East 7th Street Peninsula Study

July 2019

Wilmington Initiatives

SEAL OF THE CITY OF WILMINGTON DELAWARE

DelDOT

WILMAPCO
Wilmington Area Planning Council

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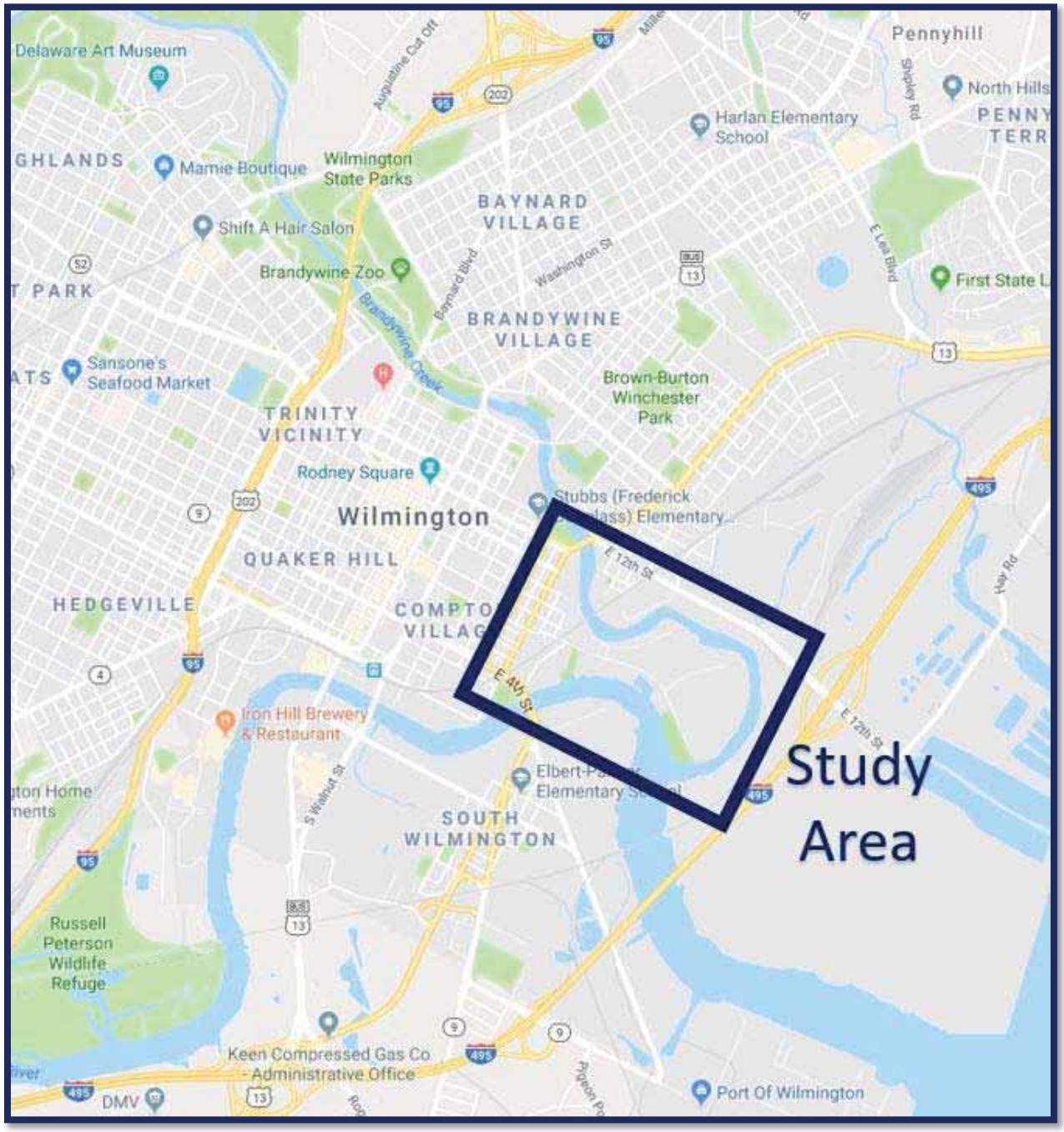
Location Map



Executive Summary

To protect the development potential of the East 7th Street Peninsula, WILMAPCO, in conjunction with Wilmington Initiatives, the City of Wilmington and DelDOT have identified several issues of concern that need to be remedied to secure the Peninsula's future. These current issues include flooding, both tidal and stormwater, accessibility, traffic circulation, lack of pedestrian/bicycle/multi-modal facilities, recreational uses, and current land uses. In an effort to examine the current issues and determine resolutions, the City submitted a request to WILMAPCO for a Unified Planning Work Program (UPWP) Study for a Roadway Improvements and Development Analysis for the Peninsula to address these topics to protect current businesses and future growth potential.

The 115-acre East 7th Street Peninsula is located at the confluence of the Christina River and Brandywine Creek, east of the Amtrak Viaduct. The study area also includes an area southwest of the Peninsula along Swedes Landing Road to East 4th Street and the area west of the Viaduct to Church Street between East 4th Street and East 8th Street in the East Side neighborhood section of the City.

There are several community resources located within the study area including: the Henderson Museum and Holy Trinity Church, also known as Old Swedes Church, which dates to the late 1600s; Fort Christina National Park; the Kalmar Nyckel Shipyard and Museum; and Babiarz Park, which includes the East 7th Street Skate Spot, a City approved "do-it-yourself" skate park.

Given its location, limited access to and from the Peninsula is an issue. Additionally, flooding is a primary concern. Both of these issues have limited growth potential at the Peninsula and have the potential to limit future investment unless they are adequately addressed. These key issues, along with preserving and protecting cultural resources, enhancing and preserving the adjacent stakeholder community, and protecting the future growth potential of the East 7th Street Peninsula are the guiding forces driving this study. It is therefore essential that improvements to address stormwater and flooding, land use and the transportation network are fully evaluated and recommendations for improvements are identified. Due to its low elevation, the Peninsula falls within the 100- and 500-year floodplains and will be impacted by future sea-level rise and other climate-change issues.

Potential solutions suggested in this study vary in cost from low-to-high, short-term to long-term implementation, and those that can be implemented by public agencies or private property owners. Some solutions may be eligible for special funding or grants.

Flooding and stormwater management options include priority action items that can begin immediately in order to maintain or provide safe access, protect property, and serve as catalysts to future improvements.

Short-term action items are items that should begin within 1-2 years and should be completed within 5-years. Short-term action items can be considered the initial building blocks to a more resilient Peninsula.

Long-term action items are items that should be accomplished in conjunction with development and maturation of the Peninsula. These items should be considered essential to the long-term resiliency on the Peninsula but are more dependent on the action and concurrence of individual lot owners. Many of these items may require financial assistance to individual lot owners from either FEMA, the State of Delaware, or the Clean Water State Revolving Fund.

Various transportation improvements are proposed for the Peninsula to improve connectivity to adjacent neighborhoods, as well as, inter-connectivity within the Peninsula. These improvements include network improvements, intersection improvements, pedestrian and bicycle accommodations, streetscapes, and pedestrian lighting.

Cost Estimates were prepared for the proposed solutions for the Peninsula and include the following:

Immediate

- Tide Gates and minor drainage/pipe improvements - $2.1 Million
- Clean out existing pipe system and video inspect for issues – No additional cost anticipated as this can be added to the City's annual maintenance program

Short-Term

- Detailed Master Plan for Stormwater Management (Design, and Implement) - $350,000
- Install new tide gates (4) - $100,000
- Install stormwater management pond - $1.65 Million

Long-Term

- Phase 1 – East 7th Street Improvements - $6.4 Million
- Phase 2 – East 4th/ Swedes Landing Road Intersection - $3 Million
- Phase 3 – East 8th Street Improvements - $4 Million
- Phase 4 – Streetscapes - $1 Million per block

Project Need

WILMAPCO, in coordination with Wilmington Initiatives, the City of Wilmington and DelDOT, identified the East 7th Street Peninsula in Wilmington, DE as an area of the City in need of improvements to protect the development potential of the Peninsula. The City submitted a request to WILMAPCO for a Unified Planning Work Program (UPWP) study for a Roadway Improvements and Development Program for the Peninsula to address concerns to protect current businesses and future development.

The purpose of this study is to analyze the current conditions on the Peninsula related to roadway deficiencies, access issues, and flooding concerns to determine the feasibility and effectiveness of recommended improvements to enhance development potential for this part of Wilmington. WILMAPCO and their partners determined that concerns at the Peninsula include: flooding, both tidal and stormwater, accessibility, traffic circulation, lack of pedestrian/bicycle/multimodal facilities, recreational uses, and current land uses. The project need is consistent with the vision for the area as described in *Wilmington 2028 A Comprehensive Plan for Our City and* Communities (*Wilmington 2028). Wilmington 2028* has identified the East 7th Street Peninsula as an "Economic Opportunities" area, and identifies the Peninsula as having the potential for a "Robust Local Economy." Further, *Wilmington 2028* identifies 7th Street as an important east-west connector in the City and encourages "…investment in 7th Street."

In addition to WILMAPCO and their partners, extensive coordination with project stakeholders, as well as the community at large, occurred throughout the course of this study. Coordination with several key agencies was also initiated including, the Department of Natural Resources and Environmental Control (DNREC), Delaware Area Rapid Transit (DART), and the Federal Highway Administration (FHWA). The Meeting Summaries section of this report provides a description and details on much of this coordination.

Project Description and Purpose

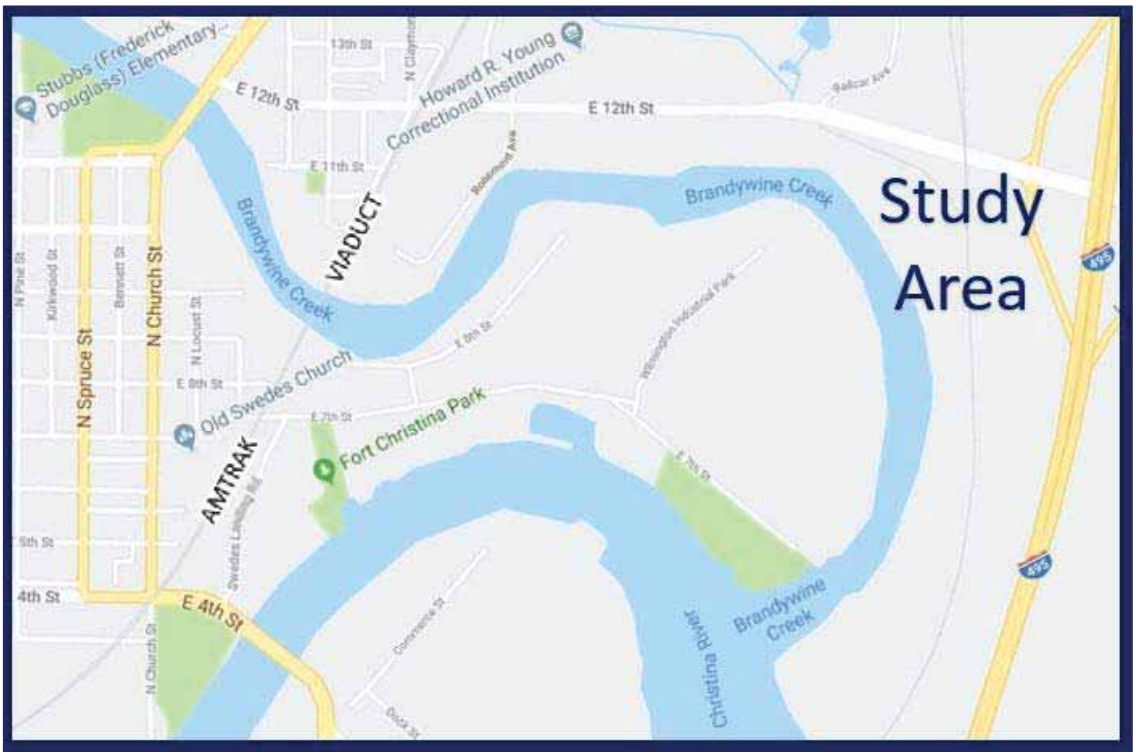
The primary purpose of this study is to examine initiatives to preserve and protect cultural resources, enhance and preserve the adjacent stakeholder community, and protect the future growth potential of the East 7th Street Peninsula. This will be accomplished through the recommendation of a series of modifications to stormwater management, land-use, and transportation network operations while mitigating flood impacts, enhancing recreational amenities and preserving the culturally and historically significant landmarks on the Peninsula.

The study began with a data gathering phase. Data was gathered from a variety of sources including desktop reviews of environmental and hydrologic data. Unmanned Aerial Photography (UAS) was used to document the Peninsula and gather existing photography. Field visits were used to explore the Peninsula on ground level as well. A Visioning Workshop, open to the public, was held to gather information and determine issues or concerns of the local community. Attendance at Wilmington Initiatives Meetings, as well as, East 7th Street Coalition Meetings also helped gather and report data.

The existing data was analyzed, and alternatives were formalized into a Peninsula-wide Master Plan to determine potential recommendations to the concerns and issues of the Peninsula Stakeholders. These solutions were presented to the community in a second public workshop for feedback and discussion. Comments and feedback from this public workshop were incorporated into the Master Plan. The Master Plan elements were prioritized into various phases based on observed needs, with input from the community from the three public workshops. Conceptual cost estimates were prepared for each phase. The Revised Master Plan with conceptual estimates and a suggested prioritization were presented to the stakeholders at a third public workshop. Workshop summaries can be found in Appendix C.

The Master Plan was presented to the stakeholders using a series of Concept Plans, renderings, and displays to explain the topics or concerns regarding the Peninsula and their suggested solutions. The Concept Plan addresses the concerns related to flooding, environmental issues, land use and zoning, recreational amenities, the transportation network, and accessibility.

This Master Plan was developed as a Planning and Environmental Linkages (PEL) study. PEL studies are a collaborative and integrated approach to transportation decision-making that consider environmental, community and economic issues early in the planning process. This information and analyses can then be utilized to inform the National Environmental Policy Act (NEPA) review process. PEL studies are an FHWA initiative used to help make better-informed project-level decisions and to shorten project delivery time, and they follow provisions set forth in 23 U.S.C. 168(b)(1)(A) and associated regulations under 23 CFR 450.212(d) and 450.313(e). A PEL checklist is included in Appendix A.



