NEW CASTLE COUNTY

Transportation Operations Management Plan

December 2022 Report

Rybinski ENGINEERING

DelDOT

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ABBREVIATIONS AND GLOSSARY

CMP: congestion management process

CMS: critical movement summation

Free flow: greater of the 15th percentile travel time and the travel time at the posted speed limit (for this report, synonymous with uncongested travel time)

Hotspot / congestion hotspot: roadway location identified as an area of focus for the TOMP

ITMS: integrated transportation management system

Longest-measured: 95th percentile travel time

LOS: level of service

MPO: Metropolitan Planning Organization

Non-recurring congestion: infrequent traffic congestion, which may be predictable (e.g., caused by a special event) or unpredictable (e.g., caused by a storm or crash)

Recurring congestion: traffic congestion that occurs on a regular basis

RTP: regional transportation plan

TID: transportation improvement district

TMC: DelDOT Transportation Management Center

TOMP: transportation operations management plan

TTI: travel time index (full definition on page 21)

TTR: travel time reliability (full definition on page 21)

Uncongested travel time: greater of the 15th percentile travel time and the travel time at the posted speed limit (for this report synonymous with free flow)

WILMAPCO: Wilmington Area Planning Council

Worst-measured: the result that indicates the most congestion across the AM, PM, and summer weekend peaks

Data note: Travel time and traffic volume data presented in this report were collected by DelDOT's ITMS device network throughout 2019. Travel time data is stored on computer servers at DelDOT TMC and processed using BluSTATs software. Traffic volume data can be accessed using DelDOT TMC's EOps system.

EXECUTIVE SUMMARY

The New Castle County Transportation Operations Management Plan (TOMP) applies DelDOT's extensive traffic data to identify congested areas in New Castle County and recommend solutions.

New Castle County's densely developed nature, coupled with growth in the southern part of the county, means that the area experiences more traffic congestion than is found in Kent and Sussex Counties. Analysis of traffic data revealed "hotspots" throughout the county where travelers experience delays, particularly during peak hours. **Figure 1** shows the areas of New Castle County where the data show congestion is most prevalent. While the data used for this report came from 2019, before the COVID-19 pandemic affected travel patterns, monitoring has shown that afternoon peak hours, which experienced the most congestion prior to the pandemic, have returned to roughly pre-pandemic levels. That finding confirms that this report's recommendations will remain valid into the future.

The improvements recommended to reduce congestion and improve travel times in these hotspot areas can be summarized in a few broad categories:

- Improve capacity not only with major capital projects but also through signing, striping, and geometric modifications
- Add monitoring devices to provide more robust data regarding the incidence and causes of congestion
- Engage in collaborative transportation planning, working across agencies to address the effects of population growth and understand the implications of emerging issues

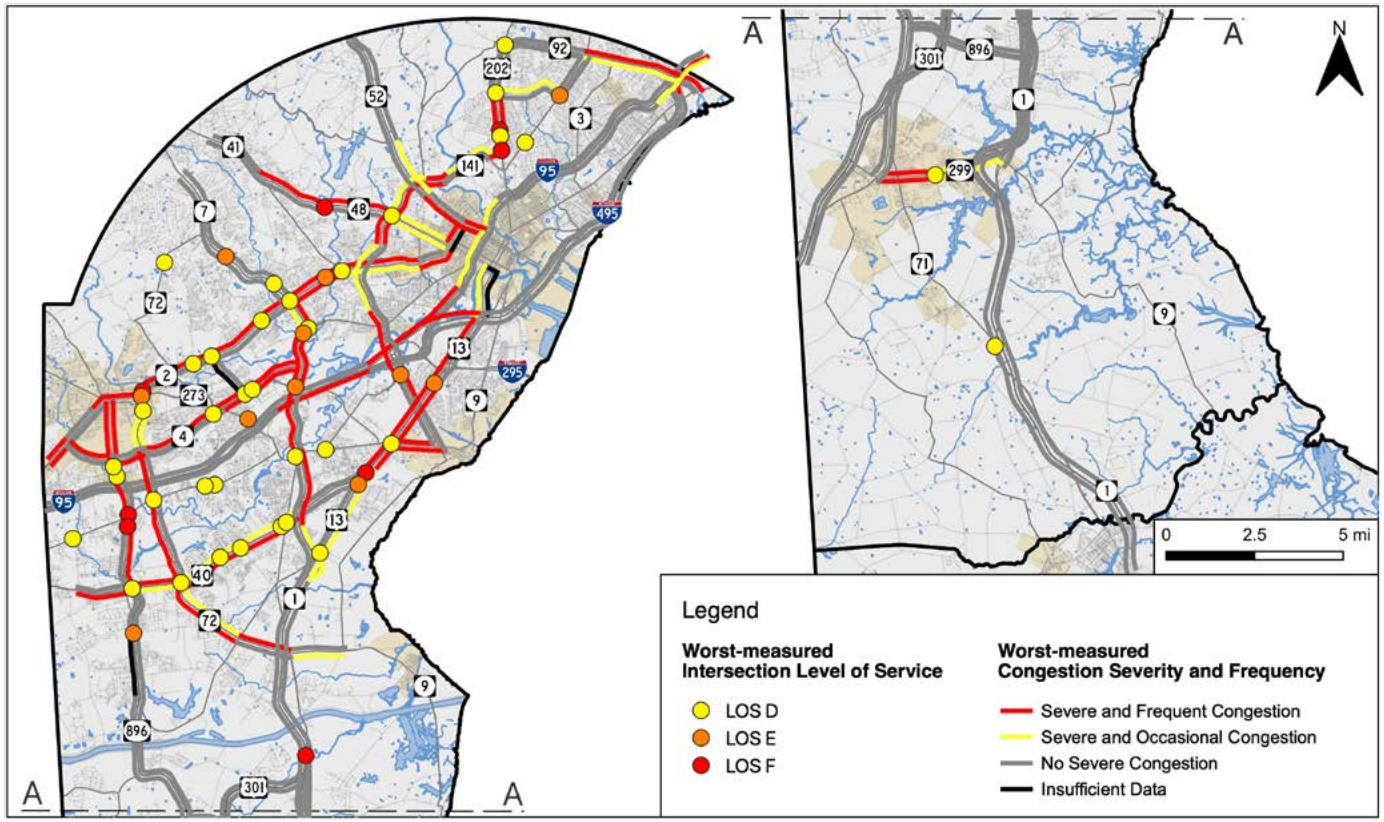


Figure 1: Areas of New Castle County where congestion is most prevalent.
Congestion severity and frequency and intersection level of service (LOS) are defined on pages 28 and 30, respectively.

USING THIS REPORT

The Transportation Operations Management Plan (TOMP) is Delaware's comprehensive approach to understand traffic mobility across the state. It applies big data from the Delaware Department of Transportation (DelDOT) Transportation Management Center (TMC) to identify traffic operations challenges, recommend solutions, and track changes. DelDOT issues and updates TOMPs for each of Delaware's three counties on a rotating basis. This plan is for New Castle County. The Sussex County TOMP will be updated next, followed by Kent County.

The purpose of the New Castle County TOMP is to give DelDOT and agency partners the data they need to make informed decisions to improve multimodal mobility in the county. This TOMP will feed into DelDOT's project prioritization process, which uses not only operations data but also inputs such as safety, environmental justice, and multimodal mobility data to select corridors for improvement. Identified projects become part of the Capital Transportation Program, a document that identifies anticipated capital investments, turning the recommendations on these pages into reality. The goal is to keep New Castle County moving to make it an even greater place to live, work, and play.

The last New Castle County TOMP was published in 2010. Since then, a range of changes have occurred, which are reflected in the analysis and findings of this report.

- The system of traffic data and monitoring has grown significantly along with the data it produces.
- New major components of the transportation network have been completed, such as the reconfiguration of the I-95 and DE 1 interchange and the opening of US 301.
- Development continued to occur in southern New Castle County, and other national and regional economic shifts have spurred changes to land use and transportation.

DelDOT's TMC and Planning Division analyzed operations data to identify congestion hotspots where congestion lengthens trips and keeps drivers on the road longer than necessary. Data analysis focused on travel time and traffic volume measures to assess the frequency and severity of congestion. Other measures such as intersection capacity were used at specific locations to give a more detailed picture.

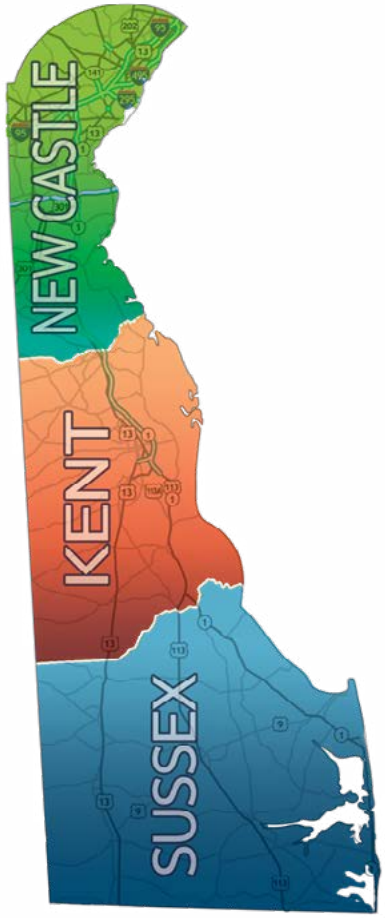
This TOMP recommends overarching strategies that are likely to result in improved multimodal mobility as well as solutions to specific problems in each hotspot. Some solutions are already underway, some can be accomplished quickly in the short term, and others involve longer-term projects.

This plan is composed of three main components:

1) **About New Castle County**, which gives an overview and context of the roadway system

2) **Traffic Analysis and Trends**, which summarizes the data analyses and process of identifying the hotspot corridors

3) **Recommendations**, which focus on the 12 identified hotspots, profiling their conditions and recommending actions to enhance mobility for each



Each of Delaware's three counties has a Transportation Operations Management Plan, which is updated periodically

The work and objectives of a wide range of entities complement and integrate with the TOMP. Page 7 shows these organizations and how the TOMP relates to them.

Working together for mobility and accessibility in New Castle County

Movement of goods and people, and the associated traffic, are critical factors influencing a community's quality of life. These factors are reflected in both the New Castle County Comprehensive Plan and the Regional Transportation Plan (RTP) covering New Castle County. These two documents define the long-range vision for the county's land use and transportation system. Both feature goals that relate to managing mobility and accessibility, including:

- **A strong, resilient economy**
- **Multimodal and equitable access to jobs, education, housing, goods, services, and recreation**
- **Preservation of the environment, including air, water, and the landscape, and prevention/mitigation of climate change**
- **Efficiency and fiscal sustainability of the built environment/infrastructure**

This New Castle County TOMP has been developed in collaboration with Wilmington Area Planning Council (WILMAPCO) and other partners with an aim of achieving these shared community goals. WILMAPCO is the metropolitan planning organization (MPO) for New Castle County as well as Cecil County, Maryland. WILMAPCO adopted its 2050 RTP in March 2019 and continuously analyzes the local transportation system performance with an objectives-driven congestion management process (CMP).

Achieving those broad community goals requires integration of transportation and land use strategies. To do so, stakeholders must start by recognizing the existing community context in which a roadway operates as well as its desired future. Subarea, corridor, and comprehensive development plans are all resources that provide such context. Recommendations in this TOMP generally emphasize opportunities for motor vehicle mobility. However, prior to implementing a recommended strategy, stakeholders should reference community growth and development plans to ensure the strategy balances mobility and safety for all modes as appropriate for the community context.

The following section summarizes New Castle County's landscape and communities. Further details regarding community context of today and desired conditions of the future can be found in the county's most recent comprehensive plan, NCC@2050, as well as the comprehensive plans of the municipalities in the county.

How TOMP is used by DelDOT and stakeholders

Traffic / TMC

- Expand integrated transportation management system (ITMS) coverage
- Enhance multimodal transportation management with data-driven understanding of operations
- Track progress of TOMP recommendations
- Promote usage of traveler information

Planning

- Incorporate TOMP methods into project prioritization
- Apply expansive data to before-and-after studies
- Incorporate TOMP recommendations into the capital program
- Coordinate area-specific TOMP strategies with community-level planning: corridor plans, comprehensive plans, transportation improvement districts, complete communities enterprise districts
- Leverage TOMP for the federally required congestion management program (through MPOs)

Community Relations

- Promote mobile app and other public notification systems
- Market New Castle County mobility choices
- Promote DelDOT projects that will address congestion and multimodal mobility

Project Development

- Use integrated transportation management system devices to collect study and design data for projects
- Assess the impact of projects on surrounding roadways and modes
- Refer to expansive data to make construction phasing decisions

ABOUT NEW CASTLE COUNTY

New Castle County is home to just over 571,000 people, which is over half of the State of Delaware's population. The county is characterized by diverse land use, with predominantly suburban development patterns but also rural farm areas and more densely developed cities and towns, such as Wilmington and Newark. From 2015 to 2020, New Castle County saw an average population increase of 0.2% per year. The growth rate has been slowing and is expected to slow further in the coming decades. The share of New Castle County residents over the age of 65 is expected to grow from its present share of about 16% to roughly 23% by 2050, a factor that will influence population mobility needs and patterns in the future.

Wilmington, the largest city in Delaware, has maintained a population of approximately 71,000 for the last 30 years. Wilmington also is an economic and cultural center of the state. The city features industry such as the Port of Wilmington, numerous museums, major governmental offices and courthouses, secondary and post-secondary educational institutions, minor league sports complexes, and a skyline of office buildings. Roughly 40,000 jobs are located within the city, and thousands more are in the immediate vicinity.

Newark, the third-largest city in Delaware, is home to the University of Delaware, which has over 20,000 students. The influx of students during the school year and major events (graduation, sporting events, concerts, etc.) on campus have significant impacts on the transportation system.

Much of the area's industry and commerce are concentrated along Interstate 95 through northern New Castle County, including regionally significant destinations such as the Christiana Hospital, Christiana Mall, online retail distribution centers, and some of the state's largest office complexes.

Traffic Generators in New Castle County

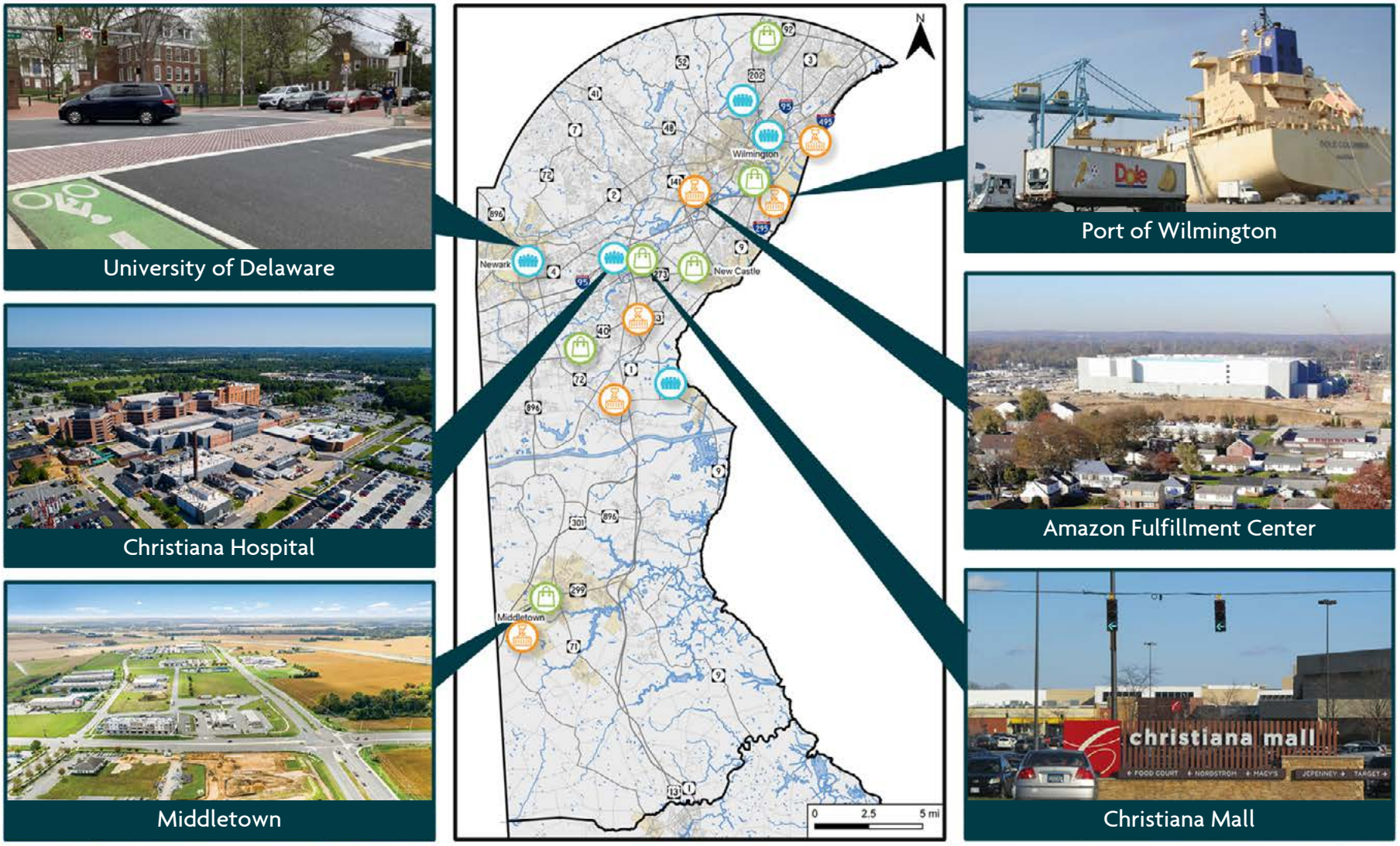


Figure 2: Map of significant traffic generators, by type, in New Castle County.

