THE ROUTE 9 CORRIDOR

Land Use and Transportation Plan

route 9 corridor MASTER PLAN

May 2017

New Castle County 1673 Delaware

WILMAPCO

DESIGN COLLECTIVE

The aerial perspective on the front cover of the document depicts a proposed vision for the Innovation District and the Route 9 Corridor. The view shows potential development around the new library between the intersections of Memorial Drive (depicted as a traffic circle) and Hillview Avenue, looking northwest. The aerial perspective shows the proposed transportation improvements and development scheme. The proposed plan suggests the long-term development potential of the area with mixed-use development lining Route 9 adjacent to the new library and residential incorporated throughout the neighborhoods where land is currently underutilized. The aerial perspective view is intended for illustrative purposes only.

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route 9 corridor MASTER PLAN

WILMAPCO COUNCIL RESOLUTION

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RESOLUTION

BY THE WILMINGTON AREA PLANNING COUNCIL (WILMAPCO) ENDORSING THE ROUTE 9 CORRIDOR TRANSPORTATION AND LAND USE MASTER PLAN

WHEREAS, the Wilmington Area Planning Council (WILMAPCO) has been designated the Metropolitan Planning Organization (MPO) for Cecil County, Maryland and New Castle County, Delaware by the Governors of Maryland and Delaware, respectively; and

WHEREAS, the WILMAPCO Council recognizes that comprehensive planning for future land use, transportation, sustainable economic development, environmental protection and enhancement, and community health and livability are necessary actions to implement the goals and objectives in the 2040 Regional Transportation Plan (RTP); and

WHEREAS, the New Castle County requested that WILMAPCO develop a land use and transportation master plan for the Route 9 Corridor between Wilmington and New Castle; and

WHEREAS, the Route 9 Master Plan assessed existing demographic, land, environmental, traffic, and real estate market conditions; and

WHEREAS, the Route 9 Master Plan employed continuous and rigorous public engagement throughout the planning process; and

WHEREAS, the Route 9 Master Plan puts forth dozens of recommendations which will spur economic development, correct unhealthy land use patterns, mitigate community health concerns, improve the multimodal transportation network, reduce illegal truck traffic while streamlining freight transportation, and, generally, spur mixed-use and mixed income reinvestment and redevelopment opportunities;

NOW, THEREFORE, BE IT RESOLVED that the Wilmington Area Planning Council does hereby endorse the final report and recommendations of the Route 9 Master Plan.

5/19/17
Date:

John Sisson, Chairperson
Wilmington Area Planning Council

WILMAPCO

Partners with you in transportation planning

EXECUTIVE SUMMARY

The Route 9 Corridor Land Use and Transportation Master Plan identifies the best reinvestment and redevelopment strategies for the Route 9 Corridor south of Wilmington, Delaware. Plan area boundaries stretch north to south from the City of Wilmington line to the City of New Castle line, and west to east from US 13 to the Delaware River. This Master Plan was requested by New Castle County, which has identified that the area needs significant revitalization. The Route 9 Master Plan was funded and executed by the Wilmington Area Planning Council (WILMAPCO) under the close guidance of a Steering Committee comprised of local civic and agency partners.

Mid-to-late 20th century development of this inner suburban corridor occurred in a jagged, haphazard way. Residential developments were not, as a rule, linked together; industries were built too close to homes; roads were built too wide; commercial activity became decentralized; healthy food and routine healthcare became inaccessible for those without a car; and raised expressways divided communities. Policies which led to the concentration of joblessness and poverty encouraged crime – the number one community concern – to flourish.

Community and business leaders, government, nonprofit groups, and residents have begun promising initiatives to begin addressing these challenges. The recent Route 9 Blueprint Community Plan, for example, establishes strategic goals and objectives for addressing environmental justice, workforce development, and youth engagement. The Delaware Department of Natural Resources and Environmental Control (DNREC), meanwhile, has detected a heavy presence of dust in the north of the corridor. They are leading a study to better understand pollution there and its potential public health and welfare impacts. New Castle County's recent rewrite of its Unified Development Code and recent state legislation to foster complete communities both begin to support the redevelopment of healthier neighborhoods. These and other efforts complement and positively extend the work of this Land Use and Transportation Master Plan.

This Master Plan is divided into three general parts. The first part is an analysis of existing conditions and infrastructure and market realities. This work ensures that our recommendations are feasible and identifies key development opportunities. Key takeaways from our existing conditions and market analyses are listed below -- fuller details can be found in the document and in the Appendix.

EXISTING CONDITIONS

- About 16,500 people live along this stretch of the Route 9 corridor. About 10,000 work here. If current trends continue, these numbers will not change much over the next two decades.
- Properties zoned for residential form the core of the study area, with commercial nestled in between. Active industrial surrounds and, in the north, directly adjoins many residential developments.
- Neighborhoods here are very distinct by housing type (detached, townhouses, apartments, hotels, etc.) and are often segregated by race and income.
- Route 9 traffic generally moves well. About 16,000 trips occur along the corridor each day and intersections, on the average day, function below capacity. Crashes are almost never fatal, but nonfatal crashes do occur with frequency in spots. The biggest cluster of crashes occurs just south of Cherry Lane.
- The corridor is auto-centric with limited pedestrian and bicycle infrastructure. Route 9, Memorial Drive, I-495, and I-295 are all currently barriers for those traveling on foot or bike to destinations, including bus stops.
- Transportation connections are often absent between communities, forcing some unnecessary vehicular and pedestrian traffic onto Route 9.
- Truck traffic is high in the corridor due to the presence of the port and industrial uses. Despite good efforts to reduce illegal truck traffic, illegal trips continue to occur through residential areas.
- Excellent community centers, schools, and libraries are in place. Notably these include: the Rose Hill Community Center, the Garfield Park Lending Library and PAL Center, Eisenberg Elementary School, McCullough Middle

School, and a new Innovation Center.

» Much of the study area is considered a food desert. According to the United States Department of Agriculture, this means that low income households are present and healthy food is often too far away.

REAL ESTATE AND MARKET ANALYSIS

» Future housing growth, particularly in senior housing (given underlying aging demographics), is possible without government subsidy or support.

» The retail sector is stagnant, particularly north of I-295. Concessions are required to draw a major catalyst, which would support more diverse and higher rent retail development.

» Future expansion of the Port of Wilmington would drive small tenant retail, office development (in the long-term), and industrial warehousing and business development.

COMMUNITY ENGAGEMENT

We employed robust and continuous community engagement throughout the planning process. Each Civic Association was invited to participate in what would become our Steering Committee. Elected officials, faith leaders, and businesspeople were specifically involved early and throughout the process.

Our broader public visioning and feedback process with area residents included: two public workshops, an online outreach campaign, participation at scheduled community meetings and events, and talking to hundreds of people on the street. We spoke with a strategic cross-section of residents who reflected the corridor's demographic and socioeconomic diversity. Respondents included residents from every neighborhood, seniors, workers, and young people.

Our community engagement process established the plan's vision, identified and prioritized the top community needs, and provided guidance in developing and refining the plan's scope and recommendations.
The top community needs we identified, in order of residents' priority, were:

» Eliminating chronic crime;

» Supporting education and job access and growth; and

» Enhancing existing community amenities.

Residents and stakeholders made specific recommendations to improve land use and transportation conditions. These recommendations included:

» Allow no new industrial along the corridor and/or properly space industrial from residential uses;

» Reuse underutilized land;

» Eliminate illegal truck traffic;

» Pursue better quality and more attractive development – both housing and retail;

» Attract more retail generally;

» Achieve a higher percentage of owner-occupied households;

» Remove hotels along West Avenue;

» Enhance bus and pedestrian and bicycle facilities; and

» Improve lighting along major roads.

RECOMMENDATIONS

Considering the preceding analysis and engagement, the final part of the Master Plan identifies recommendations. These recommendations are sometimes broad and sometimes quite detailed.
The major, big ideas, for the Route 9 Corridor of tomorrow are:

» Industrial lands adjacent to Route 9 will be appropriately separated from residential neighborhoods. We propose to rezone the northern tip of the corridor – north of I-495 – to industrial or open space and remove residential. Beginning around Rogers Road and moving south, we propose to prohibit industrial and transition existing industry to a mix of commercial and residential. This long-term repositioning of industry will mitigate exposure to heavy dust pollution and odors, improve population health, greatly reduce illegal truck traffic, and, at the same time, allow industry the room it needs to operate and create jobs.

» New truck routes (Pigeon Point Road Extension and Garasches Lane Extension) will work to keep trucks out of existing and future neighborhoods and simultaneously improve freight movement efficiency, freeing industry and the port to comfortably expand west and south.

» Zoning adjustments allowing for mixed use development (residential/commercial/office) will encourage healthy suburban centers along the corridor to grow and thrive. New development will be concentrated in these centers, instead of dropping piecemeal as it has along the corridor. This concentration of mixed-use and income development will magnify economic impact, facilitate easy bus, walking, bicycling access, and create great shared community and regional spaces.

» The first center to be redeveloped will be around the Innovation District. There, new senior, rental, and for-sale housing (mostly market rate, but with some affordable units) will be packed around the new library, along with new office and retail and park space. In the longer-term, this development will spur the removal and redevelopment of the hotels along West Avenue, part of an excessively large parking lot in front of the Bowlerama, an aging, underutilized retail block north of Hillview Ave., and a new mixed-use, infill development across from the Rose Hill Community Center on Lambson Lane.

» Both Route 9 and Memorial Drive will be placed on road diets, and their key intersections will be redesigned and rebuilt to enhance safety and keep traffic moving. Some vehicular travel lanes will be unnecessary with our proposed intersection enhancements, and the saved space will be dedicated to the safer movement of buses, pedestrians, and bicyclists. Meanwhile, an internal pedestrian/bicycle path system will knit together the now largely disconnected neighborhoods along the corridor. These improvements will reduce dangerous vehicle crashes, make it easier and safer to cross Route 9 and Memorial Drive on foot or bicycle, and better connect existing and planned neighborhoods and amenities.

NEXT STEPS

These recommendations will proceed towards implementation individually, and over time, under the guidance of the State and County. It must be stressed that no funding has yet been set aside to complete any of these recommendations. And most of the recommendations above and throughout the report are planning concepts which will require further, more detailed, study.

This Master Plan has identified a 20-year land use and transportation vision and plan for the Route 9 Corridor based on careful analysis and strong public outreach. It was a necessary first step on the long journey to full implementation, one which will undoubtedly spur additional studies, designations, grants, and projects along the way. Continued public support and pressure to implement the recommendations in this Master Plan are necessary to help speed their delivery.

INTRODUCTION

OVERVIEW

Locator Map - The Route 9 Corridor study area is located approximately 3 miles south of Wilmington, Delaware between I-295 and I-495.

New Castle County has identified a three-mile stretch of the Route 9 corridor near Wilmington, Delaware as in significant need of reinvestment and revitalization. The County requested that the Wilmington Area Planning Council (WILMAPCO), the area's Metropolitan Planning Organization, conduct a 20-year Master Plan to help guide future land and transportation development along this corridor. The study area includes Route 9 from the City of New Castle boundary to the City of Wilmington boundary, along with adjacent lands west to US 13 and east to the Delaware River. In future years, WILMAPCO hopes to extend the study area north to the Christina River and south to SR 273.

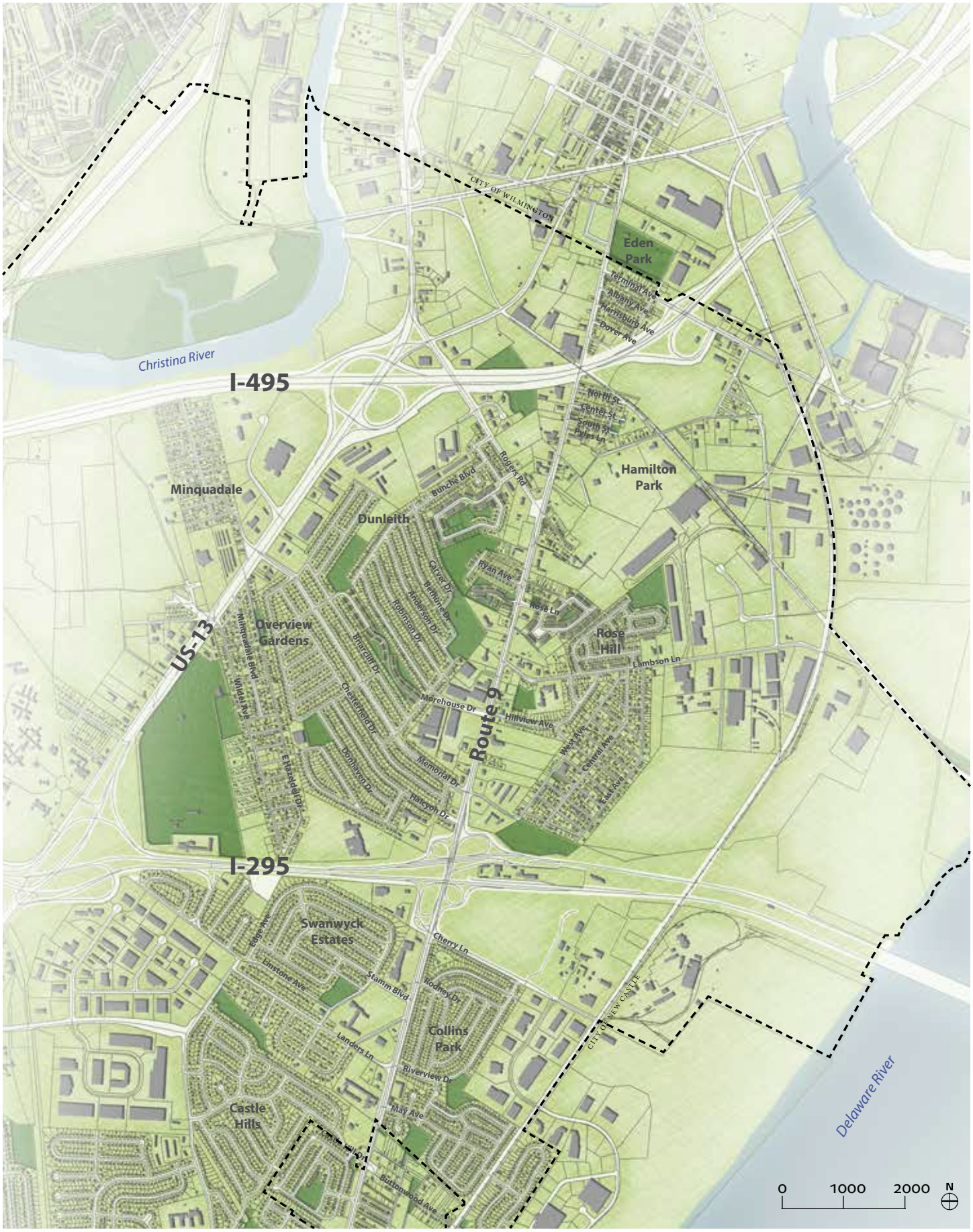
Past studies, such as the 2015 Walkable Communities Workshop Report, have called for improving the quality of life, efficiency of transporting people, and supporting sustainable economic development. Further, the Master Plan complements the Blueprint Communities Route 9 Revitalization Plan, currently under development, which identifies strategic goals and objectives to realize environmental justice, strengthen workforce development, and better engage youth. The Route 9 Corridor Master Plan references these studies and develops a set of analyses and recommendations that will guide roadway improvements, address the streetscape within the public right-of-way, inform the market feasibility of future development, and implement a common vision for the Route 9 Corridor and adjacent underutilized properties. The Master Plan has been endorsed by the WILMAPCO Council and New Castle County as a guide for future redevelopment on the corridor. The recommendations in this Plan should be viewed as concepts, many of which require more careful consideration before their implementation. Implementation of the Plan will take place in stages, and over time, as funding becomes available. All previous studies referenced throughout the document can be accessed through the Route 9 website at www.wilmapco.org/route9/.

Currently the Route 9 Corridor functions as the area's main thoroughfare, providing crucial links between major expressways, a variety of commercial businesses, major industrial uses such as the Port of Wilmington, and pockets of single-family residential homes. The corridor's assets include strong schools, churches and community centers, great parks, and multi-generational neighborhoods that are home to inspiring civic leaders with deep community roots. The local community's social capital is an asset that can be leveraged as part of any redevelopment and revitalization efforts in the corridor. Despite these assets, the area is challenged by lack of investment; underutilized land and incompatible land uses; high unemployment and economic disparities; a high crime rate; environmental pollution; and health challenges, including a lack of routine medical care providers and higher infant mortality and lower life expectancy rates than other communities Currently, this segment of Route 9 is auto-oriented, with limited capacity for pedestrians and cyclists, and acts as a barrier between the land uses to the east and west.

The Route 9 Corridor Master Plan addresses these issues and creates a shared vision through extensive stakeholder involvement and community input. To help guide the planning process, the project Steering Committee established a list of project goals. These, in addition to other needs voiced by the community, helped form a collective master plan strategy that is outlined within this document.

PROJECT GOALS

- Improve health and quality of life of residents by improving access to jobs, education, healthy foods, active recreation opportunities, community services, and affordable residential development;
- Incentivize economic development, including mixed-use and mixed-income development;
- Mitigate environmental and health concerns;
- Examine land uses and recommend zoning adjustments; and
- Recommended roadway improvements that promote and enhance the use of alternative transportation and manage truck traffic.



Existing Conditions Illustrative Site Plan - The Route 9 Corridor Master Plan area spans approximately 3 miles along Route 9, from the City of Wilmington to the City of New Castle, and, west to east from Route 13 to the Delaware River.

PROCESS

In December of 2015, the consultant team led by Design Collective, Inc. was engaged by WILMAPCO to begin the Route 9 Corridor Master Plan. The process approach was outlined by a series of tasks that were initiated in sequence during the course of one year to effectively examine, invision, and create a set of development recommendations for the Route 9 Corridor.

TASK 1: ANALYSIS

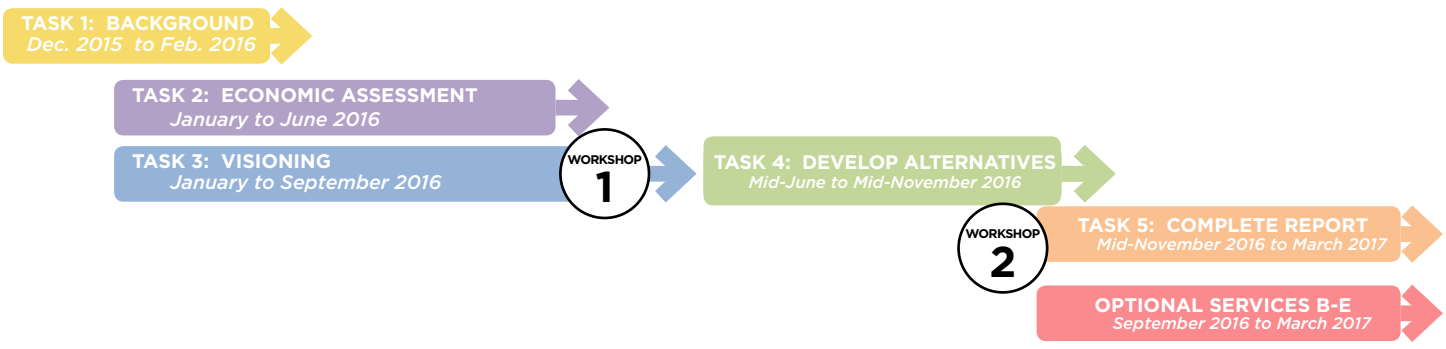
Through a series of analyses and interactive public meetings, the design team began its process by collecting and interpreting data to identify the issues and needs for the future of the corridor. In January of 2016, the team held preliminary Steering Committee meetings to better understand the current strengths, weaknesses, and goals of the corridor. Analysis maps, each describing a different physical element of the corridor, were produced by WILMAPCO. In February, the analysis diagrams, GIS data, and aerial imagery were cross-referenced by the design team through various site visits to explore and better understand the existing conditions of the study area.

TASK 2: REAL ESTATE/ ECONOMIC DEVELOPMENT ASSESSMENT

From January-June of 2016, RCLCO, the market-economic consultant, conducted a comprehensive assessment of the corridor's economic development potential. The market analysis results outlined the impacts, needs, and feasibility for industrial, office, retail, and residential growth. With these results, the design team created strategic growth areas along the corridor that indicated both short- and long-term development goals.

TASK 3: COMMUNITY VISIONING

A series of Steering Committee meetings and summer outreach sessions were conducted throughout the first half of the year to assess community preferences and visions for the corridor. Interactive public input meetings were held on May 24, 2016 and November 29, 2016 to collect valuable insights from those who live, work, and visit the corridor. The public input received, along with the steering committee meetings and summer outreach sessions, informed the strategies and criteria outlined in the Route 9 Corridor Master Plan.



TASK 4: DEVELOP ALTERNATIVES

Short and long-term redevelopment plan alternatives were developed based on the needs expressed by the community and stakeholders and development potential outlined in the market analysis summary. Additionally, recommendations for zoning changes were provided to improve opportunities for mixed-use development and address the issues of incompatible land uses.

A complete traffic analysis of Route 9 and Memorial Drive was conducted by Toole Design Group, the project's traffic/ transportation consultant. Traffic data (hourly speed and volume data, intersection data, and turning movements), traffic signal information, and road geometry information received from WILMAPCO and DelDOT was used to model traffic operations of existing and proposed lane configurations. Existing traffic conditions for the morning and evening peak periods included a "no build" scenario that only projected traffic growth with no design changes. One "build" scenario was modeled, analyzed, and used to guide proposed intersection concept plans and cross-section alternatives. Components of the traffic analysis are incorporated throughout the document. The complete analysis results are included in *Appendix C. Traffic Analysis.*

Using information from the community input sessions, building on ideas from the Walkable Community Workshop Report, and the traffic analysis modeling, various transportation concepts for the corridor were developed. Corridor-wide initiatives aimed to improve safety and access for everyone with three important topics given particular attention: the need to improve walkability, manage freight traffic, and enhance access to/from bus stops. Specific intersections along Route 9 and Memorial Drive were studied. Three alternative street design concepts for each intersection were created: a basic (or low-cost) option, a mid-range option, and an optimum option.

The materials produced in Task 4 were shown at the second Public Workshop on November 29, 2016, for review and feedback.

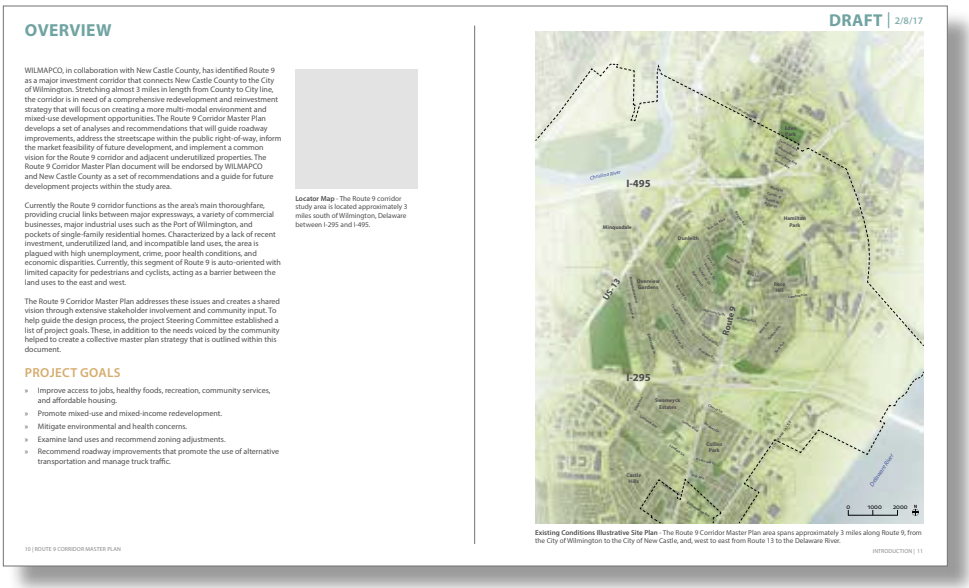
TASK 5: COMPLETE REPORT

The redevelopment plan and accompanying deliverables were refined based upon the Steering Committee, stakeholder input, and an open public comment period. Preferred design alternatives were selected and are identified in this document. The Route 9 Corridor Master Plan is a highly visual report detailing the tasks completed throughout 2016, the goals identified by the community, and implementation strategies for improving the Route 9 Corridor.

DOCUMENT CONTENT

The Route 9 Corridor Master Plan contains a comprehensive set of analyses, recommendations, and supporting documentation that will serve as a guide for the design and development of the corridor. This document is organized into four principle sections: *Introduction*, which provides a brief overview of the project history, study area goals, and process for implementation; *Analysis*, which explores the existing, physical conditions of the Route 9 Corridor and community input received throughout the project; *Recommendations*, which includes detailed zoning, development, and streetscape improvements; and *Appendices*, which provides unabbreviated documentation that supports the *Analysis* and *Recommendations* sections.

The Route 9 Corridor Master Plan is not a prescription for a specific design mandate. Variations from this document that conform to the goals set forth by WILMAPCO and New Castle County may occur. Throughout this document, precedent and illustrative examples of building types, architectural design styles, open space design, streetscape, and similar images are offered. These images are for visual representation and illustrative purposes only. They are not intended to suggest a specific style or design.



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OVERVIEW

WILMAPCO, in collaboration with New Castle County, has identified Route 9 as a major investment corridor that connects New Castle County to the City of Wilmington. Stretching almost 3 miles in length from County to City line, the corridor is in need of a comprehensive redevelopment and reinvestment strategy that will focus on creating a more multi-modal environment and mixed-use development opportunities. The Route 9 Corridor Master Plan develops a set of analyses and recommendations that will guide roadway improvements, address the streetscape within the public right-of-way, inform the market feasibility of future development, and implement a common vision for the Route 9 corridor and adjacent underutilized properties. The Route 9 Corridor Master Plan document will be endorsed by WILMAPCO and New Castle County as a set of recommendations and a guide for future development projects within the study area.

Currently the Route 9 corridor functions as the area's main thoroughfare, providing crucial links between major expressways, a variety of commercial businesses, major industrial uses such as the Port of Wilmington, and pockets of single-family residential homes. Characterized by a lack of recent investment, underutilized land, and incompatible land uses, the area is plagued with high unemployment, crime, poor health conditions, and economic disparities. Currently, this segment of Route 9 is auto-oriented with limited capacity for pedestrians and cyclists, acting as a barrier between the land uses to the east and west.

The Route 9 Corridor Master Plan addresses these issues and creates a shared vision through extensive stakeholder involvement and community input. To help guide the design process, the project Steering Committee established a list of project goals. These, in addition to the needs voiced by the community helped to create a collective master plan strategy that is outlined within this document.

PROJECT GOALS

- Improve access to jobs, healthy foods, recreation, community services, and affordable housing.
- Promote mixed-use and mixed-income redevelopment.
- Mitigate environmental and health concerns.
- Examine land uses and recommend zoning adjustments.
- Recommend roadway improvements that promote the use of alternative transportation and manage truck traffic.

Locator Map - The Route 9 corridor study area is located approximately 3 miles south of Wilmington, Delaware between I-295 and I-495.

Existing Conditions Illustrative Site Plan - The Route 9 Corridor Master Plan area spans approximately 3 miles along Route 9, from the City of Wilmington to the City of New Castle, and, west to east from Route 13 to the Delaware River.

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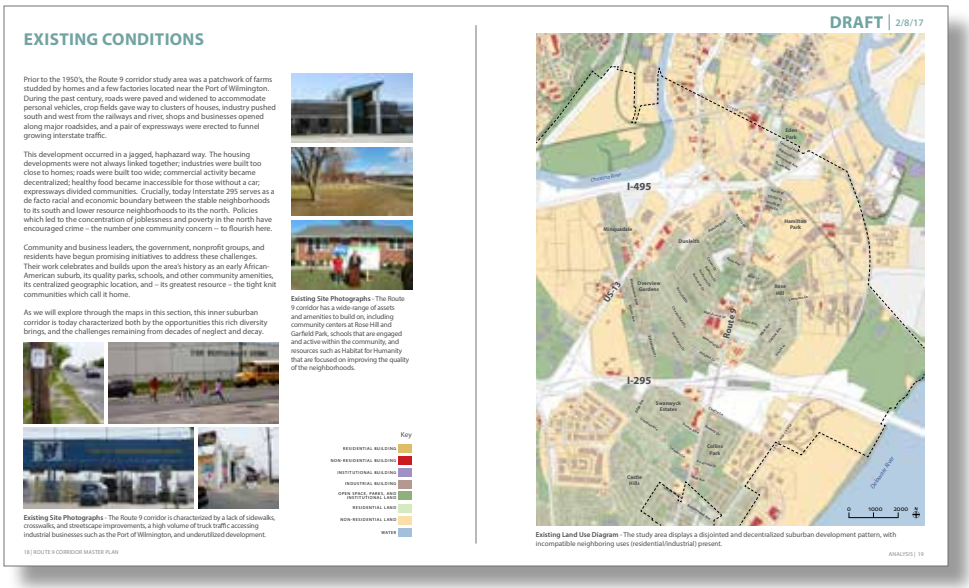
INTRODUCTION | 11

INTRODUCTION

Provides a brief overview of the project location, objectives outlined by the study, process, timeline, and general description of the document content.



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EXISTING CONDITIONS

Prior to the 1950's, the Route 9 corridor study area was a patchwork of farms studded by homes and a few factories located near the Port of Wilmington. During the past century, roads were paved and widened to accommodate personal vehicles, crop fields gave way to clusters of houses, industry pushed south and west from the railways and river, shops and businesses opened along major roadsides, and a pair of expressways were erected to funnel growing interstate traffic.

This development occurred in a jagged, haphazard way. The housing developments were not always linked together; industries were built too close to homes; roads were built too wide; commercial activity became decentralized; healthy food became inaccessible for those without a car; expressways divided communities. Crucially, today Interstate 295 serves as a de facto racial and economic boundary between the stable neighborhoods to its south and lower resource neighborhoods to its the north. Policies which led to the concentration of joblessness and poverty in the north have encouraged crime – the number one community concern – to flourish here.

Community and business leaders, the government, nonprofit groups, and residents have begun promising initiatives to address these challenges. Their work celebrates and builds upon the area's history as an early African-American suburb, its quality parks, schools, and other community amenities, its centralized geographic location, and – its greatest resource – the tight knit communities which call it home.

As we will explore through the maps in this section, this inner suburban corridor is today characterized both by the opportunities this rich diversity brings, and the challenges remaining from decades of neglect and decay.

Existing Site Photographs - The Route 9 corridor is characterized by a lack of sidewalks, crosswalks, and streetscape improvements, a high volume of truck traffic accessing industrial businesses such as the Port of Wilmington, and underutilized development.

Existing Site Photographs - The Route 9 corridor has a wide-range of assets and amenities to build on, including community centers at Rose Hill and Garfield Park, schools that are engaged and active within the community, and resources such as Habitat for Humanity that are focused on improving the quality of the neighborhoods.

Existing Land Use Diagram - The study area displays a disjointed and decentralized suburban development pattern, with incompatible neighboring uses (residential/industrial) present.

ANALYSIS AND VISION

Examines the physical and economic conditions of the Route 9 Corridor study area through photo documentation, analysis of Geographic Information System (GIS) data, market studies, public engagement, and input received from the project stakeholders and community.

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CENTER-SPECIFIC RECOMMENDATIONS

CENTER 1: TERMINAL AVENUE

Center 1 is situated at the intersection of Terminal Avenue and Route 9, directly north of Interstate 495. This area consists primarily of the Eden Park neighborhood and recreational facility, direct adjacency to the Port of Wilmington, large industrial properties, and Interstate 495 making truck traffic a significant concern. A majority of the industrial properties along this stretch of Route 9 are heavily utilized, causing the small amount of residential to be incompatibly situated.

Industry will always be a major component of the area, even as it evolves with advancements in technology. With I-495 to the south and a functioning rail corridor to the north, Center 1 is fairly isolated from surrounding commercial and residential development. This area has the potential to target industrial growth without compromising the mixed-use investment that is targeted along Route 9. The vision for Center 1 depends on a phased relocation strategy for the residents of Eden Park to live in a safer environment. The adoption of programs that leverage funds and incentives to provide residents with the appropriate support are also necessary. Additionally, an efficient truck and traffic network that provides convenient, direct access between interstate systems and the Port of Wilmington should be created to discourage truck traffic along Route 9. These initiatives will improve the corridor as a whole and allow reinvestment along Route 9 to better serve those who live, work, and visit the area.

Locator Map

Uses														Heights	
	Heavy Industrial	Light Industrial	Office	Retail	Residential	Mixed-Use	Institutional	Civic	Open Space	Parks	Utilities	Agriculture	Vacant	Existing	Proposed
	Heavy Industrial	●	●	●	●	●	●	R	R	?	R	?		35'-90' max height (height to use)	180'** max height
	Light Industrial	●	●	●	●	●	●	R	R	?	R	?		35' max height	180'** max height
	Neighborhood Conservation (NC)	*	*	*	*	●	●	R	R	R	R	R			

● = Permitted R = Recommended ? = Requires further study
*If support of residents is obtained, strongly consider rezoning to **discourage** residential in the Neighborhood Conservation (NC) District in Route 7.

TERMINAL AVENUE: ZONING ASSESSMENT + RECOMMENDATIONS

Center 1 existing zoning consists of Heavy Industrial (HI) and Neighborhood Conservation (NC) zoning designations. The priority investment properties cover all parcels, except Eden Park, within 200' of Route 9.

As requested by the community, Center 1 rezoning should encourage the transition of all uses to industrial. Residents who choose to stay in the Eden Park neighborhood should be provided a planted, open space buffer between future industrial improvements. The current max height ranges and should be 90' along the corridor to provide sufficient industrial redevelopment opportunities. All new buildings within 100 feet of single-family residential development will need to refer to the New Castle County Unified Development Code Section 40.04.110c[4].

TERMINAL AVENUE: INTERSECTION DESIGN

Terminal Avenue provides a direct connection between the Port of Wilmington and I-495. The road ends at Route 9, which is west of the I-495 interchange, however there is a driveway into a large industrial operation on what would otherwise be the west approach.

The intersection design for Terminal Avenue reflects its designation as one of four centers along the Route 9 corridor. As such, the recommended intersection design was based on creating a gateway for those entering the corridor from the north and incorporating other transportation goals. It also supports the recommended land use districts of Neighborhood Conservation in the southeast quadrant and Heavy Industry in the southwest quadrant, as well as the popular Eden Park in the northeast quadrant and just outside the study area. The traffic analysis completed for Route 9 and the Terminal Avenue intersection supports a single lane roundabout with one lane on each of the four approaches. The roundabout design can be modified in the future to accommodate a connection to Garasches Lane.

The photo below on the left shows the existing signal-controlled intersection, with two or three travel lanes in each direction, right turn slip lanes for northbound traffic onto Terminal Avenue and westbound traffic onto Route 9. Islands defining the right turn slip lanes include pedestrian pathways, however, there are not striped crosswalks.

The intersection redesign shown below on the right converts the available right-of-way to a roundabout. A mountable truck apron provides the turning radii needed for large trucks. Pedestrian and bicyclists crossing are striped and include center refuge islands. The recommended design also includes improved bus stops just north and south of the intersection. The roundabout does not include an approach from the west as DelDOT roundabout guidelines do not permit private driveway access directly from the roundabout. The driveway is relocated to the north.

Note: DelDOT's roadway maintenance program does not include street trees, so therew ould need to be a maintenance agreement with a non-DelDOT entity.

RECOMMENDATIONS

Provides a set of planning and design principles and rezoning recommendations to encourage appropriate methods for redevelopment. Highlights short and long-term development opportunities based on market studies. Describes the street system, identifying specific design and dimensional criteria, and provides illustrative and photographic examples of street and streetscape design elements.

APPENDIX C.
Traffic Analysis

ROUTE 9 TRAFFIC ANALYSIS: MEMORANDUM

Route 9 is a Minor Arterial roadway in New Castle County which connects Dover, DE to Wilmington, DE and provides truck access to the Wilmington Port Facility. It carried an average daily traffic (ADT) volume of 12,000-17,000 vehicles per day in 2015. This memo presents an assessment of existing and future traffic conditions along Route 9 between D Street at the north and Landers Lane to the south. Currently, this segment of Route 9 is comprised of two through lanes in each direction with additional storage lanes for left and right turns at intersections. The study area includes 15 unsignalized/signalized intersections and a cloverleaf interchange with I-295.

Route 9, a heavily used truck route, is primarily designed for vehicles with no dedicated bicycle facilities and frequent gaps in the narrow sidewalk. Most intersections do not have marked crosswalks and not all legs of the intersection have marked crosswalks. This project evaluates reallocating right-of-way along Route 9 for the construction of improved sidewalks, planted medians, separated bike lanes, and other infrastructure changes to transform Route 9 into a thriving multimodal corridor.

CONCEPT

Route 9 will undergo a road diet which reduces the corridor by one travel lane in each direction. Traffic signals at Terminal Avenue, Memorial Drive, and Cherry Avenue will be replaced with roundabouts. Further refinements to proposed lane configurations at critical intersections (Intersection #3, #5, #10, #11, #16 and #17), including more detail on the roundabout lane configurations, are summarized below. At all remaining intersections, one through lane will be removed in each direction and left-turn lanes will be maintained. (Note: Intersection numbers #1-11 and #16-19 are used for the Synchro analysis. Intersections #12-15 were intentionally omitted.)

Terminal Avenue (Int. #3)

- Single lane roundabout with one lane on each approach

Rogers Road/Sutton Lane (Int. #5)

- Skewed intersection replaced with two offset T-intersections
- Rogers Road maintains a traffic signal
- Removed right turn channelization on Rogers Road (i.e. eastbound) approach
- Sutton Lane converted to stop-controlled

Memorial Drive (Int. #10)

- Hybrid single/double lane roundabout
- Northbound, southbound, and westbound approaches have two approach lanes
- Eastbound approach has one approach lane and one yield-controlled, right-turn "bypass" lane

Halcyon Drive (Int. #11)

- Halcyon Drive (i.e. eastbound) approach changed to right-turn only

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I-295 Interchange

- Northbound and southbound each have one travel lane and one deceleration lane between on- and off-ramps

Cherry Lane (Int. #16)

- Hybrid single/double lane roundabout
- Northbound, southbound, and eastbound approaches each have two approach lanes
- Westbound approach has one approach lane and one free-flowing, right-turn "bypass" lane

Rodney Drive (Int. #17)

- Reduce westbound approach to one lane

As the designs for each of these intersections progress, turning movements for a large design vehicle should be evaluated at intersections with proposed roundabouts to ensure that the intersection geometry still accommodates heavy vehicle traffic. Additional consideration for the needs of users with visual impairments should also be given to bicycle and pedestrian crossings at multilane roundabout entrances and exits. Potential treatments include raised crosswalks or bicycle signalization.

DATA SOURCES AND ASSUMPTIONS

Intersection turning movement counts were received from WILMAPCO archives. These intersection counts were collected during previous traffic impact studies, and included data from varying months between 2014 and 2016. Morning and evening peak hours varied, but generally fell between 7:15 AM and 9:00 AM for the morning peak hour and 4:15 PM and 6:00 PM for the evening peak hour. These counts were not volume balanced, since discrepancies from intersection to intersection could be explained by the differences in times of year and peak hour. Additional growth factors were not added to any counts for the purposes of normalizing to 2016 volumes, since historical growth data obtained from DelDOT did not indicate any significant and consistent growth patterns along the corridor over the past two years. Additional volume estimates for interchange ramps were provided from WILMAPCO's travel demand model.

Assessment of future conditions was completed assuming a horizon year of 2036 and a compounded growth rate of 1% per year, or 22% over 20 years. This growth rate includes both regional traffic growth and traffic associated with local development.

ANALYSIS APPROACH

The performance of the signalized/unsignalized study intersections for motor vehicles was analyzed in SYNCHRO 8.0. Performance was measured using Levels of Service (LOS), which is based on the process in the 2000 Highway Capacity Manual. This assessment used the following performance measures: delay, level of service, the 95[th] percentile queue, and volume to capacity ratio.

The performance of segments of the cloverleaf interchange was analyzed in HCS 2010. Performance was measured for one merge ramp from northbound DE-9 to I-295, and for two weave segments between I-295 and northbound and southbound DE-9. These analyses were based on processes in the 2010 Highway Capacity Manual, and used the following performance measures: segment density, level of service, and volume-to-capacity ratio.

Analysis was conducted for existing conditions, "No Build" conditions (i.e. existing geometric and signal conditions with 2036 background traffic volumes), and "Build" conditions (i.e. proposed road diet with 2036 traffic volumes).

APPENDICES

The Route 9 Corridor Master Plan includes a summary of the analysis conducted that supported the recommendations made. The Appendices provide the full reports and findings associated with this analysis. *Appendix A. Map Analysis* includes a set of maps produced by WILMAPCO. *Appendix B. Market Analysis* provides the full Market Analysis Memorandum written by RCLCO. *Appendix C. Traffic Analysis*, exhibits the traffic analysis findings for Route 9 and Memorial Drive. *Appendix D. Stakeholder Input* is a compilation of all input received at various meetings, summer outreach events, and public workshops.

ANALYSIS

EXISTING CONDITIONS

Prior to the 1950s, the Route 9 Corridor study area was a patchwork of farms studded by homes and a few factories located near the Port of Wilmington. During the past century, roads were paved and widened to accommodate personal vehicles, crop fields gave way to clusters of houses, industry pushed south and west from the railways and river, shops and businesses opened along major roadsides, and a pair of expressways were erected to funnel growing interstate traffic.

This development occurred in a jagged, haphazard way. The residential developments were not always linked together; industries were built too close to homes; roads were built too wide; commercial activity became decentralized; healthy food and routine healthcare became difficult to access for those without a car; expressways divided communities. Crucially, today Interstate 295 serves as a de facto racial and economic boundary between the stable neighborhoods to the south and lower resource neighborhoods to the north. Policies which led to the concentration of joblessness and poverty in the north have encouraged crime – the number one community concern -- to flourish here.

Community and business leaders, the government, nonprofit groups, and residents have begun promising initiatives, such as the Blueprint Communities Route 9 Revitalization Plan, to address these challenges. Their work celebrates and builds upon the area's history as an early African-American suburb, its quality parks, schools, and other community amenities, its centralized geographic location, and – its greatest resource – the tight knit communities that call it home.

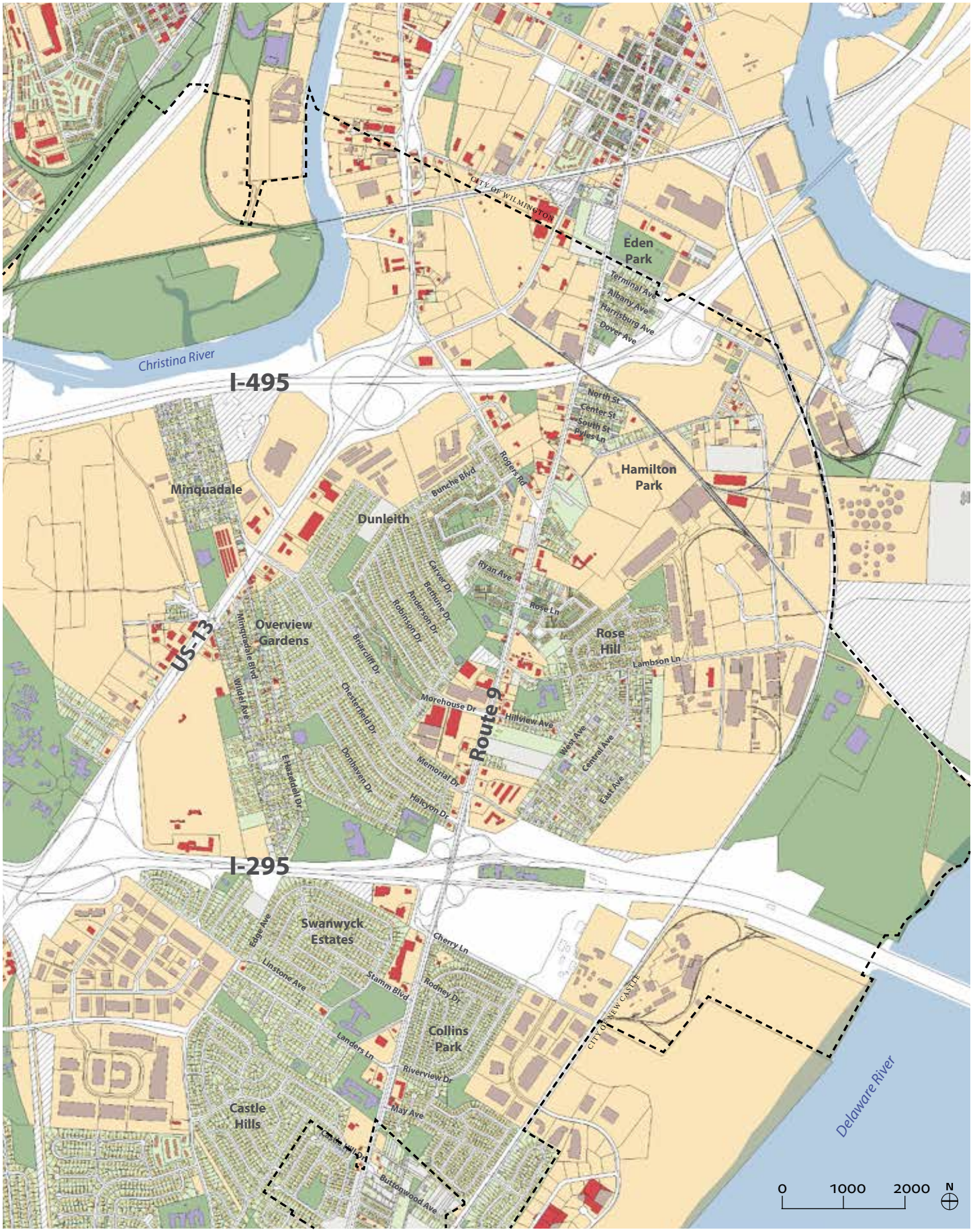
As we will explore through the maps in this section, this inner suburban corridor is today characterized both by the opportunities this rich diversity brings, and the challenges remaining from decades of limited investment and upkeep.