Study Area Map

Existing Conditions

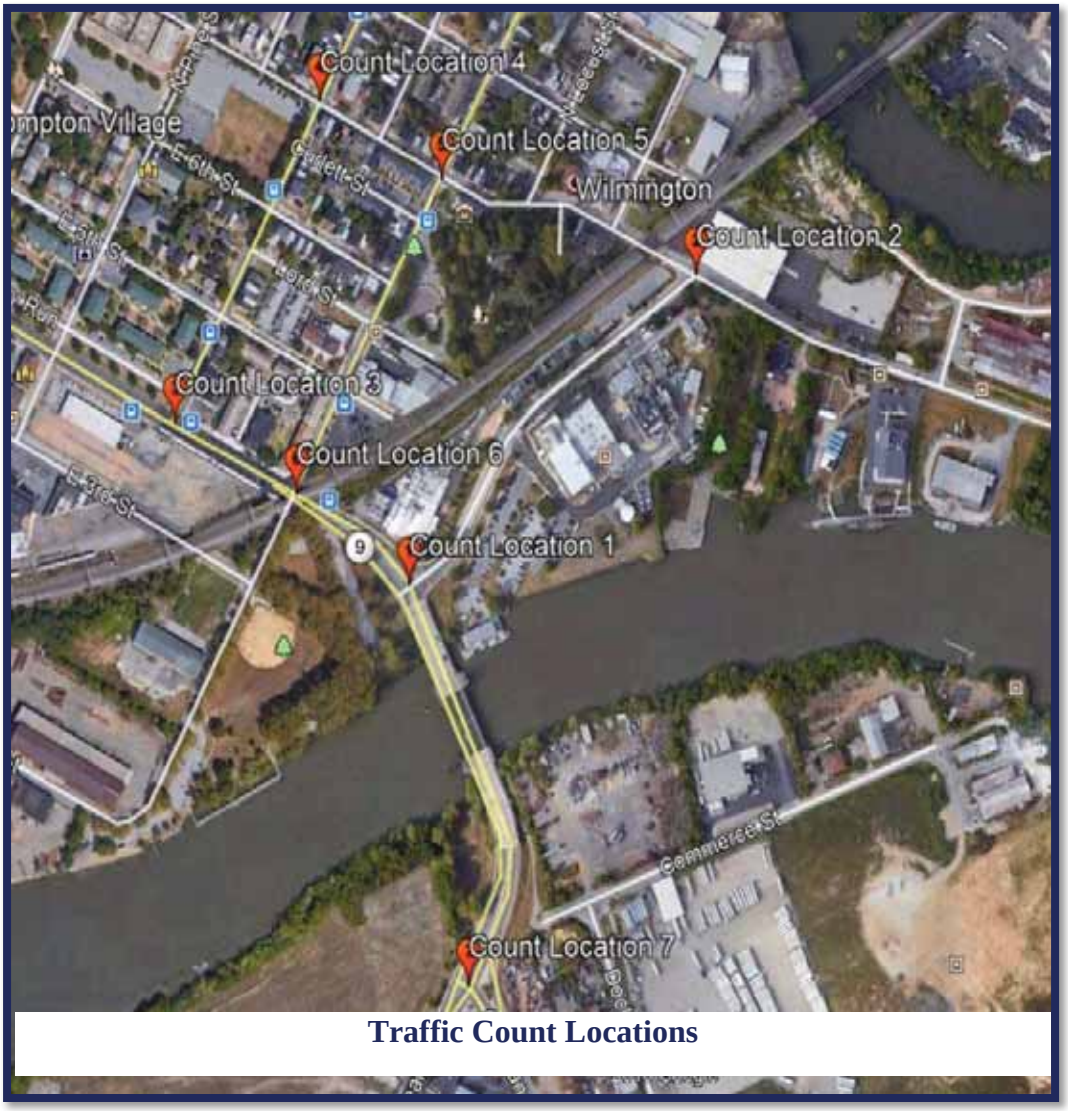
Located at the confluence of the Christina River and Brandywine Creek, the Peninsula encompasses approximately 115 acres west of the Amtrak Viaduct. The WILMAPCO East 7th Street Peninsula Study also includes the area south of the Peninsula along Swedes Landing Road to 4th Street and the area west of the Viaduct to Church Street between 4th Street and 8th Street.

Traffic Analysis

The East 7th Street Peninsula is somewhat isolated. The Amtrak Viaduct on the west side of the Peninsula limits accessibility to the Peninsula from the East Side Neighborhood. Currently only two roadways, East 7th Street and Swedes Landing Road, from the 4th Street corridor, provide access to the Peninsula. East 7th Street between the AMTRAK Viaduct and N. Buttonwood Street is two lanes with one lane in each direction. At N. Buttonwood Street vehicles traveling westbound, out of the Peninsula itself, are required to turn right onto N. Buttonwood Street as East 7th Street becomes an eastbound one-way street allowing travel toward the Peninsula only. N. Buttonwood Street and the adjacent roads are laid out in a grid typical of many urban transportation networks. Turning radii are typically not suited for large trucks, and the land use is mostly residential.

Traffic counts were performed at seven (7) intersections, which included:

- Swedes Landing Road and East 4th Street
- S Heald Street and Christiana Avenue
- E 4th Street and N Church Street
- E 4th Street and Spruce Street
- E 7th Street and Spruce Street
- E 7th Street and N Church Street
- E 7th Street and Swedes Landing Road



Traffic Count Locations

The operational analysis was completed utilizing Synchro to model a "multiple intersection network" including the following intersections:

- DE 9 / E 4th Street at Swedes Landing Road
- Swedes Landing Road at E 7th Street
- DE 9 / E 4th Street at Christiana Avenue (Signal Permit N691T)
- DE 9 / E 4th Street at US 13 / N Church Street (Signal Permit N690T)
- DE 9 / E 4th Street at N Spruce Street (Signal Permit N689T)
- N Spruce Street at E 7th Street

The operational analysis was reported with HCM 6th Edition methodologies to obtain Level of Service (LOS), delay, and queuing. The intersections of E 4th Street at Swedes Landing Road and E 4th Street and Christiana Avenue were reported with HCM 2010 edition methodologies due to combined lane movements. The difference between the HCM 6th edition and the HCM 2010

edition are not significant. The input values for the 2018 existing conditions included utilizing turning movement count data collected on Thursday, May 31st, 2018 by The Traffic Group and provided by WILMAPCO. For the signalized intersection standard signal timing cycle lengths with signal timing optimization was utilized for the preliminary operational analyses.

The focus of the preliminary traffic analysis was the intersection of E 4th Street at Swedes Landing Road, as this is the only intersection within the modeled network for which the intersection control and the movements at the intersection were altered in the proposed scenario. With that noted, the other five (5) intersections within the model network operated at an acceptable LOS C or better for both the AM and PM peak hour periods, including the addition of the modifications being made to the intersection of E 4th Street and Swedes Landing Road. The results determined a majority of approaches would operate with an LOS A or LOS B. The one exception to this was the intersection of E 4th Street and Spruce Street for the AM Peak Period for the scenario that included the signalization of E 4th Street and Swedes Landing Road, for which the southbound N Spruce Street approach was reflected to operate at a LOS D. This should be confirmed using the actual City of Wilmington Synchro timing, in a later design phase.

At the intersection of E 4th Street at Swedes Landing Road, it was determined that for the AM and PM peak hour conditions with the restriction of left-turns from Swedes Landing Road and the approach operating under stop-control conditions, the approach is reflected to operate at a LOS B and a low delay of 11.7s for the AM peak hour and a LOS B with a low delay of 10.4s for the PM peak hour. When the intersection operations were analyzed with allowing the left-turn movement from Swedes Landing Road, the approach LOS remained a LOS B for both the AM and PM peak hours with the delay increasing slightly to 14.0s and 11.2s respectively. In additional to the Swedes Landing approach, the E 4th Street southbound left-turn movement was reflected to operate with an LOS A and a delay of 9.9s during the AM peak hour and 8.6s during the PM peak, for both stop-control condition scenarios (i.e. with and without the Swedes Landing left-turn movement restricted).

When completing the operational analyses for the signal control condition at the intersection of E 4th Street and Swedes Landing Road, there is a decline in LOS and increase in delay. This is intuitive for the E 4th Street approaches as they were previously free movements. Although, the Swedes Landing Road approach LOS declines to a LOS C for both the AM and PM peak hours with a delay of 22.5s and 26.3s respectively. Furthermore, the E 4th Street left-turn movement is also reflected to operate a lower LOS D during the AM and the PM peak hours with a higher delay of 38.8s and 36.4s respectively. As for the overall intersection, under the stop-controlled condition the intersection delay was reflected to be under 1.0s for both peak hours and both scenarios (LOS A), while the intersection delay under signal control is 19.5s and 11.4s for the AM and PM peak hours (LOS B).

Field observations were completed on the existing roadway network within the study area. Swedes Landing Road is a two-lane road in fair to good condition with sidewalks on both sides. There is a traffic light at a gated entrance to Noramco with pedestrian crosswalks. The traffic light was at one time in operation and began having operational issues. Noramco coordinated with the City of Wilmington, who put the traffic signal on flashing. Currently, the traffic signal is not in operation. Staff members of Noramco use this crossing to reach the other side of the Noramco plant. Traffic calming is something Noramco would like to see addressed at this intersection.

On the Peninsula east of the AMTRAK Viaduct, there is a limited roadway network. There are three main roads on the Peninsula; East 7th Street, Wilmington Industrial Park, and East 8th Street. Each roadway on the Peninsula is a two-lane road with approximately 12' wide lanes and no shoulders. The pavement on all three roadways is in fair to poor condition. East 7th Street has a double yellow stripe down the centerline that is worn and faded. East 8th Street and Wilmington Industrial Park do not have pavement markings. There are no pedestrian or bicycle accommodations on the three roadways, except for a sidewalk along the south side of East 7th Street from Swedes Landing Road to the Kalmar Nyckel property. East 7th Street services the length of the Peninsula. Wilmington Industrial Park services the northeast limits of the Peninsula. East 8th Street services the northern portion of the Peninsula, but only connects to East 7th Street on the western end of the Peninsula via Claymont Street. East 8th Street ends at the eastern limit of the Peninsula with no connection to the other roadways. There are signs of flooding throughout the roadways. Ponding is very common and water marks left behind from ponding water are also very common throughout the Peninsula.

Internal Roadway Network

As property owners have modified or developed their parcels throughout the Peninsula those properties have been raised to avoid flooding. Overall this has left the roadways much lower in elevation than the surrounding ground, causing flooding and ponding of water.

The intersection of East 7th Street and Wilmington Industrial Park is the lowest point on the Peninsula. Water ponding is often visible at this intersection. The intersection is a multi-legged intersection with a center grass median that causes driver confusion. The streets join together in

a configuration that forms an "A." In addition, there is an entrance to a private property at this intersection.

The intersection of Swedes Landing Road and East 4th Street is an unsignalized intersection that allows all vehicular movements except left turns from Swedes Landing Road onto East 4th Street. These left turns would provide a direct route to access Interstate 495, allowing vehicles to leave the Peninsula without traveling through the City grid transportation network.

Flooding Concerns

In addition to limited accessibility, flooding is an issue on the Peninsula. Flooding occurs in many situations such as after significant weather events or during high tide in any weather condition. Community members have observed that water has risen over the Peninsula perimeter in the area of the Kalmar Nyckel. The community noted that there are a few days every year when post weather event flooding prevent them from reaching their destination on the Peninsula. During these events flooding is measured from 12-inches of standing water and higher. Standing water is often observed along the edges of the roadway on the Peninsula even during dry periods not following weather events, as a result of tidal events. Limited access and flooding limit the East 7th Street Peninsula from reaching its full potential. Improvements to the stormwater management system and roadway network to, from and within the Peninsula, including accessibility, circulation and multimodal connectivity are being evaluated in this study. **Appendix B** provides a detailed description of the environmental concerns related to flooding, on the East 7th Street Peninsula, as well as, proposed infrastructure improvements, recommendations, and immediate, short-term and long-term action items.

Photo of the submerged intersection of East 7th Street and Industrial Avenue

The area in dark blue in **Figure 1** is the area of the Peninsula that experiences the heaviest flooding on a continual basis. This map is consistent with the information gathered at the Visioning Workshop.

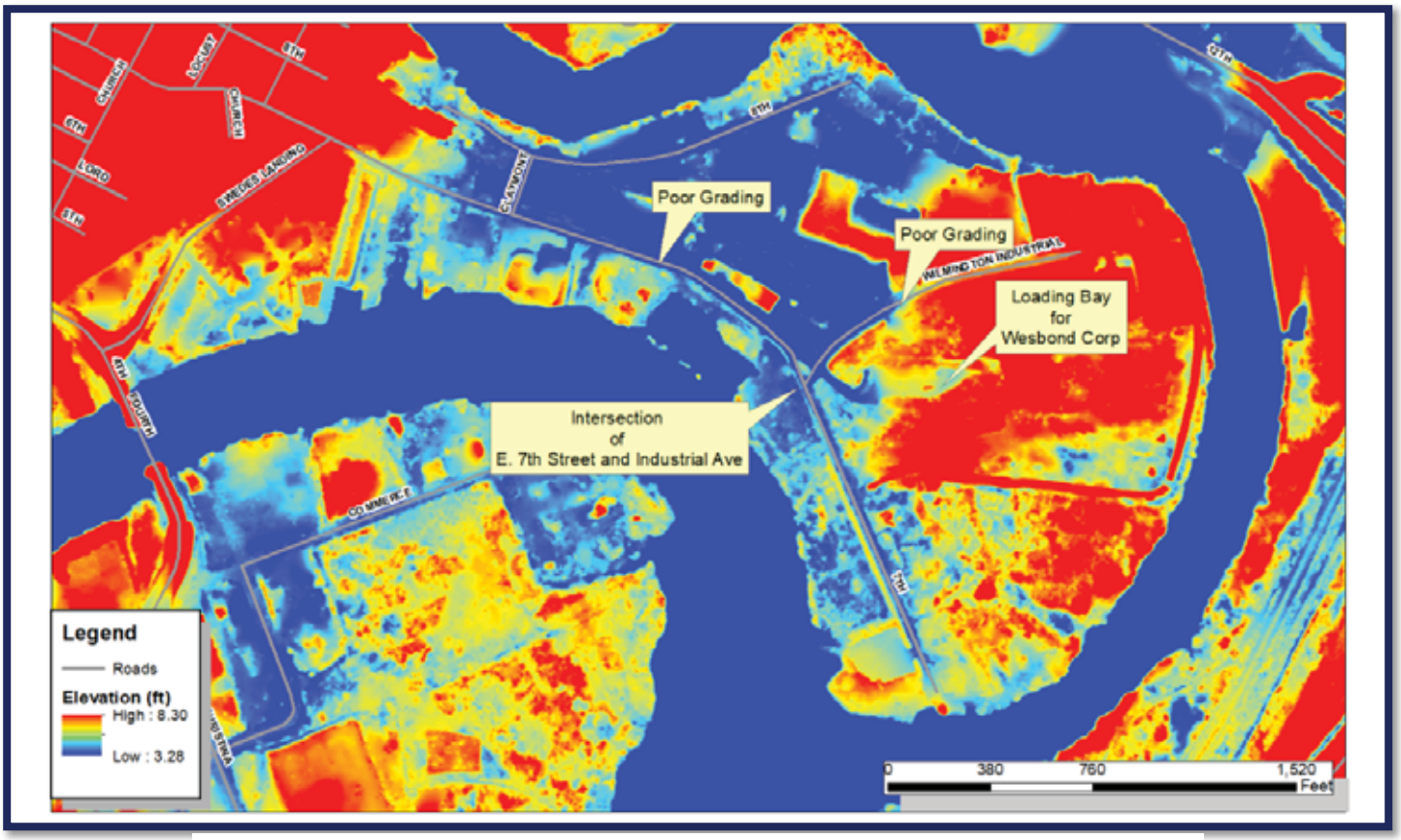


Figure 1: East 7th Street Peninsula Flooding Areas

Figure 2: East 7th Street Peninsula Zoning Map

Land Uses

Zoning separates land uses into permissible zones that are regulated for uniformity. Current zoning, shown on **Figure 2** on the East 7th Street Peninsula is comprised of the following codes: W-2 Commercial /Manufacturing; W-3 Low Intensity Manufacturing/ Commercial Recreation; W-4 Residential Commercial; and O Open Space (Fort Christina National Park and Mayor John E. Babiarz Park).

Currently DART does not provide service to the Peninsula, however DART Route 9 provides service across Brandywine Creek on 12th Street, DART Route 15 passes by the Peninsula on 4th Street, and DART Route 8 passes by the Peninsula on 4th Street and Church Street between 4th and 8th Streets. As development of the East 7th Street Peninsula grows and the demand for transit service increases, the potential for transit service on the Peninsula will be reevaluated. Any proposed transit service to, from and/or on the East 7th Street Peninsula will be closely coordinated with DART.

The East Side Neighborhood of Wilmington forms the western boarder of the study area. Originally a Swedish settlement, the East Side Neighborhood has evolved through the many years of its history. Today, the area is experiencing redevelopment and includes residences, restaurants and other amenities.

The study area also includes the Henderson Museum and Holy Trinity Church, also known as Old Swedes Church. Located at East 7th Street and North Church Street, the Church is a designated National Historical Landmark and dates back to the late 1600s. Old Swedes Church is considered one of the few remaining examples of Swedish Colonial architecture in the area.

Located along East 7th Street, just east of Swedes Landing Road, and bordered by the Christina River to the south, Fort Christina was the site of the first Swedish settlements in North America. Built in 1638 and named after Queen Christina of Sweden, today the site is the location of Fort Christina National Park. Old Swedes Church and Fort Christina are included in the First State National Historical Park, which is comprised of seven sites across the State and is Delaware's only National Park.

The East 7th Street Peninsula was the landing spot for the Kalmar Nyckel ship which brought the first Swedish settlers to the area. The Peninsula celebrates this history with the Kalmar Nyckel Shipyard and Museum which maintains a replica of the ship on-site, as well as many other historical artifacts, and documents Swedish settlement and history of the area.