The town of Middletown is in the southern half of the county, south of the Chesapeake and Delaware Canal. For the past few decades, population growth in the greater Middletown area, including Odessa and Townsend—collectively referred to as "MOT"—has accounted for an increasingly large share of total population growth in the county. MOT is a suburban bedroom community, providing residences for many who travel to jobs further north, while the rest of the southern half of the county maintains rural development patterns. Farming, and increasingly logistics and light industrial activity, impact the landscape and transportation system in this part of the county.

Land use patterns and the design and function of the transportation system lay the foundation for mobility in a region. **Figure 2** shows concentrations of commercial, industrial, and institutional land uses across the county, represented as "employment," "shopping," or "freight." These types of uses generally attract vehicle trips at intense levels and contribute to recurring congestion in parts of New Castle County.

Figure 3 represents locations in the county that generate non-recurring congestion associated with planned events. Other sources of non-recurring congestion include weather events, such as flooding of low-lying and coastal roadways, and construction and traffic incidents. The Congestion and Delay section on page 21 explains more about different types of congestion across New Castle County.

The transportation system and its traffic influence, and are influenced by, the community. For example, the transportation system in a highly built-up urban area, where work, home, and other daily needs are close together, tends to feature a strong network of sidewalks and transit. This pattern is significantly different from a transportation system in a rural or suburban area, which tends to be more focused on motor vehicle travel.

The population, economy, and landscape of New Castle County have evolved in parallel with its transportation system of roads, transit, sidewalks, and paths. A century ago, New Castle County was predominantly local in nature with limited links—roads, rail, and water—for longer trips.

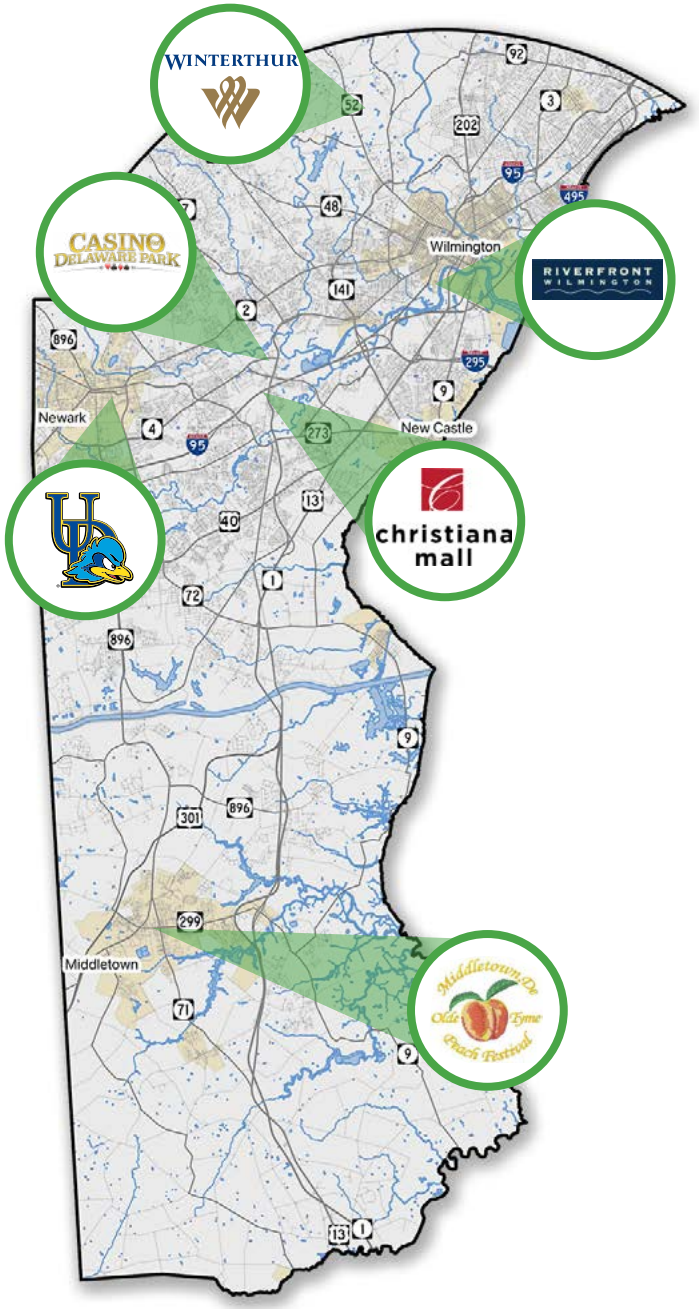


Figure 3: Some locations of planned special events in New Castle County, which are associated with non-recurring congestion.

ROADWAYS AND VEHICLE TRAFFIC

The county now has an expansive network of roads that serve most trips. **Figure 4** illustrates the system's most significant roadways which are the focus of this TOMP.

Limited-access Roadways

The I-95 corridor is a major limited-access corridor that serves regional traffic connecting the Philadelphia and New York metropolitan areas to the north with the Baltimore and Washington, DC, metropolitan areas to the south. I-95 serves both regional and local traffic. I-495 provides a bypass carrying most through traffic around Wilmington, so I-95 in the city carries primarily local trips. I-295 primarily serves regional through traffic connecting to the New Jersey Turnpike via the Delaware Memorial Bridge.[1]

DE 1 is a north-south freeway that extends south from I-95 and runs the length of the state, connecting to Dover, the Delaware beaches, and regional routes to the rest of the Delmarva Peninsula.

US 301 is a north-south freeway that serves local traffic around Middletown and is a regional alternative to I-95. It connects New Castle County to the Washington, DC, metropolitan area via US 50 and the Chesapeake Bay Bridge.

DE 141 has limited access between I-95 and DE 2 but elsewhere is primarily a signalized arterial roadway.

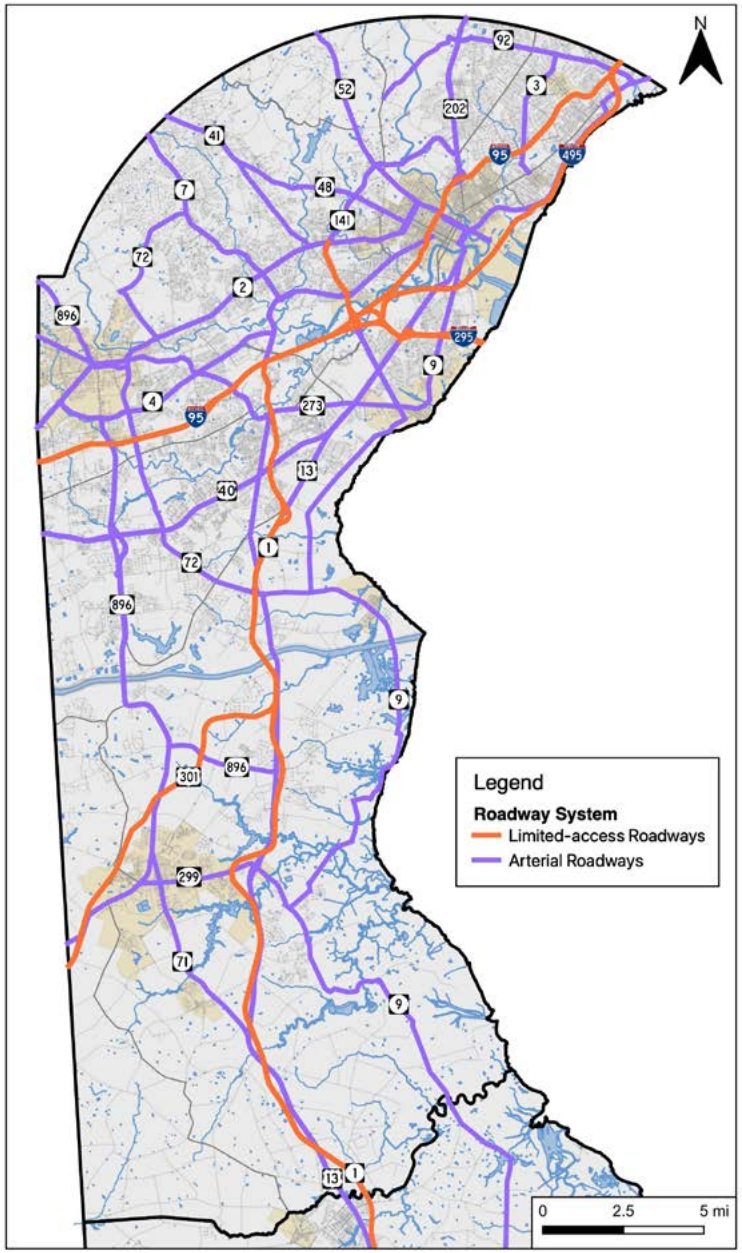


Figure 4: New Castle County's most significant roadways are the focus of the analysis for this TOMP.

[1] I-295 is maintained by the Delaware River and Bay Authority. DelDOT is not responsible for maintenance and operations along I-295 beyond the interchange with I-95.

Arterial Roadways

US 13 is a north-south arterial roadway that serves local traffic through the Wilmington area, runs adjacent to the New Castle Airport, and is parallel to DE 1 in the southern half of New Castle County.

US 202 is a north-south arterial roadway with access points serving hundreds of businesses including shopping centers, restaurants, and office parks. US 202 also serves as a regional roadway connecting I-95 and Wilmington to West Chester and the western Philadelphia metropolitan area.

US 40 is an east-west arterial roadway with access points serving industrial, commercial, and residential properties. US 40 runs parallel to I-95 and joins with US 13 on the east side of the county.

DE 141 loops around the west side of the Wilmington area and serves as a local arterial roadway. DE 141 has limited access between I-95 and DE 2.

DE 2, DE 4, DE 7, DE 48, DE 72, DE 92, DE 273, DE 299, and DE 896 are other major arterial roadways that primarily serve local New Castle County traffic.

Recently Completed Improvements

Since publication of the 2010 New Castle TOMP report, the transportation network has undergone many improvements to maintain existing roads, improve safety, and reduce congestion. **Figure 5** and the accompanying table present several of the projects that have been completed. The Hotspots section of this report features other local improvements that have been completed and/or are in progress toward improving mobility.

Project #	Project Name	Completed
1	**DE 141 Interchange with I-95** In just over two years, this project reconstructed each of the eight ramps and four bridges that make up the I-95 & DE 141 interchange while also improving pedestrian and transit facilities in the area and providing additional capacity at the intersection of DE 141 and Commons Boulevard. The changes provided necessary improvements to safety and capacity while extending the life of the interchange.	2021
2	**DE 1 Southbound Auxiliary Lane between DE 273 and US 40** The DE 1 southbound auxiliary lane project widened DE 1 to provide a 1.5-mile auxiliary lane to provide congestion relief and make lane changes safer for traffic entering and exiting the mainline.	2020
3	**Margaret Rose Henry Bridge** The Margaret Rose Henry Bridge provides a direct connection between the Wilmington riverfront and US 13 and I-495. This connection supports new development on both sides of the Christina River in Wilmington and provides improved pedestrian and bicycle facilities, encouraging a shift away from personal vehicles for locals making short trips across the river.	2020

Project #	Project Name	Completed
4	**Wilmington Signals Upgrade and Integration** In preparation for the multi-year I-95 Restore the Corridor project, the City of Wilmington and DelDOT partnered to upgrade 218 City traffic signals and integrate them into DelDOT's traffic signal system. In addition to the integration of signals, the city-state partnership also added 21 Bluetooth sensors and 22 traffic cameras for travel time and congestion monitoring. This effort enabled remote control of the integrated signals and facilitated seamless transportation management across city-state borders.	2020
5	**US 301** The new section of US 301 provides a freeway connection between Maryland and DE 1 in southern New Castle County. The road allows travelers to bypass 29 at-grade intersections that they previously had to navigate. It also shifts freight transport off local roads and communities and onto the new freeway. The new US 301 mainline is also the first road in Delaware to make use of all-electronic tolling technology.	2019
6	**Diverging Diamond Interchange at DE 1 and DE 72** In order to improve safety for all modes of travel and relieve congestion, DelDOT constructed the State's first ever diverging diamond interchange at DE 1 and DE 72. The new interchange reduces opportunities for collisions, shortens pedestrian crossings, and provides traffic calming while simplifying signal operations.	2016
7	**DE 1 Northbound Auxiliary Lane between US 40 and DE 273** The DE 1 northbound auxiliary lane project widened DE 1 to extend the on-ramp from the US 40 interchange as a continuous lane to the off-ramp to DE 273. The previous configuration caused delays because it did not give drivers enough room to merge onto DE 1.	2015
8	**I-95 and DE 1 Interchange** The reconstruction of the I-95 and DE 1 interchange took place as part of a multi-project interstate improvement program that also involved projects dealing with I-95 widening, the I-95 toll plaza in Newark, and the Churchman's Road and DE 7 intersection. The project alleviated congestion near the Christiana Mall by providing elevated connecting ramps from DE 1 and I-95.	2014
9	**I-95 Toll Plaza Project** The I-95 Newark toll plaza was reconstructed to provide highway speed E-ZPass lanes; the project also reconfigured both the northbound and southbound approaches. The changes reduced delays and improved safety by reducing the potential for rear-end crashes.	2011

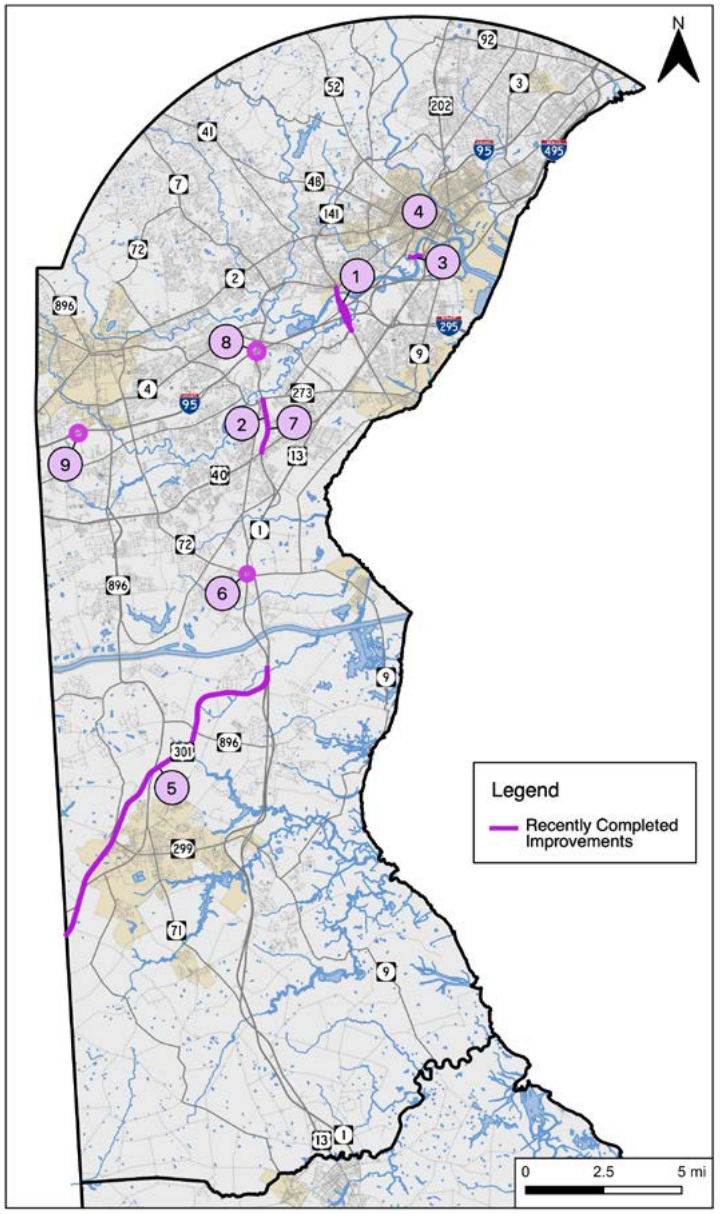


Figure 5: Map of recently completed improvements (not exhaustive).

TRANSIT, WALKING, AND BICYCLING

Personal travel in New Castle County is predominantly done by car. **Figure 6** shows the distribution of travel to work by mode of travel.

Transit service stretches across New Castle County, with service concentrated in the population-dense areas in the northern part of the county. Amtrak's Northeast Corridor has stops in Newark and Wilmington. SEPTA regional rail serves those two stations as well as Churchman's Crossing and Claymont. DART provides fixed-route transit services throughout the county. Transit services are concentrated around transit centers in Wilmington and Newark. Park and Rides are conveniently located along major roadways such as Prices Corner, Christiana Mall, Peoples Plaza, DE 896/DE 4, and DART's mid-county facility. Within New Castle County, six DART routes account for at least 50% of total ridership: 6, 13, 4, 5, 33, and 2. The transit system as a whole and these routes in particular factor into mobility at micro and macro levels in the county. These high-ridership routes are called out in the Recommendations section of this report where they are directly related to any of the hotspots. The City of Newark and University of Delaware also operate bus services in Newark, and Cecil Transit provides connections with DART at the People's Plaza Park and Ride in Glasgow and with SEPTA at the Newark Transportation Center.

Walking and bicycling make up a small share of travel in New Castle County. However, some areas of the county that have both substantial non-motorized infrastructure, like sidewalks and shared use paths, and a relatively dense mix of land uses achieve higher rates of walking and bicycling. For example, Wilmington has one of the state's highest rates of walking and bicycling, which together make up 18% of residents' travel to work. These modes are substantial for local travel in communities like Newark as well.

