

Wilmington Riverfront Transportation Infrastructure Project

Revised Environmental Assessment

June 27, 2024

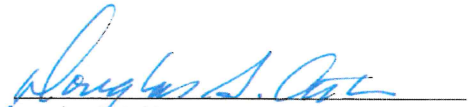
Wilmington Riverfront Transportation Infrastructure Project

REVISED ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to the National Environmental Policy Act (42 U.S.C. § 4332(2)(C))
and
CEQ Regulations (40 CFR Parts 1500 – 1508) by

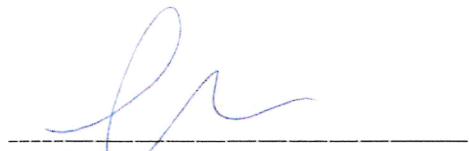
The U.S. Department of Transportation, Federal Highway Administration
and
The City of Wilmington, Delaware

APPROVED FOR PUBLIC AVAILABILITY



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6/27/2024
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Abbreviations & Acronyms

AC – Acres

ACS – American Community Survey

ADA – Americans with Disabilities Act

APE – Area of Potential Effects

ATTAINS – Assessment and Total Maximum Daily Load Tracking and Implementation System

BIR – Brownfield Investigation Report

BMPs – Best Management Practices

CEJST – Climate and Economic Justice Screening Tool

CEQ – Council on Environmental Quality

CFR – Code of Federal Regulations

CH₄ – Methane

CMMP – Contaminated Materials Management Plan

CNE – Common Noise Environment

CO – Carbon Monoxide

CO₂ – Carbon Dioxide

CTP – Capital Transportation Plan

CWA – Clean Water Act

CZM – Coastal Zone Management

dBA – A-weighted Decibel

DE – Delaware

DelDOT – Delaware Department of Transportation

DNREC – Delaware Department of Natural Resources and Environmental Control

DTC – Delaware Transit Corporation

DWMAPS – Drinking Water Mapping Application to Protect Source Waters

EA – Environmental Assessment

EFH – Essential Fish Habitat

EJ – Environmental Justice

EJSCREEN – EJ Screening and Mapping Tool

EO – Executive Order

EPA – U.S. Environmental Protection Agency

ESA – Endangered Species Act

FAQs – Frequently Asked Questions

FEMA – Federal Emergency Management Agency

FHWA – Federal Highway Administration

FONSI – Finding of No Significant Impact

FPRA – Final Plans of Remedial Action

GAMN – General Assessment Monitoring Network

GARFO – Greater Atlantic Regional Fisheries Office

GHG – Greenhouse Gas

HASP – Health and Safety Plan

HUC – Hydrologic Unit Code

HUD – Housing and Urban Development

ICE – Infrastructure Carbon Estimator

IPaC – Information for Planning and Consultation

IPCC – Intergovernmental Panel on Climate Change

Leq – Equivalent Sound Level

LF – Linear Feet

LOS – Level of Service

LULC – Land Use /Land Cover

LWCF – Land and Water Conservation Fund

MOVES – Motor Vehicle Emission Simulator

MSATs – Mobile Source Air Toxics

MSFCMA – Magnuson-Stevens Fishery Conservation and Management Act

N₂O – Nitrous Oxide

NAAQS – National Ambient Air Quality Standards

NEPA – National Environmental Policy Act

NFIP – National Flood Insurance Program

NHPA – National Historic Preservation Act

NMFS – National Marine Fisheries Services

NOAA – National Oceanic and Atmospheric Administration

NRHP – National Register of Historic Places

NRTR – Natural Resources Technical Report

O₃ – Ozone

O&M – Operations and Maintenance

PAHs – Polycyclic Aromatic Hydrocarbons

PCBs – Polychlorinated biphenyl

PDC – Project Design Criterion

PM_{2.5} – Particulate Matter

PPA – Project Programmatic Agreement

RAISE – Rebuilding American Infrastructure with Sustainability and Equity

RCRA – Resource Conservation and Recovery Act

RDC – Riverfront Development Corporation

RMP – Risk Management Plan

RTE – Rare, Threatened, and Endangered

SC-GHG – Social Cost of GHG Emissions

SDWA – Safe Drinking Water Act

SF – Square Feet

SHPO – State Historic Preservation Office

SIP – State Implementation Plan

SSA – Sole Source Aquifer

STIP – Statewide Transportation Improvement Program

SVOCs – Semi-volatile Organic Compounds

TNM – Traffic Noise Model

TOY – Time-of-Year

TPH – Total Petroleum Hydrocarbons

U.S.C. – United States Code

USACE – U.S. Army Corps of Engineers

USDOT – U.S. Department of Transportation

USFWS – U.S. Fish and Wildlife Service

VOCs – Volatile Organic Compounds

WILMAPCO – Wilmington Area Planning Council

WOTUS – Waters of the United States

Executive Summary

This Environmental Assessment (EA) reports the results of the potential environmental impacts of the proposed Wilmington Riverfront Transportation Infrastructure Project (formerly known as the South Market Street Redevelopment Project). The Federal Highway Administration (FHWA), as lead Federal agency; the City of Wilmington, Delaware, as project sponsor and joint lead agency; and in partnership with the Riverfront Development Corporation (RDC), are preparing an EA for the Wilmington Riverfront Transportation Infrastructure Project (Project) in Wilmington, Delaware in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [U.S.C.] 4321, *et seq.*), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500 – 1508), FHWA regulations implementing NEPA (23 CFR 771.119), and applicable Federal, state, and local laws and regulations. The City of Wilmington is a recipient of Federal funds through a U.S. Department of Transportation (USDOT) Fiscal Year 2021 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant.

The Project is located in Wilmington, New Castle County, Delaware, along the east Christina riverbank. The Project's study area extends east from the Christina River to South Market Street and is bound on the north by the Christina River and on the south by Judy Johnson Drive (formerly New Sweden Street). The Project is proposed to replicate the City's street grid characteristic of the North Market Street corridor, north of the Christina River within the South Market Street Riverfront East area. Refer to **Figure 1**.

The Project study area has a shipping and manufacturing, industrial, and brownfields land use history and is marshy and largely inaccessible with significant elevation differences that has created a mud flat condition along the northern and western edges of the Project study area. South Market Street, the eastern project border, is a one-way, four-lane arterial road that extends 0.57 mile along the study area.

The purpose of the Project is to provide transportation infrastructure to further the connectivity of the riverfront area and provide multi-modal resources. The needs for the Project are the following:

- An expanded road network branching from South Market Street west into the project area;
- Pedestrian and cyclist accommodation on new roadways and a new set of pedestrian and bicycle pathways that connect to the existing network of pathways surrounding the site along the Christina riverbank; and
- Rehabilitate and create effective stormwater management.

A No Build and a Build Alternative were considered in this EA. The No Build Alternative represents current conditions and a baseline with which to compare the Build Alternative. The No Build

Alternative does not meet the purpose and need for this project; however, the No Build Alternative is retained for evaluation purposes.

The Build Alternative proposes to construct transportation improvements, including: replication of the Wilmington street grid; a Riverwalk; new pedestrian and cyclist accommodations that connect to the existing network pathways; repair of the existing bulkhead; construction of a new bulkhead; additional drainage outfalls and tide control valves; and two feet of clean fill beneath the proposed transportation improvements.

This EA presents the socioeconomic, cultural, natural, and other environmental resources in the Project study area, the anticipated effects to those resources, and measures to avoid, minimize, and mitigate unavoidable effects to those resources. The EA presents a comparative analysis between the No Build and Build Alternative so that interested citizens, elected officials, and other stakeholders can assess the potential social, cultural, and natural environmental effects from the Project. These effects can be both beneficial and negative, as well as direct, indirect, and cumulative over time (**Chapter V, Table 12**). Refer to **Table ES-1** for a comparison summary of potential direct effects between the No Build and Build Alternative.

Beneficial direct effects of the transportation infrastructure improvements include creation of a road network south of the Christina River, continuity of intersection type and spacing, provision of key access points into and around the area for all users, improved accessibility for all users, improved drainage conditions, and protection against 100-year flood events. In addition, the Project improvements also include a new Riverwalk, open space, and an American with Disabilities Act (ADA) accessible pedestrian and cyclist accommodations on new roadways. These proposed improvements have the potential to provide community benefits by improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services.

Table ES-1: No Build and Build Alternative Resource Direct Effects Comparison

Comparison Factor	No Build	Build Alternative
Land Use and Zoning	No change	13.6 acres converted to infrastructure and open space; 42 acres converted to mixed use
Businesses, Economy, and Employment	No change	1 business displacement; approximately 200 construction-related jobs
Neighborhoods and Community Facilities	No effect	Improved community benefits and mobility
Demographics	No effect	There are currently no residential uses and limited employment opportunities within the Project study area. The infrastructure improvements proposed with the Build Alternative are anticipated to have direct effects on demographic characteristics.
Environmental Justice	No effect	No disproportionately high or adverse effect to the environmental justice population
Hazardous Materials	No effect	3 low-risk sites; 17 moderate risk sites; 4 high-risk sites

Comparison Factor	No Build	Build Alternative
Noise	No effect	24 residential noise-sensitive land uses would be impacted by traffic-generated noise
Air Quality	No effect	Project meets all applicable air quality requirements
Greenhouse Gas and Climate Change	No effect	Increase in GHG emissions from construction, operational, and maintenance activities
Historical Structures	No effect	No adverse effect
Archaeology	No effect	Potential adverse effect
Wetlands and Waters	No effect	Impacts to Federal- and state-regulated features
Watersheds and Surface Water	No effect	Impacts a drainage area of 0.03 square mile and increases the amount of impervious surface area within the watershed
Groundwater and Hydrology	No effect	Project could add additional sources of groundwater contamination from roadway runoff
Floodplains	No effect	Encroachment because the Project is contained entirely within the 100-year floodplain
Vegetation, Terrestrial Habitat, and Terrestrial Wildlife	No effect	Impacts to edge species; no substantial impacts to wildlife habitat
Rare, Threatened, and Endangered (RTE) Species	No effect	No adverse effect on the ESA-listed species
Aquatic Biota	No effect	Impacts to aquatic biota and natural habitat
Section 4(f) and Section 6(f) Properties	Not applicable	Creation of a Riverwalk and multiple public green spaces and parks

The Draft EA document was available for public review and comment from April 1, 2024 through May 15, 2024 on the project website (<https://www.riverfronteastconnect.com/>) and hard copies were available at the following locations in the Project study area: Neighborhood House (1218 B St, Wilmington, DE 19801), Chase Center on the Riverfront (815 Shipyard Dr, Wilmington, DE 19801), and MSK Community Center (1009 Sycamore St, Wilmington, DE 19805).

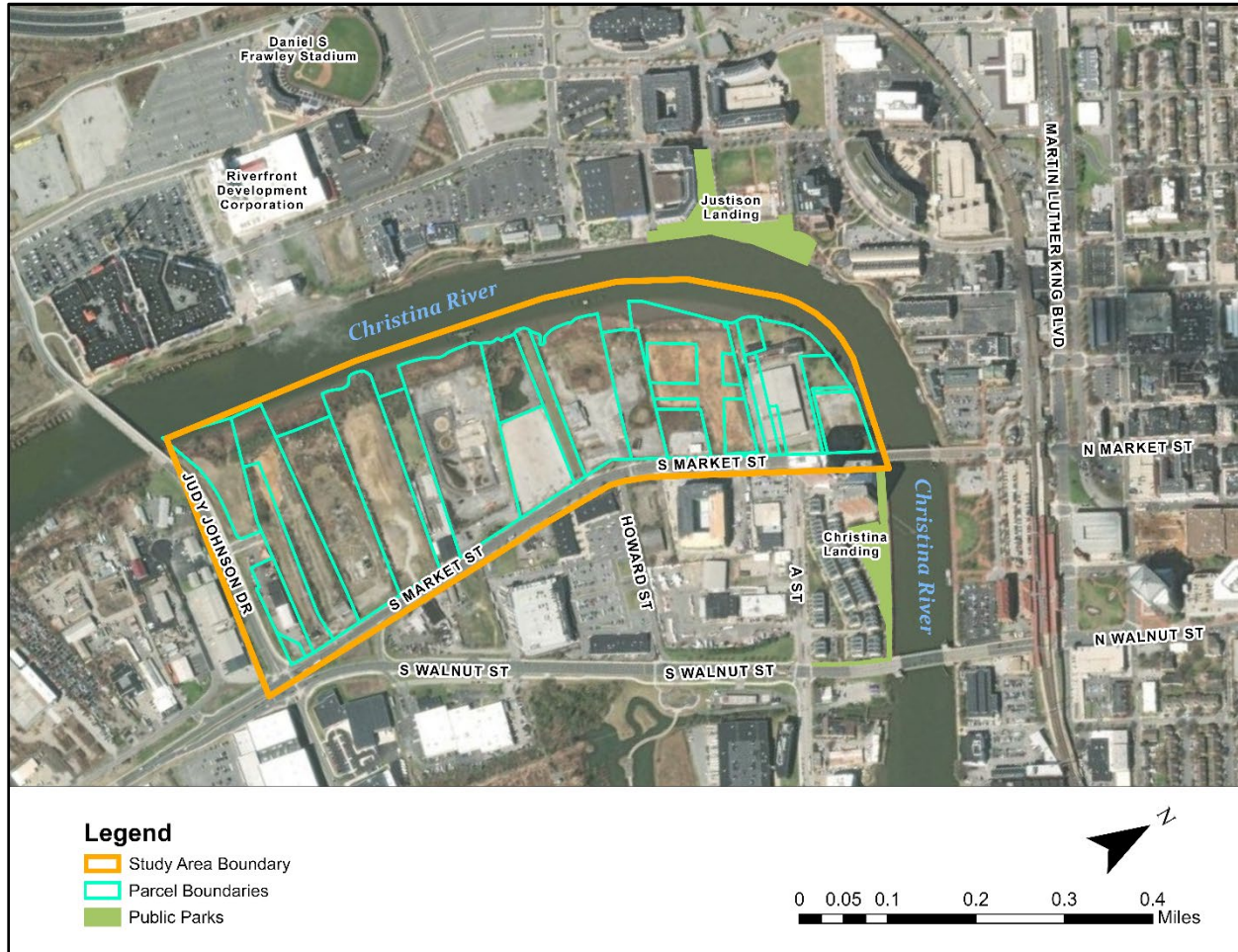
All comments received during the official comment period were reviewed by FHWA and the City. A total of 42 comments from 38 individuals and organizations were received during the comment period. Additionally, the U.S. Environmental Protection Agency submitted comments via letter on May 1, 2024. **Appendix K** includes transcribed copies of all comments received and responses to each comment. If FHWA determines that there are no significant impacts, a Finding of No Significant Impact (FONSI) would be issued and made available to the public. Refer to the Project website (<https://www.riverfronteastconnect.com/>) for the latest Project information.

I. Introduction

A. Project Study Area

The Wilmington Riverfront Transportation Infrastructure Project (Project) is located along the east Christina riverbank in Wilmington, New Castle County, Delaware. The Project's study area is bound by the Christina River on the north and west and by South Market Street on the east and by Judy Johnson Drive (formerly New Sweden Street) in the south (**Figure 1**).

Figure 1: Wilmington Riverfront Transportation Infrastructure Project Study Area Map



B. Background

The existing conditions of the Project study area include former industrial buildings and accessory structures, surface parking, former junkyards, and brownfields. This area has been shaped by its history of shipping and manufacturing and was an active industrial area until its decline after World War II. The *Wilmington 2028: A Comprehensive Plan for Our City and Communities*,¹ otherwise referenced as the *City of Wilmington's Comprehensive Master Plan*, defines the land use in the Project study area as a waterfront mixed use, and the entire Project study area is within the 100-year floodplain caused by coastal storm surges from the Delaware Bay. The parcels located within the Project study area have limited access for vehicles, pedestrians, and bicycles.

The Christina riverbank on the western and northern boundaries of the Project study area is marshy and largely inaccessible. Significant differences of elevation between the high and low tide conditions have created a mud flat condition along the northern and western edges of the Project study area. South Market Street, the eastern project border, is a one-way, four-lane arterial road that extends 0.57 mile along the study area.

The proposed improvements would replicate the city grid characteristics of the North Market Street corridor, north of the Christina River and southward to the intersection of South Market Street and Judy Johnson Drive.

¹<https://www.wilmingtonde.gov/government/city-departments/planning-and-development/wilmington-2028>

II. Purpose and Need

A. Project Purpose

The purpose of the Project is to provide transportation infrastructure to further the connectivity of the riverfront area and provide multi-modal resources.

B. Project Need

The needs of the Project are the following:

- An expanded road network branching from South Market Street west into the Project study area;
- Pedestrian and cyclist accommodation on new roadways and a new set of pedestrian and bicycle pathways that connect to the existing network of pathways surrounding the site along the Christina riverbank; and
- Rehabilitate and create effective stormwater management.

1. Expand the Roadway Network

Currently, the parcels located within the Project study area have limited access for vehicles, pedestrians, and bicycles, and there are no public streets between South Market Street and the east bank of the Christina River. This is reflective of the historical industrial uses in the project area to which access was only required via South Market Street.

The existing street grid of downtown Wilmington is organized by numbered cross streets that run east to west and named city streets that run north to south. Within the Project study area, South Market Street and South Walnut Street are the primary arteries that link downtown Wilmington in the north with Interstate 495 (I-495) in the south. Currently, the block street grid characteristics of downtown Wilmington does not extend into the Project study area, resulting in an inconsistent street grid and lack of multimodal connectivity.

2. Pedestrian and Cyclist Accommodations

The Project study area lacks bicycle and pedestrian infrastructure, which limits multimodal mobility for the surrounding population with limited transportation access. The *City of Wilmington Comprehensive Master Plan* states that “Designing streets for all users will improve connectivity and quality of life” (page 110). There is a need to provide multi-modal accommodations for bicyclists and pedestrian users along the Christina River, especially based on the number of households (12%) in the project area that have no access to a vehicle (see **Appendix B**). Creating bicycle and pedestrian infrastructure will help improve increased access to employment opportunities but will also improve safety, connectivity, and mobility.

3. Effective Stormwater Management

The entire Project study area falls within the 100-year floodplain caused by coastal storm surges from the Delaware Bay. Under its current condition, the Project study area is expected to be entirely inundated in the case of a 100-year flood event and is vulnerable to sea level rise and

extreme weather events. The Project study area also currently has 23.3 acres of impervious surface. To support the proposed transportation infrastructure improvements, effective stormwater management and resiliency solutions are needed to address ongoing drainage issues, provide adequate conveyance, eliminate the backup of tidal water during tidal fluctuations in the tidally influenced Christina River, and raise the site above the 100-year floodplain.

The Delaware Department of Transportation Statewide Transportation Improvement Program (STIP) is the state's six-year Capital Transportation Plan (CTP). The Project is listed in the FY 2023 – FY 2028 CTP as the South Wilmington Infrastructure Improvements, which will allow for infrastructure improvements to facilitate economic growth and development and to allow for future transportation-related improvements.

III. Alternatives Considered

A. No Build Alternative

The No Build Alternative assumes the roadway infrastructure; Riverwalk; pedestrian, bicycle, and mobility improvements; flood prevention measures; and drainage work would not occur. The No Build Alternative does not meet the purpose and need for this Project, as it would not provide transportation infrastructure to further the connectivity of the area; provide multi-modal resources, including pedestrian and cyclist accommodations; nor rehabilitate or create effective stormwater management. However, the No Build Alternative does provide a baseline condition with which to compare to the Build Alternative. Therefore, the No Build Alternative is retained for evaluation purposes.

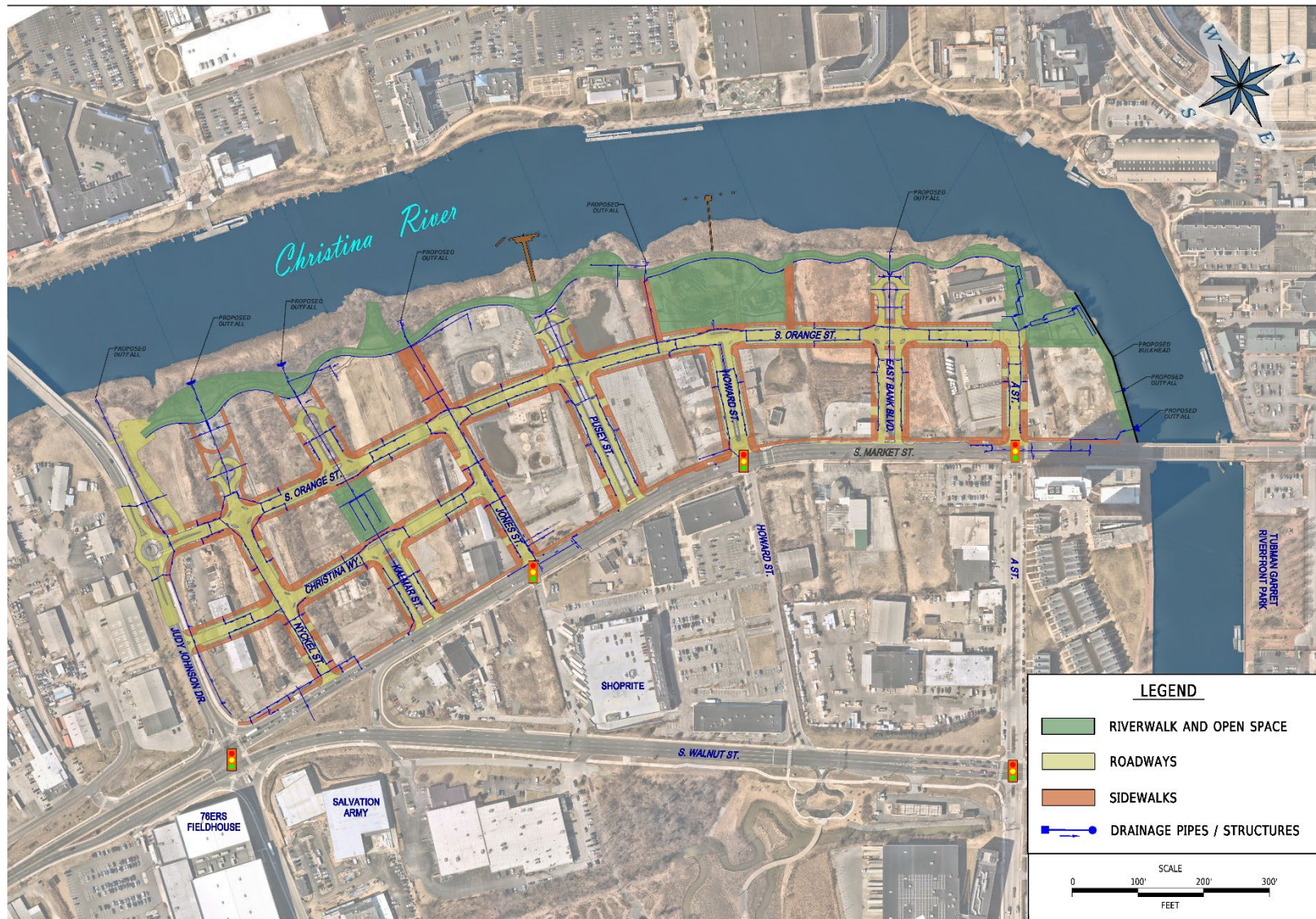
B. Build Alternative (Preferred Alternative)

The Build Alternative proposes to construct transportation infrastructure improvements for the South Market Street Riverfront East area of the City. The Build Alternative proposes an expanded road network branching from South Market Street towards the Christina River and replicating the downtown Wilmington grid system in the Project study area. Infrastructure improvements are proposed to create continuity of intersection type/spacing and provide key points of access into the Project study area.

The proposed street grid is a balance of defining buildable parcels as well as appropriate infrastructure access for vehicles (local, commuter, public transportation), pedestrians, and bicyclists and will include on street parking (**Figure 2**). The proposed grid considers major circulation movements, creating three east-west and evenly spaced signalized movements across South Market Street, and connecting the major north-south Market Street and Walnut Street corridors to Orange Street within the limits of the Project study area (from north to south: at A Street, Howard Street, and Jones Street).

Pedestrian routes were also considered while laying out the proposed grid. The Build Alternative proposes to include pedestrian and cyclist accommodations on new roadways and a new set of pedestrian and bicycle pathways that connect to the existing network of pathways surrounding the Project study area (shown in orange in **Figure 2**). The proposed location of the east-west movements at A Street and Howard Street provides direct pedestrian access to and from the South Market Street Bridge, the Walnut Street corridor, the Wilmington Wetland Park, and the Southbridge neighborhood located east of the proposed Project study area. At the south end of the Project study area, proposed pedestrian and bicycle connections from the proposed street grid connect directly to existing pedestrian and bicycle connections that currently cross the river to the western Riverfront via Judy Johnson Drive and the Senator Margaret Rose Henry Bridge.

Figure 2: Build Alternative Site Plan



Adjacent to the eastern riverbank, a Riverwalk similar to the existing Riverwalk on the western riverbank is proposed to be built as part of the Build Alternative to provide access to this currently inaccessible riverfront. The Riverwalk would be a minimum width of 18 feet and include a dedicated eight-foot bike lane alongside a pedestrian walkway. Under the Build Alternative, connections between the east and west Riverwalks are proposed via the existing Senator Margaret Henry Rose Bridge to the south and the South Market Street bridge to the north.

Under the Build Alternative, the proposed in-water work would include repairing the existing bulkhead which is in current disrepair. The Build Alternative proposes to construct a new bulkhead in front of the existing bulkhead. The new bulkhead would be a higher elevation to allow the new Riverwalk to be constructed at a minimum of 18 inches above the 100-year flood elevation. The tidal influence of the river exposes mud flats in front of the existing bulkhead during the tide cycles. The new bulkhead would be constructed from the landside of the existing bulkhead.

The transportation infrastructure improvements under the Build Alternative also incorporate strategic resiliency solutions to environmental challenges currently faced by the site. The Project study area is expected to be entirely inundated in the case of a 100-year flood event under its current condition. The Build Alternative proposes to elevate the transportation elements in compliance with the Federal Emergency Management Agency (FEMA) Floodplain Regulations to protect the site from inundation and flood-related damage. While the existing South Market Street roadway would remain at its existing elevation below the 100-year flood event, all other proposed roads would be constructed at elevations above the 100-year flood event except where they would connect to existing streets at lower elevations. Additionally, proposed sidewalks and the Riverwalk would also be at elevations above the 100-year flood event. These Project elements are aligned with the City of Wilmington's strategies² to harden infrastructure vulnerable to sea level rise and extreme weather events.

In addition to raising the elevation of the site, it is anticipated that the Project study area would need a two-foot clean cap over contaminated soils, prior to the infrastructure improvements, to prevent contaminated soil erosion and human contact. The soils and groundwater are contaminated; these contaminants have also been found in sediment and surface water along the bank of the Christina River. Multiple Brownfield Redevelopment Agreements and remedial action plans for the Project study area are under development between the City, the RDC, the U.S. Environmental Protection Agency (EPA), and the Delaware Department of Natural Resources and Environmental Control (DNREC), and existing remediation agreements will be followed accordingly.