Existing Site Photographs - The Route 9 Corridor is characterized by a lack of sidewalks, crosswalks, and streetscape improvements, a high volume of truck traffic accessing industrial businesses such as the Port of Wilmington, and underutilized development.

Existing Site Photographs - The Route 9 Corridor has a wide-range of assets and amenities to build on, including community centers at Rose Hill and Garfield Park, schools that are engaged and active within the community, and resources such as Habitat for Humanity that are focused on improving the quality of the neighborhoods.

Key

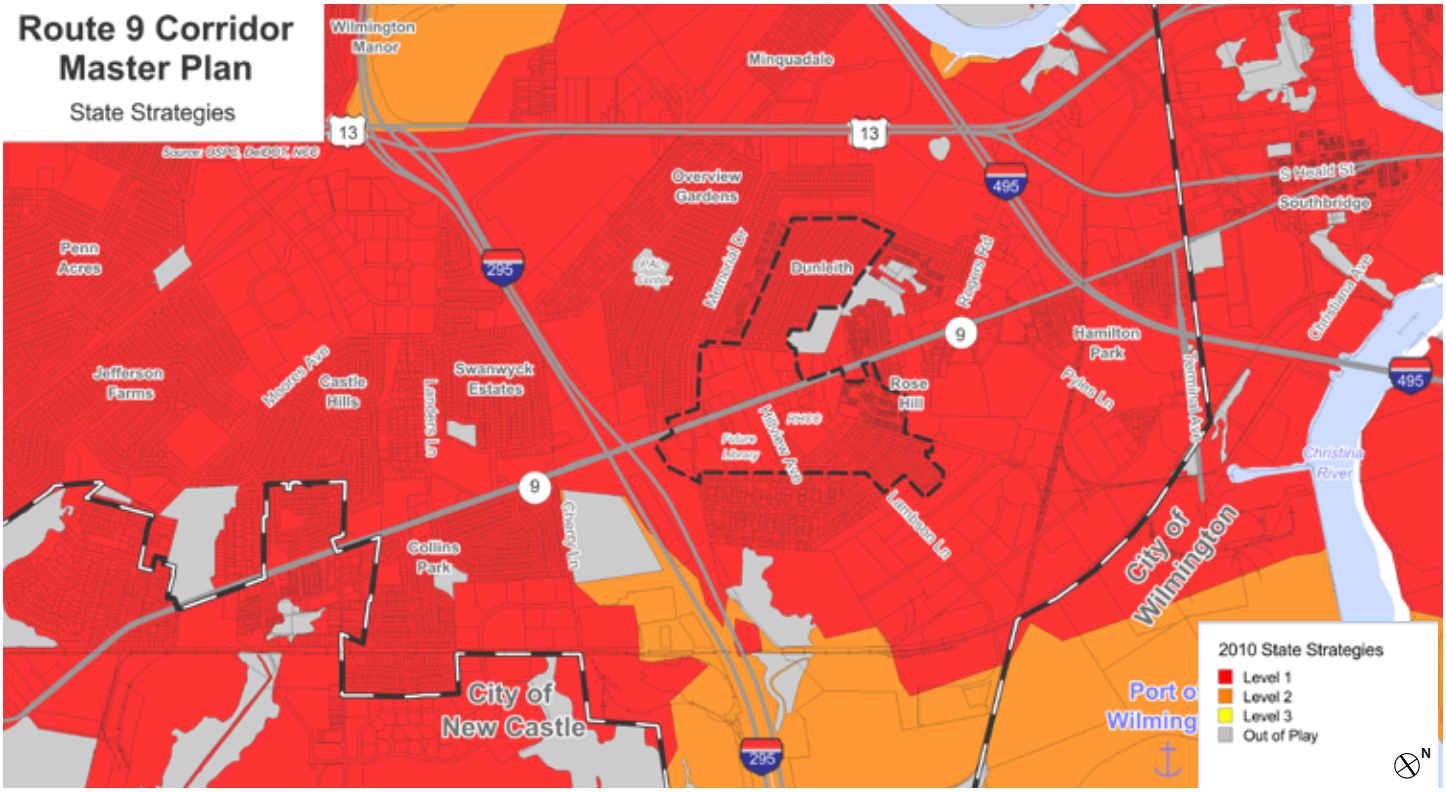
- RESIDENTIAL BUILDING
- NON-RESIDENTIAL BUILDING
- INSTITUTIONAL BUILDING
- INDUSTRIAL BUILDING
- OPEN SPACE, PARKS, AND INSTITUTIONAL LAND
- RESIDENTIAL LAND
- NON-RESIDENTIAL LAND
- WATER



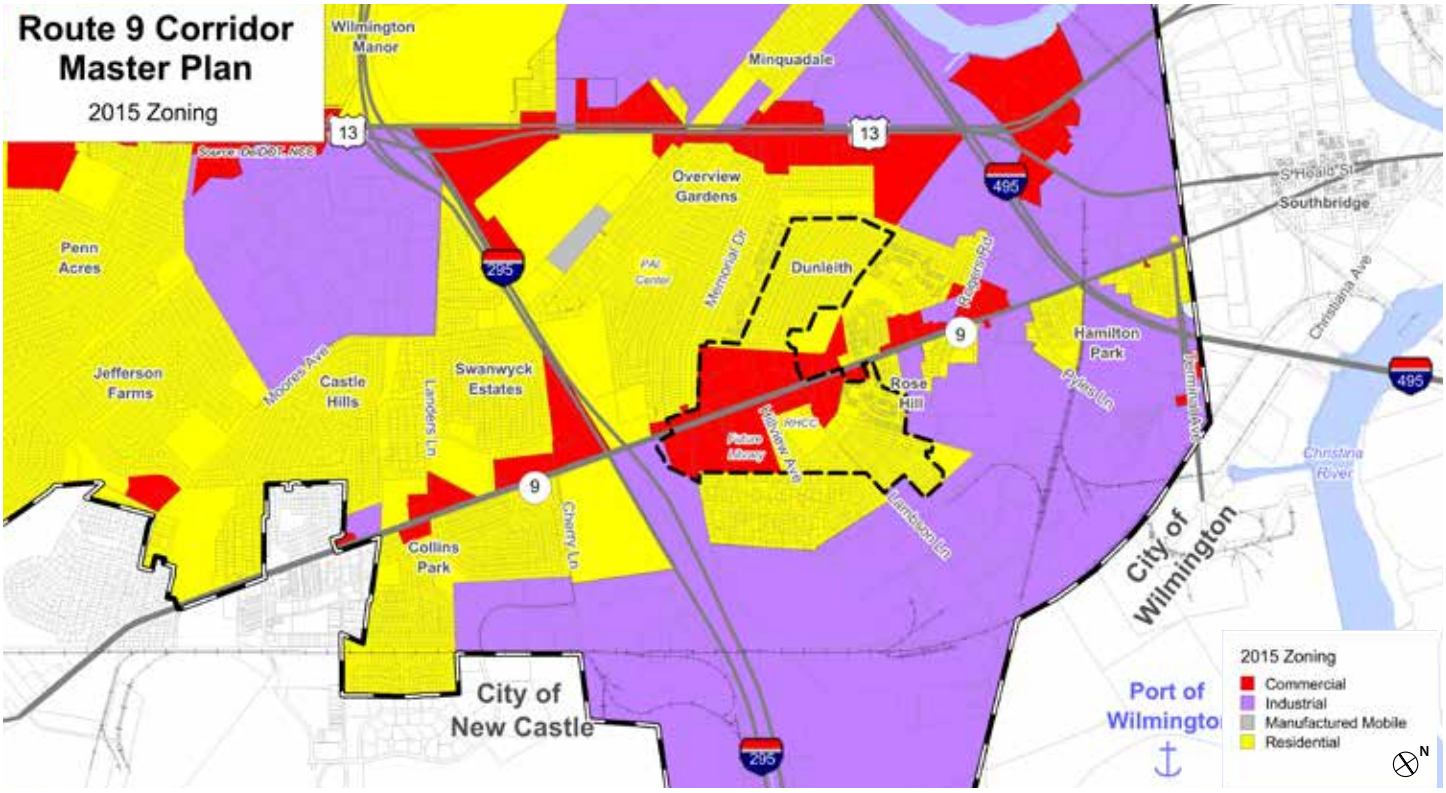
Existing Land Use Diagram - The study area displays a disjointed and decentralized suburban development pattern, with incompatible neighboring uses (residential/industrial) present.

MAP ANALYSIS

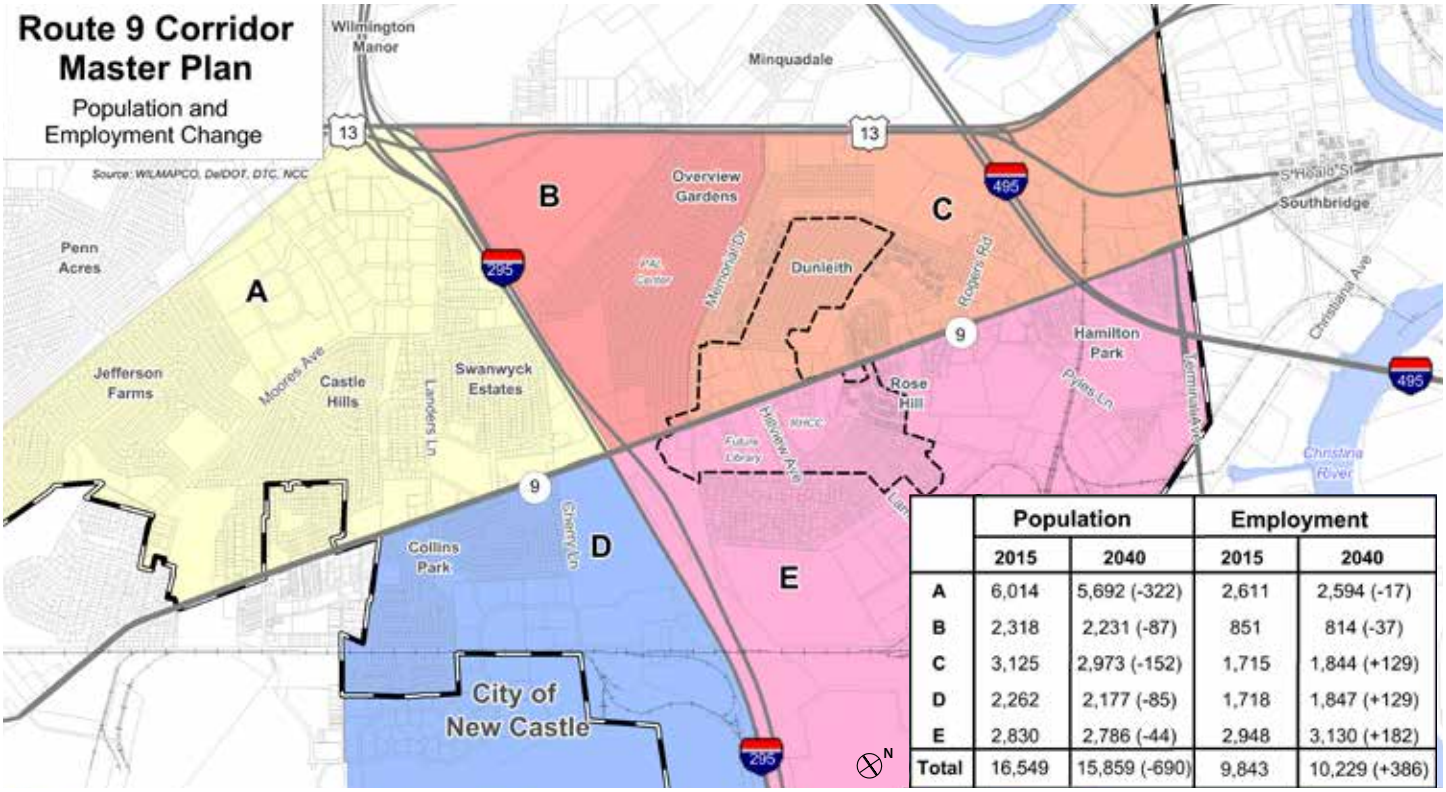
The maps below are an abridged version of a mapping analysis WILMAPCO conducted along the corridor. They provide a general overview of existing conditions. The full analysis can be found in *Appendix A. Site Diagrams*.



State Strategies - Our study area is identified as Level 1 and Level 2 investment areas by the State of Delaware. These places are a top priority for growth and reinvestment. Route 9 and the lands adjoining it fall within the Level 1 category, while lands along the Delaware River are a Level 2 investment area.

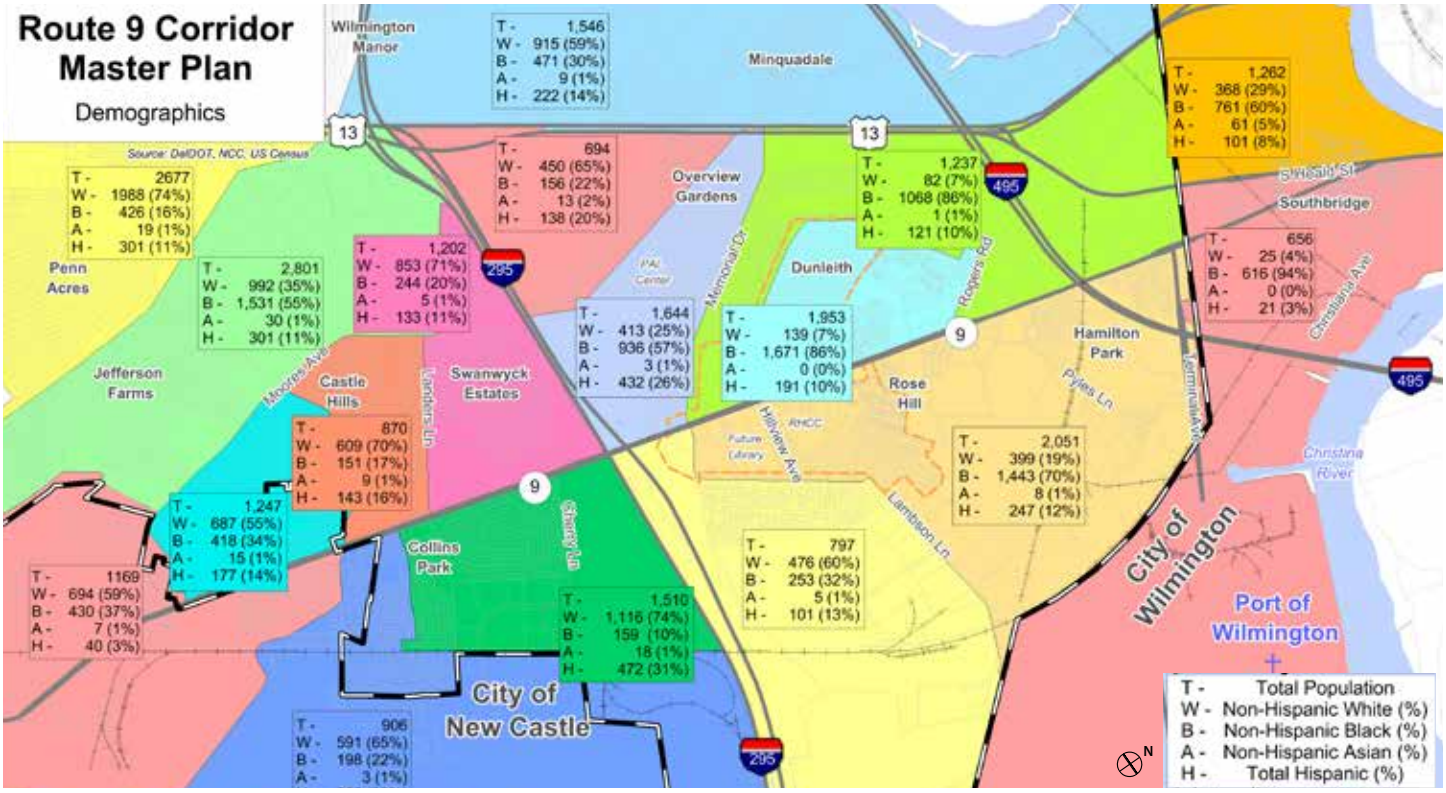


Zoning - The study area consists primarily of properties zoned industrial, residential, and commercial. Properties zoned for residential form the core of the study area, with commercial properties lining the edges of Route 9 and US 13. Properties zoned for industrial form a crescent around all of these uses, stretching from the Delaware River to the Christina River and then south beyond Minquadale.

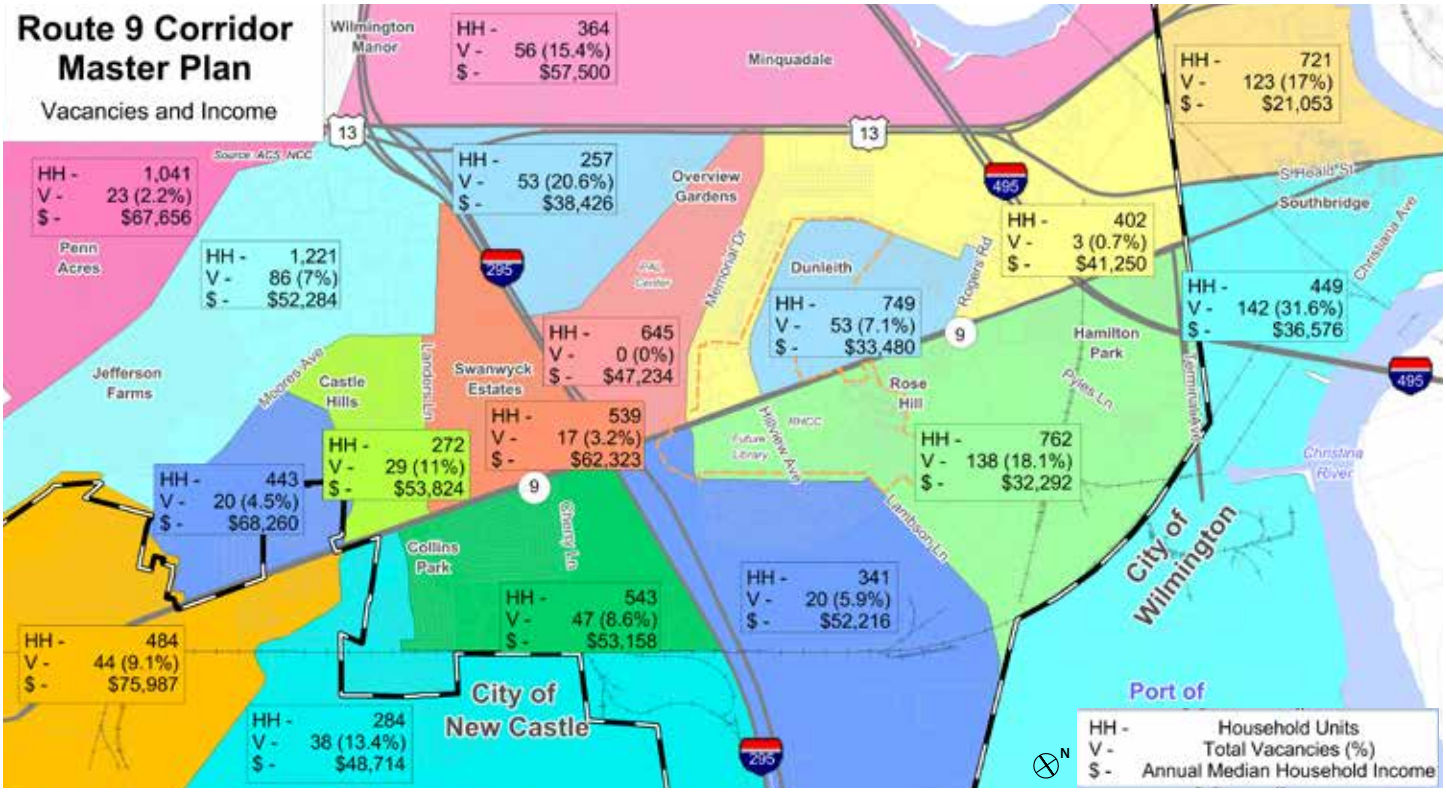


	Population		Employment	
	2015	2040	2015	2040
A	6,014	5,692 (-322)	2,611	2,594 (-17)
B	2,318	2,231 (-87)	851	814 (-37)
C	3,125	2,973 (-152)	1,715	1,844 (+129)
D	2,262	2,177 (-85)	1,718	1,847 (+129)
E	2,830	2,786 (-44)	2,948	3,130 (+182)
Total	16,549	15,859 (-690)	9,843	10,229 (+386)

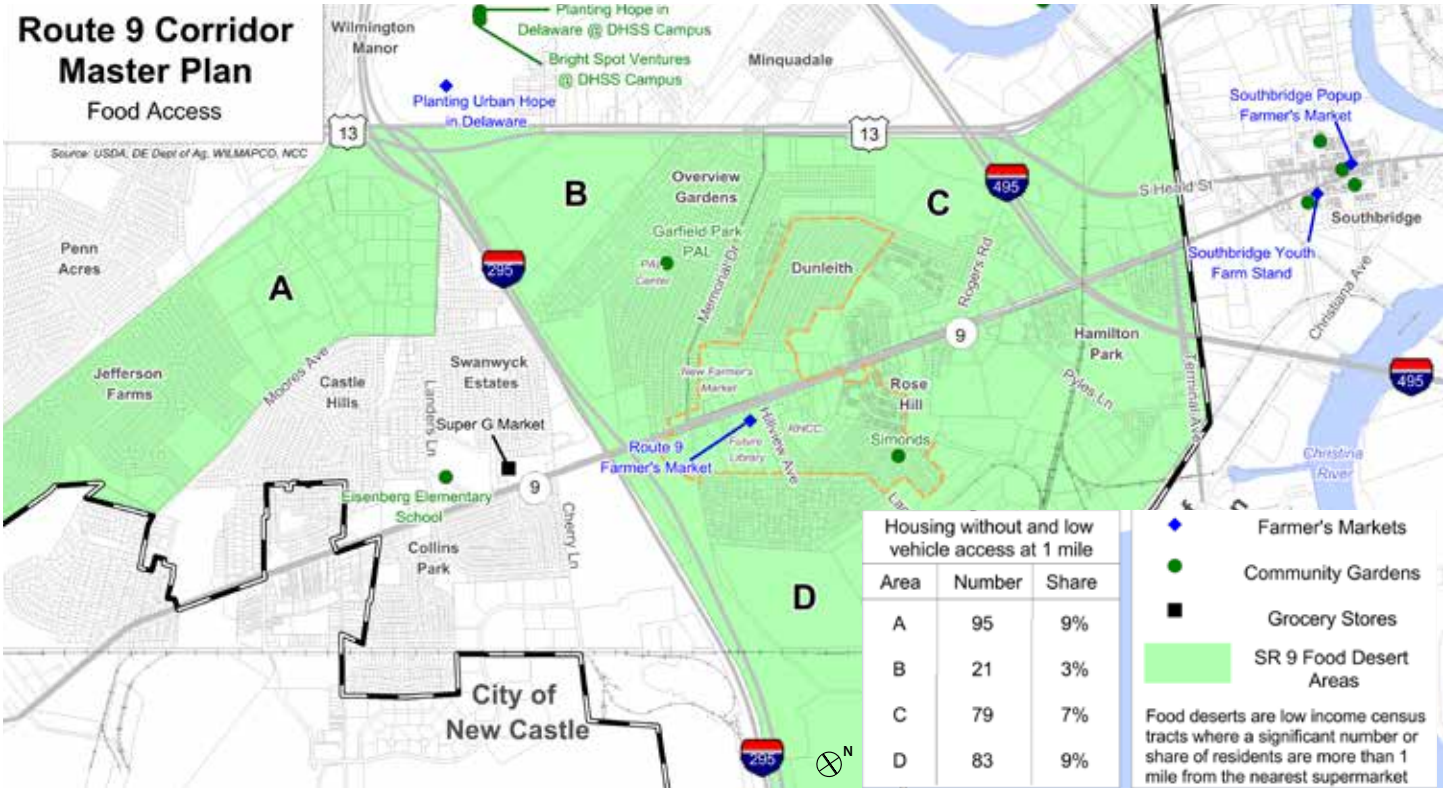
Population + Employment Change - About 16,500 people live in and around the study area. Most (69%) live in communities west of Route 9, such as Castle Hills and Overview Gardens. During the next 25 years, the study area's population is projected to decline by about 690 residents. Some 9,800 jobs are located in study area. These jobs are approximately distributed west (53%) and east (47%) of the highway. By 2040, 386 new jobs are expected in the study area.



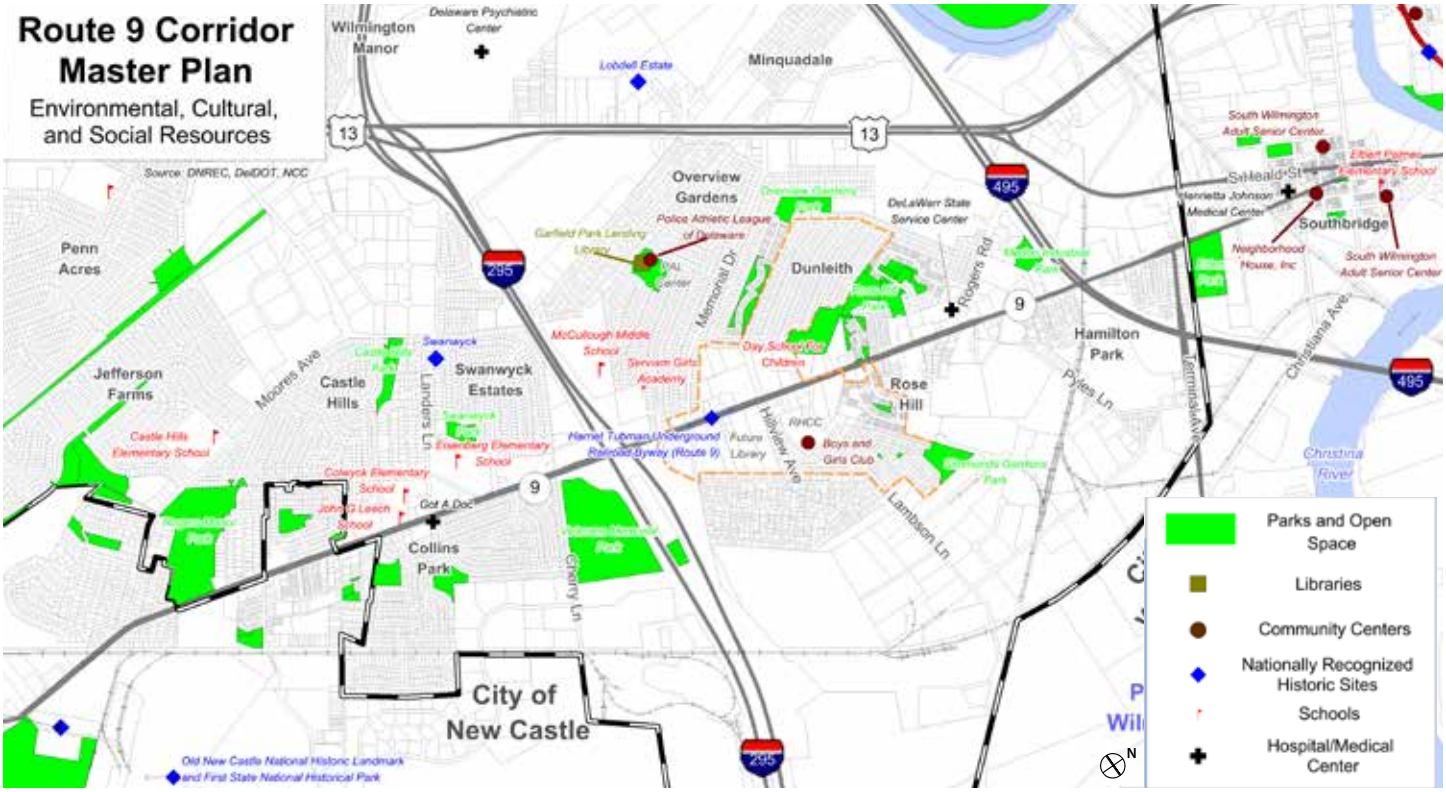
Demographics - White, black, and Hispanic residents all live within the study area. Most neighborhoods are racially and ethnically segregated -- black residents comprise the majority of the population in communities in the northern end of the study area, while white residents are more likely to be found in the southern portions of the corridor. A cluster of Hispanic residents live within the neighborhoods straddling the I-295 overpass.



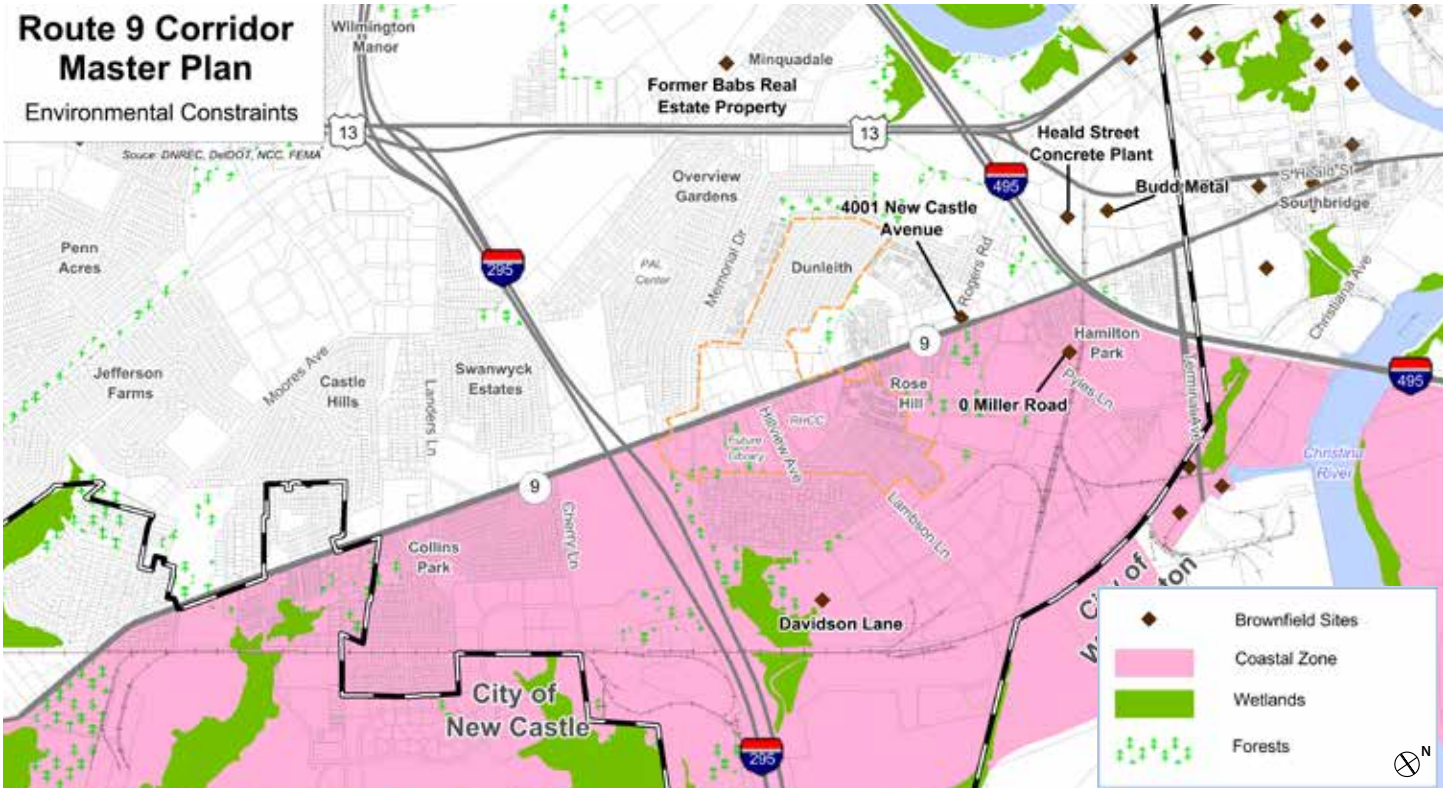
Vacancies + Income - Neighborhoods within the study area vary widely between annual median household incomes and vacancy rates. Generally, communities in the northern half of the study area are home to residents with lower incomes. For example, Dunleith's median household income rests at $33,500, while Swanwyck Estate's tops $62,000. Residential vacancy rates are generally low throughout the study area. Exceptions are the Census block group comprising Rose Hill and Hamilton Park (18.1%), and a portion of Minquadale south of the Garfield Park Community Center.



Food Access - Most of the study area is a food desert, according to the United States Department of Agriculture. More than 275 low-income households have poor vehicle access and are more than a mile from a supermarket. Positively speaking, a new farmers market is set to open at the future library site. This market will replace a smaller seasonal market. Additionally, the "Super G" supermarket has opened. Thus, 100 households are expected to be lifted out of the food desert in 2017.

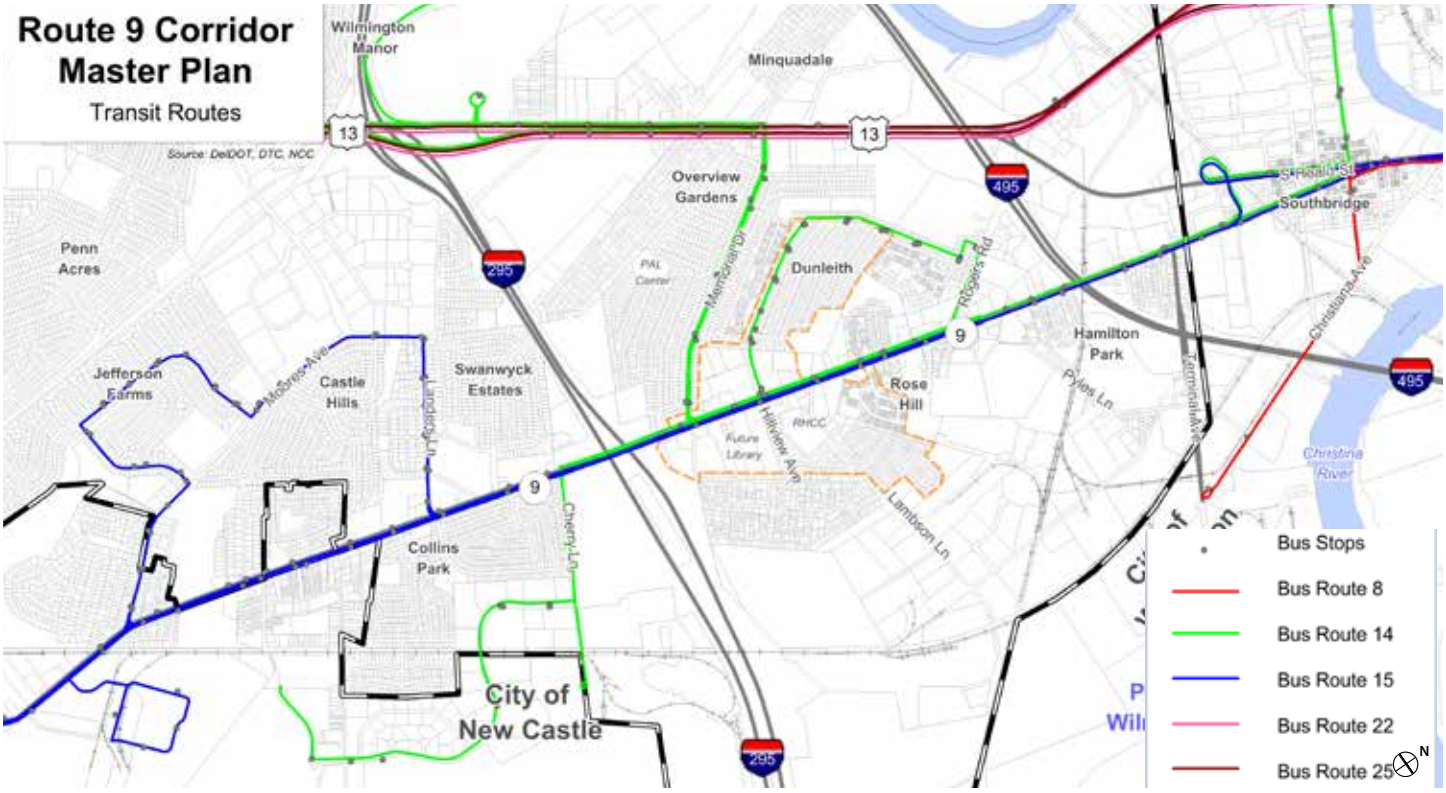


Environmental, Cultural + Social Resources - The corridor is home to a handful of community resources, such as parks, libraries, community centers, and schools. Prominent among these is the Rose Hill Community Center (RHCC), the Garfield Park Lending Library and PAL Center, Eisenberg Elementary School, and McCullough Middle School. A future library and innovation center is planned near the RHCC. The Swanwyck Historic Property is the only site listed on the National Register of Historic Places within the study area. The Harriet Tubman Underground Railroad Byway traverses through the study area. There are many properties eligible for the Register or inventories within the State Historic Preservation Office.

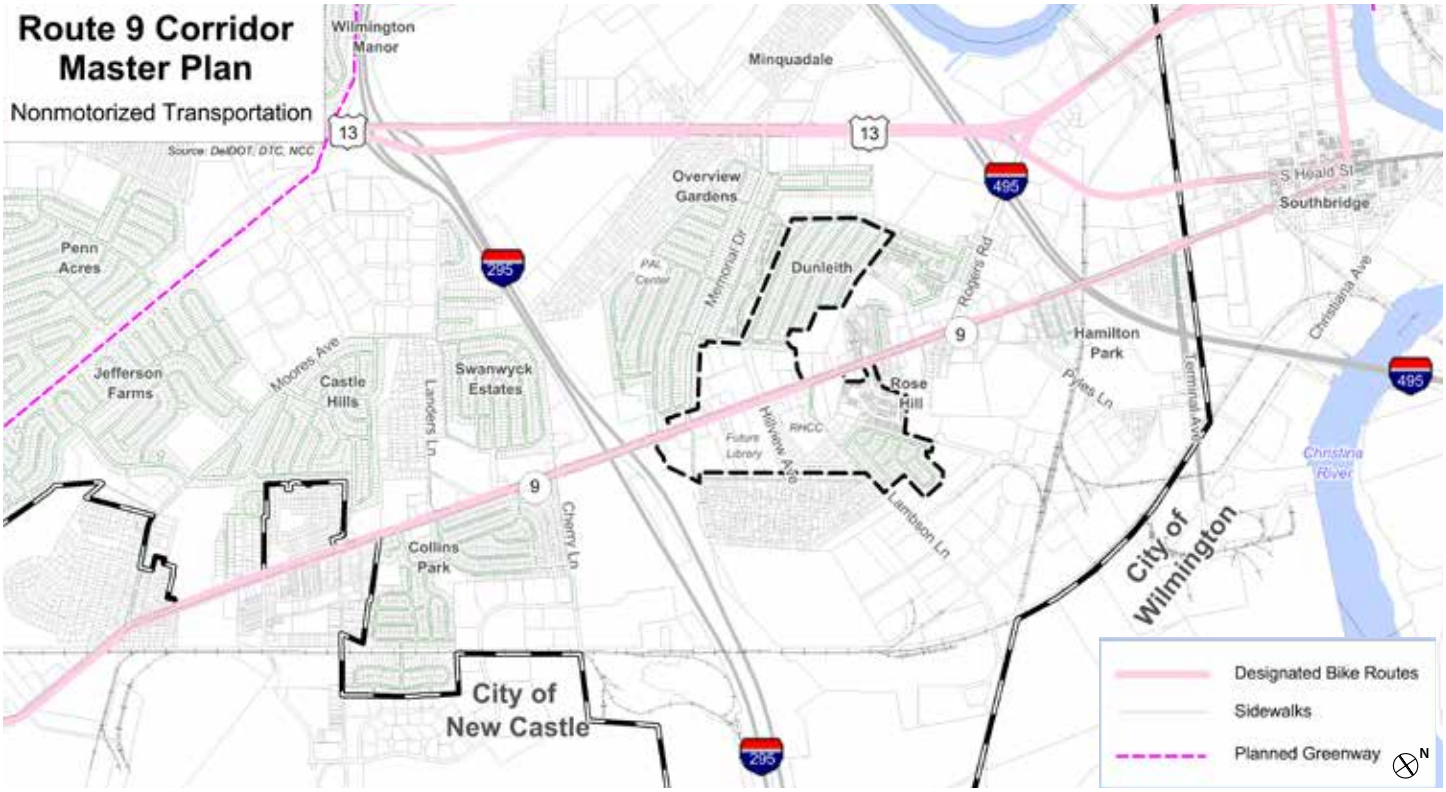


Environmental Constraints - Five brownfield sites are in the study area, most near the I-495 Expressway. All are contaminated and remedial action may be needed for future devleopment. Wetlands line the Delaware River and stretch east along the northern edge of the I-295 Expressway. All lands east of Route 9, with the exception of the Port of Wilmington, fall under the protection of Delaware's Coastal Zone Act, limiting redevelopment opportunities. Sea level rise impacts are mostly limited to lands adjacent to the Delaware and Christiana Rivers and lands surrounding the streams which empty into them.

Highway Conditions - More than 16,000 vehicles travel along Route 9 each day. The corridor appears to be functioning smoothly in terms of capacity. Level of Service (LOS) counts at five intersections indicate LOS "A" conditions, indicating the potential of additional capacity. More than 1,000 trucks also travel the corridor each day. Dozens of vehicle crashes occur along Route 9 each year. While almost none are fatal, clusters of crashes can be identified. The largest occurs just south of Cherry Lane.



Transit Routes + Ridership - Several bus routes operate in the vicinity of the study area. The bus Routes 14 and 15 primarily serve the Route 9 Corridor, extending from Downtown Wilmington. Several covered bus stops exist along the corridor south of Rogers Road, however many are marked only by a sign and offer no rider amenities. The most heavily-trafficked stops are located near the intersection of Memorial Drive.



Nonmotorized Transportation - A skeleton nonmotorized transportation network exists in the study area. Route 9 is a designated bicycle route. Sidewalks are in place along portions of the corridor, and are in place within some of the surrounding neighborhoods. Some of these existing sidewalks are discontinuous, in disrepair, or are often blocked by parked cars.

PUBLIC HEALTH CONSIDERATIONS

Due to its underlying demographics and limited healthcare and healthy food availability, the Route 9 corridor falls within a larger area of public health concern. Consider these facts:

The Delaware Division of Public Health identified the 19720 ZIP code south of the City of Wilmington, within which our study area falls, as experiencing a high rate of health burdens. These burdens result from the cumulative impacts of the ZIP code's high infant mortality rate, lower life expectancy rate, lower median income, and lower high school graduation rates, in comparison to other ZIP codes. (Health Equity Guide, June 2015).

This study has identified dense pockets of neighborhoods with populations that are predominantly non-white (both non-Hispanic Blacks and Hispanics). State-level data have shown Blacks and Hispanics to be at elevated risk of poor health outcomes such as overweight/obesity and asthma due to their lower reported levels of physical activity and lower rates of fruit and vegetable consumption, in comparison to their white counterparts. (see Delaware Survey of Children's Health, 2014 and Health Equity Guide, June 2015). *

This study identified four food deserts covering much of the study area. Food deserts, according to the United States Department of Agriculture, are low-income census tracts where a significant number or share of residents live more than 1 mile from the nearest supermarket.

This study has documented the presence of industry situated too close to residential developments, and the regular illegal movement of heavy diesel trucks through neighborhoods, conditions that negatively impact air quality and can aggravate asthma and other respiratory conditions.

DNREC identified the population within our study area as being at an elevated risk for cancer in a September 2016 letter to WILMAPCO. DNREC also has noted a violation of the state welfare standard regarding dust exposure within their 2017 community air quality study at Eden Park Gardens. (See www.wilmapco.org/route9 for more information).