The benefits of travel by non-auto modes (transit, walking, and bicycling) are increasingly recognized and sought for their contribution to enhanced quality of life in a community. They improve health and equity while reducing vehicle miles traveled and associated congestion. The transit, walking, and bicycling networks are small compared to the county's roadway network. However, the state's Complete Streets policy, local bicycle and pedestrian planning, and other walking and bicycling efforts have resulted in expansion and enhancement of facilities for walking and bicycling. One example is the roughly six-mile-long Jack A. Markell

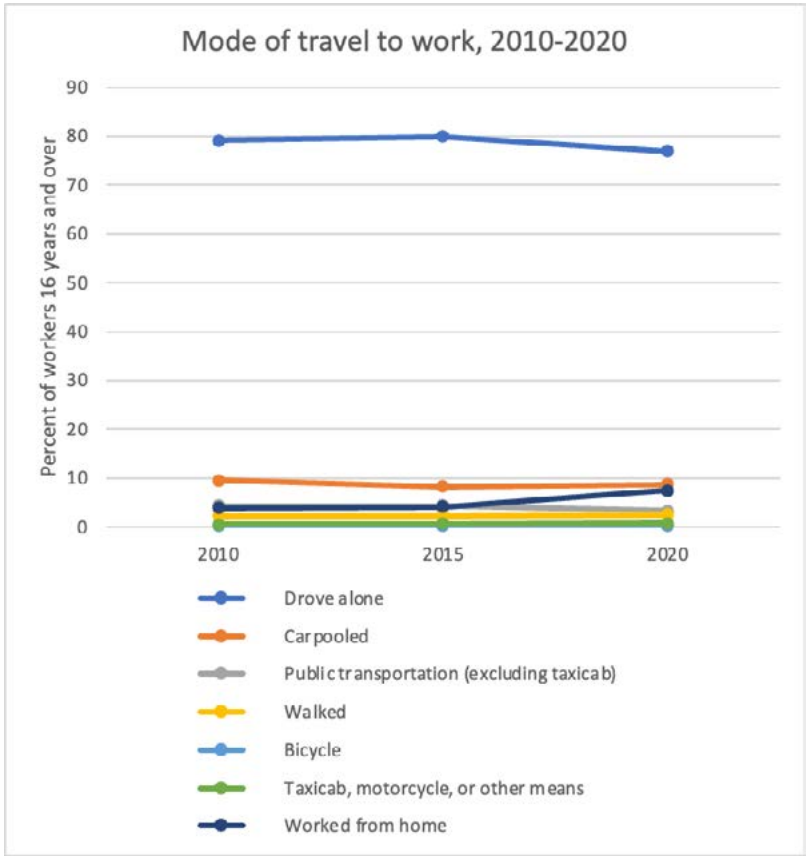


Figure 6: Travel modes used by New Castle County residents to go to work. (Source: ACS 5-year estimates, US Census Bureau)

Trail linking New Castle and Wilmington. Comprehensive land use plans are also generally encouraging land use patterns and design that can contribute to more balanced use of transportation facilities and reduce congestion.

While the TOMP focuses on evaluating automobile congestion and mobility, all modes are important to the overall effectiveness of county and statewide transportation systems and are reflected in the recommendations.

Transportation facilities for all modes of travel

Delaware adopted a Complete Streets policy in 2009. The concept of Complete Streets reflects the principle that people of all ages, abilities, incomes, races, and ethnicities should have safe, comfortable, and convenient access to community destinations by whichever mode of travel they choose. For over a decade, DelDOT has implemented the policy and expanded the network of walking and bicycling facilities in Delaware. These facilities also support a more robust transit system by enhancing access to and from transit stops.

The following links provide additional information about Complete Streets and transit, walking, and bicycling in New Castle County:

- **The University of Delaware Complete Communities Toolbox completecommunitiesde.org/planning/complete-streets**
- **DART First State transit service dartfirststate.com**
- **WILMAPCO New Castle County Bicycle Plan wilmapco.org/bikencc**
- **DelDOT Bicycle and Pedestrian Count Program Guide deldot.gov/Publications/plans/bikeandped/pdfs/DelDOT_Count_Program_Guide.pdf**
- **New Castle County Connecting Communities Initiative delawaregreenways.org/new-castle-county-connecting-communities-initiative**
- **Delaware Greenways delawaregreenways.org**
- **WILMAPCO's plans and reports (including many local and corridor-focused multimodal plans) wilmapco.org/plans-and-reports**

FREIGHT IN NEW CASTLE COUNTY

The freight system in New Castle County includes air, rail, water, and roadway transportation. Trucks carry more than 68% of all Delaware freight, according to the Delaware 2022 State Freight Plan. **Figure 7** shows the national highway freight network in New Castle County. Interstates 95, 295, and 495 make up the primary highway freight system in Delaware and bring out-of-state traffic into and through the state.

With the rapid expansion of online retail, freight and associated distribution of goods increasingly impacts traffic in New Castle County. Commercial vehicles are included in the traffic data analyzed and reflected this report. However, the statewide Delaware Freight Plan (2022) looks more closely at the challenges, needs, opportunities, and solutions associated with freight. Some concerns associated with freight and commercial motor vehicles, which have implications for overall roadway mobility, include vehicle size, movement, speed, parking, and safety. The national highway freight network is coincident with the system of roads that serve a wide range of users. The implications of freight and recommendations for balancing needs are further addressed in the Recommendations section of this report.

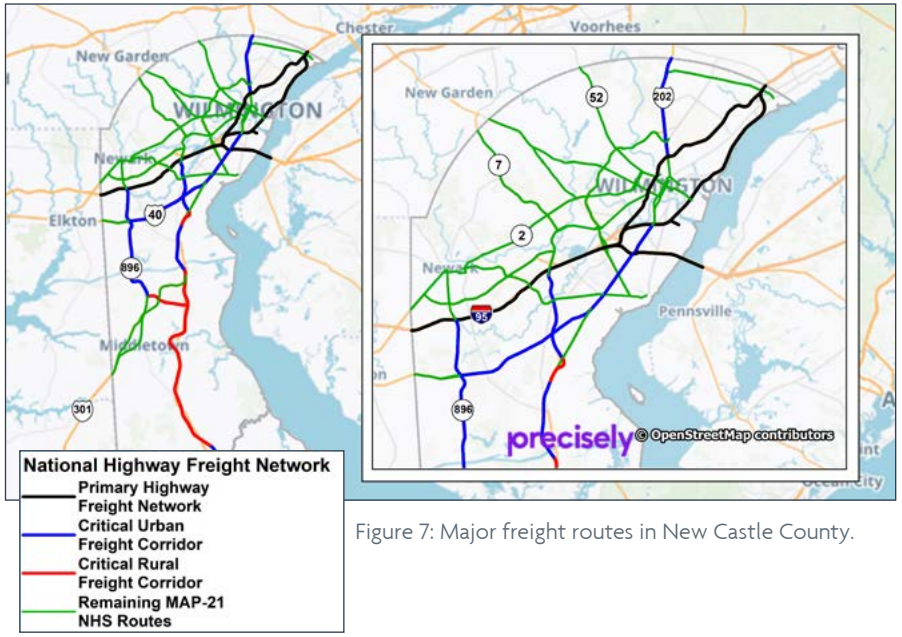


Figure 7: Major freight routes in New Castle County.

TRAFFIC ANALYSIS AND TRENDS

DAILY TRAFFIC GROWTH

A review of daily traffic volumes on New Castle County's largest roads between 2017 and 2019 reveals that volumes largely stabilized, with very little annual growth observed. In 2018, volumes decreased on I-95 and DE 141 when compared to the year prior. **Figure 8** shows the data. These trends are in line with changes to the county's population growth rate, which has also slowed. With much of New Castle County north of the C and D Canal already well developed, future increases in daily traffic will likely be driven by the communities that are still growing south of the canal.

COVID-19 PANDEMIC

Since March 2020, the COVID-19 pandemic has changed traffic trends across the transportation system. Due to the unsettled impacts of the pandemic, traffic data from 2019 was analyzed for this report as an established, stable baseline for planning purposes. Area-specific analyses using more recent data show that daily traffic volumes in New Castle County have generally returned to approximately pre-pandemic levels, as shown in **Figure 9**. While traffic volumes during the AM peak have not returned to pre-pandemic levels, PM peak volumes have. Since analysis of congestion hotspots shows that the PM peak is more congested than the AM peak, the congestion hotspots identified later in this report are still valid.

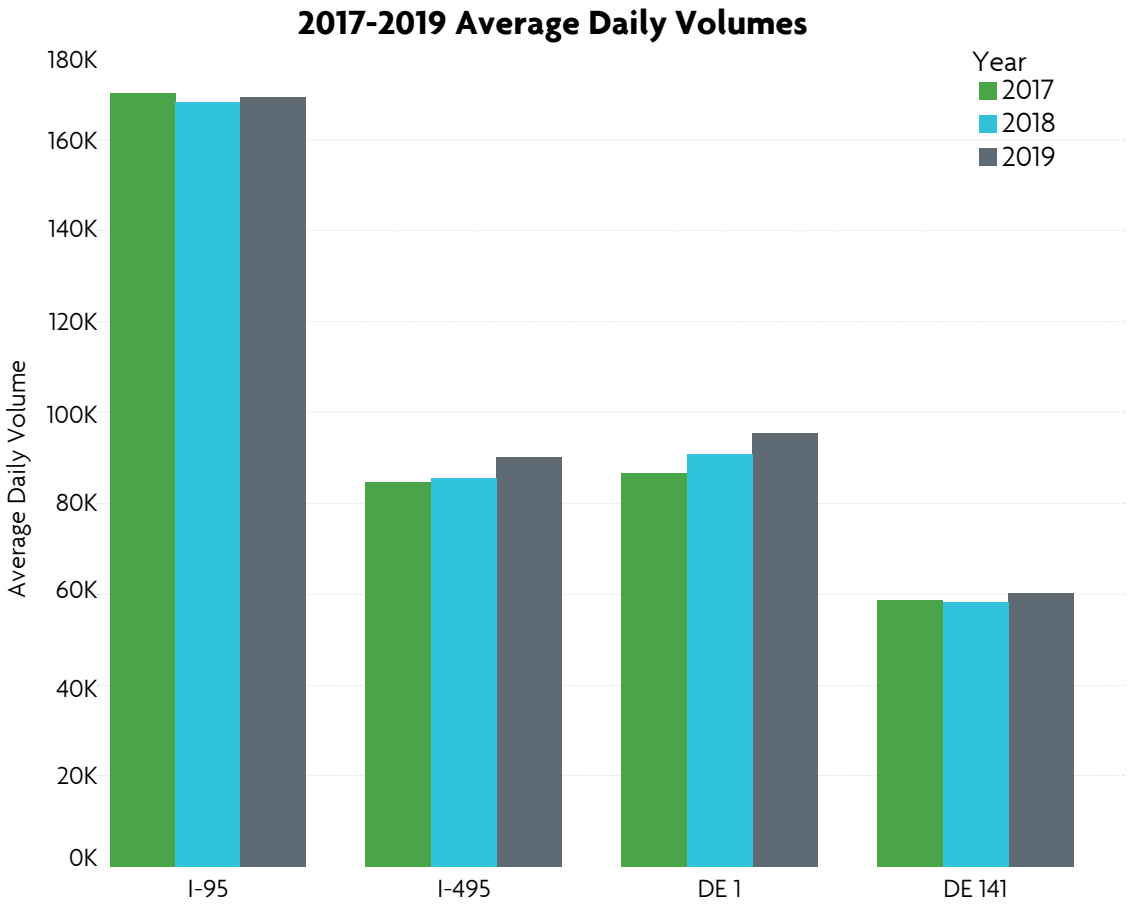


Figure 8: The 2017-2019 average daily volumes reflect the population growth and demographic trends in New Castle County.

USING DATA TO MONITOR TRAFFIC OPERATIONS

DelDOT's 24/7/365 operations data supports traffic analysis and reveals traffic volume trends along New Castle County's major corridors and roadways, as well as throughout Delaware. See the DelDOT ITMS and TOMP websites for more information.

This report is based on data from an extensive network of devices that make up DelDOT's ITMS. Radar detectors capable of capturing vehicle volumes, speeds, and classification; in-pavement traffic counters; cameras that allow employees and the public to see conditions in real time; water level sensors that act as a real-time flood warning system; and Bluetooth travel time sensors enable DelDOT to monitor traffic in real time, 24/7, and to look back at historical data to pull out trends for future planning.

This TOMP predominantly relies upon volume data from Wavetronix and signal system loop detectors as well as travel time data from Bluetooth travel time sensors. These ITMS devices are shown in **Figure 10**. Since 2019, the Bluetooth travel time system has expanded further along state corridors in Wilmington. These corridors may be included in future TOMP reports.

A key goal of the TOMP program is to identify congested areas so that recommended improvements can be developed and then be implemented. Congestion occurs when demand (the number of people who want to use a road) exceeds capacity (the number of users that the road is equipped to handle). Determining where demand exceeds capacity requires layering multiple types of operations data.

By looking at **volume** data, we can identify peak periods when there are the highest number of travelers on the roadway, congested areas, growth trends, seasonal and day of week fluctuations, and more. **Travel time** data tells us how long it takes road users to get from point A to point B, regardless of what the volume is. Layering these two types of data together, DelDOT now has a good sense of where travelers experience delay, and for how long, at any given time of day.

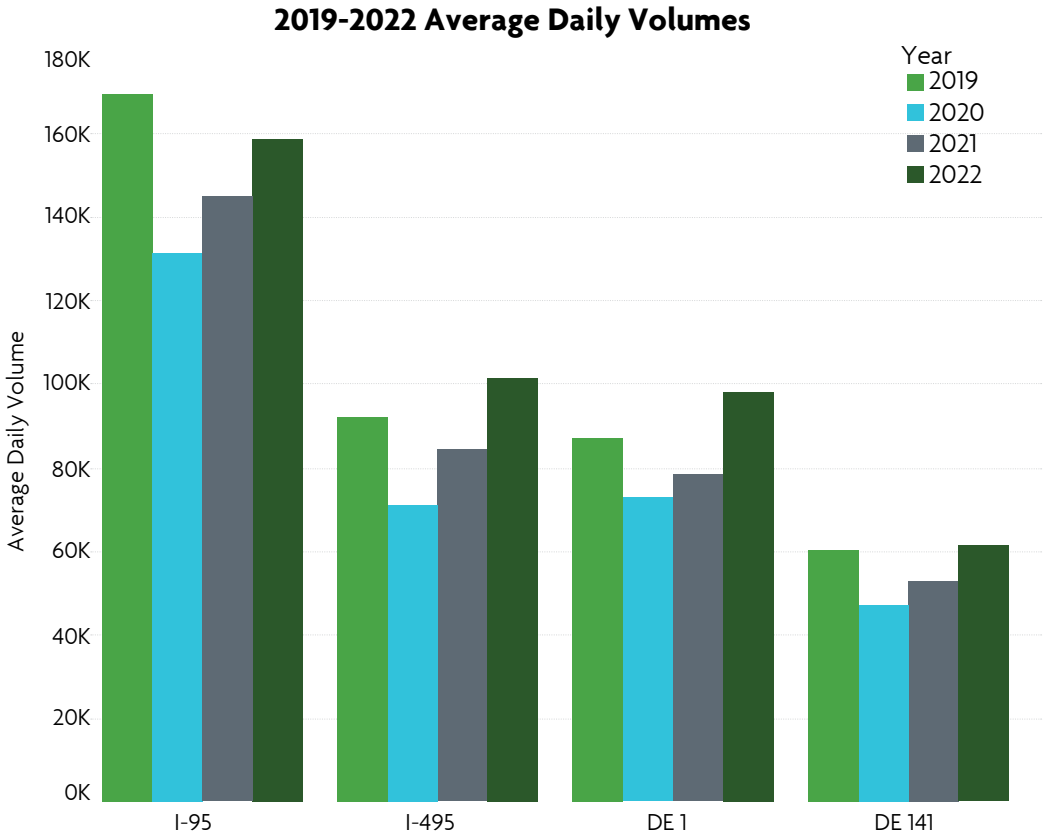


Figure 9: The 2019-2022 average daily traffic volume trends reflect the COVID 19 pandemic impacts.

Layering these findings once more with critical movement summations, or CMS, we can further identify any specific movements at an intersection that may be contributing to delay. For CMS analysis, vehicles are counted as they pass through an intersection. If there is congestion or inconsistent traffic flow, the count may not perfectly reflect traffic demand. These traffic counts are an effective starting point to estimate traffic demand, and by additionally considering travel time measurements, analysts can get a better picture of congestion and how to fix it. In these scenarios, a "good" CMS intersection (indicating sufficient capacity) may be surrounded by "bad" travel time links (indicating delay).

A more detailed look at using data to monitor traffic operations can be found on the TOMP website.