Skate Park Babiarz Park

Recreational amenities on the Peninsula include a skate park located at the eastern end of the Peninsula within Babiarz Park. Known as the 7th Street Skate Spot, it is a City approved, "do-it-yourself" skate park built and run by the Wilmington Skate Project,

Kinetic Skateboarding and local skaters. The skate park is very popular with local skaters. The skating community maintains the skate park themselves, as well.

Trees on the peninsula are a mix of native and non-native species that likely grew after the closure of the Wilmington Landfill. Several mature stands of trees exist along the southern edge of the peninsula. Currently these trees appear in good health but may show signs of stress in the future due to impacts from Sea Level Rise, erosion, and increasing salinity levels.

Figure 3 - Potential Wetlands

Potential wetlands can be found along the entire perimeter of the Peninsula, as well as, in some of the forested areas as shown in **Figure 3**. Future improvements to the Peninsula will require more in-depth wetland studies and potential mitigation measures. Coordination with the Army Corps of Engineers (ACOE) and DNREC will occur throughout the wetland identification, impacts and if necessary, mitigation efforts.

Hazardous materials/waste analyses are not within the scope of this study. As private development occurs on the Peninsula it will be incumbent on the individual property owners to have their properties cleared and/or undertake necessary mitigation efforts. Road improvements that proceed to future phases will also require hazardous materials/waste analyses with potential mitigation. These analyses are typically conducted by DelDOT for state highway projects, as well as, other improvements conducted on state owned lands. For City funded projects, the analyses and mitigations would fall under the purview of the City.

During public workshops, trash and debris on the Peninsula were concerns of the stakeholders. Trash and debris were observed during site visits, mostly in areas that were not immediately adjacent to occupied buildings. Some trash and debris could be traced back to the following sources:

- Open dumpsters in close vicinity
- Users who park on the peninsula during lunch break and throw trash out of their window
- Blown litter from trash receptacles and from sources beyond the peninsula
- Construction/demolition debris associated with specific sites

Meeting Summaries

This study was conducted with the Wilmington Initiatives Partners (City of Wilmington Departments of Planning, Public Works, Economic Development and the Mayor's Office) acting as the management committee, assisting in decision-making and administrative issues. Active

participation from area stakeholders was encouraged, and the project team met with the East 7th Street Peninsula Coalition several times over the course of the study. This group is made up of state and local institutions, agencies and groups related to Old Swedes Church, Fort Christina and the Kalmar Nyckel Foundation with a focus on promoting the Peninsula as a cultural and recreational area, and creating better connections with the Eastside neighborhood and City residents. The project team also met with businesses and property owners on the peninsula to ensure that we were hearing from all local stakeholders, and these groups and local residents were invited to three public workshops to ensure inclusion through our public outreach process. A more detailed description of the public outreach process can be found in Appendix C.

On **May 16, 2018** Century presented the project team and our approach to the study to Wilmington Initiatives. Materials for discussion at the June 20, 2018 public workshop held by Wilmington Initiatives and the June 26, 2018 public "visioning" workshop were discussed for approval.

On **June 20, 2018** Wilmington Initiatives held a city-wide consortium on current and future projects. Century attended to present the East 7th Street Peninsula study and to gather feedback and data from the community in attendance. Feedback was generalized and included relief that Peninsula improvements were gaining traction in the City.

On **June 26, 2018** WILMAPCO in conjunction with the project partners held the first public workshop. There were 49 people in attendance. Following the presentation, participants were invited and encouraged to attend a roundtable discussion on a variety of topics which included: Flooding, Environmental Constraints/Cultural Resources, Future of the Peninsula in the No-Build Scenario, Land Use/Zoning, Recreational Amenities, and Transportation Network. Participants were given 10 minutes to discuss each topic and then report back to the group their thoughts on each topic. Maps were used to gather feedback and collect data. Information such as issues and challenges relating to flooding, environmental concerns, preservation, protection, growth, amenities, recreation, education, and transportation network improvements were discussed with the local community to gather first-hand information and knowledge.

On **August 15, 2018** Century presented a summary of the workshop materials, including feedback from the June 2018 public workshop to the Wilmington Initiatives Partners.

On **September 19, 2018** Century presented a summary of workshop feedback from the June 26, 2018 public workshop to the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center.

On **September 20, 2018** Century presented the results of the study analysis and possible solutions to Wilmington Initiatives.

On **October 2, 2018** a meeting was held with Mayor Purzycki, Herb Inden (Director of Planning and Development), Brian Mitchell (Director of Transportation – Public Works), Tanya

Washington (Chief of Staff at Mayor's Office at City of Wilmington), and representatives from Century Engineering. Topics that were covered include the future of the Peninsula and difficulties for the city to purchase properties for repair. One of the constraints in the improvement of the peninsula is requirements for deep piles. It was suggested by City representatives in the meeting that the number one priority should be raising the roads and improving the drainage.

At one time Noramco, a pharmaceutical company on the Peninsula, suggested closing Swedes Landing Road between East 7th and East 4th Street to expand their business. That suggestion has been abandoned as there was not enough property to expand as needed.

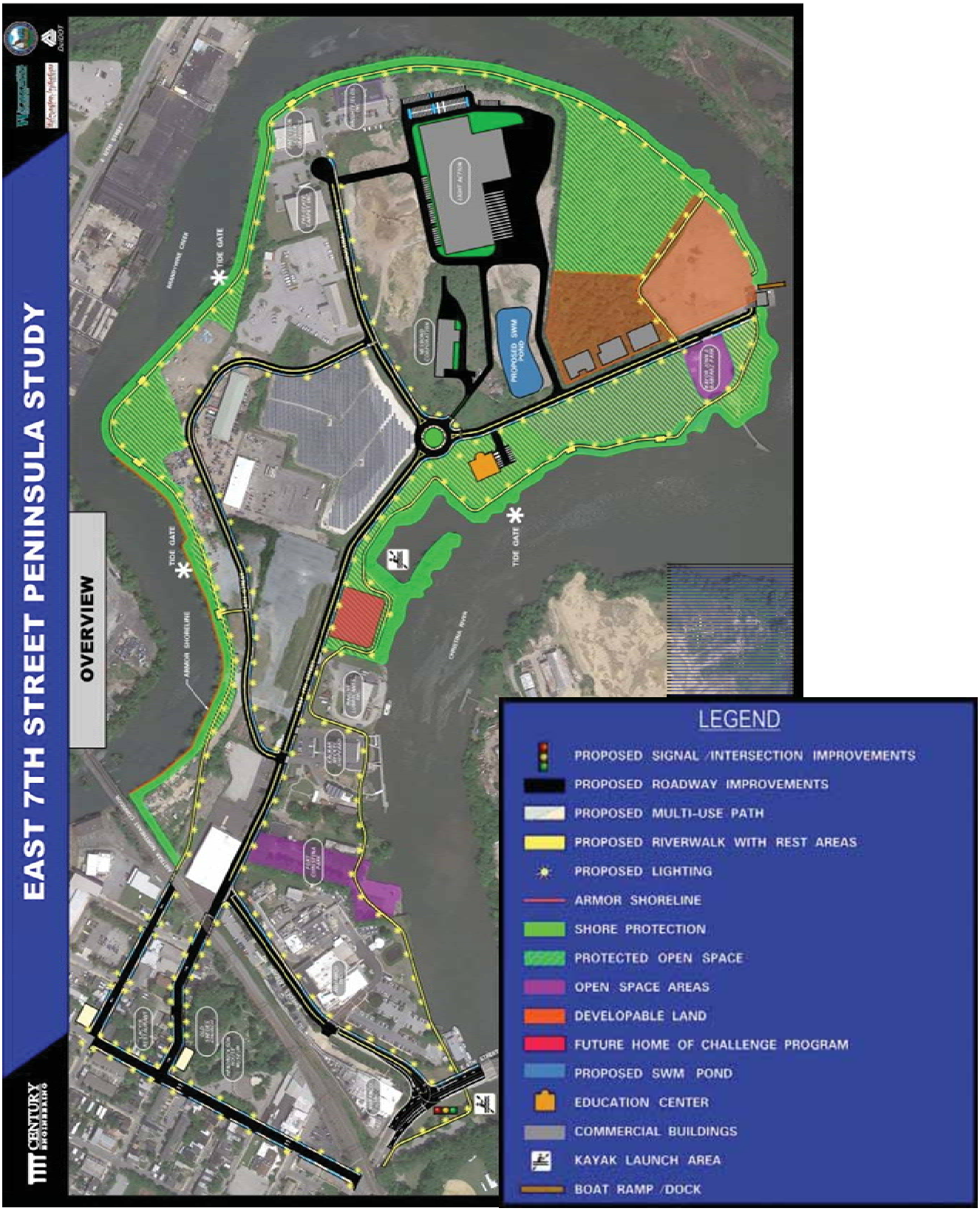
On **July 11, 2018** a meeting was held with the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center. Topics included finding ways to enhance visitor's experiences when visiting the Peninsula. It was announced at the meeting that potentially William Penn Foundation has money for a grant and would like to be a sponsor of improvements on Peninsula.

Senator Harris McDowell III proposed for the Peninsula to be a tourist attraction and suggested there should be a second smaller ship along with the Kalmar Nyckel. This would enable the Peninsula to still have a ship docked when the Kalmar Nyckel is sailing off-site. There may be $150,000 secured in the near future for the second ship as well as a potential visitor center located near the Riverfront.

On **February 6th, 2019** the Wilmington Initiatives partners, including City of Wilmington, DelDOT and WILMAPCO, presented the draft Master Plan for the East 7th Street Peninsula to the public at the Kalmar Nyckel Copeland Maritime Center. The Master Plan addressed flooding, business access, resiliency, transportation, preservation of cultural resources, wayfinding signs, recreation and education opportunities, including a 50 foot waterfront buffer around the Peninsula to protect the shoreline. Proposed improvements include improved tide gates, shore protection and Riverwalk with rest areas. Some of the proposed transportation network improvement included a four-way signal on 4th Street, elevated roadways, open 8th Street Viaduct Connection to East Side Community, connectivity between 8th Street and Wilmington Industrial Park, and pedestrian lighting along all roadways.

On **May 15, 2019** Public Workshop information was presented to the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center. The stakeholders were briefed on a summary of the information that would be available at the Public Workshop being held on May 15, 2019. The Final Master Plan was presented as well as suggested phasing and costs.

Proposed Concept: Figure 9: East 7th Street Master Plan



Proposed Improvements

In addition to the more obvious concerns of flooding, both tidal and stormwater, accessibility, and traffic circulation, the lack of pedestrian/bicycle/multimodal facilities, recreational uses, and retail/restaurant land uses were identified as significant concerns by the project stakeholders and nearby residents. A range of improvement options were developed, discussed and evaluated to address these needs. These options were vetted through an extensive public and community participation process, and consensus was reached on the most supported options. The consensus balanced the needs, desires and requirements of the various stakeholders including those concerned with: preserving environmental and cultural resources; enhancing recreational amenities; maximizing the Peninsula for future development; alleviating flooding; improving access to, and circulation through the Peninsula, including multimodal improvements; and stabilizing the Peninsula, thereby allowing it to remain flexible for yet to be determined future uses.

An alternative was vetted to provide additional access to the Peninsula via a bridge from 12th Street across Brandywine Creek to the Peninsula; however, use and need on the Peninsula did not justify the cost at this time. This option may be reevaluated at a future time if additional growth on the Peninsula necessitates this connection.

The following descriptions explain the options considered in this study:

Potential recommendations suggested in this study vary in cost from low-to-high, short-term to long-term implementation, and the solutions are separated between those that can be implemented by public agencies or private property owners. Some solutions may be eligible for special funding or grants.

Flooding and Stormwater Management Improvements

To address the flooding and stormwater management issues of the Peninsula, various solutions are suggested. The suggestions are separated between immediate, short-term, and long-term action items. (See **Appendix B**) Wilmington Public Works has commissioned a Resilient Wilmington Study to prepare the City for Climate Risks. When that study report is final and adopted by City government, elements that apply to the East 7th Street Peninsula should be included in the implementation plan.

Priority action items are suggested to begin immediately in order to maintain or provide safe access, protect property, and serve as catalysts to future improvements. Many immediate action items provide a quick return in observed benefits. These immediate action items include:

- Develop a detailed resiliency implementation plan for the future of the Peninsula. The detailed implementation plan should be an extension of the initial study and should be indexed to development phases on the Peninsula, allowing the City to determine the appropriate time to execute the elements of the plan. Indexing the plan to development activities potentially allows the City to request contribution from developers that trigger

elements of the resiliency implementation plan. The resiliency implementation plan should focus on items such as: determining the ideal building lot elevation for each lot on the Peninsula; determining ideal roadway elevations; determining whether current flood design standards are sufficient for development on the Peninsula; identifying and preparing any ordinances that are beneficial to development on the Peninsula while designing for future flood conditions; identifying specific partners to provide financial assistance to existing residents who are currently suffering regular impacts from flooding; developing a drainage master plan; and identifying specific areas to be preserved for open space and wave energy dissipating buffers.

- Implement strict code requirements for any new development and redevelopment on the Peninsula to be in compliance with stringent flood design standards, including the requirement to elevate portions of lots containing infrastructure. There has been recent redevelopment on the Peninsula and additional redevelopment and development is anticipated in the future, making this a high priority item. Having cohesive flood design standards that are Peninsula-wide in place is important so that all new development and re-development follow the overall cohesive plan.
- Survey and maintain existing drainage infrastructure, including flushing all pipes and clearing all ditches. Additionally, install tide gates on all outlet pipes. Tide gates allow runoff to flow out of the drainage system into the Brandywine Creek or Christina River during low tide, but closes during high tide to prevent water from the Creek or River to enter the drainage system.
- Following the results of a detailed hydrology study, evaluate whether existing drainage is sufficiently sized to drain the existing and proposed roadway improvements. It is anticipated that this will need to be done in conjunction with design of the stormwater management system.

Short-term action items are items that should begin within 1-2 years and should be completed within 5-years. Short-term action items can be considered the initial building blocks to a more resilient Peninsula. Items that should be considered short-term are as follows:

- Elevate the existing roadway system. Currently the roadway system is the low point on the Peninsula in multiple locations and becomes one of the first areas to become flooded, blocking ingress and egress. Raising the roadway system to the elevations determined in the detailed master plan will ensure that residents have safe access during flooding events and will encourage additional development and redevelopment. Raising the road will require interim drainage improvements to ensure that buildings and lots that are lower than the elevated roadways are not negatively impacted.
- Construct a stormwater retention pond. A stormwater retention pond allows for buffer storage of rainwater during high tide events, when the tide gates on the outlets of the drainage system are closed. At minimum the pond should be sized to hold 12-hours of runoff from the 100-year storm event and drain completely during one tide cycle.
- Design and implement elements of the drainage master plan. Several instances were observed where it appears development has altered or blocked pre-existing drainage conveyances. Restore or replace these conveyances to ensure that all lots drain.

- Bulkhead or elevate and armor the northwest side of the Peninsula where elevations are lowest, and the Brandywine Creek continues to slowly erode the neck of the Peninsula. Armoring a shoreline can include the construction of a sea wall made of metal, rock, or wood to protect the shoreline from erosion particularly during storms.
- Begin obtaining and preserving areas identified for buffers, particularly in locations where development is most expected. Buffers are identified in the concept plan around the perimeter of the Peninsula to protect the Peninsula from erosion. These buffers will provide wave energy dissipation during storm surge events and will provide open spaces that reduce runoff during rain events.

Long-term action items are items that should be accomplished in conjunction with development and maturation of the Peninsula. These items should be considered essential to the long-term resiliency on the Peninsula, but are more dependent on the action and concurrence of individual lot owners. Many of these items may require financial assistance to individual lot owners from either FEMA, the State of Delaware, or the Clean Water State Revolving Fund. The Peninsula is located within the City's Federal Opportunity Zone, which could potentially connect investors to property owners to help fund the needed improvements. Items that should be considered long-term are as follows:

- Elevate existing developed lots and infrastructure. This may occur as lots are re-developed or as individual lot owners perform major upgrades to their existing facilities. It is anticipated that financial assistance will be required for the majority of individual lot owners.
- Implement living shorelines, breakwaters, or other energy attenuating devices to ensure long-term shoreline stability. This may occur on a lot by lot basis or may occur as several publicly funded projects.
- Complete acquisition of preserved areas for buffers.

