. Master plans are developed by state and/or local agencies in order to provide a comprehensive, long-range vision for the development of a specific region or community and guide the development process and provide a vision for future use. The comprehensive master planning documents examined for this study will affect future land use and guide development within the vicinity of the project and incorporate requests for multimodal transportation and revitalization, mainly in residential, environmental, and commercial capacities. The *Middle Branch Master Plan*, *Middle Branch Transportation Plan*, *Cherry Hill Community Master Plan*, *South Baltimore Gateway Master Plan*, and *Port Covington Master Plan* are discussed in this chapter. The current study is consistent with the referenced master plans, as each mentions the necessity to improve the Vietnam Veterans Memorial Bridge for community and transportation advancement.

Middle Branch Master Plan (2007)

The *Middle Branch Master Plan* includes discussion of open space and recreation, design, development, transportation, environmental factors, heritage, tourism, sustainable communities, and implementation. The Plan supports the strategic development of areas to help spur economic advancement and support surrounding communities. Recommendations include zoning changes and a comprehensive transportation plan for the Port Covington and Swann Park peninsulas. Considerations are identified for repairs and upgrades to anticipate for increased traffic and attention to the compatibility of development around existing heavy industrial sites. Multimodal, vibrant, and safe communities that encourage healthy use of both the land and water aim to enhance circulation within and between neighborhoods.





The *Middle Branch Master Plan* includes a vision to:

- Ensure that opportunities for economic development integrate and support the Middle Branch ecosystem, existing communities, and the unique character and location of Middle Branch.
- Build a safe, accessible, sustainable transportation system to support Baltimore's natural waterfront with a mix of uses and incomes in new development patterns to enhance community life in and around the area.
- Preserve historic, cultural, and natural resources for public enjoyment and heritage tourism development.

Specifically, the following *Middle Branch Master Plan* recommendations are applicable to the Hanover Street Corridor Study Area:

- Establish design guidelines, street/path connectivity targets, and sustainable transportation policy to support walking, transit use and on-street bicycle networks, particularly at major transit nodes and light rail stations.
- The fifth travel lane on the Vietnam Veterans Memorial Bridge may be unnecessary due to travel volumes. Reversible lanes are not ideal for vehicular safety. It may be possible to capture the extra width from this lane and provide a bike trail along the west side of the bridge.
- The extra width in major arterials such as Waterview Avenue, Cromwell Street, Hanover Street, and Potee Street south of the Vietnam Veterans Memorial Bridge provides opportunities to establish boulevards with green space and bicycle and pedestrian facilities.
- Highway access improvements could involve existing ramp systems or the creation of new entrance and exit ramps
- The plan's vision for heritage and tourism aims to "preserve historic, cultural, and natural resources for public enjoyment and heritage tourism development." The Vietnam Veterans Memorial Bridge is eligible for the designation of a Baltimore City Landmark.
- Provide for a sustainable, well-balanced, well-designed transportation system for cars, transit users, bicyclists, and pedestrians.

Middle Branch Transportation Plan (2011)

The *Middle Branch Transportation Plan* considers both land and water surrounding the Study Area and builds upon several other area plans. Community goals that were highlighted in the 2007 *Middle Branch Master Plan* directed the efforts of the *Middle Branch Transportation Plan*.





The *Middle Branch Transportation Plan* supports the *Middle Branch Master Plan* by:

- Promoting new developments and renewal of existing communities.
- Encouraging walking, bicycling, water transport, and public transportation at major transit nodes and light rail stations.
- Enhancing circulation within and around neighborhoods.
- Improving regional access to the Baltimore and Washington D.C. metro areas for public and private transportation modes.
- Assessing the usage and capacity of the current transportation infrastructure and adding targeted capacity, facilities, and connections.
- Developing policies and procedures to guide future transportation planning, to implement the transportation strategies, and to manage and sustain the transportation system.

Specifically, the following recommendations are identified in the *Middle Branch Transportation Plan* that would be applicable to the Hanover Street Corridor Study Area:

- Remove the center lane on the Vietnam Veterans Memorial Bridge and add bike lanes in both directions to enhance the connectivity between South Baltimore and Middle Branch communities.
- Construct bicycle lanes on Hanover Street from Wells Street to the Vietnam Veterans Memorial Bridge.
- Consider future water taxi landing locations at Port Covington, West Covington Park, Westport, and Middle Branch Park near the Vietnam Veterans Memorial Bridge to provide an opportunity for the reduction of vehicular traffic on the road network within this area.
- Change the traffic signal phasing at the Hanover Street/McComas Street intersection by “splitting” the signal phase for the McComas Street approaches, with eastbound traffic preceding westbound traffic.
- Construct a new connection between South Baltimore and Port Covington by extending Marshall Street underneath I-95 and over the railroad tracks to intersect with McComas Street to improve pedestrian, bicycle, and vehicular connectivity between the South Baltimore and Port Covington areas and provide an alternate route to Hanover Street and Key Highway.

Cherry Hill Community Master Plan (2008)

The *Cherry Hill Community Master Plan* supports the “sustainable communities” principles of the *Middle Branch Master Plan* and is specific to the Cherry Hill community, south of the Vietnam Veterans Memorial Bridge. Specific recommendations of the *Cherry Hill Community Master Plan* that are applicable to the Hanover Street Corridor Study Area include the following:





- Conduct a comprehensive assessment of all infrastructure (roads, storm drains, lights, etc.) and create a plan for upgrading deficient infrastructure components.
- Evaluate the routes, accessibility, frequency, and reliability of Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) buses.

South Baltimore Gateway Master Plan (2015)

The *South Baltimore Gateway Master Plan* offers a comprehensive and holistic look at South Baltimore neighborhoods and potential improvements, ranging from housing and transportation to safety and culture. The Plan offers details on the planning process; area history; existing conditions; specific goals, strategies, and recommendations; community investments; and implementation steps. This Plan aims for safe transportation and improved “Complete Streets” connectivity, an expanded trail system, and enrichment of the waterfront walkway.

The Plan encompasses 14 distinct neighborhoods, industrial areas, and waterfront. The five guiding principles of the Plan are transparency, collaboration, sustainability, innovation, and sense of place. The Plan stresses connectivity of all transportation modes to increase access while improving safety of non-motorized transportation and making connections within and between neighborhoods.

Similar to those recommendations outlined in the *Middle Branch Master Plan* and *Middle Branch Transportation Plan*, the following specific *South Baltimore Gateway Master Plan* recommendations are applicable to the Hanover Street Corridor Study Area:

- Create a South Baltimore “gateway” at Hanover Street and Wells Street.
- Evaluate additional water taxi service landings in the Middle Branch and adjacent areas (West Covington Park and Middle Branch Park near the Vietnam Veterans Memorial Bridge).
- Develop alternatives for intersection improvements at McComas Street and Hanover Street.
- Develop structural and multimodal enhancements along the Vietnam Veterans Memorial Bridge.
- Improve access to Middle Branch Park.
- Add multimodal access on the Bridge, replace or upgrade the existing structure, and improve entrances on both sides.
- Consideration of freight-related safety and accessibility, as Hanover Street is a critical truck route.

Port Covington Master Plan (2016)

As part of the proposed redevelopment plan at Port Covington, the *Port Covington Master Plan* was released on June 1, 2016. The Plan shows a vision of the proposed development, with a new street grid, new transit facilities and links, and new parks. The components of the plan include multimodal connectivity, ecology and parks, resilient infrastructure, land use and zoning, and civic uses. Pedestrian and bicycle connectivity are stated as being a priority.





Specific to the Hanover Street Corridor Study Area, Hanover Street is described as being redesigned to serve the regional traffic and freight movements, as well as enhancing safety. Enhanced connections to I-95 are also proposed.

As part of the site analysis section, it is stated that “many of the properties comprising Port Covington are considered brownfields and are at various stages of remediation. Some have been through the Maryland Department of the Environment Voluntary Cleanup Program and some are not yet enrolled. All properties will be required to meet the necessary cleanup standards for redevelopment.”

Data Collection

Assessing existing conditions and data collection is the foundation for the entire study and includes a review of available Baltimore City data, as well as field verification. As the first step, the Study Team developed a data collection plan for assessing the physical, operational, and socio-economic needs and determining the existing roadway, traffic, transit, bicycle, pedestrian, waterway, freight, bridge, land use, socioeconomic, cultural and environmental conditions along the Hanover Street corridor. The data collected for this study includes the following:

- Previous studies, plans, and reports in the Study Area
- Bridge plans and recent inspection reports
- Safety data – crash data history and accident statistics
- Current traffic conditions – intersection traffic counts and Average Daily Traffic (ADT) counts
- Roadway features
- Drainage and utilities
- Pedestrian facilities
- Bicycle accommodations
- Truck routes
- Transit routes and facilities
- Census data/community demographics
- Land use and zoning information
- Environmental resources
- Economic analysis data (description and analysis included in separate report).

Mapping of applicable data items listed above was developed within the study limits and generated using the most recent available geographic information system (GIS) data from Baltimore City and other





agencies. GIS layers, which are separate digital files graphically representing information such as roads, parks, and environmental features, enable maps to be customized based on the specific data being presented. This mapping, and a more detailed description, is presented later in this chapter for each applicable dataset.

The specific data collected is categorized and discussed below.

Structures

There are five major bridge structures located within the Study Area for the Hanover Street corridor. Any or all of these structures may be affected by future corridor development. These major structures include:

- Hanover Street over Middle Branch (Vietnam Veterans Memorial Bridge) – Bridge BC 5210; owned and maintained by BCDOT
- Hanover Street over CSX Railroad – Bridge BC 5209; owned by CSX and maintained by BCDOT
- Hanover Street over CSX Railroad – Bridge BC 5212; owned and maintained by BCDOT
- Hanover Street Northbound Ramp to I-95 Southbound (Ramp J) – Bridge BCW 552; owned and maintained by MDTA
- I-95 Northbound Ramp to Southbound Hanover Street (Ramp K) – Bridge BCW 553; owned and maintained by MDTA

The bridge locations are depicted on **Figure 2-1** (see end of chapter). A summary discussion of each structure follows.

The existing structural configuration, physical condition, and geometry of these structures have been reviewed within the context of the following available BCDOT data sources:

- Bridge Plans (Original Construction and Rehabilitation)
- Bridge Inspection Reports
- Bridge Rating Summaries and Calculations
- Movable Bridge Opening Records
- Historic Documents.

In bridge inspection reports, condition ratings are provided using the following guidelines and definitions:

- Excellent condition
- Very good condition: No problems noted



- Good condition: Some minor problems
- Satisfactory condition: Structural elements show some minor deterioration
- Fair condition: All primary structural elements are sound, but may have minor section loss, cracking, spalling, or scour
- Poor condition: Advanced section loss, deterioration, spalling, or scour
- Serious condition: Loss of section, deterioration, spalling, or scour has seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
- Critical condition: Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored, it may be necessary to close the bridge until corrective action is taken.
- Imminent failure condition: Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put it back in light service.
- Failed condition: Out of service – beyond corrective action.

Bridge No. BC 5210 (Vietnam Veterans Memorial Bridge) – Hanover Street over Middle Branch

The Hanover Street Bridge, officially renamed the Vietnam Veterans Memorial Bridge in 1993, is the major crossing of the Middle Branch between Cherry Hill and Port Covington. It is a historically significant structure that comprises a major section of the corridor and will be a predominant issue with regard to corridor planning and any reconstruction efforts.

The Vietnam Veterans Memorial Bridge is a 37-span bridge built in 1916 and rehabilitated in 1970 and 1992. The structure consists of a two-leaf Rall-type bascule span, 16 cantilevered truss spans configured (through the use of concrete encasement) as elliptical open spandrel arches flanking each end of the bascule, and 20 concrete arcade spans at the north end of the bridge. The bridge has an overall length of 2,290'-2". The bridge has an out-to-out width of 72'-0" providing a clear roadway width of 60'-0" between curbs. The bridge carries five lanes of traffic, two in each direction with a reversible center lane.



Photo 2-1: Bridge BC 5210

The superstructure in the arcade spans consists of adjacent prestressed concrete solid slab beams. The arch-span superstructure (eight spans on each side of the movable span) consists of cantilevered steel Warren trusses encased in concrete which support concrete floor beams, prestressed concrete deck



planks, and a concrete wearing surface. The use of the steel trusses with formwork allowed for the construction of a bridge with a Beaux Arts style arched façade without the need of shoring in the waterway. The bascule span superstructure consists of steel truss bascule girders, steel truss and steel plate built-up floor beams, and steel stringers supporting an open grid steel deck. The bascule girders and floor beams are identified as fracture critical members.

The substructure consists of reinforced concrete abutments and wing walls. The upper portions of the pier walls are the concrete encased anchor sections of the cantilevered trusses. There are concrete sidewalks along both sides of the structure and concrete parapets with single strand railing along each side of the bridge in the arcade and arch spans. The traffic barrier in the movable span consists of steel railings. There are W-beam traffic barriers along the approaches.

Previous major rehabilitation work has addressed the movable span electrical and mechanical operating systems, the movable span steel grid deck, and the approach span superstructure.

The bridge is not posted and is summarized in the inspection reports as being in **Poor Condition**. Table 2-1 below summarizes the Maryland Legal Load Limits (red font indicates minor load carrying deficiencies):

TABLE 2-1: BRIDGE BC 5210 LOAD LIMITS

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)
H-15	15 Tons	16.5	27.5
HS-20	36 Tons	28.0	47.0
Type 4	35 Tons	21.5	36.5
Type 3S2	40 Tons	35.5	59.5

The major components of necessary repair work include the replacement of the deck wearing surface and the electrical operating system, as well as other repairs throughout the structure. Items that will also have a major impact on the rehabilitation cost are the potential need for any repairs associated with the timber pile foundations and the material condition of both existing steel and concrete elements – items beyond the scope of the current information available. Therefore, to realize a future service life of 75 to 100 years, it is anticipated that currently unforeseen additional major costs will likely be incurred for a complete rehabilitation.

The movable spans accommodate a navigable waterway and require openings throughout the year. The following summarizes the movable bridge openings from 2015 and 2016:



Year 2015

- Opened two (2) times for recreational sail boat
- Opened zero (0) times for commercial vessels
- Opened (partially) six (6) times for maintenance

Year 2016

- Opened zero (0) times for recreational sail boat
- Opened zero (0) times for commercial vessels
- Opened one (1) time for maintenance

Bridge No. BC 5209 – Hanover Street over CSX Railroad

Bridge No. BC 5209 is a three-span (68'-0", 68'-0", 69'-0") multi-girder bridge built in 1929. The bridge has an overall length of 206'-0" with a curb-to-curb width of 50'-0" and carries four lanes of traffic – two in each direction (north and south). The superstructure consists of 10 concrete-encased riveted steel plate girders supporting a reinforced concrete deck. The substructure consists of reinforced concrete abutments, wing walls, and piers. There are W-beam traffic barriers along the approaches and concrete parapets on the bridge.



Photo 2-2: Bridge BC 5209

The bridge is not posted and is summarized in the inspection reports as being in **Fair Condition**. **Table 2-2** below summarizes the Maryland Legal Load Limits:

TABLE 2-2: BRIDGE BC 5209 LOAD LIMITS

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)
H-15	15 Tons	15	15
HS-20	36 Tons	36	36
Type 3	33 Tons	33	33
Type 3S2	40 Tons	40	40



Bridge No. BC 5212 – Hanover Street over CSX Railroad

Bridge No. BC 5212 is a seven-span, each 50'-0", steel beam bridge built in 1900 and reconstructed in 1975. The bridge has an overall length of 367'-0" with a curb-to-curb width of 61'-8" and carries five lanes, two lanes in each direction (northbound and southbound) and a reversible center lane. The superstructure consists of weathering steel beams supporting a reinforced concrete deck. The substructure consists of reinforced concrete piers, abutments and wingwalls. There are W-beam traffic barriers along the approaches and reinforced concrete parapets on the bridge. There is a sidewalk on the east side of the bridge only.



Photo 2-3: Bridge BC 5212

The bridge is not posted and is summarized in the inspection reports as being in **Poor Condition**. **Table 2-3** below summarizes the Maryland Legal Load Limits:

TABLE 2-3: BRIDGE BC 5212 LOAD LIMITS

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)
H-15	15 Tons	49.0	82.0
HS-20	36 Tons	63.0	99.9
Type 4	35 Tons	54.5	91.0
Type 3S2	40 Tons	93.0	99.9

Bridge No. BCW 552 – Hanover Street Northbound Ramp to I-95 Southbound (Ramp J)

BCW552001 carries the I-95 southbound on-ramp as part of the MDTA Fort McHenry Tunnel Facility. This 10-span curved steel multi-girder bridge was built in 1979 and carries one lane of traffic from northbound Hanover Street to I-95 southbound over CSX Locust Point tracks, Hanover Street, and Race Street. It has an overall length of 1,031'± (along the Ramp J baseline) with a clear roadway width of 24'-0"±. The superstructure is composed of a 420' long five-span continuous unit, a 145' long two-span continuous unit and a 466' long three-span continuous unit with a reinforced concrete deck. The substructure is composed of reinforced concrete piers and a reinforced concrete abutment.



Photo 2-4: Bridge BCW 552

The bridge is not posted and is summarized in the inspection reports as being in **Satisfactory Condition**. **Table 2-4** below summarizes the Maryland Legal Load Limits:

**TABLE 2-4: BRIDGE BCW 552 LOAD LIMITS**

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)
H-15	15 Tons	27	46
HS-20	36 Tons	37	62
Type 3	33 Tons	37	62
Type 3S2	40 Tons	50	84

Bridge No. BCW 553 – I-95 Northbound Ramp to Southbound Hanover Street (Ramp K)

BCW553001 carries the I-95 northbound off-ramp as part of the MDTA Fort McHenry Tunnel Facility. This 12-span curved steel multi-girder bridge was built in 1979 and carries one lane of northbound traffic from I-95 to southbound Hanover Street over Race Street, McComas Street, a private business and CSX Railroad. It has an overall length of 1,137'± (along the Ramp K baseline) with a clear roadway width of 20'-0"±. The superstructure is composed of a four-span continuous unit (142'-0"±, 184'-0"±, 184'-0"± and 125'-0"±), a two-span continuous unit (81'-0"± and 81'-0"±), a single span (80'-6"±) and five rolled steel W-beam simple spans (52'-0"±, 52'-0"±, 52'-0"±, 52'-0"±, 51'-2"±) carrying a reinforced concrete deck. The substructure is composed of reinforced concrete piers and a reinforced concrete abutment at the north end. The deck was resurfaced in 2014/2015.

**Photo 2-5: Bridge BCW 553**

The bridge is not posted and is summarized in the inspection reports as being in **Satisfactory Condition**. **Table 2-5** below summarizes the Maryland Legal Load Limits:

TABLE 2-5: BRIDGE BCW 553 LOAD LIMITS

Vehicle	Gross Vehicle Weight	Inventory (Tons)	Operating (Tons)
H-15	15 Tons	34	57
HS-20	36 Tons	56	94
Type 3	33 Tons	52	88
Type 3S2	40 Tons	79	100



Existing Transportation Network

Study Area Intersections

The following nine signalized intersections are included in the Study Area and the location and intersection lane configurations are shown in **Figure 2-2** (see end of chapter):

1. Hanover Street (MD 2) and Wells Street
2. Hanover Street and McComas Street
3. Hanover Street and Cromwell Street
4. Hanover Street (northbound) and Waterview Avenue
5. Potee Street (southbound) and Waterview Avenue
6. Hanover Street (northbound) and Cherry Hill Road
7. Potee Street (southbound) and Cherry Hill Road
8. Hanover Street (northbound) and Reedbird Avenue
9. Potee Street (southbound) and Reedbird Avenue

Roadway Characteristics

Hanover Street (MD 2) is a Baltimore City-owned and maintained north-south major arterial roadway in the Study Area. From Wells Street to I-95, the Hanover Street corridor is a four-lane undivided highway which transitions to a five-lane undivided highway until just south of the Vietnam Veterans Memorial Bridge. In this section, the center lane operates as a reversible lane and is allocated to the peak traffic direction in the AM and PM peak periods using overhead lane-use signals. South of the bridge to the southern study limit at Reedbird Avenue, the corridor consists of a two-way couplet – three lanes in the northbound direction on Hanover Street and three lanes in the southbound direction on Potee Street. Curb and gutter is present along the entire roadway within the Study Area. The posted speed limit is 35 mph from Wells Street to Cherry Hill Road and 40 mph from Cherry Hill Road to Reedbird Avenue.