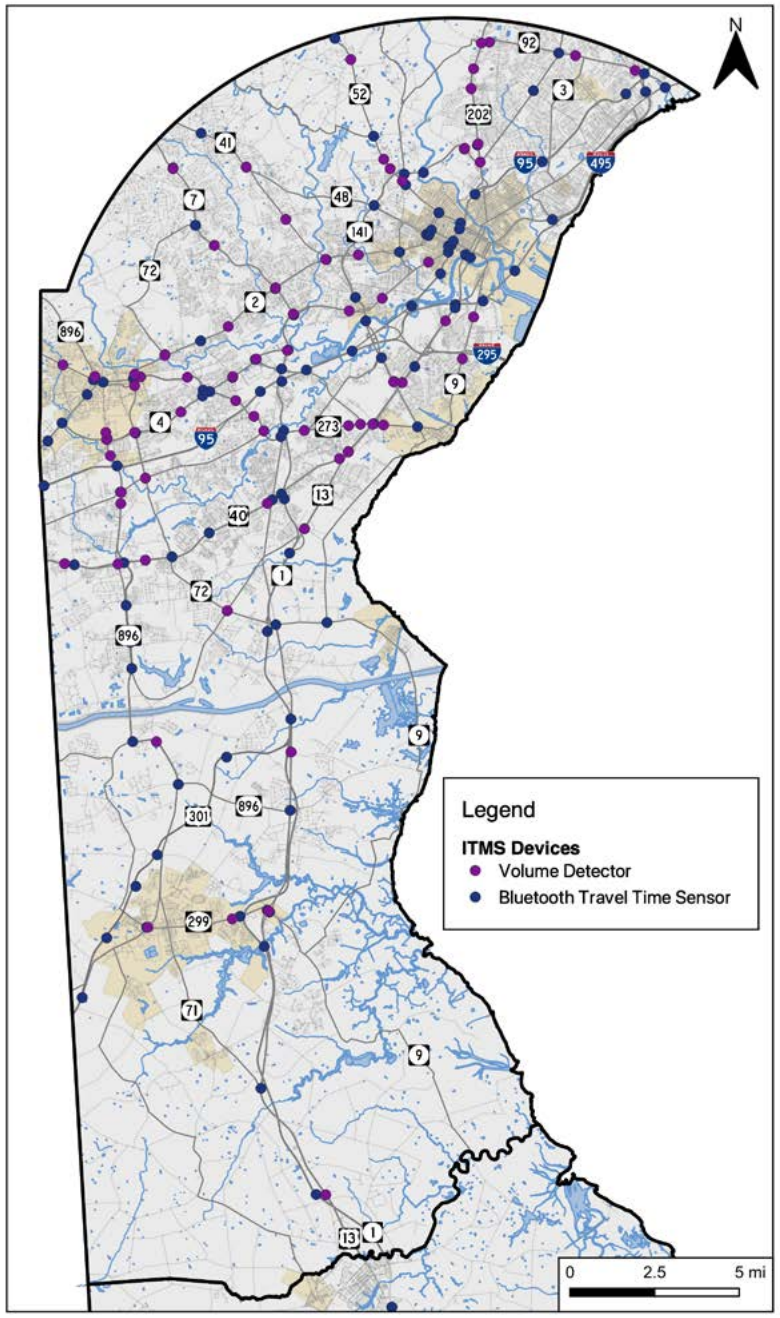


Figure 10: Devices used for developing this New Castle County TOMP.

TRAFFIC PEAKS AND TRENDS

Traffic in New Castle County is driven by commuters on weekdays (Tuesdays through Thursdays) with regular AM and PM peak periods. Since New Castle County contains so many residential areas, schools, and employment centers, these peaks typically last longer and are more variable than in Kent or Sussex Counties. Traffic volumes are highest between 6 AM and 9 AM and 3 PM and 6 PM, as shown in **Figure 11** and **Figure 12**.

Traffic volumes during summer weekends (Saturdays and Sundays from Memorial Day weekend through Labor Day weekend) are highest between 9 AM and 5 PM, as shown in **Figure 13** and **Figure 14**. Delaware's section of the interstate system and DE 1 serve as important connectors to travel destinations such as major cities and beach communities along the east coast.

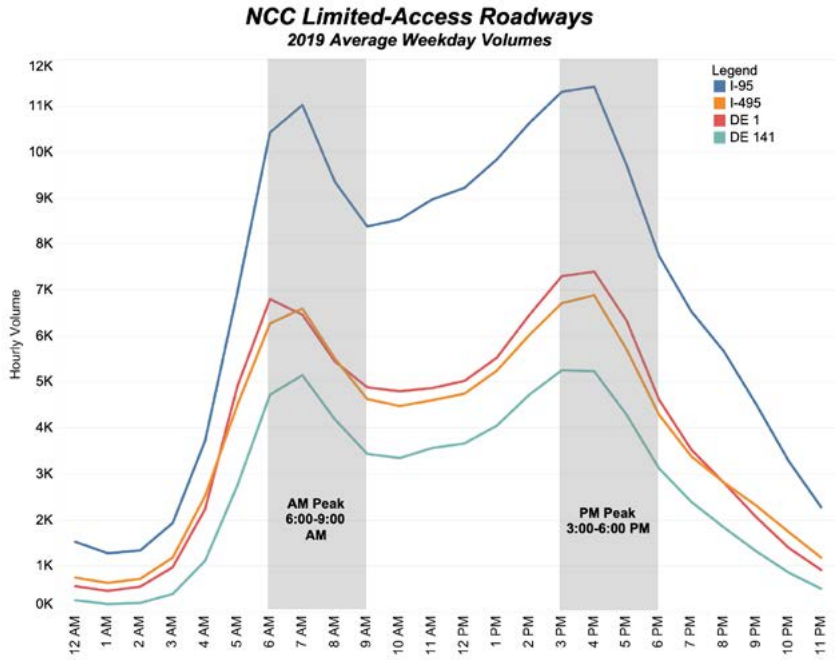


Figure 11: Average hourly weekday volumes on limited access roadways are highest during the AM and PM peak periods when residents travel to and from work.

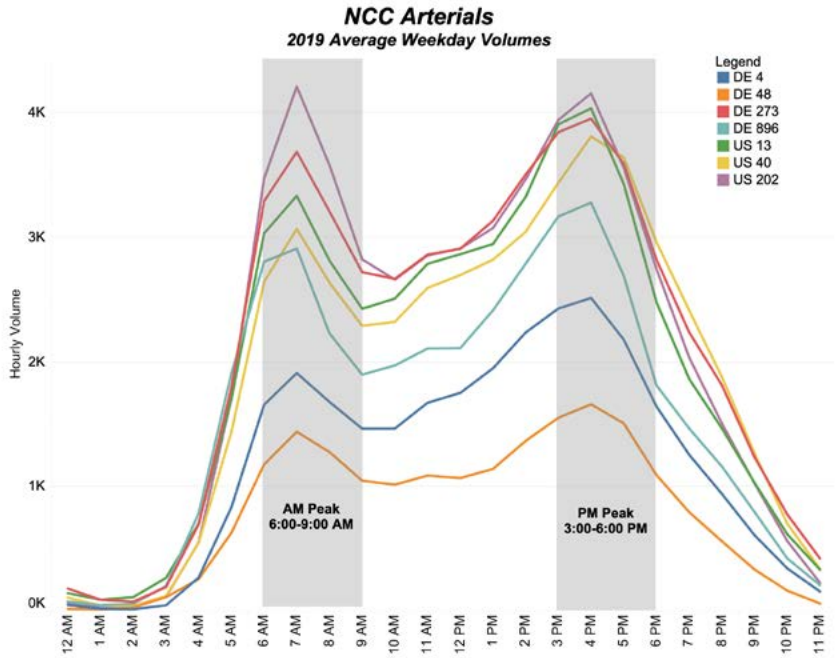


Figure 12: Average hourly weekday volumes on signalized roadways follow similar trends to limited-access roadways.

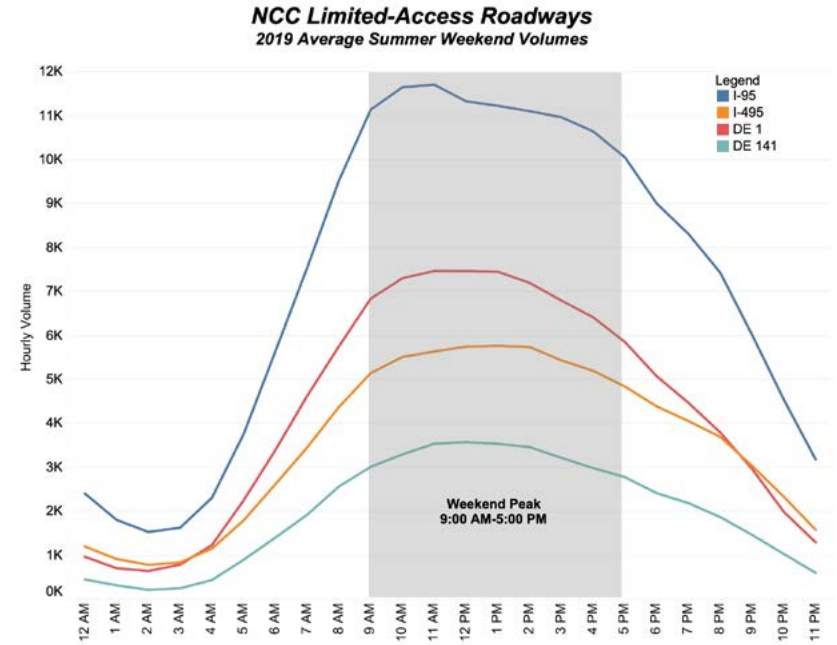


Figure 13: Average summer weekend volumes on limited-access roadways have a peak period that stretches between 9:00 AM and 5:00 PM, but volumes typically reach their absolute peak in the late morning.

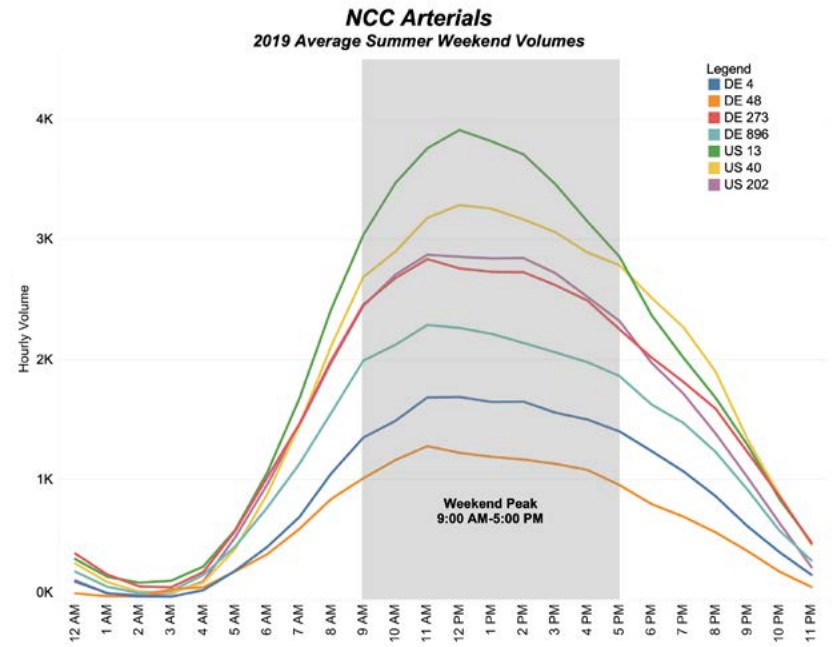
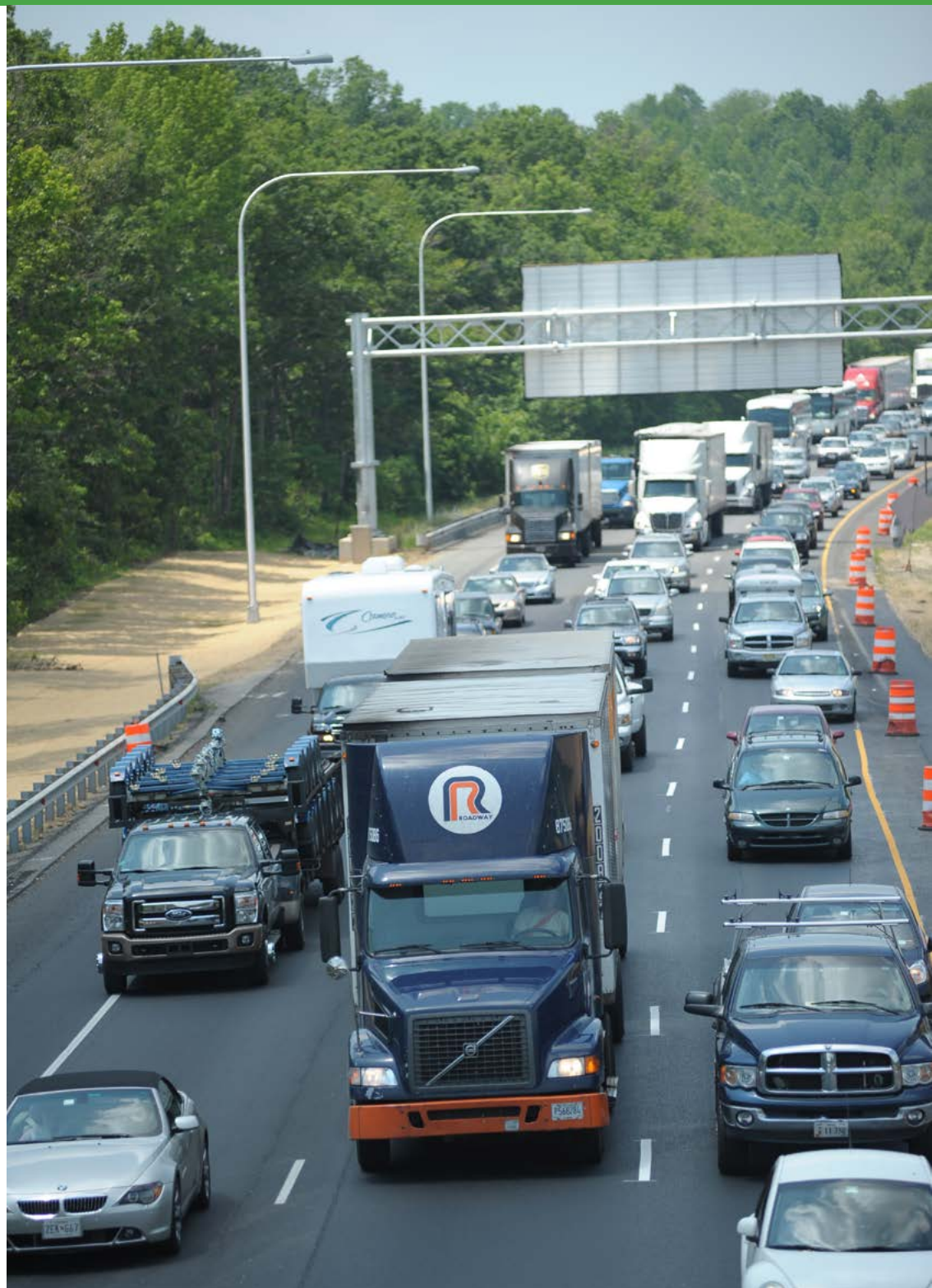


Figure 14: Volumes on signalized roadways are also highest between 9:00 AM and 5:00 PM, although volumes do peak slightly later during this range, closer to the early afternoon.



CONGESTION AND DELAY

Traffic demand fluctuates throughout each day, week, and year. The amount of regular demand on a roadway helps DelDOT make design and operation decisions, such as signal timing, traffic control, and lane configurations–all of which affect the roadway's capacity. The highly developed landscape in New Castle County, with a variety of traffic generators, means that the base level of congestion and traffic tends to be higher than in Sussex and Kent Counties. To plan trips and get to their destinations on time, drivers need to know how severe the congestion may be and how likely it is to occur on a typical day. These two questions are answered using different measures. We can tell how bad congestion gets on roads by using travel time reliability (TTR), which compares the longest-measured[2] travel time to the uncongested travel time. Similarly, we can gain a better understanding on how frequently congestion occurs by using a travel time index (TTI), which compares typical conditions represented by the median[3] travel time to the uncongested travel time.

TRAVEL TIME ANALYSIS

Because the peak periods in New Castle County are slightly different from and tend to be longer than those of the other two counties, the analysis team considered using a wider time range for analysis of New Castle County roadways. A wider window of time can, however, hide congestion when using measures like TTR and TTI because data from congested conditions can get diluted by including more data from uncongested periods. Additionally, in considering the tradeoff between comparability across the state and identifying congestion at a very fine resolution, the analysis team determined that using the same windows of time as were used in the Kent and Sussex County TOMPs was appropriate. The travel time analysis was conducted for AM, PM, and summer weekend peak periods of 7 AM to 9 AM, 4 PM to 6 PM, and 10 AM to 6 PM, respectively. For all the major arterials analyzed, this approach captures the highest-volume periods.

Types of Non-recurring Congestion

Non-recurring congestion on roadways comes in many forms and is always some version of traffic demand and roadway capacity being out of balance.

- **During construction or traffic incidents, capacity is lower than normal due to lane closures.**
- **During inclement weather, capacity is lower due to decreased visibility and/or dangerous roadway surfaces.**
- **During special events and holidays, demand is higher because visitors are using the roadways.**

In some cases of non-recurring congestion, interesting combinations of increased traffic demand and decreased capacity occur. An example would be a parade attracting visitors and closing a major roadway.

Visit the ITMS website for further explanation of congestion in Delaware.

[2]"Longest-measured" is represented by the 95th percentile travel time, meaning only 5% of travel times recorded are higher than this value. Outliers are excluded before finding the 95th percentile travel time.
[3]"Median" is represented by the 50th percentile travel time, meaning 50% of travel times recorded are higher than this value and 50% are lower than this value.

During the AM peak period, delays may occur on many of New Castle County's signalized roadways as people commute to work and school. **Figure 15** captures the TTR observed along major road segments during 2019.