** There are many root causes of these observed racial/ethnic health disparities. These include: structural racism, residential segregation, limited healthy and affordable food access, heightened crime exposure, limited preventative care access, limited walking and bicycling connectivity, and more. That our study area is home to many nonwhite minorities, it is plausible that they are more likely to experience poor health outcomes (documented at the county and state levels) from these root causes.*

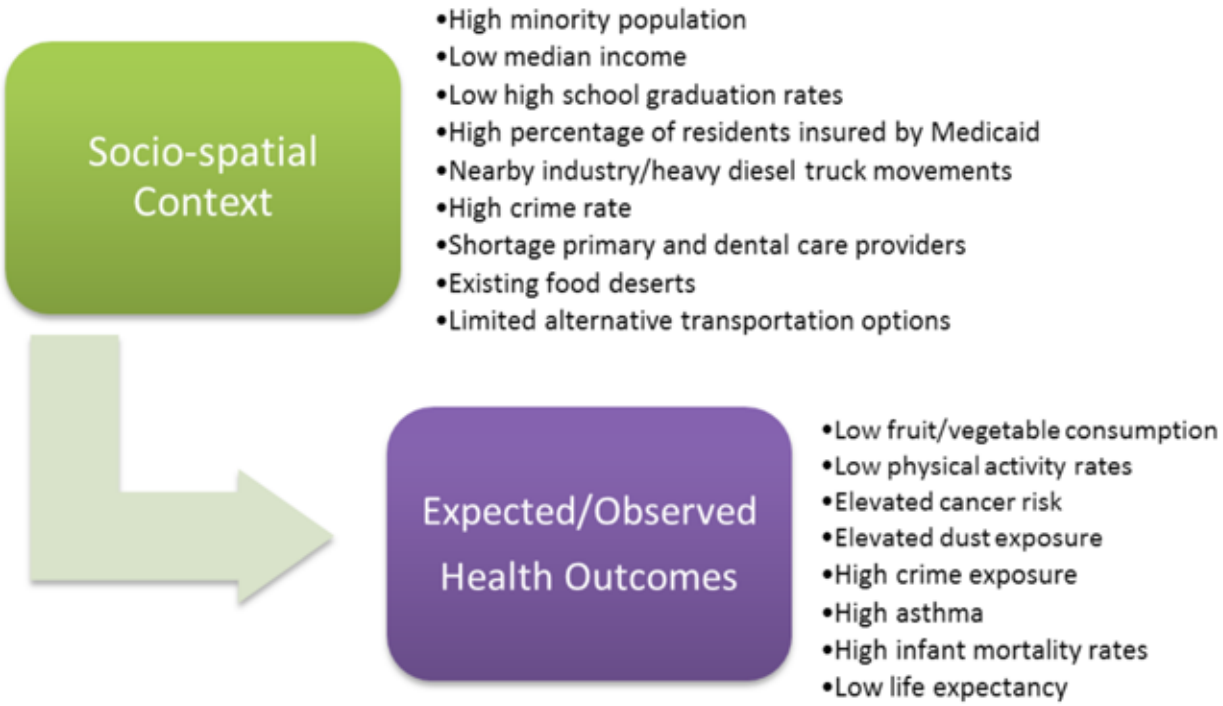
The study area is home to a high percentage of individuals covered by Medicaid – the publicly funded insurance program for low-income families, children, pregnant women, and people with disabilities. (Health Equity Guide, June 2015).

The Route 9 corridor falls within a Health Professional Shortage Area for both primary and dental care providers (Delaware Primary Care Health Needs Assessment, February 2016).

The New Castle County Police Department has noted that the study area is home to an area with an elevated rate of crime: while the corridor comprises only 1.8% of the county's total population, 14% of the county's crime occurs here.

This study has documented a limited and discontinuous network of bicycle and pedestrian facilities along the corridor, which negatively impacts the ability of low-income non-car households to use alternative modes of transportation to access services.

Taken all together, the Route 9 corridor's socio-spatial context drives poor expected and observed health outcomes as represented in the graphic below.



MARKET ANALYSIS

At the start of the Route 9 Corridor Master Plan, a comprehensive assessment of the corridor's economic development potential was conducted at the start of the planning process. The market analysis results highlighted below outline the demand and feasibility for industrial, office, retail, and residential growth. The information summarizes opportunities and projected program by use. The full Market Analysis Memorandum provided by RCLCO is provided in *Appendix B. Market Analysis.*

Definition of Subject Corridor-Primary Market Area

MARKET ANALYSIS GOALS

» Ensure the vision aligns with market feasibility;

» Analyze the corridor's existing conditions and context to better understand its relationship and market potential;

» Identify appropriate development opportunities and uses specific to various segments of the corridor; and

» Communicate and maximize the economic potential while preserving the local history to align with the community's vision and needs

RETAIL

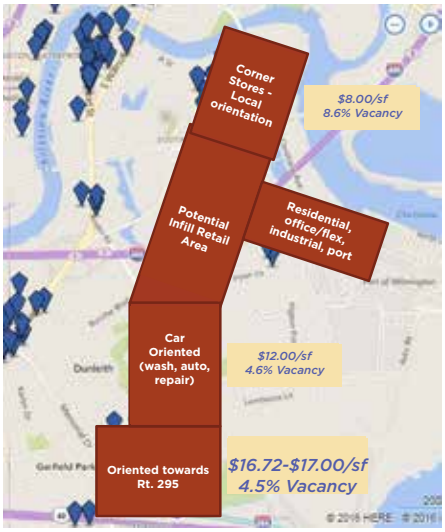
Analysis

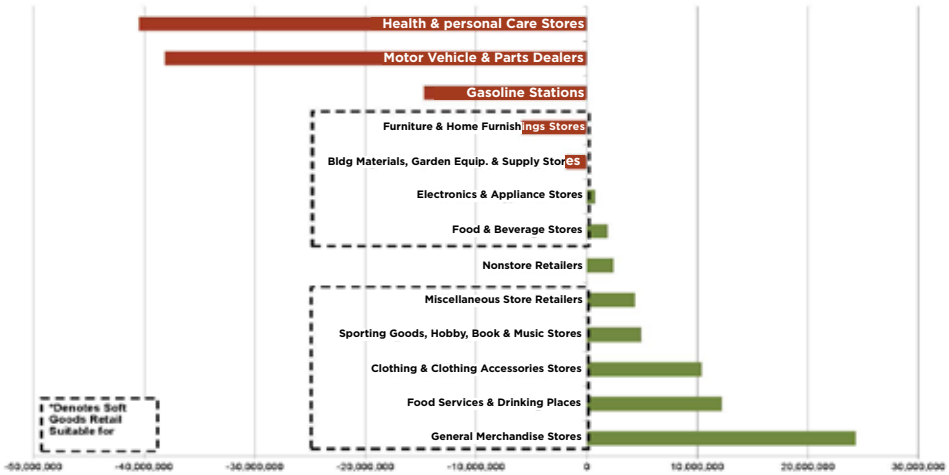
The lack of new retail delivery, high vacancy rates, and stagnant rental rate growth demonstrates a market that has struggled to provide new, contemporary retail that drives higher rental growth. With the expansion of the Port of Wilmington and an influx of jobs, retail development in the form of small, local tenants may have a slight opportunity. This development will depend on additional concessions that need to be implemented and incentivized by the state and county.

Projected Program

» 0-5 year projection: 9,000 square feet

» 5-10 year projection: 18,000 square feet





Retail Typologies and Rents (above); Retail Leakage Analysis (left) - This chart demonstrates local retail spending power locally generated but lost to other shopping locations (bars to the right of the zero axis) or expenditures for which people travel to this market area (bars to the left of the zero axis).

OFFICE

Analysis

The corridor is not located in a favored growth area and has experienced a lack of opportunities to attract outside capital and investment. Future opportunities are moderate and will most likely arise in the next economic cycle (2020+) with outside investments spurring redevelopment opportunities. Like retail, the office growth has the potential to expand as new jobs come to the Port of Wilmington.

Projected Program

» 0-5 year projection: 50,000 square feet

» 5-10 year projection: 100,000 square feet

Employment Density (left) - The clustering of dots on this map show major employment concentrations in and around Wilmington.

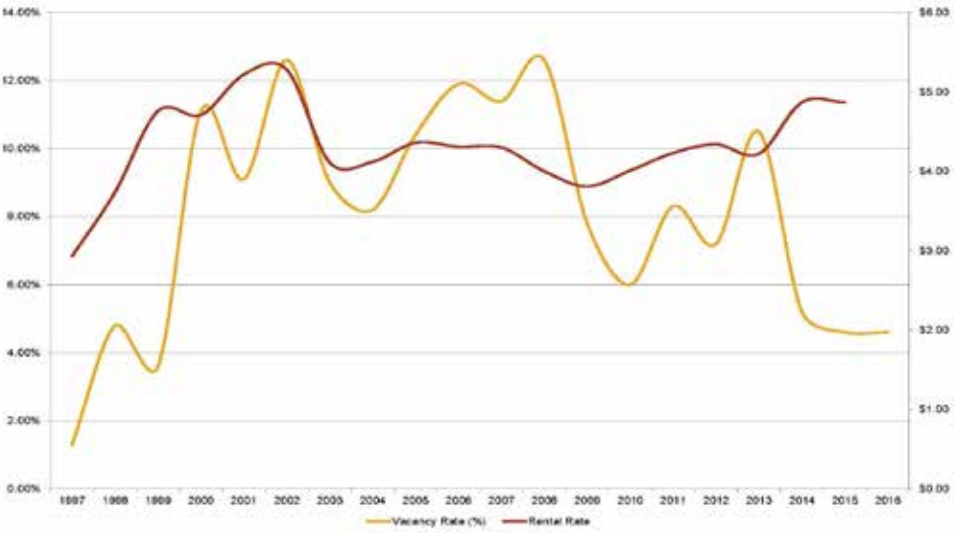
INDUSTRIAL

The Port of Wilmington and its expansion is a key driver to the industrial success of the corridor. This opportunity will bring more jobs, spur investment, and create more dollars and development momentum for the industrial initiatives along the corridor. More specifically, there is a high opportunity for an increase in industrial warehousing and business development.

Projected Program

» 0-5 year projection: 3.3 million square feet

» 5-10 year projection: 6.6 million square feet



Industrial - Vacancy and Rental Rates

RESIDENTIAL

The Residential Market forecasts naturally-occuring opportunities that will likely arise without any intervention. Specifically, the for-sale market is moderate given prevailing household growth and opportunities to choose for-sale product in the primary market. However, the for-rent analysis shows a low opportunity for for-rent, multi-family residential along the corridor. The data demonstrates that the majority of the area's rental households will choose existing older rental product based on their age and income levels. The aging population suggest senior housing as a viable, naturally-occurring land use that can be supported without major investment by state, county, or local funding sources. The Route 9 library will also be an economic driver that has the potential to spur senior housing development.

Projected Program

- Residential For-Sale: 10-15 units/ year
- Residential For-Rent: 24-41 units/ year
- Senior housing 0-10 year projection: 100 units

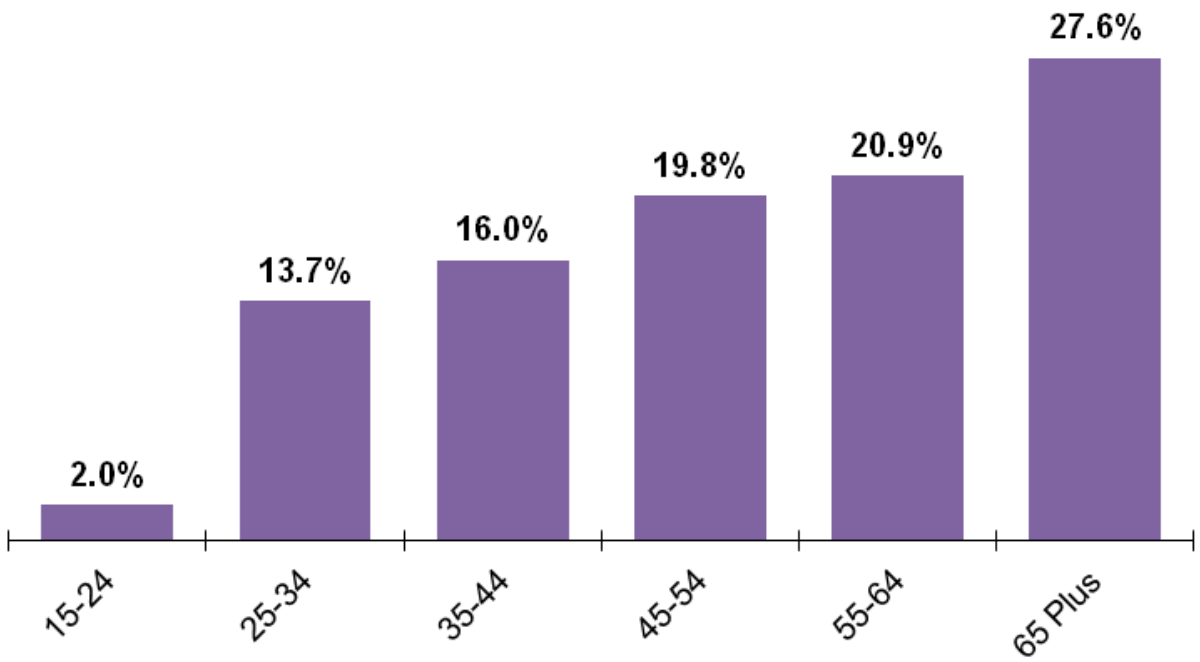
Summary of Housing Demand Forecast (2016-2020)

Age and Income	Total For-Sale Single-Family Detached Demand	Total For-Sale Single-Family Attached Demand	Total For-Sale Condo Demand	Total For-Sale Other Demand
Summary of Annual Demand for New Homes by Age Group (Units per Year)				
UNDER - 34	57	64	3	0
35 - 54	47	74	3	1
55 - 64	61	58	1	1
65 - AND OVER	14	15	4	0
Total	**178**	**211**	**11**	**2**
Summary of Annual Demand for New Homes by Income Level (Units per Year)				
UNDER $35,000	32	40	3	2
$35,000 - $50,000	34	37	1	0
$50,000 - $75,000	36	50	4	0
$75,000 - $100,000	20	39	0	0
$100,000 - $150,000	42	31	2	0
$150,000 AND OVER	14	14	1	0
Total	**178**	**211**	**11**	**2**

Residential For-Sale (New and Existing)

Summary of Rental Housing Demand (Units Per Year) 2016-2020				
Age and Income	Total Annual Demand	Local Market Capture of Total		
		Low	Moderate	High
Summary of Annual Rental Demand by Age Group (Units per Year)				
UNDER - 34	174	4	5	7
35 - 54	276	10	13	16
55 - 64	79	1	2	2
65 - AND OVER	61	2	3	3
Total	**591**	**18**	**23**	**28**
Summary of Demand by Income Level (Units per Year)				
UNDER $35,000	247	0	0	0
$35,000 - $50,000	81	0	0	0
$50,000 - $75,000	96	1	2	3
$75,000 - $100,000	110	11	14	17
$100,000 - $150,000	44	4	6	7
$150,000 AND OVER	12	1	1	2
Total	**591**	**18**	**23**	**28**

Residential For-Rent (New and Existing)



PMA Distribution of Age by Householder - PMA stand for primary market area, but for this purpose let's just say Wilmington Market Area.

TRAFFIC + TRANSPORTATION

LEVEL OF SERVICE AND SAFETY ALONG ROUTE 9

Level of Service for motorists is related to the average number of vehicles traveling each day (ADT), especially in relation to the number of travel lanes. Route 9's ADT of about 16,000 is relatively low in comparison to it capacity for handling motor vehicles based on the number of travel lanes and lanes at signalized intersections. Existing conditions for pedestrians, bicyclists, and transit riders do not appear to be at the same level. WILMAPCO identified several locations along the corridor with high numbers of vehicle crashes in 2014. While the recommendations that follow in this report will help improve safety at critical intersections – and throughout the corridor – further ongoing safety improvements may be necessary through DelDOT's Hazard Elimination Program.

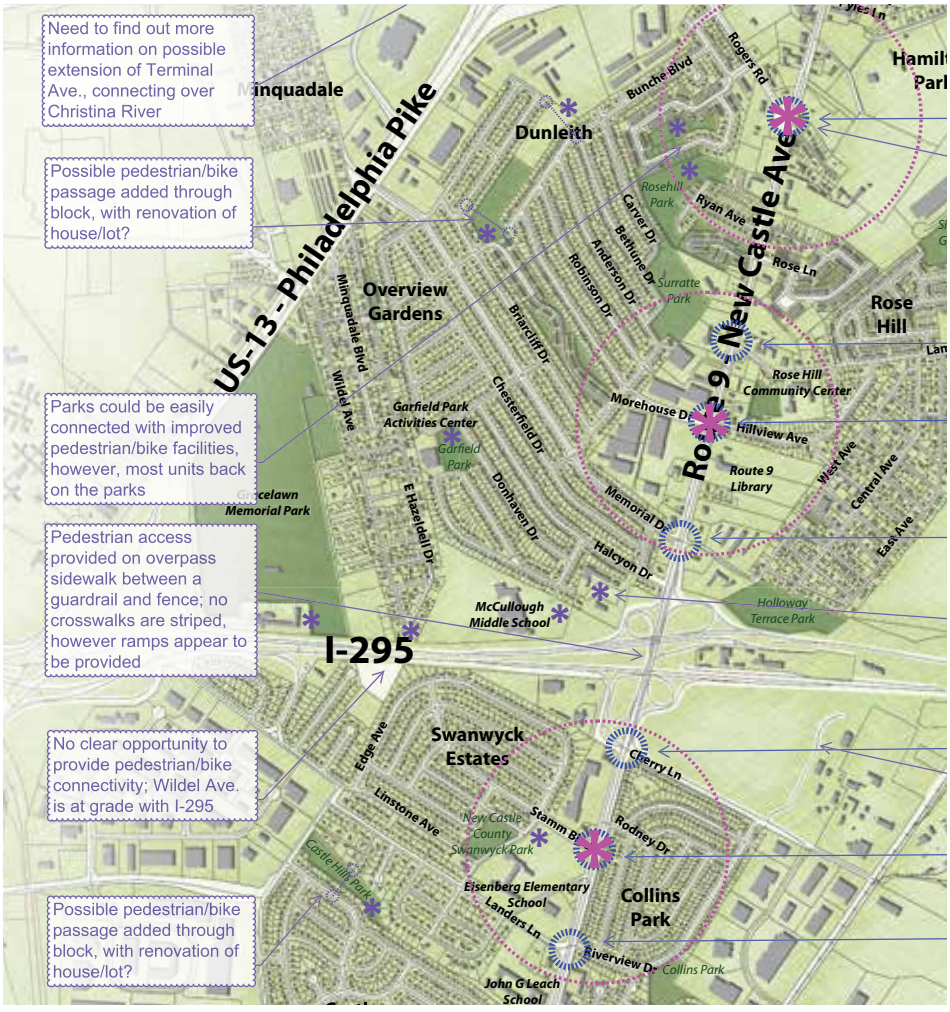
The Route 9 study area is comprised of an existing traffic and transportation network that is predominantly focused on motor vehicle facilities providing access onto or off of I-295, I-495, the Port of Wilmington, and various other commercial and industrial businesses situated along the corridor. Route 9 currently acts as a psychological and physical barrier between the east and west side neighborhoods, with a handful of signals present at various intersections. Additionally, these neighborhoods are typically isolated due to minimal transportation or public access connections, limiting safe and convenient vehicular and pedestrian access across Route 9, to retail establishments and necessary services, and between communities. Few off-road multi-use paths exist within the study area offering the opportunity for improvements, especially between neighborhood parks, community amenities, and major institutions. An inventory of more specific conditions was documented throughout the study area in combination with public feedback to determine the best improvement strategies to create a more multi-modal, accessible, and safe environment for the Route 9 Corridor.

Key concerns regarding the transportation network identified in past assessments as well as by community members and the project team include the quality and quantity of pedestrian and bicycle facilities, access to and amenities at bus stops, the lack of a coordinated and complete streetscape and lighting, the challenges of traveling between neighborhoods and across Route 9, and the volume of truck traffic related to the Port of Wilmington. Vehicle safety and recurring vehicle crashes were also identified as concerns during the analysis process.

PEDESTRIAN CIRCULATION

The pedestrian network along Route 9 offers those walking minimal safe or assuring infrastructure. There are various gaps in sidewalks and places to cross the roadway. The majority of sidewalks do not meet minimum guidance of 5' and were originally situated directly adjacent to the roadway curb with no planting buffer. They also suffer from a lack of maintenance. Both conditions create an uncomfortable walking experience, especially with the number of large trucks using the road. All users would benefit from an investment in ADA-compliant facilities, especially where sidewalks cross driveways and meet some intersection curb ramps.

There are few established connections between neighborhoods and schools from one to the other side of Route 9. Additionally, both I-495 and I-295 are barriers to inter-neighborhood travel on foot or bicycle. In both cases, Route 9 serves as the only point of access across these interstate highways. While Route 9 travels under I-495, it travels over I-295 forcing people walking or bicycling to cross numerous ramps that lack both a striped crosswalk and pedestrian warning signs, and along a narrow sidewalk constrained by jersey barriers or guard rail.



Existing Pedestrian Circulation Photos- Sidewalks either do not exist (top image) or are currently too narrow and do not meet Americans with Disaibilities Act (ADA) requirements at curb cuts (top-middle image); Sidewalks are buffered from roadway in some locations, but are in poor condition (bottom-middle image); Sidewalk conditions under I-495 are not buffered or provided sufficient lighting (bottom image)

Pedestrian Connections- Working sketch conducted in March of 2016 identifying site visit observations, specifically the lack of a clear pedestrian circulation network and opportunities for future connections (left image)

BICYCLE CIRCULATION

People riding bicycles along Route 9, which is a designated bicycle route, do so on sidewalks, service roads, or within the striped shoulder next to the roadway. There are few other designed bicycle routes or facilities in the study area. However, the recently expanded trail network around Surratte Park provides the opportunity for bicyclists to connect to other neighborhood parks and adjacent communities.

VEHICULAR CIRCULATION

Motor vehicles traveling on Route 9 are a mix of private and commercial vehicles, public transit and school buses, and construction vehicles. Overall motor vehicle traffic volumes are lower than parallel roads, such as Route 13. As with traveling on foot or bicycle, there is a limited roadway system between neighborhoods east and west of Route 9 for motorists. Some streets dead end; others are part of an internal circulation system within a neighborhood. Main connections between Route 9 and Route 13 to the east are I-295 and I-495, Memorial Drive, Rogers Road, and the circuitous Landers Road-Moores Lane-Bouldon Boulevard connection. Both of these conditions limit network agility and can result in additional trips on Route 9.

The five bus routes that traverse the area are the Routes 8, 14, 15, 22, and 25. Buses serve stops using either the painted shoulder or travel lane. Stops with the highest ridership are at Route 9 and Memorial Drive where the new library is located.

TRUCK CIRCULATION

Truck traffic is common along Route 9 and surrounding roads due to the presence of the Port of Wilmington and large industrial and construction businesses across from Eden Park. Key access points to Route 9 are the I-495 and I-295 interchanges, with Port of Wilmington-bound trucks making their way to Terminal Avenue. Based on the 2013 Port of Wilmington Parking Study (www.wilmapco.org/portparking/), some truck drivers use weight- and class-restricted neighborhood streets for travel to and from the port. The opening and closing schedule for the Port of Wilmington also creates a need for truckers to park overnight. There are few areas designated for overnight parking.

TRAFFIC + TRANSPORTATION ANALYSIS SUMMARY

General characteristics of traffic and transportation along the Route 9 Corridor in the study area are:

- Built and operated for motor vehicles;
- Generally, has capacity for more motor vehicles or facilities for other modes;
- Limited connections increase short trips on Route 9 for travel between neighborhoods and for destinations north and south;
- Route 9, I-295, and I-495 are significant barriers between neighborhoods;
- Truck traffic is high in the corridor due to the presence of the port and industrial uses. Despite efforts to reduce illegal truck traffic, illegal trips continue to occur through residential areas; and
- Vehicular-pedestrian and vehicular-bicyclist conflicts cause continued safety concerns.

COMMUNITY ENGAGEMENT

We employed robust, continuous, and often innovative community engagement throughout the planning process. Leaders from every civic association along the Route 9 Corridor were invited in February 2016 to join what would become our Steering Committee. This committee reviewed the work of our team and guided the study throughout. Elected officials, faith leaders, and business people were specifically engaged early and throughout the process.

An extensive public visioning process occurred during the summer of 2016. A workshop was held in May, followed by an online outreach campaign. Targeted outreach was conducted at specific events, scheduled community meetings, and on the street. Specific attention was also given to reaching the area's youth. About 250 residents and stakeholders representative of the demographic diversity in the corridor were directly engaged in this multipronged effort. This visioning process produced the plan's vision statement, a list of community needs, and the framework for the zoning, development, and transportation alternatives presented later.

Working through our Steering Committee, these alternatives were developed in the early fall of 2016. The recommendations factored in both the economic assessment and the results of the public visioning process.

In November 2016, a second public workshop was held where these alternatives were presented and discussed, and the list of community needs were prioritized. We followed the public workshop up with a "mini workshop" of area middle school students a few days later. Over the winter, we tweaked our recommendations based on the feedback received from both events. In February, an internal draft of the plan was presented to the Steering Committee. Further tweaks were made and a draft was made available for public comment in March.

A written draft of the plan was made available for public comment in March 2017. We reached out to attendees of our workshops individually to review the plan, as well as offered to present it at various local civic and community meetings through our Steering Committee leadership. Notices of the draft plan's availability were posted at the Garfield Park library and Rose Hill Community Center. The public comment period, which ran through the month of April, was also advertised through WILMAPCO's electronic newsletters and social media. The plan was presented to the All Civics group, the Delaware Healthy Eating and Active Living Coalition's Environmental and Policy Committee, and DNREC's Planners Technical Advisory Committee in April.

Feedback on the draft plan was generally very positive. Beyond minor tweaks throughout, we added a new subsection in the existing conditions chapter which paints a clearer picture of public health concerns in the study area. We also completed work on the "Next Steps" chapter, which was also made available for public comment in early April.

Negative feedback was voiced by one resident at the All Civics meeting regarding the placement of rental homes in Center 3 near owner-occupied housing. According to that resident, rental properties inherently create problems and should be isolated.

The project steering committee met on April 27, 2017 and reviewed the comments voiced to date, discussed what to adjust and what not to, and unanimously endorsed the study.

PROJECT STEERING COMMITTEE

A committee which eventually became known as the "Steering Committee" guided the study throughout the process. The Steering Committee provided guidance on all aspects of the plan, from public outreach to technical analysis.

Initially, following our process for conducting large community plans, separate Management and Advisory Committees were established. The Management Committee was comprised of departments from New Castle County and the State of Delaware that requested the study, helped select the project consultant, and would later implement the study. The Advisory Committee was comprised of community stakeholders, nonprofits, the Colonial School District, and the New Castle County Police Department. After the study kicked off, both reviewed identical material and met on the same days.

Residents on the advisory committee voiced concern, however, that this process was not transparent. They felt members of the Management Committee were not representative of their community. To satisfactorily address this concern, WILMAPCO dissolved both committees and formed a joint "Steering Committee." A listing of steering committee membership is on the right. Meeting dates and notes from steering committee meetings can be found in the appendix.

STEERING COMMITTEE MEMBERS	
NAME	ORGANIZATION
Sheila Berkel	Rose Hill Community Center
Dolan Dusty Blakey	Colonial School District
Marco Boyce	New Castle County
Carry Casey	New Castle County
Jerry Collins	Holloway Terrace Civic Association
Lauren DeVore	Delaware Department of Natural Resources and Environmental Control
Michael Hahn	Delaware Department of Transportation
Sophia Hanson	New Castle County
Herbert Inden	Delaware Office of State Planning
Robert Jameson	Police Athletic League of Delaware
Lee Jarmon	All Civic Chair/Overview Gardens Garfield Park Civic Association
Reverend Louis McDuffy	Eden Park Gardens
Rob McLucas	New Castle County Police
Patti Miller	Nemours Health and Prevention Services
James Parker	Oakmont Civic Association
Eric Pugliano	DART First State
Jane Rattenni	New Castle County
George Samuels	Rose Hill Civic Association
Jay Saunders	Simonds Gardens Civic Association
Sandra Smithers	New Castle Prevention Coalition/Dunleith Civic Association
Timothy Snow	Delaware Department of Transportation
Bill Swiatek	WILMAPCO
Jake Thompson	WILMAPCO
David Trincia	Minquadale Civic Association
Brent Van Lith	Delaware River and Bay Authority

ONLINE OUTREACH

A project webpage and the Facebook page were maintained throughout the planning process. The webpage housed an introduction to the study, project materials such as presentations, meeting notes, and workshop flyers, links to other related plans, and updates on the plan's progress. The Facebook page mostly featured pictures from outreach events. As of February 2017, the webpage amassed 450 unique page views (with over 1,000 visits total) and our Facebook page collected 46 "likes."

While the webpage proved especially effective for communicating with the Steering Committee and others, direct interaction with residents though these platforms was very limited. Despite efforts to publicize it only about a dozen residents responded to an online survey we developed during the visioning process. Other outreach methods – specifically face-to-face feedback – proved more successful in this study area.

A logo was developed and used throughout the outreach process to help brand the initiative. It plays off the styling of the New Castle County Innovation District logo, an initiative which preceded and informed this plan. The vectors on the Master Plan logo represent the corridor's major interstates and highways. The green to blue color shading, meanwhile, depicts the area's close relationship with the Delaware River.

KEY STAKEHOLDERS

Elected officials, faith leaders, and business leaders were engaged at the initial stages of our visioning process.

County Representatives Jea Street, George Smiley, and Chris Bullock and State Senator Margaret Rose Henry, and State Representative J.J. Johnson provided invaluable insight into the corridor's recent developments, their hopes and dreams for the area, voiced support for the plan, and cautioned us to set realistic expectations. Following our visioning process, we returned to them to discuss our project alternatives. We were unable to reach State Representative Michael Mulrooney.

We had limited success reaching the faith community. A search yielded more than two dozen churches operating in the study area. Our idea was to invite leaders from each of these churches to a single meeting. We wrote, e-mailed, and called each of the churches inviting them to send a representative to attend. Only two faith leaders, however, appeared at this meeting. While general support for the study's direction was received, a follow-up meeting with additional faith leaders organized by one of the pastors in attendance never materialized. We kept faith leaders updated throughout our planning process, and received confirmation that some had distributed our outreach literature to their congregations.

Economic development and business leaders were also engaged early in the planning process as part of the economic assessment. To the right is a listing of those with whom we engaged, or attempted to engage. Their guidance related to long-term plans at the Port of Wilmington and land development trends along the corridor helped shape the recommendations in this plan.

ECONOMIC DEVELOPMENT LEADERS	
NAME	ORGANIZATION
David Archer	Delaware Economic Development Office
Gene Bailey	Port of Wilmington
William Barthel	City of New Castle
Paul Bryant	Patterson Woods
Dave Cantera	Cantera & Associates
Rich Dudek	Patterson Woods
Jeff Flynn	City of Wilmington
Marcus A. Henry	New Castle County
Johnathan R. Hickey	Emory Hill
Ted C. Williams	Landmark

PUBLIC WORKSHOP 1

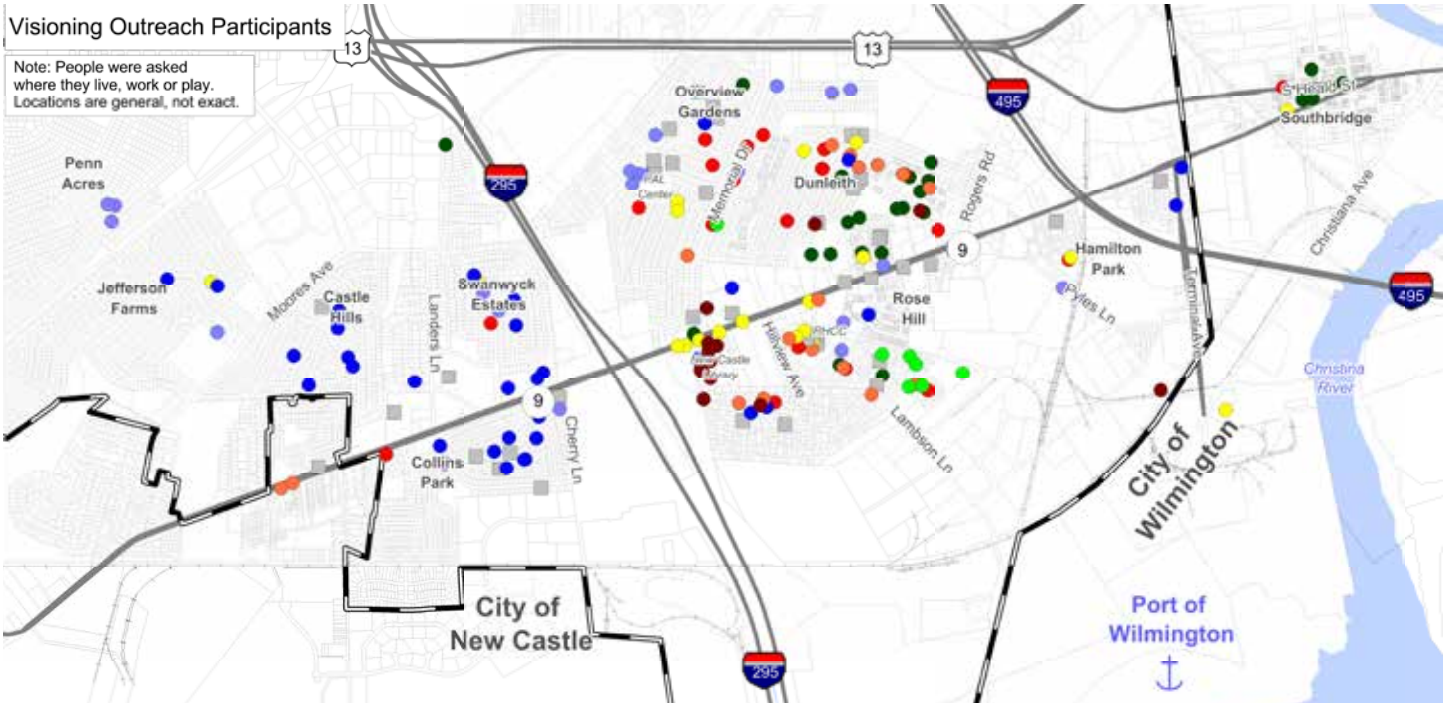
A heavily-advertised (via flyers, mailings, radio, etc.) public visioning workshop was held on May 24 at the Rose Hill Community Center. About 70 people attended. Participants viewed a presentation about the goals and structure of the plan, and then worked in small groups to identify the challenges and opportunities they felt were present in the Route 9 Corridor. Together with the feedback from our key stakeholders, the ideas from this workshop formed the basis of the plan's vision and recommendations.

SUMMER VISIONING OUTREACH

In most plans, the visioning workshop would have culminated the visioning process, but for us it was only the beginning. While attendance was good at our workshop, we realized that those in attendance were not representative of the corridor's diversity. We asked participants at the workshop to identify on a map where they lived, worked, or played. Afterwards, it was evident that many places were underrepresented – like Oakmont, the hotels on West Avenue, and neighborhoods south of I-295. Extra outreach was required to reach underrepresented areas and groups.

The map below illustrates the resulting comprehensive reach of our extra engagement during the summer. The squares on the map show where participants at our May Visioning Workshop lived, worked, or played. The circles are representative of participants from different outreach events, with each event depicted by a different color. We engaged a variety of age groups and communities – from teenagers at a basketball game, to seniors at a bingo tournament, to dozens of kickboxers before and after their practice, to people on the street at a shopping center and a hotel.

Workshop 1 (May 2016)- The workshop included round table discussions to highlight strengths, weaknesses, and visions using various maps. Icon cards that identify a range of development precedents were discussed as well.



We significantly pared down the workshop material during our extra summer outreach. Only three basic questions of participants were asked: what was special about the corridor, what were its challenges, and what would they improve? Replies to these questions were captured on sticky notes, written by the person himself or by a member of staff. We encouraged participation in our survey through both fun giveaways, and, when we were outside on a hot day, free water ice.

PUBLIC WORKSHOP 2

Following our summer outreach, we finalized a list of community needs, a vision for the project, and a series of land use and transportation alternatives. This material was presented at a second public workshop on November 29. Like the first public workshop advertising and attendance were strong – again about 70 people.

Participants first received a presentation summarizing the recommendations in the plan. Afterwards, they were invited to visit and interact with poster boards displaying different aspects and specific recommendations of the study. The boards reviewed material related to: plan overview and public outreach, market analysis, development and zoning and traffic and transportation. We collected feedback on the project's draft vision statement, prioritized a list of community needs via a dot survey, and obtained feedback on specific draft recommendations from re-zoning ideas to intersection rebuilds.

COMMUNITY COALITION OUTREACH

Throughout the study, we also made periodic presentations to a pair of important associations: the All Civics group (a gathering of area civic associations) and the New Castle Prevention Coalition (a community development coalition). We attended a few scheduled meetings to discuss the study, keep members informed of its progress, and encouraged attendance at our workshops. Crucially, we engaged, or attempted to engage, both groups to provide feedback on the draft plan. The draft plan was presented to the All Civics group at their April meeting.

Student Outreach - A "mini workshop" of area middle school students provided feedback and review of the Route 9 Corridor proposal following Workshop 2.

LATINO OUTREACH

Advertising for the public workshops occurred in both English and Spanish, and a Spanish-language interpreter was present for both workshops. Online surveys were also available in Spanish. The Latin American Community Center, the Delaware Hispanic Commission, and the Mexican Consulate in Philadelphia were engaged to help promote the study to area Latinos.

Workshop 2 (November 2016)- The workshop included round table discussions to highlight strengths, weaknesses, and visions using various maps. Icon cards that identify a range of development precedents were discussed.

PROJECT VISION

The project vision was developed following our summer outreach. It received no significant comments or suggested adjustments on our second public workshop. The vision states:

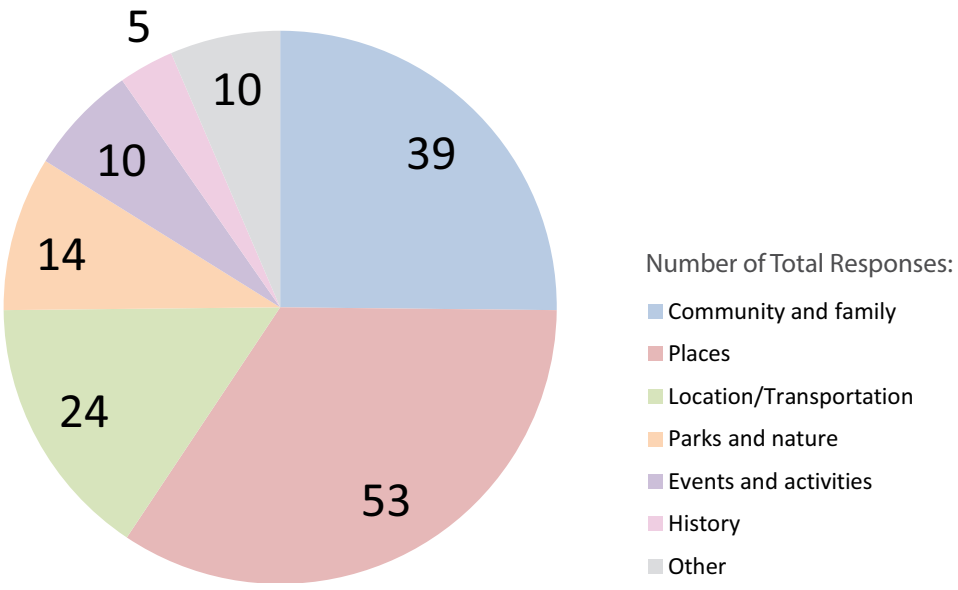
The Route 9 Corridor Master Plan will identify the best reinvestment and redevelopment strategies for the Route 9 Corridor between the City of Wilmington and the City of New Castle.

SUMMER OUTREACH THEMES

The word clouds and pie charts below illustrate what we heard on the street during our summer outreach campaign. These are generalized themes. Most people had something quite specific to say when asked what was special about the Route 9 Corridor, or to list challenges it faced. Interestingly, responses to questions vary by location. While crime was a concern up and down the corridor, residents south of I-295, for example, were more likely to list traffic and road construction as a challenge. This section reviews general themes across the corridor. If you would like to review detailed responses, please see the appendix.

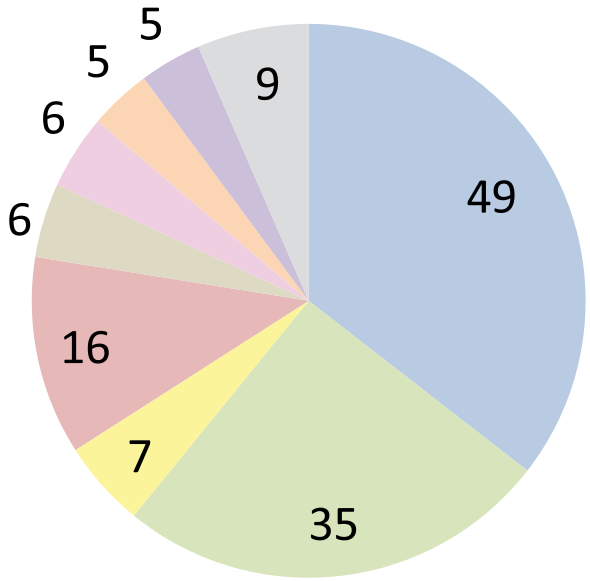
What's Special about the Route 9 Corridor?

Most people listed community, existing places, and its location as positive features of the study area. The community theme included responses such as the area's family friendliness and caring neighbors. Responses nested in the existing places theme involved the area's variety of positive amenities such as community centers, libraries, stores, and shops. The location theme mainly involved the benefits associated with proximity to major regional highways.



What are the Route 9 Corridor's Greatest Challenges?

Crime and transportation problems were the top challenges people identified. Drugs, prostitution, and violence were recurring responses within the crime category. Traffic safety issues and insufficient pedestrian and bicycle facilities were the top concerns in the transportation category.

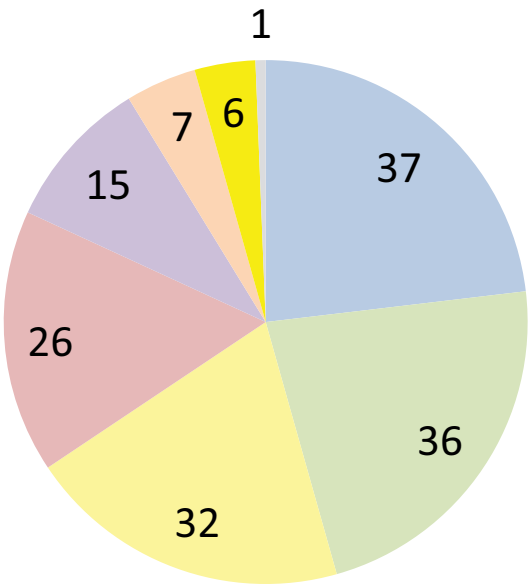


Number of Total Responses:

- Crime
- Transportation
- Unemployment
- Homelessness
- Construction
- Lack of activities
- Lack of businesses
- Sanitation/Maintenance
- Other

What Improvements do you Suggest for the Route 9 Corridor?

Respondents suggested a wide variety of improvements for the study area. Most involved improvements to the transportation system, more businesses and amenities, better public safety, and enhanced parks and activities. Specific ideas that were repeated often included: better paved and cleaner roads, the addition of sidewalks/bicycle lanes, more stores that sell food (such as grocery and convenience stores), tackling crime, and more activities for children.



Number of Total Responses:

- Transportation
- Businesses and amenities
- Public safety
- Parks and activities
- Sanitation
- Jobs
- Housing
- Other

PRIORITIZED COMMUNITY NEEDS

Community needs were identified through the first public workshop and summer visioning process, and then prioritized by attendees at the second public workshop. All attendees participated in the prioritization. The listing to the right, however, reflects priorities based on self-identified residents of the study area. Eliminating chronic crime was identified as the top need to address. Per law enforcement data, the northern tier of our study area (north of I-295) represents 1.8% of the county's population, but 14% of total crime.

PRIORITIZED COMMUNITY NEEDS	
IDENTIFIED NEED	VOTES
Eliminating chronic crime	12
Supporting education and job access and growth	10
Enhancing existing community amenities	8
Additional owner-occupied residential development	6
Better bus, walking, and bicycling transportation	6
Reducing the environmental and health burdens of industry	4
Maintaining affordable residential	4
Adding additional retail development	4
Tying future port expansions to sustainable economic growth	3
Showcasing the area's rich history	2
Others (write in)- Protecting historical area throughout Route 9	(2 blue dots)

SPECIFIC IDEAS AND FEEDBACK FROM WORKSHOPS

Participants at the first and second public workshops discussed and provided specific guidance on changes, particularly related to land development and transportation they would like to see.

Zoning issues were identified and discussed at length during the first public workshop. Industrial uses, such as the concrete plant at Terminal Avenue and Route 9, were thought to be too close to residential communities. Participants at the workshop generally felt the proximity of industrial uses to their neighborhoods contributed to environmental concerns and their poor public health. The desire to reuse underutilized land was identified, as well as eliminating truck traffic on restricted roadways and truck idling.

The need for better quality and more attractive development was also a recurring theme. Residents noted the lack of retail along the corridor, the proliferation of shabby storefronts and poor building materials, the need for senior housing, and the challenges associated with vacant properties and absentee landlords. A desire to increase the owner-occupied residential stock, as well as to remove the hotels along West Avenue (some of whose guests were perceived as a major source of crime), were brought up time and again. Key crime-fighting ideas also included in the addition of more lighting, cleaning up parks, and a greater police presence.