Transportation Improvements

Various transportation improvements are proposed for the Peninsula to improve connectivity to adjacent neighborhoods and inter-connectivity within the Peninsula.

- Based on community feedback that the Peninsula is isolated and difficult to exit without traveling through the city's gridded system of roadways the intersection of East 4th Street and Swedes Landing Road is proposed to be improved including: two restriped and repaved, eastbound through lanes and a dedicated left turn lane from East 4th Street to Swedes Landing Road; two restriped and repaved, westbound East 4th Street through lanes; restriped and repaved, east and westbound through lanes separated by brick medians; restriped and repaved, dedicated right and left turn lanes from southbound Swedes Landing Road to east and westbound East 4th Street separated by brick medians; and a new traffic signal will be installed at the intersection. The intersection will be improved with turn lanes and a traffic signal to accommodate all turning movements. This proposed improvement will allow truck traffic from various stakeholders such as Light Action and Noramco more direct access to the Interstate system and will assist in preventing truck traffic from inundating the residential neighborhoods.

  Due to the proximity of the intersection of East 4th Street and Swedes Landing Road to the moveable bridge over the Christina River, the proposed traffic signal should be interconnected with the existing drawbridge control. This will enable the traffic signal at the intersection to be designed for preemption by the operation of the drawbridge. The preemption will involve the display of a steady red indication for a special sequence of signal phases to prohibit traffic movements from the intersection towards the moveable bridge when activated. During the special sequence, through traffic on southbound 4th Street and westbound left-turn traffic from Swedes Landing Road will be stopped for the duration of the preempt phase.

- East 7th Street is proposed to be restriped and repaved from North Church Street to the end of the Peninsula. This roadway is also proposed to be raised 3-5' to improve drainage and stormwater management, as described above.

- East 8th Street is proposed to be repaved between North Church Street and the Amtrak Viaduct. The 8th Street tunnel beneath the 8th Street Viaduct will be reopened and refurbished with lighting for bicycle and pedestrian use. East 8th Street on the Peninsula is proposed to be raised 3' to 5' and repaved from just east of Claymont Street (including Claymont Street) for its entire length, including drainage and stormwater management improvements, as previously described. A connection will be sought to extend East 8th Street to Wilmington Industrial Park. This would improve circulation on the Peninsula and serve as a necessary connection to maintain access during the construction of East 7th Street. The connection shown in this Master Plan is located to line up with the entrance of the Kalmar Nyckel and to fit between the solar panel site and Verizon. Locations of these connections are conceptual and will need further investigation during the design phase.

- The current intersection of East 7th Street and Wilmington Industrial Park is proposed to be converted to a compact roundabout to ease driver confusion, while providing an elevated intersection to meet the elevated roadways meeting at this intersection. Roundabouts can provide lasting benefits and value in many ways. They are often safer, more efficient, less costly and more aesthetically appealing than conventional intersection designs. Furthermore, roundabouts are an excellent choice to complement other transportation objectives – including Complete Streets, multimodal networks, and corridor access management – without compromising the ability to keep people and freight moving.

- Streetscape improvements are suggested for all roadways within the Peninsula, as well as, roadways west of the Peninsula to Church Street. Church Street is also suggested to be improved by a streetscape between East 4th and East 8th Streets. Streetscape improvements include pedestrian facility improvements along all roadways. West of the Viaduct where existing sidewalks are very wide, pedestrian improvements would include new concrete sidewalks with decorative brick accents. East of the Viaduct where few-to-no sidewalks exist,

a multi-use path will be added to one side of the roadway to accommodate both bicycles and pedestrians. The side of the road that the multi-use path is constructed will be determined in design. Based on funding, the side of the road that does not have a multi-use path may receive a 5-foot side sidewalk. Pedestrian lighting is also included with all streetscape improvements. Landscaping, signing, striping, and decorative fixtures such as decorative light poles or signal poles are also suggested.

- All improvements throughout the study area will meet ADA Accessibility requirements.

Recreational Amenities and Improvements

In addition to the goals of protecting the East 7th Street Peninsula from future flooding and improving its economic viability, improving the recreational opportunities and connecting the East Side Neighborhood to the Peninsula are additional goals of the study. Recreational amenities suggested as part of this study include a two-mile Riverwalk proposed around the entire perimeter of the Peninsula. The Riverwalk would include pedestrian lighting and rest areas, such as locations for educational kiosks and benches. The location of the Riverwalk on the Master Plan is conceptual. The actual location will be determined in design.

Boat ramps and kayak launch areas are proposed at various locations around the Peninsula.

Wayfinding signs are recommended at strategic locations throughout the East Side Neighborhood and on the Peninsula to facilitate mobility in and around the study area. The Wayfinding signs will also assist in connecting the adjacent neighborhoods to the Peninsula, enabling them to be the gateway into the Peninsula. The Wayfinding signs will assist in directing visitors between Old Swedes Church and the Fort Christina/Kalmar Nyckel Foundation. Outbound Wayfinding signs will direct westbound traffic from East 7th Street to North Buttonwood Street to East 8th Street to get back to Church Street. Historical markers, as well as plaques for locally significant resources, are recommended at appropriate sites and locations throughout the East Side Neighborhood and on the Peninsula. Kiosks and educational centers will be proposed throughout the study area detailing the area's history and to serve as guides providing information about the area's new amenities.

Cost Estimates and Phasing

Cost Estimates were prepared for the proposed solutions for the Peninsula. These cost estimates are based on conceptual sketches using aerial photography and field verification. Topographic survey was not used for the cost estimates. Assumptions and contingencies were made to produce the most accurate cost estimate possible using the information available.

A phased approach is suggested, and cost estimates were developed based on the suggested phasing. The costs and phases are as follows:

Immediate

- Tide Gates and minor drainage/pipe improvements - $2.1 Million
- Clean out existing pipe system and video inspect for issues – No additional cost anticipated as this can be added to the City's annual maintenance program

Short-Term

- Detailed Master Plan for Stormwater Management (Design, and Implement) - $350,000
- Install new tide gates (4) - $100,000
- Install stormwater management pond - $1.65 Million

Long-Term

- Phase 1 – East 7th Street Improvements - $6.4 Million
- Phase 2 – East 4th/ Swedes Landing Road Intersection - $3 Million
- Phase 3 – East 8th Street Improvements - $4 Million
- Phase 4 – Streetscapes - $1 Million per block


EAST 7TH STREET PENINSULA STUDY
PHASING
PHASING LEGEND
PHASE 1 – EARLY ACTION DRAINAGE IMPROVEMENTS
PHASE 2 – 7TH ST./ROUNDABOUT
PHASE 3 – 4TH ST./OLD SWEDES LANDING
PHASE 4 – 8TH STREET IMPROVEMENTS
PHASE 5 – STREETSCAPES
TIDE GATE
TIDE GATE
TIDE GATE
PROPOSED SWM POND
EAST 7TH STREET
INDUSTRIAL STREET
ARMOR SHORELINE
CHRISTINA RIVER
BRANDYWINE CREEK
CHURCH STREET
MARKET STREET BRIDGE

Related Studies

There is a draft report available for the City Department of Public Work's Study**, Resilient *Wilmington: Preparing Today for Tomorrow's Climate Risks.*** The goals of this report include assessing the current and future risks to Wilmington from climate change and to, "develop near-, mid- and long-term recommendations to mitigate and prepare for the effects of climate change". Two of the threats to Wilmington are changing precipitation (more frequent and intense rainfall events) and rising sea levels. The 7th Street Peninsula falls within FEMA's designated 100 and 500 year Floodplain areas, are vulnerable to both 1% and 0.2% annual chance storm events, and fall within the Mean Higher High Water planning scenarios for +3 and +6 feet of inundation. In the draft report, East 7th Street on the Peninsula is noted as being subject to repetitive flooding events.

The draft report stresses adaptation for at-risk areas by updating current Waterfront Development Standards, using zoning as a tool to set strong design standards for areas within the floodplain, and developing greener stormwater management practices. The report advocates for Wilmington's Tide Gate Program, which includes the assessment, repair and replacement of the City's tide gates, and would directly impact the 7th Street Peninsula stormwater management network. The draft report also recommends raising the northern shoreline of the Peninsula along the Brandywine Creek as part of a multi-phase near- and mid-term improvement. As the Resilient Wilmington study concludes and the report is finalized, these measures should be included in the implementation plan for the 7th Street Peninsula study.

***Wilmington 2028 A Comprehensive Plan for Our City and Communities* (*Wilmington 2028*)** is an update of the City's current comprehensive plan, which was completed in 2009. According to *Wilmington 2028*, "The Plan establishes priorities, helps guide decision making, determines how to best spend limited resources, and helps raise money for improvements citywide."

The proposed improvements described in the East 7th Street Peninsula Master Plan are consistent with the vision for the area as outlined in Wilmington 2028. The East 7th Street Peninsula is identified in *Wilmington 2028* as an "Economic Opportunities" area, and future land use is shown as Waterfront Mixed Commercial / Light Manufacturing. As part of its context within the East Side Neighborhood, the East 7th Street Peninsula is described in *Wilmington 2028* as having potential for a "Robust Local Economy" and recommends "…position and promote the 7th Street Peninsula for neighborhood and economic development." Additionally, *Wilmington 2028* recommends "Invest in 7th Street as an important east-west connector in the city that links assets from the 7th Street Peninsula to Bancroft Parkway."

East Side strategies map

Strong Safe Neighborhoods

1. Prevent nuisance properties and stabilize vacant properties.
2. Support community engagement through community-based public safety.
3. Implement an equitable investment strategy for civic spaces like parks, pools, libraries and community centers.

Healthy Thriving Communities

4. Partner with service agencies to transform civic spaces into community hubs that offer cross-programming.

Robust Local Economy

5. Position and promote Front Street Warehouse District and 7th Street Peninsula for neighborhood economic development.

Connected City and Region

6. Create better multimodal connections on 4th, 11th, 12th, and Walnut Streets.
7. Redesign Walnut Street to serve as a bridge between East Side and downtown.
8. Invest in 7th Street as an important east-west connector in the city that links assets from the 7th Street Peninsula to Bancroft Parkway.
9. Limit truck traffic in neighborhoods.

Sustainable and Resilient City

10. Extend the off-street trail along the rivers to connect and provide flood mitigation to neighborhoods north and south of the rivers.
11. Increase green space through yards and vacant lot improvement.

Next Steps

Environmental - All Federally funded projects, as well as those which involve federally regulated resources must adhere to the regulations set forth in the National Environmental Policy Act of 1969 (NEPA). Given these parameters, it is likely that environmental evaluation and documentation will be required before improvements may proceed to design and construction.

There are also numerous historic/potentially historic (Section 106) resources, as well as recreation, wildlife and waterfowl [Section 4(f)] resources located within the study area. Therefore, any impact to, or taking of lands from, any of these resources will require consultation with the Federal Highway Administration (FHWA) to satisfy NEPA and Section 4(f) requirements, State Historic Preservation Office (SHPO) for Section 106; Delaware Department of Natural Resources (DNREC); and the US Army Corps of Engineers.

Based on the recommended improvements, significant impacts to protected resources are not anticipated. Therefore, it is reasonable to assume that this project may be cleared through a Categorical Exclusion Evaluation. Similarly, effects to Section 106 resources are expected to be minor (No Effect and/or No Adverse Effect) and may be approved through a Memorandum of Agreement (MOA). Lastly, it is reasonable to assume that a Section 4(f) *de minimis* finding by FHWA is likely.

Full analyses of all study area resources are required, however if the assumptions above are accurate it may be reasonably assumed the environmental clearance process will last approximately 12-16 months per phase of improvements.

Assumptions and Limiting Conditions

The preparation of this feasibility study assumes that all services and work products will conform to current DelDOT Standards, Policies, and Procedures.

Concept Plan

The East 7th Street Master Plan can be found on the following page.


EAST 7TH STREET PENINSULA STUDY
PHASING
CENTURY
LEGEND
PROPOSED SIGNAL, INTERSECTION, IMPROVEMENTS
PROPOSED ROADWAY IMPROVEMENTS
PROPOSED MULTI-USE PATH
PROPOSED RIVERWALK WITH REST AREAS
PROPOSED LIGHTING
ARMOR SHORELINE
SHORE PROTECTION
PROTECTED OPEN SPACE
OPEN SPACE AREAS
DEVELOPABLE LAND
FUTURE HOME OF THE CHALLENGE PROGRAM
PROPOSED SWM POND
EDUCATION CENTER
COMMERCIAL BUILDINGS
KAYAK LAUNCH AREA
BOAT RAMP /DOCK
PHASING LEGEND
PHASE 1 - EARLY ACTION DRAINAGE IMPROVEMENTS
PHASE 2 - 7TH ST ROUNDABOUT
PHASE 3 - 4TH ST FOOD SWINGS LANDING
PHASE 4 - 6TH ST IMPROVEMENTS
PHASE 5 - STREETSCAPES
Scale: 1" = 80'
(40'x60')
May 2019
TIDE GATE
ARMOR SHORELINE
EAST 7TH STREET
CHRISTINA RIVER
PROPOSED SWM POND
LIGHT ACTION
HOUSTON STREET
BRANDYWINE CREEK

Community from Church Street to East 7th Street Peninsula, including East 4th Street to 7th Street

Entrance to the East 7th Street Peninsula, including East 8th Street Viaduct

Kalmar Nyckel Foundation and Fort Christina State Park

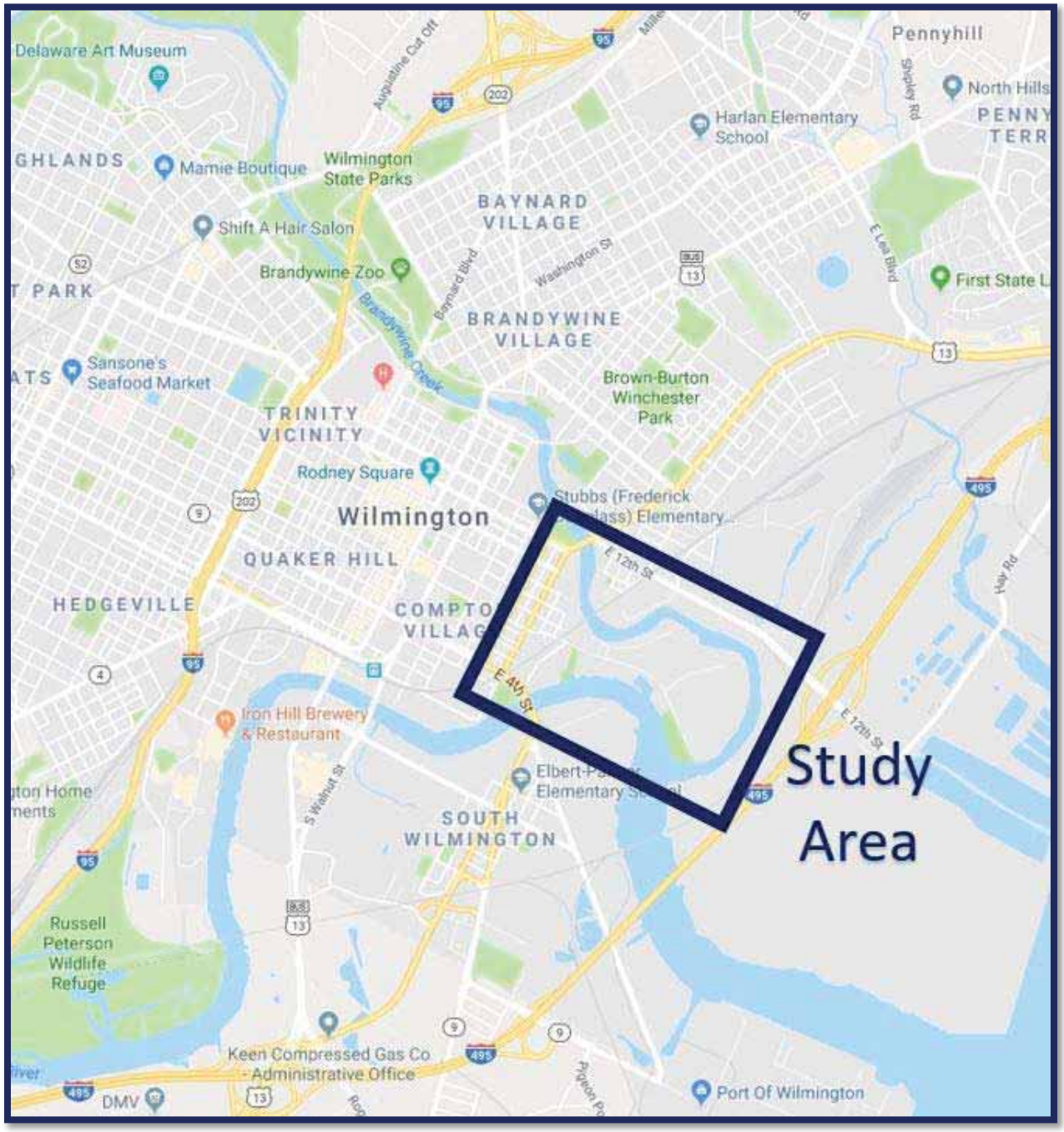
Looking East along the East 7th Street Peninsula

Looking West along East 7th Street

Looking West toward Wilmington Industrial Park from Across Brandywine Creek

Skate Park on Eastern end of East 7th Street

Location Map



Executive Summary

To protect the development potential of the East 7th Street Peninsula, WILMAPCO, in conjunction with Wilmington Initiatives, the City of Wilmington and DelDOT have identified several issues of concern that need to be remedied to secure the Peninsula's future. These current issues include flooding, both tidal and stormwater, accessibility, traffic circulation, lack of pedestrian/bicycle/multi-modal facilities, recreational uses, and current land uses. In an effort to examine the current issues and determine resolutions, the City submitted a request to WILMAPCO for a Unified Planning Work Program (UPWP) Study for a Roadway Improvements and Development Analysis for the Peninsula to address these topics to protect current businesses and future growth potential.