There is no on-street parking present on Hanover Street or Potee Street in the Study Area, but on-street parking is present on Hanover Street north of Wells Street and on both Cherry Hill Road and Reedbird Avenue between Hanover Street and Potee Street. No on-street parking is present on Waterview Avenue between Hanover Street and Potee Street.

Drainage and Utilities

Mapping of available drainage and utility information, including locations of streetlights, storm inlets, and conduit, was developed using Baltimore City GIS data within the Study Area. The existing roadway is primarily served by a closed storm drain system, with outfalls discharging to the Middle Branch of the Patapsco River. The existing drainage and utility information is shown in **Figure 2-3** (see end of chapter).





Existing street lighting, as shown in **Photo 2-6**, is intended for vehicular visibility and not pedestrian visibility.



Photo 2-6: Existing Street Lighting

Pedestrian Facilities

Pedestrian facilities (including sidewalks, crosswalks, pedestrian signals, and Americans with Disabilities Act (ADA)-compliant ramps with detectable warning surfaces), were inventoried in the Study Area. Sidewalks are mostly present on both sides of the roadway in the Corridor, with the exception of the northbound direction in the area north of McComas Street under I-95 and the southbound direction between McComas Street and Cromwell Street.

There are numerous locations in the Study Area where overgrown brush or debris reduces the sidewalk width to less than three feet. Additionally, there are areas where the sidewalk does not provide adequate ADA clearance around utility poles/signs/etc. On the Vietnam Veterans Memorial Bridge, multiple wooden ramps are in-place with heights and gaps that may be difficult for a wheelchair user to traverse, creating additional ADA issues. On the southern side of the bridge on Hanover Street, an overgrown set of stairs leads down to access the Gwynns Falls Trail, but there is no paved path from the base of the stairs to the trail.

All of these areas decrease pedestrian maneuverability and comfort in the Corridor and are shown in **Photo 2-7** below. The pedestrian facilities in Study Area are documented in **Figure 2-4** (see end of chapter).



Photo 2-7: Pedestrian Safety Issues



Bicycle Facilities

Existing and proposed bicycle facilities were also inventoried in the Study Area. The existing bicycle network in the Corridor includes a designated bike lane on northbound Hanover Street from Reedbird Avenue to Cherry Hill Road (see Chapter 5, **Photo 5-1**), designated eastbound and westbound bike lanes on Cherry Hill Road connecting Hanover Street and Potee Street to points west, as well as the off-road Gwynns Falls Trail.

Proposed bicycle facilities are based on the *2015 Baltimore City Bike Master Plan* and include additional trails, as well as dedicated bike lane(s) on Hanover Street through the entire Study Area.

Photo 2-8 shows a bicycle crossing the Vietnam Veterans Memorial Bridge using the sidewalk and the existing and proposed bicycle accommodations are documented in **Figure 2-5** (see end of chapter).



Photo 2-8: Bicycle Crossing the Vietnam Veterans Memorial Bridge



Truck Routes

Hanover Street is classified as a *restricted route* (no trucks from 7:00pm to 7:00am) from I-95 to Wells Street and northward into the South Baltimore neighborhood. From I-95 south to the study limits, Hanover Street is designated as a *through truck route* (unrestricted access 24 hours a day, seven days a week) on Baltimore City's Official Truck Routes map. These truck route designations mean that the roads are designed to handle the geometry, heights, and weights of trucks. **Figure 2-6** shows the portion of the Baltimore City Official Truck Routes map relevant to the Study Area and **Photo 2-8** shows examples of trucks currently using the Hanover Street corridor.

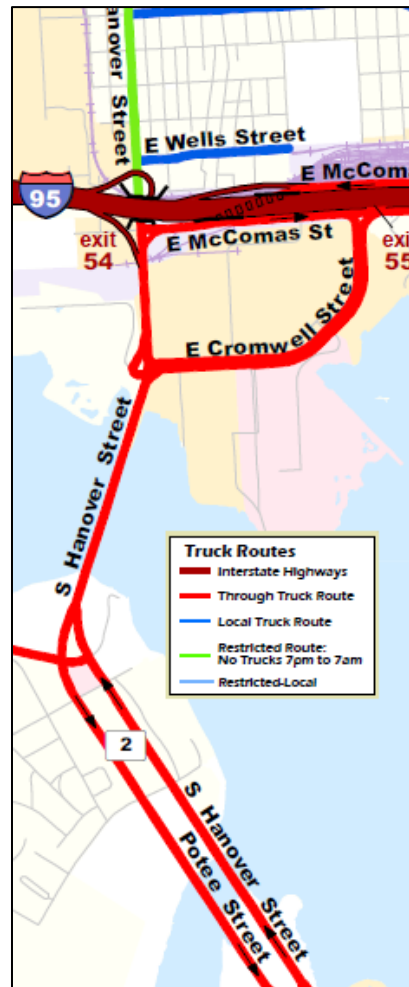


FIGURE 2-6: APPROVED BALTIMORE CITY TRUCK ROUTES

Source: Baltimore City Official Truck Routes Map



Photo 2-8: Truck Examples in the Corridor

Significant truck traffic is present in the Corridor as Hanover Street serves as a connection between and amongst the Interstate system, other trucking routes, multiple large industrial site and ports to the south of the Study Area.

BCDOT Bridge staff confirmed that all but one of the structures in the Study Area do not have recorded vertical constraints since they are well above standard truck heights. The vertical clearance of Hanover Street under I-95 is recorded as 21'-2".



Transit Routes and Facilities

Bus

The Study Area is served by the MDOT MTA, which operates the 14, 27, 29, 51, and 64 local bus routes. It should be noted that the redesigned MDOT MTA BaltimoreLink transit system (with full implementation in Summer 2017) is not included within Existing Conditions and updated information will be discussed later in this report. A few examples of bus shelters and stops are shown in **Photo 2-9** and **Figure 2-7** (see end of chapter) shows the inventory of existing transit routes and facilities in the Study Area. **Table 2-6** provides additional information on the available transit service in the Study Area. Average headways are between 15-20 minutes in the weekday peak hours, 30-40 minutes in the weekday off-peak hours, and up to 90 minutes on weekends.



Photo 2-9: Examples of Bus Shelters and Stops in the Corridor

TABLE 2-6: AVAILABLE TRANSIT SERVICE

Bus Route	Type of Service	Span of Service	Weekday Headway			Weekend Headway			
			AM Peak	Off-Peak	PM Peak	Weekend Service	AM Peak	Off-Peak	PM Peak
MTA 14	Local	5:00am – 12:00am daily	20 min.	30 min.	20 min.	Sat/Sun	30/90 min	30/90 min	30/90 min
MTA 27	Local	5:00am – 1:00am daily	20 min.	40 min.	20 min.	Sat/Sun	40/30 min	40/60 min	40/30 min
MTA 29	Local	5:00am – 12:00am daily	20 min.	30 min.	20 min.	Sat	20 min	20 min	20 min
MTA 51	Local	4:30am – 1:30am daily	20 min.	30 min.	20 min.	Sat/Sun	40/40 min	50/60 min	40/40 min
MTA 64*	Local	4:30am – 1:30am daily	15 min.	30 min.	15 min.	Sat/Sun	30/30 min	40/50 min	40/30 min

* MDOT MTA also runs an express bus service variation (Route 164) with a single stop at Potee Street/Cherry Hill Road



With the MDOT MTA BaltimoreLink transit system, the entire local and express bus systems in Baltimore are being redesigned and updated information is presented in Chapter 4 of this report, including Fall 2016 MDOT MTA ridership data.

Water Taxi

Baltimore Water Taxi currently operates north and east of the Study Area, within the Inner Harbor and as far as Fort McHenry and Canton. There are no planned water taxi routes in the Study Area, but the *2015 Baltimore Water Transit Strategic Plan* identified Westport and Cherry Hill as potential travel markets south of the existing Inner Harbor routes. These areas were also noted in the *Middle Branch Transportation Plan*.

Existing Environmental Resources

Natural Resources

A desktop review of publically available information was conducted to identify the existing natural resources present within the project's natural resources study area, which has been defined as an approximate 500-foot wide swath along the length of the Hanover Street corridor, therefore approximately 250 feet on either side of the roadway.

Wetlands/Waterways

Wetland and waterway data sources, including the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, Maryland Department of Natural Resources (DNR) wetland mapping, and United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Web Soil Survey were utilized to map existing features (**Figures 2-8a and 2-8b**, see end of chapter).

The Hanover Street corridor is located within the Patapsco River Lower North Branch and Baltimore Harbor 8-digit watersheds, and part of the greater Patapsco River watershed (**Figure 2-8b**). Both DNR and NWI mapping indicate the open water system of the Patapsco River and its adjacent Middle Branch, each with its own designation. DNR designates the area as an estuarine open water system. NWI wetland mapping designates the area as an estuarine, subtidal, unconsolidated bottom system. Additional DNR wetlands are identified adjacent to the natural resource study area, but no other wetland or waterway systems were identified within the study area. Coordination with the Maryland Department of the Environment (MDE) and the U.S. Army Corps of Engineers (USACE) will be necessary during future phases of the project not part of this study in order to determine the potential limits of tidal waters and agency jurisdiction over resources.

There are no federal or state designated Wild and Scenic Rivers or Wetlands of Special State Concern located within the natural resources study area.

The Middle Branch of the Patapsco River flows beneath the Vietnam Veterans Memorial Bridge. This section of water acts as a feeding and resting area for many fish and bird species during migration





periods, and is important habitat for various waterfowl throughout the year. Water-based recreation, such as fishing and rowing, are historically popular activities.

Floodplains

Data of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps identifies the 100-year floodplain of the Patapsco River located within the natural resources study area and surrounding the Vietnam Veterans Memorial Bridge (**Figure 2-8a**).

Flood Insurance Rate Maps depict flood hazard areas as Special Flood Hazard Areas (SFHA). SFHA areas are defined as having a one-percent chance of being equaled or exceeded in a given year, also referred to as the 100-year floodplain (FEMA, 2016). Floodplain within the study area is designated as Zone AE, in which base flood elevations are determined.

Chesapeake Bay Critical Area (CBCA)

The Chesapeake Bay Critical Area Act establishes the State of Maryland Chesapeake Bay Critical Area Commission (CAC) governed by the Department of Natural Resources (DNR). DNR requires that all municipalities including Baltimore City prepare a Critical Area Management Program (CAMP) in order to protect shoreline natural areas and habitat. The CBCA encompasses all land and water within 1,000 feet landward of the state tidal wetlands boundary of the shoreline of the Chesapeake Bay and its tributaries. The Critical Area Buffer is defined as the area within 100-feet landward of tidal waters, tidal wetlands, and tributary streams (DNR, 2016a). The CBCA is further categorized into three land classifications: Intensely Developed Areas (IDAs), Limited Development Areas (LDAs), and Resource Conservation Areas (RCAs). These classifications are based on the predominant land use of the area and the intensity of development at the time it was mapped.

The natural resources study area contains both IDA and RCA land classification areas (**Figure 2-8b**). IDAs are defined as areas with 20 or more adjacent acres where residential, commercial, institutional or industrial land uses predominate. Little natural habitat is located within these areas and the main focus is to improve water quality through reducing pollutant loads. RCAs are characterized largely as natural environments or where resource-utilization activities take place including agriculture, forestry, fisheries activities, and aquaculture (DNR, 2016b). Activities occurring within the City and within the CBCA must abide by the City of Baltimore CAMP.

The CAC also identify Habitat Protection Areas (HPA) that provide habitat for fish, wildlife, and plant species such as non-tidal wetlands and anadromous fish spawning areas, and receive special protection within the CBCA. The Baltimore City CAMP has further identified specific HPAs with having significant ecological benefit and identified them as Designated Habitat Protection Areas (DHPA), which have been mapped and surveyed as areas with especially important habitat for seasonal waterfowl and fish habitat. Baltimore City identifies 12 DHPA's within the City, two of which are located within the natural resources study area: Lower Middle Branch and Reedbird (BCDP, 2011), both located south of the Vietnam Veterans Memorial Bridge (**Figure 2-8b**).





Forest Habitat

A review of Baltimore City GIS data and aerial mapping, and subsequent field verification, was conducted to determine the presence of forested areas and specimen trees located within the natural resources study area. Projects that occur within Baltimore City are subject to the *Baltimore City Supplement to the State Forest Conservation Manual* (BCDP, 1992). According to the supplement, a forested area is defined as “a biological community dominated by trees and other woody plants covering a land area of 10,000 square feet or greater. Forest includes (1) areas that have at least 100 trees per acre with at least 50 percent of those having a two-inch or greater diameter at 4.5 feet above the ground (DBH – diameter at breast height), and (2) forest areas that have been cut but not cleared. Forest does not include orchards.”

Forested areas occur in two locations within the natural resources study area (**Figure 2-8a**). One area is located at the southern portion of the Vietnam Veterans Memorial Bridge, northwest of Waterview Avenue within Middle Branch Park, and includes two forest stands that are fragmented by the Vietnam Veterans Memorial Bridge and encompass approximately 1.64 acres (71,290 square feet). The second area is located on the north side of Vietnam Veterans Memorial Bridge just north of E. Cromwell Street and south of I-95. This area includes five forest stands fragmented by South Hanover Street and the railroad, with each stand totaling over 10,000 square feet of forested area. This area encompasses approximately 4.8 acres (20,935 square feet).

A specimen tree is defined as a tree 30”DBH or greater or a tree having 75 percent or more of the diameter of the current state champion tree of that species. Field verification identified the presence of specimen trees within the natural resources study area, mainly along South Hanover Street, south of the Vietnam Veterans Memorial Bridge.

There are no Forest Interior Dwelling Species (FIDS) habitat located within or adjacent to the natural resources study area.

Soils

The USDA-NRCS Web Soil Survey was used to identify the existing soil types located within the natural resources study area. The six soil types present are illustrated on **Figure 2-8b** and a more detailed description of soil properties is listed in **Table 2-7** below. Soils include udorthents (disturbed soil where the upper soil material has been removed, filled, or graded), urban land, and various urban land complexes. Urban land consists of areas where more than 80 percent of the surface is covered by asphalt, concrete, buildings, or other impervious surfaces. The only relatively undeveloped ground within the study area is located within Middle Branch Park. Soils there are identified as Keyport-Urban Land complex. These moderately well drained soils are located on upland foot-slopes of the Coastal Plain.



TABLE 2-7: SOILS WITHIN NATURAL RESOURCE STUDY LIMITS

Soil Type	Hydric Soil (Y/N)	Prime Farmland Soil (Y/N)	Erosion Factor Kw (whole soil)*	Drainage Class
Christiana-Urban land complex, 0 to 8 percent slopes (7UB)	N	N	.37	Well drained
Keyport-Urban land complex, 0 to 8 percent slopes (15UB)	N (5% hydric components)	N	.43	Moderately well drained
Sassafras-Urban land complex, 0 to 8 percent slopes (29UB)	N	N	-	Well drained
Udorthents, smoothed, 0 to 35 percent slopes (42E)	N	N	.10	Well drained
Urban land, 0 to 15 percent slopes (44UC)	N	N	-	-
Water (W)	N	N	-	-

Source: USDA-NRCS. Web Soil Survey. 2016. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

* Indicates the erodibility of the whole soil, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. A K value over 0.35 is considered a highly erodible soil.

Rare, Threatened, and Endangered Species

On June 7, 2016, an online request for information regarding the presence of threatened or endangered species, proposed and candidate species, and critical habitat that may occur within the proposed natural resource study area was submitted to the USFWS. Results indicated no threatened or endangered species, critical habitats, refuges, or fish hatcheries. On June 13, 2016 a letter was received from the Maryland DNR Wildlife and Heritage Service, indicating no State or Federal records for rare, threatened or endangered species present within the boundaries of the project site. It also indicates that although not within the project boundaries, known historic waterfowl concentration areas are located adjacent to the southeastern part of the project boundaries. A letter dated June 20, 2016 was sent to Maryland DNR Project Review Division to request records for fisheries resources, including anadromous fish. On June 28, 2016 a response was received from the Maryland DNR Coastal Policy Coordinator indicating that the study area contains herring spawning and juvenile habitat and white perch juvenile habitat. A letter dated June 20, 2016 was also sent to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), to request records for federally listed fisheries resources. On July 25, 2016, the NOAA Fisheries department responded indicating that all efforts should be made to avoid and minimize adverse effects to the aquatic environment and directing use of best management practices to minimize the release of suspended sediment in the waterway and acoustic impacts to fish in the area. If there are any in-water activities planned, then the time-of-year restriction within these waters includes February 15 through June 15 during any year. Essential fish habitat has also been designated within the project area. See **Appendix A** for Agency Correspondence.





Waterfowl

The Chesapeake Bay, located in the Atlantic Flyway is home to many species of waterfowl that depend on the Chesapeake Bay as a food source, over wintering area, and year-round habitat. The natural resources study area includes waterfowl staging and concentration areas, located east of the Vietnam Veterans Memorial Bridge (see **Figure 2-8a**). Specifically, waterfowl staging and concentration areas located within the natural resources study area supports habitat for various wintering waterfowl (BCDP, 2011). The letter received from the Maryland DNR Wildlife and Heritage Service identified known historic waterfowl concentration areas located adjacent to the southeastern part of the project boundaries (see **Appendix A**). Further coordination with their office will be required if any water-dependent activities will be associated with this project.

Parkland and Easements

Baltimore City currently has approximately 6,000 acres of parkland and public space. Parklands are important to the City's overall natural resources health, as well as providing green space for residents and visitors. Parklands within the city range from small non-forested lots, to multi-acre forested lots. A desktop review of both City and State owned parklands revealed that there are no State owned parklands within or adjacent to the natural resources study area, but there are two City owned parks, Reedbird Park and Middle Branch Park.

Reedbird Park intersects the natural resources study area in the southernmost end of the corridor, south of Reedbird Avenue. This park is approximately 40 acres in size and mainly comprised of open space, with recreational facilities including basketball, tennis and a playground. Middle Branch Park is located at the southern end of the Vietnam Veterans Memorial Bridge. This 150-acre park was created in 1977 in an effort to restore environmentally degraded sites. Today it is comprised of open space and areas for wildlife viewing and a boardwalk, as well as recreational facilities such as rowing and kayaking, fishing, and picnic areas. Forested areas occupy the eastern end of the park, within the natural resources study area (**Figure 2-8b**).

A further review was conducted of several land easement types including Maryland Environmental Trust (MET), Forest Legacy Program, and Forest Conservation Act, which all function to help protect and conserve Maryland's forests. According to DNR database information and MD iMAP GIS mapping, none of these easements or protected areas are present within the natural resources study area.

Additionally, Maryland's Green Infrastructure Assessment (GIA) was reviewed and found that no green infrastructure hubs or corridors are located within or adjacent to the natural resources study area. The GIA identifies millions of acres of ecologically significant undeveloped land throughout the state in an interconnected network of hubs and corridors with the goal of protecting these areas against fragmentation.

Socioeconomic Resources

The Hanover Street corridor serves as a major thoroughway between downtown Baltimore City, South Baltimore, and Anne Arundel County. In order to better represent the existing socioeconomic resources surrounding the corridor, a more broad study area was used than that for the natural resource





environment, incorporating such social characteristics as regional and local demographics for population, race, age, gender, and income, as well as neighborhood and community resources. The following section provides an overview of the existing socioeconomic resources surrounding the corridor.

Social Characteristics

Regional Demographics

Regional demographics for the state of Maryland and Baltimore City are illustrated in **Table 2-8**. Results indicate a population increase of 19 percent and six percent, respectively, in Maryland and in Baltimore City by the year 2040. According to the 2010 U.S. Census, Maryland's population is 55 percent White, 29 percent Black or African-American, 8 percent Hispanic/Latino, and 6 percent Asian; while Baltimore City has a higher population of Black or African-American at 63 percent and lower population of White, Hispanic/Latino and Asian at 28 percent White, 4 percent Hispanic/Latino, and 2 percent Asian. According to the most recent U.S. Census American Community Survey, 2010-2014 five-year data set, Maryland has a median household income of \$74,149, and Baltimore City has a median household income of \$41,819. The U.S. Census Bureau identifies the official poverty rate in the United States in 2014 at 14.8 percent, which means that nearly 15 percent of the population have incomes that range from \$11,670 for individuals to \$40,090 for a household with eight members. Twenty-four percent of Baltimore City's population is indicated as living below the federal poverty level, which is more than twice as high as the state of Maryland's population living below the federal poverty level at 10 percent.