Transportation improvement ideas included: more bus shelters, better streetscapes with lighting and pedestrian and bicycle facilities, safer turn lanes, and safer pedestrian road crossings.

Reaction to the recommended alternatives at the second workshop was varied and wide-ranging. Unfortunately, not all of it was captured on our boards due to the fluidity of the interactions with planners. Some participants at the workshop felt that no new industrial uses should be allowed in the corridor, while others felt with proper spacing, as recommended, it may be acceptable. Reaction to the proposed road diets was cautiously skeptical. The roundabout rebuilds received about an equal mix of both positive and negative comments. The bicycle and pedestrian upgrades received universally positive comments. The overall nodal development strategy, with a mixed-use cluster development around the new library, also received universally positive comments.

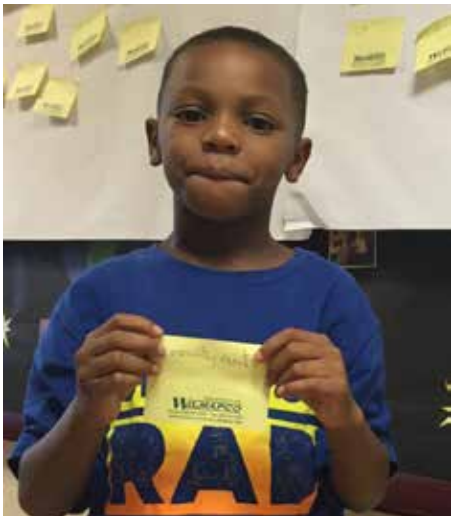
YOUTH ENGAGEMENT

Young people are too often a forgotten demographic when developing community plans. While they have less experience than their seniors, youth often have different needs and great ideas for making communities better for everyone.

We specifically engaged area youth throughout our planning process and incorporated what they had to say into the plan's recommendations. We partnered with the Rose Hill Community Center, the Boys and Girls Club, New Castle County's Department of Community Services, and the Colonial School District to talk with dozens of young people. They helped establish the project vision, our draft recommendations, and provided reaction to those recommendations.

Overall, we found that, like adults, crime was a top concern for young people in our study area. While they said most people in their communities were friendly, they expressed feeling unsafe with chronic instances of drugs and violence. Enhanced, safer, and better-connected parks and activity spaces was the most common need identified.

Being non-drivers, young people are also more acutely impacted by our study area's limited pedestrian and bicycle transportation networks. When we ran through our second public workshop's community needs prioritization exercise with about a dozen local eighth graders, better bus, walking, bicycling transportation came out as the top need, closely followed by enhancing community amenities and eliminating crime.



RECOMMENDATIONS

OVERVIEW

The following recommendations offer a wide-range of opportunities that work towards accomplishing one or more of the Project Goals outlined in the *Introduction* of the document. Such goals include, properly separating residential and industrial lands by changing the underlying zoning. This will mitigate exposure to heavy dust pollution and odors, improve population health, greatly reduce illegal truck traffic, and, at the same time, allow industry the room it needs to operate and create jobs. In an effort to keep trucks out of the neighborhoods and improve freight movement efficiency, the incorporation of new truck routes will allow industry and the port to comfortably expand west and south and avoid continued disruption of adjacent residents. Further zoning adjustments to allow for mixed use, residential/commercial/office development will encourage healthy suburban centers along the corridor to grow and thrive. New development will be concentrated in these centers, instead of dropping piecemeal along the corridor. This concentration of mixed-use and income development will magnify economic impact, facilitate easy bus, walking, bicycling access, and create great shared community and regional spaces. The first center to be redeveloped will be around the Innovation District. There, new senior, rental, and for-sale housing (mostly market rate, but with some affordable units) will be packed around the new library, along with new office and retail and park space. To address the goal to improve alternative transportation, both Route 9 and Memorial Drive will be placed on road diets, and their key intersections will be redesigned to enhance safety and keep traffic moving. Some vehicular travel lanes will be unnecessary with the enhancements, and the saved space will be dedicated to the safer movement of buses, pedestrians, and bicyclists. Meanwhile, a pedestrian/bicycle trail system will knit together the now largely disconnected neighborhoods along the corridor.

The following recommendations are organized into three components: *Guiding Principles*, *Corridor-Wide Recommendations*, and *Center-Specific Recommendations*. Each set of recommendations focuses on the corridor at a different scale to provide a comprehensive set of recommendations. All of the recommendations reference the site analysis conducted during project initiation and the public input received throughout the project. The information shown throughout this section of the document and the preferred scenarios were reviewed by the community at Public Workshop #2 and vetted prior to incorporation into the document.

The *Guiding Principles* identify overarching, best practices for achieving a more successful and sustainable built environment. These principles have been targeted as essential strategies for improving this specific corridor. They will be used to guide appropriate zoning, streetscape, and development improvements and to avoid subjective and inconsistent decision-making that has and may compromise the character and function of the Route 9 Corridor.

The *Corridor-Wide Recommendations* include an assessment and proposal for improving zoning regulations, pedestrian and bike accommodations, and traffic and truck circulation throughout the corridor. These recommendations target the entire study area and evaluate opportunities at a larger scale. They are a set of framework plans that identify an interconnected network of zoning and circulation improvements that will create a more multi-modal, sustainable, and mixed-use corridor.

The *Center-Specific Recommendations* target four key intersections or "centers" that are well-positioned for growth based on the existing zoning, current use, and surrounding development. Each of these centers addresses major intersections in need of streetscape improvements and key parcels within a 1/4-mile walking radius (equal to an average 5-minute walk) that are prime opportunities for investment or redevelopment. Key parcels include any underutilized land within 200' of Route 9. The specific recommendations outlined in this section include a zoning assessment and changes to allowable uses and/or bulk standards based on community goals and visions, infrastructure improvements, and cross-section alternatives for detailed streetscape components. A more in-depth overview of pedestrian, bicycle, transit, and stormwater facilities is also defined for each of the centers in this section.

The four centers, as selected by the Steering Committee and community, are:

- Center 1: Terminal Avenue
- Center 2: Rogers Road
- Center 3: Memorial Drive
- Center 4: Stamm Boulevard

Proposed Development Centers - Four centers that are well positioned for strategic investment based on existing zoning, current use, and surrounding development were selected and evaluated for their redevelopment potential.

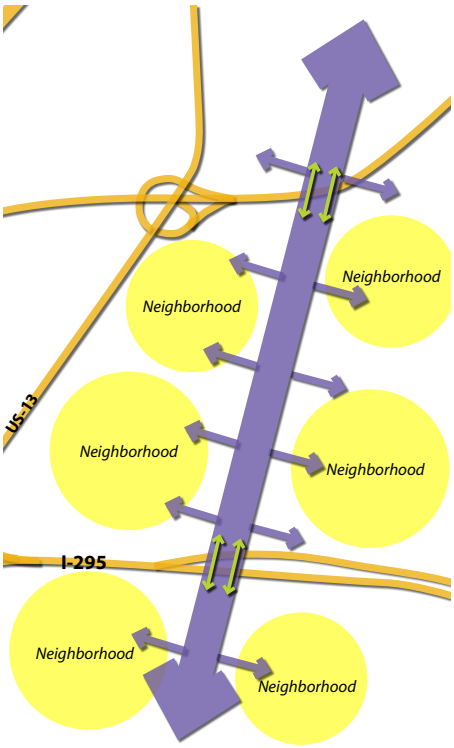
GUIDING PRINCIPLES

The Route 9 Corridor guiding principles establish appropriate design criteria and influence future streetscape and development improvements. These defining principles incorporate best practices and strategies for creating a lively, walkable, and cohesive mixed-use corridor. The guiding principles for the Route 9 Corridor include:

- Bridge Barriers
- Create Identifiable Centers
- Incorporate an Appropriate Mix of Uses
- Establish Gateways
- Strengthen Building Frontage
- Incorporate Complete Streets Strategies
- Encourage Road Diets
- Consider Unique Roundabout Solutions

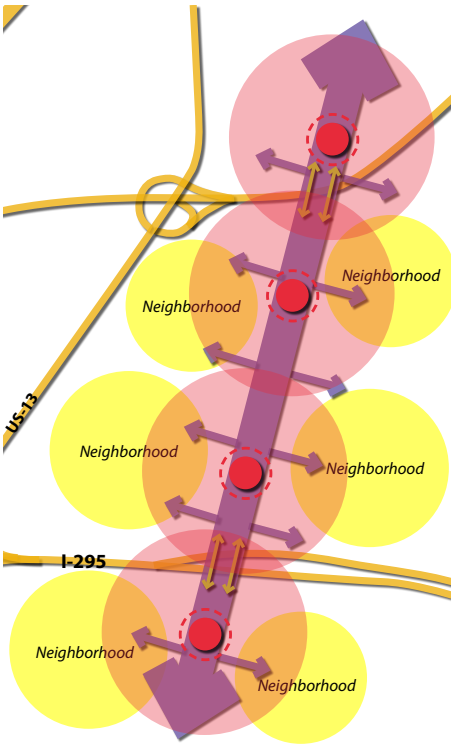
BRIDGE BARRIERS

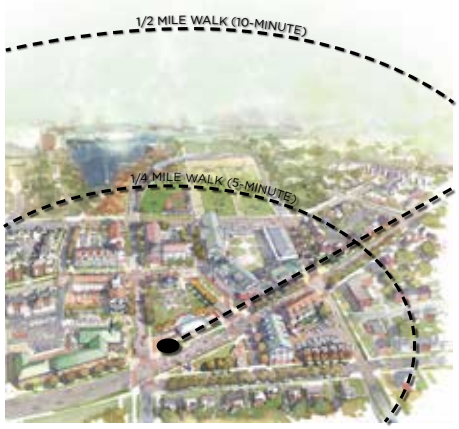
- Create clear and safe pedestrian and bicycle links across Route 9 and between major interstates to the northern and southern ends of the study area
- Provide strong connections between neighborhoods and corridor amenities and destinations



CREATE IDENTIFIABLE CENTERS

- Target strategic investment nodes or "centers" for redevelopment
- Provide a mix of neighborhood-serving uses in these centers
- Centers should be compact and walkable:
  - 1/4-mile (5-minute) walking radius
  - 1/2-mile (10-minute) walking radius





INCORPORATE AN APPROPRIATE MIX OF USES

- A wide-range of uses to serve a mix of incomes within the local and broader community
- More compact development; Reduced distance between homes, workplaces, businesses, and other services and destinations
- Promotes walkability, bicyling, and increased access to transit to enable active transportation options
- Better healthy living; Access to fresh, healthy foods and opportunities for active recreation
- Creates stronger neighborhood character and sense of place and promotes social cohesion

ESTABLISH GATEWAYS

- Located at key locations to announce primary entry points
- Establish identity and welcome visitors, including the Harriet Tubman Underground Railroad Byway which traverses through the corridor
- Create a cohesive character throughout the corridor

STRENGTHEN BUILDING FRONTAGE

- Encourage new development to locate directly against the street
- Screen parking from corridor view
- Entrances should be visible from the corridor and provide easy access and wayfinding for all users
- Limit curb cuts along Route 9

INCORPORATE COMPLETE STREETS STRATEGIES

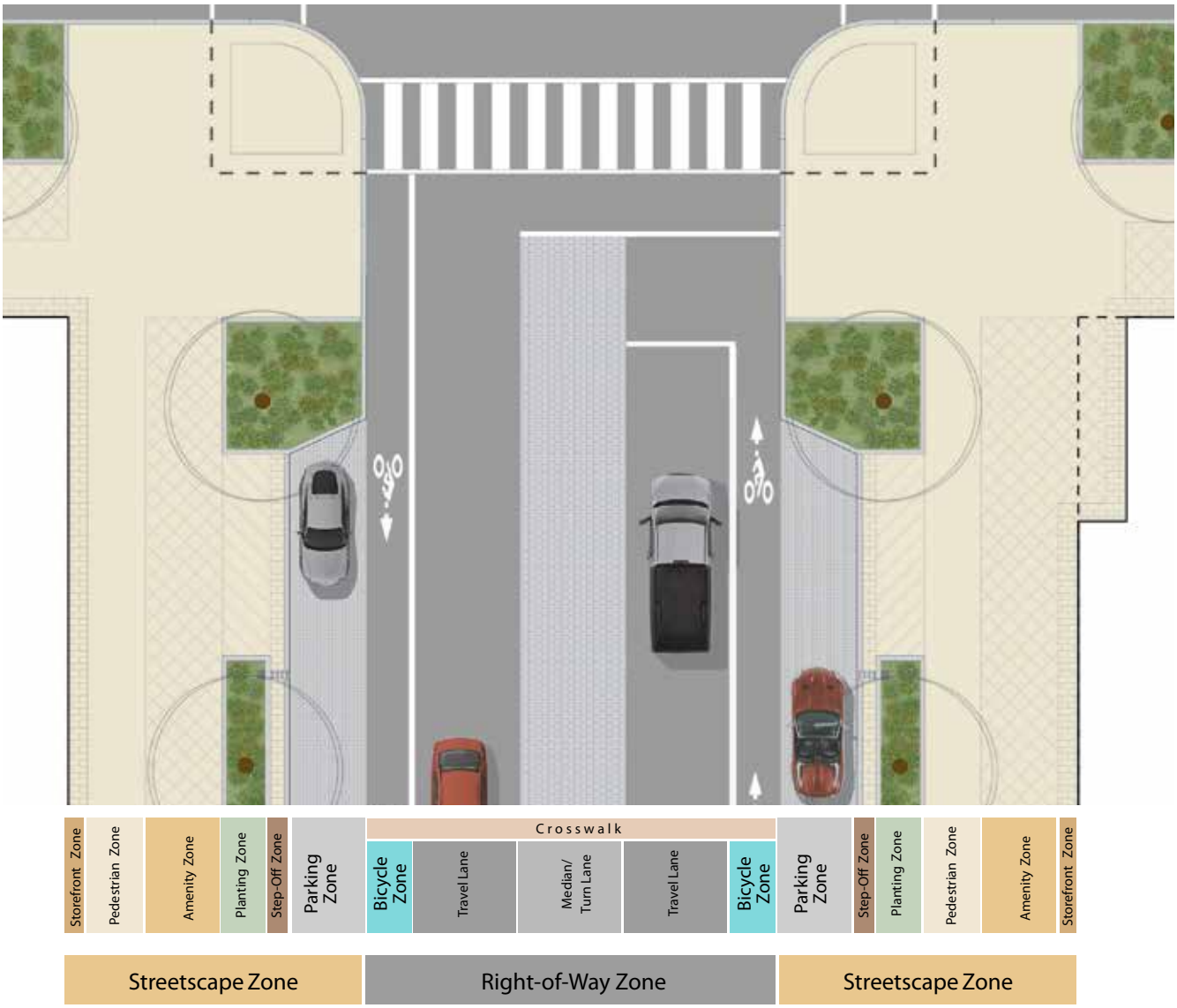
Complete Streets is a national movement to change the way most roads are planned, designed, constructed, operated, and maintained to enable safe access for all users. At its core, the Route 9 vision calls for a "Complete Street" design approach that accommodates the needs of pedestrians (including those with mobility impairments), bicyclists, and drivers; addresses sustainability; and conveys a unique aesthetic that speaks to the character of the Route 9 Corridor.

With this vision in mind, the redesign of Route 9 should consider the mobility and safety of all users, ensuring that maximizing traffic capacity and speed is not the dominant consideration in street design. Complete Streets recognize that crossing the street, walking to school and shops, and cycling to work or for recreation are equally important as driving. The street and sidewalks should include elements that provide appropriate visual and physical clues to alert drivers that pedestrians and bicyclists are present and are welcomed users. Complete Streets enable transit to be efficiently accommodated or incorporated at a later date. Route 9 plays an important role in the livability of the area and its design should consider the range of all users' mobility.

KEY COMPONENTS

The streetscape design criteria for Route 9 address all of the necessary components of Complete Streets, including:

- General provisions for the roadway, including vehicle travel lanes, bicycle lanes, traffic calming devices, pedestrian sidewalks, and the elements that comprise these components;
- Right-of-Way Zone design criteria for bicycle and vehicular travel lanes; and
- Streetscape Zone design criteria for stormwater management planters, street trees, sidewalks, and all other elements between the curb/edge of pavement and building fronts



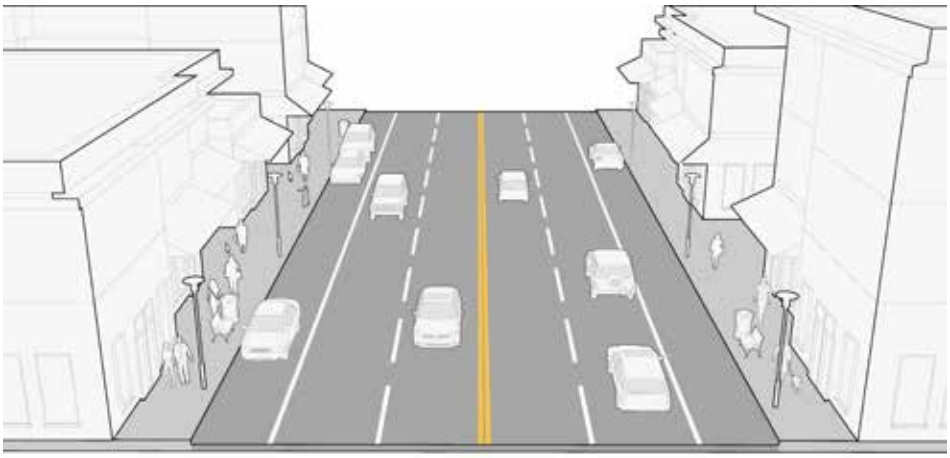
The diagram above shows a typical detail plan incorporating Complete Street principles. Utilities are not identified. Where feasible, utilities should be buried to maximize opportunities for streetscape improvements above grade.

ENCOURAGE ROAD DIETS

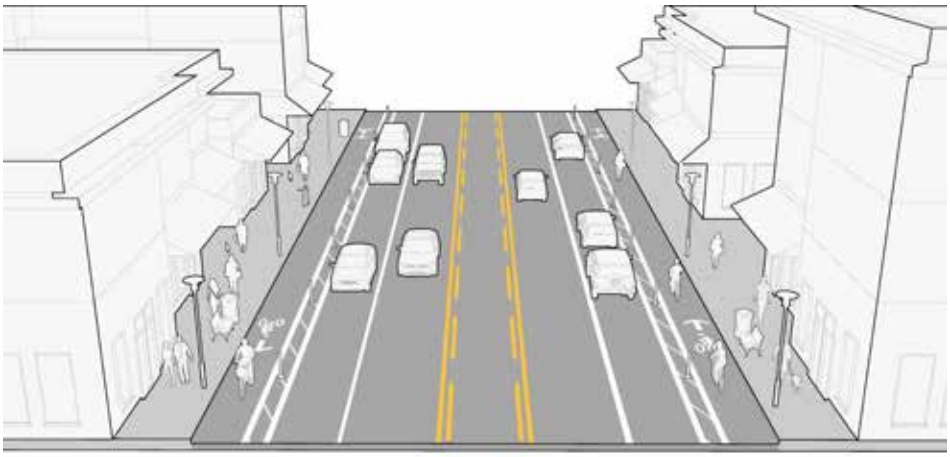
Road Diets redistribute travel lanes in the public right-of-way for other travel modes beyond vehicular. They are part of an overall strategy to create a multi-modal transportation network, which is often part of a larger corridor or neighborhood redevelopment plan. Typical configurations include changing a four-lane road to five lanes: two bike lanes, two motor vehicle travel lanes, and a center two-way left turn lane (TWLTL), as can be seen in the diagrams below. However, other configurations may include curb extensions or center pedestrian medians to shorten pedestrian crossing distances, a parking lane, or fully-equipped transit stops.

Best practices include conducting a traffic analysis before the conversation and collecting data on key performance metrics such as volumes by mode, crash rates, average motor vehicle travel speeds, retail sales, parking use, and transit use. Collecting data on these metrics at regular intervals after the conversion allows transportation professionals to make small adjustments, if needed.

For this study a traffic analysis was performed; more information on the findings can be found in Appendix C. Traffic Analysis.



Before



After

IMPORTANT STATISTICS

Road Diets have been implemented for at least two decades and are steadily increasing in popularity. More than 600 state, regional and local jurisdictions have adopted or have committed to adopting Complete Streets policies, establishing the expectation that all future roadway projects will adhere to the principle that streets should be designed with all users in mind rather than merely providing enough capacity for vehicle throughput.

Safety. Road Diets can make the roadway environment safer for all users. Studies indicate a 19 to 47 percent reduction in overall crashes when a Road Diet is installed on a previously four-lane undivided facility. For pedestrians, Road Diets result in fewer lanes to cross and provide an opportunity to install refuge islands that slow vehicles in the mid-block crossing area, which is where 70 percent of pedestrian fatalities occur.

Low Cost. Road Diets make efficient use of the roadway cross-section. The majority are installed on existing pavement within the right-of-way. When planned in conjunction with reconstruction or simple overlay projects, the safety and operational benefits of Road Diets are achieved essentially for the cost of restriping pavement lanes.

Quality of Life. Road Diets can make shared spaces more livable and contribute to a community-focused, Complete Streets environment. On-street parking and bike lanes can also bring increased foot traffic to business districts.

Source: https://www.fhwa.dot.gov/innovation/everydaycounts/edc-3/roaddiets.cfm

CREATE ROUNDABOUT SOLUTIONS

A Roundabout is a circular intersection that moves traffic counterclockwise around a central island. Often confused with traditional "traffic circles", one way modern roundabouts differ in that they feature traffic calming qualities that encourage drivers to reduce their speed through the intersection. The design of a roundabout also reduces the need for direct left turns, which are a major reason for intersection crashes, thereby increasing the overall safety aspect of the intersection. Modern roundabouts typically include sidewalks, multi-use paths, or bikeways for non-motorized travelers and provide designated crossing locations.

Roundabouts that need to accommodate large vehicles such as trucks and buses without adding unneeded travel lanes are designed with a 'truck apron,' a slightly raised area around the inner circle in the center of the roundabout, to help navigate wider turns. The truck apron expands the turning radius for large vehicles by using this space for rear wheels. DelDOT has developed design criteria specifically to accommodate large vehicles such as trucks and buses.

A well designed, strategically placed modern roundabout is better for the environment than a signalized intersection because it creates shorter delays for motorists and shorter vehicle queues. The longer delays associated with traffic signals result in more vehicles idling for longer periods. Vehicles approaching a roundabout tend to arrive in a slow "rolling" pace rather than the typical stop/start behavior at signalized intersections. This results in lower fuel consumption. Recent studies have shown that idling vehicles emit larger amounts of some types of pollutants than vehicles traveling at moderate speeds. Based on this finding, fewer idling vehicles at a roundabout will result in lower emissions of certain pollutants than the same traffic at a signalized intersection.

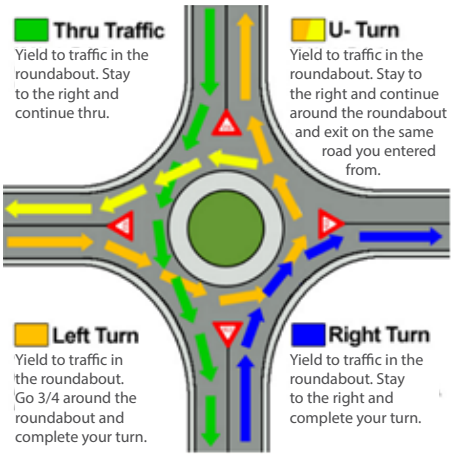
IMPORTANT STATISTICS

A well-designed, strategically-placed roundabout has several benefits.

Safety. Slower speeds and less conflict points reduces the frequency and severity of accidents. National studies have indicated that serious and fatal crashes have been reduced by 70 to 90 percent at locations where roundabouts were installed.

Operation. Overall delays may be reduced due to the smooth flow of vehicle traffic rather than the stop-and-go traffic of normal intersections.

Aesthetics. The central island is often landscaped to help beautify the intersection.



Roundabout Design - Roundabouts have low-speed, one-way traffic and yields at each entry point (above image).

State of Delaware Informational Brochure (left image) - For additional information, please see: http://www.deldot.gov/information/community_programs_and_services/roundabouts/index.shtml

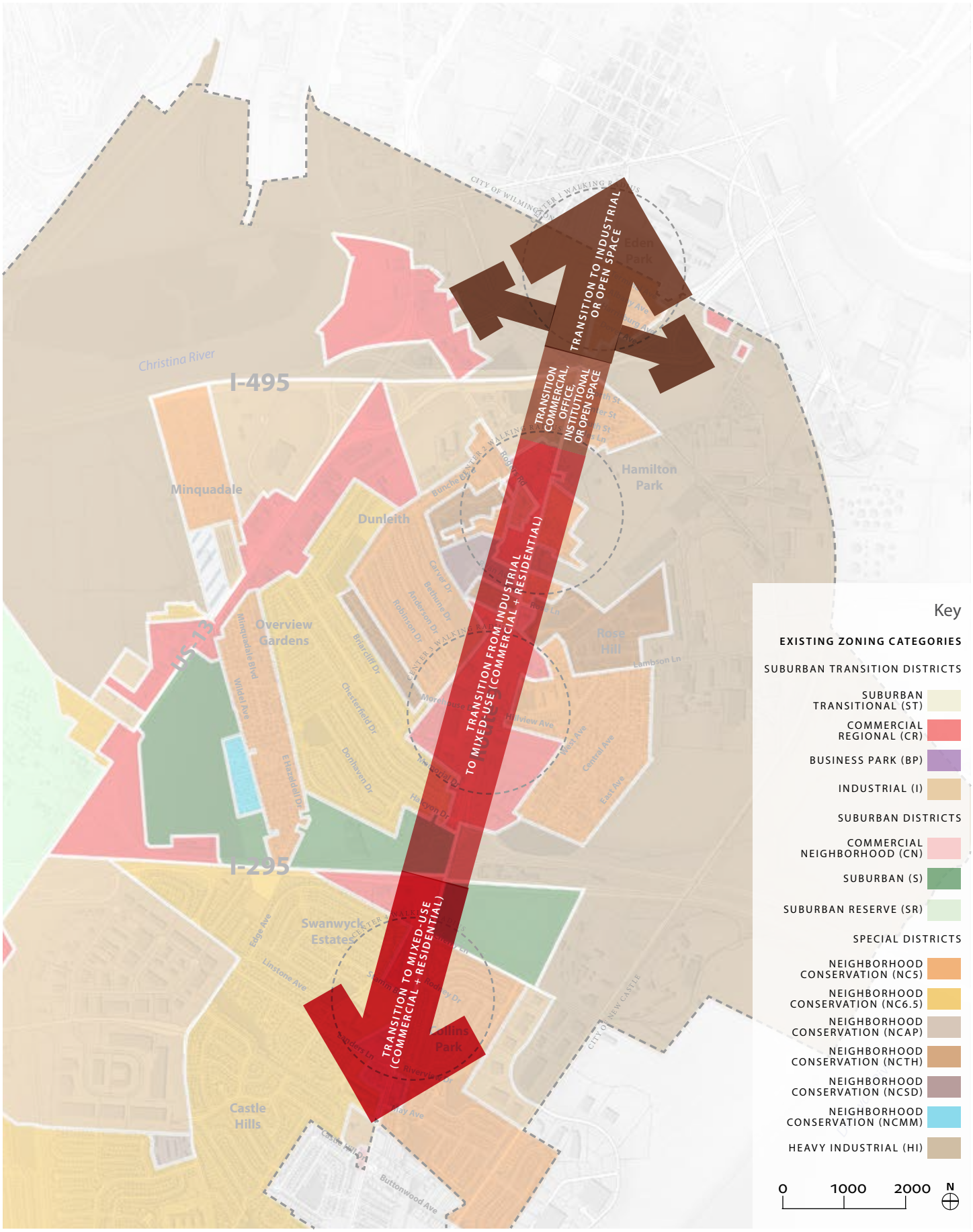
CORRIDOR-WIDE RECOMMENDATIONS

ZONING OVERVIEW

Illogical zoning and development patterns along the Route 9 Corridor are the underlying source of several environmental and public health problems here – from poor air quality created by emissions and dust to illegal heavy truck traffic traveling along neighborhood streets, such as Pyles Lane. As shown on the zoning map, industrially-zoned land is directly adjacent to residential neighborhoods. While these two uses are both of great value, they must be adequately separated from each other to protect public health and quality of life. Without properly spacing these uses, environmental and public health burdens will continue to be carried by residents here for the foreseeable future. Measures to enforce environmental regulations at industries and deter illegal truck traffic are positive steps, but are only partial – and likely temporary – solutions.

To meaningfully address this problematic development pattern, we propose sweeping revisions to the study area's zoning based on the newly adopted Unified Development Code. Given the strong and enduring presence of industry in and around Terminal Avenue (Center 1), the presence of contaminated brownfields here, the desire by the City of Wilmington to maintain and expand light industry along nearby Garasches Lane, the need for expansion of the Port of Wilmington, and the desire of residents for more jobs, strong consideration should be given to buying out and fully relocating residents from the Eden Park neighborhood and re-zoning that land for light industrial or open space. The Hamilton Park neighborhood, south of Eden Park, is also surrounded by industry and should be rezoned to allow for commercial, office, institutional, and open space while prohibiting further residential and industrial uses. This approach, long advocated by the local civic association leaders, should only take place after careful consultation with every property owner and resident in each community and their approval. This process should begin by conducting a sociological relocation survey of both communities to introduce the idea and gather feedback. If relocation is pursued, residents should be provided an adequate, above market value price for their house and other relocation support. Residents should be relocated completely before any new industrial development is introduced. With residential uses removed from the northern tier of our study area, we will address a public health concern in our study area – heavy localized exposure to particulates caused by dust and emissions. Simultaneously, this maneuver will have economic development potential by allowing the repositioning of light industry, such as warehousing and manufacturing, in a contained, separated, and attractively-located section of the corridor. Additionally, the recommendation will allow for the freer and more efficient movement of freight without impinging on the quality of life of residents. Another recommendation in the traffic + truck section builds upon this rezoning by adding an extension of Garasches Lane to Route 9 to provide industries in the City of Wilmington with a more direct link to the interstates and Port. This link would help boost economic development potential along Garasches Lane, and sow the seeds for more regional jobs.

Beginning around Rogers Road (Center 2), the zoning and development pattern shifts from being predominantly industrial to predominantly residential and commercial. Here, and radiating out from Centers 3 and 4 as well, we propose the rezoning of land to mixed-use and mixed income development. Industry should be prohibited all along this stretch of the roadway corridor, but encouraged to continue operating along the Delaware River. Adjustments to existing zoning are required to allow for a mix of commercial and residential properties along this vast stretch of the corridor. Taken together, both recommendations will produce a logical and healthier development pattern where industry and homes are properly spaced. There is also potential for establishing an Economic Empowerment District over the existing industrial areas to allow for light industry (light manufacturing uses, office park, flex-space, and limited retail and service uses that serve the industrial uses) to strategically position itself in the northern tier of the study area and along the western bank of the Delaware River. This opportunity allows for manufacturing growth that may be shared by the County and City of Wilmington and localizes freight movement that would minimize public health impacts. South, along the rest of the corridor stretching from Rogers Road to Stamm Boulevard and beyond, industry will be phased out and prevented from redeveloping. Instead, a mix of commercial and residential uses will blossom and radiate from the Centers.



Zoning Overview

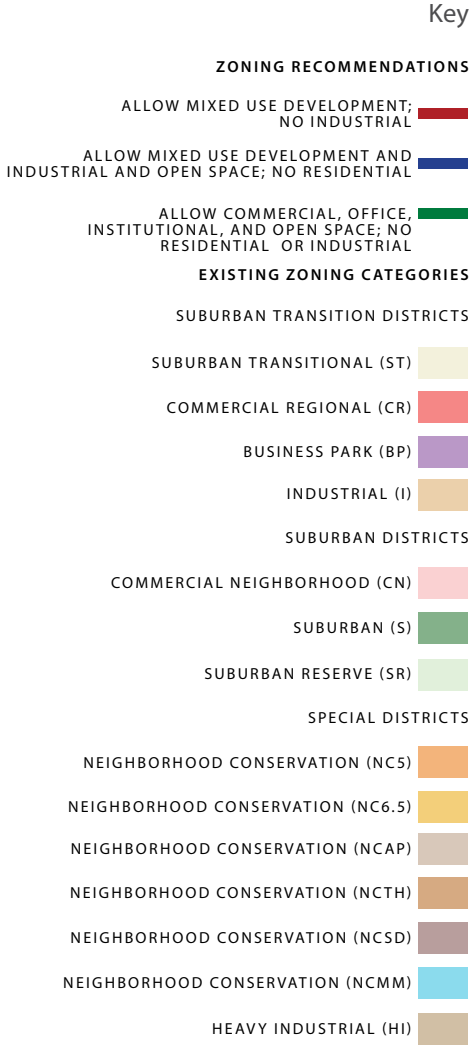
ZONING RECOMMENDATIONS

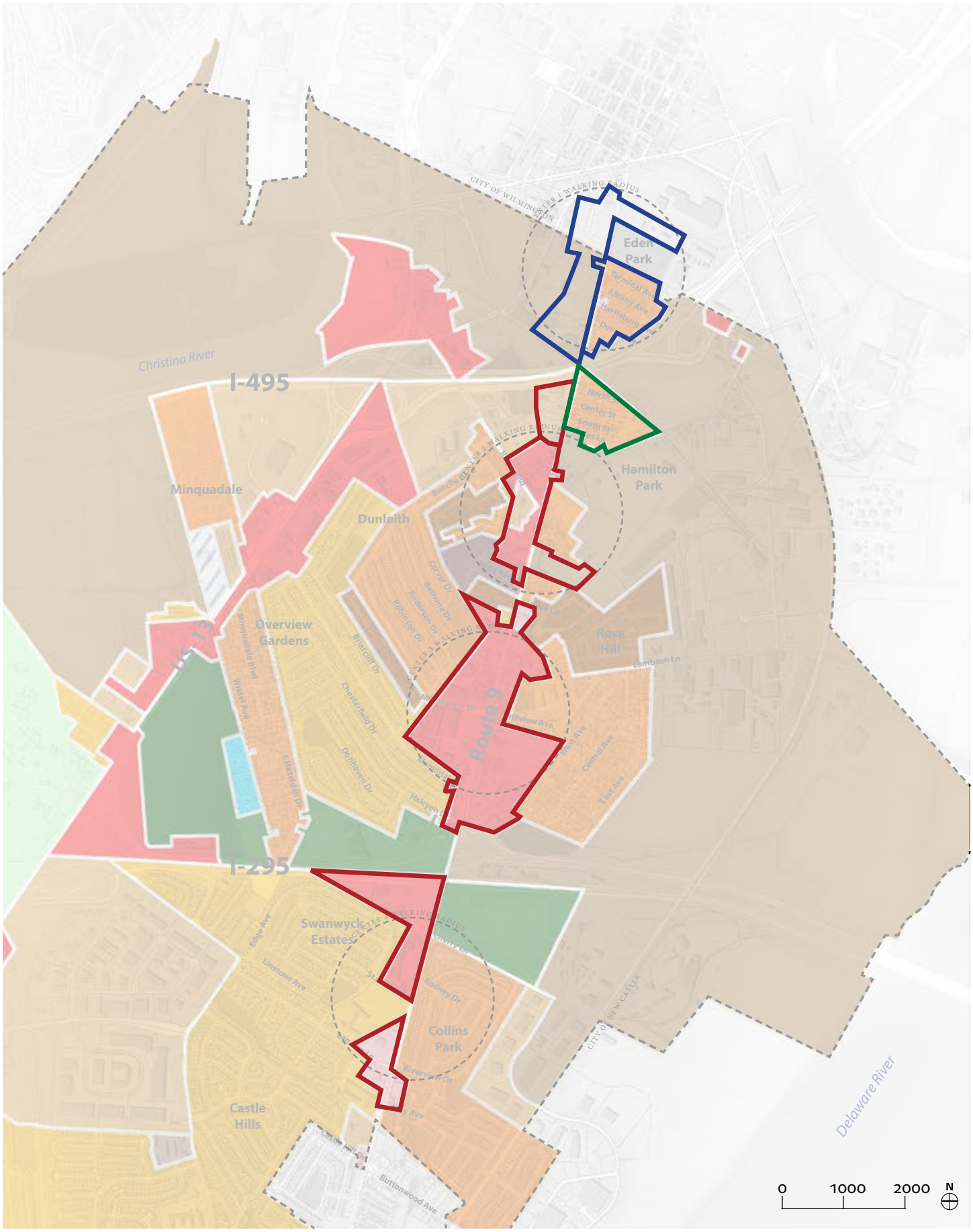
Following the analysis of the existing zoning conditions, the design team identified key parcels for redevelopment along the Route 9 Corridor. Allowable uses and bulk standards for each parcel were assessed using the New Castle County Unified Development Code. High-level rezoning recommendations were provided based on community feedback and categorized as two major strategies:

1. Zoning Recommendation 1: If community support is achieved, relocate the Hamilton Park and Eden Park Gardens neighborhoods. Rezone Eden Park Gardens to open space or light industrial. Rezone Hamilton Park to commercial, office, institutional or open space.
2. Zoning Recommendation 2: Promote mixed-use and mixed income residential and commercial development at and south of Rogers Road. Rezone existing industrial parcels to disenfranchise them by preventing expansion or future redevelopment.

The information collected throughout this analysis influenced and supported the center-specific recommendations found on pages 68-89. The center-specific zoning recommendations provide a more detailed set of suggestions regarding allowable uses, heights, and other bulk standards based on select parcels and their associated zoning classification.

The zoning recommendations identified within this document have been discussed with the New Castle County Land Use Department. All of the recommendations made are suggestions that may influence the re-write of the New Castle County Unified Development Code. To be implemented, all rezoning would need to be officially reviewed and approved by New Castle County.





Zoning Assessment and Recommendations

PEDESTRIAN + BICYCLE RECOMMENDATIONS

A corridor's pedestrian and bicycle network can be integral to community life for travel across the corridor, support for local businesses, and travel to school and other daily needs. While the Route 9 Corridor, like many others, was designed and built for motor vehicle travel, people walk and bicycle along and cross the corridor. The viability of recommended redevelopment included in this report relies in part on a solid walking and bicycle networks. The analysis of these networks was completed to improve conditions for existing residents and employees and to work in tandem with redevelopment as it occurs.

The Route 9 Corridor Master Plan aims to complete and enhance the pedestrian network as recommended in the cross-section concepts under Center-Specific Recommendations. Recommended changes include:

1. Complete the sidewalk network installing sidewalks where missing and ensuring sidewalk access to all bus stops;
2. Repair, widen, clean, etc. all existing sidewalks to ensure ADA compliance and overall usability;
3. Install one curb ramp in each direction of travel; ramps should be wider than the minimum width required in order to provide capacity for increases in pedestrian and bicycle traffic;
4. Stripe all signalized pedestrian crossings and all pedestrian crossings across stop or yield controlled sidestreets/ramps;
5. Install the center multi-use path recommended between Memorial Drive and Cherry Lane
6. Establish a procedure for determining the appropriate location of mid-block pedestrian crossings and guidelines for these crossings. Consider the use of Rectangular Rapid Flashing Beacons where appropriate;
7. Install pedestrian-scale lighting, street trees, benches, signage, murals, sculptures, fountains, and other streetscape elements, where appropriate;
8. Ensure all bus stops are ADA compliant and are equipped with a bus shelter, light, service information, and a trash/ recycling receptacle;
9. Establish a regular program to maintain streetscaping – including street trees, enhanced bus stop amenities, community art, and alternative pavement markings. Consider a special lighting and landscaping district to provide funds for maintenance and oversight. Engage community groups and businesses to assist with maintenance; and
10. Work with private property owners to create and formalize pedestrian pathways and public access easements.

Convert portions of the roadway to bicycle lanes as shown in the preferred cross section concept on page 69, in the Center-Specific Recommendations. Recommended changes include:

11. Installing wide bicycle lanes or separated bicycle lanes on Route 9 and Memorial Drive.
12. Install bicycle parking at bus stops and key civic locations, such as the new Library and Innovation Campus.

More detailed recommendations related to specific intersections along Route 9 can be found on pages 68-89. More detailed maps of existing nonmotorized and transit facilities can be found in the Existing Conditions section.

KEY RECOMMENDATIONS FOR PEDESTRIAN AND BICYCLE NETWORK OUTSIDE THE PUBLIC ROW

13. Identify and build connections between neighborhoods, leveraging the existing system of neighborhood parks
14. Ensure these connections are well-lit and offer current best practices safety features
15. Build a small off-road connection across I-295 between Wildel Avenue and Landers Lane
16. Develop a way-finding system to inform and direct people walking and bicycling about their route options

Key

EXISTING ON-ROAD ROUTES

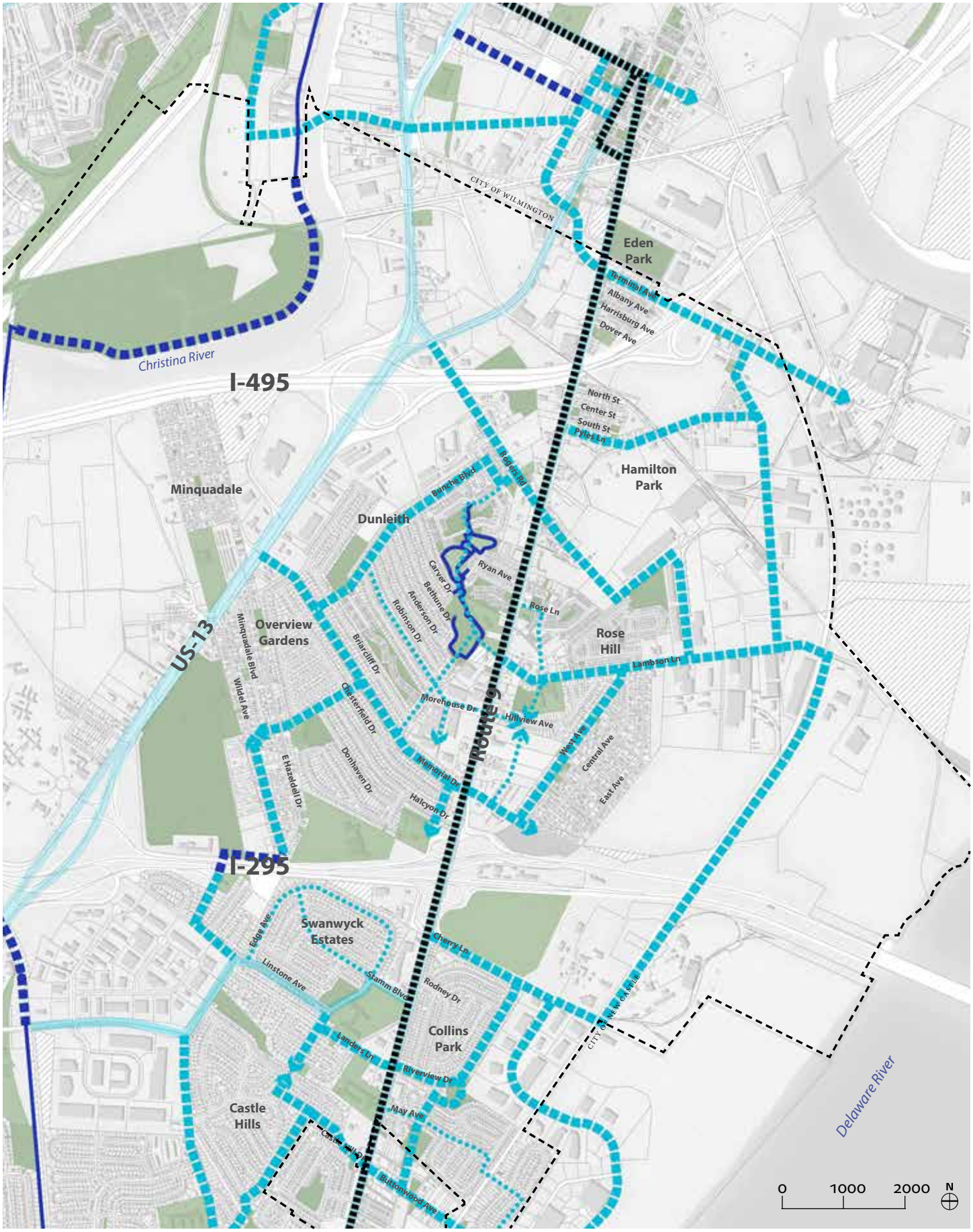
PROPOSED PRIMARY ON-ROAD ROUTES

PROPOSED SECONDARY ROUTES

PROPOSED PRIMARY OFF-ROAD ROUTES

EXISTING SECONDARY OFF-ROAD ROUTES

HARRIET TUBMAN SCENIC BYWAY



Existing and Recommended Bicycle On- and Off- Road Routes

Vehicle and Pedestrian Facilities - Crosswalks, turn lanes, and pedestrian refuge island should be clearly marked and identified to create safe access across Route 9. These elements can significantly reduce crashes and pedestrian injuries.