The 115-acre East 7th Street Peninsula is located at the confluence of the Christina River and Brandywine Creek, east of the Amtrak Viaduct. The study area also includes an area southwest of the Peninsula along Swedes Landing Road to East 4th Street and the area west of the Viaduct to Church Street between East 4th Street and East 8th Street in the East Side neighborhood section of the City.

There are several community resources located within the study area including: the Henderson Museum and Holy Trinity Church, also known as Old Swedes Church, which dates to the late 1600s; Fort Christina National Park; the Kalmar Nyckel Shipyard and Museum; and Babiarz Park, which includes the East 7th Street Skate Spot, a City approved "do-it-yourself" skate park.

Given its location, limited access to and from the Peninsula is an issue. Additionally, flooding is a primary concern. Both of these issues have limited growth potential at the Peninsula and have the potential to limit future investment unless they are adequately addressed. These key issues, along with preserving and protecting cultural resources, enhancing and preserving the adjacent stakeholder community, and protecting the future growth potential of the East 7th Street Peninsula are the guiding forces driving this study. It is therefore essential that improvements to address stormwater and flooding, land use and the transportation network are fully evaluated and recommendations for improvements are identified. Due to its low elevation, the Peninsula falls within the 100- and 500-year floodplains and will be impacted by future sea-level rise and other climate-change issues.

Potential solutions suggested in this study vary in cost from low-to-high, short-term to long-term implementation, and those that can be implemented by public agencies or private property owners. Some solutions may be eligible for special funding or grants.

Flooding and stormwater management options include priority action items that can begin immediately in order to maintain or provide safe access, protect property, and serve as catalysts to future improvements.

Short-term action items are items that should begin within 1-2 years and should be completed within 5-years. Short-term action items can be considered the initial building blocks to a more resilient Peninsula.

Long-term action items are items that should be accomplished in conjunction with development and maturation of the Peninsula. These items should be considered essential to the long-term resiliency on the Peninsula but are more dependent on the action and concurrence of individual lot owners. Many of these items may require financial assistance to individual lot owners from either FEMA, the State of Delaware, or the Clean Water State Revolving Fund.

Various transportation improvements are proposed for the Peninsula to improve connectivity to adjacent neighborhoods, as well as, inter-connectivity within the Peninsula. These improvements include network improvements, intersection improvements, pedestrian and bicycle accommodations, streetscapes, and pedestrian lighting.

Cost Estimates were prepared for the proposed solutions for the Peninsula and include the following:

Immediate

- Tide Gates and minor drainage/pipe improvements - $2.1 Million
- Clean out existing pipe system and video inspect for issues – No additional cost anticipated as this can be added to the City's annual maintenance program

Short-Term

- Detailed Master Plan for Stormwater Management (Design, and Implement) - $350,000
- Install new tide gates (4) - $100,000
- Install stormwater management pond - $1.65 Million

Long-Term

- Phase 1 – East 7th Street Improvements - $6.4 Million
- Phase 2 – East 4th/ Swedes Landing Road Intersection - $3 Million
- Phase 3 – East 8th Street Improvements - $4 Million
- Phase 4 – Streetscapes - $1 Million per block

Project Need

WILMAPCO, in coordination with Wilmington Initiatives, the City of Wilmington and DelDOT, identified the East 7th Street Peninsula in Wilmington, DE as an area of the City in need of improvements to protect the development potential of the Peninsula. The City submitted a request to WILMAPCO for a Unified Planning Work Program (UPWP) study for a Roadway Improvements and Development Program for the Peninsula to address concerns to protect current businesses and future development.

The purpose of this study is to analyze the current conditions on the Peninsula related to roadway deficiencies, access issues, and flooding concerns to determine the feasibility and effectiveness of recommended improvements to enhance development potential for this part of Wilmington. WILMAPCO and their partners determined that concerns at the Peninsula include: flooding, both tidal and stormwater, accessibility, traffic circulation, lack of pedestrian/bicycle/multimodal facilities, recreational uses, and current land uses. The project need is consistent with the vision for the area as described in *Wilmington 2028 A Comprehensive Plan for Our City and* Communities (*Wilmington 2028). Wilmington 2028* has identified the East 7th Street Peninsula as an "Economic Opportunities" area, and identifies the Peninsula as having the potential for a "Robust Local Economy." Further, *Wilmington 2028* identifies 7th Street as an important east-west connector in the City and encourages "…investment in 7th Street."

In addition to WILMAPCO and their partners, extensive coordination with project stakeholders, as well as the community at large, occurred throughout the course of this study. Coordination with several key agencies was also initiated including, the Department of Natural Resources and Environmental Control (DNREC), Delaware Area Rapid Transit (DART), and the Federal Highway Administration (FHWA). The Meeting Summaries section of this report provides a description and details on much of this coordination.

Project Description and Purpose

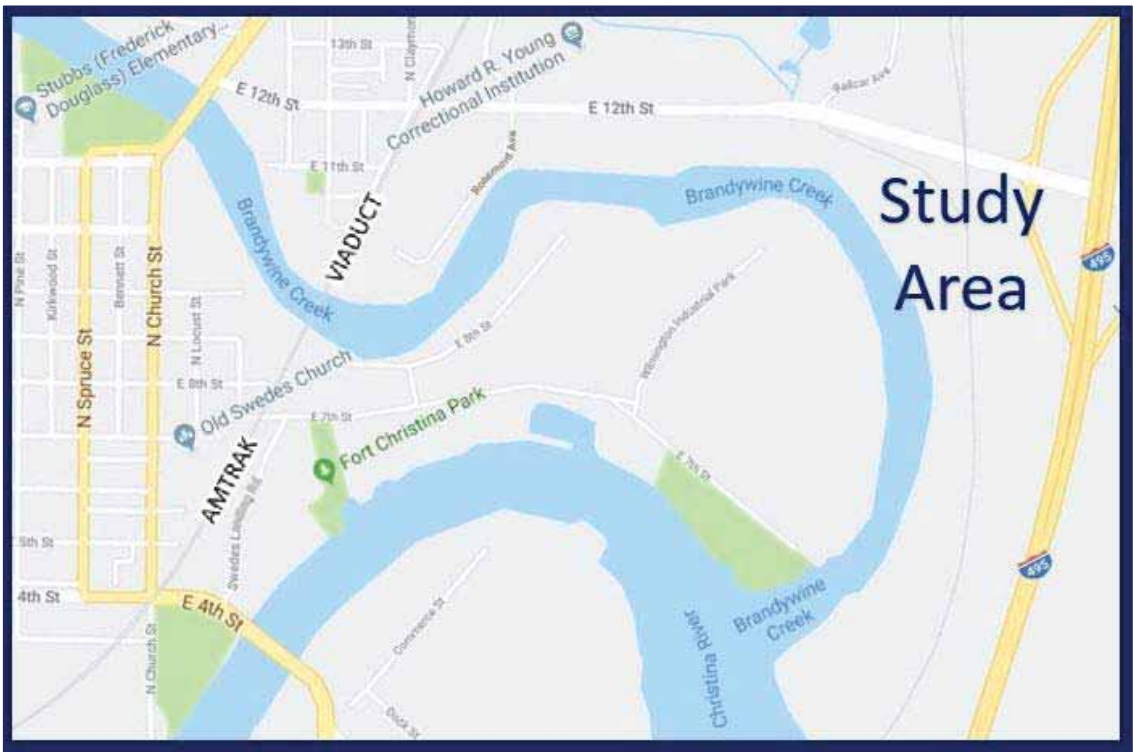
The primary purpose of this study is to examine initiatives to preserve and protect cultural resources, enhance and preserve the adjacent stakeholder community, and protect the future growth potential of the East 7th Street Peninsula. This will be accomplished through the recommendation of a series of modifications to stormwater management, land-use, and transportation network operations while mitigating flood impacts, enhancing recreational amenities and preserving the culturally and historically significant landmarks on the Peninsula.

The study began with a data gathering phase. Data was gathered from a variety of sources including desktop reviews of environmental and hydrologic data. Unmanned Aerial Photography (UAS) was used to document the Peninsula and gather existing photography. Field visits were used to explore the Peninsula on ground level as well. A Visioning Workshop, open to the public, was held to gather information and determine issues or concerns of the local community. Attendance at Wilmington Initiatives Meetings, as well as, East 7th Street Coalition Meetings also helped gather and report data.

The existing data was analyzed, and alternatives were formalized into a Peninsula-wide Master Plan to determine potential recommendations to the concerns and issues of the Peninsula Stakeholders. These solutions were presented to the community in a second public workshop for feedback and discussion. Comments and feedback from this public workshop were incorporated into the Master Plan. The Master Plan elements were prioritized into various phases based on observed needs, with input from the community from the three public workshops. Conceptual cost estimates were prepared for each phase. The Revised Master Plan with conceptual estimates and a suggested prioritization were presented to the stakeholders at a third public workshop. Workshop summaries can be found in Appendix C.

The Master Plan was presented to the stakeholders using a series of Concept Plans, renderings, and displays to explain the topics or concerns regarding the Peninsula and their suggested solutions. The Concept Plan addresses the concerns related to flooding, environmental issues, land use and zoning, recreational amenities, the transportation network, and accessibility.

This Master Plan was developed as a Planning and Environmental Linkages (PEL) study. PEL studies are a collaborative and integrated approach to transportation decision-making that consider environmental, community and economic issues early in the planning process. This information and analyses can then be utilized to inform the National Environmental Policy Act (NEPA) review process. PEL studies are an FHWA initiative used to help make better-informed project-level decisions and to shorten project delivery time, and they follow provisions set forth in 23 U.S.C. 168(b)(1)(A) and associated regulations under 23 CFR 450.212(d) and 450.313(e). A PEL checklist is included in Appendix A.



Study Area Map

Existing Conditions

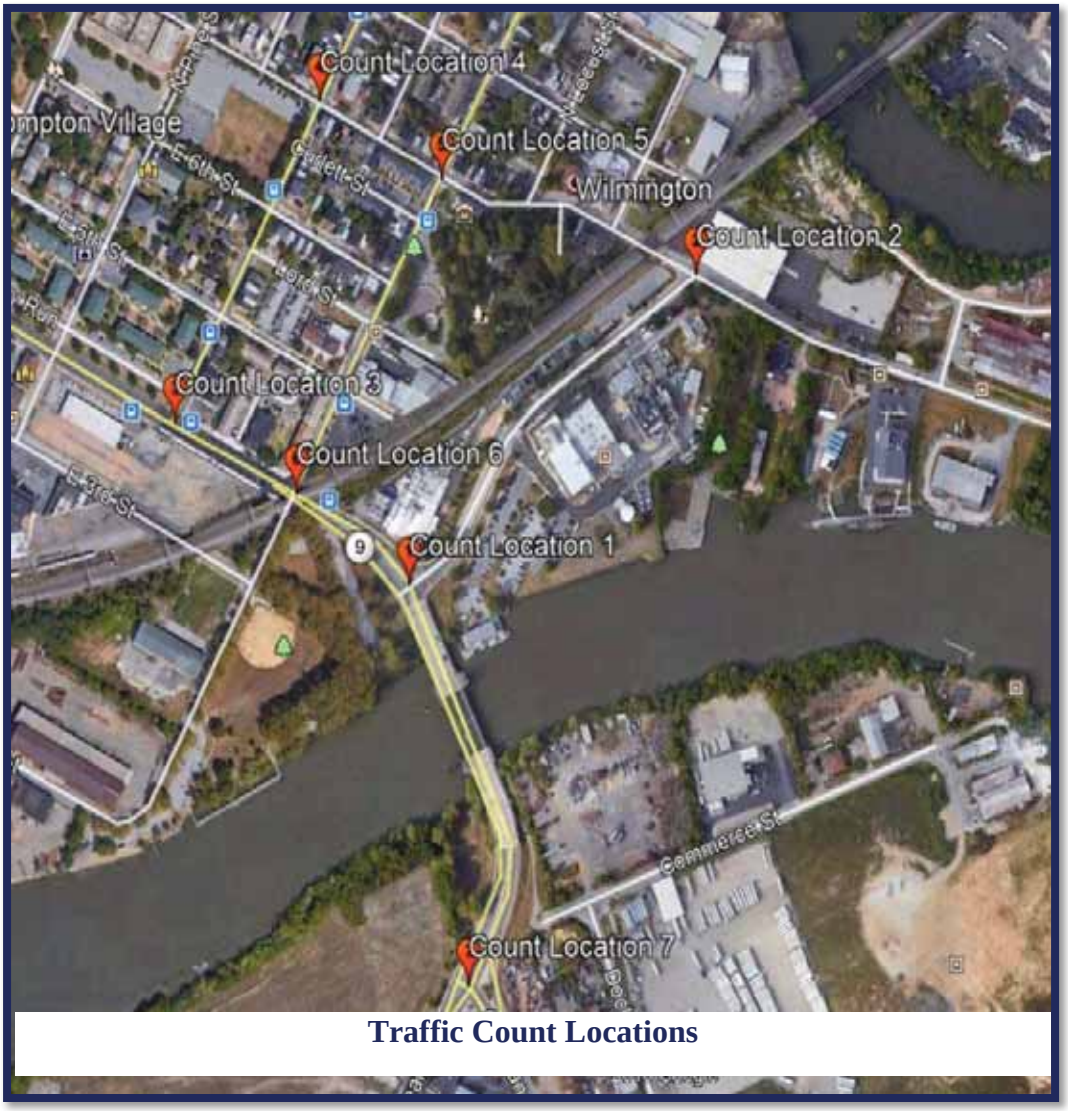
Located at the confluence of the Christina River and Brandywine Creek, the Peninsula encompasses approximately 115 acres west of the Amtrak Viaduct. The WILMAPCO East 7th Street Peninsula Study also includes the area south of the Peninsula along Swedes Landing Road to 4th Street and the area west of the Viaduct to Church Street between 4th Street and 8th Street.

Traffic Analysis

The East 7th Street Peninsula is somewhat isolated. The Amtrak Viaduct on the west side of the Peninsula limits accessibility to the Peninsula from the East Side Neighborhood. Currently only two roadways, East 7th Street and Swedes Landing Road, from the 4th Street corridor, provide access to the Peninsula. East 7th Street between the AMTRAK Viaduct and N. Buttonwood Street is two lanes with one lane in each direction. At N. Buttonwood Street vehicles traveling westbound, out of the Peninsula itself, are required to turn right onto N. Buttonwood Street as East 7th Street becomes an eastbound one-way street allowing travel toward the Peninsula only. N. Buttonwood Street and the adjacent roads are laid out in a grid typical of many urban transportation networks. Turning radii are typically not suited for large trucks, and the land use is mostly residential.