TABLE 2-8: REGIONAL DEMOGRAPHICS

TABLE 2-8A: REGIONAL POPULATION AND POPULATION GROWTH

	2000	2010	2040	Change 2000-2010	Change 2010-2040
Maryland	5,296,486	5,773,552	6,889,700*	9%	19%
Baltimore City	651,154	620,961	659,100*	-5%	6%

Source: *Maryland Department of Planning, Maryland State Data Center, July 2014

TABLE 2-8B: POPULATION DISTRIBUTION BY RACE WITHIN THE REGION

	Population	White	Black or African- American	American Indian & Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic/ Latino
Maryland	5,773,552	55%	29%	<1%	6%	<1%	<1%	2%	8%
Baltimore City	620,961	28%	63%	<1%	2%	<1%	<1%	2%	4%

Source: 2010 U.S. Census Data, Summary File 1 – Maryland Planning Department May 26, 2011

**TABLE 2-8C: REGIONAL DISTRIBUTION BY AGE AND GENDER**

	Population	Gender		Age			
		Male	Female	Under 18	18-39	40-64	65 & Over
Maryland	5,773,552	48%	52%	23%	29%	35%	12%
Baltimore City	620,961	47%	53%	21%	35%	32%	12%

Source: 2010 U.S. Census Data, Summary File 1 – Maryland Planning Department

TABLE 2-8D: MEDIAN INCOME AND POVERTY LEVEL WITHIN THE REGION

	Median Household Income	Population Living Below Federal Poverty Level
Maryland	\$74,149	10%
Baltimore City	\$41,819	24%

Source: U.S. Census American Community Survey 2010-2014 5-year Estimates

TABLE 2-8E: HOUSING DATA WITHIN THE REGION

	Total Housing Units	Occupied	Vacant	Owner Occupied	Renter Occupied
Maryland	2,378,814	61%	9%	70%	30%
Baltimore City	296,685	40%	16%	56%	44%

Source: 2010 U.S. Census Data, Summary File 1 – Maryland Planning Department

TABLE 2-8F: INDIVIDUALS WITHIN THE REGION WITH A DISABILITY

	Total Persons Disabled	Persons Disabled
Maryland	600,417	10%
Baltimore City	94,058	15%

Source: U.S. Census American Community Survey 2010-2014 5-year Estimates

Study Area Demographics

In order to create the Hanover Street corridor socioeconomic study area, the U.S. Census Data American Community Survey 2010-2014 5-year data set was used at the block group level where available. Data from the 2010 Decennial U.S. Census and data for the Census Tracts has been used where recent block group data is unavailable. Seven U.S. Census-delineated Census Tracts encompassing 15 Block Groups comprise the socioeconomic study area (**Figure 2-9**, see end of chapter). **Table 2-9** provides information about population, race, age, gender, and income within U.S. Census-delineated Census Tracts and Block Groups in the socioeconomic study area.

Population distributions by race indicate White populations within Baltimore City (28 percent) are lower than that of the identified socioeconomic study area (41 percent) and Black or African-American populations within Baltimore City (63 percent) are higher than that of the socioeconomic study area (54 percent). However, the racial distribution of the block groups north of Vietnam Veterans Memorial Bridge is notably different than that south of the bridge. North of the bridge, the population in eight of the nine block groups are over 84 percent White. In contrast, the six block groups south of the bridge have over 90 percent Black or African-American populations. The percentage of Hispanics/Latinos are the third most prevalent in the socioeconomic study area and are generally spread evenly throughout.

Gender distribution within the socioeconomic study area is similar to the gender distribution of Baltimore City. Age distribution indicates a higher percentage of the population younger than that of



Baltimore City living within the study area. Nearly 70 percent of the socioeconomic study area population is under 40 years of age, with seven of the 15 block groups having more than 50 percent of their population between 18 and 39 years of age.

TABLE 2-9: STUDY AREA DEMOGRAPHICS

TABLE 2-9A: POPULATION DISTRIBUTION BY RACE WITHIN THE SOCIOECONOMIC STUDY AREA

		Population	White	Black or African American	American Indian & Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic /Latino
Socioeconomic Study Area		16,034	41%	54%	<1%	1.33	<1%	<1%	1.35	2.39
Census Tract 2301.00	Block Group 1	1,037	84 %	<1%	<1%	3.09	0%	<1%	1.16	5.40
	Block Group 2	916	33%	62%	0.55	1.53	0%	0%	1.75	0.76
Census Tract 2302.00	Block Group 1	890	89%	3%	0%	2.70	0%	<1%	1.80	4.04
	Block Group 2	1,282	88%	6%	0%	1.95	0%	<1%	1.33	3.04
Census Tract 2303.00	Block Group 1	72	93%	0%	1.39	1.39	1.39	0%	0%	2.78
	Block Group 2	1,064	85 %	7%	<1%	2.07	0%	<1%	2.16	3.67
Census Tract 2404.00	Block Group 1	1,056	88 %	3%	<1%	3.69	0%	0%	2.08	2.84
	Block Group 2	314	90 %	2%	0%	3.50	0%	0%	1.27	2.87
	Block Group 3	1,201	92 %	2%	<1%	2.16	0%	<1%	1.08	2.83
Census Tract 2502.03	Block Group 1	975	2 %	94%	<1%	0.51	0%	0%	1.03	1.85
	Block Group 2	1,043	3%	92%	<1%	<1%	0%	<1%	2.30	1.63
Census Tract 2502.04	Block Group 1	1,538	<1%	99%	<1%	0%	0%	0%	0.52	<1%
	Block Group 2	2,587	1%	97%	<1%	0%	<1%	<1%	0.81	0.97
Census Tract 2502.07	Block Group 1	1,206	3%	91%	<1%	0.75	0%	<1%	1.41	3.90
	Block Group 2	853	2%	93%	1%	<1%	0%	<1%	1.64	2.23

Source: 2010 U.S. Census Data, Summary File 1 – Maryland Planning Department

**TABLE 2-9B: AGE AND GENDER DATA WITHIN THE SOCIOECONOMIC STUDY AREA**

			Gender		Age			
		Total Population	Male	Female	Under 18	18-39	40-64	65 & Older
Socioeconomic Study Area		16,034	46%	54%	24%	46%	23%	8%
Census Tract 2301.00	Block Group 1	1,037	57%	43%	11%	67%	18%	4%
	Block Group 2	916	48%	52%	25%	48%	20%	6%
Census Tract 2302.00	Block Group 1	890	52%	48%	6%	71%	17%	6%
	Block Group 2	1,282	53%	47%	8%	65%	20%	7%
Census Tract 2303.00	Block Group 1	72	61%	39%	14%	39%	35%	13%
	Block Group 2	1,064	54%	46%	11%	60%	23%	7%
Census Tract 2404.00	Block Group 1	1,056	51%	49%	9%	59%	23%	9%
	Block Group 2	314	47%	53%	3%	85%	11%	<1%
	Block Group 3	1,201	48%	52%	11%	52%	26%	10%
Census Tract 2502.03	Block Group 1	975	43%	57%	31%	29%	30%	11%
	Block Group 2	1,043	42%	58%	28%	37%	2^%	10%
Census Tract 2502.04	Block Group 1	1,538	40%	60%	47%	28%	20%	4%
	Block Group 2	2,587	39%	61%	40%	28%	23%	9%
Census Tract 2502.07	Block Group 1	1,206	42%	58%	28%	39%	25%	8%
	Block Group 2	853	42%	58%	29%	31%	30%	10%

Source: 2010 U.S. Census Data, Summary File 1 – Maryland Planning Department

**TABLE 2-9C: MEDIAN INCOME AND POVERTY LEVEL WITHIN THE SOCIOECONOMIC STUDY AREA**

		Median Household Income	Population Living Below the Federal Poverty Level
Socioeconomic Study Area		\$63,052	22%
Census Tract 2301.00	Block Group 1	\$115,699	8%
	Block Group 2	\$47,987	15%
Census Tract 2302.00	Block Group 1	\$98,798	4%
	Block Group 2	\$101,000	5%
Census Tract 2303.00	Block Group 1	\$68,750	0%
	Block Group 2	\$79,615	14%
Census Tract 2404.00	Block Group 1	\$85,635	5%
	Block Group 2	\$88,365	12%
	Block Group 3	\$105,583	3%
Census Tract 2502.03	Block Group 1	\$33,571	19%
	Block Group 2	\$30,446	29%
Census Tract 2502.04	Block Group 1	\$14,510	60%
	Block Group 2	\$12,631	59%
Census Tract 2502.07	Block Group 1	\$28,852	20%
	Block Group 2	\$34,338	16%

Source: U.S. U.S. Census American Community Survey 2010-2014 5-year Estimates

TABLE 2-9D: HOUSING DATA WITHIN THE SOCIOECONOMIC STUDY AREA

		Total Housing Units	Occupied	Vacant	Owner Occupied	Renter Occupied
Socioeconomic Study Area		7,584	91%	9%	37%	63%
Census Tract 2301.00	Block Group 1	489	93%	7%	52%	40%
	Block Group 2	452	92%	8%	19%	73%
Census Tract 2302.00	Block Group 1	558	88%	12%	39%	49%
	Block Group 2	668	88%	12%	50%	37%
Census Tract 2303.00	Block Group 2	574	86%	14%	51%	35%
	Block Group 1	42	86%	14%	62%	24%
Census Tract 2404.00	Block Group 2	201	96%	4%	7%	89%
	Block Group 1	597	86%	14%	58%	28%
	Block Group 3	619	92%	8%	73%	20%
Census Tract 2502.03	Block Group 1	367	93%	7%	35%	58%
	Block Group 2	488	89%	11%	27%	62%
Census Tract 2502.04	Block Group 1	517	97%	3%	7%	90%
	Block Group 2	1,075	93%	7%	8%	86%
Census Tract 2502.07	Block Group 1	591	92%	8%	3%	89%
	Block Group 2	346	93%	7%	36%	57%

Source: U.S. Census American Community Survey 2010-2014 5-year Estimates



**TABLE 2-9E: INDIVIDUALS WITHIN THE SOCIOECONOMIC STUDY AREA WITH A DISABILITY**

		Total Population	Total Persons Disabled	Persons Disabled
Socioeconomic Study Area		16,477	2,132	13%
Census Tract 2301.00	Block Group 1	1,896	236	12%
	Block Group 2			
Census Tract 2302.00	Block Group 1	2,147	179	8%
	Block Group 2			
Census Tract 2303.00	Block Group 2	1,091	122	11%
	Block Group 1			
Census Tract 2404.00	Block Group 2	2,829	139	5%
	Block Group 1			
	Block Group 3			
Census Tract 2502.03	Block Group 1	1,905	266	14%
	Block Group 2			
Census Tract 2502.04	Block Group 1	4,178	813	20%
	Block Group 2			
Census Tract 2502.07	Block Group 1	2,431	377	16%
	Block Group 2			

Source: U.S. Census American Community Survey 2010-2014 5-year Estimates

The median household income in the socioeconomic study area is \$63,052, more than \$21,000 higher than Baltimore City; however this varies widely within the socioeconomic study area from a high of \$115,699 to a low of \$12,631. The percentage of the study area population living below the poverty level is 22 percent, two percent less than in Baltimore City. Concentrations of the population with the highest median household incomes are located in the northern portion of the study area while areas with the highest percent of the population living at or below the poverty level are located in block groups 1 and 2 within Census Tract 2502.04 in the southern portion of the study area (refer to **Figure 2-9**). These block groups have approximately 60 percent of the population living below the poverty level.

The socioeconomic study area includes 7,584 housing units. Occupied units within the socioeconomic study area are 91 percent, which is higher than that of Baltimore City at 84 percent. In total, the housing units located within the socioeconomic study area have a slightly lower owner-occupancy rate at 37 percent than that of Baltimore City at 40 percent. Renter occupied housing units are concentrated in the southern portion of the study area in the Cherry Hill Neighborhood.

Disability statistics that include all ages within a population are only available at the U.S. Census Tract level. Within the socioeconomic study area, 13 percent of the population is identified as having a disability, which is a higher percentage than both the State and Baltimore City. Census Tract 2502.04, which indicated the two block groups with the highest percent living at or below the poverty level also show the highest percentage of individuals with a disability.

Study Area Neighborhoods/Communities

The Vietnam Veterans Memorial Bridge connects the South Baltimore Neighborhood to the north with the Cherry Hill Neighborhood to the south. In the northern portion of the socioeconomic study area,





north of I-95, neighborhoods include South Baltimore, Riverside, Sharp-Leadenhall, and Federal Hill. South of I-95, industrial/commercial neighborhoods include the Locust Point Industrial Area, the Spring Garden Industrial Area, and the Port Covington Area. These areas south of I-95 are currently part of the Port Covington Master Plan which is slated to construct specialty retail areas, residential units, industrial/light manufacturing space, hotel buildings, office space, public parks, public waterfront, and other public facilities. The Spring Garden Industrial Area and the Port Covington Area are the closest in proximity to the Hanover Street corridor. In the southern portion of the socioeconomic study area, south of the Vietnam Veterans Memorial Bridge, the residential Cherry Hill Neighborhood also includes Middle Branch Park and Reedbird Park. Cherry Hill is a densely urban neighborhood mainly comprised of small to medium sized row houses as well as apartment complexes. Refer to **Figure 2-10** (see end of chapter) for the location of each neighborhood/community.

Environmental Justice

Executive Order 12898, *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to identify and address disproportionately high and/or adverse human health or environmental effects on minority and/or low-income populations. Since the Hanover Street Corridor Study is receiving a federal grant, Baltimore City is required to abide by this executive order.

Minority and Low-Income Populations

The 2010 U.S. Census data were used to determine the presence of minority and/or low-income populations within Baltimore City and within the socioeconomic study area. Minority populations include concentrations of persons who identify as Black or African-American, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, Other, Two or More Races, and Hispanic/Latino. In order to identify potential minority populations, individual block groups within the socioeconomic study area are compared with a meaningfully greater percentage of minorities than that of a larger geographic region. For this project, the individual block groups are compared to the minority population of Baltimore City. The entire socioeconomic study area is located in Baltimore City, which is a densely populated major, urban core, and the Baltimore City demographics represent the diversity of all of the neighborhoods located within. Therefore, for this planning study, block groups with minority populations greater than the percentage of minorities in Baltimore City (72 percent) are considered minority and a potential environmental justice population. Six of the 15 block groups within the study area have been identified as minority, all located south of the Vietnam Veterans Memorial Bridge (block groups 1 and 2 of Census Tracts 2502.03, 2502.04, and 2502.07). Refer back to the Population Distribution by Race within the Socioeconomic Study Area table (**Table 2-8B**) and **Figure 2-9**.

Low-income populations are concentrations of people living below the federal poverty level. In order to identify potential low-income populations, individual block groups with a greater percentage of people living below the federal poverty level than that of Baltimore City (24 percent) are considered low-income populations. Based on 2010-2014 American Community Survey estimates, three of the 15 block groups (Census Tract 2502.02 block group 1, and Census Tract 2502.04 block groups 1 and 2) contain



potential low-income populations. Refer back to the Median Income and Poverty Level within the Socioeconomic Study Area table and **Figure 2-9**.

As illustrated in **Figure 2-9**, block groups with potential environmental justice populations are concentrated in the southern portion of the socioeconomic study area, south of the Vietnam Veterans Memorial Bridge, and largely within the Cherry Hill Neighborhood.

Limited English Proficiency

Individuals who do not speak English as their primary language or who have a limited ability to read, write, speak and comprehend English are defined as having Limited English Proficiency (LEP). Executive Order 13166 states that individuals who have LEP should have access to federally conducted and funded programs and activities, and that it's expected that agency plans would provide for this access.

According to the 2010-2014 American Community Survey estimates, the socioeconomic study area contains a total of 6,807 households, and of that total, 75 households are designated as LEP (**Table 2-10**). Spanish is identified as the most spoken language of the LEP households, with 46 households that speak Spanish as their primary language. There are 14 households that speak an Asian or Pacific Island language, and 15 households that speak some other language. Census Tract 2301.00 Block Group 1 contains 25 LEP households, the most of any block group in the socioeconomic study area.

TABLE 2-10: LIMITED ENGLISH PROFICIENCY HOUSEHOLDS

		Total Households	Total LEP Households	LEP Households
Socioeconomic Study Area		6,807	75	1%
Census Tract 2301.00	Block Group 1	375	25	7%
	Block Group 2	416	0	0%
Census Tract 2302.00	Block Group 1	505	0	0%
	Block Group 2	516	0	0%
Census Tract 2303.00	Block Group 1	37	0	0%
	Block Group 2	448	0	0%
Census Tract 2404.00	Block Group 1	581	0	0%
	Block Group 2	155	0	0%
	Block Group 3	532	0	0%
Census Tract 2502.03	Block Group 1	312	11	4%
	Block Group 2	455	9	2%
Census Tract 2502.04	Block Group 1	569	0	0%
	Block Group 2	953	0	0%
Census Tract 2502.07	Block Group 1	646	14	2%
	Block Group 2	307	16	5%

Source: U.S. Census American Community Survey 2010-2014 5-year Estimates

Community Facilities and Services

Community facilities and services located within the socioeconomic study area include libraries, medical facilities, public services, recreation, religious institutions, schools, senior centers and housing, and transportation modes (**Table 2-11**). These facilities were identified using spatial data acquired from Baltimore City and field verified through a windshield survey. **Figure 2-10** illustrates the location of each community facility and the numbering corresponds to **Table 2-11**.





Schools

A total of twelve schools (see **Table 2-11**) are located within the study area, which include five elementary schools, three middle schools, and four secondary schools, three of which function as both an elementary and a middle school in the same complex. The New Era Academy, Southside Academy, and Maritime Industries Academy are the closest in proximity to the Hanover Street corridor and all share the same facility on Seamon Avenue.

Religious Facilities

Seventeen religious facilities (see **Table 2-11**) are identified within the study area. The New Generation Pentecostal and Inner Harbor Church of God are both located directly on South Hanover Street.

Medical Facilities

Four medical facilities (see **Table 2-11**) are identified within the study area, all located south of the Vietnam Veterans Memorial Bridge. The largest facility, MedStar Harbor Hospital, located within the corridor on South Hanover Street, serves the entire socio-economic study area, adjacent neighborhoods, and counties. This facility serves a high concentration of low-income residents and the treatment for the community of Cherry Hill is a main focus of this hospital. Prevention of heart disease and diabetes are top priorities in this area. Harbor Hospital Life Resource Center is located across the street from the hospital and houses the Simulation Training & Education Lab, which functions as an educational resource for the MedStar Health Company. The facility offers training, project management, and research services. DaVita Harbor Park Dialysis Center on Cherry Hill Road is specifically for patients in need of treatment for kidney disease.

Public Service Facilities

The four public service facilities within the study area (see **Table 2-11**) include a post office, police station, firehouse, and a sanitation yard. The Hook & Ladder Company 6 firehouse is located directly on South Hanover Street, and the only public service facility located north of the bridge. The Cherry Hill Post Office, the Southern Police Station, and the Baltimore City Department of Public Works SW Sanitation Yard are located south of the Vietnam Veterans Memorial Bridge.

Recreation Facilities

Research has identified five recreation facilities within the socio-economic study area (see **Table 2-11**), two located north of the Vietnam Veterans Memorial Bridge and three south of the bridge. Ella Bailey Recreation Center, located on East Heath Street, is housed in the same facility as Thomas Jefferson Elementary School and Middle School. Patapsco Recreation Center, located on Roundview Road, is housed in the same facility as Patapsco Elementary School. Cherry Hill Splash Center, located within Reedbird Park on Reedbird Avenue, is the closest in proximity to the corridor.