Bicycle Facilities - Bicycle facilities may include on-street accommodations, separated on-road paths buffered by parking and/or medians, and off-road paths that can be multi-purpose and accommodate a range of users.

Bus Facilities - A range of bus facilities can be incorporated along Route 9, including fully sheltered structures, benches that include signage and other passenger information, or curbside passenger zones that are clearly marked and dedicated for loading. Pedestrian and bike accommodations should be integrated or proximate to the bus facilities to create a more effective and successful multi-modal system.

Lighting, Signage, Landscape and Hardscape - These components are critical to the success of the vehicular, pedestrian, bicycle, and bus facilities. Each improves the safety, efficiency, and aesthetics of a streetscape and ultimately benefits the users.

TRAFFIC + TRUCK RECOMMENDATIONS

Recommendations for traffic and truck movements within the Route 9 Corridor are based on overall goals of the transportation analysis, including a traffic analysis that estimated traffic volumes through 2036 based on expected growth and redevelopment. The analysis was used to support three cross-section options for Route 9 between the City of Wilmington and the City of New Castle and for Memorial Drive between Route 9 and Route 13. The analysis also estimated traffic at five intersections, which was then used as the basis for recommending intersection redesigns.

Key take-aways from the analysis are:

» Motor vehicle traffic volumes along both Route 9 and Memorial Drive today and in 2036 will not exceed the current roadway capacity, making it possible to reallocate one lane in each direction for pedestrian, bicycle, and transit rider travel.

» Intersection redesigns that incorporate pedestrian and bicycle crossing facilities can handle expected motor vehicle traffic without a significant change in the level of service (i.e., delay). The redesigns support the designated centers detailed in this report.

See Appendix C. Traffic Analysis for the full analyses.

Recommendations for improving motor vehicle traffic operations and managing truck traffic are part of a balanced transportation system. In addition to the recommended changes including streetscape and lighting recommendations for pedestrians, bicyclists, and transit riders, recommendations for traffic and large trucks include:

1. Implement road diets on both Route 9 and Memorial Drive, at times removing one vehicle travel lane in each direction to reduce speeds, improve safety, and improve pedestrian and bicycle networks;
2. Rebuild key intersections to more facilitate left/right vehicle turns, improve safety for vehicle and pedestrian/bicycle users, provide much safer pedestrian crossings of Route 9 and Memorial Drive, and to complement the road diet by more efficiently moving traffic;
3. Comprehensively and consistency sign and re-sign roads which are closed to trucks not making local residential deliveries. Ensure that this signage is reflected in truck GPS systems;
4. Additional roadways to provide more direct access for trucks to the Port of Wilmington from I-295 and I-495;
    - Pigeon Point Road extension south to Buttonwood Avenue
    - Interchange between I-295 and Pigeon Point Road
    - Connection between Garasches Lane and Terminal Avenue to link industry along Garasches Lane to the interstates and the port
5. Overnight parking for Port-related trucks with electricity;
6. General education, outreach, and enforcement to ensure truck use of designated roadways and facilities and reduce truck use on restricted residential streets; and
7. Create an inventory of diesel vehicles and equipment at the Port of Wilmington and surrounding businesses. Utilize this inventory to inform environmental grant applications to replace old engines which emit significant levels of fine particulates.

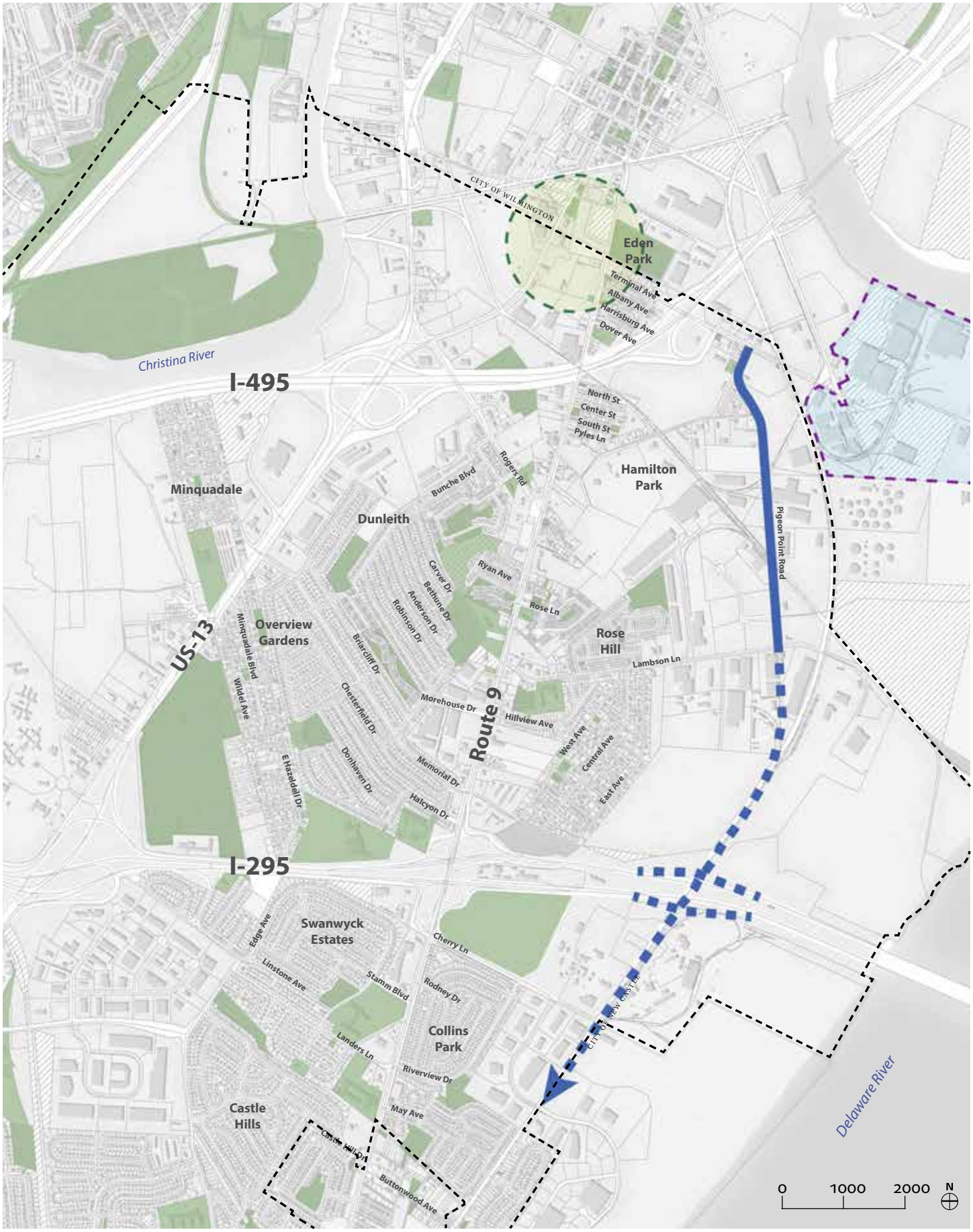
Electrified Parking Spaces (EPS) or Truck Stop Electrification (TSE) - Provides truck drivers the necessary services, such as heating, air conditioning, or appliances, without requiring them to idle their engine.

Key

PROPOSED PIGEON POINT ROAD EXTENSION TO I-295 ALONG EXISTING RAIL CORRIDOR

PORT OF WILMINGTON BOUNDARY

GARASCHES LANE CONNECTION



Recommended Roadways Expansion for Port of Wilmington Truck Access

TRAFFIC ASSESSMENT

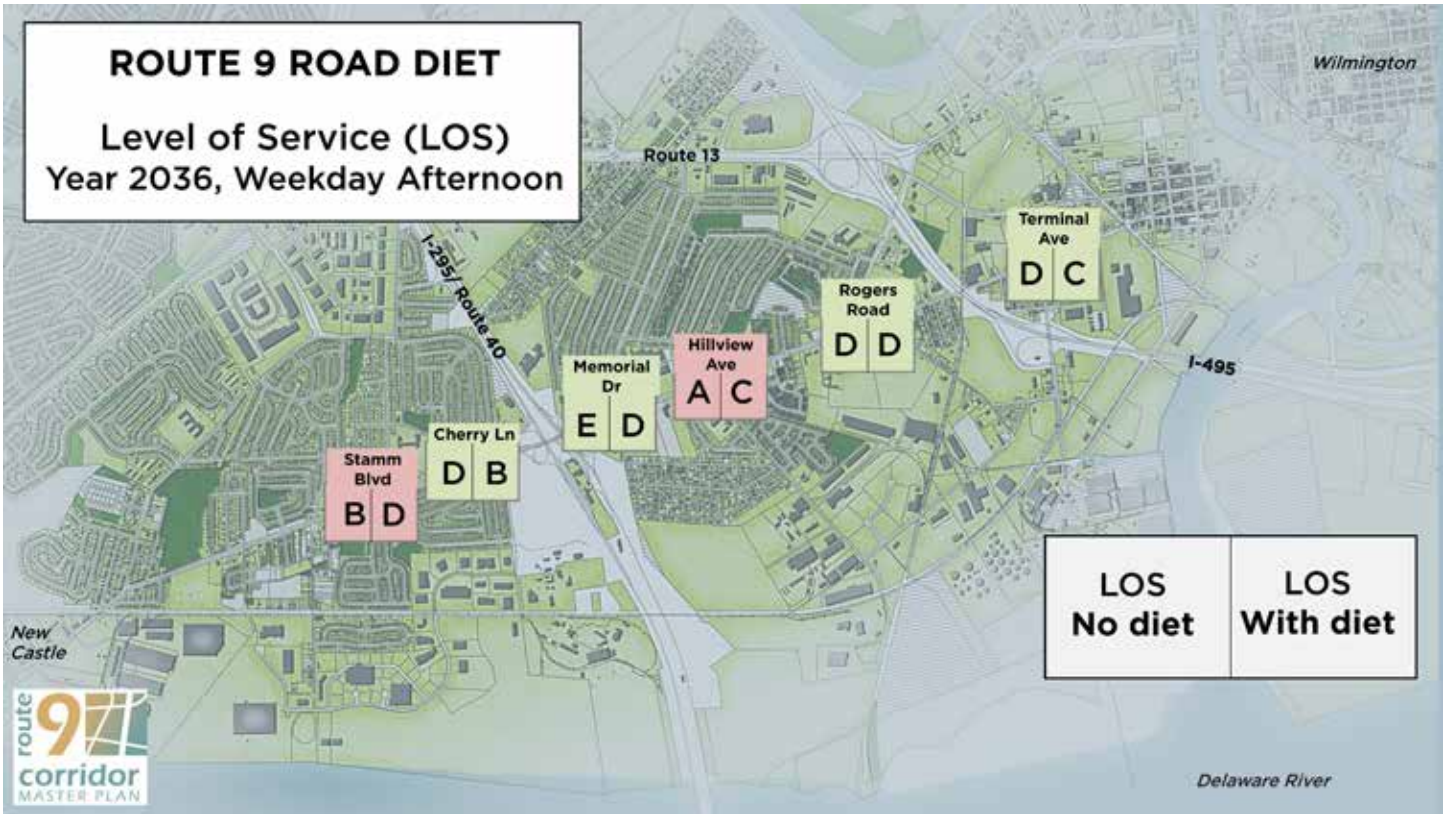
We studied how the recommended road diets and intersection rebuilds would impact traffic Level of Service (LOS). Our computer model considered not only present traffic volumes based on hard data, but also estimated conditions in two decades. The future estimates assumed that vehicle traffic would increase by 22% by 2036. This is a liberal estimate based on possible growth resulting from increased investment and job and population growth in the corridor, including the expansion of the Port. It does not account for the replacement of motor vehicle trips with pedestrian, bicycle, or transit trips for local travel, which we expect will happen to some degree with the recommended improvements in the study.

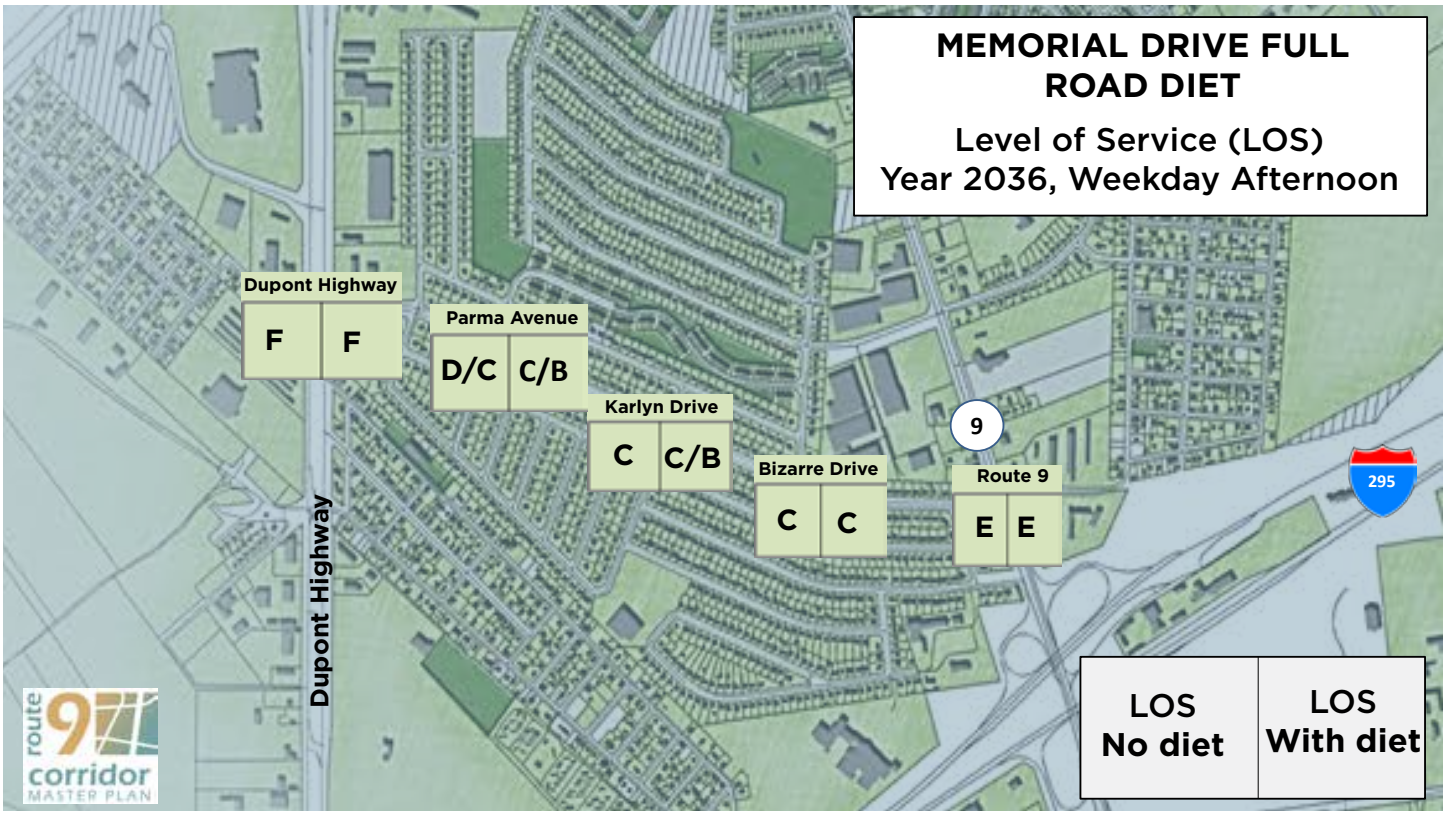
LEVEL OF SERVICES (LOS)

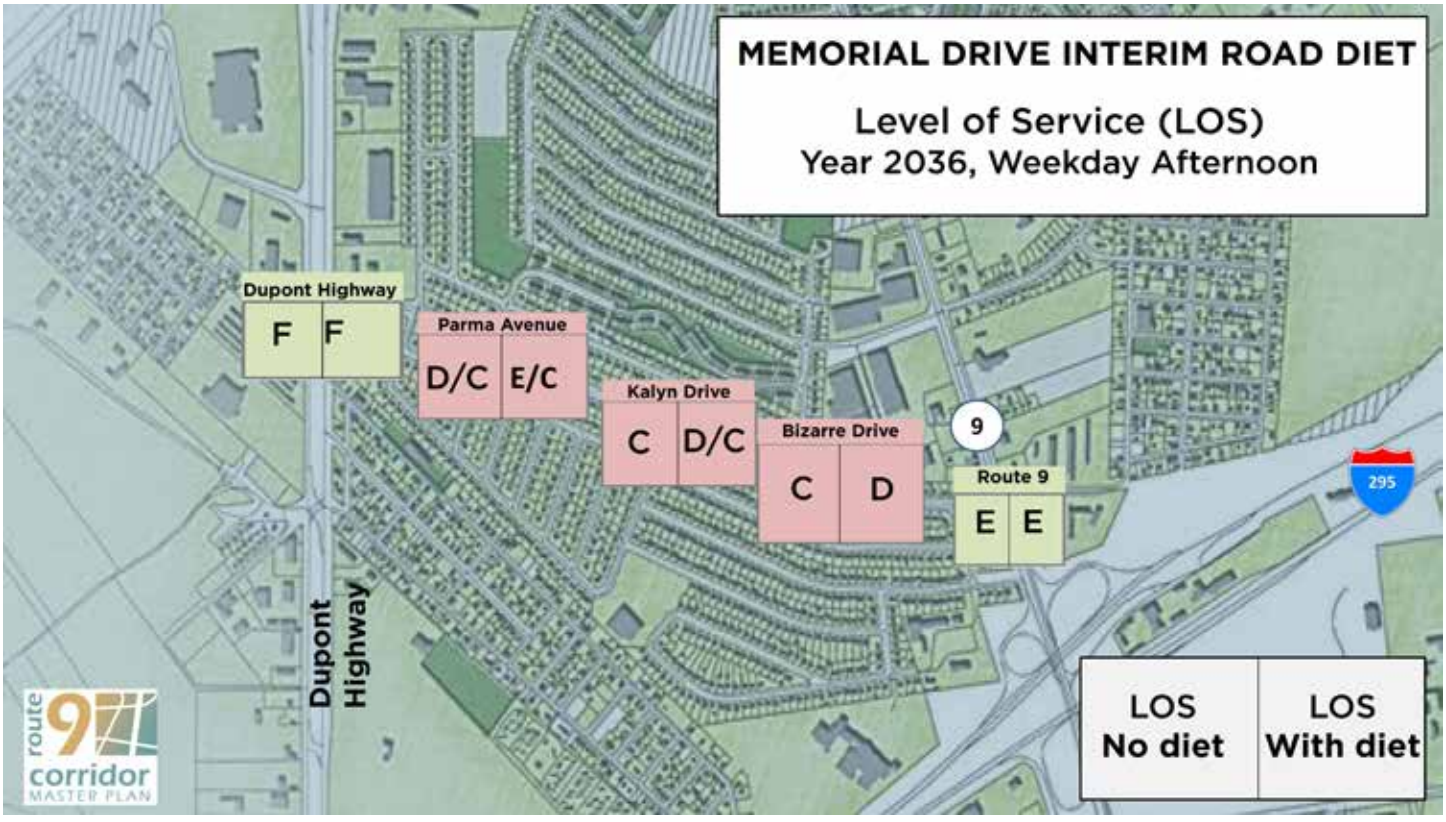
Level of Service (LOS) measures how well traffic flows and assigns a letter grades from "A" to "F." Grade "A" is considered completely free-flowing traffic with limited queues at intersections. Grade "F" involves poor vehicle flow with stop and go movements, and clogged intersections with significant delays.

The maps below illustrate our analysis. Each compare LOS conditions in 2036 with no changes to the infrastructure ("LOS no diet") against implementation of the road diet and intersection rebuilds ("LOS with diet"). Conditions along Route 9 itself generally improve with the road diet, with no intersections operating below "D." Without any adjustments, Memorial Drive at Route 9 is expected to operate at LOS "E" by 2036. Regarding Memorial Drive itself, the full proposed diet (which includes the creation of a center turn lane) would have a beneficial impact through 2036. An inexpensive interim road diet along Memorial Drive (which could be completed during a repaving and would maintain the raised center median) was found to have a slightly negative impact by 2036. If the interim diet is pursued here after further community consultation, we still do recommend construction of the full road diet in the medium to long term.

For additional information regarding traffic analysis, please see *Appendix C. Traffic Analysis*.




MEMORIAL DRIVE FULL ROAD DIET
Level of Service (LOS)
Year 2036, Weekday Afternoon
Dupont Highway
F F
Parma Avenue
D/C C/B
Karlyn Drive
C C/B
Bizarre Drive
C C
9
Route 9
E E
295
Dupont Highway
LOS No diet
LOS With diet
route 9 corridor MASTER PLAN

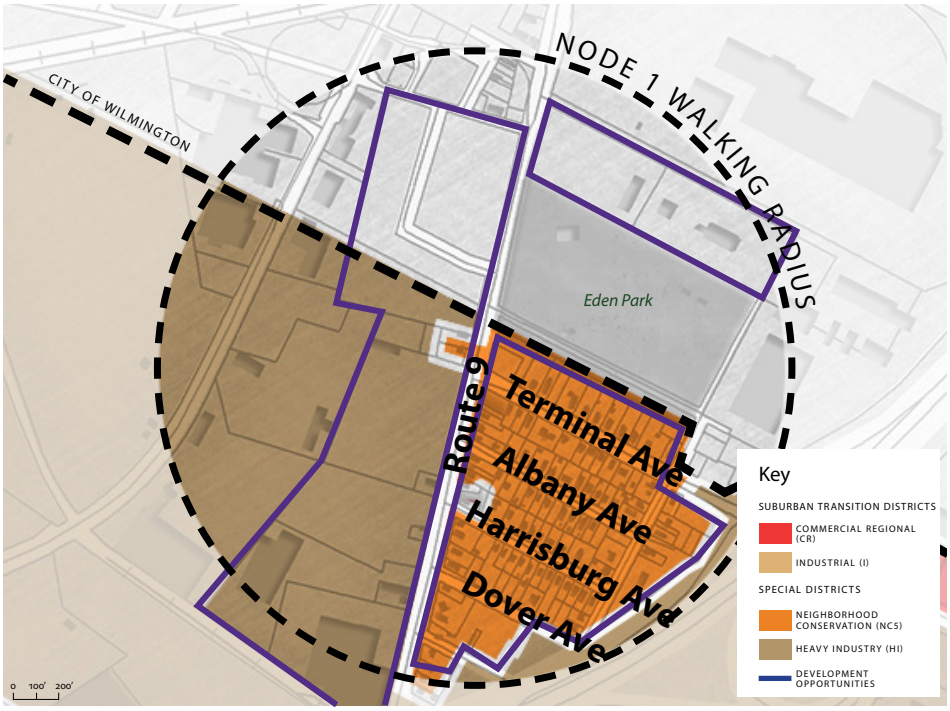

MEMORIAL DRIVE INTERIM ROAD DIET
Level of Service (LOS)
Year 2036, Weekday Afternoon
Dupont Highway
F F
Parma Avenue
D/C E/C
Kalyn Drive
C D/C
Bizarre Drive
C D
9
Route 9
E E
295
Dupont Highway
LOS No diet
LOS With diet
route 9 corridor MASTER PLAN

CENTER-SPECIFIC RECOMMENDATIONS

CENTER 1: TERMINAL AVENUE

Center 1 is situated at the intersection of Terminal Avenue and Route 9, directly north of Interstate 495. This area consists primarily of the Eden Park neighborhood and recreational facility, with direct adjacency to the Port of Wilmington, large industrial properties, and Interstate 495 making the public health impacts of dust, emissions, noise, and heavy truck traffic a significant concern for local residents and officials. A majority of the industrial properties along this stretch of Route 9 are heavily utilized, causing incompatibility issues with the residential.

Industry will always be a major component of the area, even as it evolves with advancements in technology. With I-495 to the south and a functioning rail corridor to the north, Center 1 is fairly isolated from surrounding commercial and residential development. This area has the potential to target industrial growth without compromising the mixed-use investment that is envisioned at the other centers along Route 9. The establishment of an Economic Empowerment District overlay in this area is a great option to support these goals. The vision for Center 1 is a phased or wholesale buyout and relocation of Eden Park residents, if their support is achieved, and the transition of that land to either light industrial or open space. Relocated residents will require appropriate financial and logistical relocation support. These initiatives will improve the corridor as a whole and allow reinvestment along Route 9 to better serve those who live, work, and visit the area.



Key
✓ = Permitted Use per New Castle County Zoning
× = Prohibited Use per New Castle County Zoning
R = Recommended Zoning Change for Permitted Use
R = Recommended Zoning Change for Prohibited Use

	Uses											Heights	
	Single-Family Detached	Single-Family Attached	Apartments	Senior Housing	Commercial Apartments	Commercial Lodging	Commercial Retail +	Mixed Use	Office	Shopping Center	Industrial	*Existing*	*Proposed*
Heavy Industrial (HI)	×	×	×	×	×	R	R	R	✓	R	✓	70'-90' max height range by use	180'** max height
Neighborhood Conservation (NC5)	R	R	R	R	×	×	R	R	R	R	R	35' max height	180'** max height

Locator Map

TERMINAL AVENUE: ZONING ASSESSMENT + RECOMMENDATIONS

Center 1's existing zoning consists of Heavy Industrial (HI) and Neighborhood Conservation (NC) zoning designations. The priority investment properties cover all parcels, except the open space of Eden Park, within 200' of Route 9.

With the support of the community, Center 1 rezoning should encourage the transition of all uses to industrial or open space. However, no conversion of residential to industrial should occur prior to the relocation of all residents. The current max height ranges should be 90' along the corridor to provide sufficient industrial redevelopment opportunities. All new buildings within 100 feet of single-family residential development will need to meet the requirements in the New Castle County Unified Development Code Section 40.04.110c*.

TERMINAL AVENUE: INTERSECTION DESIGN

Terminal Avenue provides a direct connection between the Port of Wilmington and I-495. The road ends at Route 9, which is north of the I-495 interchange, however there is a driveway into a large industrial operation across the intersection to the west.

The proposed intersection design for Terminal Avenue reflects its designation as one of four centers along the Route 9 Corridor. As such, the recommended intersection design was based on creating a gateway for those entering the corridor from the north and incorporating other transportation goals. It also supports the recommended land uses, as well as Eden Park in the northeast quadrant. The traffic analysis completed for Route 9 and the Terminal Avenue intersection supports a single lane roundabout with one lane. The roundabout design can be modified in the future to accommodate a connection to Garasches Lane.

The photo below on the left shows the existing signal-controlled intersection, with two or three travel lanes in each direction, right turn slip lanes for northbound traffic onto Terminal Avenue and westbound traffic onto Route 9. Islands defining the right turn slip lanes include pedestrian pathways, however, there are not striped crosswalks.

The intersection redesign shown below on the right converts the available right-of-way to a roundabout. A mountable truck apron provides the turning radii needed for large trucks. Pedestrian and bicyclists crossing are striped and include center refuge islands. The recommended design also includes improved bus stops just north and south of the intersection.

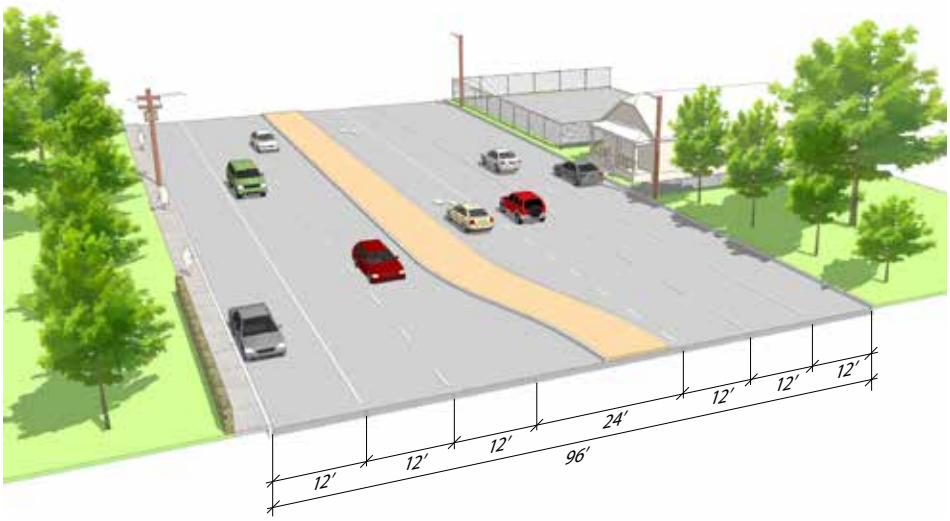
Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

ROUTE 9 AT TERMINAL AVENUE: CROSS SECTION

This portion of Route 9 is expected to support residential neighborhoods to the east, at least in the near term, and heavy industrial to the west and east. The current condition, as shown in the diagram below, includes narrow sidewalks, no designated bicycle facilities, safe for a painted shoulder which is used for parking. The proximity of the sidewalk to the roadway creates an uncomfortable condition for pedestrians. The number of travel lanes and dedicated left turn lanes create a long travel distance for pedestrians crossing Route 9 at this point. Given the mix of land uses in the area, it is important to provide safe, comfortable, and adequate pathways and connections. This includes bus stop access for workers at area industries and travelers to and from Wilmington.

Estimated traffic volumes for 2036 support one travel lane and one turn lane in each direction, leaving space for sidewalks, a separated bicycle lane, and expanded bus stop facilities. Three options for this re-allocation are shown on the facing page. All scenarios are designed to improve safety for all travel modes, while expanding facilities for pedestrians, bicyclists and transit. Recommended changes include improved pedestrian infrastructure, new bicycle infrastructure, and maintain motor vehicle travel lanes to meet estimated demand. Moving from Scenario 1 to 2 to 3 adds green infrastructure, additional separation for bicycle lanes, an expanded bus stop, and a center turn lane with periodic planted medians. Given the mix of residential and heavy industrial, Scenario 1 (with transitions north and south) is recommended for this portion of Route 9. Pedestrian improvements on the east side of Route 9 to support use of Eden Park just north of Terminal Avenue are also recommended. Scenario 1 will also accommodate significant diverted or overflow motor vehicle traffic from Route 13 and I-95.

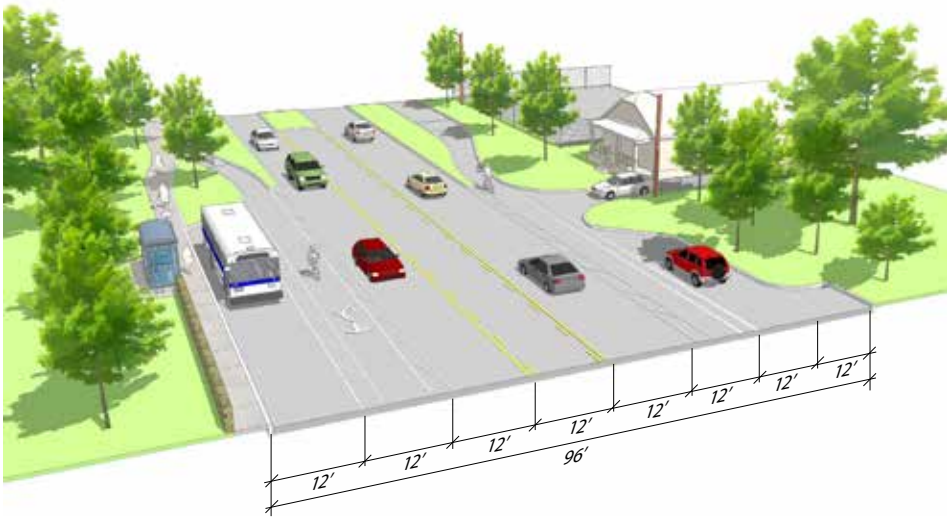
EXISTING SITE CONDITIONS - *North of Terminal Avenue Looking South*



KEY FEATURES

- Uncomfortable pedestrian + bicycle environment
- Limited lighting + plantings
- Sidewalk on west side of Route 9
- Obstacles in sidewalk
- 2 northbound and 2 southbound travel lanes
- Left turn lanes
- Breakdown/ parking shoulder

SCENARIO 1 - *North of Terminal Avenue Looking South (Preferred)*



KEY FEATURES

- Buffered bike lanes
- Wide sidewalk at existing obstacles
- Bus shelter with lighting
- Planting islands with street trees
- 1 northbound and 1 southbound travel lane
- Center two-way left turn lane
- Breakdown/ parking shoulder
- No impacts to existing curb lines, stormwater inlets, or utilities beyond the intersection transition

*Low construction cost

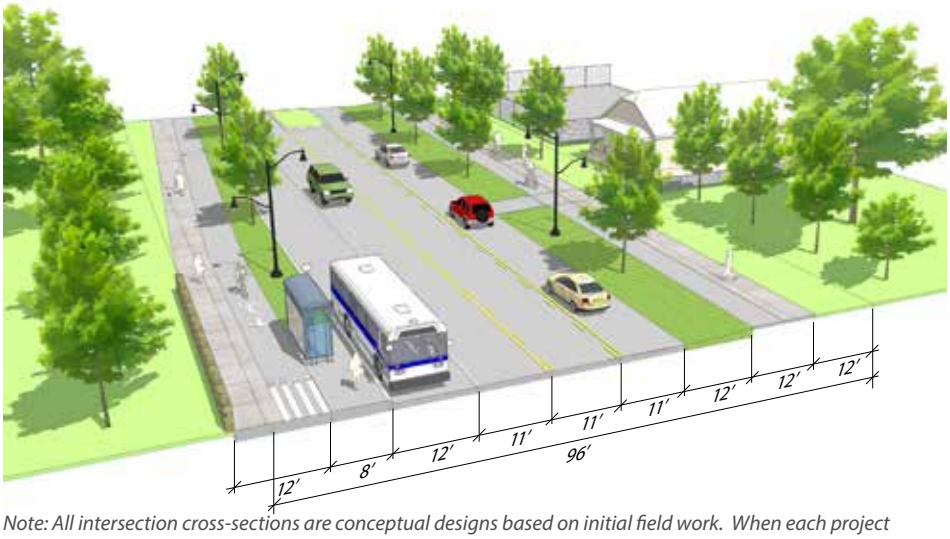
SCENARIO 2 - *North of Terminal Avenue Looking South*

KEY FEATURES

- Separated bike lanes
- Wider sidewalk at existing obstacles
- New street level sidewalk on east side of Route 9
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- Street-side bus shelter with lighting
- 1 northbound and 1 southbound travel lane
- Center two-way left turn lane
- Designated bus and breakdown parking shoulder

*Moderate construction cost

SCENARIO 3 - *North of Terminal Avenue Looking South*



KEY FEATURES

- Separated bike lanes
- Wider sidewalk
- New sidewalk on east side of Route 9
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting + screening
- Street-side bus shelter with lighting
- 1 northbound and 1 southbound travel lane
- Center turn lane provides space to negotiate a broken down vehicle
- Designated bus pull-in

*High construction cost

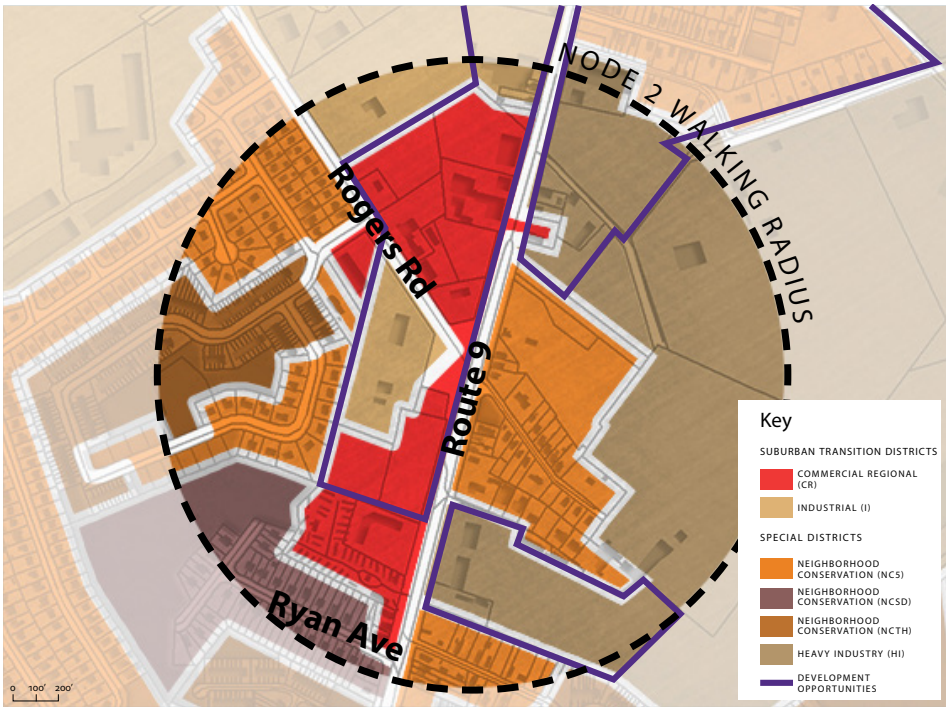
Note: All intersection cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed.

CENTER 2: ROGERS ROAD

Center 2 is situated at the intersection of Rogers Road and Route 9 just south of Interstate 495. In this area, a mix of smaller commercial and industrial properties line the western edge of Route 9. On the east side, a mix of single-family detached and attached homes are directly adjacent to the corridor and surrounded by large industrial properties. The Hamilton Park neighborhood and Rose Hill Gardens community are two neighborhood pockets currently affected by the location of residential directly adjacent to industrial. Hamilton Park, in particular, is unfortunately situated between I-495 and Pyles Road, a major truck route to the Port of Wilmington and various industrial users. A majority of the commercial and industrial properties along this stretch of Route 9 are underutilized, poorly maintained, and incompatible with the neighborhood fabric that exists around it. Center 2 has the potential to be a neighborhood center that expresses the identity of the Route 9 Corridor and could benefit from strategic investment.

The vision for Center 2 incorporates a mix of smaller, neighborhood-serving commercial, office, and institutional tenants along Route 9. Existing industrial uses will need to be phased out through rezoning strategies, eliminating the opportunity for future industrial development. In the short-term, both the County and Steering Committee are in support of a relocation strategy for the residents of the Hamilton Park neighborhood. Rezoning for this neighborhood should prohibit future residential or industrial development, but allow for commercial, office, institutional or open space uses that are more appropriate adjacent to the interstate and truck traffic along Pyles Lane. Each of these recommendations will allow for a more vibrant, mixed-use center with a wide-range of amenities that can better serve the surrounding neighborhoods, create stronger connections to and across Route 9, and establish a minor gateway that begins to identify the corridor for those traveling east on Rogers Road.

Locator Map



Key
✓ = Permitted Use per New Castle County Zoning
× = Prohibited Use per New Castle County Zoning
R = Recommended Zoning Change for Permitted Use
R = Recommended Zoning Change for Prohibited Use

		Uses											Heights	
		Single-Family	Single-Family	Apartments	Senior Housing	Commercial Apartments	Commercial Lodging	Commercial Retail +	Mixed Use	Office	Shopping Center	Industrial	*Existing*	*Proposed*
	Heavy Industrial (HI)	R	R	R	R	R	R	R	R	✓	R	R	70'-90' max height range by use	65'** max height
	Industrial (I)	R	R	R	R	R	✓	✓	R	✓	R	R	30'-65' max height range by use	no change
	Commercial Regional (CR)	R	R	R	✓	✓	✓	✓	✓	✓	✓	×	50'-180'* max height range by use	65'** max height
	Neighborhood Conservation (NC5)	✓	✓	✓	✓	×	×	R	R	R	R	×	35' max height	65'** max height

ROGERS ROAD: ZONING ASSESSMENT + RECOMMENDATIONS

Center 2's existing zoning consists of Commercial Regional (CR), Industrial (I), Heavy Industrial (HI), and Neighborhood Conservation (NC) zoning designations. The priority investment properties (non-residential land within 200' of Route 9) fall under the HI, I, CR, and NC5 designations.

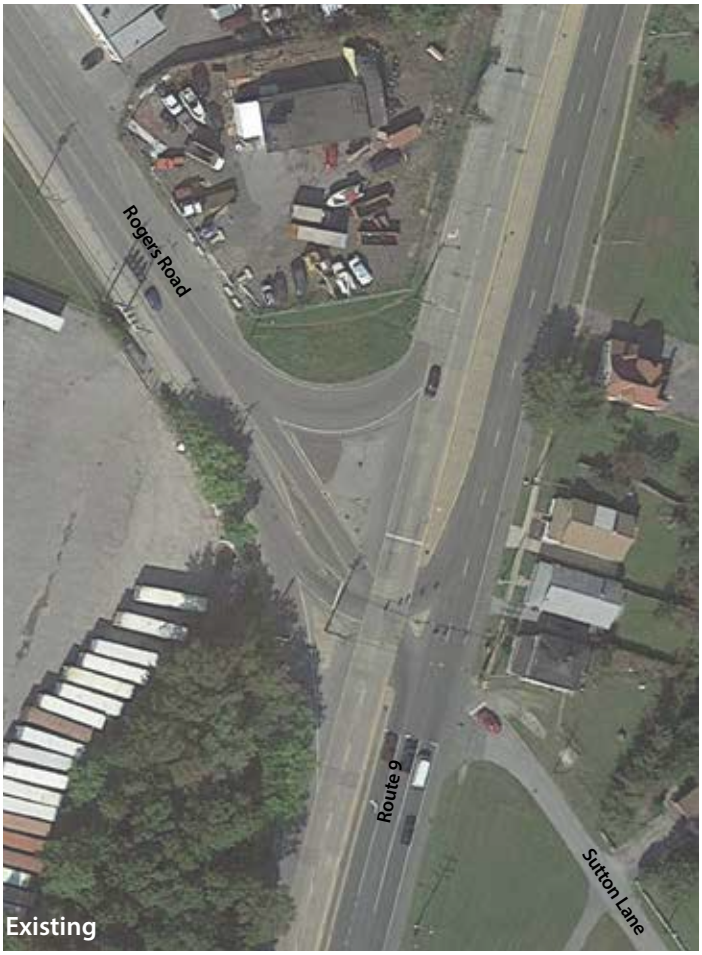
As requested by the community, Center 2 rezoning should allow for all uses and discourage additional industrial. The current max height ranges should be 65' along the corridor to provide sufficient mixed-use redevelopment opportunities. All new buildings within 100 feet of single-family residential development will need to refer to the New Castle County Unified Development Code Section 40.04.110c*.

ROGERS ROAD: INTERSECTION DESIGN

Rogers Road provides a direct connection between Route 9 and Route 13 and I-495. The roadway continues east of Route 9, renamed as Sutton Lane, a short residential street that extends for about 600 feet before it ends. A traffic signal controls all left turns; right turns are accommodated with slip lanes or right turn on red. Pedestrian crossings are limited to the south approach of Route 9. The photo below on the left shows the existing intersection. The intersection's geometry requires a generous amount of right-of-way and pavement.

The proposed intersection design for Rogers Road reflects its designation as one of four centers along the Route 9 Corridor.

The proposed intersection design shown on the right below changes the existing configuration to improve travel for pedestrians and bicyclists, and continue to provide a reliable level of service for motor vehicles, and improve safety. Based on the traffic analysis, the proposed design eliminates the slip lanes and re-organizes this single skewed intersection into two offset T-intersections – one for Rogers Road and one for Sutton Lane -- with a traffic signal at Rogers Road. Sutton Lane traffic turning onto Route 9 is stop-controlled. The redesign includes expanded bus stops on each side of Route 9 and pedestrian crossings to access these stops. Right-of-way currently used for the southbound slip lane is converted to a small park, with a connecting pathway between Route 9 and Rogers Road. Other pedestrian and bicycle facilities include new sidewalks and a separated bicycle lane (northbound and southbound). The proposed intersection design is based on Scenario 3 and is a planning level design based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection with the planned cross-section.



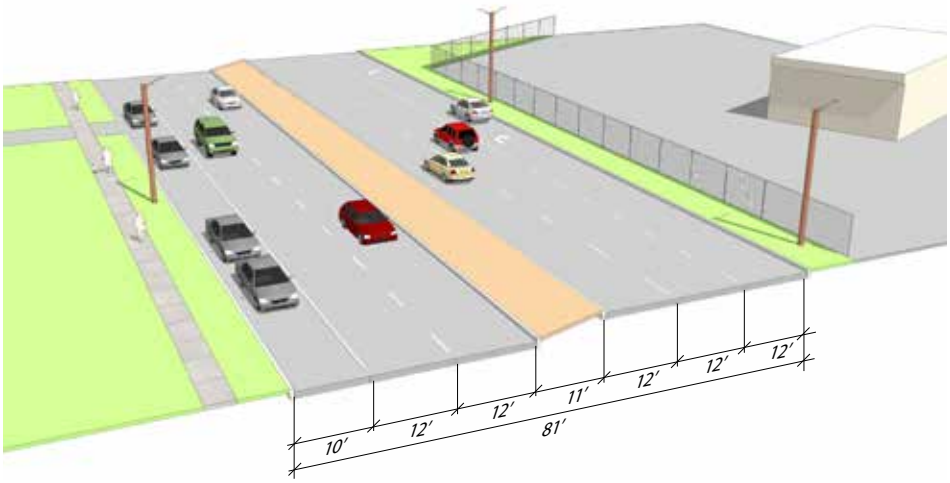
Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

ROUTE 9 AT ROGERS ROAD: CROSS SECTION

The current condition of this portion of Route 9, as shown in the diagram below, includes a sidewalk along the length of the west side. Infrequent maintenance has allowed vegetation to encroach on the sidewalk, reducing its usable width. There are long gaps in the sidewalk on the east side, especially between Revis Avenue and Rizzo Avenue, primarily due to parking in front of commercial establishments. There is also no dedicated bicycle facility, save for a wide painted shoulder.