Currently, the Project study area has 23.3 acres of impervious area. As part of the Build Alternative, existing impervious surface would be removed accordingly. The proposed

² <https://www.wilmingtonde.gov/government/city-departments/public-works/resilient-wilmington>

transportation improvements would reduce the impervious area to 18.6 acres (a decrease by 4.7 acres). The Build Alternative proposes to add drainage outfalls to support the proposed transportation infrastructure. The outfalls would be strategically located throughout the Project study area to address ongoing drainage issues and provide adequate conveyance for the proposed transportation infrastructure. All proposed outfalls would be designed to discharge above Mean Low Water elevation of the Christina River at higher elevations than existing outfalls. In addition to the higher outfall elevation, there would be tide control valves installed at each outfall to eliminate the backup of the tidal water during the tidal fluctuations. The proposed storm drain and trench drain systems would be designed to provide efficient collection of surface runoff and adequate conveyance of stormwater throughout the Project study area. The separation of storm drain networks and proposed construction of new outfalls would provide an overall improvement to the current drainage conditions to the tidally influenced Christina River throughout the Project study area.

As described in this document, under the Build Alternative the proposed street grid is a balance of defining buildable parcels as well as appropriate infrastructure access for vehicles (local, commuter, public transportation), pedestrians, and bicyclists. A new Riverwalk and public open space is proposed along with pedestrian and cyclist accommodations on new roadways and a new set of pedestrian and bicycle pathways that connect to the existing network of pathways surrounding the Project study area.

These Project goals could not be met in any other location. There are no practicable alternatives to this Project and the environmental benefits are considerable. The Project improves natural and beneficial floodplain values, as the action includes removal of contaminated soils, enhancing wetlands, improving wildlife habitat in enhanced wetland areas and, by eliminating invasive species, improving natural beauty and outdoor recreational opportunities via the Riverwalk and open space. All of the proposed improvements have the potential to provide community benefits by improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services.

1. Construction Methods and Assumptions

The City and RDC anticipate the construction of the infrastructure improvements proposed in the Build Alternative to take several years to complete.

Prior to the start of construction, the City and the RDC would concurrently continue contaminated material testing, perform the archaeological investigation as described in the Section 106 Project Programmatic Agreement (**Appendix H**) as applicable, and obtain the necessary permits and approvals for the Project (**Table 11**). After obtaining the necessary permits and approvals, archaeological investigations and contaminated materials activities will continue and will be followed by the transportation infrastructure Project site work.

Construction activities are anticipated to begin simultaneously at several locations within the Project study area to accommodate activities requiring lengthy construction times. The time necessary for each activity would vary and depend upon contractors' means and methods.

It is anticipated that trucks traveling to and from the Project study area during construction would access the area via the I-495, US Business 13 / South Market Street, and Judy Johnson Drive. The construction plan would detail the construction of the main north-south spine road through the Project study area first, currently identified as Orange Street which will be used as a temporary construction haul road (**Figure 2**). Construction trucks and vehicles would access Orange Street from Judy Johnson Drive, travel through the site, and exit via South Market Street. This approach would limit the construction-related traffic to existing regional roadways and minimize Project-related construction traffic traveling through adjacent residential communities.

Detailed discussions of the potential environmental effects that may be associated with construction activities and recommended measures to mitigate or minimize such effects are identified in **Chapter V** of this EA document.

IV. Traffic Analysis

As part of the development of the *South Market Street Master Plan*³ a traffic study was conducted in 2021. Refer to **Appendix A** for the *South Market Street Redevelopment Master Planning Traffic Operation Analysis Report*. The traffic analysis considered 13 study scenarios: 2020 existing conditions, 2030 No Build and Build scenarios, and 2040 No Build and Build scenarios. This analysis informed the traffic and transportation improvements needed in the Project study area.

The proposed roadway grid under the Build Alternative considers major circulation movements, creating three east-west and evenly spaced signalized movements across South Market Street, and connecting the major north-south Market Street and Walnut Street corridors to Orange Street within the limits of the Project study area. The traffic analysis informed the need for three new traffic lights on South Market Street from north to south: at A Street, Howard Street, and Jones Street.

The traffic analysis also informed that Orange Street, the main north-south proposed roadway in the Project study area, should extend from A Street to Judy Johnson Drive. In addition, the traffic analysis warrants allowing eastbound left turns from Orange Street to Judy Johnson Drive via separate left-turn lane or roundabout. These improvements would allow vehicles to/from the west along Judy Johnson Drive to access the infrastructure improvements without having to go through the intersections of Market Street at New Sweden Street or MLK Jr. Boulevard at Market Street. The City and RDC will coordinate with the Delaware Department of Transportation (DelDOT) on any improvements needed on South Market Street.

³ <https://riverfronteast.com/>

V. Environmental Resources, Effects, and Mitigation

The following chapter presents the existing conditions and direct, indirect, and cumulative effects, as a result of the No Build and Build Alternative from the proposed transportation infrastructure improvements on the environmental resources within the Project study area. Minimization and mitigation measures for direct effects from the transportation infrastructure improvements for each resource are also discussed. This chapter presents summaries of existing conditions, methodologies of assessment, anticipated effects and proposed mitigation, where applicable for each environmental resource. More detailed documentation is included in the Project technical reports appended to this EA and cross-referenced throughout the chapter.

As required by NEPA, effects or impacts, including direct, indirect, and cumulative effects to the human environment from the proposed Build Alternative that are reasonably foreseeable should be disclosed. The Council on Environmental Quality (CEQ) defines direct, indirect, and cumulative effects as follows:

- **Direct effects**, which are caused by the action and occur at the same time and place (40 CFR § 1508.1(g)(1)).
- **Indirect effects**, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to included changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.1(g)(2)).
- **Cumulative effects**, which are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.1(g)(3)).

The Project's indirect and cumulative effects analysis was conducted in accordance with NEPA and its implementing CEQ regulations. To assess indirect and cumulative effects, an analysis area boundary was developed by synthesizing sub-boundaries, including watersheds, Census tracts, and the City of Wilmington Neighborhood Analysis Areas, to cover a geographic area large

Technical Reports Supporting the EA

Appendix A: South Market Street Redevelopment Master Plan Traffic Operational Analysis

Appendix B: Final Socioeconomic Technical Report

Appendix C: Final Hazardous Materials Survey Technical Report

Appendix D: Final Noise Technical Report

Appendix E: Final Air Quality Technical Report

Appendix F: Final Architectural Evaluation-Level Survey Technical Report

Appendix G: Final Phase IA Archaeological Assessment

Appendix H: Final Section 106 Programmatic Agreement

Appendix I: Final Natural Resources Technical Report

Appendix J: Final Indirect and Cumulative Effects Technical Report

Appendix K: Comments and Responses on Draft Environmental Assessment

enough to ensure that all reasonably foreseeable indirect and cumulative effects were adequately captured in this analysis. A period of 50 years (2000-2050) was set as the analysis time frame, which was determined based on historical trends and availability of data. For additional information on the methodology, approach, and analysis area used to assess indirect and cumulative effects for this Project, refer to the *Indirect and Cumulative Effects Technical Report (Appendix J)*.

A. Land Use and Zoning

This section provides an overview of land use and zoning in the Project study area. Existing and future land use patterns and development goals are identified in the long-term comprehensive and master plans implemented by local governments. Land use conditions within the Project study area were identified through the *City of Wilmington's Comprehensive Master Plan* and land use/land cover (LULC) data from the State of Delaware⁴.

1. Existing Conditions

Currently the existing land uses within the Project study area are a mix of industrial, commercial, and vacant brownfields. This is confirmed with the most recent LULC data from the State of Delaware for 2017, as shown in **Figure 3**. Other primary land uses surrounding the Project study area include commercial/industrial, mixed urban or built-up land, wetland, residential, and recreational land uses. More information including a map of existing land use can be found in Section III of the *Socioeconomic Technical Report (Appendix B)*.

The *City of Wilmington's Comprehensive Master Plan* identifies the current zoning in the Project study area as W-4, a waterfront zone. W-4 is defined in the Plan as a waterfront residential commercial district, where medium to high density residential, retail, and office development can take place in the future. The southern end of the Project study area that falls outside of the City of Wilmington's boundary is defined as heavy industrial by New Castle County. Refer to **Appendix B** for a map of zoning in and around the Project study area.

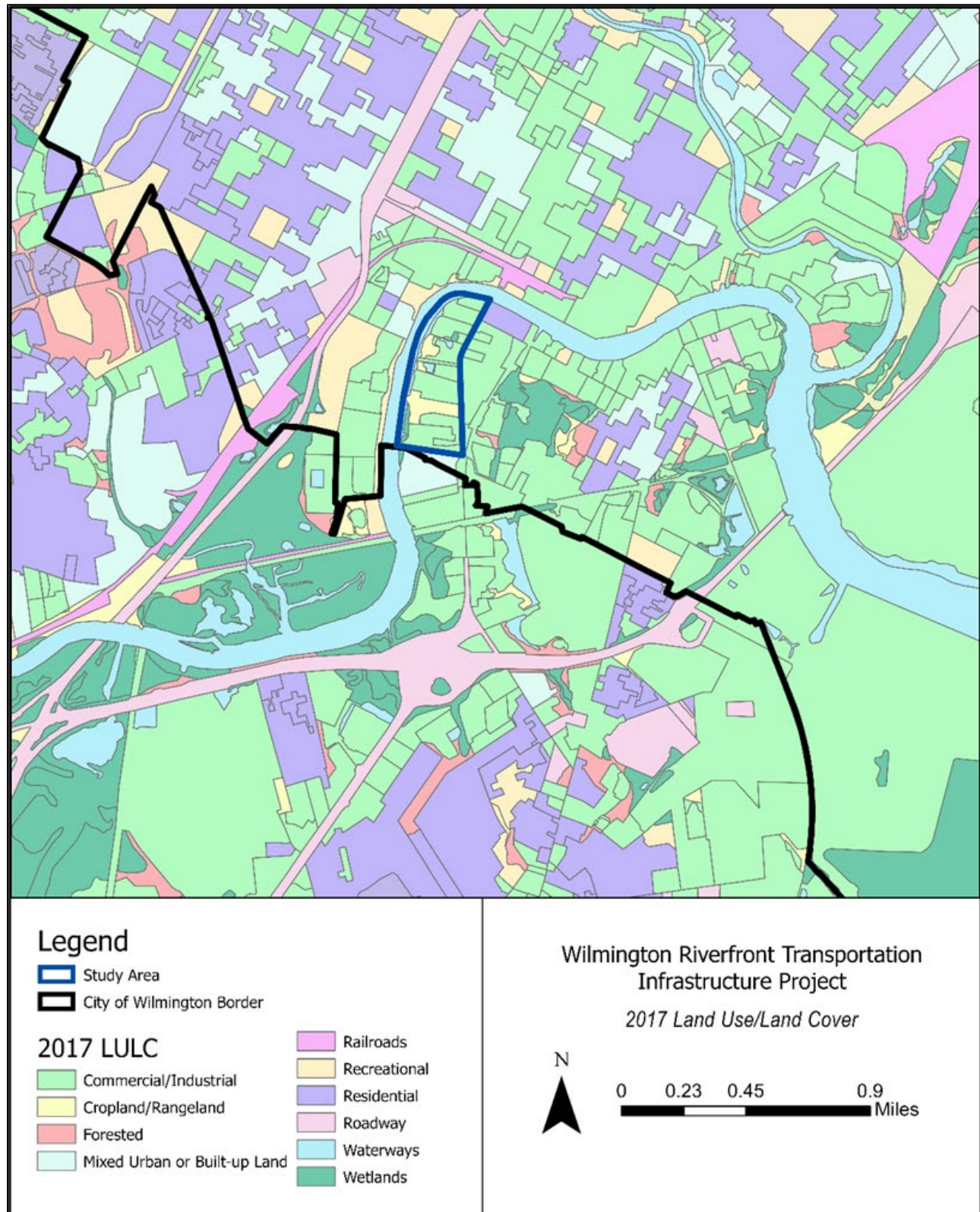
2. Direct Effects

The No Build Alternative would not involve any project-related construction. Compared to the Build Alternative, the No Build Alternative may slow the pace of infrastructure improvements to further the connectivity of the riverfront area and provide multi-modal resources. The No Build Alternative would not be consistent with the purpose of the Project.

Under the Build Alternative, a total of 13.6 acres is anticipated to be impacted by the transportation infrastructure improvements proposed with the Project. Currently, land use in the Project study area is primarily commercial/industrial. Land use in the area is anticipated to be converted to roadway infrastructure and Riverwalk under the Build Alternative.

⁴ <https://stateplanning.delaware.gov/demography/dpc-projection-data.shtml>

Figure 3: Land Use/Land Cover Conditions



Zoning in the area was updated by the City of Wilmington from manufacturing zoning to waterfront residential/commercial in accordance with the *City of Wilmington's Comprehensive Master Plan*.

3. Indirect Effects

The proposed infrastructure improvements under the Build Alternative are anticipated to not prevent future land use changes to occur in accordance with the *City of Wilmington's Comprehensive Master Plan*. The proposed infrastructure improvements as outlined in the Build Alternative are not anticipated to conflict with the *South Market Street Master Plan* and the *City of Wilmington's Comprehensive Master Plan* waterfront mixed use land use, as it envisions the area as a live, work, play environment, with a range of uses to support office, retail, entertainment, housing, public parks, and more.

While plans for development have not been finalized, future land redevelopment is anticipated to bring beneficial indirect effects by providing a mix of uses and community resources that do not currently exist or serve the underutilized Project study area and its surrounding communities. Additional discussion on indirect effects to land use is included in **Appendix J**.

4. Cumulative Effects

Past, present, and future land use changes and development have and will continue to occur within the indirect and cumulative effects analysis area to support and accommodate existing and future populations. The proposed infrastructure associated with this Project and indirect future development that are anticipated to occur in the Project study area is anticipated to promote beneficial land uses and make use of land in the Project study area that is currently underutilized. As such, the incremental effect of the proposed Project on land use, considered in light of past, present, and future actions, is anticipated to be minimal; overall, the Project would improve infrastructure in the Project study area and not conflict with planned mixed use development, according to the *South Market Street Master Plan*, where none currently exists. Additional discussion on cumulative effects to land use is included in **Appendix J**.

5. Minimization and Mitigation

The direct effects from the Project's transportation infrastructure improvements are anticipated to be beneficial, and includes the Riverwalk; network of pedestrian and bicycle improvements; raising the infrastructure out of the 100-year flood event; and providing at least two feet of clean fill under the transportation improvements (refer to **Chapter III, Section B** for additional details on the benefits from the Project). Thus, mitigation is not necessary.

B. Businesses, Economy, and Employment

1. Existing Conditions

There are four active businesses in the Project study area, including a gas station, hardware store, and two commercial businesses.

The hardware store operates on property owned by the RDC. The RDC maintains an agreement with the business owner to continue leasing the property until June 2024, at which time the owner anticipates retiring. The owner extended the lease from December 2023 to June 2024 in order to liquidate the company's assets before retirement. The two commercial businesses currently lease their buildings from a property management company, which has an agreement with the RDC to redevelop their property in the future. The gas station currently owns the property they operate on.

2. Direct Effects

The No Build Alternative would not involve any project-related construction; therefore, no property acquisitions, property impacts, or business displacements would result. The two commercial businesses and the gas station would not be affected. The hardware store is expected to close as the owner is currently in the process of liquidating the business in anticipation of their upcoming retirement. The property management company that currently leases property to the two commercial businesses within the Project study area is not expected to renew the leases. The two businesses are not considered business displacements as the leases would end with or without the proposed improvements. The primary long-term impact of the No Build Alternative may be to slow the pace of infrastructure improvements including multi-modal improvements to further the connectivity of the riverfront area. The No Build Alternative would not be consistent with the purpose of the Project.

The Build Alternative is anticipated to result in one business displacement, the gas station. Acquisition of this property is anticipated with the proposed infrastructure improvements. The property management company that currently leases property to the two commercial businesses within the Project study area is not expected to renew the leases. The two businesses are not considered business displacements as the leases would end with or without the proposed improvements. The property management company has an agreement with the RDC to redevelop their property in the future. The owner of the hardware store is in the process of liquidating the company in order to retire, and thus this is not considered a business displacement as a result of the Project.

Additionally, construction of the Build Alternative is anticipated to have beneficial impacts on employment in the area. Construction of the infrastructure improvements proposed with the Build Alternative are anticipated to create approximately 200 construction-related jobs.

Any property acquisition activities would be performed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act). The Uniform Act establishes minimum standards for Federally funded programs and projects that require acquisition of real property (real estate) or displace persons from their homes, businesses, or farms. For nonresidential displacements, including businesses, the Uniform Act provides the following options:

- Payment for the actual, reasonable moving costs and related expenses, and
- Payment for actual, reasonable reestablishment expenses, or
- A fixed payment “in lieu of” moving and reestablishment costs.

The Uniform Act is described in Appendix A of the *Socioeconomic Technical Report*, **Appendix B** in this EA document.

3. Indirect Effects

The Build Alternative proposes to provide economic benefits by improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services. Construction of the Build Alternative is anticipated to create construction-related jobs in the community. Through future redevelopment on the site and addition of office and retail space, an indirect effect of the Project could result in a potential increase in businesses and employment within the Project study area. Additional discussion on indirect effects to businesses, economy, and employment is included in **Appendix J**.

4. Cumulative Effects

Overall, the Build Alternative is anticipated to facilitate and increase economic growth and employment by providing infrastructure that could allow for the future development of the South Market Street area; future infill and development that is anticipated to occur has the opportunity to create new economic and employment opportunities for the Project study area and surrounding communities. In light of past, present, and future actions, the Project is not expected to contribute substantially to the incremental effect on businesses and the economy; in general, the Project is anticipated to facilitate future economic activity and increase opportunities for new businesses. Additional discussion on cumulative effects to businesses, economy, and employment is included in **Appendix J**.

5. Minimization and Mitigation

The direct effects from the Project’s transportation infrastructure improvements are anticipated to be beneficial, such as approximately 200 construction-related jobs and better access to jobs; thus, mitigation is not necessary. However, the City will commit to supporting businesses that qualify for the Office of Economic Development’s Strategic Fund set-aside for minority owned businesses as well as providing notices to the Southbridge Civic Association for business development events hosted by the Office of Economic Development and economic development partners such as the Small Business Administration, Small Business Development Center, Delaware Division of Small Business, and Community Development Financial Institutions. The City and RDC will also commit to advertising and holding outreach events for construction workforce opportunities in nearby disadvantaged neighborhoods.

C. Neighborhoods and Community Facilities

This section provides an overview of neighborhoods and community facilities within the Socioeconomic Study Area. As outlined in the *Socioeconomic Technical Report* (**Appendix B**), the

Socioeconomic Study Area was determined by selecting U.S. Census block groups surrounding the Project study area. Block groups within one mile to the south and east of the Project study area were selected to cover the surrounding communities. Even though existing communities north and west of the Project study area are separated by the Christina River, block groups to the north and west were included in the Socioeconomic Study Area. Eleven block groups make up the Socioeconomic Study Area (**Figure 4**), which is located entirely within New Castle County, Delaware. Data regarding neighborhoods and community facilities was available through local, state, and regional sources.

1. Existing Conditions

Neighborhoods surrounding the Project study area include Browntown, Hedgeville, and Southbridge. Southbridge is a minority neighborhood located east of the Project study area. It is an underserved and disadvantaged neighborhood located just south of the Christina River and downtown Wilmington and north of I-495. The neighborhood experiences low rates of employment, high through traffic, and insufficient infrastructure. Browntown and Hedgeville are minority neighborhoods located west of the I-95 corridor. Though Browntown and Hedgeville are both located in the Socioeconomic Study Area, I-95 and the Christina River separate the communities from Project study area. Browntown and Hedgeville have both had considerable growth of Latino, Hispanic, and African-American populations in the past decade (refer to **Appendix B**).

Figure 4 shows the neighborhoods and community facilities located in the Socioeconomic Study Area. Community facilities include places of worship, food banks/pantries, service organizations/community centers, and parks/recreation facilities. There are currently no community facilities within the Project study area. A more detailed list of each community facility can be found in Section VIII of the *Socioeconomic Technical Report* (**Table 6, Appendix B**).

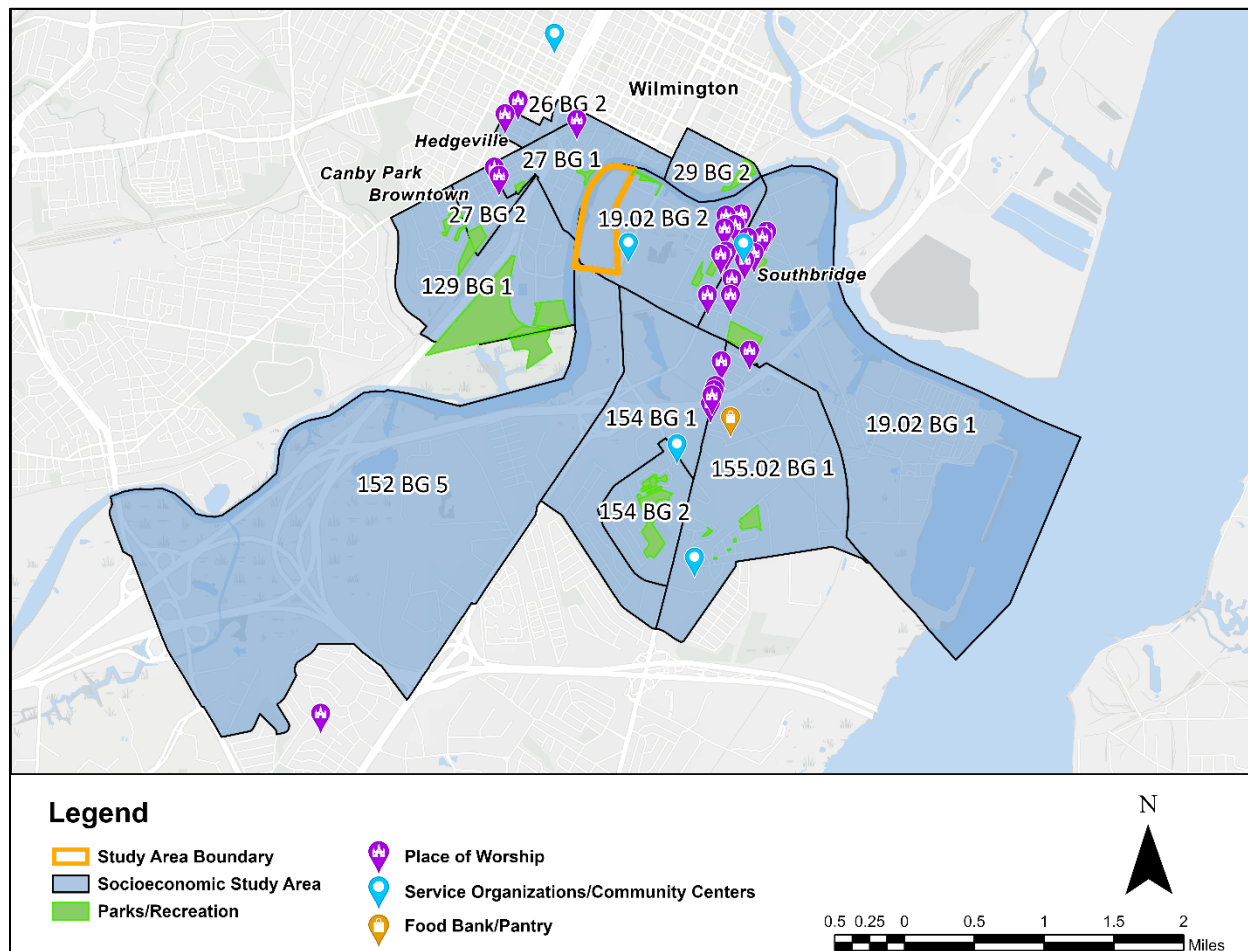
2. Direct Effects

The No Build Alternative is not anticipated to involve any property acquisitions or project-related construction and therefore no impacts to neighborhoods or community facilities are anticipated to occur. The primary long-term effect of the No Build Alternative may be a slowed pace of infrastructure improvements to further the connectivity of the riverfront area and provide multi-modal resources.

The Build Alternative is not anticipated to affect existing community facilities, as there are no community facilities within the Project study area, as shown in **Figure 4**. The proposed infrastructure improvements under the Build Alternative are anticipated to provide benefits to the surrounding communities, such as provide key points into the Project study area, bicycle and pedestrian improvements, including a new Riverwalk and open space. The proposed pedestrian and cyclist accommodations on new roadways are anticipated to improve connectivity in the area. All these proposed improvements have the potential to provide community benefits by

improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services.

Figure 4: Socioeconomic Study Area, Block Groups, Neighborhoods & Community Facilities



3. Indirect Effects

Future redevelopment of the Project study area is anticipated to have beneficial effects to neighborhoods and community facilities. The *South Market Street Master Plan* proposes to create a new neighborhood with mixed-use development and community facilities and potential for new commercial/retail space that does not currently exist in the Project study area. Community facilities and services do not currently exist within the Project study area and, therefore, the planned future redevelopment is anticipated to be a beneficial indirect effect of the Project.

Additionally, the Project may potentially result in increased property values as an indirect effect from the Project, but the specific effects to the surrounding communities, including to Environmental Justice (EJ) populations (refer to **Section E** of this chapter for a definition of EJ and

EJ populations) near the Project study area, are not known at this time. It is also unknown whether affordable housing would be provided as part of planned future development. With consideration of the Project's indirect effects in mind, mitigation is not necessary. Refer to **Section E** of this chapter for more information on effects to EJ populations and commitments made to EJ populations.

Additional discussion on indirect effects to neighborhoods and community facilities is included in **Appendix J**.

4. Cumulative Effects

Past, present, and future development and growth have had and continue to have beneficial effects to neighborhoods and communities through the provision of community facilities, transportation infrastructure, and recreational resources. The construction of appropriate transportation infrastructure within the Project study area, which is underutilized and does not currently contain residential populations, residential properties, or community facilities, is not anticipated to have a negative impact on the indirect and cumulative effects analysis area and communities adjacent to the Project study area. Overall, the Project is anticipated to provide community benefits, as noted, and the incremental effects to neighborhoods and community facilities would be beneficial. However, the potential for increased property values from future planned redevelopment could incrementally add to the overall cumulative effects felt by these populations. Additional discussion on cumulative effects to neighborhoods and community facilities is included in **Appendix J**.

5. Minimization and Mitigation

The Build Alternative is not anticipated to impact any existing community facilities because there are no community facilities within the Project study area as previously discussed in this section (refer to **Figure 4**). Further, the direct effects from the Project's transportation infrastructure improvements are anticipated to be beneficial; thus, mitigation is not necessary.

D. Demographics

This section provides an overview of demographics in the Socioeconomic Study Area. Data regarding population, race, economy, employment, and other demographics were assessed through the U.S. Census Bureau's (2021) American Community Survey (ACS) 2017-2021 5-Year Estimates, as well as state, regional, and local sources. Data were collected at the block group level, as well as the county and state level for comparison.

1. Existing Conditions

The population data of Delaware, New Castle County, and the 11 block groups is presented in **Table 1**. The total approximate population of Delaware is 981,892 people, New Castle County is 567,769, and the Socioeconomic Study Area is 15,280. Populations of the block groups located in the Socioeconomic Study Area range from 595 to 2,083 people.

Table 1: 2021 Total Population

Geographic Area/ Block Group	Total Population	Percent of Study Area
Delaware	981,892	N/A
New Castle County	567,769	N/A
19.02 BG 1	595	4%
19.02 BG 2	1,484	10%
26 BG 2	843	6%
27 BG 1	1,380	9%
27 BG 2	1,323	9%
29 BG 2	867	6%
129 BG 1	2,083	14%
152 BG 5	1,854	12%
154 BG 1	1,150	8%
154 BG 2	1,787	12%
155.02 BG 1	1,914	13%
Study Area Total	15,280	100%

Note: all values rounded to the whole number

Source: U.S. Census Bureau (2021) ACS 2017-2021 5-Year Estimates

According to the Delaware Population Consortium 2023 projections,⁵ Delaware's population is expected to grow by approximately 177,918 citizens between 2020 and 2050, an increase of approximately 18 percent. By 2050, Delaware's population is expected to increase to be just over 1,167,866 citizens. New Castle County's population is expected to grow to approximately 21,842 citizens between 2020 and 2050, an increase of 3.8 percent. By 2050, New Castle County is expected to reach a total population of 592,561 citizens.