**TABLE 2-11: COMMUNITY FACILITIES**

FACILITY ID	FACILITY NAME	FACILITY TYPE	FACILITY ADDRESS
1	Cherry Hill Library	Library	606 Cherry Hill Road, Baltimore MD 21225
2	MedStar Harbor Hospital	Medical	3001 S. Hanover Street, Baltimore MD 21225
3	DaVita Harbor Park Dialysis Center	Medical	111 Cherry Hill Road, Baltimore MD 21225
4	Harbor Hospital Life Resource Center	Medical	2900 S. Hanover Street, Baltimore MD 21225
5	Family Health Centers of Baltimore	Medical	631 Cherry Hill Road, Baltimore MD 21225
6	Our House Family Support Center	Misc.	2707 Sethlow Road, Baltimore MD 21225
7	The Choice Program At UMBC	Misc.	971 Seagull Avenue, Baltimore MD 21225
8	National Federation of the Blind	Misc.	1800 Johnson Street, Baltimore MD 21230
9	Cherry Hill Urban Garden	Misc.	Cherry Hill Road and Veronica Avenue, Baltimore MD 21225
10	Southern Police Station	Public Service Facility	10 Cherry Hill Road, Baltimore MD 21225
11	Baltimore City Dept. of Public Works SW Sanitation Yard	Public Service Facility	701 Reedbird Avenue, Baltimore MD 21225
12	Cherry Hill Post Office	Public Service Facility	1500 Cherry Hill Road, Baltimore MD 21225
13	Hook & Ladder Co. 6	Public Service Facility	1227 S. Hanover Street, Baltimore MD 21230
14	Patapsco Recreation Center	Recreation	844 Roundview Road, Baltimore MD 21225
15	Cherry Hill Splash Park	Recreation	101 Reedbird Avenue, Baltimore MD 21225
16	Cherry Hill Aquatic Center	Recreation	2600 Giles Road, Baltimore MD 21225
17	Ella Bailey Recreation Center	Recreation	100 E. Heath Street, Baltimore MD 21230
18	Solo Gibbs Recreation Center	Recreation	1044 Leadenhall Street, Baltimore MD 21230
19	Mount Sinai Holy Church	Religious Facility	2901 Joseph Avenue, Baltimore MD 21225
20	Church Of Advent Church Of Federal Hill	Religious Facility	1301 S Charles Street, Baltimore MD 21230
21	St. Veronica's Catholic Church	Religious Facility	806 Cherry Hill Road, Baltimore MD 21225
22	Inner Harbor Church Of God	Religious Facility	1632 S Hanover Street, Baltimore MD 21230
23	Grace United Church Of Christ	Religious Facility	1404 S Charles Street, Baltimore MD 21230
24	First Baptist Church of Cherry Hill	Religious Facility	823 Cherry Hill Road, Baltimore MD 21225
25	Saints Stephen & James Church	Religious Facility	938 S Hanover Street, Baltimore MD 21230
26	Riverside Baptist Church	Religious Facility	1602 Johnson Street, Baltimore MD 21230
27	New Generation Pentecostal	Religious Facility	1751 South Hanover Street, Baltimore MD 21230
28	Kingdom Hall of Jehovah's Witness	Religious Facility	400 Reedbird Avenue, Baltimore MD 21225
29	Cherry Hill Community Presbyterian	Religious Facility	819 Cherry Hill Road, Baltimore MD 21225
30	Community Baptist Church of Cherry Hill	Religious Facility	827 Cherry Hill Road, Baltimore MD 21225
31	Hemingway Temple African Methodist Episcopal Church	Religious Facility	2701 Woodview Road, Baltimore MD 21225
32	Life Celebration Center Church-South	Religious Facility	601 Cherry Hill Road, Baltimore MD 21225



33	Cherry Hill United Methodist Church	Religious Facility	3225 Round Road, Baltimore MD 21225
34	Kingdom Hall of Jehovah's Witness	Religious Facility	2400 Giles Road, Baltimore MD 21225
35	Created For So Much More Worship Center	Religious Facility	701 Cherry Hill Road, Baltimore MD 21225
36	Thomas Johnson Elementary / Middle School	School	100 E. Heath Street, Baltimore MD 21230
37	Friendship Academy at Cherry Hill	School	801 Bridgeview Road, Baltimore MD 21225
38	Dr. Carter G. Woodson Elementary / Middle School	School	2501 Seabury Road, Baltimore MD 21225
39	Arundel Elementary / Middle School	School	2400 Round Road, Baltimore MD 21225
40	Southside Academy	School	2700 Seamon Avenue, Baltimore MD 21225
41	Sharp-Leadenhall Elementary School	School	150 W. West Street, Baltimore MD 21230
42	New Era Academy	School	2700 Seamon Avenue, Baltimore MD 21225
43	Maritime Industries Academy High School	School	2700 Seamon Avenue, Baltimore MD 21225
44	Patapsco Elementary School	School	844 Roundview Road, Baltimore MD 21225
45	Allen Senior Center	Senior Center	1404 South Charles Street, Baltimore MD 21230
46	Cherry Hill Senior Life Center	Senior Center	606 Cherry Hill Road Suite 201, Baltimore MD 21225
47	Cherry Hill Senior Manor	Senior Housing	901 Cherry Hill Road, Baltimore MD 21225
48	Charm City Circulator	Transportation	1400 Cherry Hill Road, Baltimore MD 21225

Parks

Middle Branch Park and Reedbird Park have already been identified within the existing corridor examined for natural resources. Five additional City-owned parks are located within the larger socioeconomic study area and are illustrated on **Figure 2-10**. These parks are owned and maintained by Baltimore City:

- Ferry Bar Park, 2700 Light St, Baltimore, MD 21230
- Heath St Park, 1701 S Charles St, Baltimore, MD 21230
- Riverside Park, 301 E Randall St, Baltimore, MD 21230
- Solo Gibbs Park, 1044 Leadenhall St, Baltimore, MD 21230
- Swann Park, 201 W McComas St, Baltimore, MD 21230

Land Use

Existing Land Use

Existing land use types located within the socioeconomic study area include residential, commercial, industrial, park/recreation, private/institutional, and transportation (**Figure 2-11**, see end of chapter). This report reflects pre-"Transform Baltimore" Zoning Code, which was passed by the City Council and signed into law in December 2016. The Hanover Street corridor is a transportation land use that provides important movement within the area, including non-interstate connectivity, emergency and detour evacuation, and oversized or hazardous material transport. Other transportation land uses include several major interstates and routes within the socioeconomic study area, including I-95,



MD 295, I-395, and I-895. Medium density residential land use is located just north and south of the Vietnam Veterans Memorial Bridge, with sporadic instances of low-density and high-density residential land uses within the socioeconomic study area. There is also a predominance of industrial land use most notably near the north end of the Vietnam Veterans Memorial Bridge. Immediately south of the bridge there is park/recreational land use.

Proposed Land Use

Land use within the socioeconomic study area will change with increasing economic investment and City approval. Within the Hanover Street corridor, land use will reflect the priorities and funding available. According to the Middle Branch Master Plan (2007), northeast of the Vietnam Veterans Memorial Bridge in the Port Covington area, medium density commercial and commercial/industrial mixed use are being considered. Northeast and northwest of the bridge and within the medium density commercial mixed-use area, a proposed development corridor and development node exists. Also northwest of the bridge, improvement of transportation access may allow for high or medium density commercial mixed use. South of the bridge, high-density residential mixed use is a possibility, along with limited commercial opportunities.

Regional and Local Economy

Regional Economy

The socioeconomic study area is located in Baltimore City and a part of the Baltimore Metropolitan Area. The regional economy is supported by continued regional population growth and a multimodal transportation network. According to the *Greater Baltimore Regional Report* (2015), commuters from this area and beyond commute into and around Baltimore for employment at the rate of 1,091,130 people per day. Major employers in the Baltimore Metropolitan Area provide educational services, health care, utilities, arts, entertainment and recreation, manufacturing, government, administrative services, professional services, accommodation and food services, information services, transportation, and warehousing. In 2014 and the first half of 2015, close to 10,000 jobs became available from new and expanding firms. According to the Baltimore Development Corporation and the Maryland Department of Commerce (October 2015), the largest employers in the City include:

- Johns Hopkins University
- Johns Hopkins Hospital & Health System
- University of Maryland Medical System
- University System of Maryland
- MedStar Harbor Hospital
- LifeBridge Health
- Mercy Health Services
- St. Agnes HealthCare





- Exelon
- Kennedy Krieger Institute
- Maryland Institute College of Art
- Horseshoe Casino

The number of jobs in Maryland increased by 9.1 percent from 2000 to 2010 and is expected to increase an additional 24.6 percent by 2040. The number of jobs in Baltimore City decreased by 14.6 percent between 2000 and 2010. However, the number of jobs in Baltimore City is expected to increase by 14.3 percent between 2010 and 2040, as shown on **Table 2-12**. Studies show that college-educated young professionals between the ages of 25 and 34 find Greater Baltimore an attractive location for employment. Generally, attracting employees within this age group is essential to prolonged economic prosperity. In Baltimore, workers in this age group grew nearly 22 percent since 2010.

TABLE 2-12: REGIONAL EMPLOYMENT AND GROWTH, TOTAL FULL AND PART-TIME JOBS

	2000	2010	2040 Projection	Change 2000-2010	Projected Change 2010-2040
Maryland	3,065,202	3,344,652	4,167,000	9.1%	24.6%
Baltimore City	446,406	381,313	435,700	-14.6%	14.3%

Source: US Bureau of Economic Analysis and Maryland State Data Center. Maryland Department of Planning; January 2015

Local Economy

South Hanover Street is the primary north-south transportation corridor for the neighborhoods in this portion of South Baltimore. Based on current traffic data, approximately 2,000+ trucks travel over the Vietnam Veterans Memorial Bridge daily, as it is the only available route for oversized and hazardous material transportation. The bridge is also an essential evacuation route and offers non-interstate connectivity between Cherry Hill, South Baltimore, and the downtown Baltimore area. The socioeconomic study area is located within a Maryland designated Priority Funding Area (PFA) (**Figure 2-12**, see end of chapter). Maryland legislation supports and encourages growth and development in PFA areas. In addition, large portions of the socioeconomic study area are inside of designated Enterprise Zones, also illustrated on **Figure 2-12**. According to the Baltimore Development Corporation, “Enterprise Zones are intended to encourage investment in distressed areas by helping to assist existing businesses to expand and to attract new companies investing in property and create jobs.”

The socioeconomic study area is also within a Sustainable Community boundary, as designated by the Governor’s Smart Growth Subcabinet and the 2010 Sustainable Communities Act. Maryland’s Department of Housing and Community Development oversees the Sustainable Communities Program, which states Sustainable Communities provide local governments with a framework for promoting environmentally, economically, and socially responsible growth and development in existing older communities. The intent of this program is to “expand the local economy, respect and safeguard





historical and cultural resources, integrate mixed land uses, encourage employment opportunities, prompt economical and sustainable housing choices, and promote growth that supports a healthy environment and active, connected communities.”

Both commercial and industrial land uses present within the study area support the local and regional economy. Within closest proximity to the corridor, industrial areas include Spring Garden Industrial Area, Port Covington, and the northwest corner of the Cherry Hill Neighborhood. Additionally, there are small commercial areas along Cherry Hill Road and between Hanover and Potee Streets (**Figure 2-12**). Northwest of the project corridor are additional commercial entities such as City Garage, Atlantic Forest Projects, and Republic Services. Northeast of the corridor, businesses of NGK-Locke, Inc., Nick’s Fish House, The Baltimore Sun, and Under Armour currently populate the waterfront. Employers south of the project corridor include a few education facilities, Baltimore Police Department, 7-Eleven, MedStar Harbor Hospital and its affiliations, and Parexel International.

The proposed Port Covington Project, located north of the Vietnam Veterans Memorial Bridge and spearheaded by Weller Development, is a planned multi-billion dollar mixed-use redevelopment on over 260 acres and three miles adjacent to the Patapsco River. This development would occur within close proximity to the study corridor. The *Port Covington Master Plan* calls for the construction of commercial, residential, open space, maritime, and retail development and has the potential to be a major employment center in the area. In addition, several developments mainly north of the corridor are also planned for construction (**Figure 2-12**).

Hazardous Materials

The Maryland Department of the Environment (MDE) defines a hazardous material as a substance that has the potential to “cause or contribute to an increase in mortality or serious illness, or, threaten human health or the environment if mismanaged... A substance is regulated as a hazardous waste if it is specifically listed as such in State regulations, is mixed with or derived from one of those “*listed*” wastes, or exhibits certain characteristics defined in the regulations.” The project area is located in a highly urbanized setting, with high potential for properties included in MDE’s Land Restoration Program and under Environmental Protection Agency (EPA) jurisdiction.

With the anticipation that the project may require an analysis of the presence of hazardous materials occurring at properties, a search of available public domain federal, state, and local databases was compiled by Environmental Data Resources, Inc. (EDR) for a 500-foot corridor along Hanover Street. These records provide information on Recognized Environmental Concerns (RECs) in connection with properties within the study area. RECs are documented past or present activities that have resulted in an adverse effect to the environment. Database information is summarized for properties with known generators, users, storage, or disposal of hazardous materials. This information is used to track environmental issues relative to properties in the project area that may present risk to the project with respect to current and future clean up requirements and liabilities. This information will be used in future phases of the project not part of this study should more detailed studies (Phase I and/or Phase II Site Assessments) be required to meet the EPA’s Standards and Practices for All Appropriate Inquiries (40 CFR Par 312), the ASTM Standard Practice for Environmental Site Assessments (E-1527-13), or



custom requirements developed for the evaluation of environmental risk associated with a particular parcel that may be determined during later design phases of the project.

Cultural Resources

A cultural resource inventory for the proposed project Area of Potential Effects (APE) has been completed for historic properties, including both archaeological and architectural resources. This section provides an inventory of previously identified historic properties within the APEs, and documents the results of background research and field reconnaissance to preliminarily assess the potential of the APEs to contain archaeological and architectural resources. In accordance with Section 106 of the National Historic Preservation Act, as amended, along with its implementing regulations 36 CFR Part 800; the Maryland Historical Trust Act of 1985, as amended; State Finance and Procurement Article §§ 5A- 325 and 5A-326 of the Annotated Code of Maryland; and Article 6 of the Baltimore City Code, “Historical and Architectural Preservation” (as revised by Ord. 15-408), coordination with the Maryland Historical Trust (MHT) and the Baltimore Commission for Historic and Architectural Preservation has been initiated.

Proposed Area of Potential Effect

The proposed APE for archaeological resources includes the anticipated limits of physical disturbance from the proposed project, and the proposed APE for architectural, above ground cultural resources considers this physical disturbance as well as possible visual and noise effects by proposed improvements. The APEs are illustrated on **Figure 2-13** (see end of chapter), and are subject to modification based on consultation with the MHT and other stakeholders in cultural resource consultation.

Previously Identified Resources

Existing publically available documentation from the MHTs Cultural Resources GIS database and associated cultural resource databases were obtained for the Hanover Street corridor and within the surrounding one mile. These databases include information on sites identified on the Maryland Inventory of Historic Properties (MIHP) and properties listed on or eligible for listing on the National Register of Historic Places (NRHP).

Archaeological Resources

The existing database search revealed no archaeological resources identified within the proposed APE. One archaeological survey was conducted by the Baltimore Center for Urban Archaeology in 1990, located partially within the APE at the site of the proposed Port Covington Commons Business Park. Archaeological investigations demonstrated that the Port Covington Rail Terminal was constructed on fill, with potential for archaeological sites to be found at a subsurface depth of 8 to 10 feet. This Port Covington archaeological site (18BC72), represented the remnants of a mid- to late nineteenth century industrial building, and was identified in machine-excavated trenches that were 10-feet wide and up to 12-feet deep. Further investigations were recommended, finding the Port Covington area in general to have high potential to contain other nineteenth century industrial sites.



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Within one mile of the proposed APE, ten archaeological resources have been identified on the MIHP as shown in **Table 2-13**.

TABLE 2-13: ARCHAEOLOGICAL SITES WITHIN ONE MILE OF THE CORRIDOR

Site Number	Site Name	Site Type
18BC109	Federal Hill Park	late 18th c. glass factory, late 18th to mid-19th c. sand mine, mid-19th c. military fort, late 19th c. park
18BC72	Port Covington	mid- to late 19th century industrial building
18BC78	MSA-01	early 19th to mid-20th century residential, commercial, and industrial buildings
18BC80	Privy 19A01 (MSA-03)	late 19th-early 20th century rowhouses and privy
18BC81	Privy 3 (MSA-04)	early 19th-early 20th century privy
18BC82	MSA-05	19th-early 20th century brick rowhouses and industrial building
18BC83	Diggs-Johnson (MSA-06)	mid-19th to mid-20th century rowhouses
18BC84	MSA-07	late 18th-early 20th century rowhouses and mid-19th to early 20th century industrial buildings
18BC85	MSA-08	mid-19th-early 20th century rowhouses
18BC86	MSA-09	late 19th to mid-20th century rowhouses
18BC87	MSA-10	late 18th century possible house, late 19th to mid-20th century commercial and residential (rowhouse) buildings
18BC95	Federal Hill Sand Mine	late 18th century glass factory, late 18th-mid-19th century sand mine
18BA88	English Consul	prehistoric shell midden

Architectural Resources

Five architectural resources listed in the MIHP were identified within the proposed architectural APE as shown in **Table 2-14**.

**TABLE 2-14: ARCHITECTURAL SITES WITHIN THE APE**

Site Number	Site Name	Site Status
MIHP #B-5139	Riverside Historic District	Listed on NRHP
MIHP #B-1067	Pabst Brewing Company/Maryland Glass and Mirror Company	Not been NRHP evaluated
MIHP #B-4530	Hanover Street Bridge/Vietnam Veterans Memorial Bridge	Determined NRHP Eligible 4/3/2001
MIH #B-1055	Lyon, Conklin, and Company	Not been NRHP evaluated
MIHP #B-1039	Locke Insulators Inc.	Not been NRHP evaluated

Both of the NRHP-listed and eligible resources, the Riverside Historic District and the Hanover Street Bridge/Vietnam Veterans Memorial Bridge, are significant under NRHP Evaluation Criteria A and C. The Riverside Historic District is significant under Criterion A for its association with the development of transportation and industry in Baltimore and is significant under Criterion C for its architecture, which is representative of the full range of domestic and ecclesiastical building types characteristic of Baltimore neighborhoods during the period from the mid-19th century through the first decade of the twentieth (Hayward, 2007).

The Hanover Street Bridge/Vietnam Veterans Memorial Bridge was determined NRHP-eligible on April 23, 2001 under Criterion A for its role in the development of transportation in Maryland during the period of Industrial-Urban Dominance, when vehicular traffic took precedence over steamboats to transport local goods to market, and under Criterion C as a significant example of the collaborative work of the State Roads Commission and the J. E. Greiner Company (Abell, 1994).

The architectural APE also contains buildings that are greater than 50 years of age that are not included on the MIHP (according to State Department of Assessments and Taxation data). These properties are shown in **Figure 2-13**, and would require Determinations of Eligibility to the NRHP:

- Cherry Hill Apartments, 100 Cherry Hill Road (Year Built: not provided by SDAT but aerials indicate it may be greater than 50 years in age)
- 18 rowhouses within Larue Square, 101 and 103 Larue Square, 3001-3027 Larue Square (odd house numbers only), and 100 and 102 Larue Square (Years Built: 1949 to 1954)
- Vietnam Veterans Memorial Bridge Shopping Center, 2830 South Hanover Street (Year Built: 1956)
- Federal Hill's Bumper Globe Collision Center, 1834 South Charles Street (Year Built: 1900)

Additional cultural resource review within one mile of the corridor identifies the projects proximity to several historic districts and some of the oldest and most densely developed and intensely surveyed areas of Baltimore, where there are an additional 704 properties and districts listed on the MIHP. The vast majority of these resources (671) have not been evaluated for their eligibility for the NRHP. Fifteen of these resources, including five historic districts, nine structures, and one boat, are listed on the NRHP. Ten of these resources, including three bridges, one historic district, and six structures, have been determined eligible for the NRHP but not formally listed. The other eight resources have been determined ineligible for the NRHP.





Field Reconnaissance and Assessment of Potential

As a result of existing database research, field reconnaissance, and an assessment of potential for resources to be present within the archaeological and architectural APEs for the proposed project, observations are presented within this section for future consideration by Baltimore City.

- Potee and South Hanover Streets, Cherry Hill** – The APE contains the roadways and shoulders, including areas of curbs, gutters, and sidewalks. The APE is dominated by graded and paved surfaces. This area is an upland area removed from the waterfront, and was a rural area until the mid- to late twentieth century. It could be anticipated that archaeological resources would not be located below deep levels of urban fill, as any resources would have been disturbed or destroyed by road construction and subsequent roadside development. This assumption should be tested by limited Phase I survey at testable locations.
- Middle Branch Park** – This Park appears to have the least developed parcels within close proximity to the corridor. However, aerial photography indicates that, particularly close to the Bridge, the APE has been subject to the placement of fill and grading to construct various alignments of Waterview Avenue and an interchange of Waterview Avenue with South Hanover Street. There are no above ground remnants of the building that appear on the west side of South Hanover Street within the park on 1948 and 1972 aerial photographs. Due to the likelihood of deep fill, geoarchaeological survey may be required to assess the depth of any fill and the potential for intact archaeological resources.
- Vietnam Veterans Memorial Bridge, over Middle Branch of the Patapsco River** – This area, crossing the river, was not subject to field reconnaissance, as any potential archaeological resources would be submerged. Underwater surveys within a mile of the corridor have not resulted in the identification of shipwrecks or other underwater sites, but such sites have been found elsewhere within the Middle and Northwest Branches of the Patapsco River. If substructure work is proposed during the development of rehabilitation and replacement alternatives, an underwater archaeological survey should be conducted.
- South Hanover Street, Port Covington Area** – The entire portion of the APE north of the Middle Branch is steeply sloped and/or covered with impervious surfaces. The previous archaeological survey completed by Stephen Austin of the Baltimore Center for Urban Archaeology in the former Port Covington Rail Terminal indicated that intact nineteenth-century archaeological resources had potential to be located below impervious surfaces and multiple feet of urban fill, limiting the usefulness of a field reconnaissance in this area. A geoarchaeological survey would clarify whether there is potential for intact archaeological resources to exist below the slopes and impervious surfaces of Port Covington.