AM Peak (7:00-9:00 AM) Travel Time Reliability

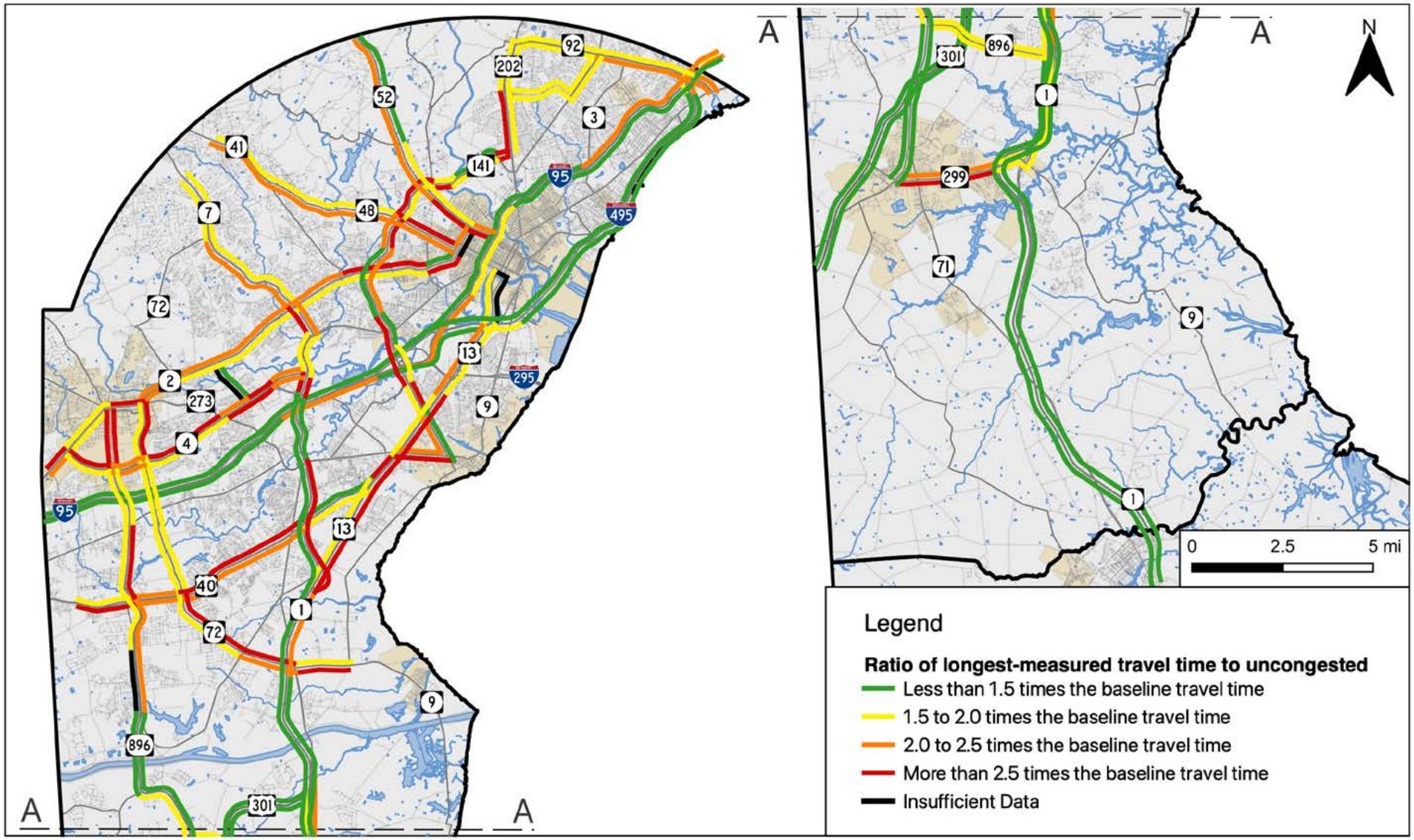


Figure 15: Travel time reliability analysis results for the AM peak period.

While Delawareans may experience delays during the AM peak throughout the year, aside from a few small sections of road, the TTI data in **Figure 16** shows delays are not common. The typical commuter did not experience travel times longer than 1.5 times the uncongested travel time on their way to work and school on most of New Castle County's roads.

AM Peak (7:00-9:00 AM) Travel Time Index

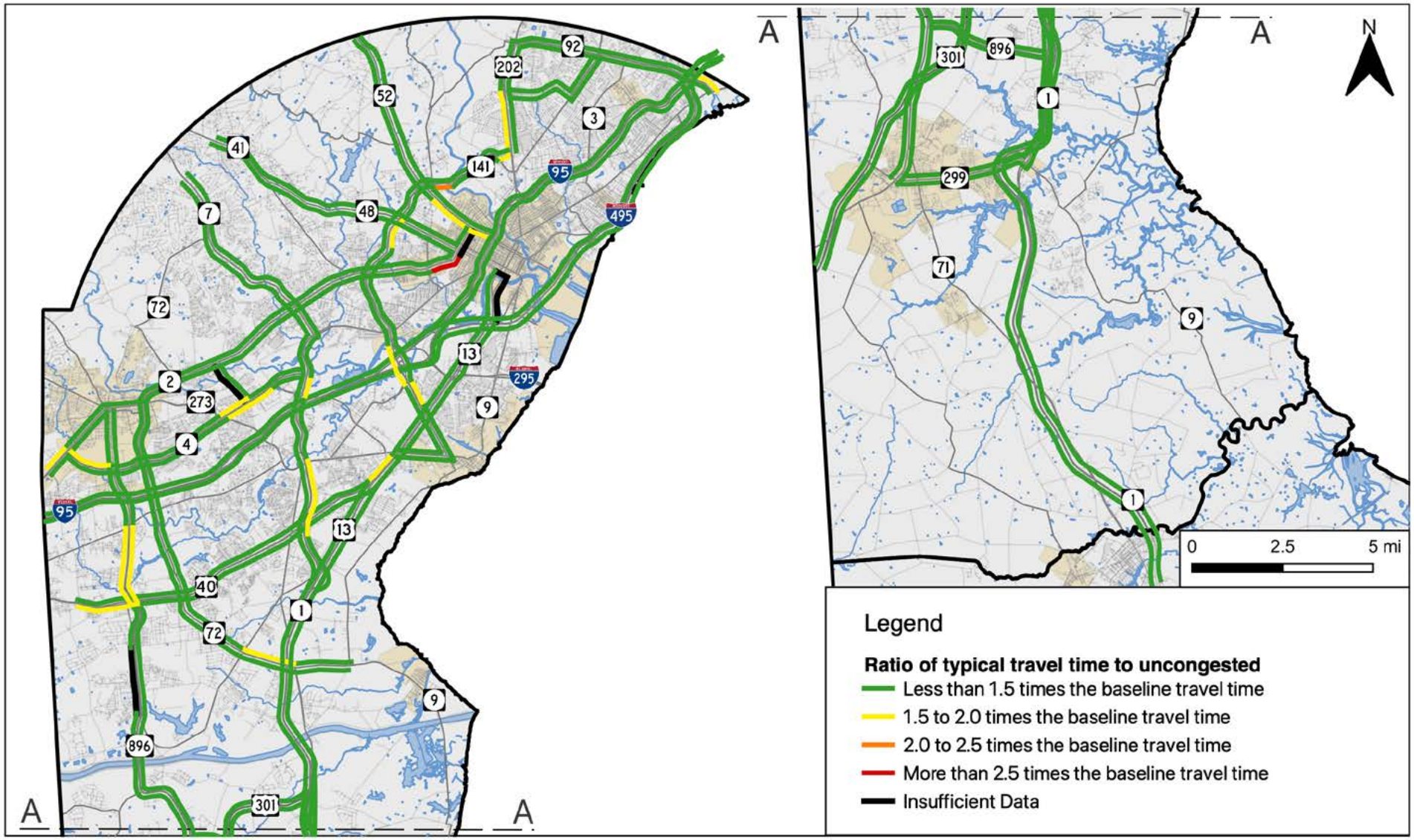


Figure 16: Travel time index analysis results for the AM peak period.

The PM peak is the most congested time in New Castle County. Delays can be expected along many commuter and commercial corridors. **Figure 17**, which captures the TTR of road segments during the PM peak, shows that drivers sometimes experienced long delays along many commuter and commercial corridors in 2019.

PM Peak (4:00-6:00 PM) Travel Time Reliability

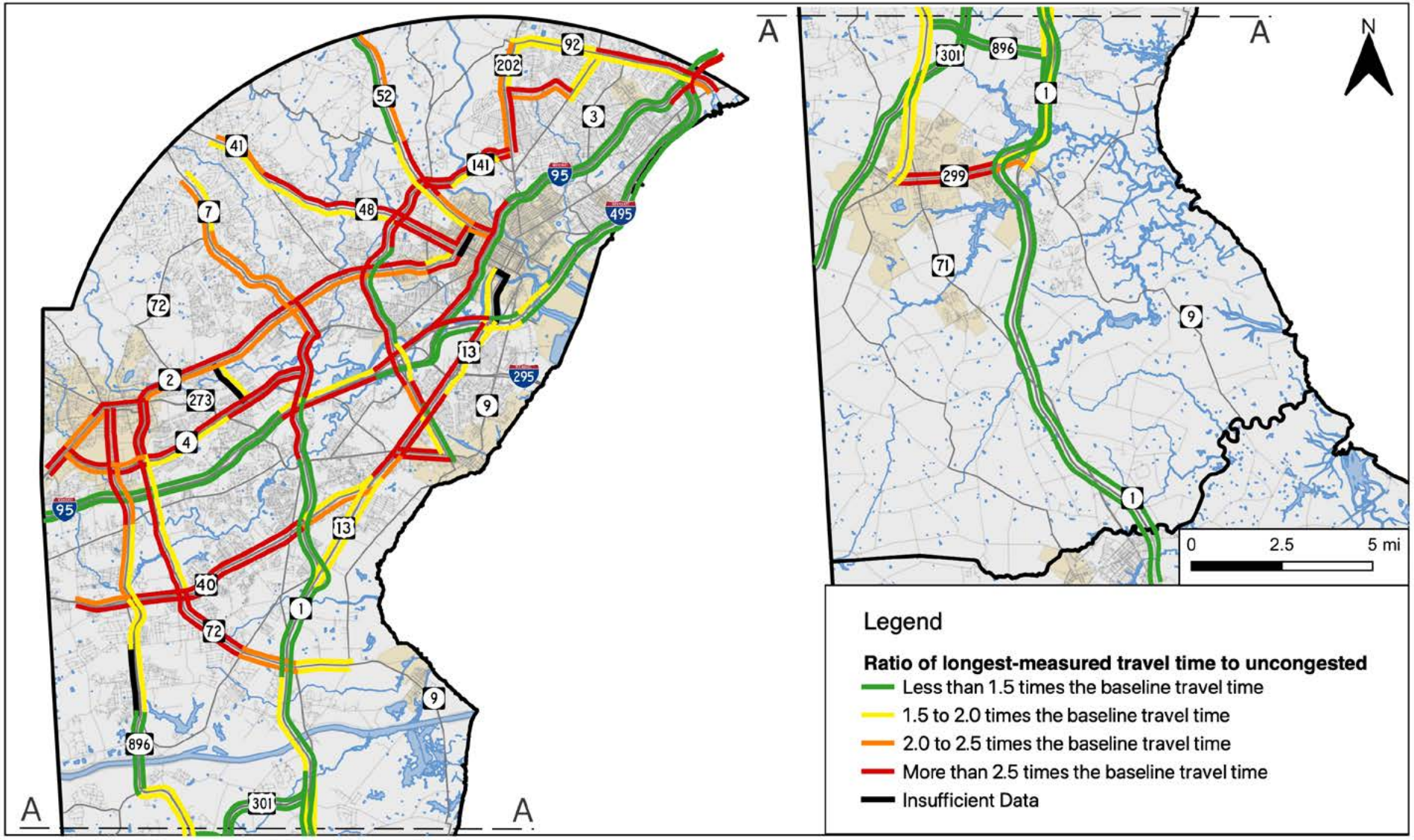


Figure 17: Travel time reliability analysis results for the PM peak period.

In addition to the potential for long delays during the PM peak, the typical commuter experienced congestion more regularly than in the AM peak. **Figure 18** shows the results of the TTI analysis for the PM peak period.

PM Peak (4:00-6:00 PM) Travel Time Index

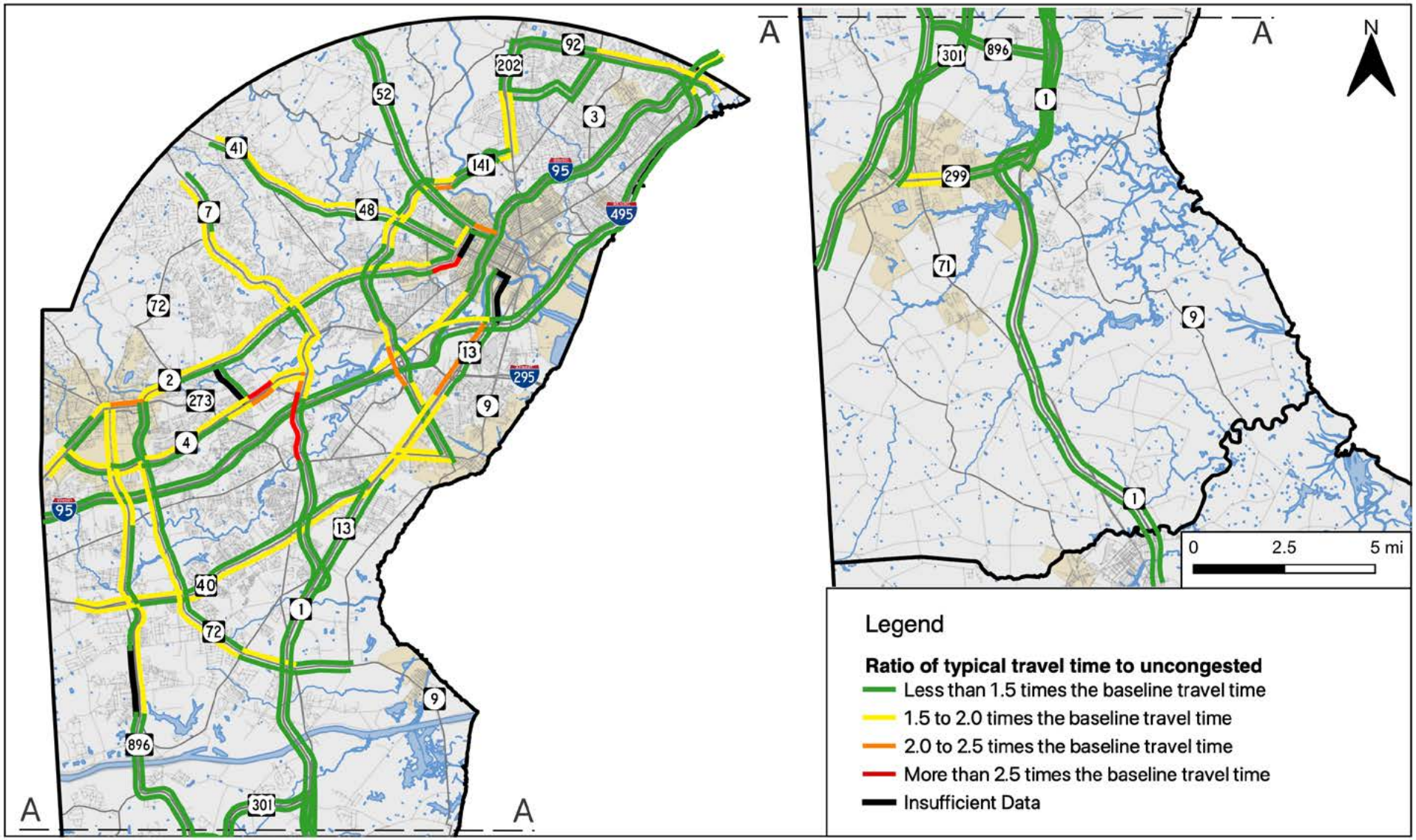


Figure 18: Travel time index analysis results for PM peak period.

Figure 19 shows Delawareans experienced delays during the summer weekend peak on many of New Castle County's roadways. The potential for long delays was highest on signalized roads lined with retail development, such as DE 2, US 40, and US 13.

Summer Weekend Peak (10:00 AM – 6:00 PM) Travel Time Reliability

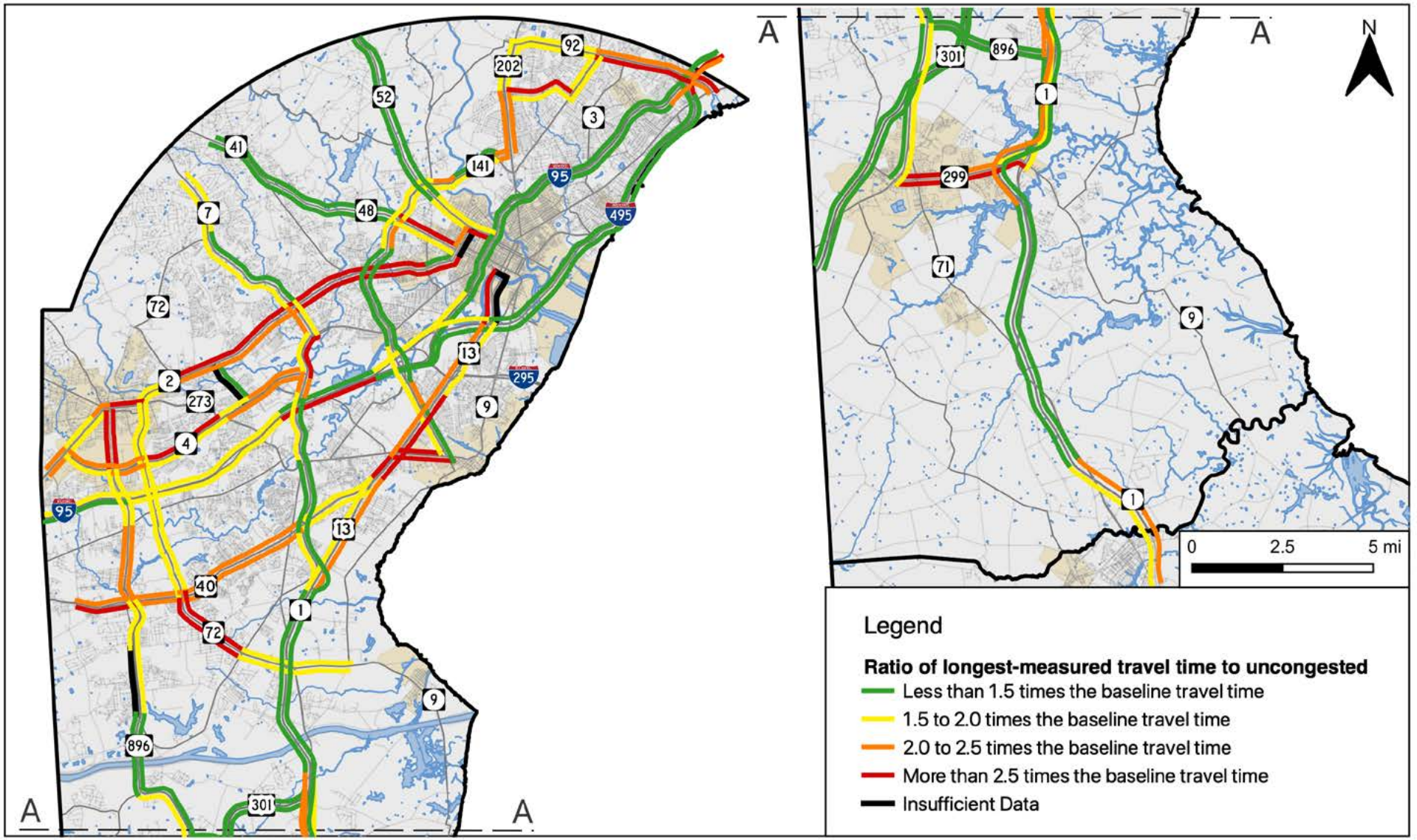


Figure 19: Travel time reliability analysis results for the weekend summer peak period.