A discussion on the potential effects to EJ populations is discussed in **Section E** of this chapter and in greater detail in **Appendix B** of this EA.

2. Direct Effects

The No Build alternative is not anticipated to have impacts on demographics. The primary long-term impact of the No Build Alternative is anticipated to be a slowed pace of infrastructure improvements to further the connectivity of the riverfront area and provide multi-modal resources.

There are currently no residential uses and limited employment opportunities within the Project study area. The infrastructure improvements proposed with the Build Alternative are anticipated to have direct effects on demographic characteristics. The infrastructure improvements

⁵ <https://stateplanning.delaware.gov/demography/dpc-projection-data.shtml>

proposed with the Build Alternative are not anticipated to have direct adverse effects on demographic characteristics.

3. Indirect Effects

As noted in **Section V.A.1**, future redevelopment of the Project study area is anticipated to bring commercial, retail, and residential land uses to the site, which is believed to result in a change to employment and residents within the Project study area where none currently exists. Overall, the Project is not expected to result in induced commercial or residential development outside of the Project study area and would not encroach upon existing communities.

Exact details on future development are not known, or whether affordable housing will be featured as part of planned future development. The Project may result in increased property values in adjacent communities, including EJ communities. Potential increased property values may lead to rising costs in housing, rent, mortgages, and property taxes that could result in a shift of demographics. Additional discussion on the potential impacts can be found in **Section C** and **Section E** of this chapter. Additional discussion on indirect effects to demographics is included in **Appendix J**.

4. Cumulative Effects

Past actions that have affected demographics include the infrastructure and land development activities that have occurred in the indirect and cumulative effects analysis area throughout the analysis time frame. Population growth in the indirect and cumulative effects analysis area has remained relatively stable since 2000; however, residential, commercial, mixed-use, and transportation projects have been constructed to accommodate the population and its needs within the analysis area. Present and future actions will accommodate existing and future populations and economic activity. The Project is not likely to have cumulative induced growth effects, as it is confined to a defined area and is surrounded by existing, established neighborhoods that do not have undeveloped land available for development. However, the makeup of demographics in communities surrounding the Project study area may shift over time with potentially rising property values. Additional discussion on cumulative effects to demographics is included in **Appendix J**.

5. Minimization and Mitigation

The anticipated direct effects from the Project's transportation infrastructure improvements are anticipated to be beneficial, for the proposed street grid is a balance of defining buildable parcels as well as appropriate infrastructure access for vehicles (local, commuter, public transportation), pedestrians, and bicyclists. Thus, mitigation is not necessary. Similarly, the anticipated indirect effects of the project do not warrant mitigation.

E. Environmental Justice

The *Socioeconomic Technical Report (Appendix B, Section X)* identifies the Environmental Justice (EJ) conditions in the Socioeconomic Study Area, including the identification of existing minority and low-income populations. The EJ analysis for this report was conducted in accordance with Executive Order (EO) 12898: *Federal Actions to Address the Environmental Justice in Minority Populations and Low-Income Populations*, USDOT Order 5610.2C: *USDOT Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and FHWA Order 6640.23A: *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Building upon EO 12898, EO 14096: *Revitalizing Our Nation's Commitment to Environmental Justice for All*, published on April 21, 2023, is also considered in this analysis.

EO 12898, issued on February 11, 1994, states that EJ must be evaluated, "... to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations ..." USDOT Order 5610.2C defines environmental justice as "the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, income, national origin, or educational level, with respect to the development, implementation and enforcement of environmental laws, regulations and policies. For the purpose of DOT's Environmental Justice Strategy, fair treatment means that no population, due to policy or economic disempowerment, is forced to bear a disproportionate burden of the negative human health and environmental impacts, including social and economic effects, resulting from transportation decisions, programs and policies made, implemented and enforced at the Federal, State, local or tribal level." Similarly, EO 14096 defines EJ as "the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment...". Thus, transportation and infrastructure investments should promote access and opportunity to low-income and minority communities.

EO 12898 directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their action on low-income and minority populations, to the greatest extent practicable and permitted by law. A disproportionately high and adverse effect on low-income and minority populations is defined by FHWA Order 6640.23A as an adverse effect that:

- Would be predominately borne by a minority and/or low-income population, or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

While EO 12898 does not define the terms minority or low-income, FHWA Order 6640.23A provides the following definitions:

- *Minority Individual* – A person who identifies as:
 1. Black: a person having origins in any of the black racial groups of Africa;
 2. Hispanic or Latino: a person Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
 3. Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent;
 4. American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or
 5. Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands.
- *Minority Population* – Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity.
- *Low-Income Individual* – A person whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.
- *Low-Income Population* – Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity.

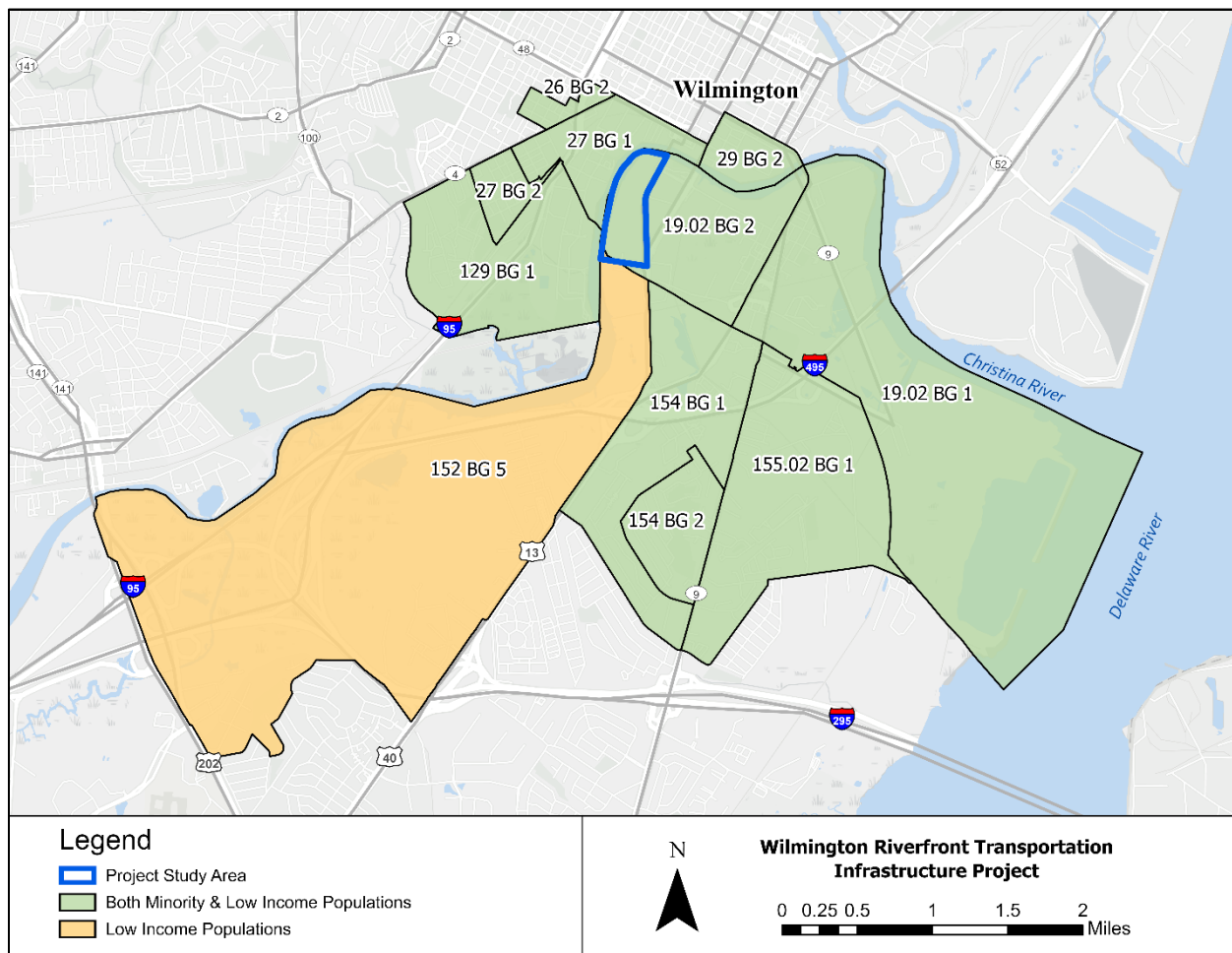
To further implement EO 12898, the 2011 FHWA Guidance on Environmental Justice and NEPA Memorandum was utilized to comply with the principles of EJ.

A review of EJ existing conditions in the Socioeconomic Study Area was conducted using the U.S. Census Bureau (2021) ACS 2017-2021 5-Year Estimates, as well as local, regional, and state data sources. Additionally, the EPA's EJ Screening and Mapping Tool (Version 2.2), referred to as EJSCREEN, for identifying environmental and demographic indicators of EJ populations was also used. Additionally, the Climate and Economic Justice Screening Tool (CEJST), Version 1.0, was used to identify disadvantaged communities. More information on the methodology used for the EJ analysis can be found in **Appendix B, Section X**.

1. Existing Conditions

Only one of the 11 block groups in the Socioeconomic Study Area was identified as having only a low-income population while the remaining ten block groups were identified as having both low-income and minority populations higher than the average of New Castle County and Delaware as a whole (**Appendix B**). **Figure 5** below shows the low-income and minority populations within the Socioeconomic Study Area. These findings are further confirmed with additional data sources, including Wilmington Area Planning Council's (WILMAPCO) 2019 Transportation Justice Plan, the EPA's EJSCREEN tool, and CEJST. Every block group within the Socioeconomic Study Area is considered an EJ population, as they all have low-income populations or both low-income and minority populations.

Figure 5: Low-Income and Minority Populations



Additional data sources other than Census data were reviewed to ensure EJ populations within the Socioeconomic Study Area were identified. These sources and results can be found in **Appendix B** and are summarized below.

The WILMAPCO 2019 Transportation Justice Plan further maps where significant and moderate EJ populations are located in New Castle County. In the Plan, WILMAPCO defines and identifies *significant* and *moderate* EJ populations. *Significant* and *moderate* EJ populations were identified with scoring system techniques developed by WILMAPCO that determines concentrations of racial and ethnic minority and low-income populations. EJ neighborhoods were identified using ACS demographic and income data, as well as affordable housing and elementary school demographic data. Compared to *moderate* EJ neighborhoods, *significant* EJ neighborhoods have higher poverty rates, a larger population of racial or ethnic minorities, more affordable housing developments, and larger populations of low income students and students belonging to racial or ethnic minorities. More information on how *significant* and *moderate* EJ neighborhoods were identified can be found in WILMAPCO's 2019 *Transportation Justice Plan*⁶.

Within the Socioeconomic Study Area, there are six moderate EJ neighborhoods identified by WILMAPCO. These neighborhoods include Southbridge, Browntown, and Hedgeville. Additionally, four significant EJ neighborhoods were identified in the Socioeconomic Study area. These neighborhoods are located in block groups 154 BG 2 between Delaware Route 9 and US Route 13, and 29 BG 2 north of the Christina River. More information on WILMAPCO's EJ analysis can be found in the *Socioeconomic Technical Report* (**Appendix B**).

The EPA's EJSCREEN gives a percentile for each block group for how heavily they experience the following environmental indicators: Particulate Matter_{2.5}, Ozone, Diesel Particulate Matter, Air Toxics Cancer Risk, Air Toxics Respiratory Hazard Index, Toxic Release to Air, Traffic Proximity, Lead Paint, Superfund Proximity, Risk Management Plan (RMP) Facility Proximity, Hazardous Waste Proximity, Underground Storage Tanks, and Wastewater Discharge.

The majority of block groups in the Socioeconomic Study Area are above the average EJ index for New Castle County as a whole for every environmental indicator. The Socioeconomic Study Area is highly impacted by all 13 environmental indicators, all with percentiles greater than the 50th percentile, and the majority over the 85th percentile for each environmental indicator. The environmental indicators that had the highest average percentile across the Socioeconomic Study Area block groups include diesel particulate matter (95th percentile), toxic releases to air (95th percentile), superfund proximity (94th percentile), RMP facility proximity (94th percentile), hazardous waste proximity (94th percentile), ozone (93rd percentile), and air toxics cancer risk (93rd percentile).

CEJST⁷ version 1.0 was also used to identify disadvantaged communities in the Socioeconomic Study Area. This tool was developed by CEQ under EO 14008 and features an interactive map that uses climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development data to identify disadvantaged communities.

⁶ http://www.wilmapco.org/EJ/WILMAPCO_2019_TJ_Plan.pdf

⁷ <https://screeningtool.geoplatform.gov/en/#11.36/39.6943/-75.5026>

Communities that are experiencing burdens regarding the data described are considered disadvantaged because they are overburdened and underserved.

While the Socioeconomic Study Area was defined at the block group level, the CEJST uses Census tracts for identifying disadvantaged communities, thus Census tracts are used for the purpose of this evaluation. Census tracts are considered disadvantaged if the tract is (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated economic burden. More information on thresholds and associated socioeconomic burdens can be found in the CEJST methodology.⁸ Census tracts with block groups included in the Socioeconomic Study Area that are identified as disadvantaged by CEJST include 19.02, 155.02, 29, 27, 26, and 129. Additional information on how each Census tract meets the disadvantaged thresholds can be found in the *Socioeconomic Technical Report* **Appendix B, Section X.B.1**. Census tracts not identified as disadvantaged include Census tracts 152 and 154, directly south of the Project study area. Results from the CEJST further confirms the EJ populations identified within the Socioeconomic study area.

As described earlier, block groups in the Socioeconomic study area identified as having both minority and low-income populations include block groups 19.02 BG 1 and 2, 26 BG 2, 27 BG 1 and 2, 29 BG 2, 129 BG 1, 154 BG 1 and 2, and 155.02 BG 1. Only block group 152 BG 5 was identified as having just a low-income population. Results from CEJST further confirms the EJ populations identified within the Socioeconomic Study Area, as the corresponding Census tracts were identified as disadvantaged for the block groups that have both low-income and minority populations. While block groups 154 BG 1 and 2 under Census tract 154 were not considered disadvantaged by the CEJST methodology, it is considered low-income based on the methodology set forth in this EA using the Housing and Urban Development (HUD) income limit and census data and has minority populations based on Census data and has significant EJ neighborhoods identified and defined by WILMAPCO. The areas identified as disadvantaged are also defined by WILMAPCO as significant and moderate EJ neighborhoods and are in high percentiles for environmental indicators as shown in the EJSCREEN analysis. While Census tract 152, which includes block group 152 BG 5 in the Socioeconomic Study Area, did not meet the threshold for low-income under the CEJST methodology, it is also considered low-income based the HUD income limit and census data used in this analysis. Furthermore, it was not identified as having an EJ neighborhood by WILMAPCO and based on the EJSCREEN analysis, block group 152 BG 5 had a lower environmental index than the average for each environmental indicator when compared to the averages of the Socioeconomic Study Area.

Additional information on EJ communities within the Socioeconomic Study Area can be found in the *Socioeconomic Technical Report*, **Appendix B, Section X.B**.

⁸ <https://screeningtool.geoplatform.gov/en/methodology>

2. Direct Effects

A comparison of impacts from the No Build and Build Alternative to EJ populations is made in the *Socioeconomic Technical Report*, **Appendix B, Section X.C**. The No Build Alternative is not anticipated to involve any project-related construction, such as displacements or loss of resources. Therefore, the No Build Alternative is not anticipated to result in disproportionately high and adverse effects to EJ populations. However, the positive effects of the Project would also not be realized, such as 13 acres of new proposed open space, infrastructure improvements, and bicycle and pedestrian improvements. Additionally, the Project study area currently experiences flooding and, as discussed in the **Section N** of this chapter, falls entirely within the FEMA 100-year floodplain. The No Build Alternative would not address the existing flooding conditions within the project area. Much of the project area is characterized by brownfields. Any work under the Build Alternative would require remediation of brownfields where transportation infrastructure is proposed. Compared to the Build Alternative, clean-up of these brownfields under the No Build Alternative may be slower to occur.

The proposed infrastructure improvements under the Build Alternative would improve livability and community benefits by improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services, addressing flooding and drainage issues, and community connectivity. Thus, the Build Alternative does not result in a disproportionately high and adverse effect on EJ populations. The *Socioeconomic Technical Report* (**Appendix B, Section X.C**) discusses in detail that the Build Alternative was not found to have disproportionately high or adverse effects on the following environmental characteristics: demographics, traffic, human health and safety, air quality, noise/vibration, water quality, hazardous materials, natural resources, visual landscape and aesthetic values, access and mobility, and community cohesion/isolation and quality of life.

The only effect identified is one business displacement associated with the Build Alternative, a gas station. The gas station currently serves the surrounding EJ population and is located in the Project study area in block group 19.02 BG 2.]

As noted in **Chapter III, Section B.1** of this EA, it is anticipated that trucks traveling to and from the Project study area during construction would access the area via the I-495, US Business 13 / South Market Street, and Judy Johnson Drive. The construction plan would detail the construction of the main north-south spine road through the Project study area first, currently identified as Orange Street which will be used as a temporary construction haul road (Figure 2). Construction trucks and vehicles would access Orange Street from Judy Johnson Drive, travel through the site, and exit via South Market Street. This approach would limit the construction-related traffic to existing regional roadways and minimize Project-related construction traffic traveling through adjacent residential communities.

The floodplain assessment for the Project took into consideration the direct and indirect effects to the Project study area and surrounding areas include Southbridge. The analysis found that the

risks associated with Project encroachment into the floodplain are minimal. The Project includes fill to raise the transportation infrastructure 18 inches above the 100-year floodplain in accordance with City of Wilmington floodplain development code. In other words, the elevation of the new infrastructure would no longer be in the base floodplain, and not subject to flooding during the 100-year storm. The Project would support base floodplain development and per City code, the development would also be elevated 18 inches above the 100-year floodplain and not subject to flooding during a 100-year storm. Elevating development parcels by 18 inches above the 100-year floodplain base flood elevation without any increases in other base floodplain elevation in the vicinity would reduce flood risk. Refer to **Section N** of this chapter and **Appendix I** for more information on the flood assessment conducted for the Project.

Outreach to EJ populations in the Socioeconomic Study Area has been conducted to provide opportunities for meaningful engagement with underserved communities that would be directly or indirectly affected by the proposed project. Information on public outreach with EJ populations can be found in the *Socioeconomic Technical Report* (**Appendix B, Section X.B**). Overall, the public has expressed support and excitement for the Project. The public has noted that they are in favor of the Project and want to know what type of future development would follow, including what types of community facilities and green spaces would be included. Furthermore, the public has shown an interest in employment opportunities that would occur with the Project, as well as residential options. Refer to **Appendix K** to review all public comments received on the Draft EA as well as comment responses.

3. Indirect Effects

As noted above in discussions related to land use, neighborhoods and community facilities, and demographics, the Project is anticipated to have beneficial indirect effects from the future redevelopment by providing a mix of land uses and community resources that do not currently exist in the Project study area and its surrounding communities, which would also benefit surrounding EJ populations. Additionally, the Project is anticipated to create approximately 200 construction-related jobs in the community. As noted above in **Section V.B.3** of this chapter, it is not known whether affordable housing will be featured as part of any planned future development, and there is the potential for rising property values that may have a negative indirect effect on surrounding EJ populations if housing costs, rent, mortgages, and property taxes increase.

Additional discussion on indirect effects to EJ populations is included in **Appendix J**.

4. Cumulative Effects

Overall, the Build Alternative is not expected to result in a disproportionately high and adverse effect on EJ populations. EJ populations within and around the Project study area are anticipated to benefit from the improvements and future redevelopment associated with the *South Market Street Master Plan*. While past, present, and future projects have and would likely have effects to potential EJ populations, the Build Alternative is not expected to contribute substantially to

the incremental effect on these populations. However, potential rising housing costs, if experienced, could add undue burden EJ populations, which over time could incrementally add to the overall cumulative effects felt by these populations. Additional discussion on cumulative effects to EJ populations is included in **Appendix J**.

5. Minimization and Mitigation

The direct effects from the Project's transportation infrastructure improvements would be beneficial to all communities, both EJ and non-EJ communities, such as having key points of access into the Project study area, integrating traffic calming to reduce vehicular traffic speed, and improving accessibility. Communities would also benefit from pedestrian and cyclist accommodations for all users, a new Riverwalk, and having open space. Also, the Build Alternative is not expected to result in disproportionately high and adverse effects on EJ populations. The Project may result in indirect effects stemming from potential rising housing costs associated with planned future redevelopment. However, with consideration of the projects direct and indirect effects in mind, mitigation is not necessary.

To further support investment in the EJ communities, specifically Southbridge, the City of Wilmington is making several commitments to the EJ community. The City's Office of Economic Development will work with the University of Delaware's Local Government Grant Assistance Program and the Southbridge Civic Association in identifying and applying for grant funding in support of the improvements identified in the Southbridge Transportation Action Plan. Additionally, the City and the RDC will continue to investigate funding to plan, design, and construct a pedestrian connection from the Southbridge Community to the Wetland Park between C Street and South Church Street. The City will commit to funding and construction of the South Wilmington Sewer Separation project that includes construction of a separate storm drain system and partial sanitary sewer reconstruction along B and C Streets to help alleviate flooding in the Southbridge community. The City will commit to supporting businesses that qualify for the Office of Economic Development's Strategic Fund set-aside for minority owned businesses, as well as providing notices to the Southbridge Civic Association for business development events hosted by the Office of Economic Development and economic development partners such as the Small Business Administration, Small Business Development Center, Delaware Division of Small Business, and Community Development Financial Institutions. Lastly, the City and RDC will commit to advertising and holding outreach events for construction workforce opportunities in nearby disadvantaged neighborhoods.

F. Hazardous Materials

A *Hazardous Materials Survey Technical Report* (**Appendix C**) identifies the existing environmental conditions and assesses the potential impacts of the Build Alternative to the soil and groundwater. All work completed complies with all aspects and amendments of the Resource Conservation and Recovery Act (RCRA) of 1976. RCRA was an amendment to the Solid Waste Disposal Act of 1965, which was the first statute that specifically focused on improving solid

waste disposal methods⁹. The Act sets standards for hazardous waste treatment, storage, and disposal facilities. Per Delaware Code Title 7, Chapter 63 § 6302 (8), hazardous waste is defined as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical or chemical characteristics may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.”

Multiple Brownfield Development Agreements and remedial action plans for the Project study area are either in place with ongoing cleanup initiatives or are under development between the City, the RDC, the EPA, and the Delaware Department of Natural Resources and Environmental Control (DNREC). The City, the RDC, the EPA, and the DNREC assume the responsibility of remediating the hazardous materials within the Project study area. These agreements are separate from this Project and would be followed subsequently. These parties will notify FHWA when they are in compliance with the remediation. Additional details on the specifics on these additional remedial agreements can be found in the Hazardous Materials Survey Technical Report (**Appendix C**).

1. Existing Conditions

To survey the hazardous materials within the Project study area, an environmental database search was completed to identify sites that may pose environmental concerns, publicly available previous environmental reports and regulatory information for sites of potential concern identified in the environmental database were reviewed, and historical maps and aerial photography to identify previous land uses were reviewed. This research indicated that the Project study area was historically used for shipping, manufacturing, and industrial purposes. Currently, the Project study area includes vacant/vegetated lots, surface parking, structures previously used for commercial/industrial purposes, a currently operational gasoline station, former junkyards, and brownfields. Physical site sampling documented in the previous environmental reports that were reviewed stated that soil, groundwater, sediment, and/or surface water samples were analyzed for various contaminants within the Project study area (**Appendix C**). Publicly available records from the DNREC documented various sites within the Project study area are already under investigation and remediation with agency oversight for the last 25 years. Based on the known land uses, sampling results from previous environmental reports and publicly available records, defined portions of the Project study area have

⁹ RCRA defines hazardous waste as a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

documented environmental contamination present in soil and/or groundwater. The degree of impact to the Project study area is discussed below.

2. Direct Effects

The No Build Alternative would not impact or encounter any hazardous materials in the Project study area.

The Build Alternative is anticipated to encounter areas of hazardous materials. **Table 2** and **Figure 6** depict the 16 properties (23 sites) of potential environmental concern within the Project study area. Sites with a low potential for hazardous materials to be present are shown in green; moderate potential for hazardous materials to be present are shown in yellow; and high/significant potential for hazardous materials to be present are red. Three of the 23 sites were determined to have a low potential for hazardous materials present, 17 of the 23 sites were determined to have a moderate potential for hazardous materials present, and four of the 23 sites were determined to have a high/significant potential for hazardous materials present. Defined areas of the Project study area were determined to have been impacted by metals, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), and/or polychlorinated biphenyl (PCB) from current and past site operations at varying levels of concentrations.