Traffic counts were performed at seven (7) intersections, which included:

- Swedes Landing Road and East 4th Street
- S Heald Street and Christiana Avenue
- E 4th Street and N Church Street
- E 4th Street and Spruce Street
- E 7th Street and Spruce Street
- E 7th Street and N Church Street
- E 7th Street and Swedes Landing Road



Traffic Count Locations

The operational analysis was completed utilizing Synchro to model a "multiple intersection network" including the following intersections:

- DE 9 / E 4th Street at Swedes Landing Road
- Swedes Landing Road at E 7th Street
- DE 9 / E 4th Street at Christiana Avenue (Signal Permit N691T)
- DE 9 / E 4th Street at US 13 / N Church Street (Signal Permit N690T)
- DE 9 / E 4th Street at N Spruce Street (Signal Permit N689T)
- N Spruce Street at E 7th Street

The operational analysis was reported with HCM 6th Edition methodologies to obtain Level of Service (LOS), delay, and queuing. The intersections of E 4th Street at Swedes Landing Road and E 4th Street and Christiana Avenue were reported with HCM 2010 edition methodologies due to combined lane movements. The difference between the HCM 6th edition and the HCM 2010

edition are not significant. The input values for the 2018 existing conditions included utilizing turning movement count data collected on Thursday, May 31st, 2018 by The Traffic Group and provided by WILMAPCO. For the signalized intersection standard signal timing cycle lengths with signal timing optimization was utilized for the preliminary operational analyses.

The focus of the preliminary traffic analysis was the intersection of E 4th Street at Swedes Landing Road, as this is the only intersection within the modeled network for which the intersection control and the movements at the intersection were altered in the proposed scenario. With that noted, the other five (5) intersections within the model network operated at an acceptable LOS C or better for both the AM and PM peak hour periods, including the addition of the modifications being made to the intersection of E 4th Street and Swedes Landing Road. The results determined a majority of approaches would operate with an LOS A or LOS B. The one exception to this was the intersection of E 4th Street and Spruce Street for the AM Peak Period for the scenario that included the signalization of E 4th Street and Swedes Landing Road, for which the southbound N Spruce Street approach was reflected to operate at a LOS D. This should be confirmed using the actual City of Wilmington Synchro timing, in a later design phase.

At the intersection of E 4th Street at Swedes Landing Road, it was determined that for the AM and PM peak hour conditions with the restriction of left-turns from Swedes Landing Road and the approach operating under stop-control conditions, the approach is reflected to operate at a LOS B and a low delay of 11.7s for the AM peak hour and a LOS B with a low delay of 10.4s for the PM peak hour. When the intersection operations were analyzed with allowing the left-turn movement from Swedes Landing Road, the approach LOS remained a LOS B for both the AM and PM peak hours with the delay increasing slightly to 14.0s and 11.2s respectively. In additional to the Swedes Landing approach, the E 4th Street southbound left-turn movement was reflected to operate with an LOS A and a delay of 9.9s during the AM peak hour and 8.6s during the PM peak, for both stop-control condition scenarios (i.e. with and without the Swedes Landing left-turn movement restricted).

When completing the operational analyses for the signal control condition at the intersection of E 4th Street and Swedes Landing Road, there is a decline in LOS and increase in delay. This is intuitive for the E 4th Street approaches as they were previously free movements. Although, the Swedes Landing Road approach LOS declines to a LOS C for both the AM and PM peak hours with a delay of 22.5s and 26.3s respectively. Furthermore, the E 4th Street left-turn movement is also reflected to operate a lower LOS D during the AM and the PM peak hours with a higher delay of 38.8s and 36.4s respectively. As for the overall intersection, under the stop-controlled condition the intersection delay was reflected to be under 1.0s for both peak hours and both scenarios (LOS A), while the intersection delay under signal control is 19.5s and 11.4s for the AM and PM peak hours (LOS B).

Field observations were completed on the existing roadway network within the study area. Swedes Landing Road is a two-lane road in fair to good condition with sidewalks on both sides. There is a traffic light at a gated entrance to Noramco with pedestrian crosswalks. The traffic light was at one time in operation and began having operational issues. Noramco coordinated with the City of Wilmington, who put the traffic signal on flashing. Currently, the traffic signal is not in operation. Staff members of Noramco use this crossing to reach the other side of the Noramco plant. Traffic calming is something Noramco would like to see addressed at this intersection.

On the Peninsula east of the AMTRAK Viaduct, there is a limited roadway network. There are three main roads on the Peninsula; East 7th Street, Wilmington Industrial Park, and East 8th Street. Each roadway on the Peninsula is a two-lane road with approximately 12' wide lanes and no shoulders. The pavement on all three roadways is in fair to poor condition. East 7th Street has a double yellow stripe down the centerline that is worn and faded. East 8th Street and Wilmington Industrial Park do not have pavement markings. There are no pedestrian or bicycle accommodations on the three roadways, except for a sidewalk along the south side of East 7th Street from Swedes Landing Road to the Kalmar Nyckel property. East 7th Street services the length of the Peninsula. Wilmington Industrial Park services the northeast limits of the Peninsula. East 8th Street services the northern portion of the Peninsula, but only connects to East 7th Street on the western end of the Peninsula via Claymont Street. East 8th Street ends at the eastern limit of the Peninsula with no connection to the other roadways. There are signs of flooding throughout the roadways. Ponding is very common and water marks left behind from ponding water are also very common throughout the Peninsula.

Internal Roadway Network

As property owners have modified or developed their parcels throughout the Peninsula those properties have been raised to avoid flooding. Overall this has left the roadways much lower in elevation than the surrounding ground, causing flooding and ponding of water.

The intersection of East 7th Street and Wilmington Industrial Park is the lowest point on the Peninsula. Water ponding is often visible at this intersection. The intersection is a multi-legged intersection with a center grass median that causes driver confusion. The streets join together in

a configuration that forms an "A." In addition, there is an entrance to a private property at this intersection.

The intersection of Swedes Landing Road and East 4th Street is an unsignalized intersection that allows all vehicular movements except left turns from Swedes Landing Road onto East 4th Street. These left turns would provide a direct route to access Interstate 495, allowing vehicles to leave the Peninsula without traveling through the City grid transportation network.

Flooding Concerns

In addition to limited accessibility, flooding is an issue on the Peninsula. Flooding occurs in many situations such as after significant weather events or during high tide in any weather condition. Community members have observed that water has risen over the Peninsula perimeter in the area of the Kalmar Nyckel. The community noted that there are a few days every year when post weather event flooding prevent them from reaching their destination on the Peninsula. During these events flooding is measured from 12-inches of standing water and higher. Standing water is often observed along the edges of the roadway on the Peninsula even during dry periods not following weather events, as a result of tidal events. Limited access and flooding limit the East 7th Street Peninsula from reaching its full potential. Improvements to the stormwater management system and roadway network to, from and within the Peninsula, including accessibility, circulation and multimodal connectivity are being evaluated in this study. **Appendix B** provides a detailed description of the environmental concerns related to flooding, on the East 7th Street Peninsula, as well as, proposed infrastructure improvements, recommendations, and immediate, short-term and long-term action items.

Photo of the submerged intersection of East 7th Street and Industrial Avenue

The area in dark blue in **Figure 1** is the area of the Peninsula that experiences the heaviest flooding on a continual basis. This map is consistent with the information gathered at the Visioning Workshop.

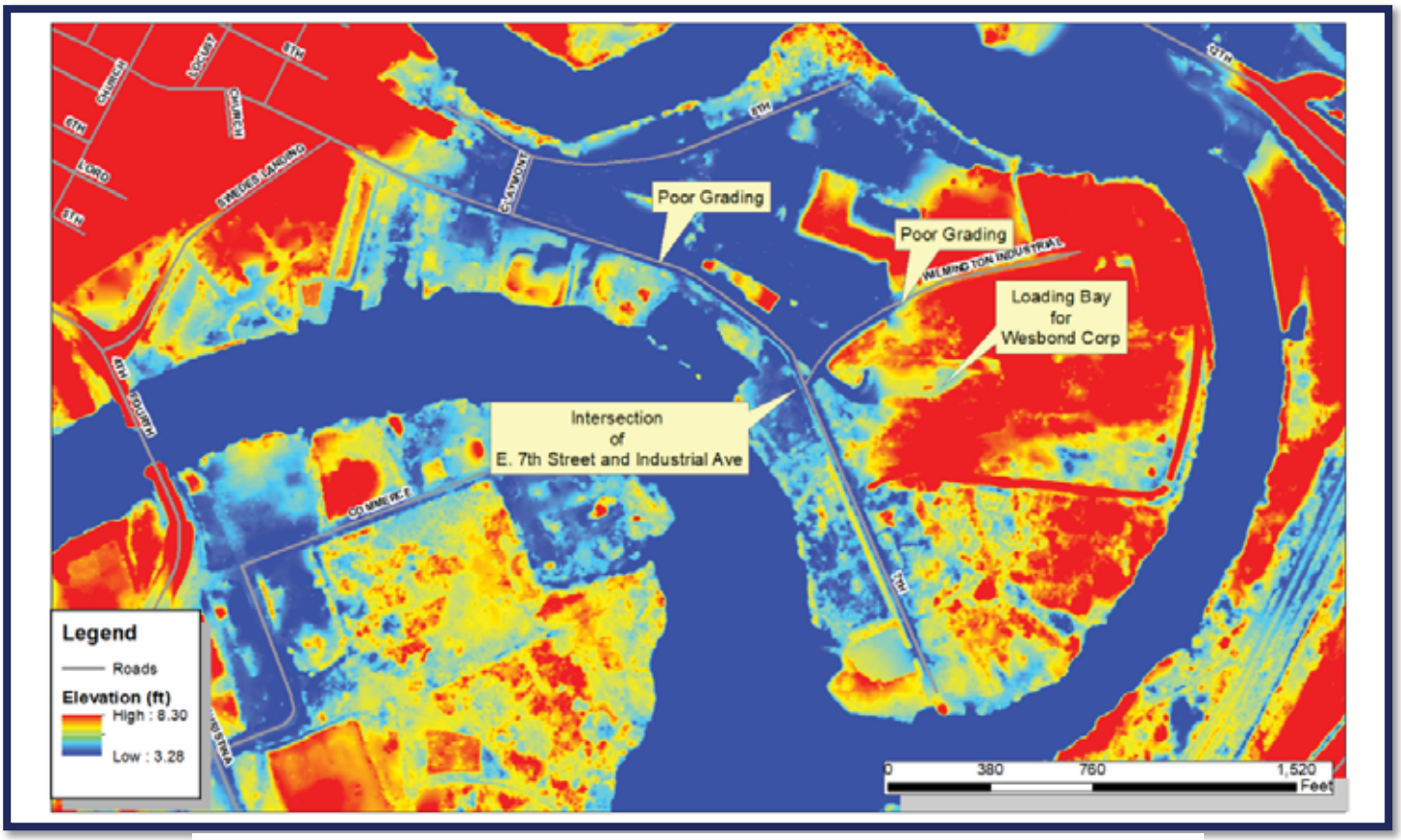


Figure 1: East 7th Street Peninsula Flooding Areas

Figure 2: East 7th Street Peninsula Zoning Map

Land Uses

Zoning separates land uses into permissible zones that are regulated for uniformity. Current zoning, shown on **Figure 2** on the East 7th Street Peninsula is comprised of the following codes: W-2 Commercial /Manufacturing; W-3 Low Intensity Manufacturing/ Commercial Recreation; W-4 Residential Commercial; and O Open Space (Fort Christina National Park and Mayor John E. Babiarz Park).

Currently DART does not provide service to the Peninsula, however DART Route 9 provides service across Brandywine Creek on 12th Street, DART Route 15 passes by the Peninsula on 4th Street, and DART Route 8 passes by the Peninsula on 4th Street and Church Street between 4th and 8th Streets. As development of the East 7th Street Peninsula grows and the demand for transit service increases, the potential for transit service on the Peninsula will be reevaluated. Any proposed transit service to, from and/or on the East 7th Street Peninsula will be closely coordinated with DART.

The East Side Neighborhood of Wilmington forms the western boarder of the study area. Originally a Swedish settlement, the East Side Neighborhood has evolved through the many years of its history. Today, the area is experiencing redevelopment and includes residences, restaurants and other amenities.

The study area also includes the Henderson Museum and Holy Trinity Church, also known as Old Swedes Church. Located at East 7th Street and North Church Street, the Church is a designated National Historical Landmark and dates back to the late 1600s. Old Swedes Church is considered one of the few remaining examples of Swedish Colonial architecture in the area.

Located along East 7th Street, just east of Swedes Landing Road, and bordered by the Christina River to the south, Fort Christina was the site of the first Swedish settlements in North America. Built in 1638 and named after Queen Christina of Sweden, today the site is the location of Fort Christina National Park. Old Swedes Church and Fort Christina are included in the First State National Historical Park, which is comprised of seven sites across the State and is Delaware's only National Park.

The East 7th Street Peninsula was the landing spot for the Kalmar Nyckel ship which brought the first Swedish settlers to the area. The Peninsula celebrates this history with the Kalmar Nyckel Shipyard and Museum which maintains a replica of the ship on-site, as well as many other historical artifacts, and documents Swedish settlement and history of the area.

Skate Park Babiarz Park

Recreational amenities on the Peninsula include a skate park located at the eastern end of the Peninsula within Babiarz Park. Known as the 7th Street Skate Spot, it is a City approved, "do-it-yourself" skate park built and run by the Wilmington Skate Project,

Kinetic Skateboarding and local skaters. The skate park is very popular with local skaters. The skating community maintains the skate park themselves, as well.

Trees on the peninsula are a mix of native and non-native species that likely grew after the closure of the Wilmington Landfill. Several mature stands of trees exist along the southern edge of the peninsula. Currently these trees appear in good health but may show signs of stress in the future due to impacts from Sea Level Rise, erosion, and increasing salinity levels.

Figure 3 - Potential Wetlands

Potential wetlands can be found along the entire perimeter of the Peninsula, as well as, in some of the forested areas as shown in **Figure 3**. Future improvements to the Peninsula will require more in-depth wetland studies and potential mitigation measures. Coordination with the Army Corps of Engineers (ACOE) and DNREC will occur throughout the wetland identification, impacts and if necessary, mitigation efforts.

Hazardous materials/waste analyses are not within the scope of this study. As private development occurs on the Peninsula it will be incumbent on the individual property owners to have their properties cleared and/or undertake necessary mitigation efforts. Road improvements that proceed to future phases will also require hazardous materials/waste analyses with potential mitigation. These analyses are typically conducted by DelDOT for state highway projects, as well as, other improvements conducted on state owned lands. For City funded projects, the analyses and mitigations would fall under the purview of the City.

During public workshops, trash and debris on the Peninsula were concerns of the stakeholders. Trash and debris were observed during site visits, mostly in areas that were not immediately adjacent to occupied buildings. Some trash and debris could be traced back to the following sources:

- Open dumpsters in close vicinity
- Users who park on the peninsula during lunch break and throw trash out of their window
- Blown litter from trash receptacles and from sources beyond the peninsula
- Construction/demolition debris associated with specific sites

Meeting Summaries

This study was conducted with the Wilmington Initiatives Partners (City of Wilmington Departments of Planning, Public Works, Economic Development and the Mayor's Office) acting as the management committee, assisting in decision-making and administrative issues. Active

participation from area stakeholders was encouraged, and the project team met with the East 7th Street Peninsula Coalition several times over the course of the study. This group is made up of state and local institutions, agencies and groups related to Old Swedes Church, Fort Christina and the Kalmar Nyckel Foundation with a focus on promoting the Peninsula as a cultural and recreational area, and creating better connections with the Eastside neighborhood and City residents. The project team also met with businesses and property owners on the peninsula to ensure that we were hearing from all local stakeholders, and these groups and local residents were invited to three public workshops to ensure inclusion through our public outreach process. A more detailed description of the public outreach process can be found in Appendix C.

On **May 16, 2018** Century presented the project team and our approach to the study to Wilmington Initiatives. Materials for discussion at the June 20, 2018 public workshop held by Wilmington Initiatives and the June 26, 2018 public "visioning" workshop were discussed for approval.