Figure 20 shows that, although congestion has been observed on summer weekends on many of New Castle County's roadways, it is common on only a few small sections of road. One segment where drivers experienced regular delays is I-95 between DE 1 and I-295/DE 141.

Summer Weekend Peak (10:00 AM – 6:00 PM) Travel Time Index

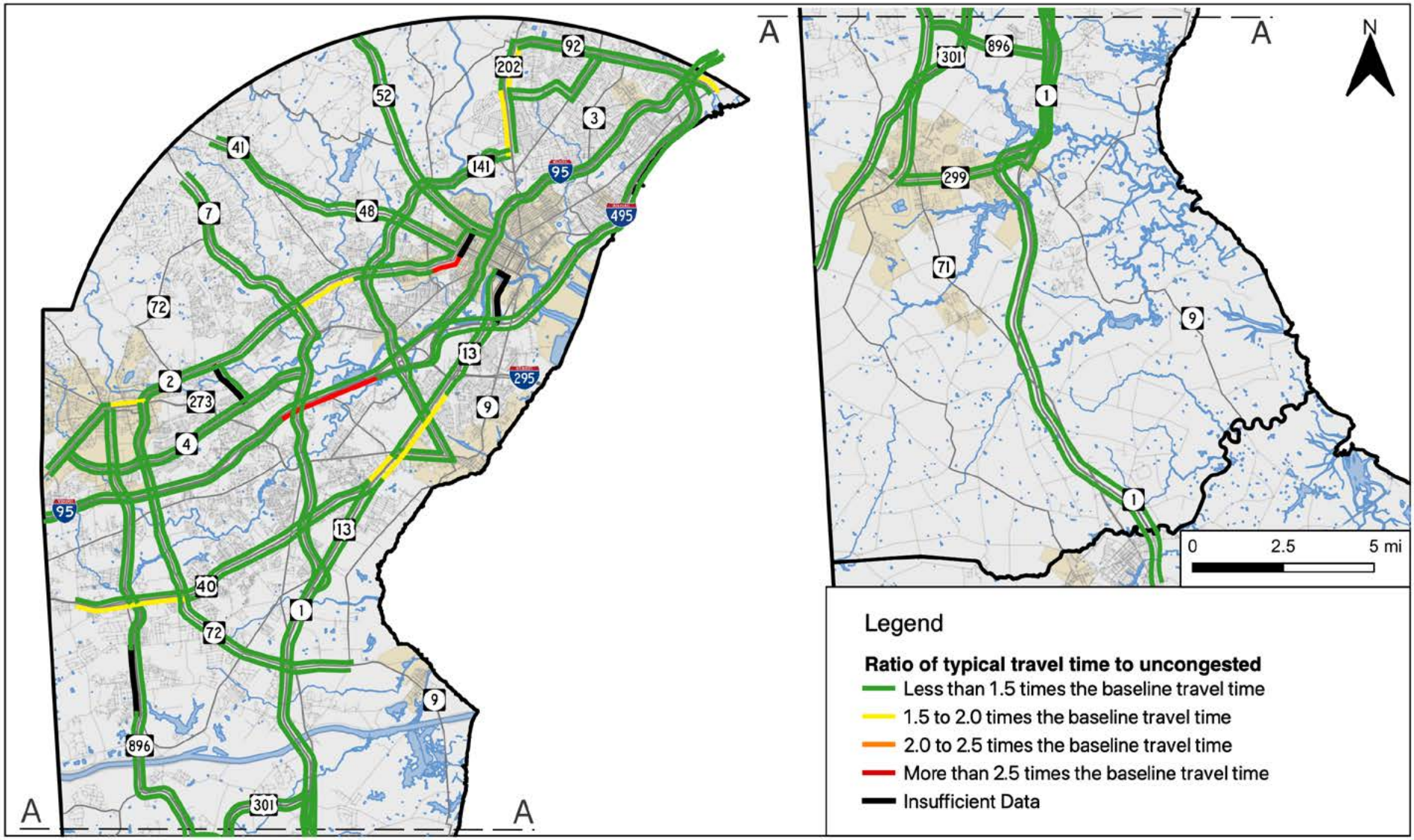


Figure 20: Travel time index analysis results for the weekend summer peak period.

CONGESTION FREQUENCY AND SEVERITY

Congestion frequency gives us an idea of how often a road is congested. It layers **TTR**, which represents how the worst conditions compare to free flow traffic, and **TTI**, which represents how typical conditions compare to free flow, to create a single measure. These metrics are explained on page 21 and in more depth on the TOMP website.

$$\textbf{CONGESTION FREQUENCY} = \frac{\text{Longest-Measured Travel Time}}{\text{Uncongested Travel Time}} \quad \textbf{AND} \quad \frac{\text{Average Travel Time}}{\text{Uncongested Travel Time}}$$

(Travel Time Reliability) *(Travel Time Index)*

Since New Castle County is so much more developed than Kent and Sussex, the base congestion level is much higher. That is to say that almost all major roads in New Castle are frequently or occasionally congested. To identify the most congested areas, the analysis focuses on severely congested roadways, whether that congestion occurs frequently or occasionally. The threshold of severe congestion was set at 2.5, according to the Highway Capacity Manual guidance for urban areas.[4] **Figure 21** shows the worst-measured congestion severity and frequency on New Castle County roads, using the definitions below. *Worst-measured congestion severity and frequency* as used in this report refers to the worst congestion severity and frequency observed across all periods analyzed for each road segment. For example, if the congestion severity and frequency for a particular segment is worse during the AM peak than during the PM peak or summer weekend peak, the congestion severity and frequency shown for that segment would be for the AM peak.

If the longest-measured travel times are less than 2.5 times the uncongested travel time, the segment has **no severe congestion**. Delays may still occur on these segments, but they are within an acceptable range for an urban area.

If the longest-measured travel times are more than 2.5 times the uncongested travel time *but* typical travel times are less than 1.5 times the uncongested travel time, the segment has **severe and occasional congestion**. Delays can exceed acceptable levels for urban areas.

If the longest-measured travel times are more than 2.5 times the uncongested travel time *and* typical travel times are more than 1.5 times the uncongested travel time, the segment has **severe and frequent congestion**. Delays occur regularly on these segments and can exceed acceptable levels for urban areas.

[4] 2016. Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Washington, DC: The National Academies Press.

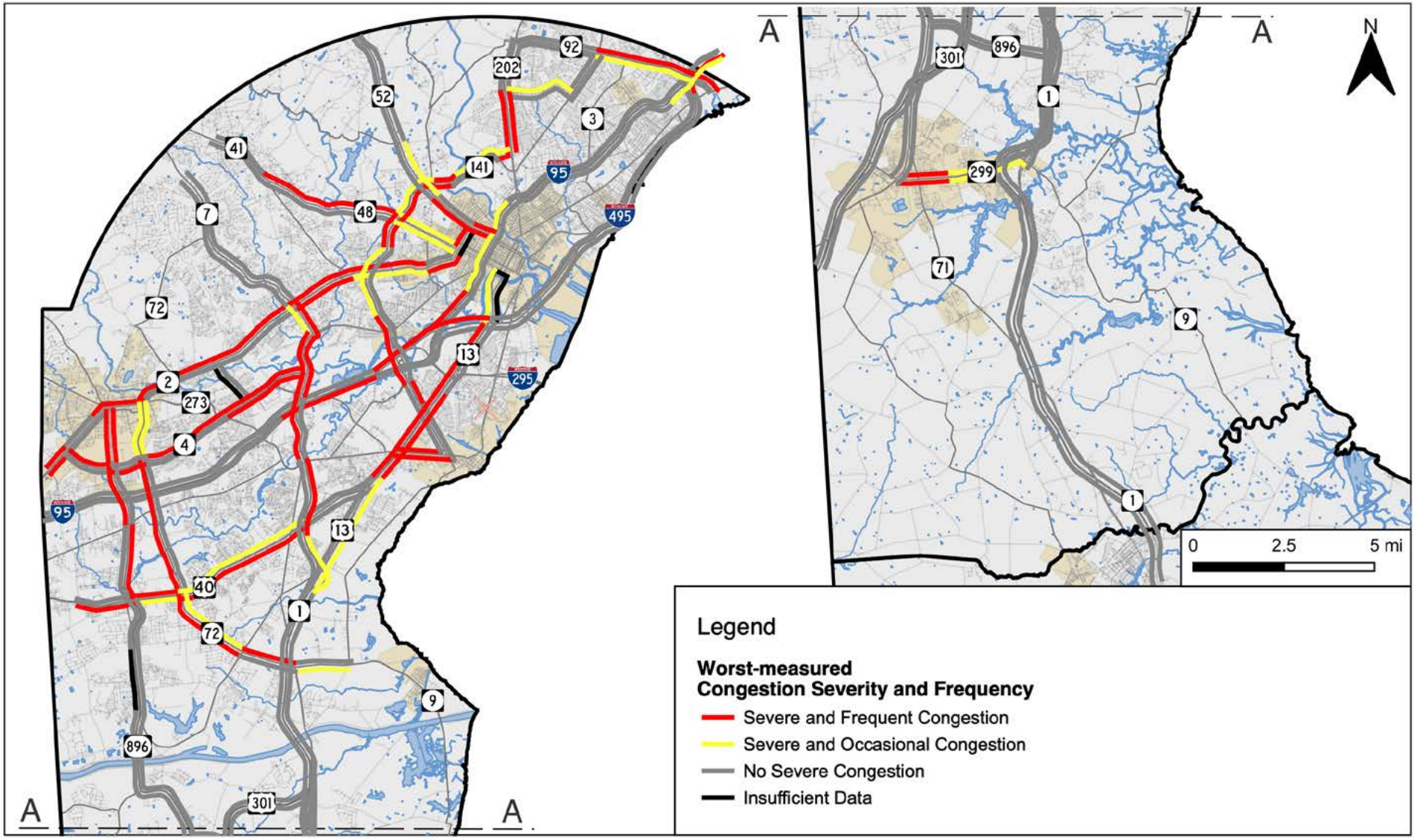


Figure 21: Map of worst-measured congestion severity and frequency on New Castle County roads.
The analysis of congestion severity and frequency identified roads to be looked at more closely to address New Castle County congestion.

INTERSECTION CAPACITY

DelDOT's travel time sensors can tell us along which roads congestion occurs, how frequently it occurs, and how severe it can get, but they do not tell us what is causing the congestion or where the congestion is originating. To properly understand how and why delay is occurring along road segments, traffic engineers conducted intersection traffic counts and critical movement summation (CMS) analysis to determine the level of service (LOS) at the locations shown with circles on **Figure 22**.

LOS of A, B, or C means that the intersection has ample capacity to process vehicles with little delay. LOS of D typically means that delays may be higher for some movements, but vehicles should still be able to proceed through the intersection in a single traffic signal cycle. LOS of E means that the volume of vehicles at the intersection is at capacity; LOS of F means that volume exceeds intersection capacity. Vehicles at an intersection with LOS E or F may have to wait more than one traffic signal cycle, even with efficient signal timing. Traffic signal cycles typically range from one to three minutes. What constitutes a "bad" LOS varies depending on the location. In much of Delaware, a LOS of D or worse has traditionally indicated the need to consider improvements to an intersection. More recently, LOS E has become more common as that threshold.

For this TOMP report, analysis of 161 intersections throughout New Castle County determined that 54 of those intersections operated at LOS D, E, or F during at least one peak period, while 19 operated at LOS E or F.

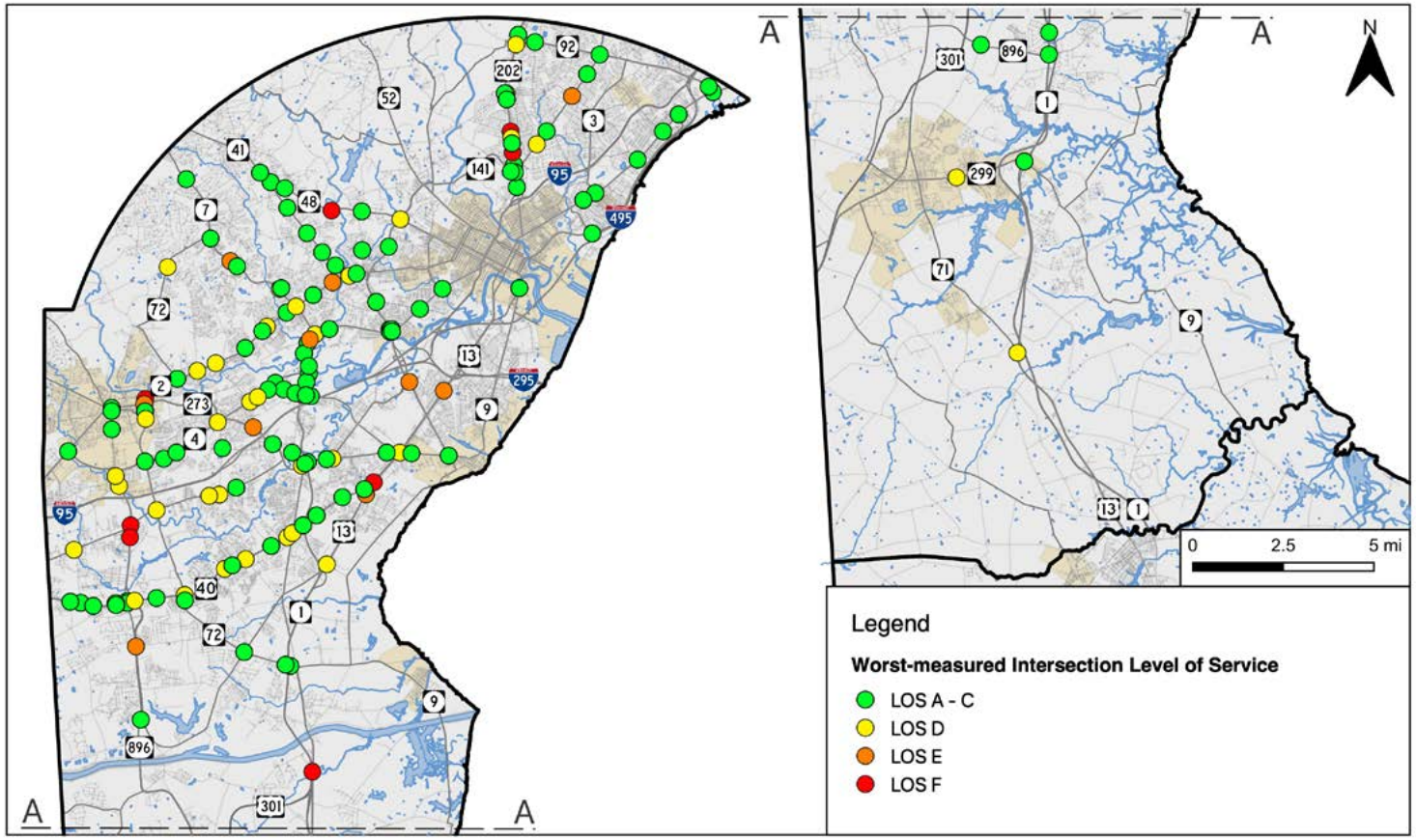


Figure 22: Intersection level of service as measured using CMS.

IDENTIFYING CONGESTION HOTSPOTS

By layering the results of the intersection LOS analysis on top of the results of the travel time congestion frequency and severity analysis, as shown in **Figure 23**, we can see which intersections control the flow of traffic along New Castle County's roads and how they affect delays.

The analyses described in this report reveal the areas of greatest congestion concern. These areas of concern are identified as 12 hotspots where congestion has a significant impact on mobility in New Castle County. Hotspots were identified through a combination of quantitative and qualitative analysis of causes of congestion both at critical intersections and along road segments.[5] First, travel time data was analyzed using TTR, TTI, congestion frequency, and congestion frequency and severity measures. Next, from among those roadways identified as congested by the travel time analysis, traffic engineers considered road volumes and the intersection LOS analysis to focus on areas where congestion impacts the most people. The quantitative findings were weighed with contextual features of countywide travel patterns and roadway characteristics to produce the final list of hotspots, shown in **Figure 24**.