Table 2: Summary of Project Study Area Sites of Potential Environmental Concern

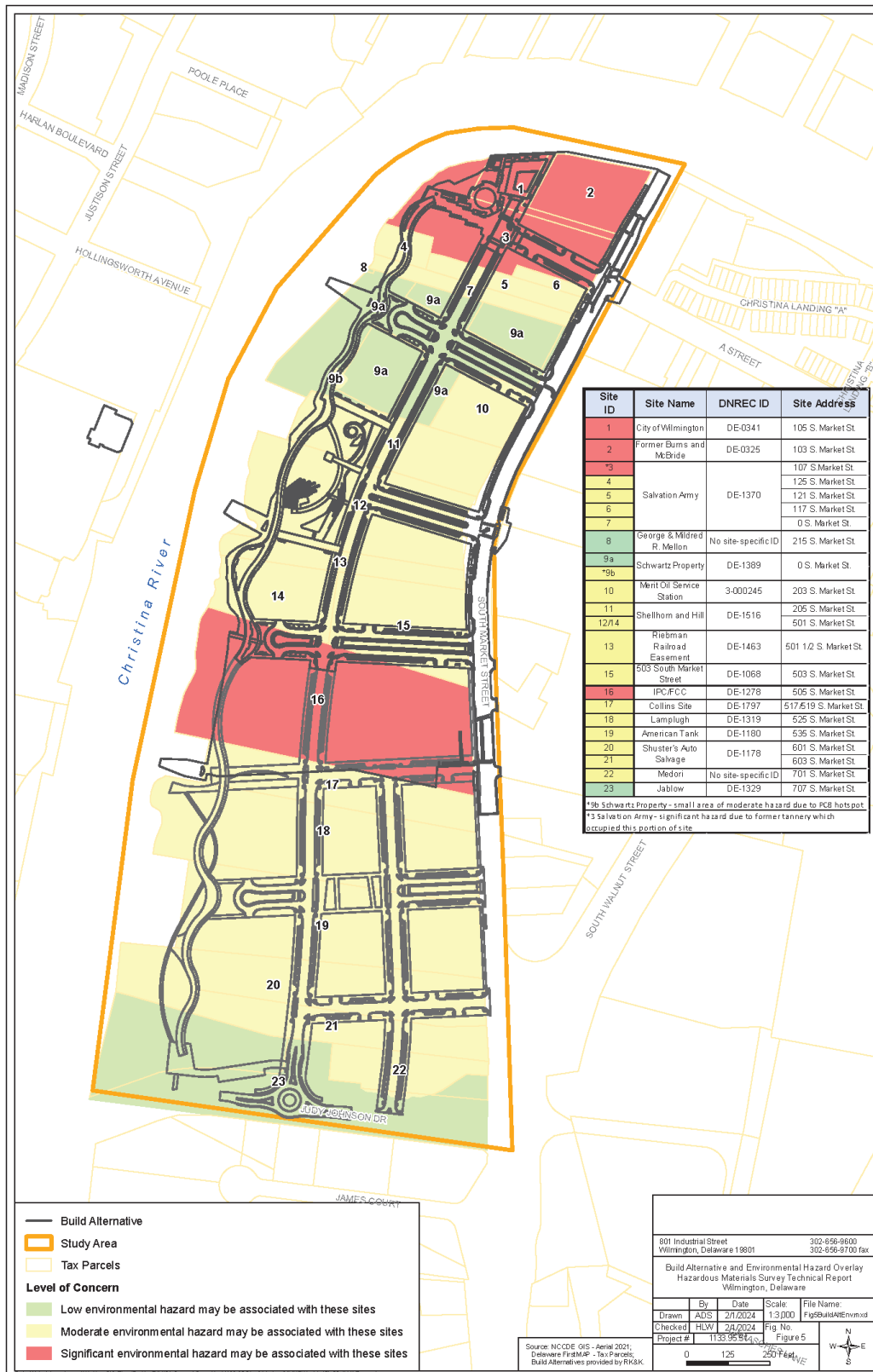
Site ID	Site Name	Site Address	Contaminants of Concern	Remediation Agreement Established
1	City of Wilmington	105 S. Market Street	Shallow Soil: metals, PAHs Deep Soil: metals, PAHs Groundwater: metals, PAHs	Yes
2	Former Burns and McBride	103 S. Market Street	Shallow Soil: metals, PAHs Deep Soil: metals, PAHs, VOCs Groundwater: metals, VOCs	Yes
*3	Salvation Army	107 S. Market Street	Shallow Soil: metals, PAHs Deep Soil: metals, PAHs Groundwater: metals	Yes
4		125 S. Market Street		
5		121 S. Market Street		
6		117 S. Market Street		
7		0 S. Market Street		
8	George & Mildred R. Mellon	215 S. Market Street	N/A	No
9a	Schwartz Property	0 S. Market Street	Shallow Soil: metals, PAHs Deep Soil: metals, PAHs Groundwater: metals Shallow soil and Deep Soil on western portion of property: PCBs	Yes
*9b				
10	Merit Oil Service Station	203 S. Market Street	Groundwater & Deep Soil: petroleum constituents	Yes
11	Shellhorn and Hill	205 S. Market Street	Shallow and Deep Soil: VOCs, SVOCs, metals	Yes
12/14		501 S. Market Street	Groundwater: VOCs, SVOCs, metals	
13	Riebman Railroad Easement	501 ½ S. Market Street	Shallow Soil: metals, PAHs Deep Soil: metals, PAHs Groundwater: metals, petroleum hydrocarbons	Yes
15	503 South Market Street	503 S. Market Street	Shallow Soil: metals, PAHs, PCBs Deep Soil: PAHs, PCBs Groundwater: metals, petroleum products, PAHs	Yes
16	IPC/FCC	505 S. Market Street	Shallow and Deep Soil: metals, PAHs Groundwater: petroleum products, PAHs, metals	Yes
17	Collins Site	517/519 S. Market Street	N/A	Yes
18	Lamplugh	525 S. Market Street	Soil: metals, PAHs, PCBs Groundwater: metals, PAHs	Yes

Site ID	Site Name	Site Address	Contaminants of Concern	Remediation Agreement Established
19	American Tank	535 S. Market Street	Shallow Soil: metals, PCBs Deep Soil: metals, PAHs, PCBs Sediment: metals, PAHs, PCBs Groundwater: metals, PAHs	Yes
20	Shuster's Auto Salvage	601 S. Market Street	Shallow Soil: PAHs, TPH, metals Deep Soil: PAHs, metals	Yes
21		603 S. Market Street	Groundwater: metals	
22	Medori	701 S. Market Street	N/A	No
23	Jablow	707 S. Market Street	Shallow Soil: metals, PAHs, PCBs Deep Soil: metals, PAHs, PCBs Groundwater: metals, VOCs	Yes

Notes: *3 Salvation Army – significant hazards due to former tannery which occupied this portion of the site

*9b Schwartz Property – small area of moderate hazards due to PCB hotspot

Figure 6: Environmental Hazardous Site Status within Project Study Area



3. Indirect Effects

Indirect effects resulting from construction of the Project related to hazardous materials could include leaching of chemicals from one contaminated site to adjacent properties or groundwater. Remediation needed for the transportation infrastructure improvements that are proposed as part of this Project would ensure that the site is prepared and indirect effects from hazardous materials would be mitigated. Additional discussion on indirect effects to hazardous materials is included in **Appendix J**.

4. Cumulative Effects

Past, present, and future development within the indirect and cumulative effects analysis area has occurred and will likely continue to occur in areas that may contain contamination or hazardous materials, specifically in locations where former industrial activity has occurred. All remedial measures for the proposed transportation infrastructure improvements and remediation being carried out by the City, the RDC, EPA, and DNREC would match the appropriate standards of future land use and would comply with all applicable environmental laws and regulations. The incremental effect of the Build Alternative to hazardous materials, in light of past, present, and future impacts, is expected to be relatively minimal due to the due diligence that is being conducted and the proposed remedial actions that would occur during construction of the Project. Additional discussion on cumulative effects to hazardous materials is included in **Appendix J**.

5. Minimization and Mitigation

In locations where the infrastructure improvements would occur, the recommended minimization and mitigation of hazardous materials includes:

- The City and the RDC will continue to work with DNREC to finalize Brownfield Investigation Reports (BIRs) and develop Final Plans of Remedial Action (FPRAs) for all sites where infrastructure would occur.
- The City and the RDC will complete asbestos, lead-based paint, and hazardous materials surveys on all buildings where infrastructure would occur and prepare abatement and management plans for these materials prior to demolition.
- The City and the RDC will collect soil and groundwater samples from moderate sites that have not previously been fully characterized.
- The City and the RDC will perform advanced remediation on moderate and high/significant sites with oversight from EPA and DNREC, where infrastructure would occur.
- The City and the RDC will collect waste characterization samples as appropriate and prepare a map overlay which correlates existing environmental site conditions to project specific design plans and evaluate whether adjustments can be made to minimize exposure.

- The City and the RDC will prepare a Contaminated Materials Management Plan (CMMP), and a site-specific Health and Safety Plan (HASP) to address soil, sediment, groundwater management, environmental health, and worker safety during construction activities; these plans will be included in the construction documents.
- Prior to the start of construction, the City and the RDC will properly abandon all existing monitoring wells located within the Project study area in locations where infrastructure would occur.
- The City and the RDC will continue public notification throughout the construction process.

If any hazardous material is encountered during Project construction, coordination with DNREC regarding the appropriate treatment and disposal options would be made. Additionally, proper precautions would be taken during construction to ensure that construction workers are not exposed to hazardous materials.

G. Noise

A *Noise Technical Report* (**Appendix D**) was completed in accordance with Federal requirements established in 23 CFR 772. Highway traffic noise studies, noise abatement procedures, coordination requirements and design noise levels in 23 CFR 772.1 - 772.19 constitute the noise standards mandated by 23 U.S.C. § 109(i). The City of Wilmington does not have a transportation noise policy that conforms with 23 CFR 772; therefore, DelDOT's Noise Policy (March 2021), which has been approved by FHWA, was used for this noise analysis. Under 23 CFR 772.5, projects are categorized as Type I, Type II, or Type III projects. Due to expanded roadway network, including new roadways and new connections to existing roadways, described in the Build Alternative (**Chapter III.B**), a Type I noise analysis was conducted to evaluate the potential noise impacts that would result from the Build Alternative (refer to **Appendix D, Section II** for additional details).

1. Existing Conditions

To determine the existing noise characteristics within the Project study area, ambient noise measurements were recorded at Christina Landing, an area near the Project study area and an area of frequent human use. Short-term ambient noise measurements of 30-minute duration were acquired on June 1, 2022, at two receptor locations, M-01 and M-02; at Christina Landing, during periods of free-flowing traffic; periods with dry roadways and periods with low to moderate wind speeds. Measured noise levels were then compared to modeled noise levels, which were calculated by the FHWA's Traffic Noise Model, version 2.5 (TNM 2.5). A difference of 3 A-weighted decibels (dBA) or less between measured noise levels and modeled noise levels is deemed acceptable, and receptors M-01 and M-02 were validated with differences of 2 dBA and 1 dBA, respectively (refer to **Appendix D, Section II**).

Additional noise receptors were incorporated into the noise model after validation to predict the worst noise conditions for the loudest hour at all noise-sensitive land use locations within the Project study area. Common Noise Environments (CNE) were used to group together noise receptors that could be exposed to similar noise sources, noise levels, traffic conditions, and topographic features. The five CNEs within the Project study area are shown in **Figure 7** below.

2. Direct Effects

The No Build Alternative would not result in noise impacts to the existing 24 receptors, representing 24 residential noise sensitive land uses.

FHWA requires noise to be analyzed for the “worst noise hour” of the day. The worst noise hour traffic condition represents a combination of vehicle volume, classification mix, and speed that would produce the worst traffic noise condition to be experienced along the Project study area. For future conditions within the Project study area, the worst noise hour typically occurs when traffic volumes approach peak conditions along South Market Street.

Worst noise hour traffic volumes were predicted for the design year 2040. These volumes can consist of either peak AM or PM traffic flow, whichever produces the highest noise levels for a given community, while not exceeding Level of Service (LOS) C. Volumes in excess of LOS C can result in lower speeds and reduced noise levels. Where necessary, traffic volumes were limited to LOS C to simulate the worst noise condition. To determine the loudest hour noise volumes, the peak hour was chosen based on the higher volume intersection wide, with PM peak being the higher volume along South Market Street and New Sweden Street, and AM peak the higher volume within the internal movements of the Phase 1/2 localized street network. For additional traffic analysis details, refer to **Appendix A** of this EA, *South Market Street Redevelopment Master Plan Traffic Operational Analysis*.

A comparison of ranges of predicted noise levels for the Existing (No Build Alternative) and Build Alternative is shown in **Table 3**. Refer to Table 5 in **Appendix D** for the complete noise level data for individual receptors.

Table 3: Predicted Design Year Noise Levels

CNE	Location	Range of Predicted Worst-Hour Leq Exterior Noise Levels (dBA)	
		Existing	Build
B-01	The River Towers at Christina Landing	55-64	55-66
B-02	The Residences at Christina Landing	55	55
B-03	Christina Landing – Single Family Homes	55-57	55-61
C-05	Luxor Lifestyle Wilmington – Outdoor Pool	57	63

Note: Leq, equivalent sound level, is the level of a steady, non-fluctuating sound that represents the same amount of acoustical energy over the same period of time.

The results from TNM modeling indicate that 24 receptors, representing 24 existing residential noise-sensitive land uses will be impacted by traffic-generated noise. The impacts in the entire Project study area fall under Noise Abatement Criteria Category B, all resulting from noise levels that meet or exceed 66 dBA for the design year. There are no significant increases of 12 dBA or more associated with the proposed improvements. B-01 is the only impacted CNE with design year noise levels that meet 66 dBA.

- CNE B-01 (The River Towers at Christina Landing) is predicted to experience 24 impacts
- CNE B-02 (The Residences at Christina Landing) is predicted to experience no impacts
- CNE B-03 (Christina Landing–Single Family Homes) is predicted to experience no impacts
- CNE C-05 (Luxor Lifestyle Wilmington–Outdoor Pool) is predicted to experience no impacts

3. Indirect Effects

The noise analysis conducted for the Project accounts for indirect effects because the existing, No Build, and Build traffic data used for modeling anticipates reasonably foreseeable actions such as those from the build out of the *South Market Street Master Plan*. Indirect effects resulting from noise would primarily occur temporarily during construction of the Project and construction of the resulting mixed-use future development. Refer to **Section V.G.5** and the *Noise Technical Report (Appendix D)* for ways that noise effects could be minimized during construction of the Project. Indirect effects of future development on the site may introduce new sources of noise, but these levels would be expected to be minimal considering the Project study area is located within a developed, urban environment. All future development that occurs would be permitted and would be consistent with the City of Wilmington’s noise policies and/or regulations. Additional discussion on indirect effects to noise is included in **Appendix J**.

4. Cumulative Effects

Past, present, and future development within the indirect and cumulative effects analysis area has occurred and will continue to occur, introducing varying degrees of noise to the urban environment in the Project study area and the urban and suburban environments within the larger indirect and cumulative effects analysis area. Generally, the noise analysis conducted for the Project accounts for cumulative effects because the existing, No Build, and Build traffic data used for modeling incorporates past actions that have happened and anticipates reasonably foreseeable future actions such as the build out of the *South Market Street Master Plan* and other potential transportation improvements. Much of the future development in the indirect and cumulative effects analysis area will be focused on future redevelopment in areas where infrastructure is planned or already exists. The incremental impact of the Build Alternative to noise, in light of past, present, and future impacts, is expected to be relatively minimal due to existing regulatory controls and regulations, as well as the already developed urban environment that it is located in. Additional discussion on cumulative effects to noise is included in **Appendix J**.

5. Minimization and Abatement

Abatement for highway traffic noise must be both feasible and reasonable for approval. Abatement of the projected noise impacts was determined to be not physically feasible for CNE B-01 as construction of a noise barrier within a very short distance between the building and roadway would severely limit access requirements for pedestrians. As abatement was determined to be not feasible, reasonableness was not assessed.

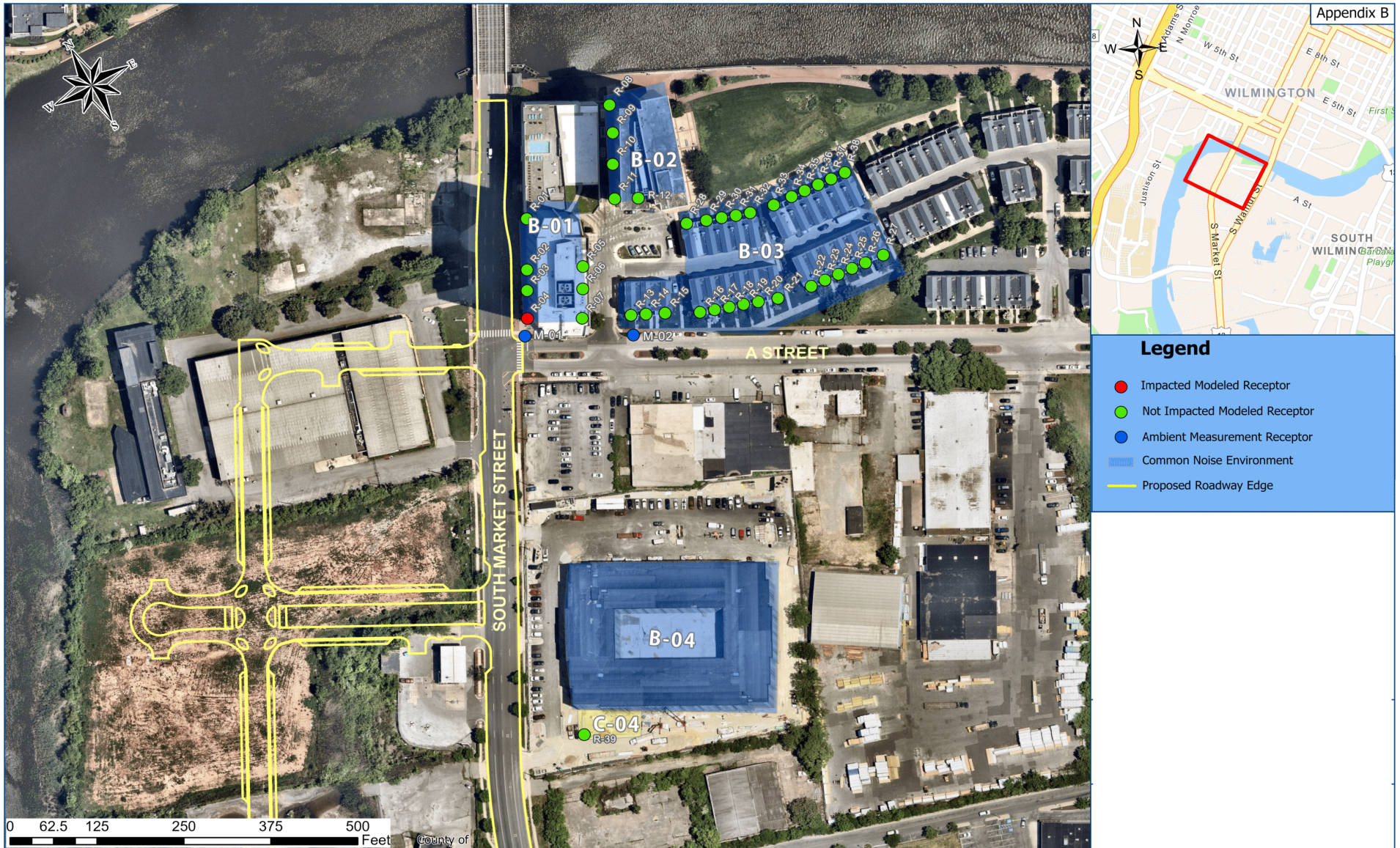
Some measures that may be employed to minimize temporary construction noise include:

- All equipment shall comply with pertinent equipment noise standards of the EPA and have sound-control devices no less effective than those provided on the original equipment.
- No equipment may have unmuffled exhaust.
- Locate stationary construction equipment as far from nearby noise-sensitive properties as feasible.
- Shut off idling equipment.
- Schedule loud construction operations to avoid periods when noise annoyance is likely.
- Notify nearby residents whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- Operate electrically powered equipment using line voltage power or solar power.

In addition, all construction operations shall be in compliance with the City's Code of Ordinances, in particular, Chapter 11 – Environment, Article III – Noise Control and Abatement¹⁰ Section 11-60(c)(7) provides specific construction noise prohibitions as well as defines construction operation times to be restricted to the following: in business and industrial districts at any time before 7:00 a.m. and after 10:00 p.m., Monday through Friday and before 9:00 a.m. and after 10:00 p.m. on Saturday, Sunday, or the day of a legal, national, or state holiday which creates a noise disturbance. In residence districts at any time before 8:00 a.m. and after 7:00 p.m., Monday through Friday; before 9:00 a.m. and after 7:00 p.m. on Saturday; and before 10:00 a.m. and after 5:00 p.m., on Sunday or the day of a legal, national, or state holiday which creates a noise disturbance.

¹⁰ https://library.municode.com/de/wilmington/codes/code_of_ordinances?nodeId=PTIIWICO_CH11EN_ARTIIINOCOAB

Figure 7: Noise Analysis Study Area Map



H. Air Quality

An *Air Quality Technical Report* (**Appendix E**) was completed to document that the project is in compliance with the Clean Air Act Amendment of 1990 and the Final Transportation Conformity Rule (40 CFR Parts 51 and 93) for Ozone (O₃) and Particulate Matter (PM_{2.5}). Air Quality conformity of the transportation plan was met as the project is included in WILMAPCO's currently conforming transportation plan (2023 Update: 2050 Regional Transportation Plan) and WILMAPCO's FY 2025-2028 Transportation Improvement Plan (TIP). Based on the criteria specified in the Transportation Conformity rule and associated guidance, the implementation of the proposed project is not considered to be one of "air quality concern" for fine particulate matter. Therefore, the CAA and 40 CFR 93.116 requirements for PM_{2.5} were met without a hot-spot analysis, since such projects have been found not to be of air quality concern under 40 CFR 93.123(b)(1) (See **Appendix E, Section IV.C.**, PM_{2.5} Assessment). The analysis also addresses Mobile Source Air Toxics (MSATs) qualitatively, and Greenhouse Gas (GHG) quantitatively, although neither are subject to transportation conformity requirements. The results of the air quality analysis are discussed below.

1. Existing Conditions

The Project study area is entirely located within the EPA-designated attainment area for all National Ambient Air Quality Standards (NAAQS) except the 2008 and 2015 8-hour O₃, as well as being designated a maintenance area for 2006 PM_{2.5} standard. Historical monitoring data from the DNREC Division of Air Quality indicates that criteria pollutants concentrations have overall been decreasing in the state over the last two decades. Refer to **Appendix E** for the primary and secondary NAAQS for the criteria pollutants and the Delaware Annual Air Quality Report figures.

2. Direct Effects

The No Build Alternative would not result in any project-related construction. The No Build Alternative would not result in greater traffic volumes or the potential to cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by the EPA.

Traffic forecasts for the Build Alternative are expected to result in greater traffic volumes throughout the Project study area compared to the No Build Alternative; however, the traffic of the Build Alternative is expected to be well below the total annual average daily traffic and diesel truck volume thresholds for a project of air quality concern. Refer to **Appendix E** for design year volume and percentage of diesel vehicles.

Of the criteria pollutants analyzed, the Carbon Monoxide (CO) analysis conducted determined that the increase in the number of vehicles due to the Build Alternative is not significant enough to cause or result in a change in CO emissions. These results, coupled with the Project study area already being designated as an attainment area for CO, concludes that the proposed improvements under the Build Alternative is not anticipated to cause or contribute to a new

violation of the CO NAAQS. PM_{2.5} emissions were also evaluated and compared to the criteria for the Transportation Conformity Rule. The Build Alternative is not considered to be one of “air quality concern” for fine particulate matter and therefore met the project level conformity requirements for PM_{2.5} without a hot-spot analysis. Refer to **Appendix E** for further details regarding the project assessment of CO.

For the proposed improvements of this Project, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT) assuming that other variables such as fleet mix are the same for the No Build and Build Alternative. MSATs emissions were evaluated and were consistent with the latest FHWA guidance, and while MSATs may increase in areas where VMT increases under the Build Alternative, MSAT emissions are expected to be lower in the future regardless of the chosen alternative due to cleaner engine standards and fleet turnover.

Construction of the Project is anticipated to cause temporary increases in emissions which may be caused by heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. The distance fugitive dust particles drift from their source depends on their size, emission height, and wind speed, which could result in indirect impacts from construction.

Ultimately, the Build Alternative meets all applicable air quality requirements and is not predicted to cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by the EPA.

3. Indirect Effects

The Project team conducted assessments for CO and PM_{2.5}, qualitative analyses for MSAT, quantitative analyses for GHG impacts, and the regional conformity analysis for ozone. The results of these analyses could be considered indirect effects because they look at air quality impacts attributable to the Project that occur in the future and later in time. These analyses demonstrate that, in the future, air quality impacts from PM_{2.5} will not cause or contribute to violations of the PM_{2.5} NAAQS, and MSAT emissions will be significantly lower than they are today.

While the plans for future redevelopment have not yet been finalized, future land use within the proposed Project study area is waterfront mixed use and encourages infill and redevelopment in the area. The indirect effects of future redevelopment may be beneficial for the Project study area and greater indirect and cumulative effects analysis area. According to an EPA study¹¹, brownfield redevelopments generally showed significant environmental benefits, including lower vehicle use, reduced carbon dioxide and air pollutant emissions. On average, neighborhoods on former brownfield sites had higher development density, better travel accessibility, and improved transit access. Therefore, no substantial indirect effects to air quality

¹¹ EPA, Air and Water Quality Impacts of Brownfields Redevelopment: A Study of Five Communities; EPA 560-7-10-232, (April 2011), <https://www.epa.gov/sites/default/files/2015-09/documents/bfenvirontimpacts042811.pdf>

are anticipated from the Build Alternative. Additional discussion on indirect effects to air quality is included in **Appendix E and J**.

4. Cumulative Effects

The regional conformity analysis conducted by WILMAPCO represents a cumulative impact assessment for purposes of regional air quality because it assesses the incremental effect of the Project in light of reasonably foreseeable future projects and effects of past and present projects. The most recent conformity analysis demonstrated that the transportation plan and program are in conformance with the SIP and the Project is not anticipated to cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by EPA. Therefore, the cumulative effects of the Project are not expected to be significant. Additional discussion on cumulative effects to air quality is included in **Appendix E and J**.

5. Minimization and Mitigation

Emissions may be produced in the construction of this Project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed following the *DeIDOT Standard Specifications for Road and Bridge Construction*¹². The specifications require compliance with all applicable local, state, and Federal regulations. Further details regarding the minimization and mitigation of construction emissions are included in **Appendix E**.

I. Greenhouse Gas Analysis and Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the Earth's climate system. The Intergovernmental Panel on Climate Change (IPCC), established by the United Nations and World Meteorological Organization in 1988, is devoted to GHG emissions reduction and climate change research and policy. Climate change in the past has generally occurred gradually over millennia, or more suddenly in response to cataclysmic natural disruptions. The research of the IPCC and other scientists over recent decades, however, has attributed an accelerated rate of climatological changes over the past 150 years to GHG emissions generated from human activities, including, but not limited to, the production and use of fossil fuels, industry, and agriculture. The impacts of climate change are being observed in the form of sea level rise, drought, more intense heat, extended and severe fire seasons, and historic flooding from changing storm patterns. Climate change does not affect all people equally. Some communities experience disproportionate impacts because of existing vulnerabilities, historical patterns of inequity, socioeconomic disparities, and systemic environmental injustices. People who already face the greatest burdens are often the ones affected most by climate change.

¹² https://deldot.gov/Publications/manuals/standard_specifications/

Human activities generate GHGs consisting primarily of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, and various hydrofluorocarbons. CO₂ is the most abundant GHG; although CO₂ is a naturally occurring and necessary component of Earth's atmosphere, fossil fuel combustion is the main source of additional, human-generated CO₂ that is the main driver of climate change. In the United States, the primary GHGs produced by the transportation sector are CO₂, CH₄, and N₂O. CO₂ emissions are a product of gasoline or diesel fuel combustion in internal combustion engines, along with relatively small amounts of CH₄ and N₂O. Vehicles with internal combustion engines are a significant source of GHG emissions of the transportation section and contribute to global climate change. Greenhouse gases are also emitted in the extraction and refining of transportation fuels, the construction and maintenance of transportation infrastructure, and the manufacture and delivery of vehicles.

The CEQ published interim, effective guidance on January 9, 2023, regarding how to evaluate GHG emissions and climate change under NEPA. According to the guidance, when conducting climate change analyses in NEPA reviews, agencies should consider the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action, as well as the effects of climate change on a proposed action and its environmental impacts. The CEQ guidance does not establish any particular quantity of GHG emissions as "significantly" affecting the quality of the human environment (CEQ 2023).

The GHG and climate change impact analysis for the Project in accordance with the CEQ (2023) guidance is summarized in the following section; refer to **Appendix B of the Air Quality Technical Report, Appendix E** of this EA for the complete analysis.

1. Existing Conditions

The existing conditions in the Wilmington Riverfront area include a mix of two-way and one-way streets with varying degrees of traffic, parking availability, and signalized intersections. The area historically consisted of former industrial buildings and is currently zoned for mixed land use. The Project study area falls entirely within the FEMA 100-year floodplain, caused by coastal storm surge from the Delaware Bay.

Currently, the area's infrastructure and transportation systems contribute to a small level of emissions, characterized by moderate vehicular traffic and limited availability of public transit options. The 2020 existing year, of which condition accounts for 11,309 average daily VMT, total annualized CO₂ equivalent (CO₂e) emissions is equal to 2,743 metric tons. At a state level, the transportation sector was the largest source of GHG emissions in Delaware in 2018, at 30% of the total GHG emissions. This existing condition sets a benchmark for evaluating the Project's potential to increase or decrease greenhouse gas emissions, taking into account current emission levels and sources within the Project study area.