On **June 20, 2018** Wilmington Initiatives held a city-wide consortium on current and future projects. Century attended to present the East 7th Street Peninsula study and to gather feedback and data from the community in attendance. Feedback was generalized and included relief that Peninsula improvements were gaining traction in the City.

On **June 26, 2018** WILMAPCO in conjunction with the project partners held the first public workshop. There were 49 people in attendance. Following the presentation, participants were invited and encouraged to attend a roundtable discussion on a variety of topics which included: Flooding, Environmental Constraints/Cultural Resources, Future of the Peninsula in the No-Build Scenario, Land Use/Zoning, Recreational Amenities, and Transportation Network. Participants were given 10 minutes to discuss each topic and then report back to the group their thoughts on each topic. Maps were used to gather feedback and collect data. Information such as issues and challenges relating to flooding, environmental concerns, preservation, protection, growth, amenities, recreation, education, and transportation network improvements were discussed with the local community to gather first-hand information and knowledge.

On **August 15, 2018** Century presented a summary of the workshop materials, including feedback from the June 2018 public workshop to the Wilmington Initiatives Partners.

On **September 19, 2018** Century presented a summary of workshop feedback from the June 26, 2018 public workshop to the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center.

On **September 20, 2018** Century presented the results of the study analysis and possible solutions to Wilmington Initiatives.

On **October 2, 2018** a meeting was held with Mayor Purzycki, Herb Inden (Director of Planning and Development), Brian Mitchell (Director of Transportation – Public Works), Tanya

Washington (Chief of Staff at Mayor's Office at City of Wilmington), and representatives from Century Engineering. Topics that were covered include the future of the Peninsula and difficulties for the city to purchase properties for repair. One of the constraints in the improvement of the peninsula is requirements for deep piles. It was suggested by City representatives in the meeting that the number one priority should be raising the roads and improving the drainage.

At one time Noramco, a pharmaceutical company on the Peninsula, suggested closing Swedes Landing Road between East 7th and East 4th Street to expand their business. That suggestion has been abandoned as there was not enough property to expand as needed.

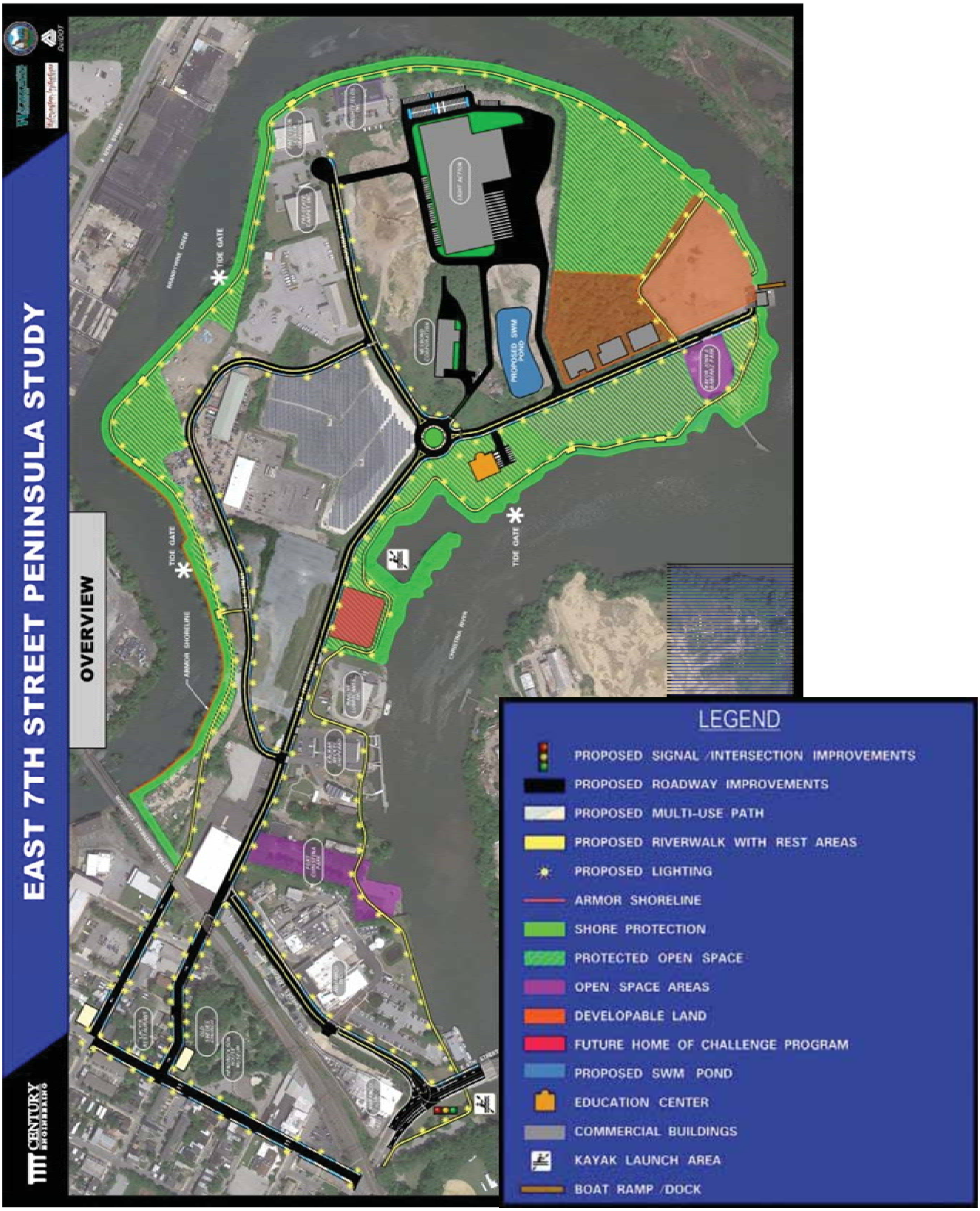
On **July 11, 2018** a meeting was held with the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center. Topics included finding ways to enhance visitor's experiences when visiting the Peninsula. It was announced at the meeting that potentially William Penn Foundation has money for a grant and would like to be a sponsor of improvements on Peninsula.

Senator Harris McDowell III proposed for the Peninsula to be a tourist attraction and suggested there should be a second smaller ship along with the Kalmar Nyckel. This would enable the Peninsula to still have a ship docked when the Kalmar Nyckel is sailing off-site. There may be $150,000 secured in the near future for the second ship as well as a potential visitor center located near the Riverfront.

On **February 6th, 2019** the Wilmington Initiatives partners, including City of Wilmington, DelDOT and WILMAPCO, presented the draft Master Plan for the East 7th Street Peninsula to the public at the Kalmar Nyckel Copeland Maritime Center. The Master Plan addressed flooding, business access, resiliency, transportation, preservation of cultural resources, wayfinding signs, recreation and education opportunities, including a 50 foot waterfront buffer around the Peninsula to protect the shoreline. Proposed improvements include improved tide gates, shore protection and Riverwalk with rest areas. Some of the proposed transportation network improvement included a four-way signal on 4th Street, elevated roadways, open 8th Street Viaduct Connection to East Side Community, connectivity between 8th Street and Wilmington Industrial Park, and pedestrian lighting along all roadways.

On **May 15, 2019** Public Workshop information was presented to the East 7th Street Coalition at the Kalmar Nyckel Copeland Maritime Center. The stakeholders were briefed on a summary of the information that would be available at the Public Workshop being held on May 15, 2019. The Final Master Plan was presented as well as suggested phasing and costs.

Proposed Concept: Figure 9: East 7th Street Master Plan



Proposed Improvements

In addition to the more obvious concerns of flooding, both tidal and stormwater, accessibility, and traffic circulation, the lack of pedestrian/bicycle/multimodal facilities, recreational uses, and retail/restaurant land uses were identified as significant concerns by the project stakeholders and nearby residents. A range of improvement options were developed, discussed and evaluated to address these needs. These options were vetted through an extensive public and community participation process, and consensus was reached on the most supported options. The consensus balanced the needs, desires and requirements of the various stakeholders including those concerned with: preserving environmental and cultural resources; enhancing recreational amenities; maximizing the Peninsula for future development; alleviating flooding; improving access to, and circulation through the Peninsula, including multimodal improvements; and stabilizing the Peninsula, thereby allowing it to remain flexible for yet to be determined future uses.

An alternative was vetted to provide additional access to the Peninsula via a bridge from 12th Street across Brandywine Creek to the Peninsula; however, use and need on the Peninsula did not justify the cost at this time. This option may be reevaluated at a future time if additional growth on the Peninsula necessitates this connection.

The following descriptions explain the options considered in this study:

Potential recommendations suggested in this study vary in cost from low-to-high, short-term to long-term implementation, and the solutions are separated between those that can be implemented by public agencies or private property owners. Some solutions may be eligible for special funding or grants.

Flooding and Stormwater Management Improvements

To address the flooding and stormwater management issues of the Peninsula, various solutions are suggested. The suggestions are separated between immediate, short-term, and long-term action items. (See **Appendix B**) Wilmington Public Works has commissioned a Resilient Wilmington Study to prepare the City for Climate Risks. When that study report is final and adopted by City government, elements that apply to the East 7th Street Peninsula should be included in the implementation plan.

Priority action items are suggested to begin immediately in order to maintain or provide safe access, protect property, and serve as catalysts to future improvements. Many immediate action items provide a quick return in observed benefits. These immediate action items include:

- Develop a detailed resiliency implementation plan for the future of the Peninsula. The detailed implementation plan should be an extension of the initial study and should be indexed to development phases on the Peninsula, allowing the City to determine the appropriate time to execute the elements of the plan. Indexing the plan to development activities potentially allows the City to request contribution from developers that trigger

elements of the resiliency implementation plan. The resiliency implementation plan should focus on items such as: determining the ideal building lot elevation for each lot on the Peninsula; determining ideal roadway elevations; determining whether current flood design standards are sufficient for development on the Peninsula; identifying and preparing any ordinances that are beneficial to development on the Peninsula while designing for future flood conditions; identifying specific partners to provide financial assistance to existing residents who are currently suffering regular impacts from flooding; developing a drainage master plan; and identifying specific areas to be preserved for open space and wave energy dissipating buffers.

- Implement strict code requirements for any new development and redevelopment on the Peninsula to be in compliance with stringent flood design standards, including the requirement to elevate portions of lots containing infrastructure. There has been recent redevelopment on the Peninsula and additional redevelopment and development is anticipated in the future, making this a high priority item. Having cohesive flood design standards that are Peninsula-wide in place is important so that all new development and re-development follow the overall cohesive plan.
- Survey and maintain existing drainage infrastructure, including flushing all pipes and clearing all ditches. Additionally, install tide gates on all outlet pipes. Tide gates allow runoff to flow out of the drainage system into the Brandywine Creek or Christina River during low tide, but closes during high tide to prevent water from the Creek or River to enter the drainage system.
- Following the results of a detailed hydrology study, evaluate whether existing drainage is sufficiently sized to drain the existing and proposed roadway improvements. It is anticipated that this will need to be done in conjunction with design of the stormwater management system.

Short-term action items are items that should begin within 1-2 years and should be completed within 5-years. Short-term action items can be considered the initial building blocks to a more resilient Peninsula. Items that should be considered short-term are as follows:

- Elevate the existing roadway system. Currently the roadway system is the low point on the Peninsula in multiple locations and becomes one of the first areas to become flooded, blocking ingress and egress. Raising the roadway system to the elevations determined in the detailed master plan will ensure that residents have safe access during flooding events and will encourage additional development and redevelopment. Raising the road will require interim drainage improvements to ensure that buildings and lots that are lower than the elevated roadways are not negatively impacted.
- Construct a stormwater retention pond. A stormwater retention pond allows for buffer storage of rainwater during high tide events, when the tide gates on the outlets of the drainage system are closed. At minimum the pond should be sized to hold 12-hours of runoff from the 100-year storm event and drain completely during one tide cycle.
- Design and implement elements of the drainage master plan. Several instances were observed where it appears development has altered or blocked pre-existing drainage conveyances. Restore or replace these conveyances to ensure that all lots drain.

- Bulkhead or elevate and armor the northwest side of the Peninsula where elevations are lowest, and the Brandywine Creek continues to slowly erode the neck of the Peninsula. Armoring a shoreline can include the construction of a sea wall made of metal, rock, or wood to protect the shoreline from erosion particularly during storms.
- Begin obtaining and preserving areas identified for buffers, particularly in locations where development is most expected. Buffers are identified in the concept plan around the perimeter of the Peninsula to protect the Peninsula from erosion. These buffers will provide wave energy dissipation during storm surge events and will provide open spaces that reduce runoff during rain events.

Long-term action items are items that should be accomplished in conjunction with development and maturation of the Peninsula. These items should be considered essential to the long-term resiliency on the Peninsula, but are more dependent on the action and concurrence of individual lot owners. Many of these items may require financial assistance to individual lot owners from either FEMA, the State of Delaware, or the Clean Water State Revolving Fund. The Peninsula is located within the City's Federal Opportunity Zone, which could potentially connect investors to property owners to help fund the needed improvements. Items that should be considered long-term are as follows:

- Elevate existing developed lots and infrastructure. This may occur as lots are re-developed or as individual lot owners perform major upgrades to their existing facilities. It is anticipated that financial assistance will be required for the majority of individual lot owners.
- Implement living shorelines, breakwaters, or other energy attenuating devices to ensure long-term shoreline stability. This may occur on a lot by lot basis or may occur as several publicly funded projects.
- Complete acquisition of preserved areas for buffers.

Transportation Improvements

Various transportation improvements are proposed for the Peninsula to improve connectivity to adjacent neighborhoods and inter-connectivity within the Peninsula.

- Based on community feedback that the Peninsula is isolated and difficult to exit without traveling through the city's gridded system of roadways the intersection of East 4th Street and Swedes Landing Road is proposed to be improved including: two restriped and repaved, eastbound through lanes and a dedicated left turn lane from East 4th Street to Swedes Landing Road; two restriped and repaved, westbound East 4th Street through lanes; restriped and repaved, east and westbound through lanes separated by brick medians; restriped and repaved, dedicated right and left turn lanes from southbound Swedes Landing Road to east and westbound East 4th Street separated by brick medians; and a new traffic signal will be installed at the intersection. The intersection will be improved with turn lanes and a traffic signal to accommodate all turning movements. This proposed improvement will allow truck traffic from various stakeholders such as Light Action and Noramco more direct access to the Interstate system and will assist in preventing truck traffic from inundating the residential neighborhoods.

  Due to the proximity of the intersection of East 4th Street and Swedes Landing Road to the moveable bridge over the Christina River, the proposed traffic signal should be interconnected with the existing drawbridge control. This will enable the traffic signal at the intersection to be designed for preemption by the operation of the drawbridge. The preemption will involve the display of a steady red indication for a special sequence of signal phases to prohibit traffic movements from the intersection towards the moveable bridge when activated. During the special sequence, through traffic on southbound 4th Street and westbound left-turn traffic from Swedes Landing Road will be stopped for the duration of the preempt phase.

- East 7th Street is proposed to be restriped and repaved from North Church Street to the end of the Peninsula. This roadway is also proposed to be raised 3-5' to improve drainage and stormwater management, as described above.

- East 8th Street is proposed to be repaved between North Church Street and the Amtrak Viaduct. The 8th Street tunnel beneath the 8th Street Viaduct will be reopened and refurbished with lighting for bicycle and pedestrian use. East 8th Street on the Peninsula is proposed to be raised 3' to 5' and repaved from just east of Claymont Street (including Claymont Street) for its entire length, including drainage and stormwater management improvements, as previously described. A connection will be sought to extend East 8th Street to Wilmington Industrial Park. This would improve circulation on the Peninsula and serve as a necessary connection to maintain access during the construction of East 7th Street. The connection shown in this Master Plan is located to line up with the entrance of the Kalmar Nyckel and to fit between the solar panel site and Verizon. Locations of these connections are conceptual and will need further investigation during the design phase.

- The current intersection of East 7th Street and Wilmington Industrial Park is proposed to be converted to a compact roundabout to ease driver confusion, while providing an elevated intersection to meet the elevated roadways meeting at this intersection. Roundabouts can provide lasting benefits and value in many ways. They are often safer, more efficient, less costly and more aesthetically appealing than conventional intersection designs. Furthermore, roundabouts are an excellent choice to complement other transportation objectives – including Complete Streets, multimodal networks, and corridor access management – without compromising the ability to keep people and freight moving.