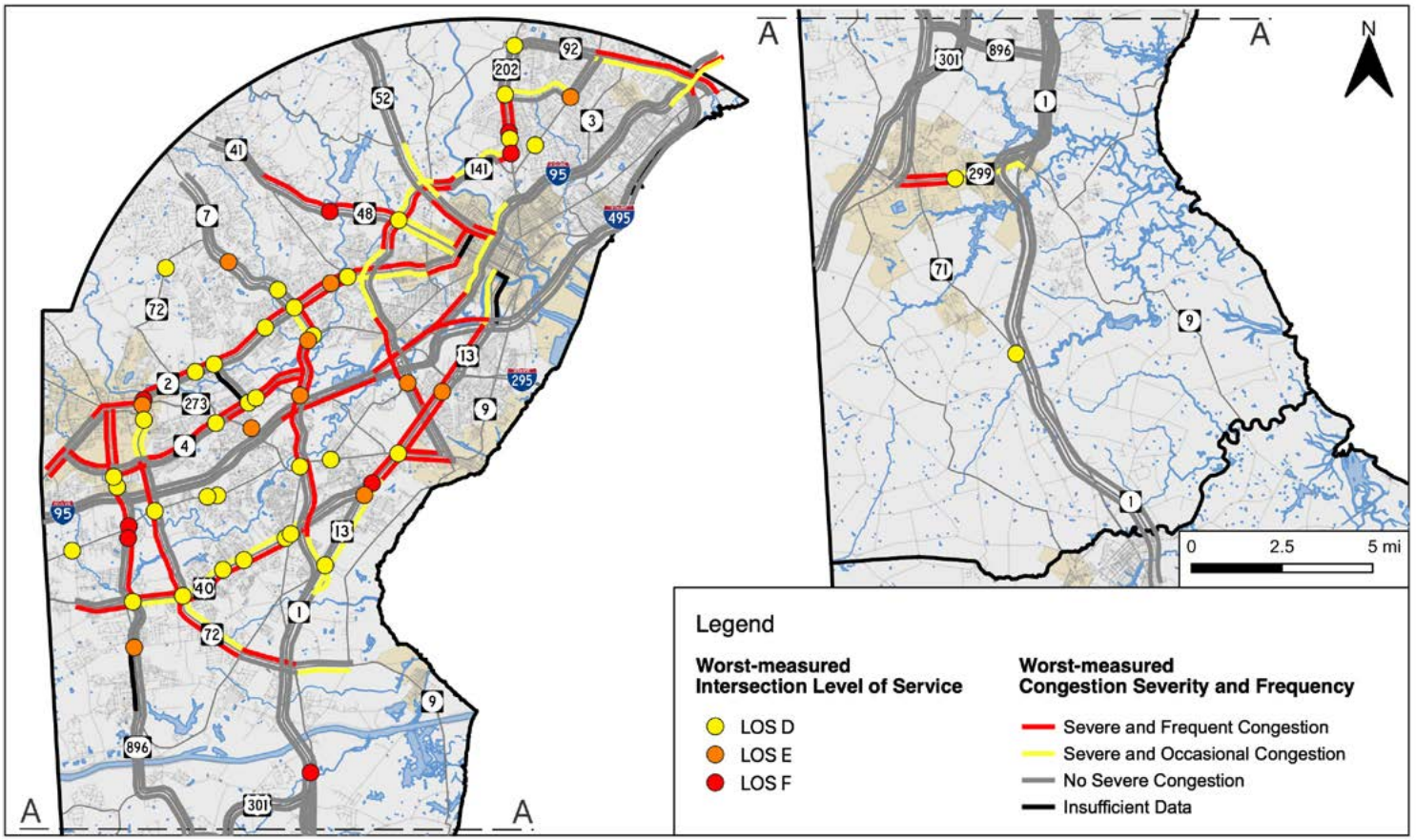


Figure 23: Worst-measured intersection level of service and congestion severity and frequency across all peaks.

[5]This approach is consistent with the approaches taken by DelDOT, WILMAPCO, and New Castle County in recent plans, such as the use of "relative arterial mobility" in the Churchman's Crossing Master Plan.

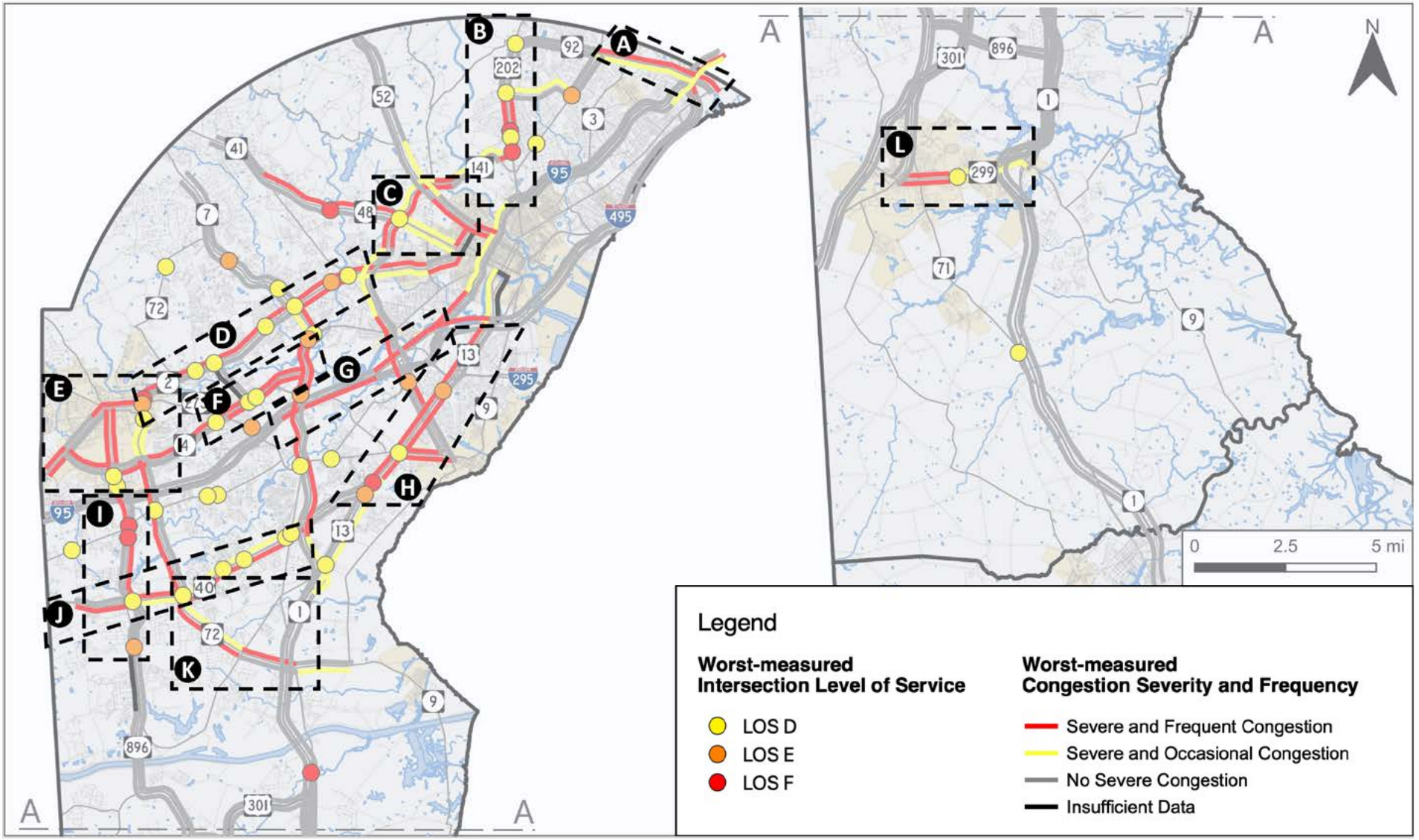


Figure 24: Locations of the 12 identified congestion hotspots.

RECOMMENDATIONS

This section of the report features overarching recommendations for addressing congestion, followed by pages detailing each hotspot, including average hourly travel times. The map on page 32 shows the location of all hotspots across the county and includes their reference letter associated with their sequence in the following pages. Each hotspot has one or more "controlling intersections"—the ones that limit traffic flow even if conditions improve in the surrounding area. Each hotspot's description ends with a list of projects to alleviate congestion: completed since 2019, in progress, planned, and recommended projects. Projects that are recognized formally in DelDOT's project portal or capital transportation program at the time of publication are treated as a proper noun and presented in title case. Project dates are noted based on current estimates but are subject to change. All recommended projects are suggested based on a high-level evaluation and require further investigation evaluating safety, mobility, and impacts to non-auto modes prior to implementation.

OVERARCHING RECOMMENDATIONS

Due to the large number of residential areas and employment centers in New Castle County, congestion occurs on some major roads throughout the day, although it is most intense during weekday morning and afternoon peaks. This report provides recommendations to mitigate congestion. However, the best way to reduce congestion is for drivers to avoid making trips during morning and afternoon rush hours; to carpool; or to travel by transit, bike, or foot when feasible.

As a result of the COVID-19 pandemic, many Delawareans who reside and work in New Castle County have taken advantage of full-time and hybrid work from home environments. This change has resulted in a decrease in traffic volumes and congestion in some areas. Where possible, the recommendations in this report consider the impacts of the pandemic on congestion.

Real-time congestion updates are available to the public through the TMC's mobile app, interactive web map, radio broadcasts, and variable message signs. These resources can help inform travelers about when to travel, which route to take, and which mode of transportation to use.

Several broad categories of congestion mitigation strategies are relevant to New Castle County. These recommendations are summarized on the next two pages and are more specifically addressed in the subsequent Hotspot feature pages.

Capital Projects

Many transportation planning studies and project development efforts address long-term, resource-intensive projects. Those capital "brick-and-mortar" projects—including recently completed, ongoing, and planned projects—are considered in the following pages. However, when recommending solutions, experts must weigh the costs associated with expected improvements against impacts. Many of the projects discussed in this TOMP are recommended because of their ability to improve operations with minimal impact to properties and environmental resources and with relatively low price tags. Some of these improvements include adjusting medians, narrowing lanes with pavement restriping to provide an additional lane, changing signal phasing, and providing safer facilities for non-auto modes. Each of these strategies attempts to add capacity and/or reduce demand. If a low cost solution is not feasible or is not expected to produce enough benefit to the operations, larger and more capital-intensive projects are considered. Additionally, DelDOT is constantly working with its agency partners to optimize signal operations through its signal retiming program.

ITMS Enhancements and Technology

DelDOT is always working to expand its ITMS to improve its ability to make data-driven decisions and mitigate congestion. The next page lists several programs that help bring this work to life and are recommended along with the location-specific recommendations.

Installation of new Bluetooth travel time sensors and volume detection devices is being prioritized as part of capital projects that may cause congestion while those projects are being built. These devices will improve the TMC's ability to monitor, detect, and respond to issues that present during construction or unpredictable incidents. **Figure 25** shows the existing devices, the devices that have already been installed since 2019, and the devices that are due to be installed in the future.

Corridor signal retimings will continue as part of DelDOT's signal retiming program, which evaluates the performance of traffic signals along DelDOT's major roads on three- to five-year cycles. The New Castle County TOMP should be used to help prioritize corridors for evaluation. As corridors are retimed, engineers must balance the needs of pedestrians, turning vehicles, and vehicles along the mainline.

Use of artificial intelligence to monitor and act on traffic conditions is a central priority of the DelDOT TMC. The Delaware transportation system is large, and even the best engineers and technicians can't monitor conditions on all roads at once. As part of a $5 million grant from the Federal Highway Administration, DelDOT is developing artificial intelligence (AI) that will be able to predict when and where congestion is going to occur and adjust signal timings as needed before delays even begin. The AI project is currently in progress in the I-95 and US 40 areas of New Castle County.

Queue detection and warning systems are already part of DelDOT's ITMS, taking advantage of the real-time travel times provided by Bluetooth sensors and congestion information provided by radar sensors. DelDOT is working to expand the use of these devices to reduce rear-end and secondary crashes that contribute to delays.

Incident management requires a combination of traffic monitoring, incident detection, inter- and intra-agency coordination, and traveler information. As DelDOT's AI program advances, DelDOT will be able to automate its existing incident management toolbox and better enable its incident response team to keep people moving.

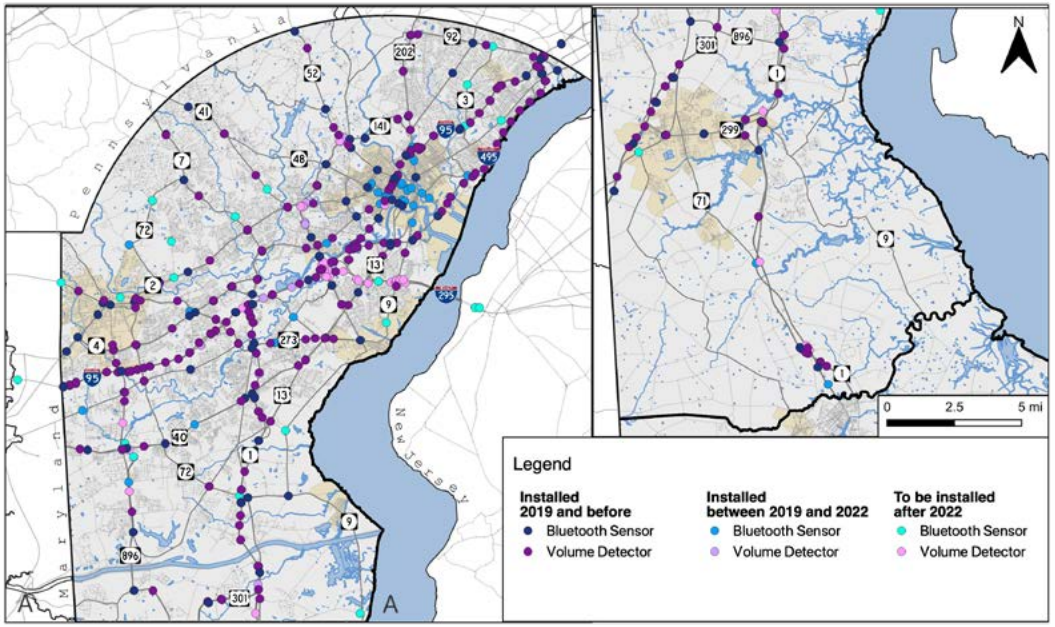


Figure 25: Existing and planned ITMS devices in New Castle County.

City-State Partnership Enhances Regional Travel

In preparation for the multi-year reconstruction of I-95 through Wilmington in 2020, the City of Wilmington and DelDOT partnered to upgrade 218 City traffic signals and integrate them into DelDOT's traffic signal system. This collaboration included the addition of Bluetooth sensors and traffic cameras for travel time and congestion monitoring. With the integration of the City's signals onto the State's online system, traffic control in the Wilmington area can be adjusted remotely at any time in response to real-time conditions. Beyond the achieved efficiencies of day-to-day business, the more dynamic management of traffic across city-state borders enhances travel throughout the region.

Demand Management and Multimodal Solutions

A systemic and effective way of reducing congestion is to reduce demand: reducing demand for vehicle miles traveled overall; replacing trips by car with carpooling, transit, walking, or bicycling where those modes of travel are convenient; and shifting demand across time periods. Resources that support mode shift are presented on pages 14-15. This report focuses on addressing congestion through means other than shifting trips to other modes or to times outside peak periods.

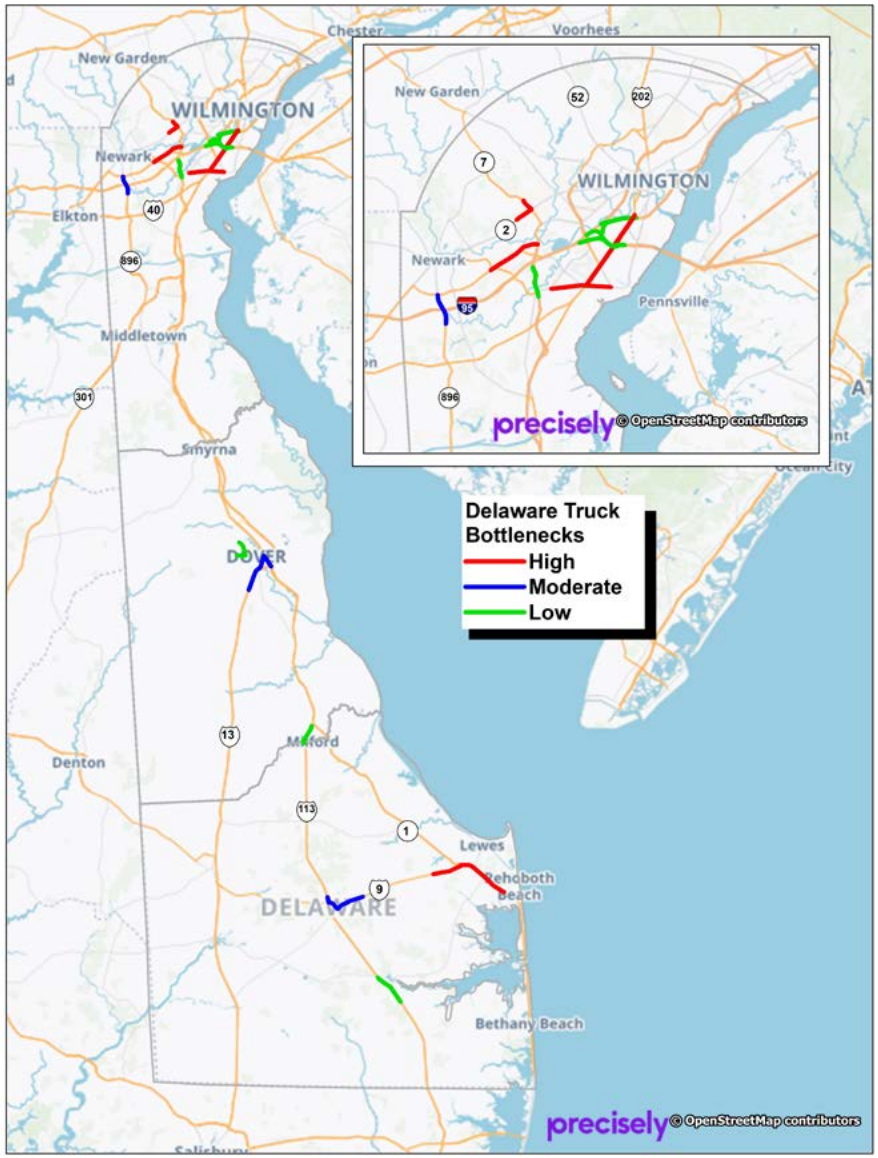


Figure 26: Truck bottlenecks in Delaware.
(Source: 2022 Delaware State Freight Plan)

Supporting outcomes that optimize use by the transportation system's full range of users often requires balancing tradeoffs. For example, a signal timing that attains a maximum reduction in travel time for a car may have tradeoffs for pedestrians and bicyclists crossing the roadway. Similarly, adjustments can also impact transit operations. These impacts and tradeoffs should be considered prior to implementing recommendations. Localized and mode-specific plans that involve community and stakeholder engagement are important sources of data and can provide clarity and guidance for enhancing mobility and safety for the multimodal transportation system.