Additional Study for Future Project Development Phases

Archaeological

Future planning and design phases not part of this study should consider the potential for additional investigations. This could include include a combination of geoarchaeological survey and Phase I archaeological survey within the South Hanover Street archaeological APE in the following areas:

- Potee and South Hanover Streets, Cherry Hill – Phase I archaeological survey
- Middle Branch and Broening Parks - geoarchaeological survey within unpaved areas in the APE
- Vietnam Veterans Memorial Bridge, over Middle Branch of the Patapsco River – underwater survey in areas that would be disturbed by any substructure bridge work
- South Hanover Street, north of the Middle Branch - geoarchaeological survey within unpaved areas in the APE

The geoarchaeological survey should be supplemented with additional documentary research including deed research to assess past land uses and archaeological potential. Depending on the results of the geoarchaeological testing, additional Phase I archaeological survey may be recommended within the archaeological APE.

Architectural

Up to seven Determination of Eligibility (DOE) forms are recommended for completion within the architectural APE. Four DOEs would be required for the resources that are not included on the MIHP but are more than 50 years in age, and three DOEs would be required for the unevaluated resources that are included on the MIHP (Locke Insulators [MIHP#B-1039]; the Lyon, Conklin and Company [MIHP#B-1055]; and the Pabst Brewing Company [MIHP#B-1067]).

Additional research is needed to clarify that the Cherry Hill Apartments are greater than 50 years in age, as well as evaluating the 18 rowhouses on Larue Square be treated as one resource. Avoidance and minimization of impacts should be adhered to through all future design efforts to eliminate adverse effects to the Vietnam Veterans Memorial Bridge/Hanover Street Bridge (NRHP-eligible) and the Riverside Historic District (NRHP-listed) and any resources determined eligible for listing on the NRHP following completion of additional DOE forms. All future efforts should build upon and continue coordination with the MHT.



Traffic Data

This section summarizes the existing traffic conditions in the Study Area based on the traffic data that was collected.

Existing Lane Geometry, Traffic Control, and Traffic Volumes

Existing intersection data was collected at the following locations, shown in **Figure 2-14** (see end of chapter).

- Hanover Street at Wells Street
- Hanover Street at McComas Street
- Hanover Street at Cromwell Street
- Hanover Street at Waterview Avenue
- Potee Street at Waterview Avenue
- Hanover Street at Cherry Hill Road
- Potee Street at Cherry Hill Road
- Hanover Street at Reedbird Avenue
- Potee Street at Reedbird Avenue
- Hanover Street at Frankfurst Avenue
- Potee/Hanover Street at Frankfurst Avenue
- Hanover Street at Patapsco Avenue
- Potee Street at Patapsco Avenue
- Potee Street at Talbott Street
- Hanover Street/Potee Street at Belle Grove Road/Jack Street
- Hanover Street at Chesapeake Avenue.

Due to important connections with I-895, Port-related land uses, and Anne Arundel County, intersections south of the southern study limit were also included. Existing lane geometry and traffic control devices for each of the intersections are shown in **Figure 2-15** (see end of chapter).

AM and PM peak period (7 – 9 AM and 4 – 6 PM) intersection turning movement counts were performed at each of the sixteen study intersections. Vehicles, trucks, buses, pedestrians, and bicycles were all counted independently. The system peak hours determined from total traffic volumes were found to be 7:30 – 8:30 AM and 4:30 – 5:30 PM. Total traffic volumes for each intersection were balanced and are included in **Figure 2-16** (see end of chapter). Peak hour bus and truck volumes are



shown in **Figure 2-17** and **Figure 2-18** (see end of chapter). Percentages of buses and trucks by approach and movement are also shown in **Figure 2-19** and **2-20** and **Figures 2-21** and **2-22**, respectively (see end of chapter). Pedestrian and bicycle volume totals for both peak periods (7 – 9 AM and 4 – 6 PM) are shown in **Figure 2-23** (see end of chapter).

In addition to turning movement counts, 48 hour volume and classification counts were collected at 12 locations (shown in **Figure 2-14**) including:

- Ramp from I-95 NB to Hanover Street SB
- Ramp from Hanover Street NB to I-95 SB
- Hanover Street north of Cromwell Road
- Hanover Street over the Patapsco River
- Potee Street over the Patapsco River
- Ramp from Potee Street/Patapsco Avenue to I-895 NB
- Ramp from I-895 SB to Potee Street SB
- Hanover Street south of Patapsco Ave
- Potee Street south of Patapsco Avenue
- Patapsco Avenue east of Hanover Street
- Frankfurst Ave east of Hanover Street
- Waterview Ave west of Hanover Street.

Volumes at the 48 hour count locations are shown in **Figure 2-24** (see end of chapter).

All turning movement counts and volume/classification counts were collected in March/May 2016 on typical weekdays while school was in session.

Crash Summary

Crash data for each of the study intersections was provided by BCDOT for the years 2010 through 2014. The study intersections are along MD 2 (Hanover/Potee) from Wells Street, south to Belle Grove Road. Data was aggregate and did not include the details of individual crashes, only the number of crashes by type.

There were 229 crashes total during the time period studied, 36 percent of which resulted in injury. No fatalities were reported.

The following is a discussion of the trends apparent from the data seen in **Table 2-15**:



- The most common types of crashes in the study corridor were rear ends (25 percent), sideswipes (24 percent), and angle crashes (22 percent).
- 23 percent of crashes occurred at night, in unknown lighting conditions.
- 28 percent of crashes occurred on a wet or icy road surface – 73 percent of crashes at Potee Street and Cherry Hill Road occurred in wet or icy conditions, a significantly higher percentage than the rest of the corridor.
- The intersections with the most crashes were Hanover Street at McComas Street (41), Hanover Street at Patapsco Avenue (38), and Potee Street at Patapsco Avenue (37).
 - Hanover Street at McComas Street – sideswipe and angle crashes were most prevalent accounting for 12 crashes (29 percent) each.
 - Hanover Street at Patapsco Avenue – rear end crashes and angle crashes were most prevalent accounting for 13 (34 percent) and eight (21 percent) of the total crashes, respectively.
 - Potee Street at Patapsco Avenue – rear end and left turn crashes were most prevalent accounting for 11 (30 percent) and 10 (27 percent) of the total crashes, respectively.
- Half of all crashes involving pedestrians occurred at the intersection of Potee Street and Waterview Avenue.
- 65 percent of left turn crashes occurred on Patapsco Ave, with 10 occurring at Potee Street and seven occurring at Hanover Street.
- Cherry Hill Road at Hanover Street had four angle crashes, accounting for 44 percent of all crashes at the intersection.

Crash totals by intersection for the four years of data provided are shown in **Figure 2-25**. **Figure 2-26** displays the number of crashes at each intersection by type and **Figure 2-27** shows the locations of the pedestrian and bicycle crashes. (See the end of chapter for figures.)



TABLE 2-15: CRASH SUMMARY BY INTERSECTION

	Severity			Light		Surface		Collision Type									Total
	Property	Injuries	Fatal	Day	Night	Wet/Snow/Ice	Dry	Opposite Dir.	Rear End	Sideswipe	Left Turn	Angle	Pedestrian	Parked Vehicle	Fixed-object	Other	
Hanover St & Wells St	9	1	0	2	2	4	6	0	4	1	1	2	0	1	0	1	10
Hanover St & McComas St	23	18	0	21	15	16	25	1	7	12	4	12	0	2	1	2	41
Hanover St & Cromwell St	18	8	0	17	7	8	18	1	6	8	1	5	1	1	2	1	26
Potee St and Waterview Ave	6	4	0	10	0	3	7	0	2	3	0	2	3	0	0	0	10
Hanover St & Waterview Ave	6	3	0	5	3	2	7	0	2	5	0	1	0	0	1	0	9
Potee St & Cherry Hill Rd	10	1	0	5	2	8	3	0	3	7	0	1	0	0	0	0	11
Hanover St & Cherry Hill Rd	5	4	0	7	1	3	6	0	2	2	0	4	0	0	1	0	9
Potee St and Reedbird Ave	11	6	0	6	2	4	13	0	5	4	1	4	1	1	0	1	17
Hanover St & Reedbird Ave	5	4	0	7	2	2	7	0	1	1	1	2	0	0	1	3	9
Potee St & Frankfurst Ave	0	4	0	3	0	0	4	0	0	0	0	4	0	0	0	0	4
Hanover St & Frankfurst Ave	1	1	0	1	1	1	1	0	0	2	0	0	0	0	0	0	2
Hanover St & Chesapeake Ave	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
Potee St and Patapsco Ave	23	14	0	24	7	7	30	1	11	4	10	4	0	1	4	2	37
Hanover St & Patapsco Ave	25	13	0	22	9	6	32	0	13	3	7	8	1	2	3	1	38
Potee St and Talbott St	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1
Belle Grove Rd & Potee / Hanover St	3	1	0	3	0	0	4	0	0	1	1	0	0	0	1	1	4
Grand Total	147	82	0	133	52	64	165	4	56	53	26	50	6	8	14	12	229



Public Outreach

In accordance with the Public Outreach Plan that was created for the Hanover Street Corridor Study, the Study Team requested feedback from a combination of community, business, and agency sources so that the team can develop a full understanding of the needs, challenges, and desires of the most frequent users of the corridor and those responsible for protecting the facility. The team identified key stakeholders in the project area and invited them to participate in either the Interagency Advisory Group (IAG) and Community Advisory Panel (CAP), and held a series of meetings with both groups. The team met with the IAG on July 19, 2016 and the CAP on July 20, 2016 to review the existing conditions data that was collected and presented in this chapter. A project newsletter was mailed to home and business addresses in the study area in August 2016 to introduce the project and advertise the September 2016 Public Meeting. Following these IAG and CAP meetings and the confirmation of the existing conditions data, the existing conditions information was presented at a Public Meeting held on September 15, 2016 at MedStar Harbor Hospital. The team described the existing bridge structures, roadway features, pedestrian and bicycle facilities, truck routes, transit routes and facilities, traffic data collection and crash data summary in the corridor. Throughout this process, stakeholders and members of the public reviewed the information and edits such as adding missing bus routes, etc. were made to the study materials as a result of feedback obtained. A recurring theme from members of the public is the appreciation of the historic nature of the Vietnam Veterans Memorial Bridge and the iconic aesthetics.

Additional public outreach for each phase of the project will be discussed throughout this report.

Summary of Existing Conditions

The Study Area existing conditions have been documented in this chapter based on data and information obtained from various sources to gain a clear understanding of the issues and constraints in the Study Area. A review of area master plans was conducted to understand the body of planning work completed prior to the Hanover Street Corridor Study and to ensure compliance and be sure that any recommendations are examined as part of this study. Additionally, a data collection plan was established to obtain the information necessary for assessing the physical, operational, and socio-economic needs and determining the existing roadway, traffic, transit, bicycle, pedestrian, waterway, freight, bridge, land use, socioeconomic, cultural and environmental conditions along the Hanover Street corridor. This information was categorized and presented, along with applicable mapping, within each of the sections of this chapter.

There are five major bridge structures located within the Study Area and any or all of these structures may be affected by future corridor development:

- The Vietnam Veterans Memorial Bridge (Bridge BC 5210) over Middle Branch is a historically significant structure that comprises a major section of the corridor and will be a predominant issue with regard to corridor planning and any reconstruction efforts. The Vietnam Veterans Memorial Bridge was built in 1916 and rehabilitated in 1970 and 1992. In recent inspection





reports, this bridge is listed as being in Poor Condition. This structure is owned and maintained by BCDOT.

- Hanover Street over CSX Railroad (Bridge BC 5209) was built in 1929. In recent inspection reports, this bridge is listed as being in Fair Condition. This structure is owned and maintained by BCDOT.
- Hanover Street over CSX Railroad (Bridge BC 5212) was built in 1900 and reconstructed in 1975. In recent inspection reports, this bridge is listed as being in Poor Condition. This structure is owned and maintained by BCDOT.
- Hanover Street Northbound Ramp to I-95 Southbound (Ramp J) (Bridge BCW 552) was built in 1979. In recent inspection reports, this bridge is listed as being in Satisfactory Condition. This structure is owned and maintained by MDTA.
- I-95 Northbound Ramp to Southbound Hanover Street (Ramp K) (Bridge BCW 553) was built in 1979. In recent inspection reports, this bridge is listed as being in Satisfactory Condition. This structure is owned and maintained by MDTA.

Additional Study Area features are summarized below:

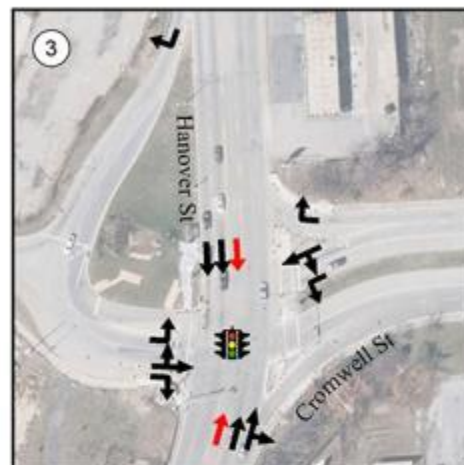
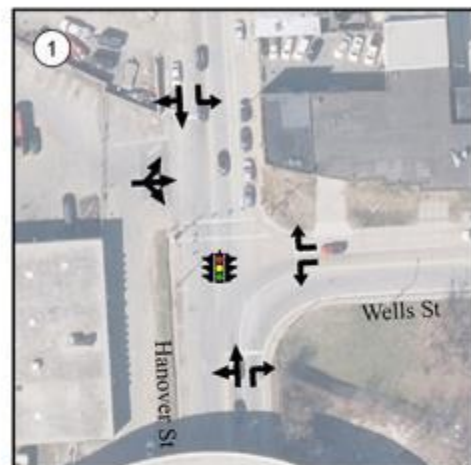
- Pedestrian facilities were inventoried in the Study Area and sidewalks are mostly present on both sides of the roadway in the Corridor, with the exception of the northbound direction in the area of I-95 and the southbound direction between McComas Street and Cromwell Street.
- The existing bicycle network in the Corridor includes a designated bike lane on northbound Hanover Street from Reedbird Avenue to Cherry Hill Road, designated eastbound and westbound bike lanes on Cherry Hill Road connecting Hanover Street and Potee Street to points west, as well as the off-road Gywnns Falls Trail. Proposed bicycle facilities from the *2015 Baltimore City Bike Master Plan* include additional trails, as well as dedicated bike lane(s) on Hanover Street through the entire Study Area.
- Hanover Street is classified as a *restricted route* (no trucks from 7:00pm to 7:00am) from Wells Street to I-95 and a *through truck route* from I-95 to Reedbird Avenue and points south on Baltimore City's Official Truck Routes map. Significant truck traffic is present in the Corridor as Hanover Street serves as a connection between the Interstate system and other trucking routes and multiple large industrial sites and ports to the south of the Study Area.
- The Study Area is served by MDOT MTA, which operates the 14, 27, 29, 51, and 64 local bus routes. The redesigned MDOT MTA BaltimoreLink transit system (with full implementation in Summer 2017) is not included as existing conditions.

A project newsletter was mailed to home and business addresses in the study area to introduce the project and advertise the September 2016 Public Meeting. The team met with the Interagency Advisory Group (IAG) and the Community Advisory Panel (CAP) to review and confirm the existing conditions data. Existing conditions information was presented at a Public Meeting held on September 15, 2016 at MedStar Harbor Hospital.





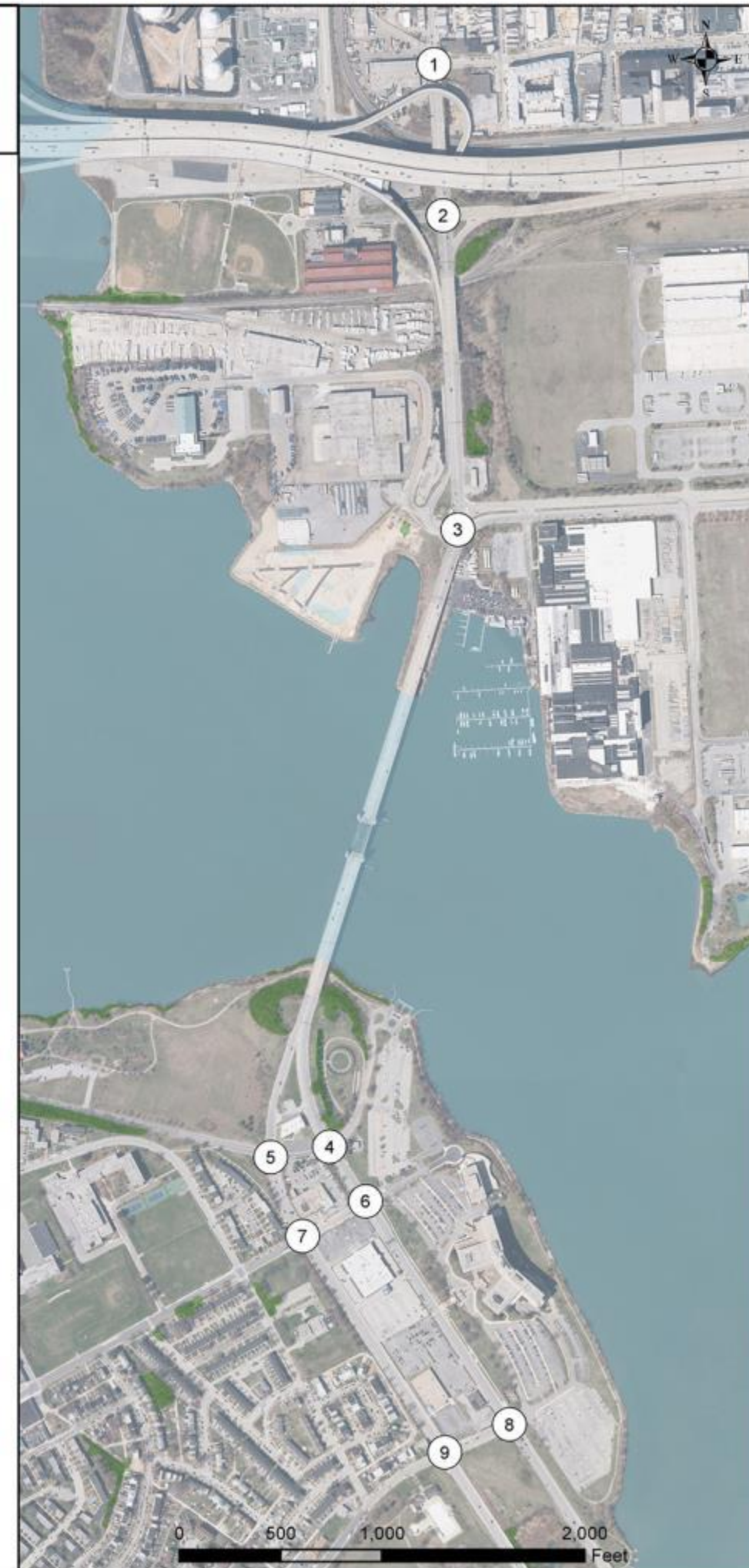
Hanover Street Corridor Study Figure 2-2: Intersection Lane Configurations