2. Project GHG Emissions and Effects

The No Build Alternative would result in a very minor increase in traffic volumes; however, it would not have potential to cause or contribute an increase in GHG emissions.

The effects from the Build Alternative on GHG emissions are multifaceted. By enhancing transportation infrastructure, the Project could lead to immediate changes in traffic patterns, potentially reducing congestion and improving vehicle efficiency, which in turn could lower emissions. However, construction activities associated with the Project are likely to result in an increase in emissions due to the additional traffic that will result from the proposed future development, which will travel the additional new alignment roadway built under the Project to serve the area. Additionally, the use of construction equipment and vehicles may result in increased GHG emissions of the Project. Assessing these emissions requires an analysis of the construction phase, anticipated changes in traffic flows, and the operational efficiency of the proposed infrastructure which is considered in the GHG analysis. For the purposes of this GHG analysis, the FHWA Infrastructure Carbon Estimator (ICE) tool was used to determine project construction and operations and maintenance (O&M) emissions, and the Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES) was used to determine on road vehicle emissions and start emissions from parked cars. Refer to **Appendix E** of this EA for additional details.

The Project's GHG emissions stem from construction O&M activities, as well as from vehicle operations. The most significant source of emissions is from the construction and O&M results from the material energy use and emissions, material transportation, and construction process during the construction phase; in addition to vehicle delays resulting from modification of traffic.

Project GHG emissions were estimated by adding the Project construction emissions during construction phase, and the O&M and vehicle operation emissions during 2030 and 2060. The GHG emission analysis was performed for the existing condition, future Build and No Build Alternative in completion year of 2040 and horizon year 2060, and cumulative emissions of construction and operation during 2025 to 2060. Construction of the roadway network for this project will be completed in 2030; however, for the purpose of this analysis the year of 2040 utilized to represent the complete build alternative, assuming the proposed residential and commercial future development is completed and the maximum of traffic operating as a result of the future development. The 2040 date offers the most conservative representation traffic levels, and therefore the most conservative representation of GHG emissions of the Project. Year-by-year GHG emissions from vehicle operation from 2030 to 2060 were calculated using MOVES4 (refer to **Appendix B, Appendix E, Attachment 1** for the year-by-year emissions from the Project). The influence of parked car emissions was quantified by the MOVES4 model that accounts for operational emissions, and included vehicle start processes for a conservative estimation of 200 parking places.

Projections for vehicle operation emission rates indicate a 30% reduction in GHG emission rates

by the 2040 and 2060 No Build conditions compared to the base year of 2020, despite an increase in vehicle miles traveled (VMT) due to regional growth. This anticipated reduction is attributed to fleet turnover, improved fuel economy, and the adoption of alternative fuel vehicles. However, the Build Alternative is expected to increase GHG emissions predominantly from roadway operations, increasing by approximately 76% in 2040 and 75% in 2060, due to new roadway alignments that increase VMT. The cumulative GHG emissions analysis up to 2060 suggests that technological and efficiency improvements may lower overall emissions. Nonetheless, the construction of and the long-term operations of the infrastructure improvements under the Build Alternative are anticipated to substantially increase emissions, as shown in **Table 4**.

Table 4: Annualized (CO₂e) Greenhouse Gas (GHG) Emissions¹

Year	2020	2040		2060	
Scenario	Existing Condition	No Build	Build	No Build	Build
Units	Metric ton/year	Metric ton/year	Metric ton/year	Metric ton/year	Metric ton/year
Construction					
Lighting	0	0	20	0	20
Pathways	0	0	5	0	5
Roadways (Construction and O&M)	24	24	76	24	76
Vehicle Delay	0	0	86	0	86
Total	24	24	187	24	187
Operation					
Vehicle Operations ^{2 3}	2,695	1,853	3,106	1,856	3,103
Total Construction and Operation	2,719	1,877	3,293	1,880	3,290
Difference Build vs No Build	NA	NA	1,417	NA	1,411
Difference Build vs No Build %	NA	NA	76%	NA	75%
Difference from Existing Condition	NA	-842	575	-839	571
Difference from Existing Condition %	NA	-31 %	21%	-31%	21%

Notes: NA – not applicable

1. Annualized greenhouse gas emissions for each activity were taken from the Introduction to the Infrastructure Carbon Estimator (ICE), Version 2.8 tool used for this Project, with the exception of vehicle operational emissions, which were taken from the Environmental Protection Agency (EPA) Motor Vehicle Emission Simulator (MOVES) modeling performed for this Project. Emissions from the ICE tool were annualized assuming a 35-year timespan of the Project.

2. A 1.27 multiplicative factor was applied to vehicle operational emissions to obtain the total well-to-wheel emissions

GHG emissions from vehicle operation were also calculated by multiplying the vehicle tailpipe emissions by a 1.27 factor to account for the upstream GHG emissions associated with fuel extraction, production, and transportation. The overall well-to-wheel GHG emissions are the sum of the tailpipe emissions and the upstream emissions. When compared to the No Build Alternative in future years, the Build Alternative has increased emissions. The Build Alternative would increase GHG operation emissions by 1,417 MT CO₂e (76 percent) in 2040, and 1,411 MT CO₂e (75 percent) in 2060 compared to the No Build Alternative. The comparative increase between the No Build and Build Alternatives is primarily the result of new alignment roadway

that is accounted for in the increased VMT. Summaries of the operational well-to-wheel GHG emissions of the existing condition and project alternatives are in the GHG Analysis (**Appendix E**).

Greenhouse gas emissions stem from the Project's influence on potential land use changes and long-term transportation behaviors. The effects of the proposed infrastructure improvements would lead to increased density and higher vehicular traffic over time. This growth could result in greater energy consumption and emissions unless offset by sustainable development practices, such as increased use of public transit, and the promotion of walking and cycling.

3. Cumulative Effects

Cumulative effects take into account the Project's emissions in the context of past, present, and reasonably foreseeable future actions. These include other future planned developments and infrastructure projects in the Wilmington Riverfront area and their combined impact on GHG emissions. Evaluating cumulative effects requires a comprehensive approach that considers the incremental impact of the Project alongside other initiatives, assessing how these combined efforts contribute to or mitigate against regional and national greenhouse gas reduction targets. Cumulative Project GHG emissions were estimated by adding the Project construction emissions during construction phase, and the O&M and vehicle operation emissions during 2030 and 2060. Year-by-year GHG emissions from vehicle operation between 2030 and 2060 were estimated by linearly interpolating the vehicle emissions. A 190% increase of GHG emissions is largely due to the traffic growth resulting from the future planned development and infrastructure, and the VMT that travels from the new roadway alignment of the Project. The cumulative social cost of GHG emissions (SC-GHG) of the Project is also summarized in **Table 5**, and in the GHG Analysis (**Appendix E**). The SC-GHG of the Build Alternative is anticipated to be about 188 percent higher than the No Build Alternative for the 2040 emission year, and about 187 percent higher than the No Build Alternative for the 2060 emission year.

Table 5: Social Cost of Greenhouse Gases for Emissions in 2060 (in 2020 dollars) and Comparisons to No Build Alternative

Discount Rate (%)	SC-GHG (\$) for 2030-2060	
	No Build	Build
5.00%	\$1,287,217	\$2,158,040
3.00%	\$3,593,991	\$6,025,448
2.00%	\$4,992,022	\$8,369,321
3% 95th Percentile	\$11,002,773	\$18,446,514
Discount Rate (%)	Changes of SC-GHG Compared to No Build (\$)	
	No Build	Build
5.00%	N/A	\$870,824
3.00%	N/A	\$2,431,457
2.00%	N/A	\$3,377,299
3% 95th Percentile	N/A	\$7,443,741

Discount Rate (%)	Changes of SC-GHG Compared to No Build (%)	
	No Build	Build
5.00%	N/A	67.65%
3.00%	N/A	67.65%
2.00%	N/A	67.65%
3% 95th Percentile	N/A	67.65%

4. Minimization and Mitigation

Minimization strategies to address GHG emissions include: the implementation of construction best practices to reduce emissions, the integration of sustainable transportation options to lower future emissions, and the use of green infrastructure to enhance carbon sequestration. Efforts to minimize and mitigate emissions are aligned with broader environmental objectives, ensuring that the Project contributes positively to the region's sustainability and resilience against climate change. Mitigating GHG emissions is vital for addressing climate change.

In Delaware, construction projects present an opportunity to implement emission reduction strategies. The State of Delaware promotes a variety of methods to lower GHG emissions, including optimizing construction schedules, reducing vehicle and equipment idling, installing energy-efficient lighting, and enhancing urban greening through tree planting, promoting sustainable commuting practices among construction workers, and prioritizing the recycling of construction materials. In addition to the State's efforts, the City of Wilmington has developed the 2022 *Resilient Wilmington: Preparing Today for Tomorrow's Climate Risks*¹³ to build resilient against climate change impacts, focusing on mitigating heavy rainfall, flooding, extreme heat, and addressing sea level rise. The Resilient Wilmington Plan includes elevating infrastructure to protect against flooding, integrating resilience into future redevelopment plans, and enhancing stormwater management through both gray and green infrastructure. These initiatives underscore Delaware's commitment to reducing the environmental and social impacts of construction projects and improving climate resilience, particularly in light of projected sea level rises that pose a significant risk to the state's low-lying areas.

To withstand the climate change effects, especially the effects due to increased temperature and precipitation, the design of the Build Alternative includes the following strategies, and additional strategies will be considered in final design:

- Incorporate pedestrian and cyclist accommodations to enhance connectivity and reduce carbon footprint;
- Construct a multi-use Riverwalk and open space areas for increased green space and public access to riverfronts; and

¹³ <https://www.wilmingtonde.gov/home/showpublisheddocument/10643/637846654834170000>

- Elevate transportation elements according to FEMA Floodplain Regulations to protect against flood-related damage, ensuring that new and existing roads, sidewalks, and the Riverwalk are above the 100-year flood elevation.

In addition to the design strategies, additional planning strategies would also make the Project more resilient to climate change effects. In the event of extreme storms and roadway closures, advance preparation would help the City and State quickly respond and recover from potential climate change hazards. Advanced preparation and planning strategies can include infrastructure assessments after storm or other climate events and the development of extreme weather risk frameworks. Planning strategies may include:

- Developing asset management and maintenance programs to ensure the new infrastructure elements are monitored and remain in good condition for the Build Alternative.
- Evaluating the resiliency of detour routes to minimize distance traveled during road closure events.

J. Cultural Resources

Cultural resources were evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800). Federal agencies are required to take into account the effects of the Project on historic properties, those that are listed, or determined eligible for listing on the National Register of Historic Places (NRHP).

In January 2023, FHWA initiated Section 106 Consultation with the Delaware State Historic Preservation Office (DE SHPO), who resides in the Division of Historical and Cultural Affairs. In February 2023, FHWA initiated consultation with Federal Tribes who have an interest in the project area; the Delaware Nation and the Delaware Tribe of Indians accepted the invitation. In March 2023, the DE SHPO requested adjustments to the area of potential effects (APE), the geographic area within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The DE SHPO concurred with a revised APE in May 2023 and requested the completion of an architectural evaluation-level survey and an archaeological Phase IA assessment. In June 2023, FHWA invited parties with potential interest in the Project to become Consulting Parties. The DE SHPO, DelDOT, the City of Wilmington Historic Preservation Planner, Preservation Delaware, Inc., and the Lenape Indian Tribe of Delaware accepted the invitation. A Consulting Parties meeting was held on July 17, 2023 to discuss the results of the identification surveys. Both reports were revised to address concerns raised by the consulting parties. The DE SHPO concurred with the findings in a revised letter dated January 24, 2024. Copies of Section 106 consultation and correspondence documents are available in **Appendix F**, the *Architectural Evaluation-Level Survey Technical Report*.

1. Historic Structures

a. Existing Conditions

An architectural survey was conducted within the 160.22-acre Architectural APE to identify all above-ground cultural resources (buildings, structures, objects, cemeteries, landscapes, district, etc.) that are 40 years or older (pre-1984) (**Figure 8**). Twenty-eight architectural properties were identified, and a field survey was completed on June 7, 2023. Properties were documented on DE SHPO Cultural Resources Survey forms, as appropriate, and evaluated for NRHP eligibility. Of the 28 buildings or structures identified within the Architectural APE, seven were determined eligible for the NRHP, 15 were determined not eligible, and six were observed as having been demolished. **Figure 8** below displays the locations of the 28 properties identified within the Architectural APE.

South Market Street Bridge (N01434), the Baltimore & Ohio Railroad Passenger Station (N03570), and the Kent Building (N12470) were previously determined NRHP eligible. Additionally, the DE SHPO concurred that four previously unevaluated properties, the Dravo Shipyard Cranes (N12438.02 – N12438.05), are NRHP eligible. Refer to **Appendix F** for additional historical context and identification and evaluation efforts within the APE.

b. Direct Effects

The No Build Alternative would have no effect on any above-ground historic properties.

With the introduction of vehicular and pedestrian improvements, the Build Alternative has the potential to alter the setting of the above-ground historic properties. In accordance with the implementing regulations of Section 106, the criteria of adverse effect were applied to the historic properties within the architectural APE. The Build Alternative would not adversely affect any of the characteristics of the historic properties that qualify the properties for inclusion in the NRHP in a manner that would diminish the integrity of the properties' locations, design, setting, materials, workmanship, feeling, or association. All above-ground historic properties are outside of the LOD, and the Project would not result in immediate physical impacts to the resources.

c. Indirect Effects

Potential indirect effects could occur to historic structures resulting from future increased population growth and development in the APE, which could occur as future redevelopment of the Project study area occurs in accordance with the *South Market Street Master Plan*. However, the APE is located within a previously disturbed, developed urban environment that primarily features properties historically associated with transportation, manufacturing, and industry. Through future redevelopment of the Project study area, more intensive land uses could lead to destruction or degradation of these resources, if older structures are cleared to make way for new construction. Additional discussion on indirect effects to historic structures is included in **Appendix J**.

d. Cumulative Effects

Past actions that may have affected historic structures include infrastructure and land development projects. The APE is in a previously disturbed, developed urban environment where some destruction or degradation of architectural resources for new construction or changes in land use have occurred. Present and future actions, including transportation projects and land development activity, may continue to affect historic properties to some extent; however, for Federally funded transportation projects, existing protective regulations and consultation requirements associated with Section 106 would minimize and mitigate for such effects, reducing the overall net effect to historic properties.

The Build Alternative would have no adverse effects to historic properties. In light of past, present, and future actions in the indirect and cumulative effects analysis area, the Build Alternative is not expected to contribute substantially to the incremental effect on these resources. Additional discussion on cumulative effects to historic structures is included in **Appendix J**.

a. Minimization and Mitigation

The Build Alternative has the potential to alter the setting of the above-ground historic properties with the introduction of vehicular and pedestrian improvements. However, the Build Alternative would not adversely affect any of the characteristics of the historic properties that qualify the properties for inclusion in the NRHP in a manner that would diminish the integrity of the properties' locations, design, setting, materials, workmanship, feeling, or association. Thus, minimization and mitigation would not be required for above-ground resources.

Figure 8: Identified Architectural Resources within the APE



2. Archaeological Resources

a. Existing Conditions

A Phase IA archaeological assessment of the Archaeological APE was conducted to review previously recorded archaeological site data, identify previous surveys in the project vicinity, locate areas with the potential to have unrecorded archaeological sites, and provide recommendations regarding additional archaeological investigations that may be necessary to identify archaeological resources prior to ground disturbing activities. The Archaeological APE of 60.7 acres was extensively researched for environmental history and past use.

It is recommended that the Archaeological APE has the potential to contain intact archaeological resources associated with Archaic (6,500 to 3,000 BC), Woodland I (3,000 BC to AD 1,000), Industrialization and Early Urbanization (1830-1880), Urbanization and Early Suburbanization (1880-1940), and Suburbanization and Early Ex-urbanization (1940-present) periods. Therefore, it is also recommended that Phase I surveys occur in four areas, measuring a total of 29.8 acres, within the Study Area. **Table 6** summarizes survey recommendations for each of the four recommended survey areas. Refer to **Appendix G, Phase IA Archaeological Assessment**, for figures and additional details on research results and recommended survey locations. The archaeological identification surveys will be phased as provided in 36 CFR 800.4(b)(2), stipulated in the Project Programmatic Agreement (PPA), and implemented following the completion of the EA because of the complexity surrounding the presence of hazardous materials and implementation of health and safety plans prior to conducting archaeological identification surveys.

Table 6: Summary of Phase I Survey Recommendations

Survey Area No.	Acreage	Potential Assessment	Phase I Testing Recommendations
1	4.4	19th- and 20th-century industrial and residential occupation	Construction monitoring followed by judgmentally placed trenches
2	7.8	Precontract and 19th-century residential occupation	Pedestrian/shovel testing of previous surfaces and mechanical trenching, as necessary
3	1.1	19th- and 20th-century railroad and bridge abutments	Pedestrian survey and shovel testing
4	16.5	Precontact and 20th-century residential occupation	Pedestrian/shovel testing of pervious surfaces and mechanical trenching, as necessary

b. Direct Effects

The No Build Alternative would have no effect on any archaeological properties.

The Project has the potential to adversely affect archaeological historic properties, should they be present within the below-ground APE. Therefore, FHWA has developed a PPA to stipulate the completion of a phased identification of archaeological historic properties (refer to **Appendix H**). The PPA includes stipulations for the completion of archaeological identification surveys, and as needed, evaluation of archaeological sites and mitigation of archaeological historic properties. The PPA also includes stipulations for the Section 106 review of Project fill sources, for which the Project has the potential to adversely affect archaeological historic properties.

c. Indirect Effects

Potential indirect effects could occur to archaeological resources resulting from future increased population growth and development in the Archaeological APE, which could occur as future redevelopment of the Project study area in accordance with the *South Market Street Master Plan*. The Archaeological APE is within a previously disturbed, developed urban environment. Land development can lead to destruction or altering the integrity of historically important characteristics of archaeological resources.

d. Cumulative Effects

Similar to historic structures, past actions that have may have affected archaeological resources include infrastructure and land development projects. Present and future actions, including transportation projects and land development activity, would likely continue to affect these resources to some extent; however, for Federally funded transportation projects, existing protective regulations and consultation requirements associated with Section 106 would minimize and mitigate for such effects, reducing the overall net effect to archaeological resources.

Effects to archaeological resources under the Build Alternative have not yet been determined. The PPA documents additional work and commitments that would be required following the NEPA decision, including the Section 106 review of Project fill sources, for which the Project has the potential to adversely affect archaeological historic properties. In light of past, present, and future actions in the indirect and cumulative effects analysis area, the Build Alternative is not expected to contribute substantially to the incremental effect on these resources. Additional discussion on cumulative effects to archaeological resources is included in **Appendix J**.

e. Minimization and Mitigation

As the Build Alternative has the potential to damage or destroy archaeological resources, the PPA documents additional work and commitments that would be required following the NEPA decision for this Project. The PPA stipulates the completion of a phased identification of, and minimization and mitigation of archaeological historic properties, should they be present. Refer to the PPA included in **Appendix H**.

K. Wetlands and Waters

Wetlands and waterways are protected by several Federal and state regulations. Waters of the U.S. (WOTUS), including wetlands, are jointly defined by the EPA and the U.S. Army Corps of Engineers (USACE) in 40 CFR 120.2 and 33 CFR 328.3.

Tidal wetlands, as well as non-tidal wetlands that include 400 or more contiguous acres are regulated under the Delaware Wetlands Act (7 Del. Code, Chapter 66) and the Wetlands Regulations (7 DE Admin. Code 7502). Delaware regulates all tidal waters (up to the mean high-water line) as well as all non-tidal rivers, streams, lakes, ponds, bays, and inlets (National Wetlands Inventory up to the ordinary high water line) under the Subaqueous Lands Act (7 Del. Code, Chapter 72) and the Regulations Governing the Use of Subaqueous Lands (7 DE Admin. Code 7504).

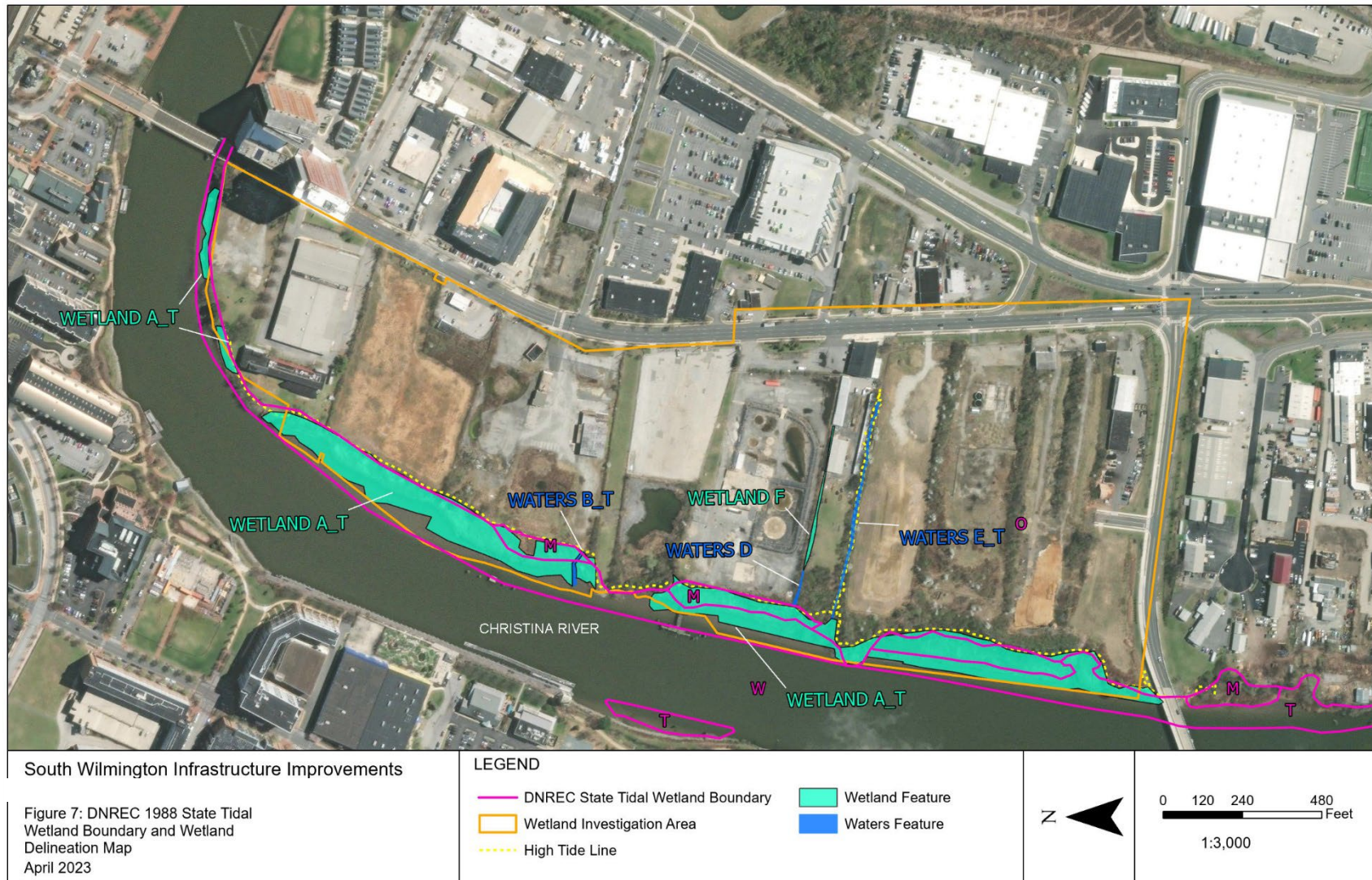
Additional information on wetlands and waterways can be found in the Wilmington Riverfront Transportation Infrastructure Project *Natural Resources Technical Report* (NRTR) (**Appendix I**).

1. Existing Conditions

A desktop review of mapped waterways and nontidal/tidal wetlands within the Project study area was conducted using National Wetlands Inventory Wetlands Geographic Information System data and Delaware DNREC 1988 Tidal maps. Environmental scientists delineated wetlands and waterways within the Project study area from November 2018 through May 2022.

Three tidal waters, one non-tidal, perennial Waters of the U.S., one estuarine emergent wetland, one palustrine emergent wetland, two DNREC mapped tidal mudflats, three DNREC state mapped tidal marsh areas, and five DNREC subaqueous lands (DNREC designation for its regulated resources) were delineated within the Project study area (**Figure 9**).

Figure 9: DNREC 1988 State Tidal Wetland Boundary and Wetland Delineation Map



Wetlands and waters were assessed using the Rapid Bioassessment Protocols, the midTRAM method, and the USACE Highway Methodology. Additionally, the biological, chemical, and physical function of the Christina River was assessed visually in the field and by review of available data. The Christina River has poor water quality due to high sediment loads, a high level of toxins due to the industrial land use along much of its banks, and high levels of nitrogen, phosphorus, and bacteria. Much of the floodplain of the Christina River is developed, which does not allow for natural floodplain interactions and flood flow dynamics. There is also a high level of invasive plant and animal species in the river. While the Christina River provides habitat for many species and provides recreational use, the system is highly degraded from anthropogenic disturbances.

2. Direct Effects

The No Build Alternative would have no impact on wetlands or waters.

Direct impacts to wetlands and waters associated with construction of the Build Alternative include grading, riprap installation, and construction-related access. Direct impacts may lead to a decrease in available wetland and waters habitat within the Project study area and ultimately a decrease in plant and animal species inhabiting these areas.

The wetlands within the Project study area are categorized as tidal and nontidal wetlands and WOTUS, including perennial streams. **Table 7** and **Table 8** summarize the direct impacts to delineated features in square feet (SF), linear feet (LF), or acres (AC), by agency.

Table 7: Summary of Direct Impacts to USACE Regulated Resources

Feature and Classification	AC	SF	AC	SF	AC	SF
	Permanent		Temporary		Total	
Wetlands	0.28	12,257	0.73	31,755	1.01	44,012
Waters	0.25	10,994	0.54	23,653	0.79	34,647
Grand Total	0.53	23,251	1.27	55,408	1.80	78,659

Table 8: Summary of Direct Impacts to DNREC Regulated Resources

Feature and Classification	AC	SF	AC	SF	AC	SF
	Permanent		Temporary		Total	
Tidal Marsh Wetlands	0.08	3,642	0.19	8,072	0.27	11,714
Tidal Mudflat Wetlands	0.27	11,743	0.87	37,893	1.14	49,636
Subaqueous Lands	0.10	4,547	0.10	4,164	0.20	8,711
Grand Total	0.45	19,932	1.16	50,129	1.61	70,061

These wetlands and waters impacts would require the following permits in Delaware:

- A Department of the Army permit pursuant to Rivers and Harbors Act Section 10 and Clean Water Act Section 404 will be required for the USACE impacts identified above. It is anticipated that confirmation of authorization will occur under Nationwide permits 38 (for Cleanup of Hazardous and Toxic Waste) and 14 (for Linear Transportation Projects).
- A Section 401 Water Quality Certification from DNREC is required before a Department of the Army permit can be issued for potential water quality impacts to wetlands. DNREC has issued Section 401 Water Quality Certifications for Nationwide Permits 38 and 14.
- A Coastal Zone Management Act Consistency Certification (CZM) from the DNREC Delaware Coastal Management Program is required before a Department of Army permit can be issued. The Delaware Coastal Management Program has issued CZM for Nationwide Permits 38 and 14.
- A Wetlands Permit from DNREC.
- A Subaqueous Lands Permit from DNREC.