Estimated traffic volumes for 2036 support one travel lane and one turn lane in each direction, leaving space for sidewalks, a separated bicycle lane, and expanded bus stop facilities. Three options for this re-allocation are shown on the facing page. All scenarios are designed to improve safety for all travel modes, while expanding facilities for pedestrians, bicyclists and transit. Moving from Scenario 1 to 2 to 3 adds green infrastructure, additional separation for bicycle lanes, and finally an expanded bus stop. Given input from the community, Scenario 2 is recommended for this portion of Route 9. Scenario 2 will allow significant diverted or overflow motor vehicle traffic from Route 13 and I-95 to use the separated bicycle lanes on the east side, or turn around where there is no center median in the areas beyond what is shown in the cross-sections. A mountable curb is recommended to provide emergency access to the planting zone for vehicles that breakdown and area waiting for assistance.

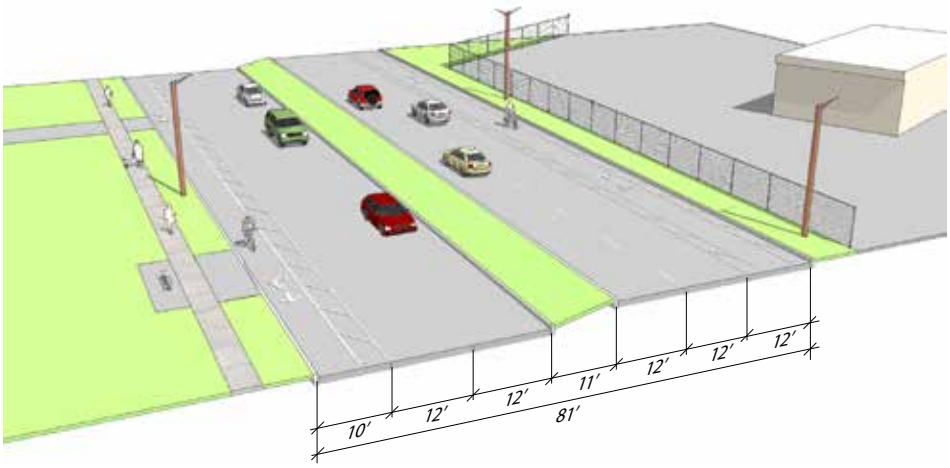
EXISTING SITE CONDITIONS - *North of Rogers Road Looking South*



KEY FEATURES

- Uncomfortable pedestrian + bicycle environment
- Limited lighting + plantings
- Sidewalk on west side of Route 9 only
- Obstacles in sidewalk
- 2 northbound and 2 southbound travel lanes
- Turn lanes
- Breakdown/ parking shoulder

SCENARIO 1 - *North of Rogers Road Looking South*

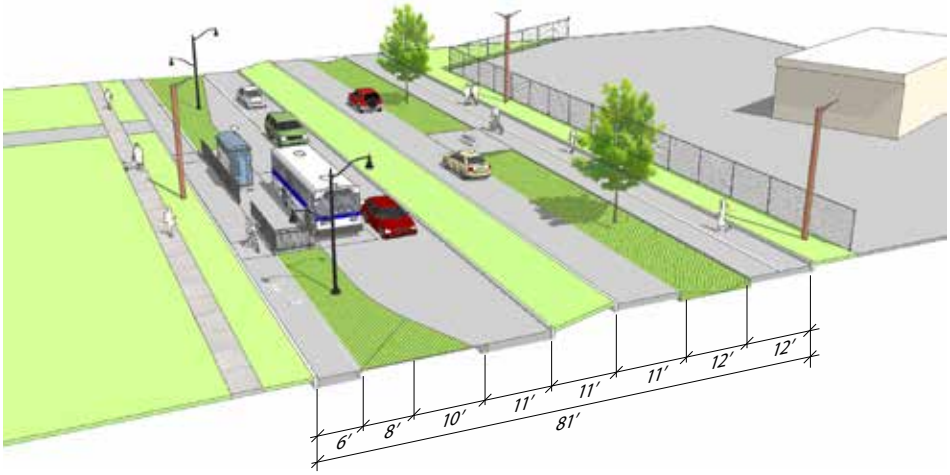


KEY FEATURES

- Buffered bike lanes
- Wide sidewalk at existing obstacles
- Improved bus stop facilities
- 2 northbound and 2 southbound travel lanes
- Right turn lanes
- Breakdown/ parking shoulder
- No impacts to existing curb lines, stormwater inlets, or utilities

*Low construction cost

SCENARIO 2 - *North of Rogers Road Looking South (Preferred)*

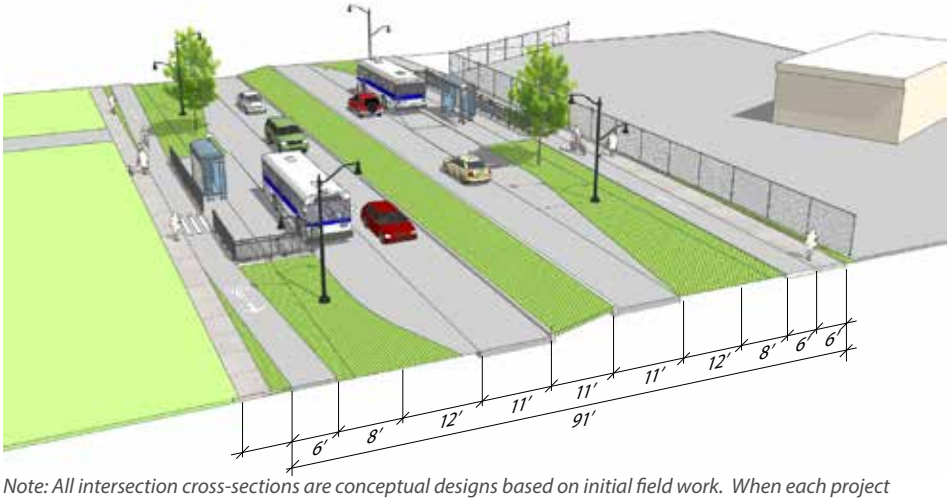


KEY FEATURES

- Separated bike lanes
- Wider sidewalk at existing obstacles
- New street level sidewalk on east side of Route 9
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- Street-side bus shelter with lighting
- 1 northbound and 1 southbound travel lane
- Designated bus pull-in
- Mountable curb for emergency access into the planting zone

* Moderate construction cost
** DelDOT roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity.

SCENARIO 3 - *North of Rogers Road Looking South*



KEY FEATURES

- Separated bike lanes
- Wider sidewalk
- New sidewalk on east side of Route 9
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- Street-side bus shelter with lighting
- 1 northbound and 1 southbound travel lane
- Designated bus pull-in

*High construction cost
** DelDOT roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity.

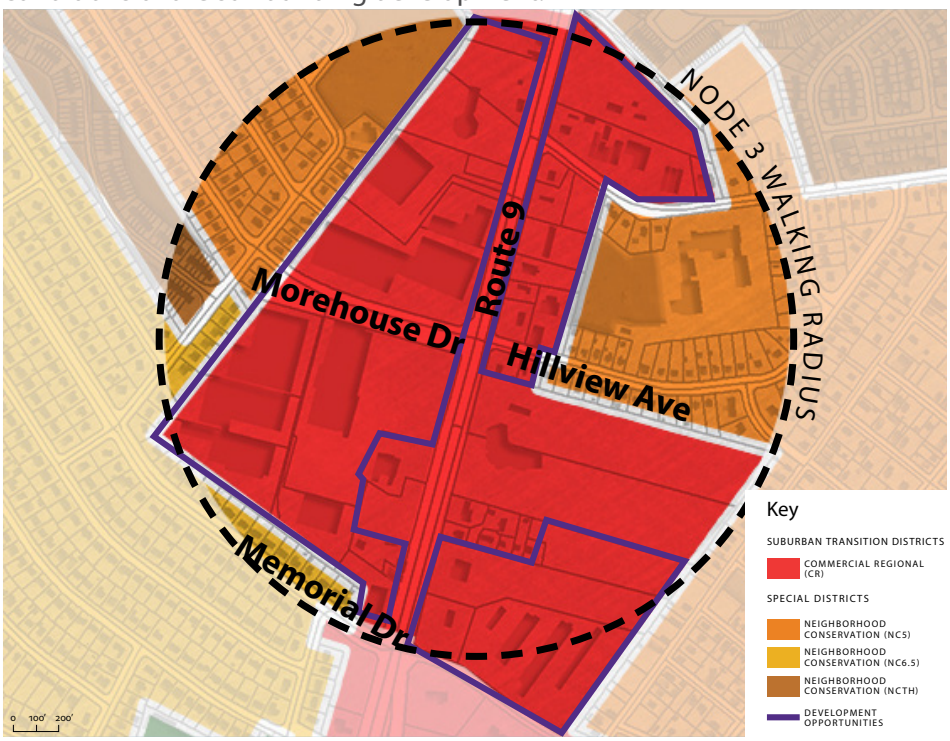
Note: All intersection cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed.

CENTER 3: HILLVIEW AVENUE

Center 3 is situated at the intersection of Hillview Avenue and Route 9. A prominent intersection along the corridor, this center encompasses large commercial parcels with surface parking that are ideal for redevelopment, undeveloped land that is currently underutilized, and several hotels that are outdated and poorly maintained. Conveniently located adjacent to the new Route 9 Library, the intersection is strategically positioned for additional development spurred by the library's new investment and is envisioned as the heart of the Route 9 Corridor.

The illustrative concept plan, shown on the facing page, shows the short- and long-term development program (Phase 1 and 2) based on the market analysis findings and zoning assessment and recommendations. The concept plan consists of 1-story retail and 2-story mixed-use development fronting Route 9. This new development, in addition to the streetscape improvements, will help to create a strong main street character that links development across both sides of Route 9. Senior housing is incorporated adjacent to the new Route 9 Library along with a mix of for-sale and rental townhouses. Similar townhouse development is provided to the north of Center 3 between Lambson and Thorn Lane. The infill of mixed-income residential in a range of housing types strengthens the surrounding neighborhood fabric and provides a stronger interconnected network of streets and open spaces for the community to access and enjoy. The proposed buildings within Phase 1 and 2 are primarily 1-3 stories with surface parking, creating efficient blocks and respecting the current height conditions of the surrounding development.

Locator Map



Key
✓ = Permitted Use per New Castle County Zoning
× = Prohibited Use per New Castle County Zoning
R = Recommended Zoning Change for Permitted Use
R = Recommended Zoning Change for Prohibited Use

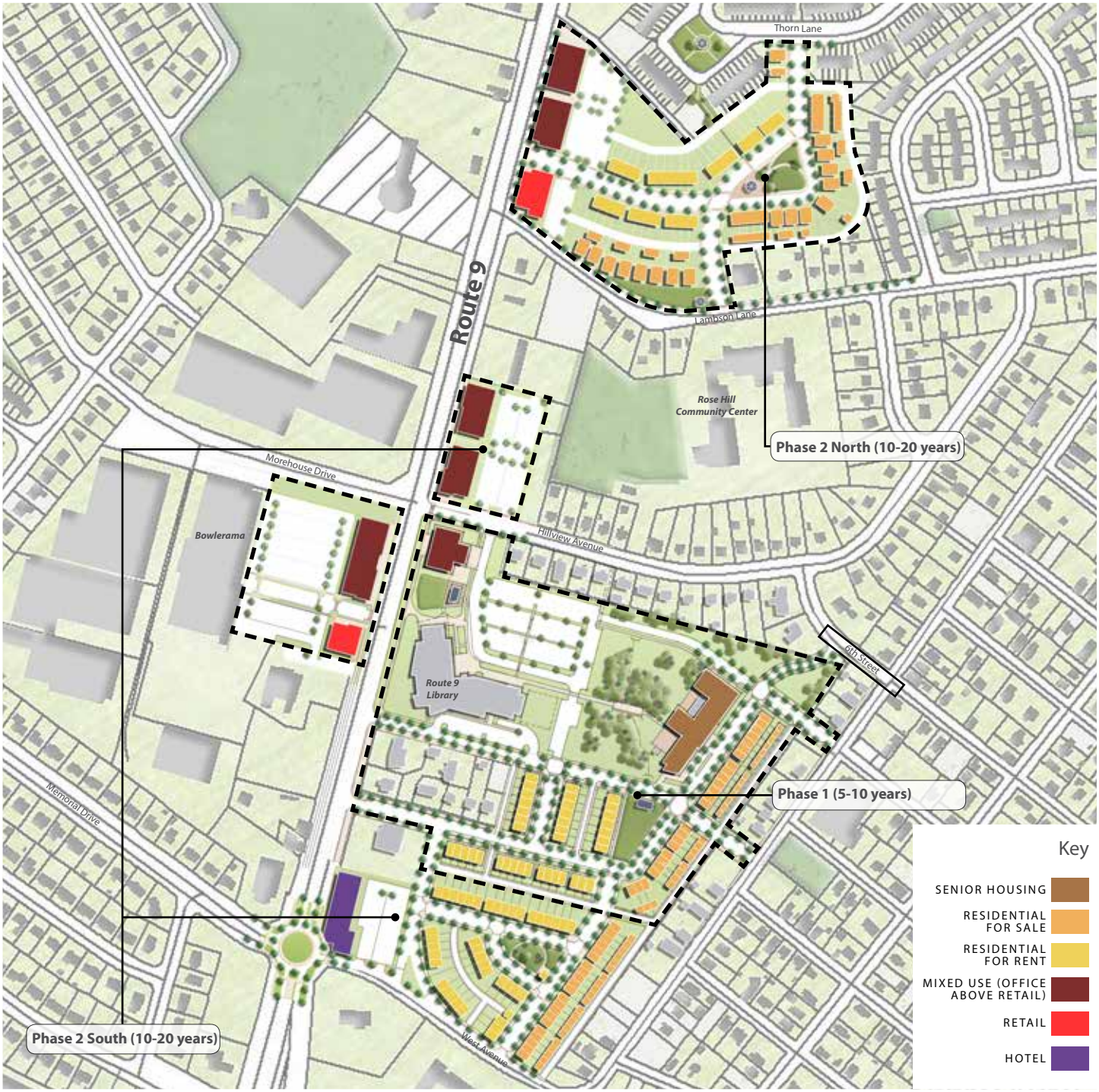
	Uses											Heights	
	Single-Family Detached	Single-Family Attached	Apartments	Senior Housing	Commercial Apartments	Commercial Lodging	Commercial Retail + Service	Mixed Use	Office	Shopping Center	Industrial	*Existing*	*Proposed*
Commercial Regional (CR)	R	R	R	✓	✓	✓	✓	✓	✓	✓	×	50'-180'* max height range by use	65'** max height

HILLVIEW AVENUE: ZONING ASSESSMENT + RECOMMENDATIONS

Center 3's existing zoning consists primarily of Commercial Regional (CR) and Neighborhood Conservation (NC) zoning designations. All priority investment properties (non-residential land within 200' of Route 9) fall under the CR designation.

As requested by the community, Center 3 rezoning should allow for all residential uses and discourage additional industrial. Max height is currently 50'-180' and sufficient for redevelopment (however, it may be more appropriate to reduce the max. height to 65'). All new buildings within 100 feet of single-family residential development will need to meet the requirements in the New Castle County Unified Development Code Section 40.04.110c*.

ILLUSTRATIVE CONCEPT PLAN: SHORT- AND LONG-TERM DEVELOPMENT SUMMARY



PHASE 1 (5-10 YEARS)

- Residential For Sale: 23 townhouses
- Residential Rental: 42 townhouses
- Senior housing: 100+ Units
- Office: 9,000 sf
- Retail: 9,000 sf

PHASE 2 NORTH (10-20 YEARS)

- Residential For Sale: 16 single-family houses 12 townhouses
- Residential Rental: 32 townhouses
- Office: 20,000 sf
- Retail: 29,000 sf

PHASE 2 SOUTH (10-20 YEARS)

- Residential For Sale: 23 townhouses
- Residential Rental: 35 townhouses
- Hotel: 120 keys
- Office: 37,000 sf
- Retail: 43,000 sf

ROUTE 9 AT MEMORIAL DRIVE: ROUNDABOUT DESIGN

Memorial Drive provides a direct connection between Route 9 and Route 13. It is also a key connecting road for neighborhoods to the north and south. Memorial Drive continues east across Route 9, renamed as West Avenue, serving another residential neighborhood.

Memorial Drive is at the edge of one of the Centers, and serves as an internal gateway to the center. It is also the north end connecting point for the multi-use path recommended for the center or Route 9 through the I-295 interchange. The intersection design for Memorial Drive supports the land use district of Commercial Regional that is prominent in Center 3.

The aerial image on the facing page shows the existing signal-controlled intersection, with two or three travel lanes in each direction, including right turn slip lanes for westbound and southbound traffic. Pedestrian islands defining the right turn slip lanes include pedestrian pathways that continue the striped crosswalks across the west and south approaches. There is no pedestrian crossing for the east and north approaches.

The traffic analysis completed for Memorial Drive recognizes the current and 2036 estimates for motor vehicle traffic at the intersection. Based on this, one additional travel lane is needed for the west side.".

The intersection redesign shown on the right converts the available right-of-way to a hybrid single-double lane roundabout. A mountable truck apron provides the turning radii needed for large vehicles (school and transit buses, and trucks). Pedestrian and bicyclists crossing are striped and include center refuge islands. Northbound, southbound, and westbound approaches have two approach lanes; the eastbound approach has one approach lane and one yield-controlled, right-turn "bypass" lane.

During the public workshop in November 2016, several residents of neighborhoods served by Memorial Drive expressed concern about their ability to merge into the roundabout from Memorial Drive due to the amount of motor vehicle traffic flowing southbound through the intersection. Two characteristics of roundabouts have been shown to reduce the likelihood of this occurring. First, roundabout geometry forces motorists to slow down when traveling through them. Slower speeds mean that gaps motorists that are merging into a roundabout need less space. Second, because all traffic is flowing in the same direction, merging into the roundabout requires only looking to the left, not to the left and right.

Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

ROUTE 9 AT MEMORIAL DRIVE: CROSS SECTION

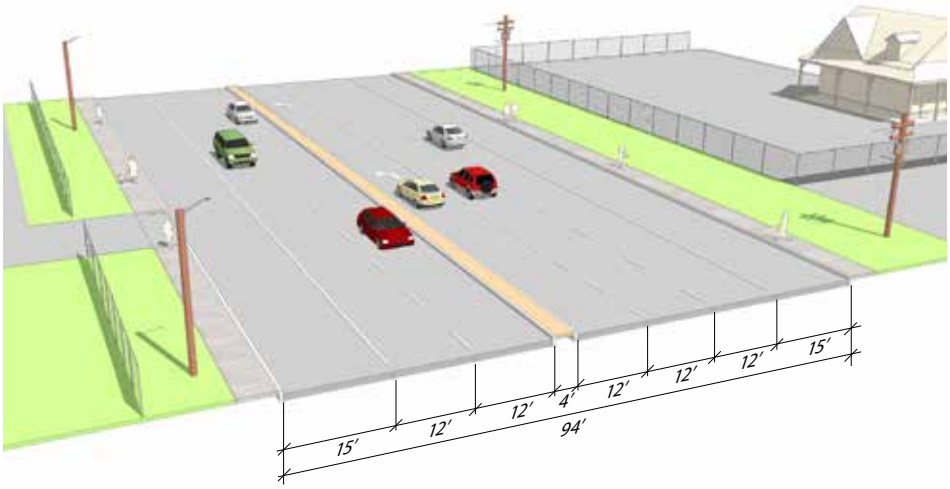
This portion of Route 9 is positioned to serve traffic related to I-295 and Route 13, as well as the commercial, motels, and residential neighborhoods to the east and west. Sidewalks and a wide painted shoulder serve pedestrians and bicyclists, but sidewalks are intermittent along the east side adjacent to one of the corridor's busiest bus stops. The graphic below highlights the existing site conditions.

This portion of Route 9 is located at the southern end of Center 3, which incorporates the new Library and the first phase of redevelopment recommended in this plan. The majority of the area in Center 3 is regional commercial. As such, this portion of Route 9 will better serve anticipated development with sidewalks, a separated bicycle lane, complete access to transit service, and a streetscape that offers aesthetic, environmental and safety benefits. A reallocation of space within the existing right-of-way is recommended.

Estimated traffic volumes for 2036 support reducing the number of motor vehicle travel lanes in both directions, leaving space for sidewalks, a separated bicycle lane, and expanded bus stop facilities. However, community members participating in the project expressed a strong preference for maintaining enough roadway to handle traffic from Route 13 and I-95 when one or both of these roads have major delays.

Three options for a new cross-section of this portion of Route 9 are shown on the facing page. All scenarios are designed to improve safety for all travel modes, while expanding facilities for pedestrians, bicyclists and transit. Moving from Scenario 1 to 2 to 3 adds green infrastructure, additional separation for bicycle lanes, and finally a center multi-use path between Memorial Drive and Cherry Lane. South of the Memorial Drive intersection, Scenario 3 is needed. North of Memorial Drive, Scenario 2 is recommended. Scenario 2 will allow significant diverted or overflow motor vehicle traffic from Route 13 and I-95 to use the separated bicycle lanes.

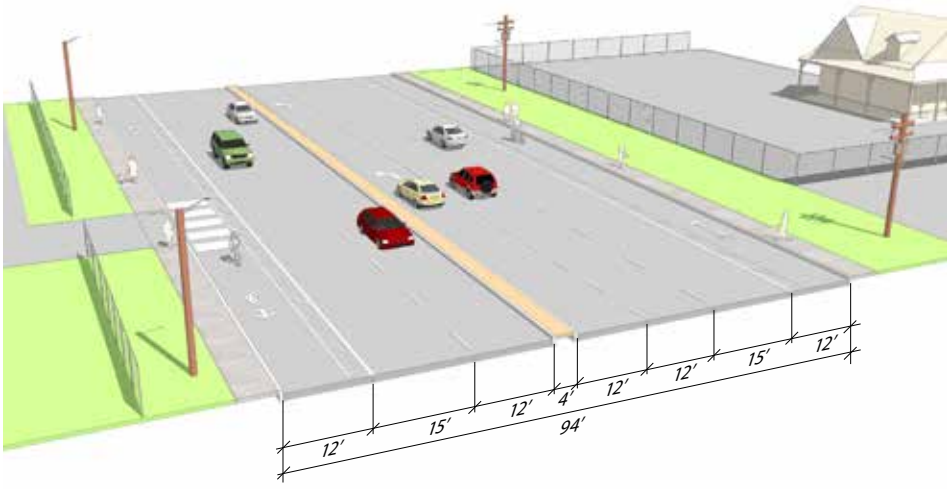
EXISTING SITE CONDITIONS - *South of Memorial Drive Looking North*



KEY FEATURES

- Uncomfortable pedestrian + bicycle environment
- Limited lighting + plantings
- 2 northbound and 2 southbound travel lanes
- Left turn lanes
- Breakdown/ parking shoulder

SCENARIO 1 - *South of Memorial Drive Looking North*

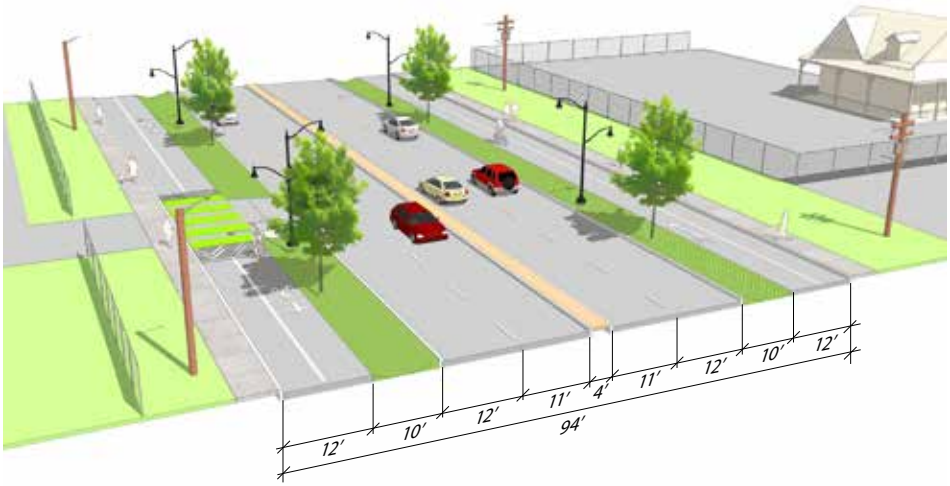


KEY FEATURES

- Buffered bike lanes
- Wide sidewalk at existing obstacles
- 2 northbound and 2 southbound travel lanes
- Left turn lane
- No impacts to existing curb lines, stormwater inlets, or utilities

*Low construction cost

SCENARIO 2 - *South of Memorial Drive Looking North (Preferred)*

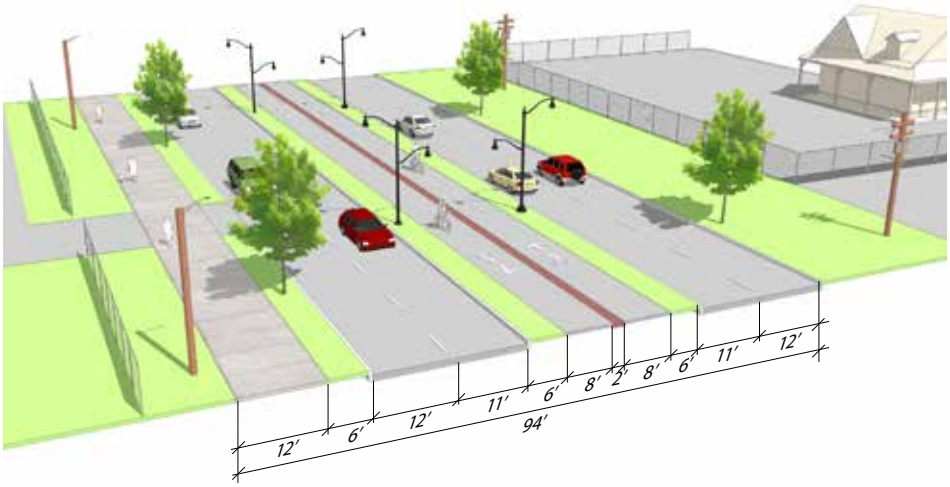


KEY FEATURES

- Separated bike lanes
- Wider sidewalk at existing obstacles
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- 2 northbound and 2 southbound travel lane

*Moderate construction cost

SCENARIO 3 - *South of Memorial Drive Looking North*



KEY FEATURES

- Center multi-use path
- Street and pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- 2 northbound and 2 southbound travel lane

*High construction cost

Note: All intersection cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed.

MEMORIAL DRIVE: ROAD DIET AND SAMPLE INTERSECTION REDESIGN

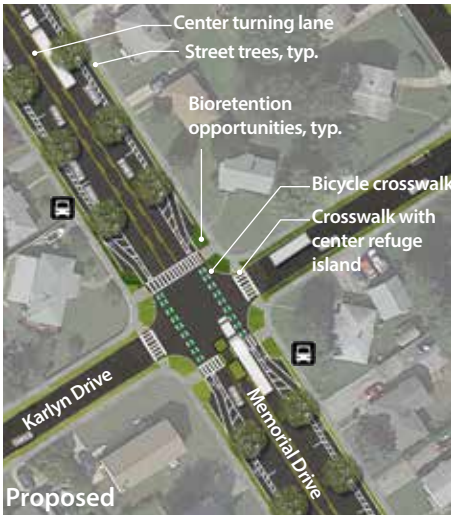
As described earlier, Memorial Drive provides a direct connection between Route 9 and Route 13. It is also a key connecting road for neighborhoods to the north and south. The road appears to have been designed and built to meet motor vehicular traffic demands at its intersections with Route 9 and Route 13. However, typical motor vehicle traffic volumes between these two intersections (especially between Lind Drive on the east end and Karlyn Drive on the west end) does not require the current number of travel lanes. The resulting width from four travel lanes plus 2 parking lanes creates a barrier for residents traveling between the Overview Gardens and Dunleith neighborhoods, and to the Garfield Park Community Center.

Estimated traffic volumes for 2036 support reducing the number of motor vehicle travel lanes in both directions, leaving space for sidewalks, a separated bicycle lane, and expanded bus stop facilities. However, community members participating in the project expressed a strong preference for maintaining enough roadway to handle traffic from Route 13 and I-95 when one or both of these roads have major delays.

Three options for a new cross-section for Memorial Drive are shown on page 79. All scenarios are designed to improve safety for all travel modes, while expanding facilities for pedestrians, bicyclists and transit. Moving from Scenario 1 to 2 to 3 adds green infrastructure, additional separation for bicycle lanes, and replacing the existing center median with a center left turn lane. Each scenario transforms Memorial Drive to a neighborhood-scale street that primarily serves residents and secondarily serves as a connector between the two state routes. Scenario 3 is recommended, as it does the best job of visually and operationally transforming the roadway. The traffic analysis tested Scenario 1 as an 'interim build' and Scenarios 3 as the 'full build'. Based on the analysis, traffic conditions improve in 2036 under Scenario 3; they degrade slightly under Scenario 1. A redesign of the intersection of Memorial Drive and Karlyn Drive (that leads more directly to Garfield Park Community Center) based on Scenario 3 is shown on the facing page. This intersection design would also be used at other intersections, such as at Bizarre and Memorial Drive, where students cross.

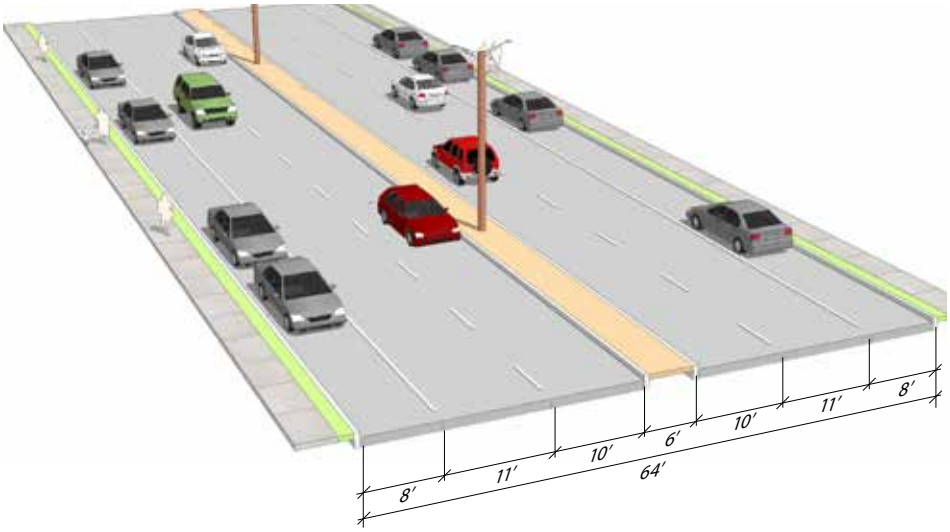
During the second round of public workshops residents of neighborhoods either side of Memorial Drive expressed concerns about how to cross a new bicycle lane. Given the level of change Scenario 3 would make to Memorial Drive, continued community engagement is recommended. For example, a modified Better Block event would allow residents and others using Memorial Drive to experience some of the changes for a day.

See Appendix C. Traffic Analysis for more details of the traffic analysis completed for Memorial Drive. More information on experiential events such as Better Blocks (also called Tactical Urbanism and pop-ups) is available online.



Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

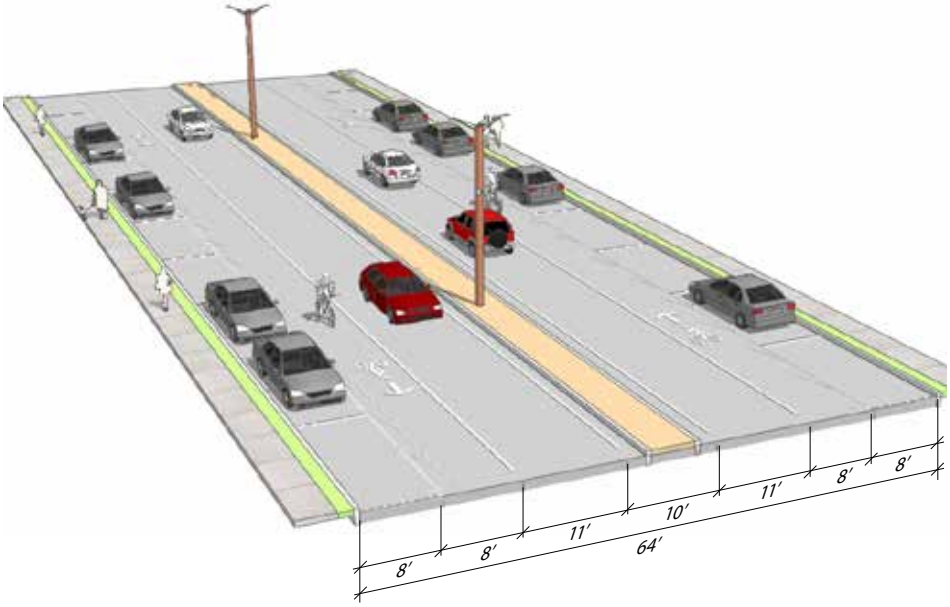
EXISTING SITE CONDITIONS - *South of Karlyn Drive Looking North*



KEY FEATURES

- Uncomfortable pedestrian + bicycle environment
- Limited lighting + plantings
- 2 northbound and 2 southbound travel lanes
- Breakdown/ parking shoulder

SCENARIO 1 - *South of Karlyn Drive Looking North*

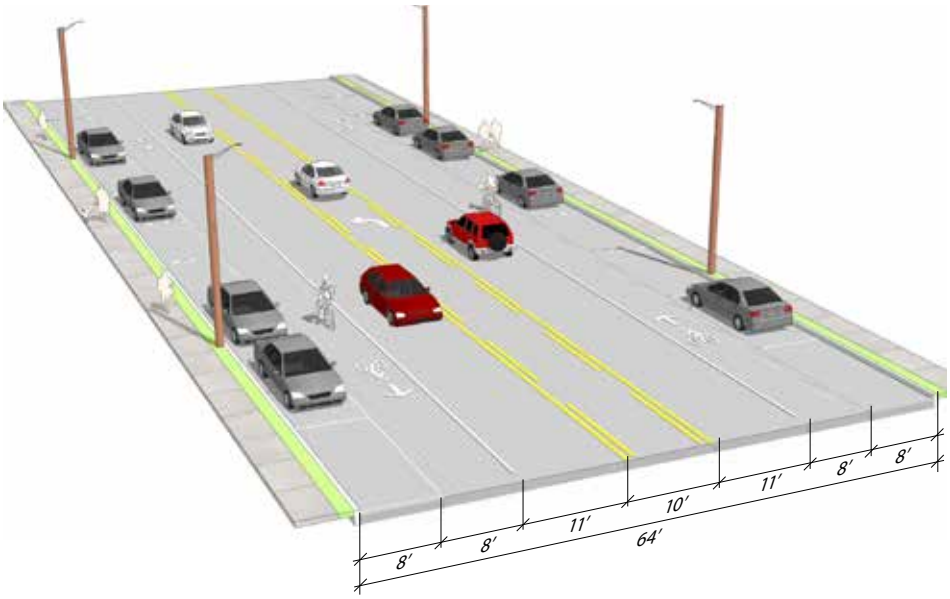


KEY FEATURES

- Bike lanes with parking buffer
- Wide sidewalk at existing obstacles
- Crosswalks with pedestrian refuge islands at key intersections
- 1 northbound and 1 southbound travel lane
- Breakdown/ parking shoulder
- No impacts to existing curb lines, stormwater inlets, or utilities

*Low construction cost

SCENARIO 2 - *South of Karlyn Drive Looking North*

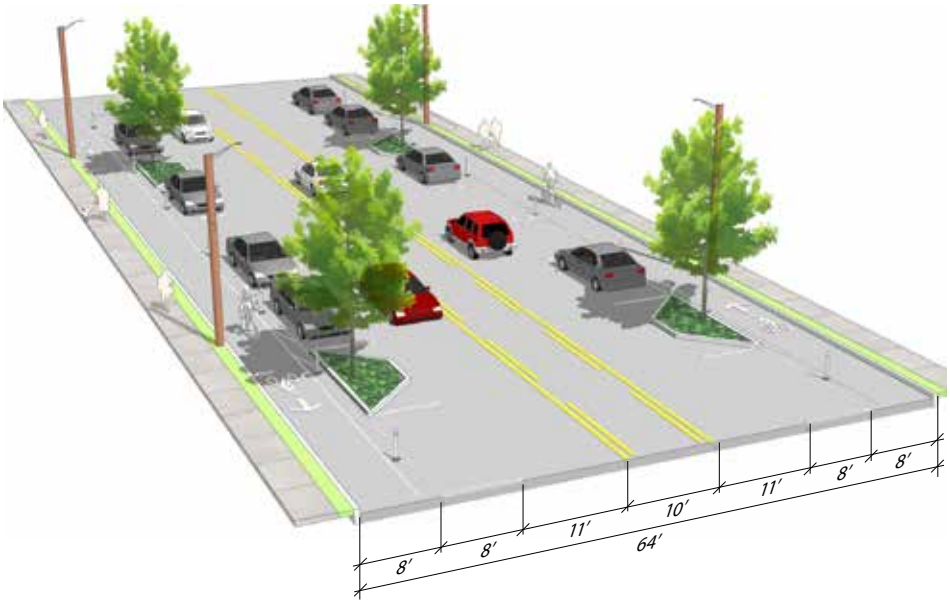


KEY FEATURES

- Bike lanes with parking buffer
- Wider sidewalk at existing obstacles
- Crosswalks with pedestrian refuge island at key intersections
- Street tree planting
- 1 northbound and 1 southbound travel lane
- Center turn lane
- Breakdown/ parking shoulder

*Moderate construction cost

SCENARIO 3 - *South of Karlyn Drive Looking North (Preferred)*



KEY FEATURES

- Bike lanes with parking buffer
- Wider sidewalk at existing obstacles
- Crosswalks with pedestrian refuge island at key intersections
- Street tree planting
- 1 northbound and 1 southbound travel lane
- Center turn lane
- Breakdown/ parking shoulder

*High construction cost

Note: All intersection cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed.

I-295 INTERCHANGE

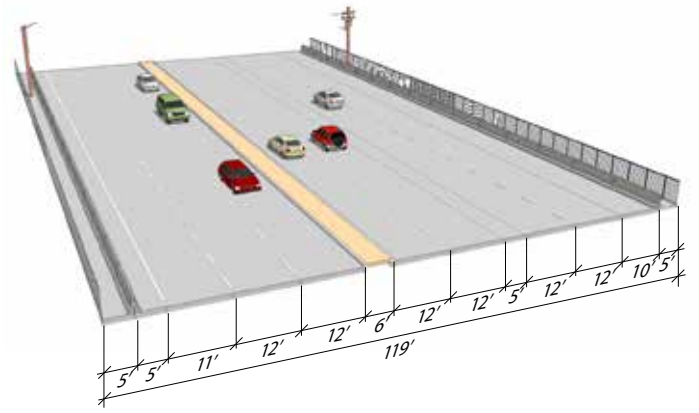
The most noticeable feature of this portion of Route 9 are the 10 ramps related to I-295 and associated access roads. While there are sidewalks along both sides of Route 9 in this portion as well as crossings at all the ramps, concerns for pedestrian safety are high, given the typical speeds at which motorists travel on ramps to and from highways such as I-295. Additionally, there are neither pedestrian warning signs nor marked crosswalks on the ramps at the point where people would be walking.

An innovative solution is to create a multi-use path down the center of the roadway between Memorial Drive and Cherry Lane. The recommendation captures the proposed redesign of Memorial Drive as a roundabout and recommends the same for Cherry Lane. The multi-use path would shift motor vehicle travel lanes outward, without the need to modify the bridge structure. Pedestrians and bicyclists would access the path from the crosswalk at the south end of the Memorial Drive roundabout and the north end of the Cherry Lane roundabout. A similar path operates along a corridor in Los Angeles, as shown below.

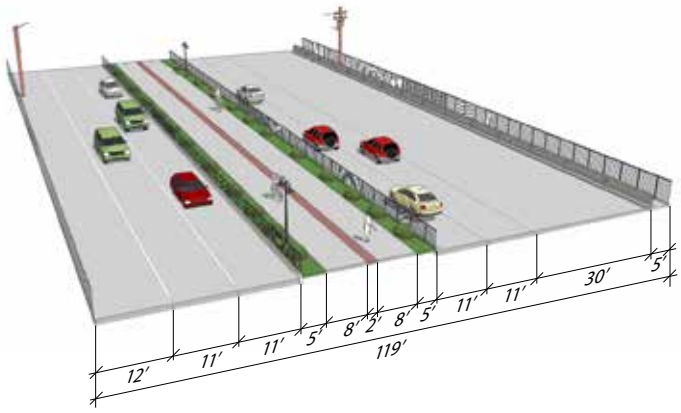
Estimated traffic volumes for 2036 support both of the roundabouts as well as the center multi-use path, with additional lanes in the roundabout, decelerations lanes, and by-lanes are included in the design, as shown on the table below.

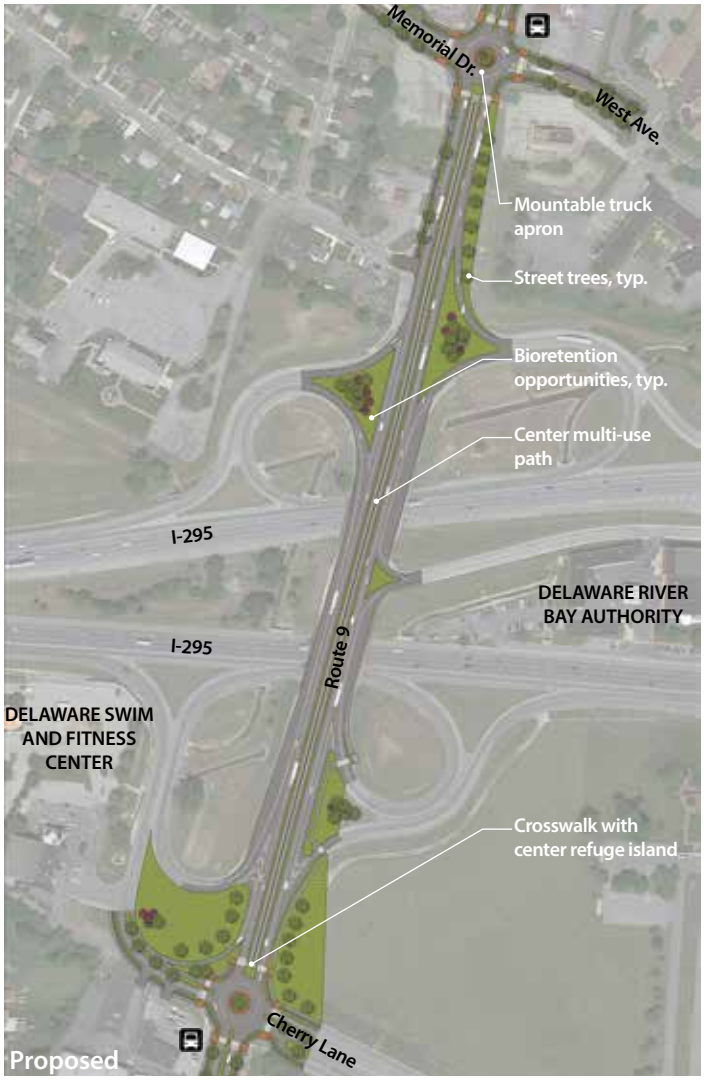
MEMORIAL DRIVE	I-295	CHERRY LANE
• Hybrid single/double lane roundabout • Northbound, southbound, and westbound approaches have two approach lanes • Eastbound approach has one approach lane and one yield-controlled, right-turn "bypass" lane	• Northbound and southbound each have one travel lane and one deceleration lane between on- and off-ramps	• Hybrid single/double lane roundabout • Northbound, southbound, and eastbound approaches each have two approach lanes • Westbound approach has one approach lane and one free-flowing, right-turn "bypass" lane

EXISTING SITE CONDITIONS -
On Bridge over I-295 Looking North



PROPOSED RECOMMENDATIONS -
On Bridge over I-295 Looking North





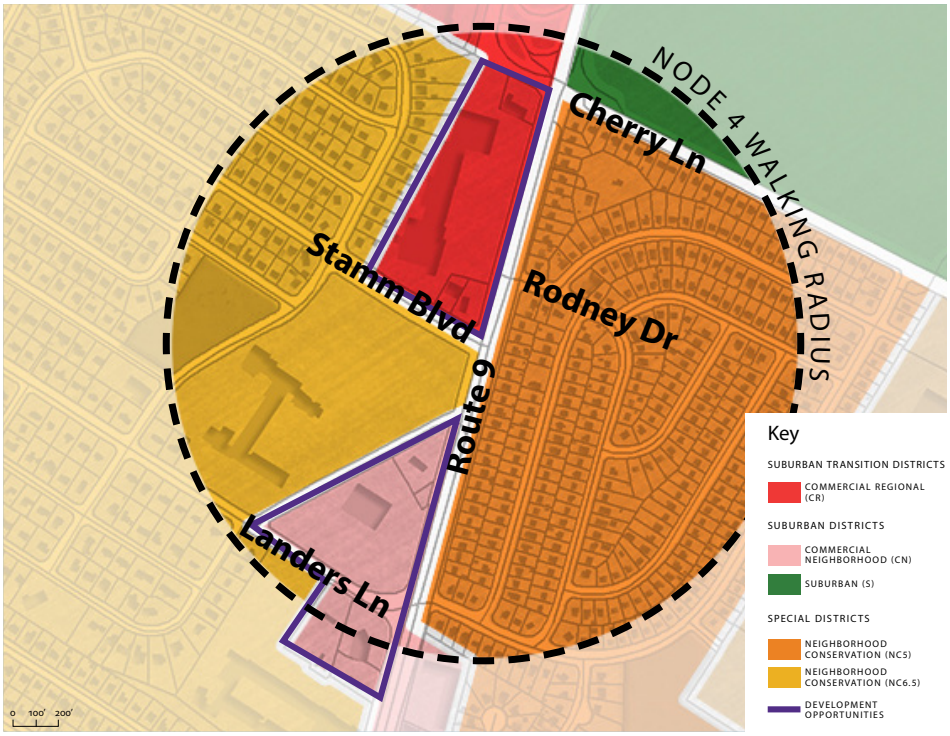
Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans and cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

CENTER 4: STAMM BOULEVARD

Center 4 is situated at the intersection of Stamm Boulevard and Route 9 just south of Interstate 295. In this area, a mix of commercial, institutional, and single-family detached homes front Route 9. The neighborhoods of Collins Park and Swanwyck Gardens are established communities immediately adjacent to this segment of the corridor. The Crossroads Plaza and New Castle Plaza shopping centers, the CVS, and the RiteAid are fairly new and primarily surface parked. These specific parcels provide the opportunity for future redevelopment that better utilizes the land and addresses new buildings along Route 9.