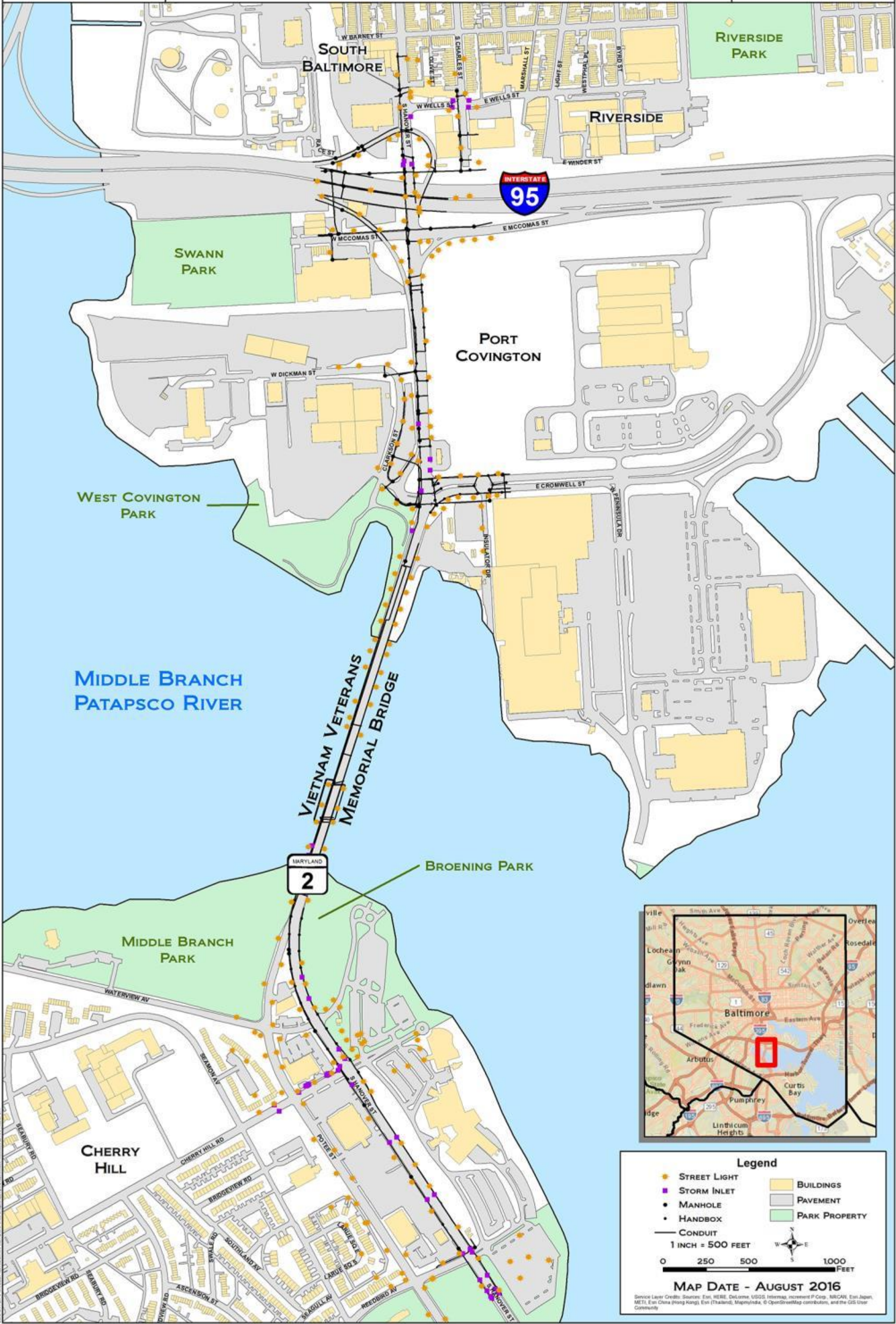
Legend

-  Full Time Lane
-  Reversible Lane
-  Signalized Intersection

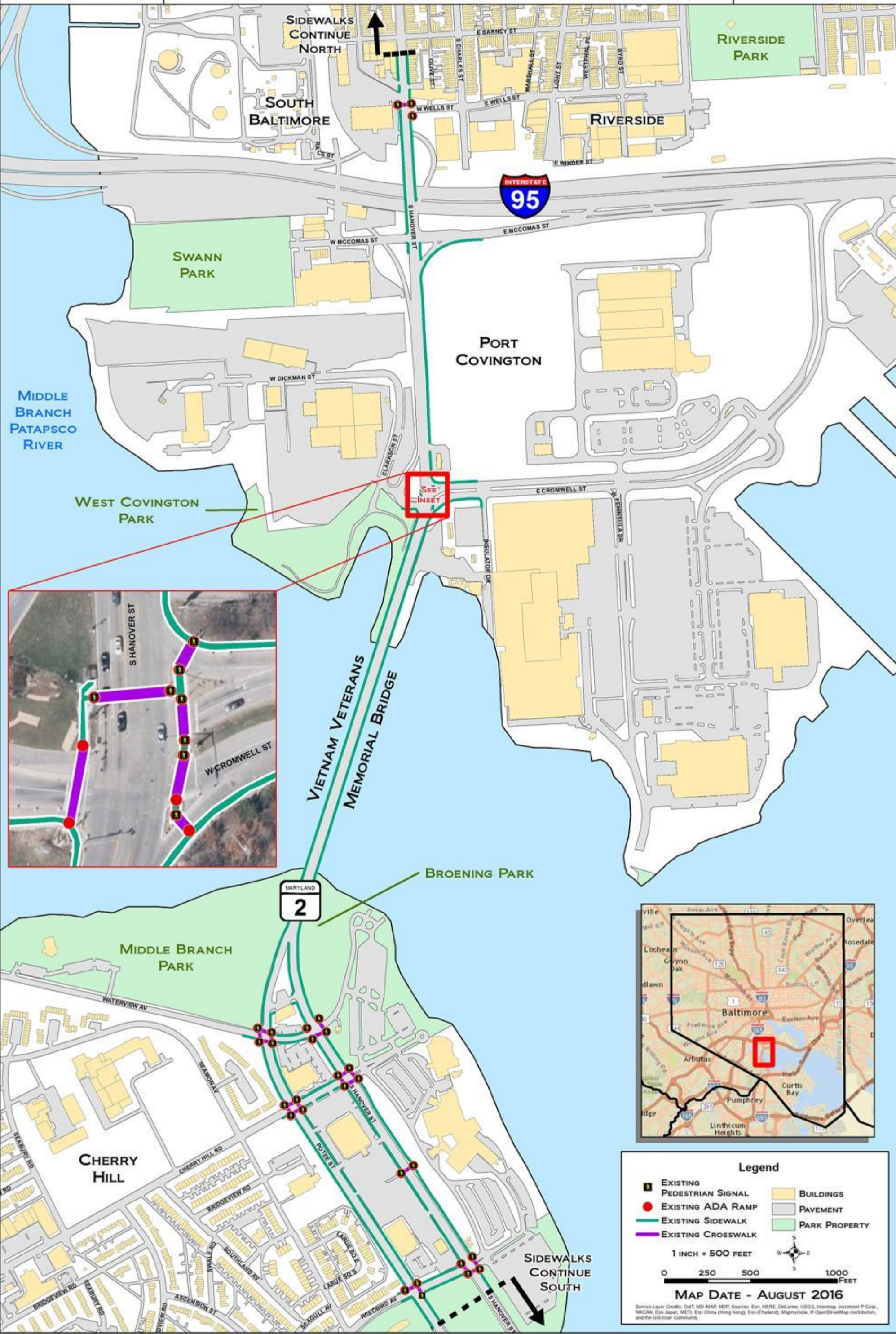
Map Date - May 2016



HANOVER STREET CORRIDOR STUDY
FIGURE 2-3: EXISTING UTILITIES

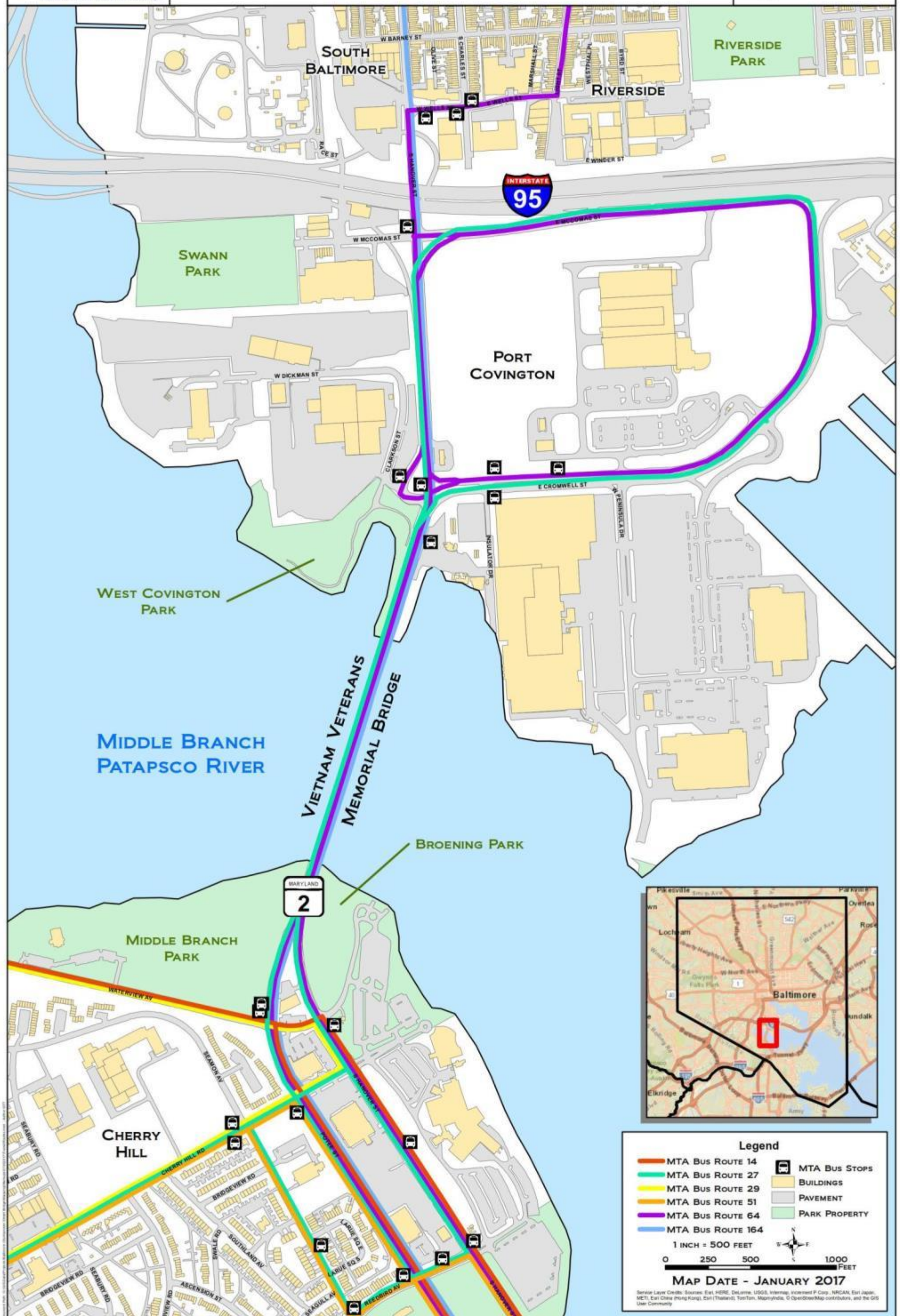


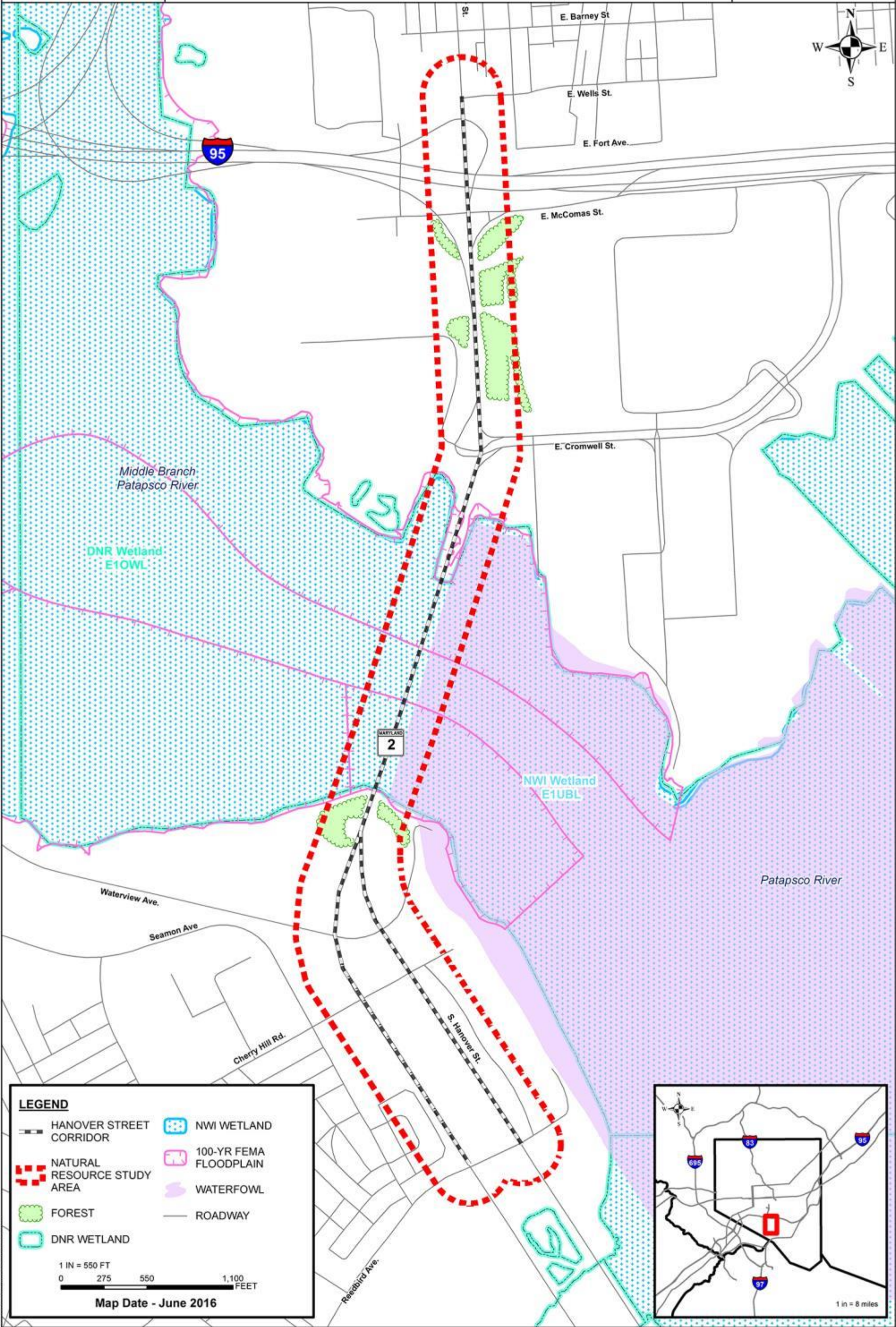
HANOVER STREET CORRIDOR STUDY FIGURE 2-4: EXISTING PEDESTRIAN FACILITIES