3. Indirect Effects

Indirect effects to wetlands and waters could result from remediation and future development of the parcels adjacent to the transportation infrastructure improvements and roadway runoff, sedimentation, and changes to hydrology. Indirect effects are anticipated to lead to a decrease in available wetland and waterway habitat within the Project study area and could ultimately lead to a decrease in plant and animal species inhabiting these areas. **Table 9** and **Table 10** summarize the direct impacts to delineated features in square feet (SF), linear feet (LF), or acres (AC), by agency.

Table 9: Summary of Indirect Impacts to USACE Regulated Resources

Feature and Classification	AC	SF	AC	SF	AC	SF
	Permanent		Temporary		Total	
Wetlands	0.04	1,803	0.00	0	0.04	1,803
Waters	0.02	1,021	0.00	0	0.02	1,021
Grand Total	0.06	2,824	0.00	0	0.06	2,824

Table 10: Summary of Indirect Impacts to DNREC Regulated Resources

Feature and Classification	AC	SF	AC	SF	AC	SF
	Permanent		Temporary		Total	
Subaqueous Lands	0.02	984	0.00	0	0.02	984
Grand Total	0.02	984	0.00	0	0.02	984

The Project study area is contained to a small area within the Lower Christina River 12-digit Hydrologic Unit Code (HUC) watershed and is not likely to have indirect effects further downstream along the Christina River. Indirect effects would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation as needed to offset wetland losses. Additional discussion on indirect effects to wetlands and waters is included in **Appendix J**.

4. Cumulative Effects

Past land use development and transportation projects have had effects on wetlands and waterways, particularly those that occurred prior to the passage of state and Federal laws that regulate wetland and waterway effects. Since laws were implemented, effects to wetlands have largely been offset by required mitigation, including construction of new wetlands.

The Build Alternative is anticipated to contribute a relatively minor incremental effect towards the long-term trend of wetland loss, which has more recently slowed due to protective legislation. The incremental effect would be minimized by the required permitting process, which would identify avoidance, minimization, and mitigation, as appropriate. Additional discussion on cumulative effects to wetlands and waters is included in **Appendix J**.

5. Minimization and Mitigation

Efforts to avoid and minimize impacts have occurred throughout the planning process and will continue during more detailed phases of design. Avoidance and minimization efforts to reduce impacts to wetlands and waters involve making every reasonable effort to avoid wetlands and waterways to the maximum extent practicable.

Wetland and stream impacts from the Build Alternative are unavoidable. These unavoidable impacts have been minimized to the extent practicable while still achieving the contaminant cleanup goals within the infrastructure improvements area and meeting DNREC stormwater regulations.

The Project team will work with DNREC and USACE during the Federal and state permitting processes to determine the loss versus impact resulting from the Project activities and identify appropriate mitigation for losses. The initial compensatory mitigation approach would be to enhance phragmites dominated tidal wetlands, on-site, along the Project shoreline. Compensatory mitigation plans developed, as required by Federal and state regulations, would comply with the requirements included in the 2008 mitigation rule, including provision for long-term management, adaptive management, and site protection. The permit applicant would be responsible for executing wetland and water mitigation requirements concurrent with Project construction, monitoring mitigation success, and long-term management of the mitigation sites in accordance with state and Federal permit conditions. The condition of wetlands that would undergo temporary impacts will be assessed prior to construction and following construction,

temporarily impacted wetlands will be restored, if needed, according to the special conditions of the state and Federal permits.

L. Watersheds and Surface Waters

Surface waters include rivers, streams, and open water features such as ponds and lakes. Section 401 and Section 402 of the Federal Clean Water Act (CWA) (33 U.S.C. 1341 and 1342) regulate water quality and the introduction of contaminants to waterbodies. Section 401 of the CWA prohibits any applicant for a Federal permit or license “to conduct any activity that may result in any discharge into waters of the United States, unless the State or authorized Tribe where the discharge would originate either issues a Section 401 water quality certification finding compliance with applicable water quality requirements or certification is waived” (40 CFR Part 121). DNREC has issued Section 401 Water Quality Certifications for Nationwide Permits 38 and 14.

In compliance with CWA Sections 303(d), 305(b), and 314 and the Safe Drinking Water Act (SDWA), states are required to develop a prioritized list of waterbodies that currently do not meet water quality standards. The 303(d) prioritized list includes those waterbodies and watersheds that exhibit levels of impairment requiring further investigation or restoration. DNREC uses monitoring data to compare waterbody conditions to water quality standards and determine which streams should be listed.

Like all surface waters, surface drinking water supplies are protected under Section 401 and Section 402 of the Federal CWA (33 U.S.C. 1341 and 1342), which regulate water quality and the introduction of contaminants to waterbodies based on designated use classes.

Additional information on watersheds and surface waters can be found in the Wilmington Riverfront Transportation Infrastructure Project *NRTR* (**Appendix I**).

1. Existing Conditions

The Project study area is located within the Christina River Watershed which is part of the larger Piedmont Drainage Basin. The Christina River Watershed covers about 50,000 acres and extends across Cecil County, Maryland; New Castle County, Delaware; and Chester County, Pennsylvania. The Christina River flows 35 miles west within an urban corridor from the Delaware River. Historically, industrialization along the Christina River negatively impacted habitat health and water quality; however, increased efforts to restore wetlands and waters throughout the watershed provides a wide range of benefits to residents and wildlife. The Christina River’s tidal stretch begins at its confluence with the Delaware River and ends around Christiana, Delaware.

Surface water quality within the Project study area was assessed based on data obtained through the DNREC General Assessment Monitoring Network (GAMN) and the EPA’s Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS) 2022 Report for the Mid Christina River Waterbody. The Mid Christina River Waterbody is categorized as impaired based on the updated EPA ATTAINS data. Nitrogen and phosphorus concentrations downstream

of the Project study area occasionally exceed the current Delaware water quality standard and are seasonally influenced. The Christina River has total maximum daily load plans in place for bacteria, sediment, nutrients, and dissolved oxygen in both low and high flow conditions.

2. Direct Effects

The No Build Alternative would have no effect on surface waters or watershed characteristics of the Christina River and on-site tidal and non-tidal channels.

The Build Alternative is anticipated to affect surface waters and watershed characteristics due to direct impacts to tidal and perennial channels and the Christina River. However, the three channels the Project would impact have a drainage area of 0.03 square mile and they provide an insignificant contribution of water flow to the Christina River, which has a drainage area of 565 square miles. Site drainage will continue to convey the water that currently flows into these channels to the Christina River. Currently, the Project study area has 23.3 acres of impervious area. As part of the Build Alternative, all of the existing impervious surface is anticipated to be removed. The proposed transportation improvements are anticipated to reduce impervious area to 18.6 acres, a decrease of 4.7 acres, which could reduce the amount and intensity of stormwater runoff entering surface water features within the Project study area.

Pollutants such as oil, grease, sediment, heavy metals, and petroleum that have been transported from impervious surfaces via stormwater runoff could be released into waterbodies around the Project study area. Without proper construction controls, contaminated soils and runoff would enter nearby surface waters. There is evidence indicating that even low levels of some contaminants of emerging concern in the environment may affect wildlife, but there is no indication that they pose a threat to human health from consuming water treated to current EPA standards.

3. Indirect Effects

As construction of future development occurs on the Project study area, there would likely be an overall increase in impervious area, which could indirectly affect the amount and intensity of stormwater runoff entering the watershed and surface water features within the Project study area.

Stormwater quality and quantity requirements would be met through brownfield remediation and conveyance structure use, which would facilitate the flow and discharge of stormwater into surface waters in the Project study area and reduce the possibility of indirect effects from increased pollution and erosion. Resiliency solutions would be incorporated into the Build Alternative to further ensure efficient collection of surface runoff and adequate conveyance of stormwater throughout the Project study area to meet current and future needs. Additional discussion on indirect effects to watersheds and surface waters is included in **Appendix J**.

4. Cumulative Effects

Within the indirect and cumulative effects analysis area, past land use practices and development have had effects on surface waters, watershed characteristics, and relative health of surface waters despite existing regulations and policies. Adverse effects on stream and water quality are likely to continue from development. Future redevelopment in the Project study area would likely increase the amount of impervious surface in that area. Future development would likely result in lesser effects than past activities, due to state and local regulations. The Project and future redevelopment would be contained to a small area and would therefore contribute a relatively small incremental effect to an increase in impervious surfaces and stormwater runoff. Additional discussion on cumulative effects to watersheds and surface waters is included in **Appendix J**.

5. Minimization and Mitigation

Direct effects to surface waters would be minimized in accordance with the Delaware 5101 Sediment and Stormwater Regulations. Per these regulations (Sections 5.6.2.1 and 5.3.3.3), the quality and quantity requirement are met through brownfield remediation and conveyance structure use best management practices (BMPs).

As detailed in the remedial action plans, two feet of clean fill cap will be used to prevent contaminated soil erosion and human contact in the transportation improvement area. Hazardous material testing requirements would ensure that the clean fill used during construction is not contaminated. A closed storm drain network will be used for the non-erosive conveyance. Excavation associated with stormwater facilities with vertical depth is discouraged within brownfield sites due to the underlying contaminated soils.

M. Groundwater and Hydrology

In 1974, Congress passed the SDWA to regulate the public drinking water supply. The SDWA Amendments of 1986 require each state to develop Wellhead Protection Programs to assess, delineate, and map source protection areas for their public drinking water sources, and determine potential risks to those sources (42 U.S.C. § 300h-7).

Delaware adopted safe water drinking regulations in May of 1971 in conformance with Title 16 Section 122(3)(c) of the *Delaware Code* and has had several revisions, with the most recent in 2005.

The EPA, as authorized by Section 1424(e) of the SDWA, is responsible for the Sole Source Aquifer (SSA) Program, which allows the EPA to designate an aquifer as a sole source of drinking water and establish a review area for any Federally funded Projects that fall within the area (42 U.S.C. § 300h-6).

Additional information on groundwater and hydrology can be found in the Wilmington Riverfront Transportation Infrastructure Project *NRTR* (**Appendix I**).

1. Existing Conditions

Groundwater is an important resource and commodity for the State of Delaware. On average, Delaware receives 40 to 44 inches of local rainfall per year, but not all of this water is available for use. From this yearly rainfall supply, approximately 13 to 15 inches makes its way into the ground where it is naturally stored in a system of groundwater aquifers that underlie most of the state.

The geology in the Project study area consists of unconsolidated soils of the Coastal Plain Physiographic Province. These unconsolidated Coastal Plain soils allow groundwater to permeate within them and be stored in much higher capacities than in the soils of the Piedmont. The coarse-grained soils are saturated and are the aquifers that supply Delaware with most of its fresh water. The Project location is within an area formed by the Potomac Formation, which is used for water supply in northern Delaware.

Currently, the Project study area includes vacant/vegetated lots, surface parking, structures previously used for commercial/industrial purposes, a gasoline station, former junkyards, and brownfields. Physical site sampling documented in the previous environmental reports reviewed analyzed soil, groundwater, sediment, and/or surface water samples for various contaminants within the Project study area (refer to **Section V.F** of this chapter and **Appendix C** for additional information on the hazardous materials). Many contaminants on the site have been found in the local groundwater, and additional contamination can result from leaching of these contaminants from the soil into the groundwater.

The EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS) contains information on Wellhead Protection Areas across the country and is presented in the HUC12 scale. Of the HUC12 Lower Christina River Watershed, only 0.09 percent of the watershed is within a wellhead protection area (zero drinking water wells). However, the EPA mapping is presented at a broad watershed scale and does not provide specific well or well-head protection locations.

SSAs are defined as an aquifer that provides at least 50 percent of the drinking water for its service area that has no reasonably available alternative drinking water sources. No SSAs cross the Project study area; however, the Delaware River Streamflow Zone/New Jersey Coastal Plains Aquifer SSA is 0.5 mile east of the Project study area.

2. Direct Effects

The No Build Alternative would not affect the existing condition of groundwater and drinking water in the Project study area; however, surface water infiltrating into groundwater through the existing contaminated soils would continue to impact local groundwater.

The construction of the Project could add additional sources of groundwater contamination from roadway runoff, including substances such as gasoline, oil, and road salts that can seep into the soil and enter the groundwater flow. Soil composition affects how readily contaminants may

reach groundwater sources. For example, contaminants are more likely to reach groundwater in sandy soils, which allow more infiltration than clay soils, which have low infiltration rates. While the clean cap and proposed impervious surfaces will prevent some groundwater recharge, the groundwater will likely stay at the same level of contamination.

3. Indirect Effects

Contaminants have been found in the local groundwater, and indirect effects of the Project could include additional contamination resulting from leaching of these contaminants from the soil into the groundwater. As construction of future development occurs in the Project study area, there would also likely be an overall increase in impervious area, which could indirectly affect the amount and intensity of stormwater runoff. Project quality and quantity requirements would be met through brownfield remediation and conveyance structure use, which would reduce the possibility of indirect effects of increased pollution and contamination. There are multiple Brownfield Development Agreements and remedial action plans in place for this Project. Additional discussion on indirect effects to groundwater and hydrology is included in **Appendix J**.

4. Cumulative Effects

As noted in **Section V.M.2** of this chapter, groundwater will likely stay at the same level of contamination. Stormwater quantity and quality requirements would be met through brownfield remediation and conveyance structure use. Future development would likely result in lesser effects to groundwater and hydrology than past activities due to state and local regulations. Additionally, all remedial measures would match the appropriate standards of future use and would comply with all applicable environmental laws and regulations. The Project study area and future redevelopment would be contained to a small area and would therefore contribute a relatively small incremental effect to groundwater contamination. Additional discussion on cumulative effects to groundwater and hydrology is included in **Appendix J**.

5. Minimization and Mitigation

Groundwater impacts would be minimized by the remedial actions in the transportation infrastructure improvement area and by the development of a non-erosive stormwater conveyance system. Two feet of clean cap over contaminated soils and impervious surfaces included in the transportation improvement areas will prevent surface water from infiltrating into the ground through contaminated soils, limiting future groundwater contamination. Contaminants associated with roadway runoff will be conveyed to the Christina River through short surface drainage swales and a non-erosive closed drainage network that will prevent these contaminants from infiltrating into the soil and affecting the groundwater.

N. Floodplains

Any actions (including construction) in base floodplains (i.e., 100-year floodplain) must comply with FHWA's regulation 23 CFR 650 Subpart A. 23 CFR 650 Subpart A prescribes FHWA policies and procedures for the location and hydraulic design of highway encroachments in floodplains. 23 CFR 650 Subpart A includes the FHWA policy of avoiding longitudinal and significant encroachment into the floodplain and minimizing adverse impacts to base floodplains while preserving natural and beneficial floodplain values and remaining consistent with the intent of the FEMA administered National Flood Insurance Program (NFIP). While 23 CFR 650 Subpart A seeks to avoid actions in base floodplains, the regulation also prescribes studies, procedures, and documentation required when the action cannot avoid an encroachment in the base floodplain.

Also regarding floodplains, as administrator of the NFIP, FEMA has regulatory authority (i.e., 44 CFR 60.3) where they may designate special flood hazard areas and requires NFIP communities to regulate activities within such designated special flood hazard areas. As a community within the NFIP, the City follows those standards and requirements for activities in special flood hazard areas. Specifically, the City has promulgated floodplain management ordinance applicable to all development and new construction.

In other words, actions and activities must be compliant with applicable FEMA regulation and those City floodplain management ordinances. Specifically, the City of Wilmington Code of Ordinance (Sec. 48-572) states that construction is not permitted within special flood hazard areas without approval and new construction be built 18 inches above the 100-year floodplain.

The following sections describe aspects of these various floodplain regulations and ordinances relevant to the various Project actions and alternatives.

1. § 650.111 Location Hydraulic Studies (FHWA)

(a) National Flood Insurance Program (NFIP) maps or information developed by the highway agency, if NFIP maps are not available, shall be used to determine whether a highway location alternative will include an encroachment.

The majority of the Project study is within NFIP developed Flood Insurance Rate Map (FIRM) number 10003C0156L, effective January 22, 2020 (**Appendix A, Figure 10, of the Natural Resource Technical Report, Appendix I**). The FIRM depicts that most of the Project study area is within Special Flood Hazard Area Zone AE (EL 9). The "Zone AE" indicates that area is subject to inundation by the 1% annual chance flood event (e.g., base floodplain). The (EL 9) indicates that those base flood elevations are 9 feet. Two small portions, (1) the northeast tip of the Project study area, and (2) a small area in the middle of the Project study area, are either within the 0.2% Annual Change Flood Hazard (i.e., 500-year floodplain) or an area of 1% annual change flood with average depth less than one foot or with average depth less than one foot or with drainage areas of less than one square mile. Another small area of the Project study is not within any mapped base floodplain.

(b) Location studies shall include evaluation and discussion of the practicability of alternatives to any longitudinal encroachments.

The Build Alternative does include longitudinal encroachments of the FEMA 100-year floodplain. These longitudinal encroachments have inundation; as a result, the Project study area is mostly within the base (i.e., 100-year) floodplain and surrounded by the 100-year floodplain. Any Build Alternative that would include transportation infrastructure improvements in the Project study area is anticipated to result in longitudinal encroachment, therefore attempting avoidance is not practicable in this location.

(c) Location studies shall include discussion of the following items, commensurate with the significance of the risk or environmental impact, for all alternatives containing encroachments and for those actions which would support base flood-plain development:

(1) The risks associated with implementation of the action,

The risks associated with Project encroachment into the floodplain are minimal. The Project includes fill to raise the transportation infrastructure 18 inches above the 100-year floodplain in accordance with City of Wilmington floodplain development code. In other words, the elevation of the new infrastructure would no longer be in the base floodplain, and not subject to flooding during the 100-year storm. The Project would support base floodplain development and per City code, the development would also be elevated 18 inches above the 100-year floodplain and not subject to flooding during a 100-year storm.

Placing fill within a 100-year floodplain can cause an increase in floodplain elevations of other locations of in vicinity of the Project. To consider this flood risk, the Project study conducted hydraulic/hydrodynamic modeling of this entire vicinity (refer to **Section N.2.** of this chapter for a synopsis of the modeling effort). The modeling demonstrated the proposed transportation infrastructure improvements and anticipated development (i.e., fill associated with the Project and anticipated development) do not increase base flood elevations. The hydraulic modeling conducted for the Project is described below.

Per the DelDOT provided Bridge Scour Modeling Directive¹⁴, three Scenarios were considered and evaluated:

- Scenario 1: A steady-flow scenario with design upland flow (from the stream or river) for the hydraulic design event and the scour design event with the downstream boundary set to the MHW elevation of the tidal receiving water daily astronomical tide.
- Scenario 2: A steady-flow scenario with design upland flow (from the stream or river) for the hydraulic design event and the scour design event with the downstream boundary set to the MLW elevation of the tidal receiving water daily astronomical tide.

¹⁴ Refer to Appendix I, Natural Resources Technical Report, to the DelDOT Modeling Directive in Appendix A of the of the 2D Modeling, Scour and Drainage Analysis Report, Appendix E.

- Scenario 3: An unsteady-flow scenario with the source of flooding being the ebb and flood tides from the tidal receiving water (no upland flow from the stream or river) with the downstream boundary conditions being set to the design, 100-year, and 200-year storm surge hydrographs from the tidal receiving water. Scenario 3, “no upland flow,” was simulated for a total period of 60 hours, which comprises the entire surge period in Delaware.

On South Market Street, the first two modeling scenarios for water surface elevation indicate a maximum difference in water surface elevation from existing condition to the build condition of 0.00 feet. The third modeling scenario indicates a maximum difference in water surface elevation of -0.01 feet. Refer to **Appendix A, Figures 11 and 12 of the Natural Resource Technical Report, Appendix I**. This minor decrease appears to be attributable to 200-year floodwaters escaping the Christina River’s right bank, south of the Norfolk Southern crossing, just downstream of the Christina River and Little Mill Creek confluence. The model scenarios do not take into account the ability of the existing pipe network to intercept, re-direct, and reduce the overland flooding. Therefore, the maximum difference in water surface elevation from existing conditions to the build condition is likely less than -0.01 feet. Refer to **Appendix E Section III.B of the Natural Resource Technical Report, Appendix I** for further discussion of the water surface elevation.

(2) The impacts on natural and beneficial floodplain values,

The Project would have no impact on natural, beneficial floodplain values, since the area within the floodplain is fully developed with little natural habitat. The developed nature of the Project study area in the 100-year floodplain provides little value to fish, wildlife, or plants. In the existing condition, the Project does not support open space, natural beauty, or opportunities for scientific study, outdoor recreation, agriculture, or forestry. The floodplain in the Project study area does not provide natural moderation of floods or improvements in water quality.

(3) The support of probable incompatible flood-plain development,

Elevating development parcels by 18 inches above the 100-year floodplain base flood elevation without any increases in other base floodplain elevation in the vicinity would reduce flood risk.

Indirect effects from the Build Alternative to floodplains are anticipated to be negligible. The transportation infrastructure improvements proposed under the Build Alternative incorporate strategic resiliency solutions. The floodplain effect modeling included proposed development adjacent to the transportation infrastructure and found that the proposed development would not affect 100-year floodplain elevations.

The Project would align with the vision and recommendations set out in the 2022 *Resilient Wilmington: Preparing Today for Tomorrow’s Climate Risks*. The proposed Project and future redevelopment would exceed City regulations that require the lowest floor of new buildings constructed in the floodplain to be at or above base flood elevation plus 18 inches and would incorporate other recommendations for waterfront development as described in *Resilient Wilmington*. The incremental effect of the Build Alternative to floodplains, in light of past, present, and future effects, is expected to be relatively minimal due to existing regulatory

controls and regulations, as well as an increased focus by the City of Wilmington to plan for and address the future effects of climate change. Therefore, as described here and as documented throughout this EA, the Project does not support incompatible development.

(4) The measures to minimize flood-plain impacts associated with the action, and

All actions occurring within the FEMA-designated 100-year floodplain would comply with FEMA and City prescribed local floodplain construction requirements. Fill and the clean cap would elevate the infrastructure improvements by 18 inches or more above the 100-year floodplain (i.e., in accordance with City of Wilmington floodplain ordinance). This would mitigate flood risk of life and property in the future.

The City will commit to funding and construction of the South Wilmington Sewer Separation project which includes construction of a separate storm drain system and partial sanitary sewer reconstruction along B and C Streets to help alleviate flooding in the Southbridge community.

(5) The measures to restore and preserve the natural and beneficial flood-plain values impacted by the action.

The current (e.g., highly developed and brownfield) conditions in the Project area do not support natural and beneficial floodplain values. As a result, the Project is anticipated to have no impact on natural and beneficial floodplain values. The Project improves natural and beneficial floodplain values as the action includes enhancing wetlands, improving wildlife habitat in enhanced wetland areas and, by eliminating invasive species, improve natural beauty. The Project also includes a Riverwalk trail, providing outdoor recreation opportunities.

(d) Location studies shall include evaluation and discussion of the practicability of alternatives to any significant encroachments or any support of incompatible flood-plain development.

The location of nearly all of Project study area is within the 100-year floodplain. The Project goals could not be met in any other location. There are no practicable alternatives to this Project. The Project does not interrupt access for emergency vehicles nor does it represent or impact any emergency evacuation route. As described in this section, the Project does not pose a significant risk. The Project conforms to all City of Wilmington floodplain protection standards. Compared to current (i.e., no build) conditions, the Project actually improves natural and beneficial floodplain values. So, while the Project study area is located in the 100-year floodplain the Project is not considered a significant encroachment.

(e) The studies required by § 650.111 (c) and (d) shall be summarized in environmental review documents prepared pursuant to 23 CFR part 771.

In addition to this section, please refer to the *Natural Resources Technical Report*, Appendix I of this EA and to the 2D Modeling, Scour and Drainage Analysis Report, which is included in Appendix E of the NRTR. Refer to **Section N.2.** of this chapter for a summary of the 2D modeling efforts.

(f) Local, State, and Federal water resources and flood-plain management agencies should be consulted to determine if the proposed highway action is consistent with existing watershed and flood-plain management programs and to obtain current information on development and proposed actions in the affected watersheds.

A floodplain approval from the City of Wilmington will be required for the Project during final design. Floodplain applications are reviewed by the Floodplain Administrator, who interprets floodplain boundaries and proposed construction activities to assess impacts and provide approval of the Project. The City of Wilmington has joined the National Flood Insurance Program (NFIP) and adopted local floodplain ordinances that are more restrictive than FEMA requirements. Specifically, the City of Wilmington Code of Ordinance (Sec. 48-572) states that construction is not permitted within special flood hazard areas without approval and new construction be built 18 inches above the 100-year floodplain. Under the NFIP, the City is responsible for reviewing and approving activities that encroach on the 100-year floodplain. No approving action is required by FEMA unless the activity results in changes to the 100-year floodplain elevation that requires changes to FEMA mapping.

O. Wildlife and Habitat

Terrestrial wildlife in the Project study area is protected under several state and Federal provisions. The protection of all migratory birds is governed by the Migratory Bird Treaty Act (16 U.S.C. 703-712); the bald eagle (*Haliaeetus leucocephalus*) is protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d); and conservation of wildlife is managed in Delaware through the implementation of state wildlife action plans, as initiated by the U.S. Fish and Wildlife Service (USFWS).

The City of Wilmington regulates trees present within the road right-of-way, City Parks, and City-owned parcels (Wilmington City Code Chapter 46).

Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. Sections 1531-1544) requires Federal agencies to use their authorities to conserve endangered and threatened species in consultation with the USFWS and/or National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS).

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and the Fish and Wildlife Coordination Act protect some of the fish and shellfish species that inhabit the Christina River. Under the MSFCMA, Essential Fish Habitat (EFH) is protected from adverse effects. Under the Delaware Administrative Code (7 Del. Admin Code 7504, Section 4.10.1.6.1), erosion and sediment control practices are required to follow standards that protect aquatic biota, wetlands, and nearshore shallow water habitat.

Additional information on wildlife and habitat can be found in the **Natural Resource Technical Report, Appendix I.**

1. Existing Conditions

a. Vegetation, Terrestrial Habitat, and Terrestrial Wildlife

Data on wildlife habitat and documented wildlife species within the Project study area were collected through analysis of aerial imagery of vegetative cover, incidental observations made during natural resource field investigations, and data provided by the resource agencies. Composition of terrestrial wildlife species is limited by the highly urbanized and disturbed environments within the Project study area. The majority of the Project study area consists of barren land, old fields, disturbed hedgerows/small forests, and tidal shorelines. The smaller remnant forest patches and old fields are primarily invasive vines, shrubs, and trees, which provide marginal habitat for edge adapted and disturbance-tolerant wildlife species.

Terrestrial habitats identified within the Project study area include: barren lands, disturbed hedgerows/marginal forests, open fields, and urban and maintained areas. The majority of the vegetated area is contained within wetlands. Urban and maintained areas, as well as barren land, are the most common terrestrial habitats within the Project study area. There are some trees present based on aerial imagery, but they are contained within disturbed areas.

b. Rare, Threatened, and Endangered Species

Federal Species Managed by USFWS

The Information for Planning and Consultation (IPaC) tool was used to assess the potential presence of Federally listed species under the jurisdiction of the USFWS on May 14, 2024 and the results are included in **Appendix I**. The IPaC Official Species List includes the Northern Long-eared Bat (*Myotis Septentrionalis*), an Endangered species, and the Tricolored Bat (*Perimyotis subflavus*), a Proposed Endangered species, indicating that these species may occur within the Project study area. Based on the IPaC submission and the standing analysis of the Determination Key, the Project was given a “May Affect” determination for the Northern Long-eared bat and further coordination with USFWS was needed. In an email dated May 21, 2024, USFWS determined the Project is “not likely to adversely affect” the Northern Long-eared bat. There is a proposed rule to list the Tricolored Bat as an endangered species, but a final listing determination is still pending. The Monarch Butterfly (*Danaus plexippus*) is also included on the Official Species List and may be present within the Project study area; however, this species has not yet been listed as Federally threatened and no further coordination is required for this species. No additional Section 7 requirements are needed for the Tricolored Bat or Monarch Butterfly. The final determination from USFWS is included in **Appendix I**.