- Streetscape improvements are suggested for all roadways within the Peninsula, as well as, roadways west of the Peninsula to Church Street. Church Street is also suggested to be improved by a streetscape between East 4th and East 8th Streets. Streetscape improvements include pedestrian facility improvements along all roadways. West of the Viaduct where existing sidewalks are very wide, pedestrian improvements would include new concrete sidewalks with decorative brick accents. East of the Viaduct where few-to-no sidewalks exist,

a multi-use path will be added to one side of the roadway to accommodate both bicycles and pedestrians. The side of the road that the multi-use path is constructed will be determined in design. Based on funding, the side of the road that does not have a multi-use path may receive a 5-foot side sidewalk. Pedestrian lighting is also included with all streetscape improvements. Landscaping, signing, striping, and decorative fixtures such as decorative light poles or signal poles are also suggested.

- All improvements throughout the study area will meet ADA Accessibility requirements.

Recreational Amenities and Improvements

In addition to the goals of protecting the East 7th Street Peninsula from future flooding and improving its economic viability, improving the recreational opportunities and connecting the East Side Neighborhood to the Peninsula are additional goals of the study. Recreational amenities suggested as part of this study include a two-mile Riverwalk proposed around the entire perimeter of the Peninsula. The Riverwalk would include pedestrian lighting and rest areas, such as locations for educational kiosks and benches. The location of the Riverwalk on the Master Plan is conceptual. The actual location will be determined in design.

Boat ramps and kayak launch areas are proposed at various locations around the Peninsula.

Wayfinding signs are recommended at strategic locations throughout the East Side Neighborhood and on the Peninsula to facilitate mobility in and around the study area. The Wayfinding signs will also assist in connecting the adjacent neighborhoods to the Peninsula, enabling them to be the gateway into the Peninsula. The Wayfinding signs will assist in directing visitors between Old Swedes Church and the Fort Christina/Kalmar Nyckel Foundation. Outbound Wayfinding signs will direct westbound traffic from East 7th Street to North Buttonwood Street to East 8th Street to get back to Church Street. Historical markers, as well as plaques for locally significant resources, are recommended at appropriate sites and locations throughout the East Side Neighborhood and on the Peninsula. Kiosks and educational centers will be proposed throughout the study area detailing the area's history and to serve as guides providing information about the area's new amenities.

Cost Estimates and Phasing

Cost Estimates were prepared for the proposed solutions for the Peninsula. These cost estimates are based on conceptual sketches using aerial photography and field verification. Topographic survey was not used for the cost estimates. Assumptions and contingencies were made to produce the most accurate cost estimate possible using the information available.

A phased approach is suggested, and cost estimates were developed based on the suggested phasing. The costs and phases are as follows:

Immediate

- Tide Gates and minor drainage/pipe improvements - $2.1 Million
- Clean out existing pipe system and video inspect for issues – No additional cost anticipated as this can be added to the City's annual maintenance program

Short-Term

- Detailed Master Plan for Stormwater Management (Design, and Implement) - $350,000
- Install new tide gates (4) - $100,000
- Install stormwater management pond - $1.65 Million

Long-Term

- Phase 1 – East 7th Street Improvements - $6.4 Million
- Phase 2 – East 4th/ Swedes Landing Road Intersection - $3 Million
- Phase 3 – East 8th Street Improvements - $4 Million
- Phase 4 – Streetscapes - $1 Million per block


EAST 7TH STREET PENINSULA STUDY
PHASING
PHASING LEGEND
PHASE 1 – EARLY ACTION DRAINAGE IMPROVEMENTS
PHASE 2 – 7TH ST./ROUNDABOUT
PHASE 3 – 4TH ST./OLD SWEDES LANDING
PHASE 4 – 8TH STREET IMPROVEMENTS
PHASE 5 – STREETSCAPES
TIDE GATE
TIDE GATE
TIDE GATE
PROPOSED SWM POND
EAST 7TH STREET
INDUSTRIAL STREET
ARMOR SHORELINE
CHRISTINA RIVER
BRANDYWINE CREEK
CHURCH STREET
MARKET STREET BRIDGE

Related Studies

There is a draft report available for the City Department of Public Work's Study**, Resilient *Wilmington: Preparing Today for Tomorrow's Climate Risks.*** The goals of this report include assessing the current and future risks to Wilmington from climate change and to, "develop near-, mid- and long-term recommendations to mitigate and prepare for the effects of climate change". Two of the threats to Wilmington are changing precipitation (more frequent and intense rainfall events) and rising sea levels. The 7th Street Peninsula falls within FEMA's designated 100 and 500 year Floodplain areas, are vulnerable to both 1% and 0.2% annual chance storm events, and fall within the Mean Higher High Water planning scenarios for +3 and +6 feet of inundation. In the draft report, East 7th Street on the Peninsula is noted as being subject to repetitive flooding events.

The draft report stresses adaptation for at-risk areas by updating current Waterfront Development Standards, using zoning as a tool to set strong design standards for areas within the floodplain, and developing greener stormwater management practices. The report advocates for Wilmington's Tide Gate Program, which includes the assessment, repair and replacement of the City's tide gates, and would directly impact the 7th Street Peninsula stormwater management network. The draft report also recommends raising the northern shoreline of the Peninsula along the Brandywine Creek as part of a multi-phase near- and mid-term improvement. As the Resilient Wilmington study concludes and the report is finalized, these measures should be included in the implementation plan for the 7th Street Peninsula study.

***Wilmington 2028 A Comprehensive Plan for Our City and Communities* (*Wilmington 2028*)** is an update of the City's current comprehensive plan, which was completed in 2009. According to *Wilmington 2028*, "The Plan establishes priorities, helps guide decision making, determines how to best spend limited resources, and helps raise money for improvements citywide."

The proposed improvements described in the East 7th Street Peninsula Master Plan are consistent with the vision for the area as outlined in Wilmington 2028. The East 7th Street Peninsula is identified in *Wilmington 2028* as an "Economic Opportunities" area, and future land use is shown as Waterfront Mixed Commercial / Light Manufacturing. As part of its context within the East Side Neighborhood, the East 7th Street Peninsula is described in *Wilmington 2028* as having potential for a "Robust Local Economy" and recommends "…position and promote the 7th Street Peninsula for neighborhood and economic development." Additionally, *Wilmington 2028* recommends "Invest in 7th Street as an important east-west connector in the city that links assets from the 7th Street Peninsula to Bancroft Parkway."

East Side strategies map

Strong Safe Neighborhoods

1. Prevent nuisance properties and stabilize vacant properties.
2. Support community engagement through community-based public safety.
3. Implement an equitable investment strategy for civic spaces like parks, pools, libraries and community centers.

Healthy Thriving Communities

4. Partner with service agencies to transform civic spaces into community hubs that offer cross-programming.

Robust Local Economy

5. Position and promote Front Street Warehouse District and 7th Street Peninsula for neighborhood economic development.

Connected City and Region

6. Create better multimodal connections on 4th, 11th, 12th, and Walnut Streets.
7. Redesign Walnut Street to serve as a bridge between East Side and downtown.
8. Invest in 7th Street as an important east-west connector in the city that links assets from the 7th Street Peninsula to Bancroft Parkway.
9. Limit truck traffic in neighborhoods.

Sustainable and Resilient City

10. Extend the off-street trail along the rivers to connect and provide flood mitigation to neighborhoods north and south of the rivers.
11. Increase green space through yards and vacant lot improvement.

Next Steps

Environmental - All Federally funded projects, as well as those which involve federally regulated resources must adhere to the regulations set forth in the National Environmental Policy Act of 1969 (NEPA). Given these parameters, it is likely that environmental evaluation and documentation will be required before improvements may proceed to design and construction.

There are also numerous historic/potentially historic (Section 106) resources, as well as recreation, wildlife and waterfowl [Section 4(f)] resources located within the study area. Therefore, any impact to, or taking of lands from, any of these resources will require consultation with the Federal Highway Administration (FHWA) to satisfy NEPA and Section 4(f) requirements, State Historic Preservation Office (SHPO) for Section 106; Delaware Department of Natural Resources (DNREC); and the US Army Corps of Engineers.

Based on the recommended improvements, significant impacts to protected resources are not anticipated. Therefore, it is reasonable to assume that this project may be cleared through a Categorical Exclusion Evaluation. Similarly, effects to Section 106 resources are expected to be minor (No Effect and/or No Adverse Effect) and may be approved through a Memorandum of Agreement (MOA). Lastly, it is reasonable to assume that a Section 4(f) *de minimis* finding by FHWA is likely.

Full analyses of all study area resources are required, however if the assumptions above are accurate it may be reasonably assumed the environmental clearance process will last approximately 12-16 months per phase of improvements.

Assumptions and Limiting Conditions

The preparation of this feasibility study assumes that all services and work products will conform to current DelDOT Standards, Policies, and Procedures.

Concept Plan

The East 7th Street Master Plan can be found on the following page.


EAST 7TH STREET PENINSULA STUDY
PHASING
CENTURY
LEGEND
PROPOSED SIGNAL, INTERSECTION, IMPROVEMENTS
PROPOSED ROADWAY IMPROVEMENTS
PROPOSED MULTI-USE PATH
PROPOSED RIVERWALK WITH REST AREAS
PROPOSED LIGHTING
ARMOR SHORELINE
SHORE PROTECTION
PROTECTED OPEN SPACE
OPEN SPACE AREAS
DEVELOPABLE LAND
FUTURE HOME OF THE CHALLENGE PROGRAM
PROPOSED SWM POND
EDUCATION CENTER
COMMERCIAL BUILDINGS
KAYAK LAUNCH AREA
BOAT RAMP /DOCK
PHASING LEGEND
PHASE 1 - EARLY ACTION DRAINAGE IMPROVEMENTS
PHASE 2 - 7TH ST ROUNDABOUT
PHASE 3 - 4TH ST FOOD SWINGS LANDING
PHASE 4 - 6TH ST IMPROVEMENTS
PHASE 5 - STREETSCAPES
Scale: 1" = 80'
(40'x60')
May 2019
TIDE GATE
ARMOR SHORELINE
EAST 7TH STREET
CHRISTINA RIVER
PROPOSED SWM POND
LIGHT ACTION
HOUSTON STREET
BRANDYWINE CREEK

Community from Church Street to East 7th Street Peninsula, including East 4th Street to 7th Street

Entrance to the East 7th Street Peninsula, including East 8th Street Viaduct

Kalmar Nyckel Foundation and Fort Christina State Park

Looking East along the East 7th Street Peninsula

Looking West along East 7th Street

Looking West toward Wilmington Industrial Park from Across Brandywine Creek

Skate Park on Eastern end of East 7th Street

t 7th Street Peninsula Study

Federal Highway Administration - Planning and Environmental Linkages Questionnaire https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_quest.aspx		
Topic	Section Reference	Comments
Background:		
Who is the sponsor of the PEL study? (state DOT, Local Agency, Other)	Project Need	
What is the name of the PEL study document and other identifying project information (e.g. sub-account or STIP numbers, long-range plan, or transportation improvement program years)?		East 7th Street Peninsula Study
Who was included on the study team (Name and title of agency representatives, consultants, etc.)?	Project Need	
Provide a description of the existing transportation facility within the corridor, including project limits, modes, functional classification, number of lanes, shoulder width, access control and type of surrounding environment (urban vs. rural, residential vs. commercial, etc.)	Existing Conditions	
Provide a brief chronology of the planning activities (PEL study) including the year(s) the studies were completed.	Project Description and Purpose	
Are there recent, current, or near future planning studies or projects in the vicinity? What is the relationship of this project to those studies/projects?	N/A	
Methodology used:		
What was the scope of the PEL study and the reason for completing it?	Project Need and Project Description and Purpose	
Did you use NEPA-like language? Why or why not?		Yes because there are state and federally re environmental and cultural resources preser Peninsula
What were the actual terms used and how did you define them? (Provide examples or list)		Purpose and Need, NEPA, Section 106, Secti SHPO, DNREC, USACE, Categorical Exclusion Evaluation, No Effect, No Adverse Effect, De
How do you see these terms being used in NEPA documents?		These analyses are described in the report fo reference in a future NEPA study
What were the key steps and coordination points in the PEL decision-making process? Who were the decision-makers and who else participated in those key steps? For example, for the corridor vision, the decision was made by state DOT and the local agency, with buy-in from FHWA, the USACE, and USFWS and other resource/regulatory agencies.	Project Description and Purpose	
How should the PEL information be presented in NEPA?		The PEL Study may be attached
Agency coordination:		

t 7th Street Peninsula Study

Federal Highway Administration - Planning and Environmental Linkages Questionnaire https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_quest.aspx		
Topic	Section Reference	Comments
Provide a synopsis of coordination with Federal, tribal, state and local environmental, regulatory and esource agencies. Describe their level of participation and how you coordinated with them.	Project Need, Existing Conditions, and Meeting Summaries	
What transportation agencies (e.g. for adjacent jurisdictions) did you coordinate with or were involved during the PEL study?	Project Need	
What steps will need to be taken with each agency during NEPA scoping?	Next Steps	
Public coordination:		
Provide a synopsis of your coordination efforts with the public and stakeholders.	Meeting Summaries	
Purpose and Need for the PEL study:		
What was the scope of the PEL study and the reason for completing it?	Project Need and Project Description and Purpose	
Provide the purpose and need statement, or the corridor vision and transportation goals and objectives to ealize that vision.	Project Need	
What steps will need to be taken during the NEPA process to make this a project-level purpose and need tatement?	Next Steps	
Range of alternatives:		
What types of alternatives were looked at?	Flooding and Stormwater Management Improvements, Transportation Improvements, and Recreational Amenities and Improvements	
How did you select the screening criteria and screening process?	Project Need	

t 7th Street Peninsula Study

Federal Highway Administration - Planning and Environmental Linkages Questionnaire https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_quest.aspx		
Topic	Section Reference	Comments
For alternative(s) that were screened out, briefly summarize the reasons for eliminating the alternative(s). (During the initial screenings, this generally will focus on fatal flaws.)	Proposed Improvements	
Which alternatives should be brought forward into NEPA and why?	Flooding and Stormwater Management Improvements, Transportation Improvements, Recreational Amenities and Improvements, and Project Need	
Did the public, stakeholders, and agencies have an opportunity to comment during this process?	Meeting Summaries	
Were there unresolved issues with the public, stakeholders, and/or agencies?		No
Planning assumptions and analytical methods:		
What is the forecast year used in the PEL study?	Proposed Improvements	
What method was used for forecasting traffic volumes?	N/A	
Are the planning assumptions and the corridor vision/purpose and need statement consistent with each other and with the long-range transportation plan? Are the assumptions still valid?	Next Steps and Project Need	
What were the future year policy and/or data assumptions used in the transportation planning process related to land use, economic development, transportation costs, and network expansion?	Next Steps and Project Need	
Environmental resources (wetlands, cultural, etc.) reviewed.		
In the PEL study, at what level of detail was the resource reviewed and what was the method of review?	Project Description and Purpose	
Is this resource present in the area and what is the existing environmental condition for this resource?	Existing Conditions and Next Steps	
What are the issues that need to be considered during NEPA, including potential resource impacts and potential mitigation requirements (if known)?	Next Steps	

t 7th Street Peninsula Study

Federal Highway Administration - Planning and Environmental Linkages Questionnaire https://www.environment.fhwa.dot.gov/env_initiatives/pel/pel_quest.aspx		
Topic	Section Reference	Comments
How will the planning data provided need to be supplemented during NEPA?	Next Steps	
List environmental resources you are aware of that were not reviewed in the PEL study and why. Indicate whether or not they will need to be reviewed in NEPA and explain why.		None known based on available desktop dat
Were cumulative impacts considered in the PEL study? If yes, provide the information or reference where the analysis can be found.	N/A	
Describe any mitigation strategies discussed at the planning level that should be analyzed during NEPA.	Flooding and Stormwater Management Improvements and Next Steps	
What needs to be done during NEPA to make information from the PEL study available to the agencies and the public? Are there PEL study products which can be used or provided to agencies or the public during the NEPA scoping process?		The PEL Study will be available to agencies ir the planning and design process.
Are there any other issues a future project team should be aware of?	N/A	