The vision for Center 4 builds off of the existing conditions, creating a stronger, more cohesive main street strategy that encourages buildings to front closer to the street and adds pedestrian access adjacent to and across Route 9. Future building forms should respect the scale and character of the surrounding neighborhoods. Similar, neighborhood-serving retail should remain to support the needs of adjacent institutions and residents. Additional mixed-use development should be incorporated to build off of the existing retail and provide added amenities and residential options.

Locator Map



Key
✓ = Permitted Use per New Castle County Zoning
× = Prohibited Use per New Castle County Zoning
R = Recommended Zoning Change for Permitted Use
R = Recommended Zoning Change for Prohibited Use

	Uses											Heights	
	Single-Family Detached	Single-Family Attached	Apartments	Senior Housing	Commercial Apartments	Commercial Lodging	Commercial Retail + Service	Mixed Use	Office	Shopping Center	Industrial	*Existing*	*Proposed*
Commercial Regional (CR)	R	R	R	✓	✓	✓	✓	✓	✓	✓	×	50'-180'* max height range by use	65'** max height
Commercial Neighborhood (CN)	R	R	R	✓	✓	✓	✓	✓	✓	✓	×	35' max height	65'** max height

STAMM BOULEVARD: ZONING ASSESSMENT + RECOMMENDATIONS

Center 4's existing zoning consists of Commercial Regional (CR), Commercial Neighborhood (CN), and Neighborhood Conservation (NC) zoning designations. The priority investment properties (non-residential land within 200' of Route 9) fall under the CR and CN designations.

As requested by the community, Center 4 rezoning should allow for all residential uses and discourage industrial. The current max height ranges should be 65' along the corridor to provide sufficient mixed-use redevelopment opportunities. All new buildings within 100 feet of single-family residential development will need to meet the requirements in the New Castle County Unified Development Code Section 40.04.110c*.

STAMM BOULEVARD: INTERSECTION DESIGN

Stamm Boulevard is the primary connection to Route 9 from the west for neighborhoods between I-295 and Landers Lane. Stamm Boulevard does not continue across Route 9 to the neighborhoods to the east. It is in the middle of the southern-most center, Center 4, and as such serves as a gateway to the study area for people traveling north from New Castle. The intersection design for Stamm Boulevard supports the land use district of Neighborhood Conservation to the east of Route 9 and the Commercial Regional and Neighborhood Conservation districts north and south of Stamm Boulevard, respectively.

The photo below on the left shows the existing signal-controlled intersection, with multiple travel lanes, a dedicated left turn lane from northbound Route 9, and a frontage road traveling south of Stamm that begins just before Route 9. There are no sidewalks or pedestrian crossings on Route 9 or Stamm Boulevard, in spite of the school to the south and commercial buildings to the north. Access to the frontage adjacent to the east side of Route 9 is from Rodney Drive to the north or Riverview Drive to the south, forcing either a right or left turn onto Route 9 from Stamm Boulevard.

The intersection redesign shown below on the right converts the available right-of-way to a space that provides pedestrians, bicyclists, transit riders, and motor vehicles space to travel efficiently and safely. Included in this are pedestrian connections from the eastside frontage road across Route 9. While the intersection has more green space than others along Route 9, unneeded impervious pavement is converted to green space that provides separation between the sidewalk and bicycle and motor vehicle travel lanes. The traffic analysis was not completed for this intersection independent of the overall analysis of current and 2036 traffic volumes. Further traffic analysis is needed to determine the impact of reducing Kiloran Drive to one northbound lane and using the west side connection between Stamm Boulevard and West Market Place as part of the bike lane and as a pedestrian walkway.

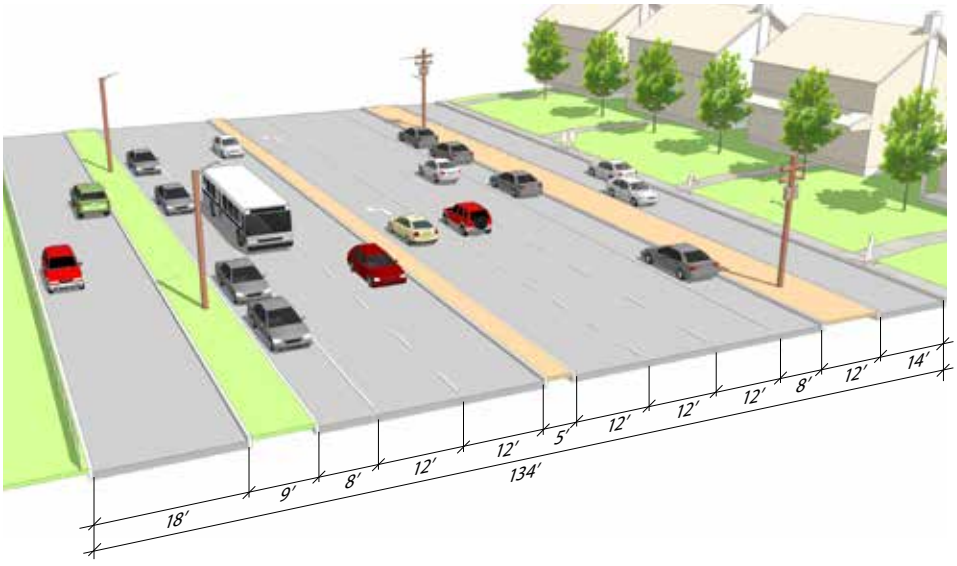
Note: DelDOT's roadway maintenance program does not include street trees, so there would need to be a maintenance agreement with a non-DelDOT entity. All intersection concept plans are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed, including modifications to match the intersection plans with the preferred cross-section.

ROUTE 9 AT STAMM BOULEVARD: CROSS SECTION

This portion of Route 9 is expected to support primarily residential neighborhoods and the existing commercial node, such as the Crossroads Plaza, gas station and nearby drug store. The current condition of an incomplete pedestrian network and lack of bicycle facilities, as shown in the diagram below of existing site conditions, suggests that a reallocation of space within the existing right-of-way is needed to support the future land uses in Center 4.

Estimated traffic volumes for 2036 support one travel lane and one turn lane in each direction, leaving space for sidewalks, a separated bicycle lane, and expanded bus stop facilities. Three options for this re-allocation are shown on page 85. All scenarios are designed to improve safety for all travel modes, while expanding facilities for pedestrians, bicyclists and transit. Moving from Scenario 1 to 2 to 3 adds green infrastructure, additional separation for bicycle lanes, and finally an expanded bus stop. Given the recommendation for Center 4 to be predominately residential with a small amount of commercial, Scenario 3 is recommended for this portion of Route 9 between Stamm Boulevard and Landers Lane, the end of the study area. While this scenario has the highest construction cost, the benefit to the adjacent communities may be worth the investment. A localized traffic analysis of the redesigns included in this report is recommended to determine their impact.

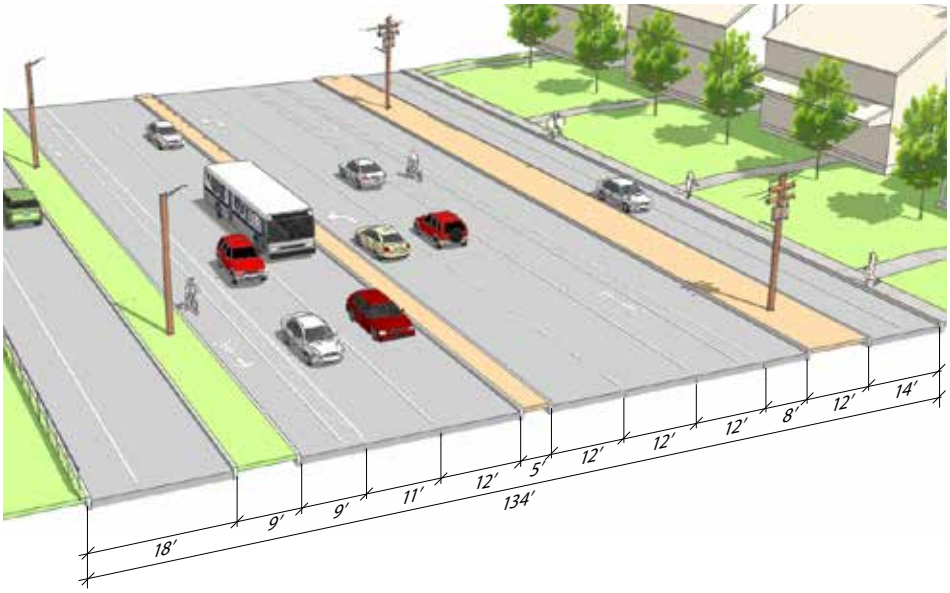
EXISTING SITE CONDITIONS - *South of Stamm Boulevard Looking North*



KEY FEATURES

- Uncomfortable pedestrian + bicycle environment
- Limited lighting + plantings
- Sidewalk on east side of Route 9
- Obstacles in sidewalk
- 2 northbound and 2 southbound travel lanes
- Left turn lane, northbound
- Breakdown/ parking shoulder
- Service road

SCENARIO 1 - *South of Stamm Boulevard Looking North*



KEY FEATURES

- Buffered bike lanes
- 1 northbound and 2 southbound travel lanes
- Left turn lane, northbound
- Breakdown/ parking shoulder
- No impacts to existing curb lines, stormwater inlets, or utilities

*Low construction cost

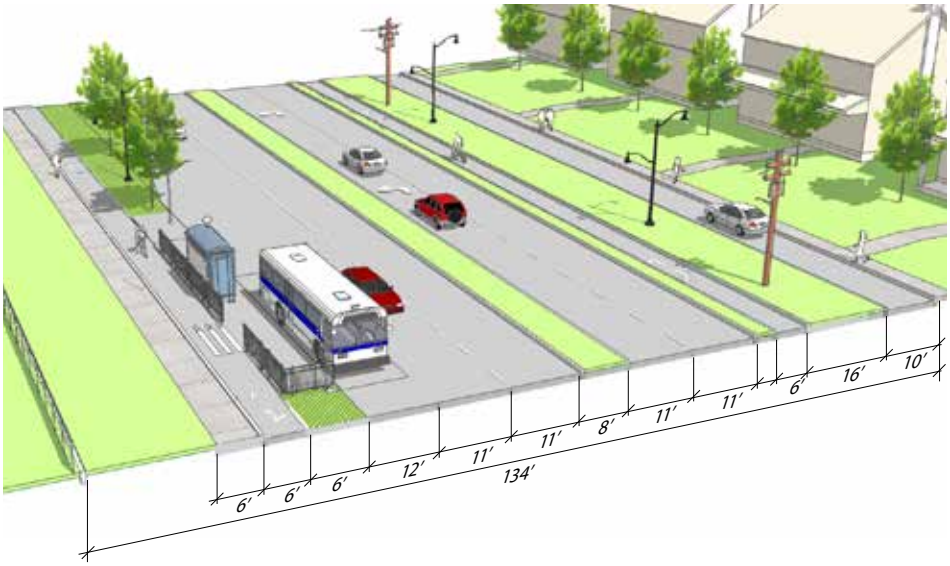
SCENARIO 2 - *South of Stamm Boulevard Looking North*

KEY FEATURES

- Separated bike lanes
- Bioretention opportunities to reduce storm water impacts
- Street tree planting
- 1 northbound and 2 southbound travel lanes
- Left turn lane, northbound

*Moderate construction cost

SCENARIO 3 - *South of Stamm Boulevard Looking North (Preferred)*



KEY FEATURES

- Separated bike lanes
- Wider sidewalk
- New sidewalk on west side of Route 9
- Street + pedestrian lighting
- Bioretention opportunities to reduce storm water impacts
- Street tree planting + screening
- Street-side bus shelter with lighting
- Designated bus pull-in
- 1 northbound and 1 southbound travel lane
- Left turn lane, northbound

*High construction cost

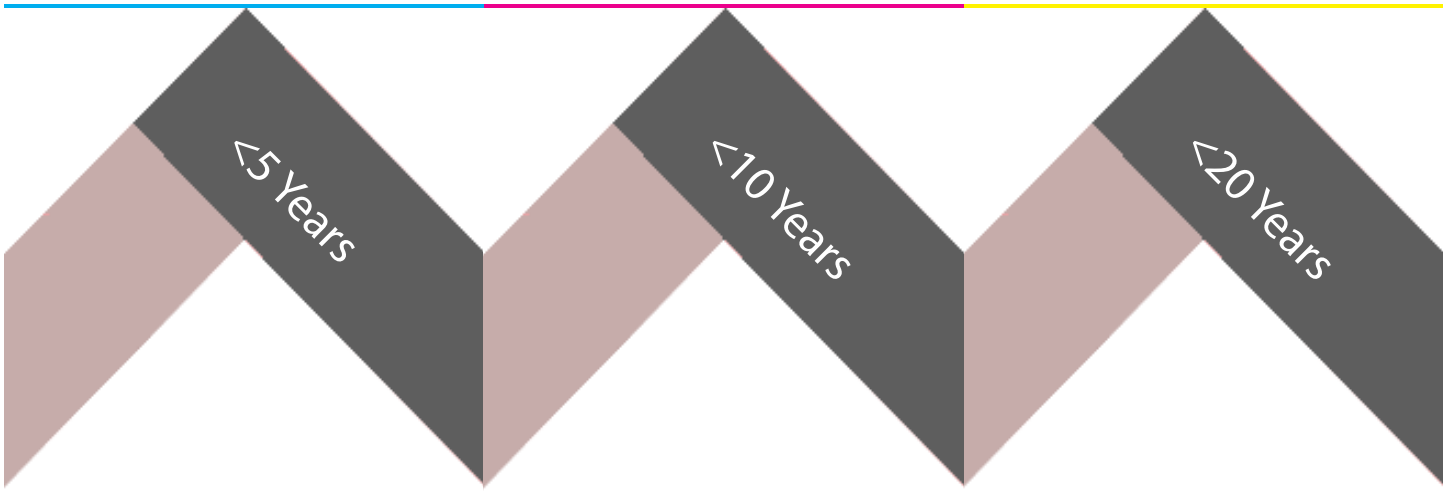
Note: Further traffic analysis is needed to better understand how Kiloran Drive (to the west) and the service roadway (to the east) are used. All intersection cross-sections are conceptual designs based on initial field work. When each project proceeds to the next step of 30% design, more intensive field work would be needed.

NEXT STEPS
Implementation

A wide-range of recommendations were made throughout the development of the Route 9 Corridor Master Plan. These suggestions provide a 20-year guide for redevelopment and transportation investment along the Route 9 corridor with the hope that additional studies, designations, grants, and projects will emerge along the way. It must be stressed that funding has not yet been set aside to complete these recommendations. However, New Castle County (in the case of zoning recommendations) and mostly DelDOT (in the case of transportation recommendations) are committed to studying the recommendations further (where necessary) and leading the implementation of these ideas in the future. In the meantime, WILMAPCO will add the transportation recommendations to the Regional Transportation Plan for added leverage. Community members, stakeholders, and interested organizations are also encouraged to make their support known to elected officials and relevant agencies to help ensure that the recommendations are not forgotten, are properly funded, and appropriately implemented.

The land use and transportation recommendations within this document fall into three time periods: short-term (less than five years), mid-term (less than 10 years), and long-term (less than 20 years). The graphics below visually organize the recommendations by time period and the tables outline specific next steps associated with each recommendation. In most cases, we expect these recommendations to proceed independently of one another through separate initiatives.

MAJOR ZONING RECOMMENDATIONS

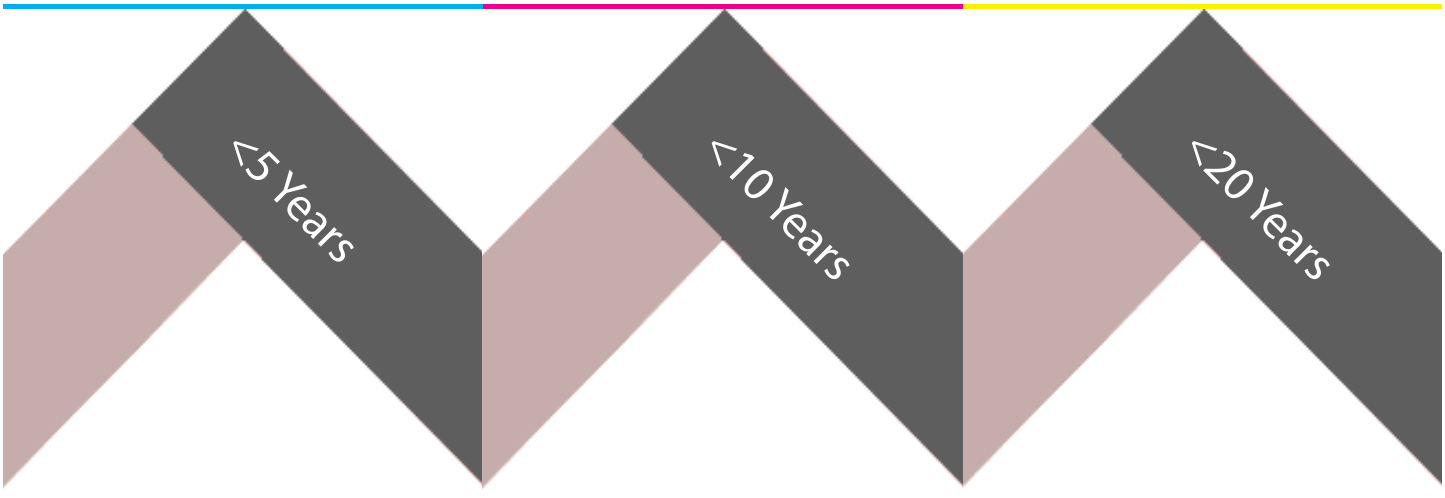


- Community buyout desirability study
- Mechanisms for fair community relocation study
- Rezone away from industrial at and south of Rogers Road
- Allow for mixed use at and south of Rogers Road
- Encourage development into Center 3
  - Pursue Downtown Development District
  - Attract retail catalyst
  - New housing/office and retail
- Integrate study into the next County Comprehensive Plan/ pursue legal acceptance
- Revise Unified Development Code to support Plan

- Complete community relocations (if desired)
- Rezone Hamilton Park to commercial, institutional, or open space
- Rezone Eden Park to industrial or open spac
- Pursue Economic Empowerment District overlay for now separated industrial

- Complete freight transportation network extensions
- Pigeon Point Road Extended
- Garasches Road Extended

MAJOR TRANSPORTATION RECOMMENDATIONS



- Pursue and refocus TAP funding to implement some bicycling/ walking recommendations in Centers
- Pursue SRTS funding to implement some bicycling/walking recommendations around schools; provide bicycle safety training
- for kids
- Consider designation of a Complete Community Enterprise District and/or Transporation Improvement District
- Consider special lighting and landscaping district
- Install missing sidewalk and add bike markings with road repaving projects
- Consider interim road diet on Memorial Drive
- Begin neighborhood pathway network w/wayfinding
- Legal review of failed illegal truck movement cases
- Install comprehensive truck signage; study futher proposed freight network extensions

- Begin road diet on Route 9 with feasiblity studies, intersection rebuilds, then lane reductions
- Establish streetscape maintenance program
- Complete full road diet on Memorial Drive
- Complete old diesel engine replacements around port
- Construct port truck parking facility to reduce idling

- Complete Route 9 road diet
- Complete neighborhood pathway network
- Complete freight transportation network extensions

Zoning Recommendations	Page	Recommendation	Responsibility	Next Steps
1.	56	If community support is achieved, relocate the Hamilton Park and Eden Park Gardens neighborhoods. Rezone Eden Park Gardens to open space or light industrial. Rezone Hamilton Park to commercial, office, institutional or open space.	New Castle County	Conduct a study which assesses the feelings and needs of residents and property owners impacted by the relocation. The University of Delaware is interested in conducting this work. Only pursue the relocations if a majority of residents in one or the other neighborhoods support the initiative. Study and determine the best mechanisms by which relocations could be pursued efficiently and fairly. Rezone the Eden Park neighborhood as industrial only after residents of both the Eden Park and Hamilton Park neighborhoods are relocated. It may be rezoned as open space or another nonindustrial use if the Hamilton Park neighborhood remains. If the Hamilton Park neighborhood is relocated first, it may be rezoned as a nonindustrial use prior to the relocation of Eden Park residents. Consider the establishment of an Economic Development District, or similar mechanisms, in this area to support the repositioned industry, and port expansion. Relevant sections of the plan should be incorporated directly into the next County Comprehensive Plan update, particularly those regarding land use form/design. Pursue other necessary legal mechanisms to implement study.
2.	56	Promote mixed-use and mixed income residential and commercial development at and south of Rogers Road. Rezone existing industrial parcels to disenfranchise them by preventing future industrial expansion or development.	New Castle County	Adjust zoning in Centers 2, 3, and 4 to allow for mixed-use development as described in this plan. Rezone industrial parcels within Centers 2, 3, and 4 for nonindustrial mixed-use development. Existing industrial businesses will remain, but should not

				be allowed to change hands or otherwise redevelop as industries. Center 3, around the Innovation District, should receive priority in the near-term. Consider reapplying for the Downtown Development District program, a Complete Community Enterprise District, or similar mechanisms, to support livable growth here and elsewhere. Encourage housing, office, and retail growth as described in the Plan. Relevant sections of the plan should be incorporated directly into the next County Comprehensive Plan update, particularly those regarding land use form/design. Pursue other necessary legal mechanisms to implement study. The next Unified Development Code update should consider revisions that would better support mixed-use development, proactive rezoning, and element density bonuses.

Pedestrian + Bicycle Recommendations	Page	Recommendation	Responsibility	Next Steps
1, 2, 3, 4, 7, 11	58	Complete the sidewalk network installing sidewalks where missing and ensuring sidewalk access to all bus stops. Repair, widen, clean, etc., all existing sidewalks to ensure ADA compliance and overall usability. Install one curb ramp in each direction of travel; ramps should be wider than the minimum width required in order to provide capacity for increases in pedestrian and bicycle traffic. Stripe all pedestrian crossings at intersections. Install pedestrian-scale lighting, street trees, benches, and other street scape elements, where appropriate. Installing wide bicycle lanes or separated bicycle lanes on Route 9 and Memorial Drive.	DelDOT/New Castle County/WILMAPCO	Per the State's "Complete Streets Policy" new and better ADA-compliant sidewalk and bicycle markings should be added along state-maintained routes during roadway repaving projects. Major, multimodal roadway projects move through state's capital program. DelDOT, as appropriate, should install marked crosswalks during projects along Route 9, Memorial Drive, or other state maintained routes in the study area. WILMAPCO and DelDOT should engage area elementary and middle schools to begin Safe Routes to School programs. Urban Bike Project, though WILMAPCO, should engage with area community centers and schools to teach safe bicycling habits to children. New Castle County should continue to pursue Transportation Alternatives Program (TAP) funding to add key segments of sidewalk and other pedestrian and bicycle amenities.
5	58	Install the center multi-use trail recommended between Memorial Drive and Cherry Lane.	DelDOT	DelDOT must set aside funding in the capital program to fund this initiative. It must proceed with the construction of roundabouts at Cherry Lane and Memorial Drive.
6	58	Establish a procedure for determining the appropriate location of mid-block pedestrian crossings and guidelines for these crossings.	DelDOT	DelDOT should examine the potential of adding midblock crossing opportunities, but only after road diets are implemented.
8	58	Ensure all bus stops are ADA compliant and are equipped with a bus shelter, light, service information, and a trash/recycling receptacle.	DART	DART should closely examine the bus stops in study area for improvements, particularly those within our identified Centers and those with high documented ridership.

9	58	Establish a regular program to maintain sidewalks, streetscaping, bus stops, and intersections.	Variety	The State should continue to follow its procedures for maintenance. New Castle County and/or a local community group or a developer should help maintain streetscaping, such as street trees. Concurrently or alternatively, New Castle County should consider a special lighting and landscaping district provide funds for maintenance and oversight of enhanced streetscape elements called for in this Plan.
10, 13, 14, 15	58	Work with private property owners to create and formalize pedestrian pathways and public access easements. Identify and build connections between neighborhoods, leveraging the existing system of neighborhood parks. Ensure these connections are well-lit and offer current best practice safety features. Build a small off-road connection across I-295 between Wildel Avenue and Landers Lane.	New Castle County	New Castle County should work with property owners and developers to build a nonmotorized pathway network, as envisioned in this Plan. Building off the success of the tri-park path project, New Castle County should take the lead in organizing the implementation of the neighborhood pedestrian and bicycle connections identified in this Plan and the Route 9 and Garfield Park Walkable Community Workshop Reports. Connections between neighborhoods will require the strategic purchase of land and/or properties which can be then be converted into use as a connecting pathway.
12	58	Install bicycle parking at bus stops and key civic locations, such as the new Library and Innovation Campus.	DART/New Castle County	DART should examine the potential for the addition of bicycle parking at busy bus stops, if it does not already exist at a location nearby. New Castle County should require that new developments and redevelopments include bicycle parking and should add bicycle parking at key existing locations where it does not already exist.
16		Develop a way-finding system to inform and direct people walking and bicycling about their route options.	New Castle County/DelDOT	New Castle County should ensure that a comprehensive signage system is in place to navigate the network of existing and future paths off of and connecting to state maintained routes. DelDOT should ensure that state maintained routes, such as Route 9 and Memorial Drive, have comprehensive walking and bicycling awareness and directional signage.

Traffic + Truck Recommendations	Page	Recommendation	Responsibility	Next Steps
1	62	Implement road diets on both Route 9 and Memorial Drive, at times removing one vehicle travel lane in each direction to reduce speeds, improve safety, and improve pedestrian and bicycle networks.	DelDOT/New Castle County	DelDOT must set aside funding in the capital program to fund these initiatives. It is possible that the diets on Route 9 and Memorial Drive can move separately as projects. We studied the implementation of an interim, low-cost road diet (scenario 1) on Memorial Drive that DelDOT could implement with the next repaving project. If this is pursued, we still recommend further public outreach as some parking spots must be removed with the interim diet, and we predict that some intersections will worsen within 20 years. The optimal road diet (scenario 3) with the center turn lane is recommended in the 20-year timeframe. This design will not only preserve parking and improve traffic conditions, but it will also vastly improve conditions for walkers and cyclists. New Castle County, in coordination with DelDOT, should strongly consider the designation of a Complete Communities Enterprise District along the Route 9 Corridor, at and south of Rogers Road. This will help spur mixed-use development and give greater priority to transportation projects in the corridor. New Castle County, in coordination with DelDOT, should also strongly consider the designation of a Transportation Improvement District over a wider swath of the corridor. This would help channel transportation investments into the study area.

3, 6	62	Comprehensively and consistently sign, both on the street and electronically, roads which are closed to trucks not making local residential deliveries. General education, outreach, and enforcement to ensure truck use of designated roadways and facilities and reduce truck use on restricted residential streets.	DelDOT/New Castle County	DelDOT should coordinate with appropriate state and federal agencies to eliminate illegal truck trips on residential streets. The long-term recommendations in this plan will work to do this, but short-term measures, such as improved signage, as well as education and enforcement, can be taken as well. DelDOT should coordinate a review of previous failed legal cases brought against local truck companies charged with violating road restrictions. This work should inform the appropriate adjustments that need to be made to help make future cases more compelling. Following the legal review/implementation of adjustments to signage: DelDOT should ensure that comprehensive truck signage exists within the corridor. Trucks should have an early warning that they are about to enter a road restricted to them. DelDOT should provide outreach to area truck-generating businesses regarding the existing restrictions in place. New Castle County should ensure that roads restricted to trucks appear restricted on truck-based GPS systems. New Castle County should coordinate with the State Police to enforce the truck restrictions.
4	62	Additional roadways to provide more direct access for trucks to the Port of Wilmington from I-295 and I-495. - Pigeon Point Road extension south to Buttonwood Avenue - Interchange between I-295 and Pigeon Point Road.	DelDOT	These initiatives require further closer examination by DelDOT. The Pigeon Point Road extension and interchange with I-295 faces challenges related to environmental constraints and the presence of a freight rail line. A close survey of this area is needed, including

		- Connection between Garasches Lane and the Terminal Avenue (to get to the Port)		the activity on that rail line. It may be that the best option here is the conversion of the rail line to a roadway. Regarding Garasches Lane, DelDOT should closely coordinate with the City of Wilmington and New Castle County to uncover the optimal location for the extension of this road. DelDOT must set aside funding in the capital program to fund these initiatives.
5	62	Overnight parking for Port-related trucks with electricity	Variety	This project was a major recommendation from WILMAPCO's 2013 Port Parking Study. Implementation of the initiative would benefit the Port and the surrounding community. A private developer or various agencies could lead this effort including – the Port of Wilmington, DelDOT, New Castle County, or the City of Wilmington.
7	62	Create an inventory of diesel vehicles and equipment at the Port of Wilmington and surrounding businesses. Utilize this inventory to inform environmental grant applications to replace old engines which emit significant levels of fine particulates.	DNREC	DNREC should continue to build an inventory of area diesel vehicles and equipment to and seek to replace old diesel engines. DNREC, working with the community, should also continue to study air quality in the corridor, and its impacts on public health and welfare.

APPENDICES

APPENDIX A.
Site Diagrams

As discussed in the Map Analysis section, the following link provides the full set of existing site diagrams conducted by WILMAPCO. They provide a general overview of existing conditions and facilitated conversations regarding future improvements.

» Task 1 Map Series: http://www.wilmapco.org/Rt_9/Route9_Task1.pdf

APPENDIX B.
Market Analysis

As discussed in the Market Analysis section of the document, the following link provides the full Market Analysis Memorandum conducted by RCLCO.

» Real Estate Market Analysis of the Route 9 Corridor Study:
http://www.wilmapco.org/Rt_9/Meetings/RT9_market_memo_Sept2016.pdf

APPENDIX C.
Traffic Analysis

ROUTE 9 TRAFFIC ANALYSIS: MEMORANDUM

Route 9 is a Minor Arterial roadway in New Castle County that connects Dover, DE to Wilmington, DE and provides truck access to the Wilmington Port Facility. It carried an average daily traffic (ADT) volume of 12,000-17,000 vehicles per day in 2015. This memo presents an assessment of existing and future traffic conditions along Route 9 between D Street to the north and Landers Lane to the south. Currently, this segment of Route 9 is comprised of two through lanes in each direction with additional storage lanes for left and right turns at intersections. The study area includes 15 unsignalized/signalized intersections and a cloverleaf interchange with I-295.

Route 9, a heavily used truck route, is primarily designed for vehicles with no dedicated bicycle facilities and frequent gaps in the narrow sidewalk. Most intersections do not have marked crosswalks and not all legs of the intersection have marked crosswalks. This project evaluates reallocating right-of-way along Route 9 for the construction of improved sidewalks, planted medians, separated bike lanes, and other infrastructure changes to transform Route 9 into a thriving multimodal corridor.

CONCEPT

Route 9 will undergo a road diet which reduces the corridor by one travel lane in each direction. Traffic signals at Terminal Avenue, Memorial Drive, and Cherry Avenue will be replaced with roundabouts. Further refinements to proposed lane configurations at critical intersections (Intersection #3, #5, #10, #11, #16 and #17), including more detail on the roundabout lane configurations, are summarized below. At all remaining intersections, one through lane will be removed in each direction and left-turn lanes will be maintained. (Note: Intersection numbers #1-11 and #16-19 are used for the SYNCHRO analysis. Intersections #12-15 were intentionally omitted.)

Terminal Avenue (Int. #3)

- Single lane roundabout with one lane on each approach

Rogers Road/Sutton Lane (Int. #5)

- Skewed intersection replaced with two offset T-intersections
- Rogers Road maintains a traffic signal
- Removed right turn channelization on Rogers Road (i.e. eastbound) approach
- Sutton Lane converted to stop-controlled

Memorial Drive (Int. #10)

- Hybrid single/double lane roundabout
- Northbound, southbound, and westbound approaches have two approach lanes
- Eastbound approach has one approach lane and one yield-controlled, right-turn “bypass” lane

Halcyon Drive (Int. #11)

- Halcyon Drive (i.e. eastbound) approach changed to right-turn only

I-295 Interchange

- Northbound and southbound each have one travel lane and one deceleration lane between on- and off-ramps

Cherry Lane (Int. #16)

- Hybrid single/double lane roundabout
- Northbound, southbound, and eastbound approaches each have two approach lanes
- Westbound approach has one approach lane and one free-flowing, right-turn "bypass" lane

Rodney Drive (Int. #17)

- Reduce westbound approach to one lane

As the designs for each of these intersections progress, turning movements for a large design vehicle should be evaluated at intersections with proposed roundabouts to ensure that the intersection geometry still accommodates heavy vehicle traffic. Additional consideration for the needs of users with visual impairments should also be given to bicycle and pedestrian crossings at multilane roundabout entrances and exits. Potential treatments include raised crosswalks or bicycle signalization.

DATA SOURCES AND ASSUMPTIONS

Intersection turning movement counts were received from WILMAPCO archives. These intersection counts were collected during previous traffic impact studies, and included data from varying months between 2014 and 2016. Morning and evening peak hours varied, but generally fell between 7:15 AM and 9:00 AM for the morning peak hour and 4:15 PM and 6:00 PM for the evening peak hour. These counts were not volume balanced, since discrepancies from intersection to intersection could be explained by the differences in times of year and peak hour. Additional growth factors were not added to any counts for the purposes of normalizing to 2016 volumes, since historical growth data obtained from DelDOT did not indicate any significant and consistent growth patterns along the corridor over the past two years. Additional volume estimates for interchange ramps were provided from WILMAPCO's travel demand model.

Assessment of future conditions was completed assuming a horizon year of 2036 and a compounded growth rate of 1% per year, or 22% over 20 years. This growth rate includes both regional traffic growth and traffic associated with local development.

ANALYSIS APPROACH

The performance of the signalized/unsignalized study intersections for motor vehicles was analyzed in SYNCHRO 8.0. Performance was measured using Levels of Service (LOS), which is based on the process in the 2000 Highway Capacity Manual. This assessment used the following performance measures: delay, LOS, the 95th percentile queue, and volume-to-capacity ratio.

The performance of segments of the cloverleaf interchange was analyzed in HCS 2010. Performance was measured for one merge ramp from northbound DE-9 to I-295, and for two weave segments between I-295 and northbound and southbound DE-9. These analyses were based on processes in the 2010 Highway Capacity Manual, and used the following performance measures: segment densityLOS, and volume-to-capacity ratio.

Analysis was conducted for existing conditions, "No Build" conditions (i.e. existing geometric and signal conditions with 2036 background traffic volumes), and "Build" conditions (i.e. proposed road diet with 2036 traffic volumes).

RESULTS

With the proposed changes, all signalized or roundabout intersections operate with an overall LOS D or above.

At stop-controlled intersections, all stop-controlled movements operate at LOS D or above with the exception of the westbound approach at Manson Parkway/Rose Lane (LOS E, 40.8 s) during the evening peak hour and the eastbound approach at Halcyon Drive (LOS E, 45.1 s) during the evening peak hour. Both of these approaches operate at LOS C in the No Build condition. All ramp and weave movements operate at LOS C or above during both peak hours. See the attached operation summary tables for additional details.

CONCLUSION

The proposed road diet will improve the pedestrian and bicycle experience, safety and comfort traveling from end-to-end and across the corridor by creating space for additional sidewalk, bike lanes, shared use paths, buffer zones, planted medians, and traffic-calming roundabouts. This analysis shows that these improvements for pedestrians and bicycles can be implemented without significant changes to vehicle operations. Additionally, the growth rate in the analysis is relatively conservative or high given the historical vehicle volume growth in the area and limited plans for future development. It may be possible that this level of growth isn't realized and actual vehicle future conditions will operate with less delay. There is also discussion about the construction of a parallel thoroughfare for access to/from the Port of Wilmington that would likely reduce the amount of truck traffic along Route 9.

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					BUILD (AM)				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 1. DE-9 & D St	EB L	12.4	B	0.21	20	EB L	14.1	B	0.29	30	EB L	24.7	C	0.47	61
	EB R	8.8	A	0.07	5	EB R	8.9	A	0.08	6	EB R	8.8	A	0.08	6
Intersection 2. DE-9 & DE-13	EB L	0.0	A	-	-	EB L	0.0	A	-	-	EB L	0.0	A	-	-
	EB R	9.2	A	0.11	9	EB R	9.5	A	0.14	12	EB R	9.3	A	0.13	11
Intersection 3. DE-9 & Terminal Ave	EBT	49.4	D	0.56	28	EBT	53.7	D	0.62	32	EB LTR	12.5	B	0.14	0
	WBL	47.1	D	0.67	#138	WBL	55.6	E	0.78	#183					
	WBT	48.0	D	0.68	#142	WBT	56.9	E	0.79	#186	WB LTR	24.8	C	0.75	7
	WBR	35.5	D	0.10	36	WBR	35.1	D	0.12	56					
	NBL	7.7	A	0.01	m3	NBL	8.4	A	0.01	m3					
	NBT	8.9	A	0.21	70	NBT	9.9	A	0.27	92	NB LTR	43.5	E	0.95	15
	NBR	3.3	A	0.21	2	NBR	3.5	A	0.25	2					
	SBL	7.8	A	0.16	48	SBL	8.5	A	0.21	58					
	SBT	9.9	A	0.02	16	SBT	10.5	B	0.03	19	SB LTR	8.0	A	0.22	1
	Overall	20.1	C	0.32	-	**Overall**	22.4	C	0.4	-	**Overall**	32.6	D	-	-
Intersection 4. DE-09 & Pyles Ln	WB LR	14.7	B	0.02	2	WB LR	17.9	C	0.03	3	WB LR	25.0	C	0.05	4
	SB LT	0.2	A	0.01	1	SB LT	0.5	A	0.01	1	SB LT	0.4	A	0.01	1
Intersection 5. DE-9 & Sutton Ln/Rogers Rd	NB L	1.7	A	0.40	25	NB L	5.1	A	0.50	73	NB L	See Intersections 5a and 5b			
	NB TR	0.7	A	0.24	12	NB TR	0.8	A	0.30	15	NB TR				
	SB T	16.9	B	0.14	85	SB T	19.5	B	0.18	m101	SB T				
	SB R	121.5	F	0.04	m12	SB R	69.5	E	0.04	m13	SB R				
	SEB LT	39.9	D	0.44	70	SEB LT	39.3	D	0.48	79	SEB LT				
	SEB R	36.7	D	0.12	57	SEB R	36.0	D	0.15	60	SEB R				
	NWB LTR	36.1	D	0.03	10	NWB LTR	35.1	D	0.03	11	NWB LTR				
	Overall	14.3	B	0.42	-	**Overall**	13.5	B	0.52	-	**Overall**				
Intersection 5a. DE-9 & Rogers Rd											EB L	39.2	D	0.42	80
											EB R	36.9	D	0.15	62
											NB L	4.6	A	0.50	103
											NB T	6.6	A	0.56	275
											SB T	12.0	B	0.34	182
											SB R	9.2	A	0.04	22
											Overall	12.3	B	0.58	-

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 61*. DE-9 & Sutton Ln											WB LR	19.2	C	0.03	2
											NB TR	0.0	A	0.64	-
											SB T	0.0	A	0.32	-
											Overall	0.1	A	-	-
Intersection 6. DE-9 & Revis Ave	WB LR	11.3	B	0.03	2	WB LR	11.0	B	0.03	2	WB LR	22.7	C	0.09	7
	SB L	1.0	A	0.01	1	SB L	10.3	B	0.1	1	SB L	13.7	B	0.02	2
Intersection 7. DE-9 & Manson Pkwy/Rose Ln	EB LTR	12.7	B	0.03	2	EB LTR	11.2	B	0.03	2	EB LTR	18.3	C	0.06	5
	WB LTR	19.8	C	0.15	13	WB LTR	14.8	D	0.13	11	WB LTR	26.8	D	0.25	24
	NB L	8.3	A	0.01	1	NB L	8.5	A	0.01	1	NB L	8.5	A	0.01	1
	SB L	9.6	A	0.02	1	SB L	10.1	B	0.02	2	SB L	13.6	B	0.04	3
Intersection 8. DE-9 & Lambson Ln	EB LTR	41.0	D	0.04	-	EB LTR	41.1	D	0.05	-	EB LTR	36.7	D	0.05	-
	WB LTR	38.6	D	0.13	17	WB LTR	39.1	D	0.39	35	WB LTR	50.7	D	0.7	87
	NB L	1.8	A	0.04	m4	NB L	2.7	A	0.06	m5	NB L	5.3	A	0.05	11
	NB TR	2.9	A	0.44	42	NB TR	4.7	A	0.58	79	NB TR	25.8	C	0.9	#885
	SB L	6.2	A	0.08	15	SB L	7.3	A	0.13	20	SB L	16.7	B	0.22	13
	SB TR	7.9	A	0.22	87	SB TR	8.7	A	0.28	109	SB TR	9.8	A	0.45	265
	Overall	9.5	A	3.6	-	**Overall**	10.9	B	0.49	-	**Overall**	24.1	C	0.84	-
Intersection 9. DE-9 & Morehouse Dr/Hillview Ave	EB LT	38.4	D	0.39	59	EB LT	35.6	D	0.38	66	EB LT	35.6	D	0.38	66
	EB R	35.2	D	0.03	-	EB R	32.6	C	0.04	1	EB R	32.6	C	0.04	1
	WB LTR	45.9	D	0.63	70	WB LTR	42.0	D	0.62	82	WB LTR	42.0	D	0.62	82
	NB L	2.2	A	0.08	8	NB L	2.5	A	0.12	m8	NB L	8.4	A	0.14	42
	NB TR	5.2	A	0.4	51	NB TR	6.9	A	0.51	311	NB TR	40.2	D	0.98	#957
	SB L	6.9	A	0.07	20	SB L	9.4	A	0.12	22	SB L	17.0	B	0.25	16
	SB TR	8.1	A	0.27	110	SB TR	11.1	B	0.36	142	SB TR	8.5	A	0.57	303
	Overall	10.7	B	0.42	-	**Overall**	12.1	B	0.52	-	**Overall**	28.2	C	0.91	-

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					BUILD				
	Movement	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**
Intersection 10. DE-9 & Memorial Ave/West Ave	EB LT	39.3	D	0.46	91	EB LT	38.6	D	0.50	104	EB LT	8.2	A	0.18	1
	EB R	36.4	D	0.12	54	EB R	35.5	D	0.14	60	EB R	10.5	B	0.35	2
	WB LT	51.0	D	0.75	#172	WB LT	66.9	E	0.87	#225	WB LT	14.0	B	0.34	1
	WB R	34.4	C	0.00	-	WB R	33.9	C	0.01	-	WB TR	9.7	A	0.13	-
	NB L	10.5	B	0.28	69	NB L	12.4	B	0.39	87	NB LT	14.4	B	0.64	5
	NB T	18.2	B	0.45	207	NB T	22.6	C	0.60	277	NB TR	17.8	C	0.72	6
	NB R	14.8	B	0.11	38	NB R	17.0	B	0.14	44					
	SB L	10.5	B	0.13	32	SB L	10.6	B	0.20	37	SB LT	10.1	B	0.42	2
	SB T	17.2	B	0.35	172	SB T	20.9	C	0.47	213	SB TR	10.8	B	0.47	2
	SB R	16.9	B	0.04	12	SB R	18.8	B	0.05	16					
	Overall	22.2	C	0.50	-	**Overall**	26.2	C	0.63	-	**Overall**	13.4	B	-	-
Intersection 11. DE-9 & Halcyon Dr	EB LR	33.8	D	0.57	81	EB LR	18.5	C	0.42	51	EB LR	20.4	C	0.45	57
	NB L	11.5	B	0.17	15	NB L	13.6	B	0.25	25					
Intersection 16*. DE-9 & Cherry Ln	EBL	52.1	D	0.42	66	EBL	52.8	D	0.49	77	EB LT	12.5	B	0.48	3
	EBT	45.7	D	0.70	191	EBT	43.4	D	0.72	220	EB TR	13.3	B	0.53	3
	EBR	37.2	D	0.05	6	EBR	34.3	C	0.07	18					
	WBL	52.4	D	0.22	19	WBL	52.4	D	0.25	22	WB LT	7.9	A	0.06	-
	WBT	39.6	D	0.05	27	WBT	36.7	D	0.07	28					
	WBR	39.6	D	0.05	-	WBR	36.6	D	0.06	-	WB R	0.0	A	0.09	-
	NBL	77.7	E	0.48	m20	NBL	67.1	E	0.30	m20	NB LT	35.6	E	0.84	9
	NBT	13.0	B	0.44	171	NBT	17.3	B	0.60	331	NB TR	43.4	E	0.90	11
	NBR	28.2	C	0.06	-	NBR	20.6	C	0.07	1					
	SBL	48.7	D	0.57	105	SBL	49.2	D	0.63	125	SB LT	6.3	A	0.26	1
	SBT	11.8	B	0.13	80	SBT	14.8	B	0.17	104	SB TR	6.7	A	0.29	1
	SBR	10.9	B	0.01	-	SBR	13.4	B	0.01	-					
	Overall	29.2	C	0.53	-	**Overall**	29.8	C	0.65	-	**Overall**	21.4	C	-	-

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					BUILD				
	Movement	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft) 95th %ile**
Intersection 17*. DE-9 & Rodney Dr	EB LTR	42.5	D	0.09	18	EB LTR	41.0	D	0.09	20	EB LTR	41.0	D	0.09	20
	WB L	42.8	D	0.13	37	WB L	41.3	D	0.14	40					
	WB TR	42.2	D	0.06	26	WB TR	40.8	D	0.07	27	WB LTR	40.3	D	0.21	49
	NB T	3.6	A	0.36	64	NB T	4.0	A	0.45	76	NB T	11.5	B	0.86	#956
	NB R	5.9	A	0.00	m0	NB R	6.5	A	0.01	m0	NB R	6.5	A	0.01	m0
	SB L	4.5	A	0.07	11	SB L	7.1	A	0.11	18	SB L	16.3	B	0.21	14
	SB T	6.3	A	0.24	94	SB T	9.5	A	0.30	155	SB T	11.6	B	0.56	307
	SB R	5.5	A	0.01	-	SB R	6.5	A	0.01	1	SB R	6.1	A	0.01	-
	Overall	7.5	A	0.31	-	**Overall**	8.7	A	0.38	-	**Overall**	13.7	B	0.72	-
Intersection 18*. DE-9 & Stamm Blvd8	EB L	50.9	D	0.62	121	EB L	51.8	D	0.67	140	EB L	51.8	D	0.67	140
	EB R	41.9	D	0.01	13	EB R	40.3	D	0.01	13	EB R	40.3	D	0.01	13
	NB L	3.4	A	0.03	m5	NB L	3.3	A	0.04	m5	NB L	2.7	A	0.04	m3
	NB T	4.0	A	0.34	51	NB T	4.4	A	0.43	62	NB T	11.9	B	0.81	#358
	SB T	4.0	A	0.18	45	SB T	4.8	A	0.23	50	SB T	3.3	A	0.42	44
	SB R	3.7	A	0.03	2	SB R	4.1	A	0.04	-	SB R	0.3	A	0.04	m0
	Overall	8.7	A	0.37	-	**Overall**	9.3	A	0.45	-	**Overall**	13.0	B	0.75	-
Intersection 19*. DE-9 & Landers Ln/Riverview Dr	EB LT	49.6	D	0.47	68	EB LT	49.7	D	0.52	79	EB LT	49.7	D	0.52	79
	EB R	45.8	D	0.05	-	EB R	45.0	D	0.06	-	EB R	45.0	D	0.06	-
	WB LTR	56.5	E	0.47	41	WB LTR	59.2	E	0.58	50	WB LTR	57.3	E	0.51	80
	NB L	10.3	B	0.11	41	NB L	11.8	B	0.16	48	NB L	13.7	B	0.18	50
	NB TR	16.4	B	0.39	240	NB TR	19.7	B	0.51	304	NB TR	54.8	D	0.98	#950
	SB L	11.0	B	0.03	10	SB L	19.7	B	0.05	17	SB L	40.6	D	0.14	m17
	SB TR	14.9	B	0.26	97	SB TR	20.3	C	0.34	151	SB T	34.6	C	0.60	#428
											SB R	27.9	C	0.06	49
	Overall	21.5	C	0.39	-	**Overall**	24.9	C	0.47	-	**Overall**	46.4	D	0.78	-

*Intersection numbers not in consecutive order because of the presence of intersections along the corridor which were assessed using HCS. Numbers 11-13 are intentially omitted.