Federal Species Managed by NOAA

NOAA Section 7 mapping tools were used to assess potential impacts to protected marine species. NOAA Section 7 mapper data indicated that the Federally listed Atlantic sturgeon (*Acipenser oxyrinchus*) and the shortnose sturgeon (*Acipenser brevirostrum*) may be present in the Christina River, which intersects the Project study area.

State Species Managed by DNREC

A letter requesting information on rare, threatened and endangered (RTE) species was sent to DNREC Division of Fish and Wildlife on August 16, 2023. DNREC indicated in a letter dated September 6, 2023, that there are no records of state-rare or Federally listed plants, animals, or natural communities within the Project study area. Refer to **Appendix B of the Natural Resource Technical Report, Appendix I** for a copy of this correspondence.

c. Aquatic Biota

Aquatic biota within the Project study area have been historically affected by population growth, industrial and urban development, and harvesting of natural resources since the 1800s. The condition of aquatic habitats is moderate throughout the Project study area. Field crews made observations of aquatic life within the Christina River, tidal wetlands, and tidal tributaries during investigations of the Project study area. Aquatic life observed during field investigations of the Project study area included species of fish, birds, and mollusks that live in and around these freshwater systems. The presence of aquatic life in smaller channels and wetlands was less common and centered around those areas where surface water appeared to be the most constant. NOAA EFH mapping was also reviewed to identify fish species with EFH within the Project study area. EFH was identified within the Christina River; EFH Mapper results were provided to FHWA for consultation and are included in **Appendix B of the Natural Resource Technical Report, Appendix I**.

2. Direct Effects

a. Vegetation, Terrestrial Habitat, and Terrestrial Wildlife

The No Build Alternative would not impact vegetation, terrestrial habitat, or terrestrial wildlife in the Project study area.

The Build Alternative is anticipated to result in the displacement of some edge specialized species, but not a substantial loss of wildlife habitat due to construction of the Project, since there is currently a lack of wildlife habitat with the Project study area. Bald eagles are not expected to be negatively affected, as no bald eagle nests have been identified by USFWS within the Project study area. As the transportation infrastructure improvements would be capped with two feet of clean soil prior to improvements, there would not be any remaining marginal forest habitat; some less motile wildlife could be killed during construction and other more motile species could be shifted away from the new construction, potentially into already occupied territories requiring further movement into unoccupied suitable habitat, if available.

Construction of the Project is anticipated to have little effect on vegetation since there is such a low cover of plants in the large areas of barren land and urban and maintained areas that currently exist within the Project study area. While hedgerows and marginal forested areas provide various benefits, including supplying necessary habitat for wildlife, there are very few of these areas within the Project study area. Construction of the Project is anticipated to involve

the removal of the remaining vegetation in the transportation improvements area where hazardous materials need to be mitigated.

b. Rare, Threatened, and Endangered Species

The No Build Alternative would not impact RTE species in the Project study area.

Federal Species Managed by USFWS

The Build Alternative would remove small, remnant forest patches and hedgerows between the industrial parcels in the Project study area and would modify the grasslands and old fields adjacent to these forest patches and hedgerows. These forest patches and hedgerows qualify as suitable summer habitat for the Northern Long-eared Bat and the Tricolored Bat and their removal may impact bats. The Tricolored Bat's suitable summer habitat includes grasslands and old field adjacent to forest and hedgerows modification of these areas may also impact the Tricolored Bat. Since meadow, wildflower, and pollinator habitats are not present in the Project study area, Federally listed candidate monarch habitat would not be affected by construction activities even if species listing status changes in the future.

Federal Species Managed by NOAA

NOAA Section 7 mapping data indicated that the Atlantic sturgeon and shortnose sturgeon are present within the Project study area. Noise impacts from pile driving have potential to impact the ESA-listed species; however, the short duration of pile driving (90 minutes per pile) and production rate of two piles per day would cause minimal disturbance. The short duration and slow rate of pile driving indicate that the waterway is unaffected by noise for 85 percent of each day construction occurs. Pile driving would take place on the intertidal shoreline of the Christina River and noise may be attenuated by the shallow water or no water pile driving conditions. In addition, in-water work would not take place from March 1 to June 30. The Greater Atlantic Regional Fisheries Office (GARFO) agreed through programmatic consultation on July 17, 2023 that the Project will not adversely affect the ESA-listed species. Refer to **Appendix B of the Natural Resource Technical Report, Appendix I** for copies of correspondence.

c. Aquatic Biota

The No Build Alternative would not impact aquatic biota in the Project study area.

The Project may affect aquatic biota due to direct and indirect impacts to tidal waters and wetlands (**Tables 5, 6, 7, and 8**). Permanent impacts to aquatic biota may include mortality of aquatic organisms during construction and permanent loss of natural habitat from grading to cap hazardous materials and to create stable outfalls. Aquatic life passage is not anticipated to be affected by construction since the impacted channels do not extend beyond the Project study area. Temporary impacts to aquatic biota could result from minor sediment discharges during construction; however, these impacts would be limited by erosion and sediment control BMPs. Construction activities may cause noise and vibration that could temporarily impact aquatic biota. However, the intensity and duration of noise impacts have been coordinated with NOAA,

who have determined that these effects do not require mitigation. Coordination with NOAA NMFS included providing detailed information about the Project's potential sound impacts and effects to fisheries species.

3. Indirect Effects

a. Vegetation, Terrestrial Habitat, and Terrestrial Wildlife

As noted above in **Section O.2.a** of this chapter, indirect effects of construction for future development on the site could involve some less motile wildlife being killed during construction and other more motile species shifting away from the new construction. The abatement of hazardous materials prior to development should improve wildlife habitat where it can recolonize. Proposed green space and tree plantings would provide habitat for wildlife, reduce the amount of invasive exotic species, reduce the amount of runoff from impervious surfaces, help provide cooling, and filter groundwater. In addition, the use of erosion and sediment control BMPs would help to minimize pollutant runoff into surrounding wildlife habitat. Additional discussion on indirect effects to vegetation, terrestrial habitat, and terrestrial wildlife is included in **Appendix J**.

b. Rare, Threatened, and Endangered Species

Federal Species Managed by USFWS

Indirect effects such as increased noise levels and increased lighting within the Project study area could impact the Northern Long-eared Bat and Tricolored Bat. Indirect effects to the candidate species, monarch butterfly, are anticipated to be minimal since the development parcels adjacent to the transportation improvements contain no suitable monarch habitat.

Federal Species Managed by NOAA

The proposed construction is not anticipated to result in indirect effects to sturgeons located in the Christina River downstream of the Project study area since construction would occur inland. As noted in **Section O.5.a of this chapter**, Project Design Criterion (PDC) would be implemented to minimize effects to RTE species. Additional discussion on indirect effects to RTE species is included in **Appendices I and J**.

c. Aquatic Biota

The proposed construction may affect aquatic biota due to indirect effects to tidal waters and wetlands. Indirect effects to aquatic biota downstream from the Project or construction of future development on the site are not anticipated. Additional discussion on indirect effects to aquatic biota is included in **Appendices I and J**.

4. Cumulative Effects

Past land development and transportation projects have affected wildlife and wildlife habitat in the indirect and cumulative effects analysis area, some of which may have occurred prior to the effects analysis time frame. Generally, the indirect and cumulative effects analysis area is developed and consists primarily of urban and suburban land uses, where wildlife habitat may

be limited or fragmented as a result of development and past land disturbance. The Project study area is a former industrial site that is highly urbanized and contains disturbed environments. Aquatic habitat and biota within the Project study area have been historically affected by population growth, industrial and urban development, and harvesting of natural resources.

The Project will include tree plantings and additional green space that would create habitat for wildlife where limited habitat currently exists, reduce the amount of invasive exotic species, reduce the amount of runoff from impervious surfaces, help provide cooling, and filter groundwater. The use of erosion and sediment control BMPs would help to minimize pollutant runoff into surrounding wildlife habitat.

The Build Alternative is not anticipated to contribute incrementally to the overall cumulative effect on vegetation, wildlife, sensitive species, and wildlife habitat, given a lack of vegetation and wildlife habitat located within the previously disturbed and contaminated former industrial site. These cumulative effects will be reduced by applicable Federal, state, and local laws and regulations. Additional discussion on cumulative effects to wildlife and habitat is included in **Appendix J**.

5. Minimization and Mitigation

a. Vegetation, Terrestrial Habitat, and Terrestrial Wildlife

Prior to construction, the transportation infrastructure improvements would be completely cleared and capped with two feet of soil due to hazardous materials on site. There is no way to avoid impacts to edge and disturbance acclimated species located on the site. The abatement of hazardous materials should improve habitat for wildlife where it can recolonize. The proposed Project will provide green space and tree plantings that would create some available habitat for wildlife. In addition, the use of erosion and sediment control and BMPs will minimize pollutant runoff into surrounding wildlife habitat.

b. Rare, Threatened, and Endangered Species

Federal Species Managed by USFWS

Coordination with USFWS on Section 7 consultation is complete, refer to **Appendix I** for a copy of the correspondence. No mitigation is proposed for the candidate species, monarch butterfly, because no habitat is present within the Project study area. Additionally, it is unlikely that mitigation efforts would be required if the species is uplisted in the future.

Federal Species Managed by NOAA

To minimize effects to rare, threatened, and endangered species, various Project Design Criterion (PDC) would be implemented. PDCs are impact minimization tactics that aim to control underwater noise, impingement/entrainment and entanglement, water quality/turbidity, habitat alteration and vessel traffic. **Table 11** below lists all the PDCs as outlined in the NOAA/FHWA Programmatic Agreement consultation dated September 13, 2023 that will be implemented for the Project and is included in **Appendix I**.

Table 11: RTE Protection Project Design Criterion (PDC)

PDC Number	PDC Type	PDC Description
1	General	Ensure all operators, employees, and contractors are aware of all FHWA environmental commitments, including these PDCs, when working in areas where ESA-listed species may be present or in critical habitat.
2	General	No portion of the proposed action will individually or cumulatively have an adverse effect on ESA-listed species or critical habitat.
7	General	Work will result in minimal or only temporary/short-term changes in water temperature, water flow, salinity, or dissolved oxygen levels.
9	General	The project will not adversely impact any submerged aquatic vegetation (SAV) or oyster reefs.
10	General	No blasting or use of explosives will occur.
11	General	No in-water work on large dams or tide gates (small dam and tide gate repairs may be permitted with prior review and approval from NMFS).
12	Underwater Noise	<p>If pile driving is occurring during a time-of-year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold, a “soft start” is required to allow animals an opportunity to leave the project vicinity before sound pressure levels increase. <i>In addition to using a soft start at the beginning of the work day for pile driving, one must also be used at any time following cessation of pile driving for a period of 30 minutes or longer.</i></p> <p><u>For impact pile driving:</u> pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one-minute wait period, then two subsequent three-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.</p> <p><u>For vibratory pile installation:</u> pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.</p>
15	Impingement/ Entertainment and Entanglement	<p>If excavating or dredging, only mechanical buckets, hydraulic cutterheads, or low-volume hopper dredges (e.g., CURRITUCK, ≤300 cubic yard maximum bin capacity) may be used.</p> <p>Note: We consider excavating a smaller scale form of mechanical dredging.</p>
16	Impingement/ Entertainment and Entanglement	<p>No new excavation or dredging in Atlantic sturgeon or salmon critical habitat (excavation in a prior construction footprint or maintenance dredging is permitted, but still must meet all other PDCs). New excavation or dredging outside Atlantic sturgeon or salmon critical habitat is limited to one-time events (e.g., burying a cable or utility line) and minor (≤2 acres) expansions of areas already subject to prior excavation or maintenance dredging. Locating a replacement bridge within 250 feet (centerline to centerline) of an existing bridge and excavation of sediment around bridge piers are considered work in a previous construction footprint.</p> <p>Note: We consider excavating a smaller scale form of mechanical dredging.</p>

PDC Number	PDC Type	PDC Description
17	Impingement/ Entertainment and Entanglement	Temporary intakes related to construction are prohibited in sturgeon and salmon spawning, rearing, or overwintering habitat during the time-of-year windows identified in General PDCs 3-5. If utilized outside those areas and times of year and in an area with anticipated sturgeon and salmon presence, temporary intakes must be equipped with 2-millimeter wedge wire mesh screening and must not have greater than 0.5 feet per second intake velocities, to prevent impingement or entrainment of juvenile and early life stages of these species.
18	Impingement/ Entertainment and Entanglement	Work behind cofferdams, turbidity curtains, or other instruments that prevent access of animals to the project area is required when ESA-listed species are likely to be present (if presence is limited to rare, transient individuals, access control measures are not necessary). Once constructed, work inside a cofferdam at any time-of-year may be permitted with NMFS approval, provided the cofferdam is installed/removed outside the time-restricted period.
19	Impingement/ Entertainment and Entanglement	No new permanent surface water withdrawal, water intakes, or water diversions.
20	Impingement/ Entertainment and Entanglement	Turbidity control measures, including cofferdams, must be designed to not entangle or entrap ESA-listed species.
21	Impingement/ Entertainment and Entanglement	Any in-water lines, ropes, or chains must be made of materials and installed in a manner to minimize or avoid the risk of entanglement by using thick, heavy, and taut lines that do not loop or entangle. Lines can be enclosed in a rigid sleeve.
23	Water Quality/Turbidity	Any temporary discharges must meet state water quality standards (e.g., no discharges of substances in concentrations that may cause acute or chronic adverse reactions, as defined by EPA water quality standards criteria).
24	Water Quality/Turbidity	Only repair, upgrades, relocations, and improvements of existing discharge pipes or replacement in-kind are allowed; no new construction of untreated discharges.
25	Water Quality/Turbidity	Work behind cofferdams, turbidity curtains, or other instruments to control turbidity is required when operationally feasible and ESA-listed species are likely to be present (if presence is limited to rare, transient individuals, turbidity control methods are not necessary).
26	Water Quality/Turbidity	Minimize all new waterward encroachment and permanent fill.
29	Vessel Traffic	Maintain project (i.e., construction) vessels operating within the action area to speed limits below 10 knots and dredge vessels to speeds of 4 knots maximum, while dredging.

PDC Number	PDC Type	PDC Description
31	Vessel Traffic	The number of project (construction) vessels must be limited to the greatest extent possible, as appropriate to size and scale of project.
32	Vessel Traffic	The project must not result in the permanent net increase of commercial vessels.

c. Aquatic Biota

Aquatic biota is anticipated to be minimally affected within the Project study area. Potential water quality impacts from construction would be minimized through strict adherence to Delaware mandated erosion and sediment controls. Impacts following construction would be minimized through development of a non-erosive conveyance. Impacts to EFH will be avoided by adherence to DNREC time-of-year (TOY) restrictions (in-water work would not take place from March 1 to June 30), reducing underwater noise by using a soft start pile driving system, minimizing water quality impacts through use of erosion and sediment control BMPs, limiting construction debris, and minimizing habitat impacts by reducing the channel size to the minimum size that still allows non-erosive conveyance. The EFH project criteria summarized above is included in the programmatic consultation with NOAA GARFO and included in the agency correspondence in **Appendix I**. NOAA Fisheries provided a “May Affect” final EFH consultation determination via a Federal Interagency Comment Form signed on May 14, 2024, which is included in **Appendix I**. The Project commits to the following four Essential Fish Habitat Conservation Recommendations provided by NOAA Fisheries Habitat and Ecosystem Services Division (HESD):

1. Restrict in-water work between March 1 and June 30 to minimize impacts to anadromous fish migration and spawning.
2. Waterborne equipment associated with construction (e.g. barges) should float at all stages of the tide.
3. All work that may suspend sediment in the water column should be enclosed within a turbidity curtain.
4. Provide compensatory mitigation for all intertidal and subtidal impacts. A draft mitigation plan should be provided to NOAA Fisheries HESD for review and approval.

Furthermore, the City will provide NOAA HESD with the draft mitigation plan and a copy of the Department of the Army permit pursuant to Rivers and Harbors Act Section 10 and Clean Water Act Section 404 prior to construction.

P. Section 4(f) and Section 6(f)

Section 4(f) of the USDOT Act of 1966, (49 U.S.C. § 303(c)) is a Federal law that protects publicly owned parks, recreation areas, wildlife and/or waterfowl refuges, or any significant historic sites. As a USDOT agency, FHWA must comply with Section 4(f) requirements when utilizing USDOT

funding or approvals for transportation projects. The proposed use of a Section 4(f) property in a transportation project cannot be approved unless FHWA determines there is no prudent and feasible alternative that avoids the property and that the project includes all possible planning to minimize harm to the property, or FHWA makes a finding that the project has a de minimis impact on the property.

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965, (36 CFR 59.3) which provides grants to Federal, state, and local governments for the acquisition of land and water for recreational purposes¹⁵. Section 6(f) of the act prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the Department of Interior's National Park Service.

A property survey determined that there are no public parks, recreation areas, wildlife and/or waterfowl refuges eligible for protection under Section 4(f) within the Project study area. The survey also determined that there are no acquired properties within the Project study area under Section 6(f) of the LWCF Act. Rather, the proposed Build Alternative is anticipated to result in the creation of a Riverwalk.

FHWA has determined that there would not be an adverse effect to historic properties (**Section J.1.b** of this chapter), and there is no Section 4(f) use to historic properties. The potential for Section 4(f) applicability to archaeological sites is still to be determined, pending identification of sites that are on or eligible for listing on the NRHP, including those that are discovered during construction, in accordance with the stipulations outlined in the PPA (**Appendix H**).

Q. Permits and Approvals

In addition to NEPA compliance, several permits and approvals are needed for this proposed Project to address direct effects to any environmental resources resulting from the Build Alternative. **Table 12** summarizes the Federal, state, and local permits, authorizations, and approvals that will be required for this Project. All permits will be obtained following NEPA approval during final design.

¹⁵ https://www.environment.fhwa.dot.gov/env_topics/4f_tutorial/keyterms_s.aspx

Table 12: Permits and Approvals

Permit/Approval	Responsible/Permitting Agency
Nationwide Permit 38 (for Cleanup of Hazardous and Toxic Waste)	USACE
Nationwide Permit 14 (for Linear Transportation Projects)	USACE
Section 401 Water Quality Certification (issued for NWP 38 and 14)	DNREC
Coastal Zone Management Act Consistency Certification (issued for NWP 38 and 14)	DNREC
Wetlands Permit	DNREC
Subaqueous Lands Permit	DNREC
Sediment and Stormwater Management Plan Approval	City of Wilmington
Floodplain Permit	City of Wilmington Floodplain Administrator
Final Plan of Remedial Action for each parcel	DNREC
Certificate of Completion of Remedy for each parcel	DNREC
Contaminated Materials Management Plan	DNREC
Site specific Health and Safety Plan	DNREC

R. Summary of Effects, Minimization, Mitigation, and Commitments

As presented throughout this chapter, the Build Alternative is anticipated to result in beneficial and some adverse direct, indirect, and cumulative effects. Proposed mitigation for unavoidable, direct impacts to environmental resources from the Build Alternative has been identified throughout this chapter, as well. Proposed mitigation developed for this Project was identified to reduce and offset environmental impacts resulting from the Build Alternative. **Table 13** presents a comprehensive summary of the minimization, proposed mitigation and commitments for impacts to environmental resources identified as a result of the Build Alternative. Final mitigation measures and commitments for the Project resulting from the NEPA process will be included in the NEPA decision document.

Beyond mitigation for unavoidable impacts, the City of Wilmington is making additional commitments to the Southbridge EJ community. These commitments have been identified in response to comments received during public outreach events with the Southbridge Community.

- The City of Wilmington's Office of Economic Development will work with the University of Delaware's Local Government Grant Assistance Program and the Southbridge Civic Association in identifying and applying for grant funding in support of the improvements identified in the Southbridge Transportation Action Plan.
- The City of Wilmington and the Riverfront Development Corporation will continue to investigate funding to plan, design, and construct a pedestrian connection from the Southbridge Community to the Wetland Park between C Street and South Church Street.
- The City will commit to funding and construction of the South Wilmington Sewer Separation project which includes construction of a separate storm drain system and partial sanitary sewer reconstruction along B and C Streets to help alleviate flooding in the Southbridge community.
- The City will commit to supporting businesses that qualify for the Office of Economic Development's Strategic Fund set-aside for minority owned businesses, as well as providing notices to the Southbridge Civic Association for business development events hosted by the Office of Economic Development and economic development partners such as the Small Business Administration, Small Business Development Center, Delaware Division of Small Business, and Community Development Financial Institutions.
- The City and RDC will commit to advertising and holding outreach events for construction workforce opportunities in nearby disadvantaged neighborhoods.

Table 13: Build Alternative Effects and Minimization, Mitigation and Commitments

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
Land Use and Zoning	13.6 acres converted to infrastructure and open space	Future land use changes, including a mix of uses and community resources	Increase in beneficial land uses on the site that is currently underutilized	No mitigation is needed
Businesses, Economy, and Employment	1 business displacement; economic benefits by improving mobility and offering new, convenient options for accessing jobs, local economic destinations, and regional transit services; creation of construction-related jobs	Addition of office and retail space, and potential increase in businesses and employment from future redevelopment	Overall no substantial contribution to the incremental effect due to future economic activity and opportunity	<p>No mitigation is needed</p> <p>Commitment: Approximately 200 construction-related jobs. The City will commit to supporting businesses that qualify for the Office of Economic Development's Strategic Fund set-aside for minority owned businesses as well as providing notices to the Southbridge Civic Association for business development events hosted by the Office of Economic Development and economic development partners such as the Small Business Administration, Small Business Development Center, Delaware Division of Small Business, and Community Development Financial Institutions.</p> <p>The City and RDC will commit to advertising and holding outreach events for construction workforce opportunities in nearby disadvantaged neighborhoods.</p>

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
Neighborhoods and Community Facilities	No effect to existing facilities; improved community benefits and mobility	A new neighborhood, community facilities, and open space as proposed in the <i>South Market Street Master Plan</i> ; enhanced access and connectivity. Potential incremental effects if upward pressure on housing costs occurs.	Not anticipated to have a negative effect on communities within and around the Project study area; beneficial due to increased community and open spaces.” Potential for incremental effects if upward pressure on housing costs occur.	No mitigation is needed Commitment: Early construction of Orange Street to serve as a haul road to minimize project-related construction traffic traveling through adjacent residential communities
Demographics	1 business displacement	Future change to population size and demographics; increase in employment and residents where none currently exist; potential incremental effects if upward pressure on housing costs occurs	Induced commercial or residential development not anticipated; accommodation of future populations and economic activity	No mitigation is needed
Environmental Justice	No disproportionately high or adverse effect	Improved safety, connectivity, mobility; increased access to employment opportunities; a mix of land uses and community resources. Potential incremental effects if upward pressure on housing costs occurs.	No incremental effect anticipated due to beneficial improvements and future redevelopment; potential incremental effects if upward pressure on housing costs occurs	No mitigation is needed Commitments: The City of Wilmington’s Office of Economic Development will work with the University of Delaware’s Local Government Grant Assistance Program and the Southbridge Civic Association in identifying and applying for grant funding in support of the improvements identified in the Southbridge Transportation Action Plan. The City of Wilmington and the Riverfront Development Corporation will continue to investigate funding to plan, design, and construct a pedestrian connection from

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
				<p>the Southbridge Community to the Wetland Park between C Street and South Church Street.</p> <p>The City will commit to supporting businesses that qualify for the Office of Economic Development's Strategic Fund set-aside for minority owned businesses as well as providing notices to the Southbridge Civic Association for business development events hosted by the Office of Economic Development and economic development partners such as the Small Business Administration, Small Business Development Center, Delaware Division of Small Business, and Community Development Financial Institutions.</p> <p>The City and RDC will commit to advertising and holding outreach events for construction workforce opportunities in nearby disadvantaged neighborhoods. The City will commit to funding and construction of the South Wilmington Sewer Separation project which</p>

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
				includes construction of a separate storm drain system and partial sanitary sewer reconstruction along B and C Streets to help alleviate flooding in the Southbridge community.
Hazardous Materials	3 low risk sites, 17 moderate risk sites, 4 high risk sites	Potential for leaching of chemicals from one contaminated site to adjacent properties or groundwater	Relatively minimal incremental effect because of due diligence and proposed remedial actions as part of the infrastructure improvements	In locations where the infrastructure improvements would occur, avoidance, mitigation, and minimization efforts include the completion of hazardous materials surveys, sampling, and investigations; completion of Brownfield Investigation Reports; development of Final Plans of Remedial Action and implementation of remediation as needed; completion of waste characterizations; completion of Contaminated Materials Management Plans and Health and Safety Plans; abandonment of all monitoring wells after remediation; proper onsite exposure precautions; proper treatment and disposal of identified hazardous materials. The City and the RDC will continue public notification throughout the construction process.

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
Noise	24 receptors/ residential noise sensitive land uses	Temporary effects during construction of the Project and future redevelopment; potential new sources of noise introduced to the Project study area	Relatively minimal incremental effect due to existing regulatory controls and regulations, and the Project study area's developed urban environment	Minimization: Refer to Chapter V, Section G.5 for a list of measures to be used to minimize potential negative effects from temporary construction noise
Air Quality	Project meets all applicable air quality requirements	Potential for temporary effects from construction of the Project and future redevelopment; beneficial effects once redevelopment occurs	Not expected to be significant. The transportation plan and program are in conformance with the SIP and the Project is not anticipated to cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS.	Minimization: Refer to Chapter V, Section H.5. for a list of construction commitments to minimize and mitigate emissions during construction
Greenhouse Gas and Climate Change	Increase in GHG emissions from construction operation and maintenance activities	Increase in GHG emissions	Increase in GHG emissions	Minimization: Refer to Chapter V, Section I.4. for a list of efforts to minimize and mitigate the increase in GHG emissions
Historical Structures & Archaeology	No adverse effect to historic structures; effects unknown for archaeology	Potential effects from future population growth and development in the APE, including destruction or degradation of resources	Not anticipated to contribute substantially to the incremental effect due to existing protective regulations and review processes	No mitigation necessary for historic structures Commitment: A Project Programmatic Agreement (PPA) stipulates the completion of a phased identification of archaeological historic properties, should they be present
Wetlands and Waters	Adverse effects to 0.3 acre DNREC Tidal Marsh Wetlands; 1.1 acres DNREC Tidal Mudflat Wetlands; 0.2 acre DNREC Subaqueous Lands; 1.0 acre	Potential roadway runoff, sedimentation, and changes to hydrology; decrease in wetland and waterway habitat	Relatively minor adverse effect due to protective legislation and the required permitting process	Mitigation: Proposed approach would be to enhance phragmites dominated tidal wetlands, on-site, along the Project shoreline.