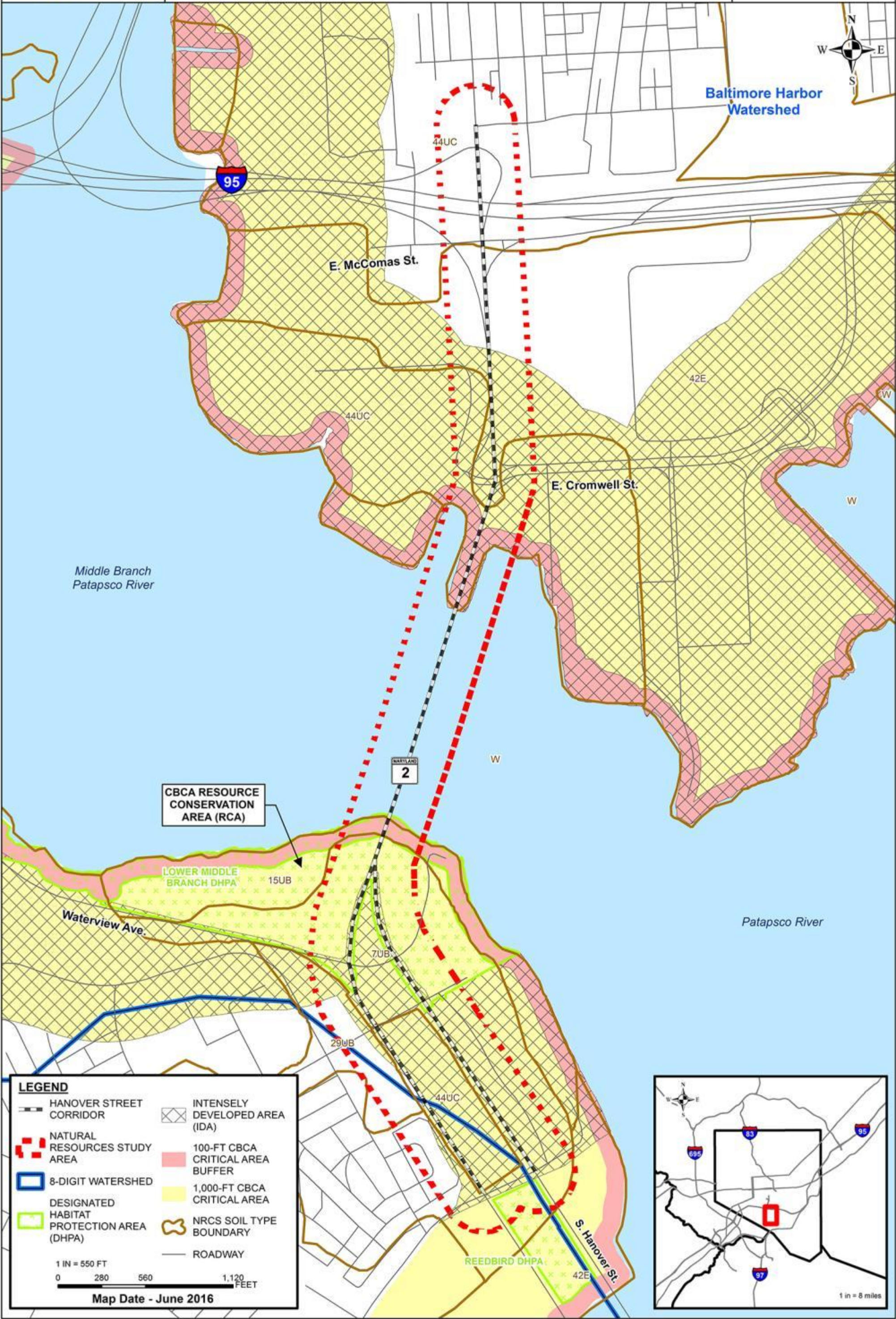


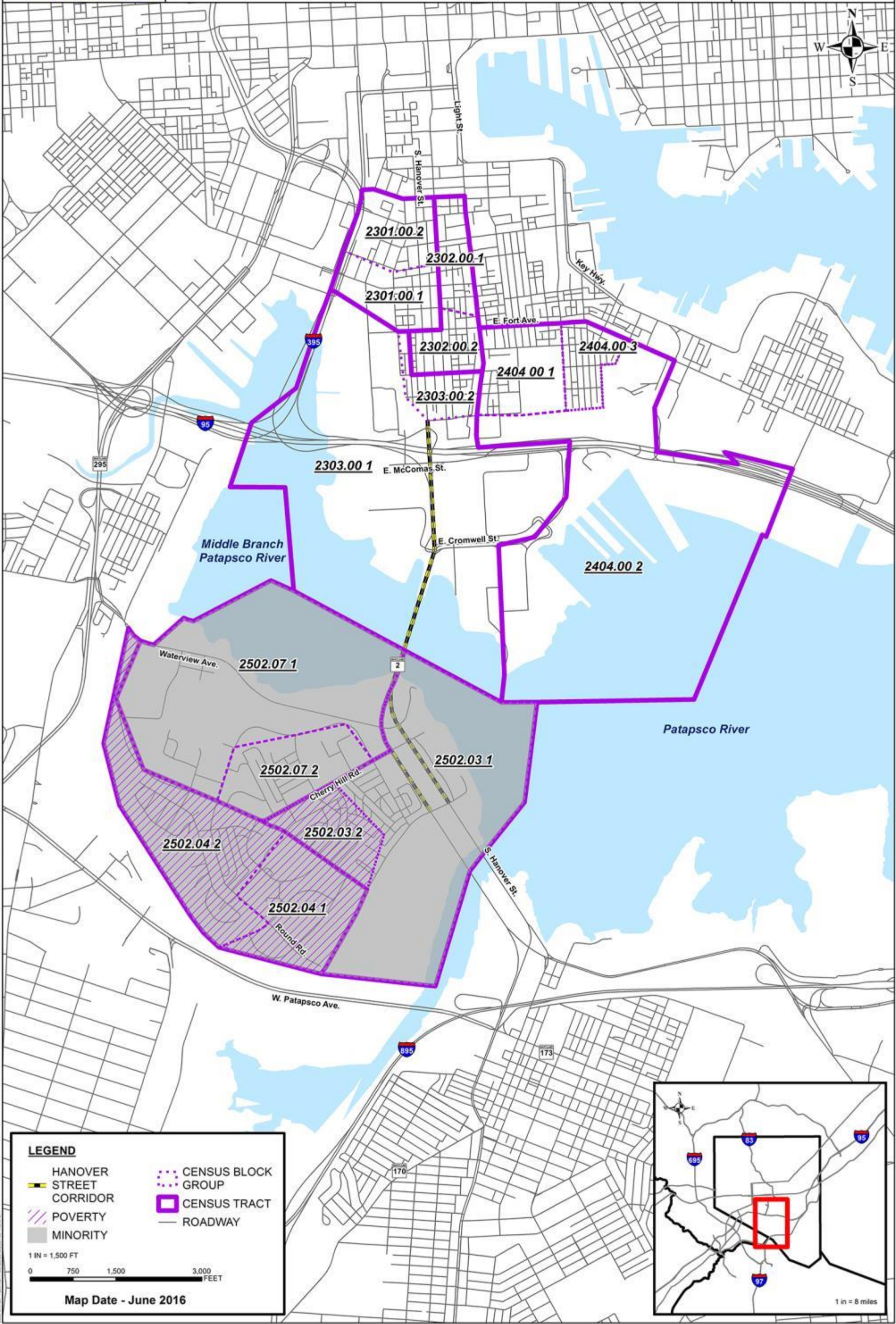


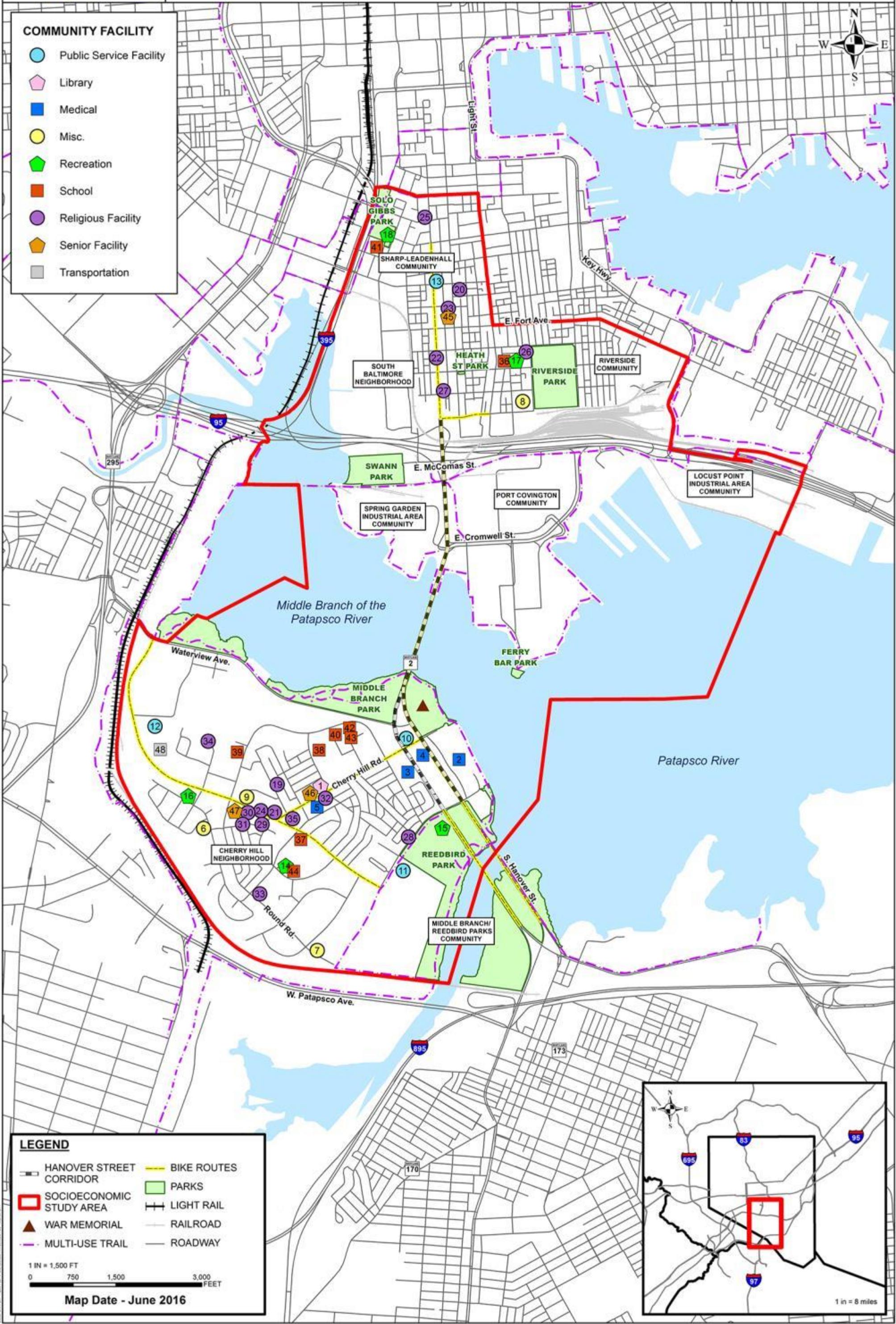
HANOVER STREET CORRIDOR STUDY FIGURE 2-7: EXISTING TRANSIT ROUTES AND FACILITIES

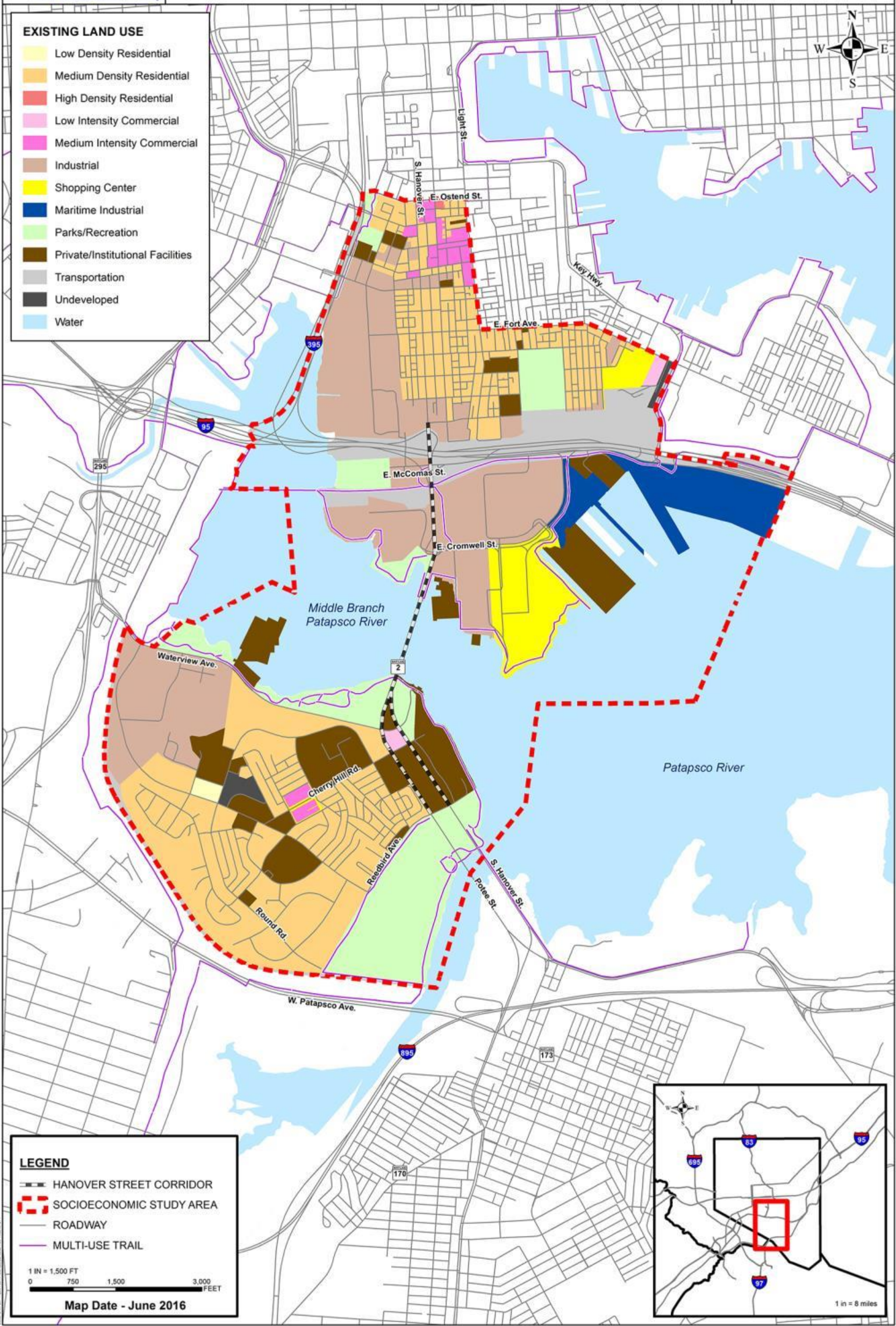




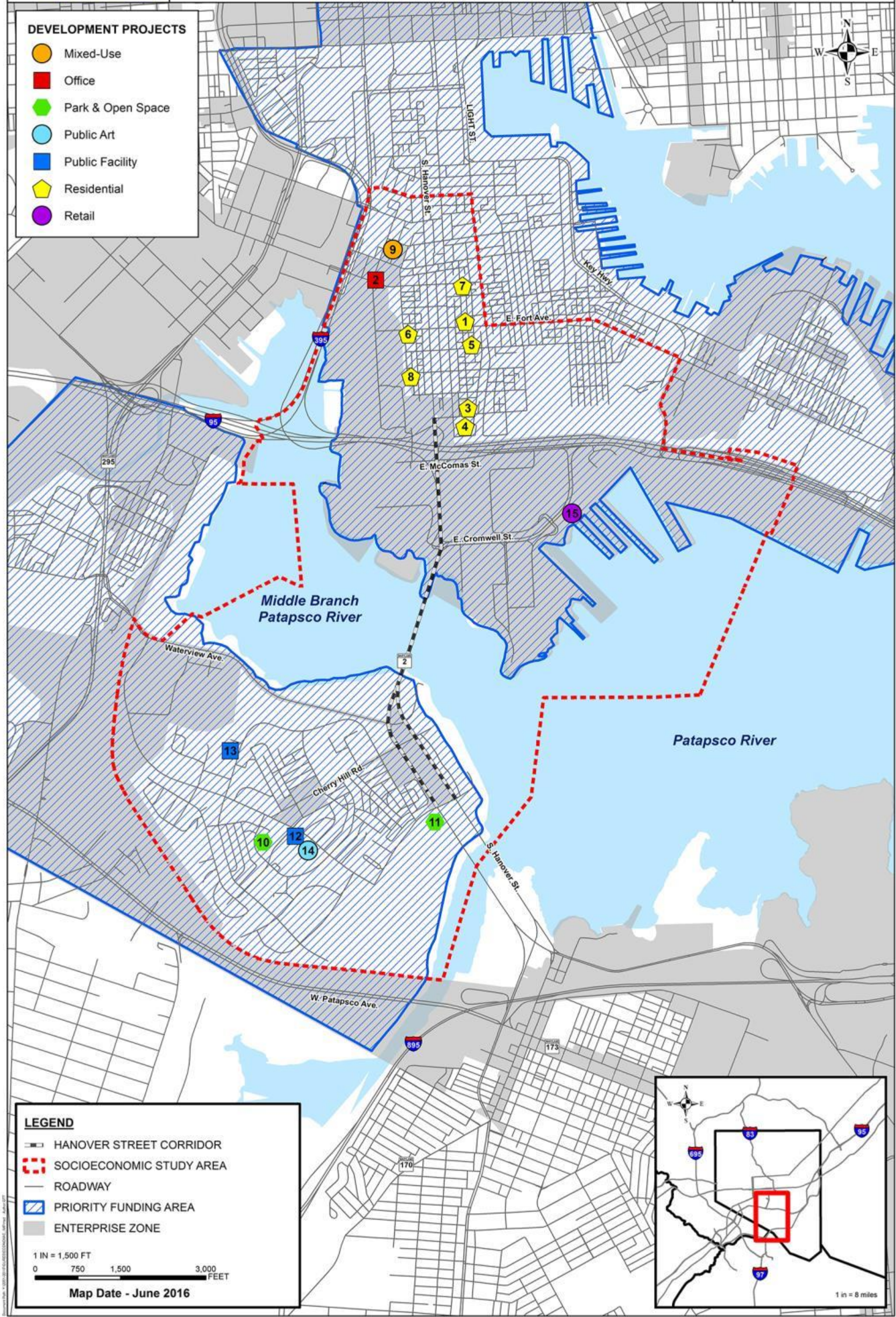


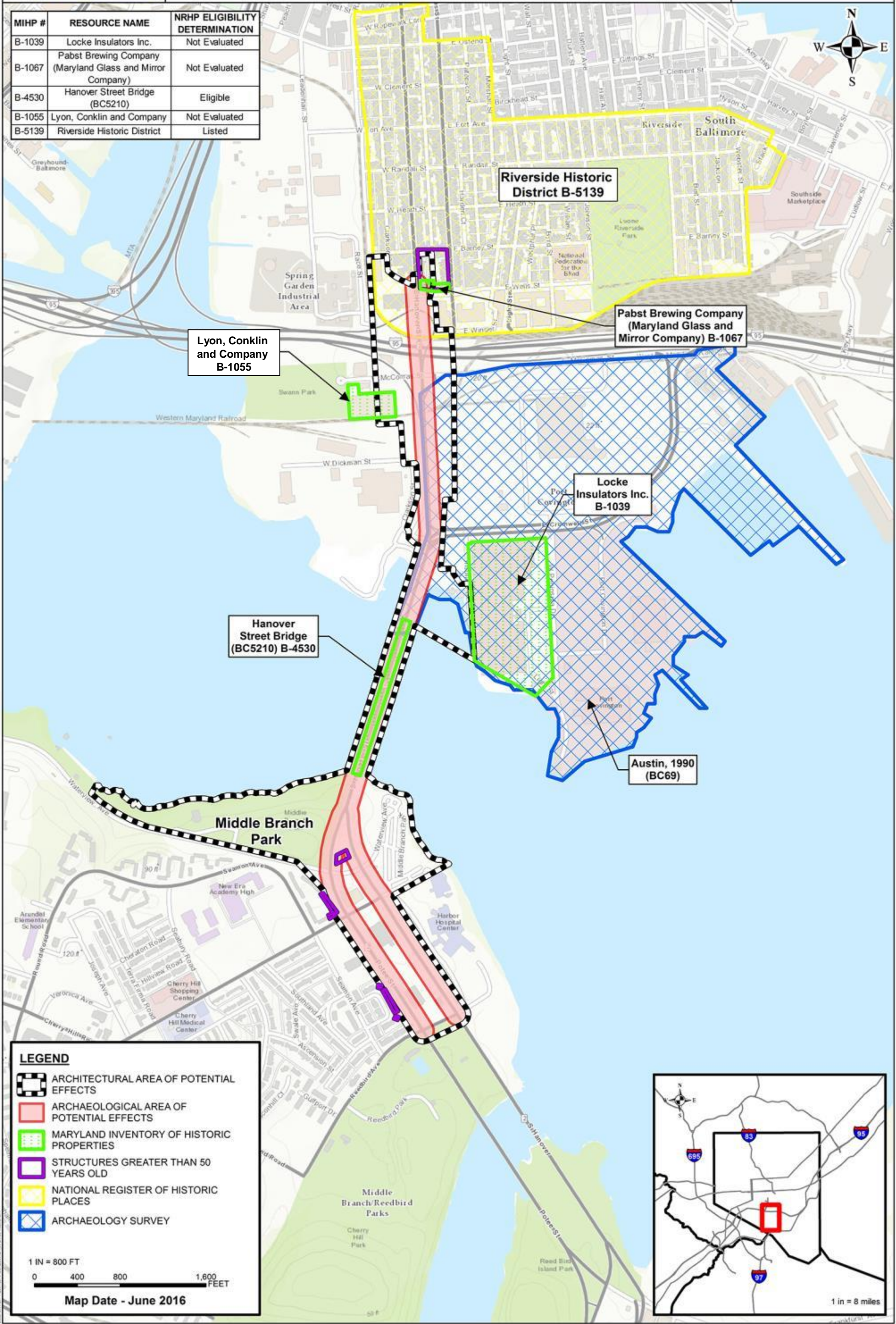






Hanover Street Corridor Study
Figure 2-12: Economic Development and Priority Funding Areas