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING				NO BUILD					BUILD				
	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile
Merge: WB 295 to NB DE-9		15.7	B	-			18.4	B	-			24.4	C	-	
Weave 1: 295 & NB DE-9		5.3	A	0.30			6.6	A	0.36			13.1	B	0.38	
Weave 2: 295 & SB DE-9		15.3	B	0.50			7.7	A	0.50			15.3	B	0.50	

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 1. DE-9 & D St	EB L	10.6	B	0.17	15	EB L	11.3	B	0.22	20	EB L	14.2	B	0.29	29
	EB R	8.6	A	0.05	4	EB R	8.6	A	0.06	5	EB R	8.6	A	0.06	5
Intersection 2. DE-9 & DE-13	EB L	0.0	A	-	-	EB L	0.0	A	-	-	EB L	0.0	A	-	-
	EB R	9.6	A	0.23	23	EB R	10.0	B	0.29	30	EB R	10.0	A	0.29	30
Intersection 3. DE-9 & Terminal Ave	EBT	42.8	D	0.3	24	EBT	41.0	D	0.28	28	EB LTR	9.6	A	0.12	-
	WBL	54.8	D	0.8	#211	WBL	78.2	E	0.94	#272					
	WBT	56.8	E	0.82	#215	WBT	82.6	F	0.95	#278	WB LTR	24.9	C	0.81	9
	WBR	33.2	C	0.09	26	WBR	32.9	C	0.11	46					
	NBL	8.3	A	0.01	m3	NBL	9.2	A	0.01	m2					
	NBT	11.1	B	0.14	67	NBT	10.6	B	0.18	80	NB LTR	18.4	C	0.74	7
	NBR	24.5	C	0.22	1000	NBR	23.7	C	0.27	116					
	SBL	8.0	A	0.14	44	SBL	9.1	A	0.18	53					
	SBT	10.7	B	0.09	49	SBT	11.9	B	0.12	58	SB LTR	13.0	B	0.49	3
	Overall	29.6	C	0.34	-	**Overall**	36.3	D	0.41	-	**Overall**	19.6	C	-	-
Intersection 4. DE-09 & Pyles Ln	WB LR	16.3	C	0.17	15	WB LR	21.4	C	0.26	26	WB LR	17.5	C	0.21	20
	SB LT	0	A	-	-	SB L	0	A	-	-	SB L	0	A	-	-
Intersection 5. DE-9 & Sutton Ln/Rogers Rd	NB L	10.7	B	0.46	m128	NB L	28.6	C	0.72	m210	NB L	See Intersections 5a and 61			
	NB TR	8.4	A	0.21	104	NB TR	12.1	B	0.29	m120	NB TR				
	SB T	29.0	C	0.37	237	SB T	43.0	D	0.62	m263	SB T				
	SB R	64.2	E	0.05	m25	SB R	77.0	E	0.06	m28	SB R				
	SEB LT	31.3	C	0.28	62	SEB LT	24.4	C	0.23	73	SEB LT				
	SEB R	41.0	D	0.71	178	SEB R	50.2	D	0.90	#402	SEB R				
	NWB LTR	29.0	C	-	-	NWB LTR	22.5	C	-	-	NWB LTR				
	Overall	26.7	C	0.55	-	**Overall**	36.7	D	0.81	-	**Overall**				
Intersection 5a. DE-9 & Rogers Rd											EB L	28.1	C	0.22	71
											EB R	53.2	D	0.87	#335
											NB L	54.2	D	0.88	m188
											NB T	7.1	A	0.50	158
											SB T	65.9	E	1.02	#817
											SB R	16.9	B	0.09	51
											Overall	44.5	D	0.95	-

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

		EXISTING					NO BUILD					BUILD			
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 61. DE-9 & Sutton Ln											WB LR	16.1	C	0.01	1
											NB TR	0.0	A	0.54	-
											SB T	0.0	A	0.39	-
											Overall	0.0	A	-	-
Intersection 6. DE-9 & Revis Ave	WB LR	11.4	B	0.03	3	WB LR	12.4	B	0.05	4	WB LR	15.6	C	0.07	5
	SB L	9.1	A	0.02	-	SB L	9.6	A	0.03	3	SB L	9.9	A	0.03	3
Intersection 7. DE-9 & Manson Pkwy/Rose Ln	EB LTR	15.3	C	0.06	5	EB LTR	15.4	C	0.08	6	EB LTR	25.5	D	0.14	12
	WB LTR	37.3	E	0.32	32	WB LTR	19.0	C	0.2	18	WB LTR	40.8	E	0.39	42
	NB L	0.2	A	0.02	1	NB L	12.1	B	0.02	2	NB L	11.9	B	0.02	2
	SB L	9.1	A	0.03	3	SB L	9.5	A	0.04	4	SB L	10.3	B	0.05	4
Intersection 8. DE-9 & Lambson Ln	EB LTR	41.0	D	0.04	-	EB LTR	41.1	D	0.04	-	EB LTR	32.4	C	0.05	-
	WB LTR	41.3	D	0.61	112	WB LTR	41.8	D	0.67	134	WB LTR	51.1	D	0.76	#174
	NB L	10.4	B	0.03	m7	NB L	18.0	B	0.06	m9	NB L	8.2	A	0.1	m1
	NB TR	10.1	B	0.34	115	NB TR	16.3	B	0.45	175	NB TR	11.0	B	0.65	361
	SB L	5.6	A	0.18	m30	SB L	8.1	A	0.26	m40	SB L	10.0	A	0.26	m34
	SB TR	9.5	A	0.51	176	SB TR	13.9	B	0.66	m#436	SB TR	40.3	D	0.98	m#912
	Overall	13.3	B	0.49	-	**Overall**	17.7	B	0.62	-	**Overall**	30.4	C	0.94	-
Intersection 9. DE-9 & Morehouse Dr/Hillview Ave	EB LT	41.0	D	0.50	66	EB LT	42.5	D	0.57	75	EB LT	42.5	D	0.57	75
	EB R	36.6	D	0.04	5	EB R	35.6	D	0.05	14	EB R	35.6	D	0.05	14
	WB LTR	40.3	D	0.45	61	WB LTR	40.4	D	0.52	71	WB LTR	40.4	D	0.52	71
	NB L	3.1	A	0.15	4	NB L	6.5	A	0.23	m16	NB L	70.0	E	0.81	#82
	NB TR	7.8	A	0.35	267	NB TR	8.5	A	0.43	330	NB TR	19.2	B	0.83	#792
	SB L	0.7	A	0.09	m2	SB L	0.9	A	0.13	m2	SB L	14.8	B	0.19	m17
	SB TR	2.4	A	0.48	63	SB TR	5.2	A	0.61	128	SB TR	42.0	D	1.02	m#1097
	Overall	8.0	A	0.47	-	**Overall**	9.7	A	0.58	-	**Overall**	33.9	C	1.02	-

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

		EXISTING					NO BUILD					BUILD			
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 10. DE-9 & Memorial Ave/West Ave	EB LT	38.9	D	0.48	98	EB LT	38.2	D	0.51	112	EB LT	16.2	C	0.33	1
	EB R	36.2	D	0.16	64	EB R	35.2	D	0.19	69	EB R	40.3	E	0.79	7
	WB LT	148.7	F	1.18	#282	WB LT	254.0	F	1.44	#362	WB LT	35.7	D	0.70	5
	WB R	32.2	C	0.02	-	WB R	32.3	C	0.03	-	WB TR	9.4	A	0.18	1
	NB L	16.2	B	0.52	84	NB L	22.9	C	0.65	125	NB LT	13.1	B	0.60	4
	NB T	20.8	C	0.43	194	NB T	23.9	C	0.55	256	NB TR	15.5	C	0.67	5
	NB R	17.6	B	0.12	44	NB R	19.0	B	0.14	51					
	SB L	5.6	A	0.15	10	SB L	6.2	A	0.22	m9	SB LT	34.4	D	0.87	10
	SB T	20.0	C	0.75	#398	SB T	41.5	D	1.00	#588	SB TR	46.9	E	0.95	14
	SB R	19.4	B	0.05	4	SB R	21.3	C	0.06	m8					
	Overall	37.8	D	0.76	-	**Overall**	59.2	E	0.95	-	**Overall**	28.4	D	-	-
Intersection 11. DE-9 & Halcyon Dr	EB LR	98.7	F	0.88	153	EB LR	21.2	C	0.44	54	EB R	45.1	E	0.68	110
	NB L	2.1	A	0.30	31	NB L	29.1	D	0.53	72	NB L	32.1	D	0.56	80
Intersection 16*. DE-9 & Cherry Ln	EBL	57.7	E	0.71	162	EBL	65.5	E	0.80	#219	EB LT	24.2	C	0.58	4
	EBT	41.6	D	0.16	41	EBT	35.4	D	0.13	43	EB TR	24.6	C	0.61	4
	EBR	41.4	D	0.11	50	EBR	35.5	D	0.14	49					
	WBL	48.7	D	0.45	69	WBL	48.4	D	0.50	80	WB LT	11.3	B	0.32	1
	WBT	47.5	D	0.44	75	WBT	50.4	D	0.70	149					
	WBR	47.1	D	0.40	69	WBR	48.8	D	0.68	144	WB R	0.0	A	0.39	2
	NBL	73.4	E	0.48	27	NBL	59.4	E	0.33	33	NB LT	13.2	B	0.54	3
	NBT	16.6	B	0.38	220	NBT	30.2	C	0.55	312	NB TR	15.3	C	0.61	4
	NBR	14.0	B	0.02	9	NBR	19.3	B	0.02	18					
	SBL	50.7	D	0.39	49	SBL	49.9	D	0.41	59	SB LT	12.3	B	0.59	4
	SBT	15.8	B	0.45	304	SBT	25.4	C	0.66	#496	SB TR	14.3	B	0.66	5
	SBR	11.5	B	0.02	-	SBR	16.5	B	0.03	-					
	Overall	30.2	C	0.49	-	**Overall**	36.6	D	0.69	-	**Overall**	12.1	B	-	-

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

		EXISTING					NO BUILD					BUILD			
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 17*. DE-9 & Rodney Dr	EB LTR	43.5	D	0.01	0	EB LTR	42.1	D	0.01	0	EB LTR	42.1	D	0.01	-
	WB L	44.2	D	0.11	36	WB L	42.8	D	0.12	0					
	WB TR	43.5	D	0.02	22	WB TR	42.1	D	0.02	24	WB LTR	41.4	D	0.14	49
	NB T	8.3	A	0.26	93	NB T	8.3	A	0.32	101	NB T	8.8	A	0.61	158
	NB R	5.8	A	0.01	0	NB R	6.4	A	0.01	0	NB R	6.4	A	0.01	m0
	SB L	4.3	A	0.09	6	SB L	1.6	A	0.12	m6	SB L	6.8	A	0.15	22
	SB T	7.7	A	0.38	37	SB T	4.0	A	0.48	45	SB T	25.7	C	0.90	#1086
	SB R	5.8	A	0.01	m0	SB R	6.4	A	0.01	m0	SB R	6.1	A	0.01	-
	Overall	8.1	A	0.33	-	**Overall**	6.9	A	0.40	-	**Overall**	19.1	B	0.75	-
Intersection 18*. DE-9 & Stamm Blvd	EB L	50.3	D	0.57	122	EB L	50.5	D	0.62	143	EB L	50.5	D	0.62	143
	EB R	43.6	D	0.03	32	EB R	42.3	D	0.04	34	EB R	42.3	D	0.04	34
	NB L	7.4	A	0.16	m33	NB L	14.9	B	0.25	m54	NB L	29.1	C	0.45	m34
	NB T	9.3	A	0.27	194	NB T	13.3	B	0.34	272	NB T	21.7	C	0.64	639
	SB T	2.3	A	0.46	49	SB T	3.0	A	0.57	63	SB T	52.1	D	1.08	m#1379
	SB R	0.1	A	0.06	-	SB R	0.1	A	0.07	-	SB R	2.9	A	0.10	m10
	Overall	8.3	A	0.46	-	**Overall**	10.1	B	0.56	-	**Overall**	39.4	D	0.98	-
Intersection 19*. DE-9 & Landers Ln/Riverview Dr	EB LT	46.8	D	0.55	121	EB LT	51.8	D	0.67	144	EB LT	67.6	E	0.81	148
	EB R	41.9	D	0.11	4	EB R	42.0	D	0.13	25	EB R	44.2	D	0.13	25
	WB LTR	54.9	D	0.56	47	WB LTR	65.2	E	0.69	56	WB LTR	52.8	D	0.57	#85
	NB L	15.1	B	0.31	64	NB L	17.9	B	0.46	77	NB L	38.1	D	0.72	#121
	NB TR	21	C	0.40	217	NB TR	22.9	C	0.49	280	NB TR	36.3	D	0.86	#672
	SB L	9.5	A	0.08	m9	SB L	10.8	B	0.12	m10	SB L	3.0	A	0.19	m1
	SB TR	16.5	B	0.58	286	SB TR	18.7	B	0.72	#480	SB T	67.9	E	1.12	m#667
											SB R	5.1	A	0.08	m7
	Overall	23.7	C	0.50	-	**Overall**	26.2	C	0.63	-	**Overall**	51.3	D	0.94	-

*Intersection numbers not in consecutive order because of the presence of intersections along the corridor which were assessed using HCS. Numbers 11-13 are intentially omitted.

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

		EXISTING					NO BUILD					BUILD			
	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile	Movement	Density (pc/min/ln)	LOS	V/C	Queue (ft) 95th %ile
Merge: WB 295 to NB DE-9		10.9	B	-			12.5	B	-			16.0	B	-	
Weave 1: 295 & NB DE-9		8.9	A	0.32			11.2	A	0.39			22.9	B	0.52	
Weave 2: 295 & SB DE-9		11.3	A	0.34			14.2	B	0.41			29.6	C	0.61	

Memorial Drive is a Minor Arterial roadway in New Castle County which carried an Average Daily Traffic (ADT) volume of 9,000 vehicles per day in 2015. It connects Dupont Highway (DE-13) and New Castle Avenue (DE-9, or Route 9). This memo presents an assessment of existing and future traffic conditions along Memorial Drive between Dupont Highway (DE-13) to the west and Route 9 to the east. Currently, this segment of Memorial Drive is comprised of at least two travel lanes in each direction with a wide shoulder on both sides of the road. Each of the intersections between Dupont Highway and Route 9 are unsignalized and the intersections at Dupont Highway (DE-13) and New Castle Avenue (DE-9) are both signalized intersections.

Like many other roadways in the surrounding network, Memorial Drive is primarily optimized for vehicular capacity. There are no dedicated bicycle facilities with frequent gaps in narrow sidewalk. The study corridor is constrained at either end by intersections with other major roadways that limit the feasibility of lane reductions at the intersection and also maintain long pedestrian crossings. A road diet between these intersections can improve conditions along a portion of the corridor.

CONCEPT

The proposed road diet concept will reduce Memorial Drive by one through lane in each direction for all intersections except for the intersection with Dupont Highway, which will maintain its current lane configuration. Three concepts have been developed for the developed roadway, and are described below.

- **Scenario 1:** one travel lane in each direction with a curbed median; conventional bicycle lanes in each direction; curbside parking lanes in each direction with a door zone buffer. The curbed median is not wide enough for vehicles to make a two-stage left turn. This Scenario is represented by “Interim Build” conditions below.
- **Scenario 2:** one travel lane in each direction with a center-turn lane; parking separated bicycle lanes and door zone buffer on both sides; bioretention areas in the parking lane. This Scenario is represented by “Build” conditions below.
- **Scenario 3:** one travel lane in each direction with a center-turn lane; conventional bicycle lanes in each direction; curbside parking lanes in each direction with a door-zone buffer. This Scenario is represented by “Build” conditions below.

Scenario 3 is the preferred option. Scenario 1 is also being considered because of concerns that the jurisdiction will not receive enough funding to remove the raised median.

As part of the Route 9 corridor study between D Street and Landers Lane/Riverview Drive, it has been proposed that the signalized intersection at Route 9 and Memorial Drive be replaced with a roundabout in order to direct pedestrian and bicyclist traffic to the median shared-use path and to reduce vehicle conflicts as vehicles along Route 9 approach the I-295 interchange. However, analysis included as part of this study assessed the intersection as a signalized intersection with the aforementioned road diet in order to assess the impact of the road diet before construction of the roundabout. The construction of the roundabout will require two approaching and two departing lanes at the intersection. If a road diet were implemented on Memorial Drive, a transition to the road diet cross-section would occur near the Memorial Drive & Lind Avenue intersection.

DATA SOURCES AND ASSUMPTIONS

Intersection turning movement counts were received from WILMAPCO. Most turning movement counts were collected in September of 2016 on the same day; however, counts for the intersections with Dupont Highway and Karlyn Drive (north) were obtained from WILMAPCO archives. Because of this discrepancy in collection times, counts were not adjusted for volume balancing. Because historical data did not show consistent significant background growth, counts from before 2016 were not adjusted for background growth.

Assessment of future conditions was completed assuming a horizon year of 2036 and a compounded growth rate of 1% per year, or 22% over 20 years. This growth rate includes both regional traffic growth and traffic associated with local development.

ANALYSIS APPROACH

The performance of the signalized/unsignalized study intersections for motor vehicles was analyzed in SYNCHRO 8.0. Performance was measured using Levels of Service (LOS), which is based on the process in the 2000 Highway Capacity Manual. This assessment used the following performance measures: delay, LOS, the 95th percentile queue, and volume -to-capacity ratio.

Analysis was conducted for existing conditions, “No Build” conditions (i.e. existing geometric and signal conditions with 2036 background traffic volumes, “Interim Build” conditions (i.e. proposed road diet with 2036 traffic volumes; existing raised median maintained) and “Build” conditions (i.e. proposed road diet with 2036 traffic volumes; existing raised median removed and center turn lane constructed).

RESULTS

With the proposed changes, both signalized intersections operate at an overall LOS of E or F during one or both peak hours. However, both intersections operate the same as No Build conditions. The roundabout being proposed at this intersection as part of the Route 9 corridor project mitigates some of this impact. The intersection at Dupont Highway operates at LOS E (63.2 s) during the AM peak hour and LOS F (141.3 s) during the PM peak hour; however, the road diet was not applied to this intersection, and it operates at the same LOS and delay as in No Build conditions in both peak hours.

Most of the stop-controlled intersections operate with all movements at LOS D or better with a few exceptions as follows. During the AM peak hour, the eastbound approach at Karlyn Drive (east) operates at LOS F (57.1 s) in Interim Build conditions, which is a small increase in delay (i.e. approximately 4 seconds) compared to No Build conditions. During the PM peak hour, the eastbound approach at Parma Avenue operates at LOS E (39.7 s), slightly worse than in No Build conditions. Also during the PM peak hour, the eastbound and westbound approaches at Karlyn Drive (west) operate at LOS F, with delays worse than in No Build conditions. (Note: the volumes for Karlyn Drive (west) eastbound through movements are significantly higher than expected given the surrounding land uses. Therefore, this intersection likely operates better than what is shown in the analysis, which may show unrealistically high volumes.) In Build conditions, all of the stop controlled intersections operate with movements at LOS D or better during the Build conditions. See the attached operations summary tables for more details.

CONCLUSION

The proposed road diet will improve the pedestrian and bicycle experience, safety and comfort traveling from end-to-end and across the corridor by creating space for additional sidewalk, bike lanes, shared use paths, buffer zones, and planted medians. In Interim Build conditions, some stop-controlled approaches will have higher delay than in Build conditions because the raised median is not wide enough to allow two-stage left turns, but most movements still operate at LOS D or above. In Build conditions, all stop-controlled movements operate at LOS D or above. This analysis shows that these improvements for pedestrians and bicycles can be implemented without significant changes to vehicle operations. Additionally, the growth rate in the analysis is relatively conservative or high given the historical vehicle volume growth in the area and limited plans for future development. It may be possible that this level of growth isn't realized and actual vehicle future conditions will operate with less delay.

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					INTERIM BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 1: Memorial Drive & DE-9	EB LT	36.0	D	0.36	73	EB LT	36.0	D	0.41	87	EB LT	36.0	D	0.41	87	EB LT	36.0	D	0.41	87
	EB R	34.2	C	0.12	44	EB R	33.8	C	0.14	50	EB R	33.8	C	0.14	50	EB R	33.8	C	0.14	50
	WB LT	47.0	D	0.70	#162	WB LT	57.4	E	0.81	#213	WB LT	57.4	E	0.81	#213	WB LT	57.4	E	0.81	#213
	WB R	34.6	C	0.00	0	WB R	34.2	C	0.01	0	WB R	34.2	C	0.01	0	WB R	34.2	C	0.01	0
	NB L	11.8	B	0.26	91	NB L	12.9	B	0.36	108	NB L	12.9	B	0.36	108	NB L	12.9	B	0.36	108
	NB T	19.2	B	0.43	#282	NB T	21.7	C	0.54	#383	NB T	21.7	C	0.54	#383	NB T	21.7	C	0.54	#383
	NB R	16.0	B	0.10	46	NB R	17.1	B	0.13	55	NB R	17.1	B	0.13	55	NB R	17.1	B	0.13	55
	SB L	15.4	B	0.12	38	SB L	16.7	B	0.18	43	SB L	16.7	B	0.18	43	SB L	16.7	B	0.18	43
	SB T	20.6	C	0.32	172	SB T	23.0	C	0.42	#234	SB T	23.0	C	0.42	#234	SB T	23.0	C	0.42	#234
	SB R	17.9	B	0.04	0	SB R	19.1	B	0.04	0	SB R	19.1	B	0.04	0	SB R	19.1	B	0.04	0
	Overall	23.1	C	0.46	-	**Overall**	25.6	C	0.56	-	**Overall**	25.6	C	0.56	-	**Overall**	25.6	C	0.56	-
Intersection 2. Memorial Drive & Lind Avenue	NB LR	13.0	B	0.23	22	NB LR	15.2	C	0.31	33	NB LR	18.6	C	0.38	43	NB LR	13.3	B	0.26	26
																NWB L	8.3	A	0.02	2
Intersection 3. Memorial Drive & Bizarre Avenue																NB L	8.4	A	0.03	2
																SB L	8.3	A	0.01	1
	NEB LTR	14.2	B	0.11	10	NEB LTR	17.1	C	0.17	15	NEB LTR	19.5	C	0.2	18	NEB LTR	13.7	B	0.12	10
	SWB LTR	12.3	B	0.15	13	SWB LTR	14.2	C	0.22	20	SWB LTR	17.7	C	0.27	28	SWB LTR	12.9	B	0.18	17
Intersection 4. Memorial Drive & Karlyn Drive (east)	EB LTR	14.1	B	0.20	18	EB LTR	17.1	C	0.28	29	EB LTR	22.9	C	0.37	41	EB LTR	14.4	B	0.23	21
	WB LTR	12.5	B	0.04	3	WB LTR	14.2	B	0.06	5	WB LTR	16.2	C	0.07	6	WB LTR	12.7	B	0.04	3
																SB L	0.4	A	0.01	1
Intersection 5. Memorial Drive & Parma Avenue	EB LTR	14.6	B	0.09	7	EB LTR	17.7	C	0.13	11	EB LTR	24.1	C	0.19	17	EB LTR	14.8	B	0.1	8
	WB LTR	11.7	B	0.14	7	WB LTR	13	B	0.12	11	WB LTR	15.2	C	0.15	13	WB LTR	13.4	B	0.12	10
																NB L	7.9	A	0.01	1
																SB L	8.6	A	0.02	2
Intersection 6. Memorial Drive & Karlyn Drive (west)	EB LTR	26.3	D	0.47	59	EB LTR	53.4	F	0.74	129	EB LTR	57.1	F	0.76	135	EB LTR	19.7	C	0.41	49
	WB LTR	18.5	C	0.04	3	WB LTR	25.2	D	0.08	6	WB LTR	28.4	D	0.09	7	WB LTR	16.8	C	0.04	3
																SEB L	7.8	A	0.02	2
																NWB L	8.9	A	0.08	7

WEEKDAY MORNING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					INTERIM BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 7. Memorial Drive & Dupont Highway	NB L	17.9	B	0.10	24	NB L	19.2	B	0.15	27	NB L	19.2	B	0.15	29	NB L	19.2	B	0.15	27
	NB T	36.8	D	0.91	#698	NB T	103.4	F	1.14	#917	NB T	103.4	F	1.14	#917	NB T	103.4	F	1.15	#917
	NB R	21.9	C	0.25	118	NB R	24.9	C	0.36	176	NB R	24.9	C	0.36	176	NB R	24.9	C	0.36	177
	SB L	31.4	C	0.72	#163	SB L	45.2	D	0.82	#229	SB L	45.2	D	0.82	#229	SB L	45.2	D	0.82	#229
	SB T	18.6	B	0.45	249	SB T	20.5	C	0.54	315	SB T	20.5	C	0.54	315	SB T	20.5	C	0.54	315
	SB R	14.3	B	0.01	0	SB R	14.8	B	0.01	0	SB R	14.8	B	0.01	0	SB R	14.8	B	0.01	0
	SEB L	43.0	D	0.12	30	SEB L	44.2	D	0.14	33	SEB L	44.2	D	0.14	33	SEB L	44.2	D	0.14	33
	SEB T	43.0	D	0.12	30	SEB T	44.2	D	0.15	34	SEB T	44.2	D	0.15	34	SEB T	44.2	D	0.15	34
	SEB R	42.4	D	0.03	0	SEB R	43.4	D	0.03	0	SEB R	43.4	D	0.03	0	SEB R	43.4	D	0.03	0
	NWB L	45.4	D	0.55	130	NWB L	49.6	D	0.64	154	NWB L	49.6	D	0.64	154	NWB L	49.6	D	0.64	154
	NWB T	45.4	D	0.56	131	NWB T	49.3	D	0.63	154	NWB T	49.3	D	0.63	154	NWB T	49.3	D	0.63	154
	NWB R	40.6	D	0.18	66	NWB R	41.4	D	0.23	71	NWB R	41.4	D	0.23	71	NWB R	41.4	D	0.23	71
	Overall	31.2	C	0.74	-	**Overall**	63.2	E	0.89	-	**Overall**	63.2	E	0.89	-	**Overall**	63.2	E	0.89	-

WEEKDAY EVENING OPERATIONS SUMMARY TABLE

	EXISTING					NO BUILD					INTERIM BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 1: Memorial Drive & DE-9	EB LT	36.6	D	0.41	86	EB LT	36.4	D	0.46	101	EB LT	36.4	D	0.46	101	EB LT	36.4	D	0.46	101
	EB R	34.6	C	0.16	56	EB R	34.1	C	0.19	61	EB R	34.1	C	0.19	61	EB R	34.1	C	0.19	61
	WB LT	148.7	F	1.18	#282	WB LT	254.0	F	1.44	#362	WB LT	254.0	F	1.44	#362	WB LT	254.0	F	1.44	#362
	WB R	32.2	C	0.02	0	WB R	32.3	C	0.03	0	WB R	32.3	C	0.03	0	WB R	32.3	C	0.03	0
	NB L	18.3	B	0.55	105	NB L	25.9	C	0.69	#162	NB L	25.9	C	0.69	#162	NB L	25.9	C	0.69	#162
	NB T	22.4	C	0.45	#246	NB T	25.2	C	0.57	#342	NB T	25.2	C	0.57	#342	NB T	25.2	C	0.57	#342
	NB R	18.8	B	0.12	52	NB R	20.0	B	0.14	57	NB R	20.0	B	0.14	57	NB R	20.0	B	0.14	57
	SB L	16.8	B	0.15	45	SB L	18.0	B	0.22	52	SB L	18.0	B	0.22	52	SB L	18.0	B	0.22	52
	SB T	32.3	C	0.78	#495	SB T	61.3	E	1.01	#626	SB T	61.3	E	1.01	#626	SB T	61.3	E	1.01	#626
	SB R	20.4	C	0.05	0	SB R	21.6	C	0.06	1	SB R	21.6	C	0.06	1	SB R	21.6	C	0.06	1
	Overall	42.5	D	0.76	-	**Overall**	66.5	E	0.94	-	**Overall**	66.5	E	0.94	-	**Overall**	66.5	E	0.94	-
Intersection 2. Memorial Drive & Lind Avenue	NB LR	14.6	B	0.25	24	NB LR	18.3	C	0.36	40	NB LR	23.2	C	0.43	53	NB LR	14.5	B	0.27	28
																NWB L	8.6	A	0.04	3
Intersection 3. Memorial Drive & Bizarre Avenue																NB L	8.6	A	0.05	4
																SB L	8.4	A	0.01	1
	NEB LTR	17.9	C	0.04	3	NEB LTR	22.8	C	0.07	5	NEB LTR	25.8	D	0.08	6	NEB LTR	15.5	C	0.04	3
	SWB LTR	15.8	C	0.24	23	SWB LTR	21.0	C	0.36	40	SWB LTR	28.2	D	0.45	56	SWB LTR	16	C	0.27	27
Intersection 4. Memorial Drive & Karlyn Drive (east)	EB LTR	15.5	C	0.18	16	EB LTR	19.8	C	0.28	28	EB LTR	26.3	D	0.35	38	EB LTR	15.1	C	0.2	18
	WB LTR	14.7	B	0.06	5	WB LTR	17.8	C	0.09	8	WB LTR	21.6	C	0.12	10	WB LTR	13.9	B	0.06	5
																SB L	8.3	A	0.3	1
Intersection 5. Memorial Drive & Parma Avenue	EB LTR	21.2	C	0.14	12	EB LTR	30.5	D	0.24	22	EB LTR	39.7	E	0.3	30	EB LTR	17.5	C	0.13	11
	WB LTR	13.6	B	0.14	12	WB LTR	16.6	C	0.21	20	WB LTR	19.8	C	0.25	25	WB LTR	14	B	0.16	15
																NB L	8.8	A	0.01	1
																SB L	8.6	A	0.04	3
Intersection 6. Memorial Drive & Karlyn Drive (west)	EB LTR	52.2	F	0.71	118	EB LTR	210.8	F	1.25	286	EB LTR	273.8	F	1.4	320	EB LTR	30.4	D	0.58	86
	WB LTR	30.3	D	0.21	19	WB LTR	*	*	*	*	WB LTR	*	*	*	*	WB LTR	26.4	D	0.21	19
																SEB L	8.1	A	0.04	3
																NWB L	9.7	A	0.13	11

WEEKDAY EVENING OPERATIONS SUMMARY TABLE																				
	EXISTING					NO BUILD					INTERIM BUILD					BUILD				
	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile	Movement	Delay (sec)	LOS	V/C	Queue (ft) 95th %ile
Intersection 7. Memorial Drive & Dupont Highway	NB L	26.0	C	0.32	38	NB L	26.5	C	0.37	44	NB L	26.5	C	0.37	44	NB L	26.5	C	0.37	44
	NB T	35.3	D	0.78	330	NB T	49.8	D	0.96	#456	NB T	49.8	D	0.96	#456	NB T	49.8	D	0.96	#456
	NB R	26.8	C	0.26	29	NB R	30.3	C	0.32	83	NB R	20.4	C	0.44	83	NB R	30.4	C	0.44	84
	SB L	73.4	E	0.97	#253	SB L	144.9	F	1.19	#339	SB L	144.9	F	1.19	#339	SB L	144.9	F	1.19	#339
	SB T	112.3	F	1.17	#735	SB T	237.1	F	1.45	#978	SB T	237.1	F	1.45	#978	SB T	237.1	F	1.45	#978
	SB R	19.4	B	0.02	0	SB R	20.1	C	0.02	0	SB R	20.1	C	0.02	0	SB R	20.1	C	0.02	0
	SEB L	39.3	D	0.08	30	SEB L	39.8	D	0.09	35	SEB L	39.8	D	0.09	35	SEB L	39.8	D	0.09	35
	SEB T	40.0	D	0.18	57	SEB T	40.7	D	0.21	67	SEB T	40.7	D	0.21	67	SEB T	40.7	D	0.21	67
	SEB R	39.0	D	0.04	0	SEB R	39.4	D	0.05	0	SEB R	39.4	D	0.05	0	SEB R	39.4	D	0.05	0
	NWB L	48.2	D	0.54	126	NWB L	51.2	D	0.62	148	NWB L	51.2	D	0.62	148	NWB L	51.2	D	0.62	148
	NWB T	48.2	D	0.54	127	NWB T	51.5	D	0.62	151	NWB T	51.5	D	0.62	151	NWB T	51.5	D	0.62	151
	NWB R	43.4	D	0.14	72	NWB R	43.4	D	0.17	81	NWB R	43.4	D	0.17	81	NWB R	43.4	D	0.17	81
	Overall	73.9	E	0.93	-	**Overall**	141.3	F	1.13	-	**Overall**	141.3	F	1.13	-	**Overall**	141.3	F	1.13	-

APPENDIX D.
Stakeholder Input

STEERING COMMITTEE MEETING MINUTES

Minutes for each Steering Committee, Advisory Committee, and Management Committee meeting are available at http://www.wilmapco.org/route9/ under the heading "Meetings and Workshops." Direct links are listed below:

- Management Committee, September 29, 2015: http://www.wilmapco.org/Rt_9/Meetings/MC_notes_9.29.15.pdf
- Management Committee, January 13, 2016: http://www.wilmapco.org/Rt_9/Meetings/MC_notes_1.13.16.pdf
- Management Committee, February 23, 2016: http://www.wilmapco.org/Rt_9/Meetings/MC_notes_2.23.16.pdf
- Advisory Committee, February 23, 2016: http://www.wilmapco.org/Rt_9/Meetings/AC_notes_2.23.16.pdf
- Management Committee, April 14, 2016: http://www.wilmapco.org/Rt_9/Meetings/MC_notes_4.14.16.pdf
- Advisory Committee, April 14, 2016: http://www.wilmapco.org/Rt_9/Meetings/AC_Notes_4.14.16_Revised.pdf
- Steering Committee, June 9, 2016: http://www.wilmapco.org/Rt_9/Meetings/SC_notes_6.9.16.pdf
- Steering Committee, September 15, 2016: http://www.wilmapco.org/Rt_9/Meetings/SC_notes_9.15.16.pdf
- Steering Committee, November 3, 2016: http://www.wilmapco.org/Rt_9/Meetings/SC_notes_11.3.16.pdf

FEEDBACK RECEIVED FROM PUBLIC WORKSHOP 1

The first Public Visioning Workshop was held on May 24, 2016. Direct links to photos of the comment boards are listed below:

- Precedent image boards with comments: http://www.wilmapco.org/Rt_9/Workshops/501-16_2016-05-24_PrecBrdsComments.pdf
- Table boards with comments: http://www.wilmapco.org/Rt_9/Workshops/501-16_2016-05-24_TableBrds_Comments.pdf

DETAILS OF SUMMER OUTREACH ACTIVITIES

Direct links to summer outreach feedback and data are listed below:

- Post-it note survey responses: http://www.wilmapco.org/Rt_9/Outreach/Post-it_Note_Survey_Responses.pdf
- Children's responses to questions: http://www.wilmapco.org/Rt_9/Outreach/Childrens_outreach_questions.pdf
- Children's drawing responses: http://www.wilmapco.org/Rt_9/Outreach/Childrens_outreach_drawings.pdf
- Online survey responses: http://www.wilmapco.org/Rt_9/Outreach/Online_survey_responses.pdf

» Public engagement map:
https://www.google.com/maps/d/viewer?mid=1eGoSiSeovmto5-0geqUZs3edkVc&ll=39.70724204916533%2C-75.55480799999998&z=14

FEEDBACK RECEIVED FROM THE SECOND PUBLIC VISIONING WORKSHOP AND MCCULLOUGH MIDDLE SCHOOL STUDENTS

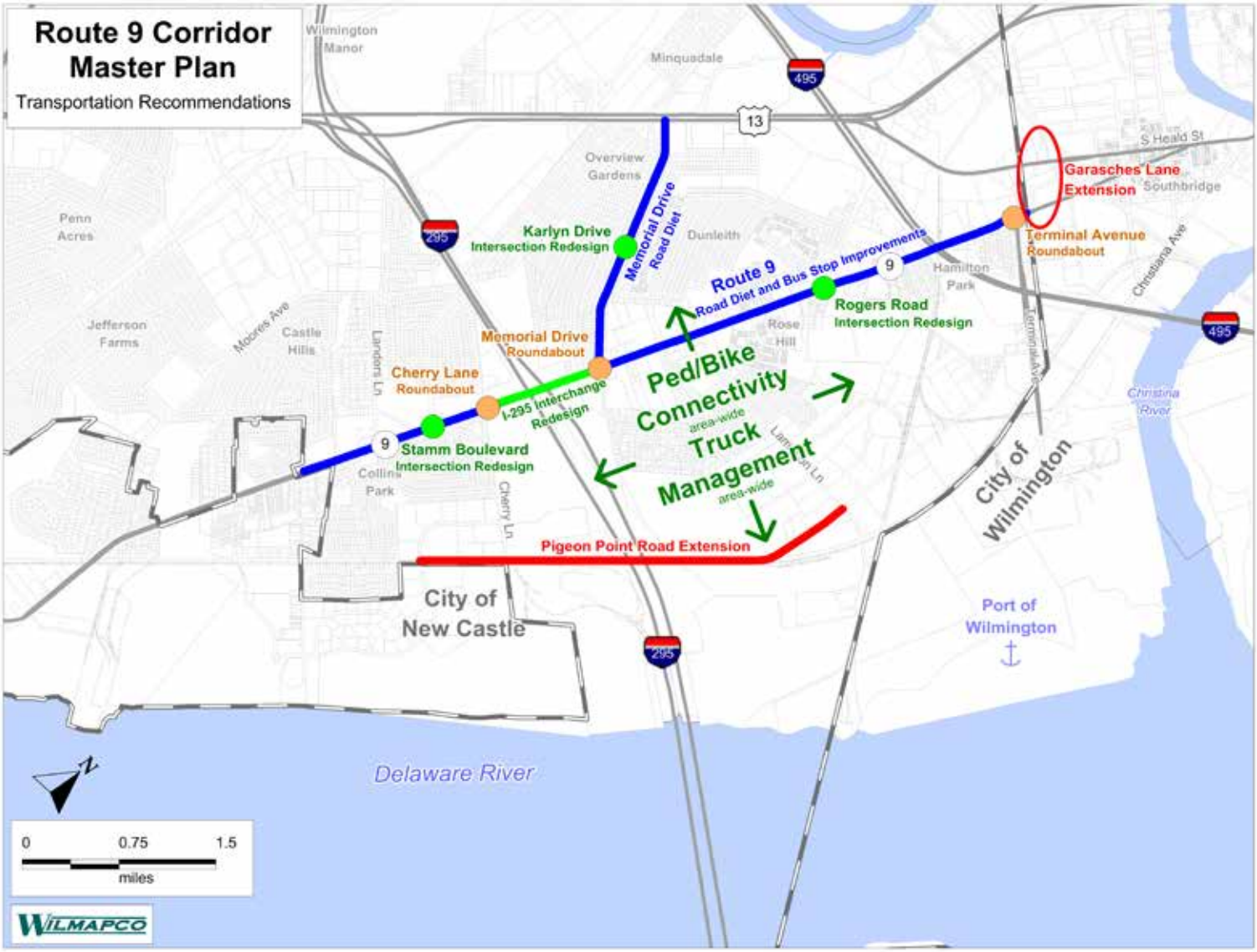
The second Public Visioning Workshop was held on November 29, 2016. In addition, WILMAPCO staff presented the Route 9 Corridor Master Plan to McCullough Middle School engineering students on December 1, 2016. Direct links to materials are listed below:

» Feedback and analysis from second workshop and students:
http://www.wilmapco.org/Rt_9/Workshops/Workshop2_Students_Comments.pdf

» Boards with comments from second workshop and students:
http://www.wilmapco.org/Rt_9/Workshops/Workshop2_Students_Boards.pdf

APPENDIX E.

Transportation recommendations map



DESIGNCOLLECTIVE

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PLANNING
INTERIORS
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GRAPHICS