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
	USACE Wetlands; 0.8 acre USACE Waters			Compensatory mitigation plans developed, as required by Federal and state regulations, would comply with the requirements included in the 2008 mitigation rule, including provision for long-term management, adaptive management, and site protection. Refer to Chapter V, Section K.5. for additional permitting details.
Watersheds and Surface Water	Adverse effects to surface waters and watershed characteristics due to direct impacts to tidal and perennial channels and the Christina River	Overall increase in impervious surface and amount and intensity of stormwater runoff entering the watershed and surface water features	Relatively small incremental effect because of the small, contained Project study area and existing regulations	<p>Minimization: Actions will be in accordance with the Delaware 5101 Sediment and Stormwater Regulations</p> <p>Mitigation: The quality and quantity requirement are met through brownfield remediation and conveyance structure use BMPs</p>
Groundwater and Hydrology	Potential for effects during construction	Contaminants leaching from the soil into the groundwater; increased impervious surface and stormwater runoff	Relatively small incremental effect because of the small, contained Project study area, remediation, and regulations	<p>Minimization: Groundwater impacts would be minimized by the remedial actions in the transportation infrastructure improvement area and by the development of a non-erosive stormwater conveyance system</p>
Floodplains	No significant encroachment to the 100-year floodplain	Beneficial effects to flooding conditions from resiliency solutions and elevating the transportation improvements	Relatively minimal incremental effect due to existing regulations and the City of Wilmington's <i>Resilient Wilmington</i> plan	<p>Mitigation: Elevating Project study area 18 inches or more above the 100-year floodplain</p>

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
				The City will commit to funding and construction of the South Wilmington Sewer Separation project that includes construction of a separate storm drain system and partial sanitary sewer reconstruction along B and C Streets to help alleviate flooding in the Southbridge community.
Vegetation, Terrestrial Habitat, and Terrestrial Wildlife	Effects to edge species; no substantial effects to wildlife habitat	Some less motile wildlife could be killed during construction and other more motile species could shift away from the new construction; improved wildlife habitat	No substantial contribution to the incremental effect due to a lack of vegetation and wildlife habitat in the Project study area and future improved habitat conditions	<p>Minimization: The abatement of hazardous materials should improve habitat for wildlife where it can recolonize</p> <p>Mitigation: Project proposes inclusion of tree plantings and additional green space</p> <p>Commitments: Refer to Chapter V, Section O.5.a. for a list of construction commitments to minimize pollutant runoff into surrounding wildlife habitat</p>
Rare, Threatened, and Endangered (RTE) Species	No adverse effects to ESA-listed species	Potential for noise effects from pile driving during construction; no effects anticipated downstream of the Project	No substantial contribution to the incremental effect due to there being no adverse effect to ESA-listed species	<p>Minimization/Commitments:</p> <ol style="list-style-type: none"> 1. Restrict in-water work between March 1 and June 30 to minimize impacts to anadromous fish migration and spawning. 2. Waterborne equipment associated with construction (e.g. barges) should float at all stages of the tide.

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
				<p>3. All work that may suspend sediment in the water column should be enclosed within a turbidity curtain.</p> <p>4. Provide compensatory mitigation for all intertidal and subtidal impacts. A draft mitigation plan should be provided to NOAA Fisheries HESD for review and approval. The City will provide NOAA HESD with the draft mitigation plan and a copy of the Department of the Army permit pursuant to Rivers and Harbors Act Section 10 and Clean Water Act Section 404 prior to construction..</p> <p>Refer to Table 11 for the list of Project design criterion to minimize potential negative effects to RTE species.</p>
Aquatic Biota	Effects to aquatic biota and natural habitat including mortality of aquatic organisms and permanent loss of natural habitat; temporary effects during construction from minor sediment discharges, noise, and vibration	Indirect effects to aquatic biota downstream from the Project or construction of future development on the site are not anticipated	No substantial contribution to the incremental effect due to lack of wildlife habitat in the Project study area and future improved habitat conditions	<p>Minimization: Through strict adherence to Delaware mandated erosion and sediment controls</p> <p>Commitment: Adherence to DNREC time-of-year, restrictions, reducing underwater noise by using a soft start pile driving system, minimizing water quality impacts through use of erosion and sediment control BMPs, limiting construction</p>

Environmental Resource	Direct Effects*	Indirect Effects	Cumulative Effects	Minimization, Mitigation, and Commitments
				debris, and minimizing habitat impacts by reducing the channel size to the minimum size that still allows non-erosive conveyance
Section 4(f) and Section 6(f)	Beneficial effect of new Riverwalk Archaeology adverse effect determination pending	No effect	No effect	No mitigation necessary Commitment: PPA will address phased identification of archaeological historic properties, should they be present

*Total reflects permanent and temporary direct effects

VI. Agency Coordination and Public Involvement

The FHWA and City of Wilmington actively engaged the public and Federal, state, and local agencies throughout the development of this Project as part of the NEPA process. As the Project moves forward, coordination with regulatory agencies and the public will continue to ensure all stakeholders have the opportunity to participate in the process and provide input.

A. Agency Coordination

FHWA coordinated with Federal, state, and local agencies to consider their role on the Project, as a Cooperating,¹⁶ Participating,¹⁷ or Notified Agency.¹⁸ The agencies who were coordinated with and their roles are listed below.

- U.S. Army Corps of Engineers - Participating
- U.S. Environmental Protection Agency - Cooperating
- U.S. Fish and Wildlife Service - Participating
- National Oceanic and Atmospheric Administration, Fisheries Greater Atlantic Regional Fisheries Office Habitat & Ecosystem Services Division - Cooperating
- U.S. Coast Guard - Notified
- Delaware State Historic Preservation Office - Participating
- DNREC Wetlands and Subaqueous Lands - Participating
- DNREC Division of Fish & Wildlife - Participating
- DNREC Division of Waste & Hazardous Materials - Notified
- DNREC Coastal Management Program - Participating
- DelDOT - Notified

An agency kick-off meeting was held on December 8, 2022 at the RDC's office (815 Justison St, Wilmington, DE 19801) and online via Microsoft Teams. Twenty Federal, state, and local agency representatives met with the Project team to discuss the Project, which included a Project introduction; an overview of the current activities undertaken by the RDC in the Project study area; an update on remediation work in the Project study area; an overview of the Project Purpose and Need, Build Alternative concepts, role of agencies; and the Project schedule and next steps. Questions received from agencies during the meeting discussed water work in the area and the bulkhead replacement, pedestrian connections, impacts to historic properties, EJ outreach, and phragmites removal along the riverbank.

¹⁶ Cooperating Agencies - 23 CFR 771.111(d) requires those agencies with jurisdiction by law (permitting or land transfer authority) to be invited to be cooperating agencies for an EIS. Other agencies having special interest or expertise with respect to any environmental impact involved in a proposed project or project alternative may also be invited.

¹⁷ Participating Agencies - 23 U.S.C. Section 139 are Federal, state, tribal, regional, and local governmental agencies that have an interest in the project. These participating agencies are formally invited to participate in the environmental review of the project. Non-governmental organizations and private entities cannot serve as participating agencies.

¹⁸ Notified Agencies include all other agencies who could have an interest in the project, or that have a role that is yet to be determined. These agencies would be notified of study milestones concurrently with the public.

In compliance with Section 106 of the NHPA, it was determined that due to the nature and scope of the Project, consultation with the DE SHPO was required and, therefore, initiated on January 19, 2023 with a letter. The letter covered an overview of the project, the APE, architectural resources of the study area, preliminary archaeological investigations, and identification of consulting parties. An online, Microsoft Teams meeting was held with the DE SHPO on March 27, 2023. Two representatives from DE SHPO met with the Project team to discuss an overview of the Project, the Project Purpose and Need, Build Alternative concepts, the study area and previously identified architectural resources, surveyed and non-surveyed architectural resources, and next steps.

A consulting parties meeting was then held on July 17, 2023, both in person and online via Microsoft Teams. The meeting covered an overview of the Project and study area, the Project Purpose and Need, NEPA Process, Build Alternative concepts, the Section 106 process, consulting parties' roles, architectural survey, archaeological survey, and next steps.

An additional meeting with the Project team and EPA was held on September 29, 2023 to discuss comments received on the technical reports. The EPA provided feedback and clarification on comments given. FHWA had interagency coordination and meetings throughout the project development process with Federal and states listed above as applicable.

FHWA held an interagency meeting on April 22, 2024, to discuss the findings of the Draft EA and to discuss the proposed schedule. Representatives from the EPA, SHPO, DNREC Wetland and Subaqueous Lands Section, and DNREC Coastal Programs Section were in attendance.

B. Public Involvement

The Wilmington Riverfront Transportation Infrastructure Project website, (<https://www.riverfronteastconnect.com/>) was launched in November 2022 to share information on the proposed Project and promote public engagement opportunities. The website provides background information on the Project, the purpose of the Project, recent and upcoming public engagement opportunities, how to submit comments to the Project team, and allows for members of the public to subscribe to Project-related newsletters. The website also includes additional resources and studies relevant to the Project and Project study area.

1. Open House

The City of Wilmington held the first public meeting for the Project as an Open House on Wednesday, December 14, 2022, from 4:30-6:30 p.m., at the Chase Center on the Riverfront. The purpose of this first open house was to introduce the Project to the public and inform the public on the Project Purpose and Need, concept plans, and project elements.

Various advertising and outreach methods were used to notify the public and stakeholders about the Open House, including a press release sent to local media, a posting to the City of Wilmington's City News website, legal advertisement in the News Journal, and posting to the City of Wilmington and the RDC's Instagram, Twitter, and Facebook pages. To reach underserved

communities in the area, an Open House flyer was sent in both English and Spanish to identified EJ organizations in the area, which included places of worship, civic leagues, and neighborhood associations; food banks and pantries; and service/justice organizations. Printed copies of the English and Spanish flyer were dropped off at community centers in the area, including the Rose Hill Community Center, Neighborhood House, and Latin American Community Center. For more information on advertising of the December 2022 Open House, including the full list of EJ organizations included in the mailing list, view the Open House Summary in **Appendix B**.

In total, the Open House was attended by 75 members of the public, with three media personnel and two elected officials. Additionally, members of the Harlan Park Civic Association, Trolley Square Civic Association, and the Southbridge Community Development Corporation attended, as well as representatives from the City of Wilmington, Delaware Transit Corporation (DTC), and WILMAPCO. Eight comments were received via the written comment form at the Open House. Comments inquired about the Project's impacts to downtown businesses, the current ShopRite location, and the environment, including impacts to wildlife and flooding conditions in the area. Other comments noted the need for bicycle and pedestrian improvements in the area, specifically a safe connection along A Street between bus stations, and an interest in a boater-friendly riverfront with dock access. In general, comments received offered support for the Project. One comment noted concern over the length of the NEPA process.

Other frequently heard comments that were communicated verbally to the Project team at the Open House included questions about what will be built in the Project study area, such as offices, apartments, or restaurants. Additional comments were asked about what is being done with the previous Salvation Army property as well as the timeframe. As noted on the project website frequently asked questions¹⁹, the Salvation Army Thrift Store and Adult Rehabilitation Center facility was previously located in the Project study area at 107 South Market Street. The facility moved less than half a mile away in 2022 to 610 South Walnut Street; however, the Salvation Army building is still standing at its previous location on South Market Street. After the NEPA process is completed and a final decision is made from FHWA, the building will be demolished, and the property will be further investigated for contaminants and remediated as appropriate.

Other comments noted the need for bicycle and pedestrian improvements in the area, specifically a safe connection along A Street between bus stations, and an interest in a boater-friendly riverfront with dock access. In addition, attendees asked about the timeframe of the NEPA process and subsequent timing of construction. Overall, the public expressed support and excitement for the proposed Project. For more information on the December 2022 Open House, refer to the Open House Summary in **Appendix B**.

Following the December 2022 Open House, a set of Frequently Asked Questions (FAQs) were developed for the Project website to continue to share information on the Project with the public

¹⁹ <https://www.riverfronteastconnect.com/overview/>

(<https://www.riverfronteastconnect.com/overview/>). FAQs were based on comments and questions commonly received and asked during the Open House and include information on the Project purpose, schedule, alternatives, and impacts.

2. Pop-up Events

In order to continue to provide opportunities for meaningful engagement with EJ populations and underserved communities that would be directly or indirectly affected by the proposed Project, a series of pop-up events were held during the Summer of 2023. Additional information on public outreach with EJ populations can be found in the *Socioeconomic Technical Report (Appendix B, Section X.B)*.

The pop-up events provided the public with the opportunity to ask questions to the Project staff and inform them of any concerns they may have regarding the Project. There was low attendance at the Grazin' in the Grass Events, so the Project Team set up a table at the grocery store, ShopRite, in the Project study area and distributed approximately 30 bi-lingual informational cards to patrons of the grocery store.

Pop-up events included:

- City of Wilmington's Grazin' in the Grass events:
 - Kuscuiusko Park in Hedgeville, 6-8 PM on Thursday, July 13, 2023
 - Eden Park in Southbridge, 6-8 PM on Thursday, July 27, 2023
- ShopRite of Christina Crossing, 10 AM-12 PM on Saturday, July 29, 2023

3. Association Meetings

In addition to the pop-up events, the Project team has presented to the Southbridge Civic Association at their June 2023 meeting and at the Canby Park Civic Association meeting in October 2023. The presentation included an overview of the NEPA process, the project timeline, the No Build and Build Alternatives, and next steps. The Project team has also offered similar presentations to the Browntown Community Association and Hedgeville Civic Association.

Comments received from the Southbridge community included the lack of direct investment in their community by the City as they are seeing development go on around them and noted the improvements the community identified in the Southbridge Transportation Action Plan the community developed. While the Southbridge community and the Southbridge Transportation Action Plan improvements are outside the scope of this Project, the City of Wilmington is making several commitments to this community. The City's Office of Economic Development will work with the University of Delaware's Local Government Grant Assistance Program and the Southbridge Civic Association in identifying and applying for grant funding in support of the improvements identified in. Additionally, the City and the RDC will continue to investigate funding to plan, design, and construct a pedestrian connection from the Southbridge Community to the Wetland Park between C Street and South Church Street.

Comments received during the Canby Community Association Meeting included comments on existing and future development; existing zoning; property impacts; and whether the open space would benefit all communities.

Further informational bi-lingual cards were left at community facilities in the area, including the Neighborhood House, Latin American Community Center, Rose Hill Community Center, and the Route 9 Library and Innovation Center. Additionally, Project posters were left at the ShopRite of Christina Crossing and Route 9 Library and Innovation Center on community bulletin boards. Materials distributed at these pop-up events can be found in the *Socioeconomic Technical Report (Appendix B)*.

4. Draft EA Availability

The Draft EA is available online at <https://www.riverfronteastconnect.com/>, and at in-person locations starting April 1, 2024. In-person viewing locations include: the Neighborhood House (1218 B St, Wilmington, DE 19801), Chase Center on the Riverfront (815 Shipyard Dr, Wilmington, DE 19801), and MSK Community Center (1009 Sycamore St, Wilmington, DE 19805).

Public hearings will be held April 15 and 17, 2024 for interested citizens, elected officials, and other stakeholders to assess and provide feedback on the proposed Project and mitigation. Public comments on the Draft EA will be accepted between April 1 – May 1, 2024. Comments can be provided through the comment form at the in-person public hearing, via the online comment form at <https://www.riverfronteastconnect.com/> or verbally at the in-person or virtual public hearings listed below.

In-Person Public Hearing:

April 15, 2024

5:30 – 8:00 p.m.

Chase Center on the Riverfront

Dravo Auditorium

815 Justison St, Wilmington, DE

Virtual Public Hearing (held via Zoom):

April 17, 2024

Session 1: 10:00 a.m. – 12:00 p.m.

Session 2: 5:30 – 7:30 p.m.

5. Public Hearing and Comment Period

a. Public Hearing Overview

FHWA and the City of Wilmington held a series of public hearings for the Project following the publication of the Draft EA in April 2024. This included one in-person hearing on April 15, 2024, from 5:30 – 8:00 p.m. at the Chase Center on the Riverfront, 815 Justison St, Wilmington, DE 19801. Two virtual public hearings were held via Zoom on April 17, 2024, from 10:00 a.m. – 12:00

p.m. and 5:30 p.m. – 7:30 p.m. The purpose of the public hearings was to inform the public of the findings of the Draft EA and provide the opportunity for the public to provide comments and testimony.

At the in-person hearing, attendees were able to provide comments via verbal testimony (both public and private) and written comment form. In addition to providing the public the opportunity to provide written comments and verbal testimony, the in-person and virtual hearings also featured informational boards for the public to learn more about the findings of the Draft EA. The informational boards were displayed outside the verbal testimony room for the in-person hearing, where attendees could ask the Project Team questions about the proposed project. For the virtual public hearing sessions, the boards were played on a loop prior to the beginning of each session. The informational display boards were made available in both English²⁰ and Spanish²¹ on the Project website (<https://www.riverfronteastconnect.com/participate/spring-2024-public-hearings/>).

b. Notification and Outreach

Various advertising and outreach methods were used to notify the public and stakeholders about the public hearings (see **Table 14**). These efforts include a press release sent to local media, post on the City of Wilmington’s City News website at (<https://www.wilmingtonde.gov/about-us/city-news>), legal advertisement in the Delaware News Journal, radio advertisement on WDEL radio station, and social media posts to the City of Wilmington’s and RDC’s social media platforms. These platforms include:

- Instagram: @cityofwilmde and @riverfrontwilmington
- Facebook: @City of Wilmington, Delaware and @Friends of Riverfront Wilmington
- X (formerly known as Twitter): @cityofwilmde
- LinkedIn: @City of Wilmington, DE

Additionally, the City of Wilmington notified elected officials of the availability of the Draft EA and upcoming public hearings in an email on April 1, 2024, and additional notification of the extended comment period was provided on May 1, 2024. A public hearing flyer was sent in both English and Spanish to identified EJ organizations in the area that have available emails, which included places of worship, civic and neighborhood associations, food banks and pantries, and service/justice organizations (see **Appendix B**). The same EJ organizations were included in the Project’s initial 2022 Open House outreach, with the full list of organizations available in the Open House Summary in **Appendix B**. Printed copies of the English and Spanish flyers were provided to community centers in the area, including the Neighborhood House, Rose Hill Community Center, Latin American Community Center, and MSK Community Center. Copies of the flyers

²⁰https://www.riverfronteastconnect.com/wp-content/uploads/2024/04/Wilmington-Riverfront-Display-Boards_FINAL_English.pdf

²¹https://www.riverfronteastconnect.com/wp-content/uploads/2024/04/Wilmington-Riverfront-Display-Boards_FINAL_Spanish.pdf

were also left at the Route 9 Library and Innovation Center and Chase Center at the Riverfront and posted to community bulletin boards located within the ShopRite of Christina Crossing.

The Project website (riverfronteastconnect.com) was updated on March 15, 2024 to display notice of the upcoming public hearings, and on April 1, 2024 with the Draft EA and appendices, in-person viewing locations, ways to comment, and additional information on the in-person and virtual public hearings. The website's FAQs were updated with the latest proposed Project information. On April 15, 2024, the informational boards displayed at the in-person public hearing were posted in English and Spanish on the website. The website was updated on May 1, 2024, to provide notification of the extended comment period to May 15, 2024.

A summary of all notification and outreach methods is shown below in **Table 14**.

Table 14: Notification and Outreach Summary

Outreach Method	Link/Description	Date
Newspaper Legal Advertisement	Public Hearing Advertisement	March 15, 2024
	Comment Period Extension	May 8, 2024
Elected Officials Email	Email sent to elected officials notifying them of the upcoming public hearings and information to share with constituents.	April 1, 2024
	Email sent notifying elected officials of extension of the comment period.	May 1, 2024
EJ Organization Outreach: Email and Flyer Drop-Off	Public hearing information and flyer emailed to 39 EJ organizations in the area, both in English and Spanish.	April 1, 2024
	Printed copies of the public hearing English and Spanish flyers dropped off at community centers in the area, Route 9 Library and Innovation Center, and ShopRite of Christina Crossing.	April 1, 2024
	Email sent reminding EJ organizations of the upcoming public hearings.	April 12, 2024
	Email sent notifying EJ organizations of extension of the comment period.	May 1, 2024
	Email sent notifying EJ organizations of the May 9, 2024, community outreach meeting in the Southbridge neighborhood.	May 3, 2024
	Printed copies of the comment period extension and community outreach meeting flyer dropped off at community centers in the area, Route 9 Library and Innovation Center, and ShopRite of Christina Crossing.	May 3, 2024
Social Media	City of Wilmington (public hearing notice): Instagram Facebook X (formerly known as Twitter) LinkedIn	April 4, 2024
	Riverfront Wilmington (public hearing notice): Facebook	April 4, 2024
	City of Wilmington (public hearing reminder):	April 9, 2024

Outreach Method	Link/Description	Date
	Instagram Facebook X (formerly known as Twitter)	
	City of Wilmington (comment period extension): Instagram Facebook Twitter LinkedIn	May 1, 2024
	Riverfront Wilmington (comment period extension): Instagram Facebook	May 7, 2024
WDEL Radio Advertisement	30-second advertisement run on WDEL the week leading up to the public hearings.	April 5, 2024
Press Release	Link to Public Hearing Press Release	April 15, 2024
City of Wilmington City News Webpage Post	Link to Public Hearing Post	April 15, 2024

c. Attendance

In total, the in-person and virtual public hearings had 66 attendees present. The in-person public hearing was attended by 38 members of the public, city staff, elected officials, and media representatives. Representatives from the Delaware Department of Transportation and Delaware Nature Society were in attendance. Additionally, a media personnel from WDEL was present. The virtual hearing sessions were attended by 18 members of the public. The morning session had eight attendees, and the evening session has 10 attendees, including representatives from WILMAPCO and Delaware Public Media.

d. Other Meetings During the Comment Period

In addition to the public hearings, the Project team attended and presented at the South Wilmington Planning Network's (SWPN) April meeting on April 23, 2024, via Zoom. SWPN is a collaborative partnership of residents and government, non-profit, and private agencies that work together to improve quality of life in the Southbridge neighborhood²². The meeting had 39 attendees that included members of the SPWN, Southbridge residents, and members of the Project team. The Project team presented the informational display boards that were present at the in-person hearing; directed attendees to the Project website to view the Draft EA; informed attendees on how to submit comments; and encouraged attendees to submit formal comments via email, voicemail, or on the Project website through the EA comment form in order for their concerns to be addressed in the Revised EA.

A community outreach meeting was held in-person at the Neighborhood House community center in the Southbridge neighborhood on May 9, 2024, from 6 – 7 p.m. This meeting was advertised through the EJ organization email list. Additionally, flyers notifying the public of the

²² <https://swpn.org/>

comment period extension and community outreach meeting were provided to community centers in the area, including the Neighborhood House, Rose Hill Community Center, Latin American Community Center, and MSK Community Center. Copies of the flyers were also left at the Route 9 Library and Innovation Center and Chase Center at the Riverfront and posted to community bulletin boards located within the ShopRite of Christina Crossing.

This community outreach meeting was held in response to public comments requesting a meeting in the Southbridge neighborhood, east of the Project study area. Eleven attendees were present at the meeting, including Southbridge residents, members of the Southbridge Civic Association, Southbridge Community Development Corporation, and SWPN. Informational display boards from the in-person public hearing were available for viewing at the community outreach meeting, with the Project Team present to answer questions about the proposed project. Attendees were encouraged to fill out a written comment form at the community outreach meeting, or to provide comments through the online comment form, email, or voicemail in order for their concerns to be addressed in the Revised EA.

e. Future Public Outreach

Updates regarding the NEPA process for the Project will be made available on the Project website (<https://www.riverfronteastconnect.com/>). If FHWA determines that there are no significant impacts, a Finding of No Significant Impact (FONSI) would be issued and made available to the public on the Project website.

The public can also follow the permitting process on the Federal Permitting Dashboard: <https://www.permits.performance.gov/permitting-project/dot-projects/wilmington-riverfront-transportation-infrastructure-project>

Lastly, the City and RDC will continue public notification throughout the construction process. Members of the public can refer to the project website for the latest information on Project implementation and upcoming activities.

C. Draft EA Comments and Responses

The comment period for the Draft EA and public hearings began on April 1, 2024, with the publication of the Draft EA on the project website and available in print at the three viewing locations, the Chase Center on the Riverfront, MSK Community Center, and Neighborhood House. The comment period ran for 30 days from April 1, 2024 until May 1, 2024. An additional 15-day comment period extension was provided by the FHWA at the request of the public, and the public comment period closed on May 15, 2024.

At the in-person hearing on April 15, 2024, six comments were received via the written comment form and three via verbal testimony. No comments were received during the morning session of the virtual public hearing, and two comments were received via verbal testimony during the evening virtual public hearing. From April 1 to May 1, 2024, 23 comments were received via the

online comment form and 2 were received via email to contact@riverfronteastconnect.com. No comments were received via voicemail to 302-250-4379. In total 42 comments from 38 individuals and organizations were received on the Draft EA. Additionally, the U.S. Environmental Protection Agency submitted comments via letter on May 1, 2024.

Common themes of comments included issues outside the scope of the Project, general support, future development, schedule, noise, advertisement of the Draft EA, documentation, water quality, flooding/floodplains, hazardous remediation, and wetland mitigation. Additionally, five comments received from four individuals asked the comment period be extended and that an additional public meeting be held in the Southbridge neighborhood, east of the Project study area.

Copies of all comments received via comment form, online comment form, email, and public hearing testimony on the Draft Environmental Assessment (EA) are included as part of the record for the Project. All comments received during the official comment period from April 1, 2024 through May 15, 2024 were reviewed by FHWA and the City.

All comments have been transcribed into tables in **Appendix K** and are presented alphabetically by the commenter's last name and assigned a number. **Appendix K** includes the verbatim comments received, except for redacting certain personal information such as addresses and email addresses. All comments were reviewed and responded to.

The public comments were considered in the development of the minimization and proposed mitigation and commitments for impacts to environmental resources identified for the Project.

VII. List of Preparers

This EA was prepared under the direction and with the involvement of the Federal Highway Administration, in cooperation with the City of Wilmington and Riverfront Development Corporation. Key preparers of this document are included below.

Name	Education, Highest Degree Achieved	Study Role/Responsibility
FEDERAL HIGHWAY ADMINISTRATION		
Rebecca Ledebom	BS Environmental Engineering Technology	Environmental Protection Specialist – Delaware Division
Daniel Montag, PE	Master of Civil Engineering	Senior Area Engineer/Major Project Manager – Delaware Division
Lee Ellen Carter	Master of Environmental Management	Environmental Protection Specialist – FHWA Headquarters
Marisel Lopez-Cruz	Master of Environmental Engineering	Environmental Protection Specialist – FHWA Headquarters
CITY OF WILMINGTON		
Sean Park	Masters of Public Policy	Director, Mayor's Office of Economic Development
Peter Weir	Masters of Public Administration	Project Manager, Mayor's Office of Economic Development
RIVERFRONT DEVELOPMENT CORPORATION OF DELAWARE		
Tony Mottola	BS Agriculture/ Natural resources	Director of Projects
RK&K		
Bob Shaffer	High School	Project Manager
Erron Ramsey, AICP	BA Environmental Studies	NEPA Manager
Matt Kozak, PE	BS Civil Engineering	Design
Karen Hutchins-Keim	PhD Archaeology	Section 106
Nicole Diehlmann	Masters in Historic Preservation	Section 106
Kevin Hughes	BS Engineering Science	Noise
Greg Barnes	BA Environmental Studies	Air Quality and GHG Analysis
Justin Reel	BS Biology	Natural Resources
Maddy Sigrist	BS Environmental Science	Natural Resources
Abigail Sale, AICP	Masters of Urban and Regional Planning	NEPA
Christina Burns	BS Environmental Science	NEPA

Name	Education, Highest Degree Achieved	Study Role/Responsibility
Katie Gibson	BA Environmental Studies	NEPA & Public Involvement
Kim Troiani	BS Computer Science	Public Involvement
Michelle Moir	BS Biology	NEPA
Brightfields, Inc. Environmental Services		
Jenna Harwanko	Masters of Business Administration	Hazardous Materials
Kathy Stiller	Masters of Marine Policy	Hazardous Materials
Heather Wrigley	BS Biology	Hazardous Materials

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