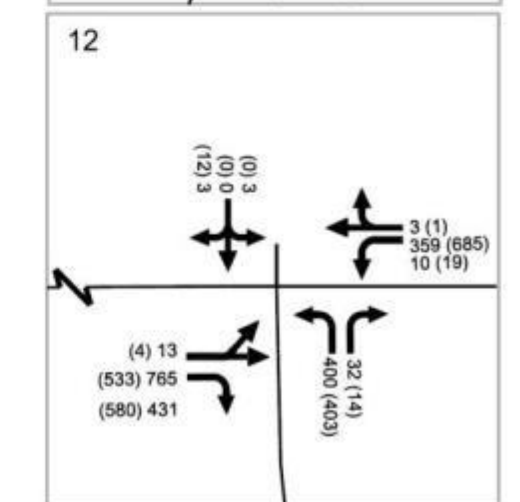
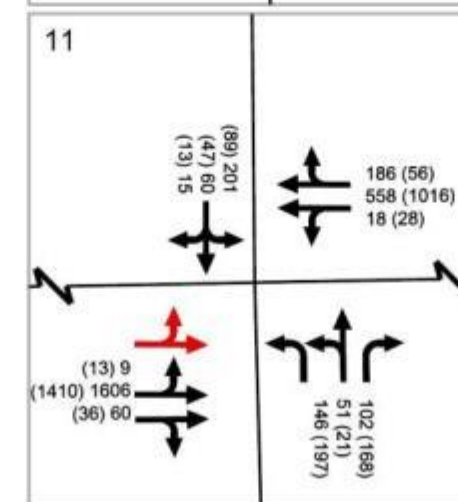
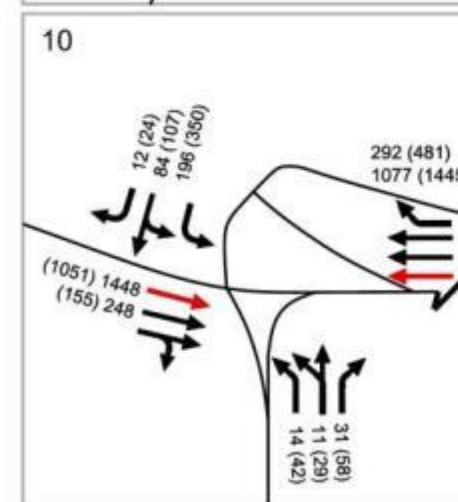
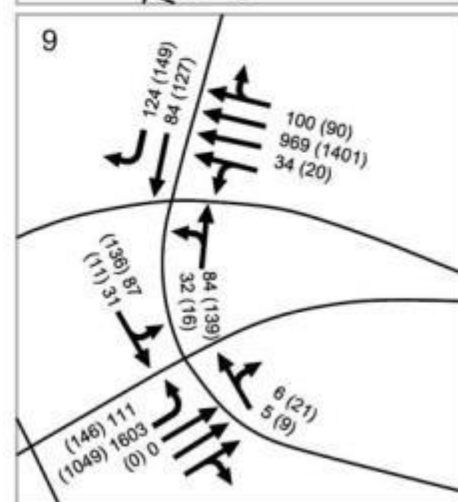
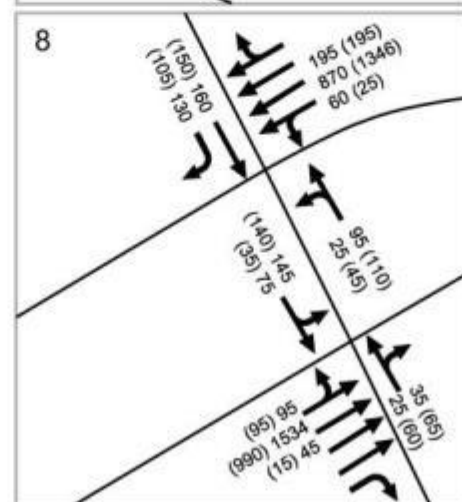
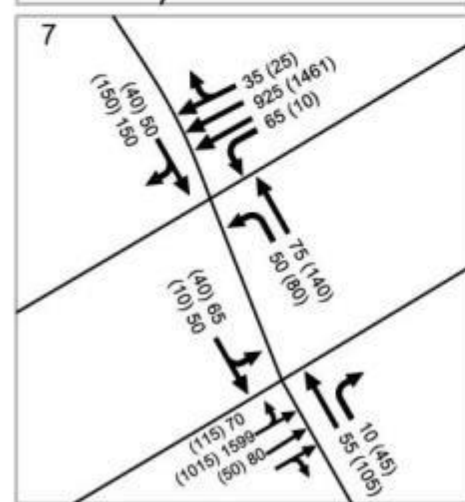
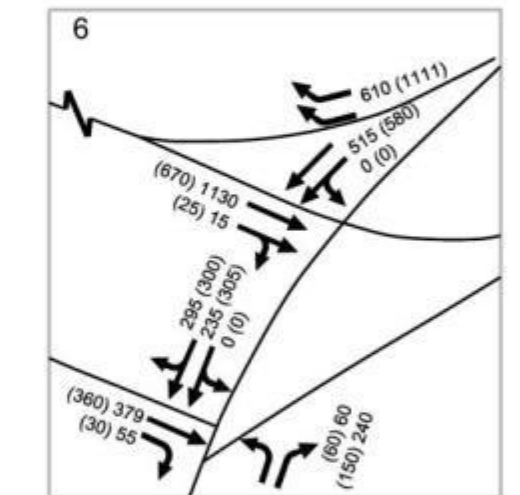
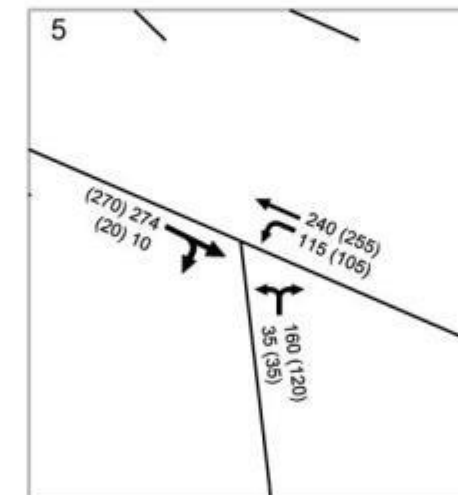
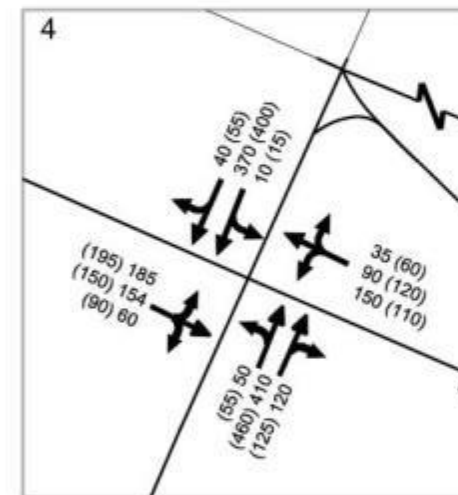
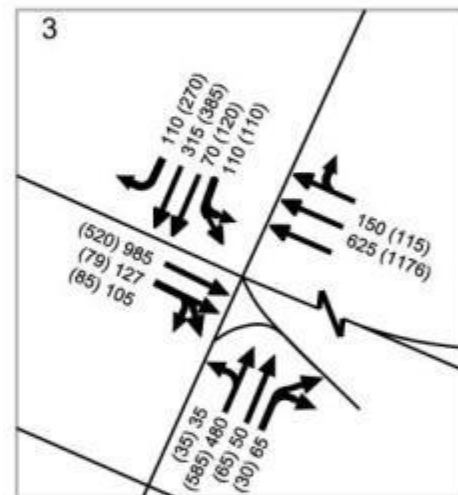
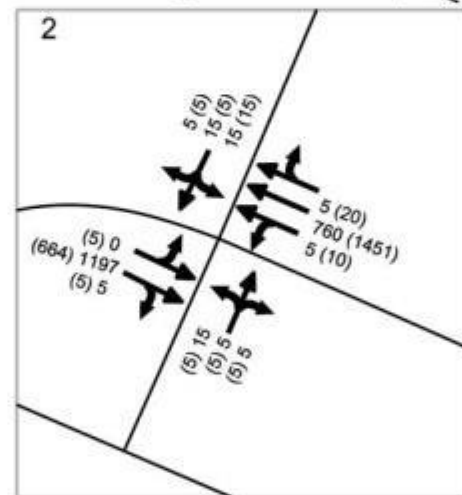
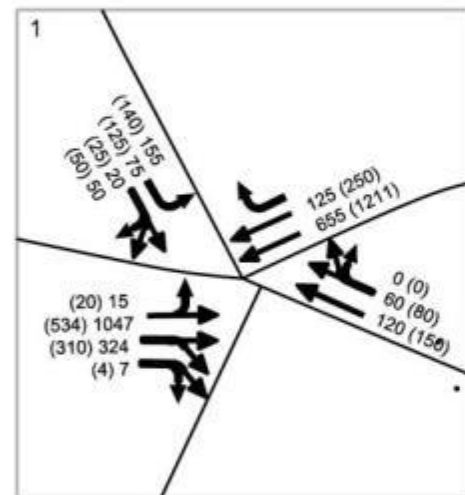
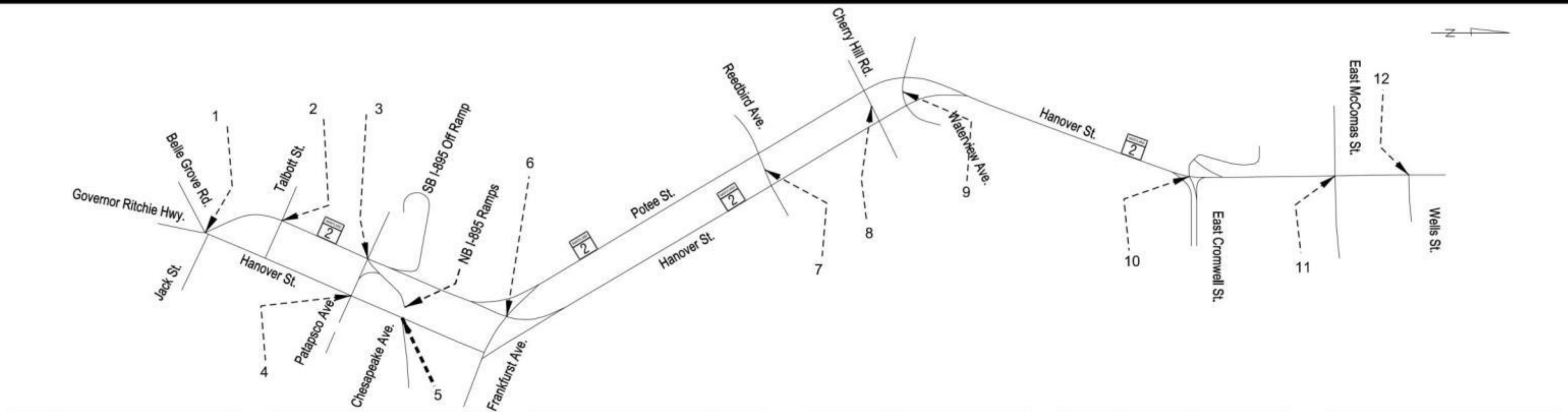






Hanover Street Corridor Study Figure 2-15: Intersection Lane Configurations

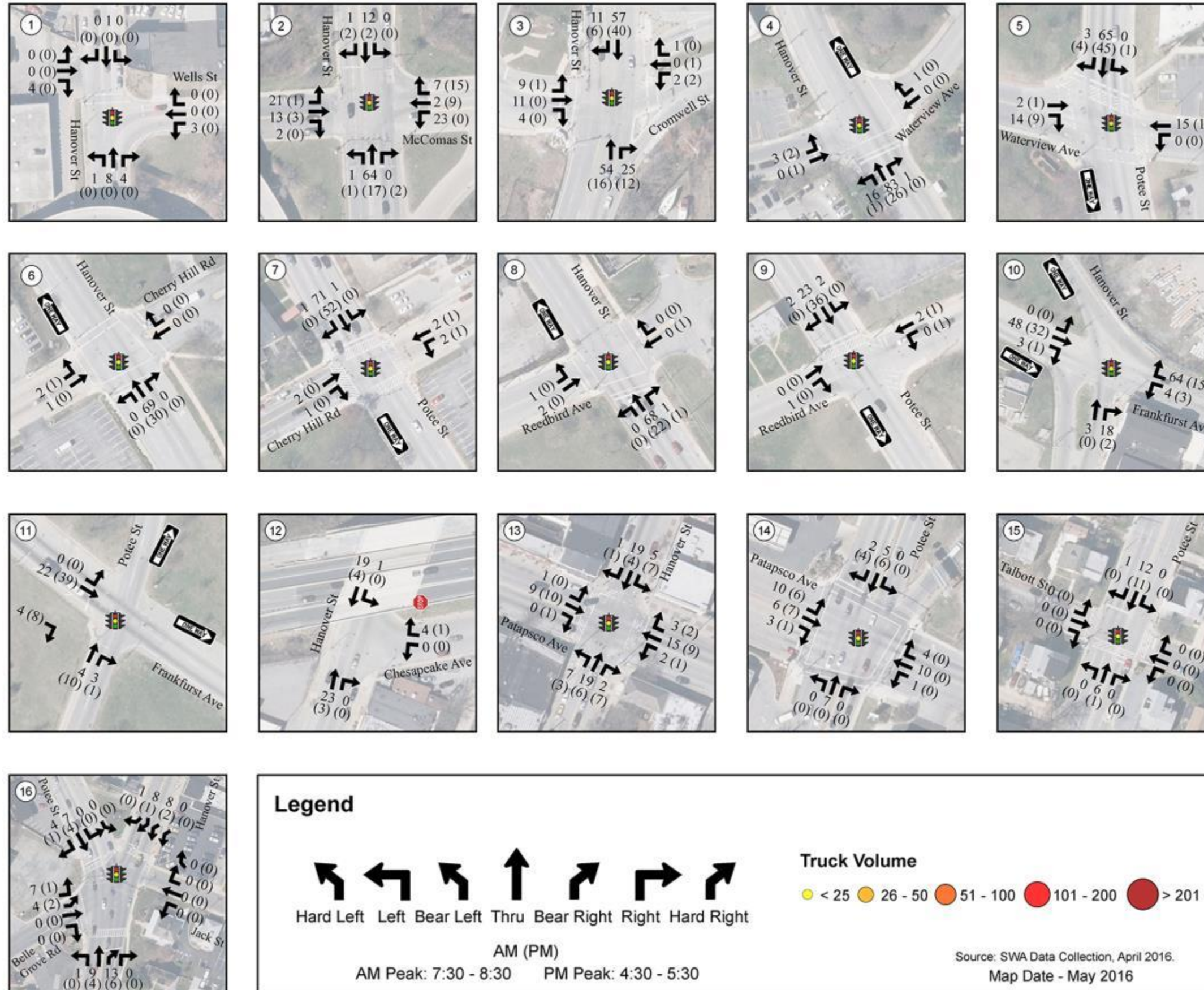




Hanover Street Corridor Study Figure 2-17: Bus Volumes and Turning Movement Counts



Hanover Street Corridor Study Figure 2-18: Truck Volumes and Turning Movement Counts



Hanover Street Corridor Study Figure 2-19: AM Peak Bus Volumes and Turning Movement Counts Percentages



Hanover Street Corridor Study Figure 2-20: PM Peak Bus Volumes and Turning Movement Counts Percentages

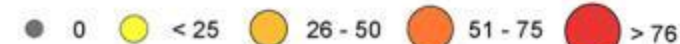


Legend



Inbound/Outbound Traffic Volume Percentage by Leg

Bus Volume



PM Peak: 4:30 - 5:30

Source: SWA Data Collection, April 2016.

Map Date - May 2016

Hanover Street Corridor Study Figure 2-21: AM Peak Truck Volumes and Turning Movement Counts Percentages



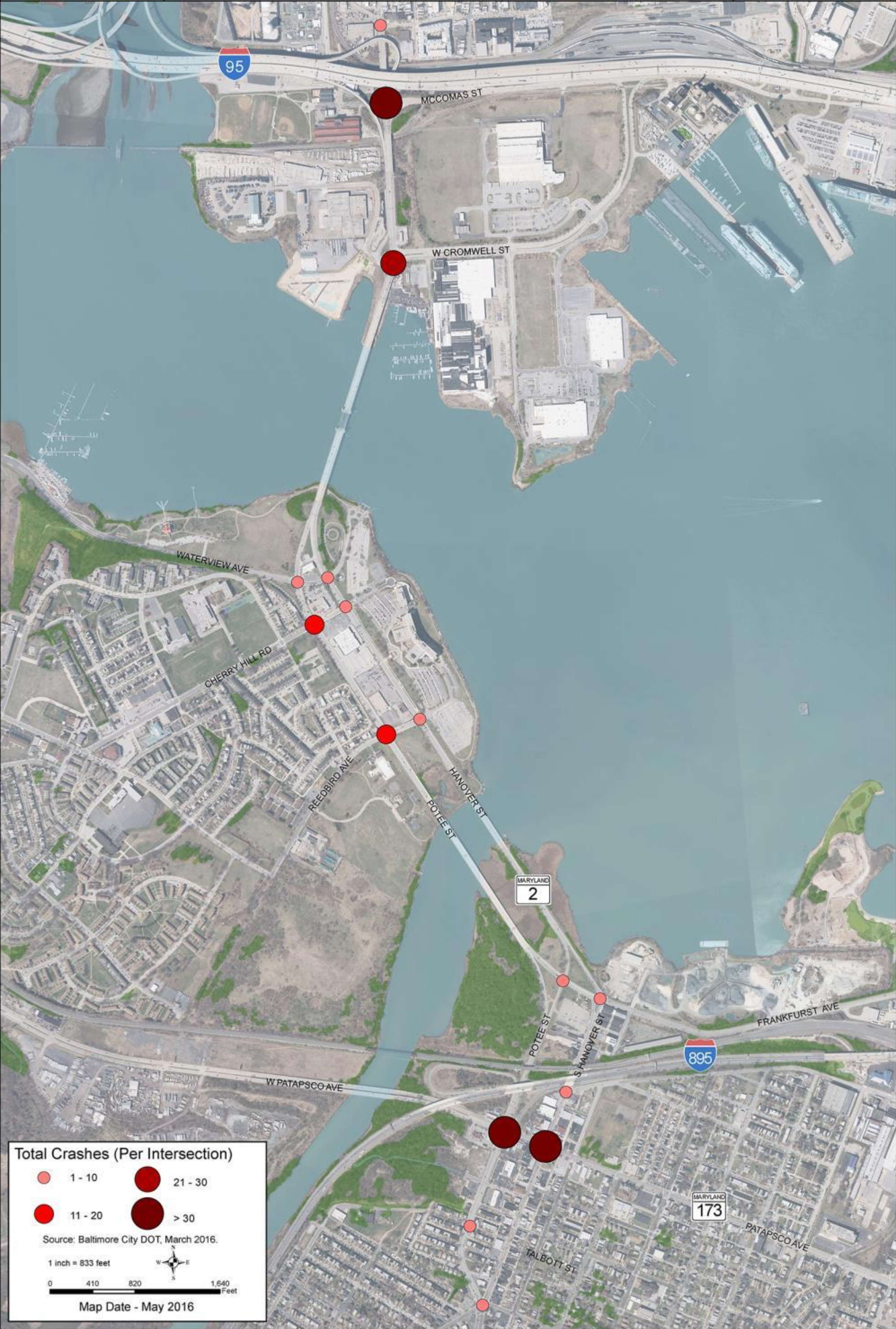
Hanover Street Corridor Study

Figure 2-22: PM Peak Truck Volumes and Turning Movement Counts Percentages

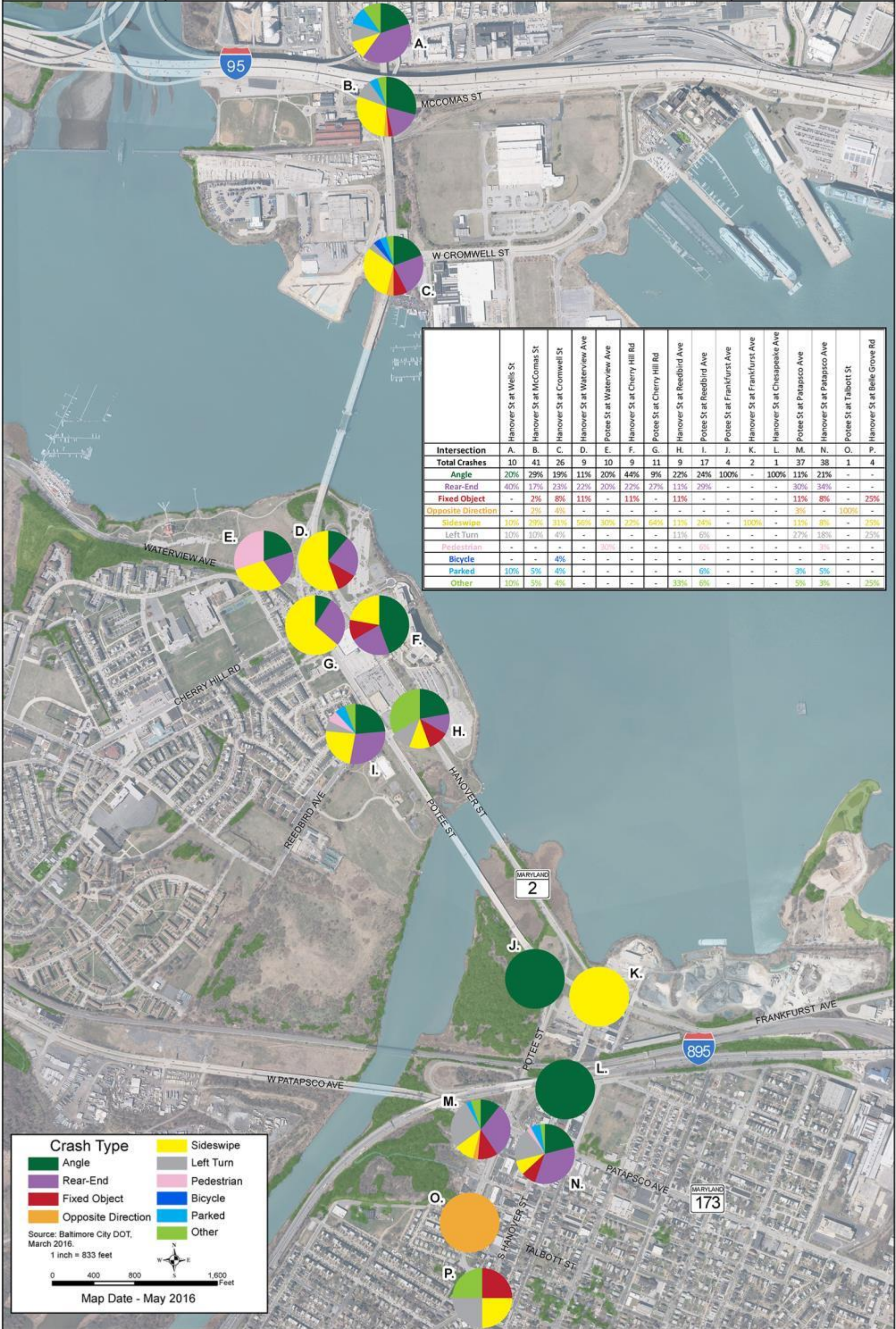








Hanover Street Corridor Study
Figure 2-26: Crash Summary from 2010 - 2014





Pedestrian & Bicycle Crash

 Pedestrian

 Bicycle

Source: Baltimore City DOT, March 2016.

1 inch = 833 feet

0 400 800 1,600 Feet

Map Date - May 2016