Freight Coordination

As freight and commercial vehicle traffic continues to grow and evolve, continued coordination in monitoring and addressing freight issues will help keep all traffic moving safely through New Castle County. The Delaware 2022 State Freight Plan presents truck freight bottlenecks, shown in **Figure 26**, as well as a wide range of strategies to address safety and efficiency of freight movement across the state and New Castle County. The freight plan also provides a summary comparison of planned projects that overlap the state's top 15 truck bottlenecks, many of which are noted in the associated hotspots pages of this TOMP. The comparison of planned projects provides a means to help support project planning/programming decisions and track potential improvements that will address congestion at the bottleneck locations.

In addition to state and local agency collaborations, the Eastern Transportation Coalition is a resource that can support congestion mitigation opportunities associated with freight and transportation systems management and operations.

CONGESTION HOTSPOTS

Hotspot A: DE 92, Foulk Road to US 13

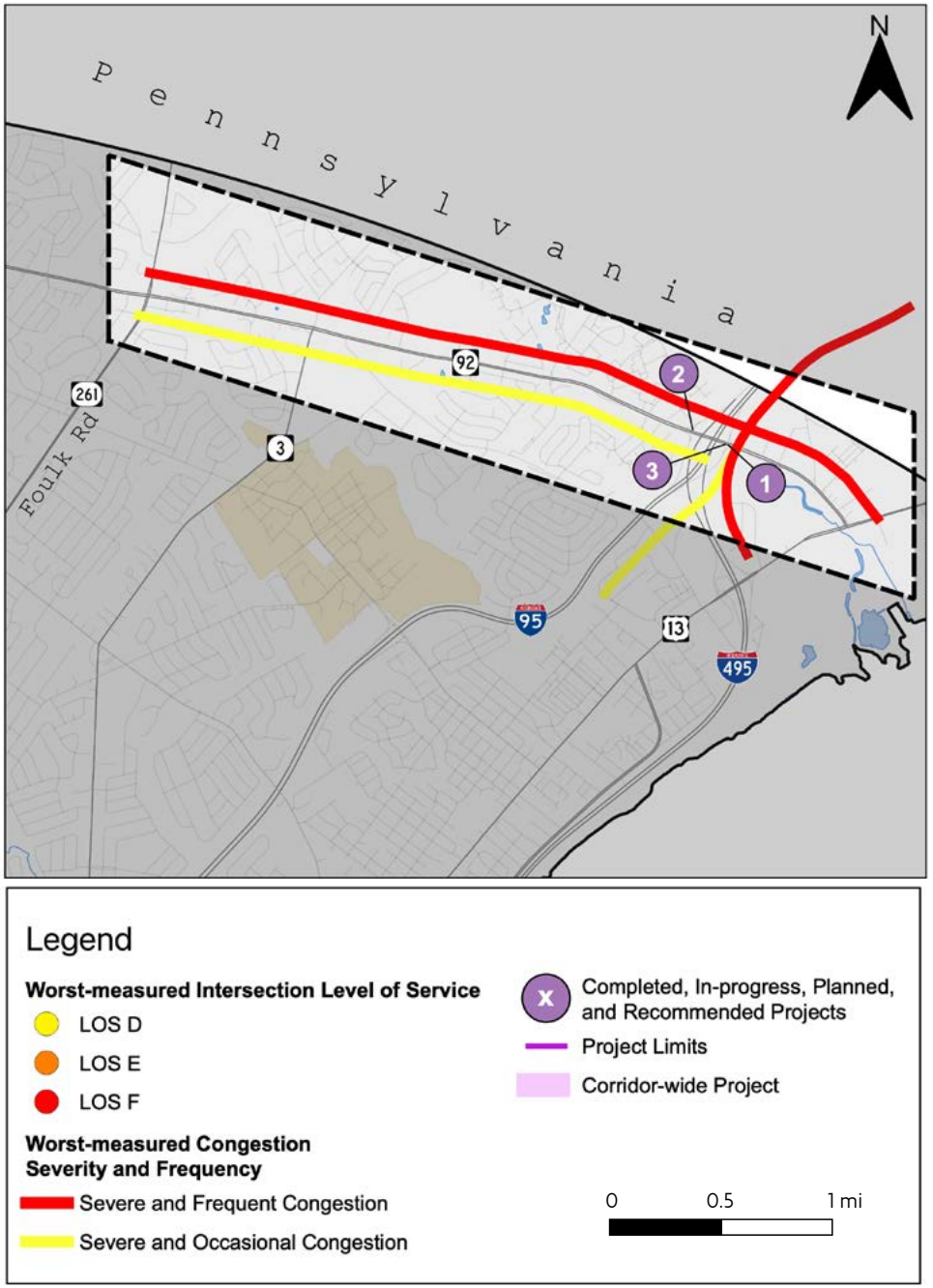
Length: 3.4 miles
Controlling Intersection: I-95 interchange ramps

Congestion typically occurs along DE 92 during the AM and PM peaks and is largely associated with the I-95 interchange ramps.

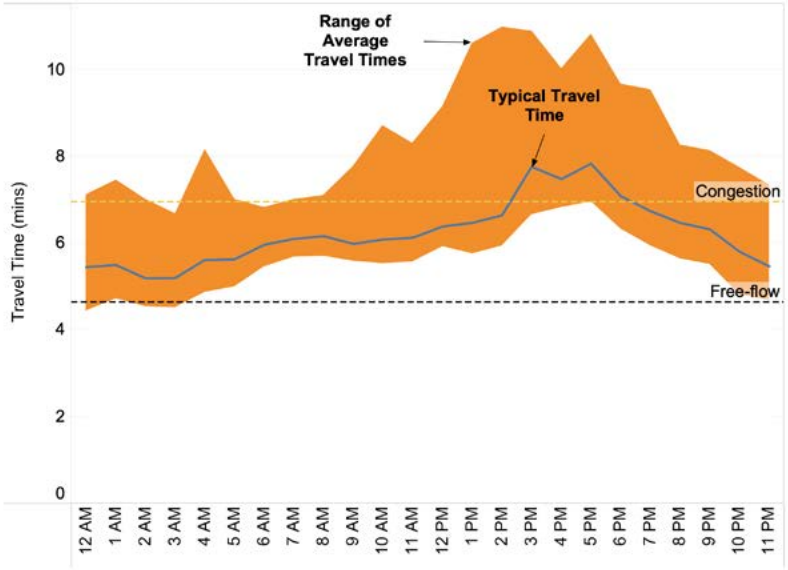
DE 92 provides connections to US 202, I-95, and US 13, three major north-south roads that connect the residential areas along DE 92 to employment and entertainment centers. Delays are worst during the PM peak, when travel times in the westbound direction are typically 7.5 minutes and sometimes exceed 11 minutes, compared to 4.5 minutes in uncongested conditions.

Planned Projects

1. **Reconstruct the DE 92 & I-95 interchange as a diverging diamond interchange** (construction TBD)
   The North Claymont Area Master Plan recommended the DE 92 and I-95 interchange be reconstructed as a diverging diamond interchange with dedicated space for walking and biking. A diverging diamond interchange will improve safety for all modes while also reducing delays.
2. **Improve I-95 southbound off-ramp** (construction TBD)
   Widening and signalizing the I-95 southbound off-ramp will improve safety for pedestrians, bicyclists, and drivers while also improving mobility for pedestrians and bicyclists.
3. **Tighten I-95 northbound off-ramp radius** (construction TBD)
   By reducing the radius of the I-95 northbound off-ramp, DelDOT will improve safety for all modes.

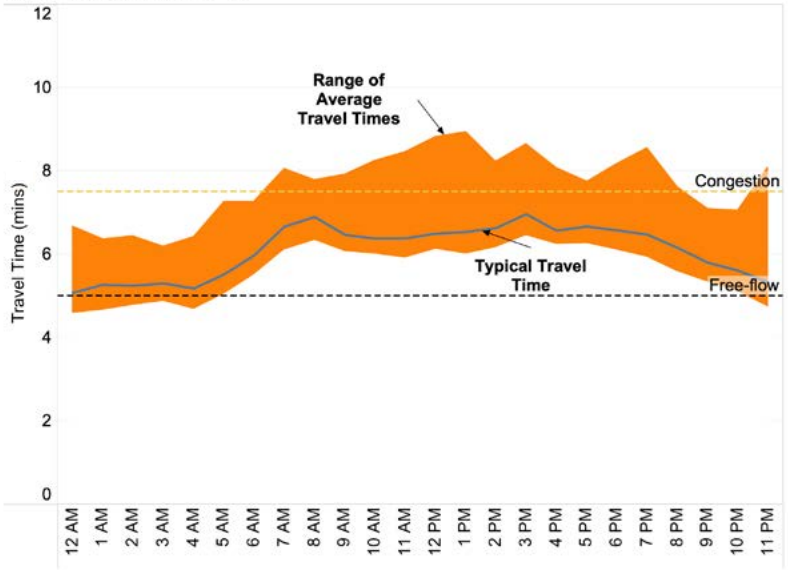


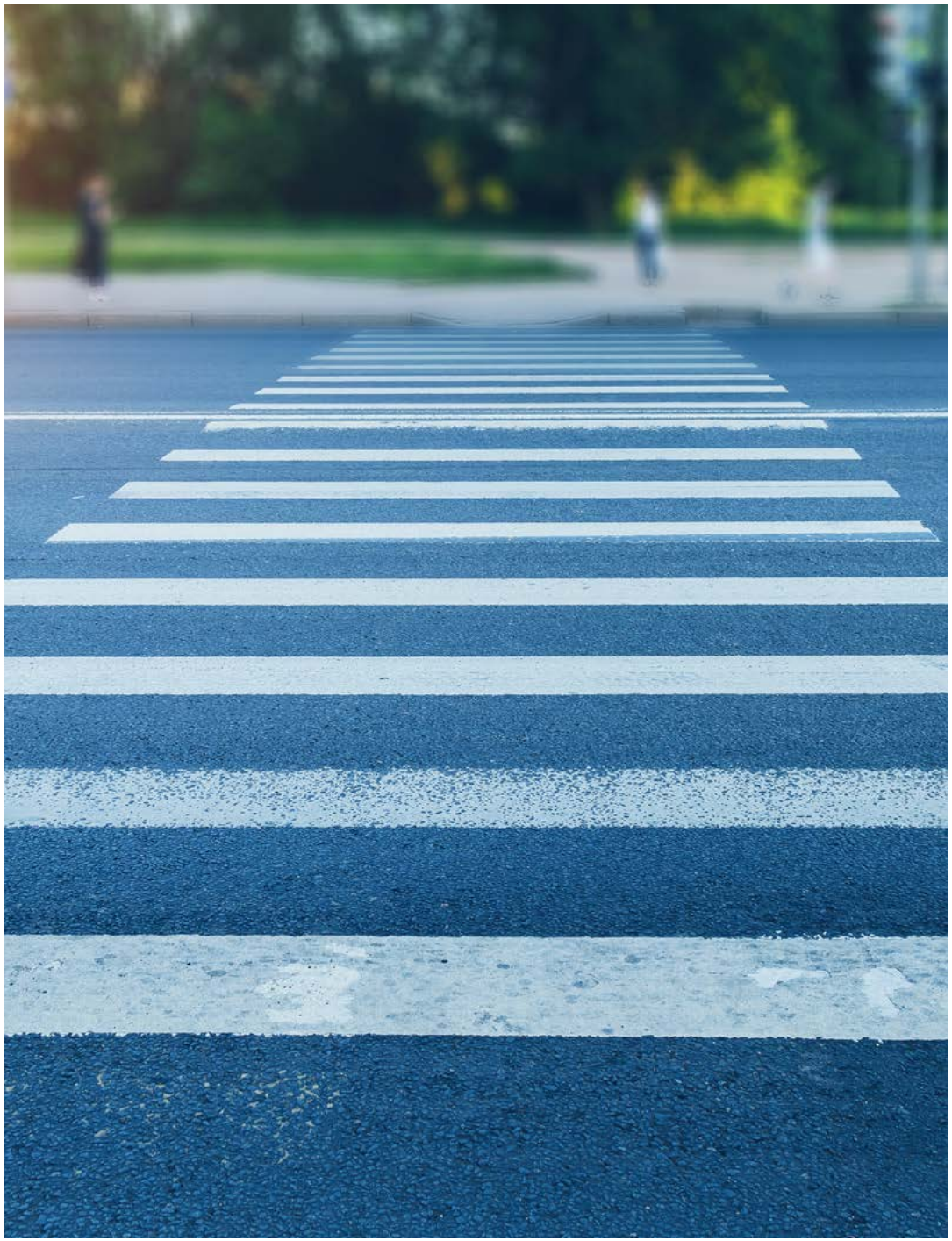
2019 WB DE 92 Average Hourly Weekday Travel Times From US 13 to Foulk Rd



Average travel times along westbound DE 92 during the PM peak regularly exceed the threshold that defines congestion. The longest average travel times reach approximately 11 minutes—over 6 minutes more than the typical travel time. The large vehicle volume served by the I-95/DE 92 interchange, together with the interchange's configuration, produce this congestion. On eastbound DE 92, congestion is not as common.

2019 EB DE 92 Average Hourly Weekday Travel Times From Foulk Rd to US 13





Hotspot B: US 202, I-95 to PA Line

Length: 5.1 miles

Controlling Intersections: Naamans Road, Silverside Road, Sharpley Road, Fairfax Boulevard, and Powder Mill Road/Murphy Road

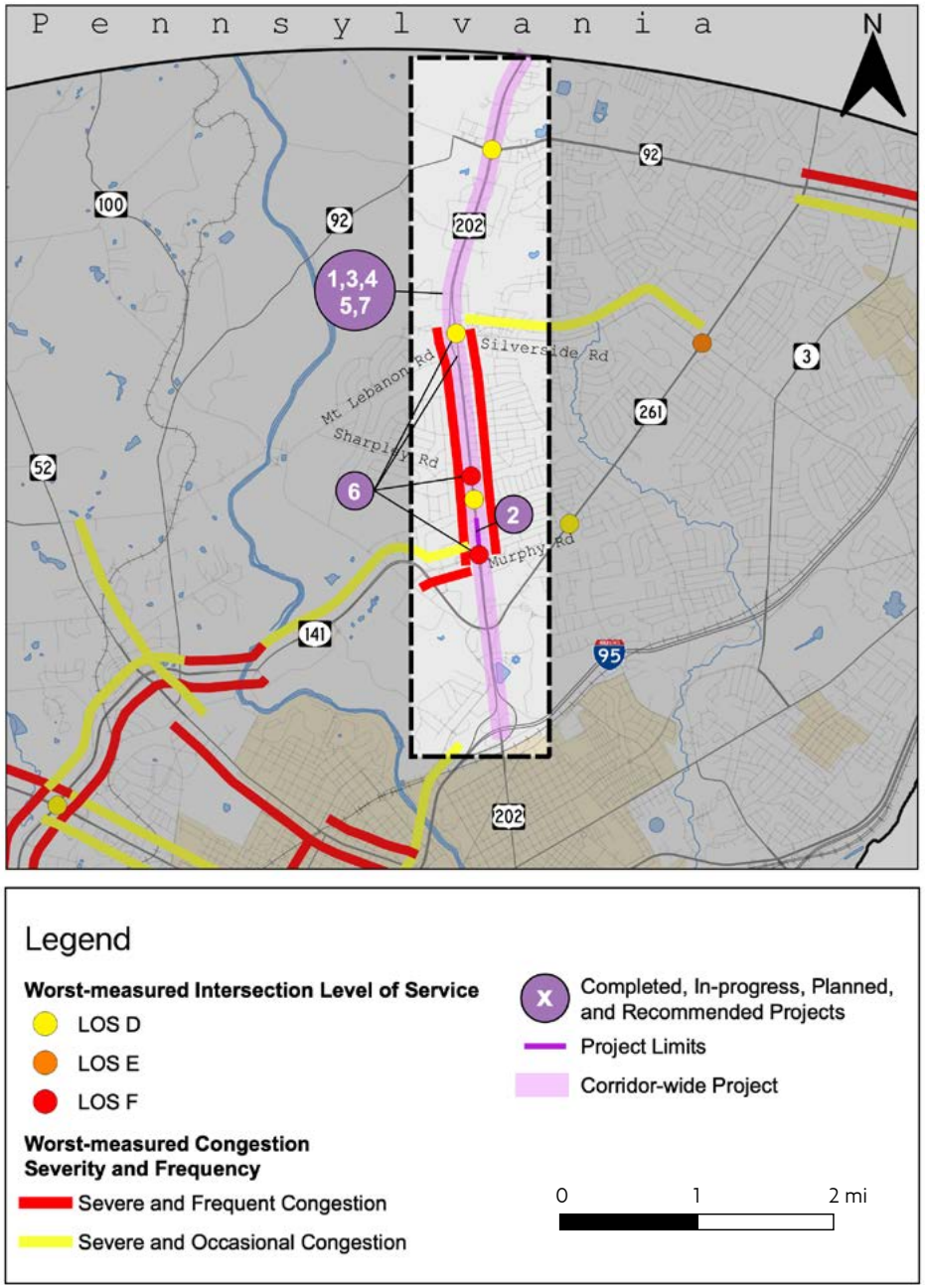
Delays along US 202 are most severe southbound towards Wilmington in the AM peak and northbound towards Pennsylvania in the PM peak. During both peaks, travel times between Silverside Road and Murphy Road, a 1.6-mile stretch that is the most congested section of US 202, have been observed to approach 9 minutes, although they are typically around 5 minutes.

US 202 serves multiple purposes. The road is used by through traffic from Pennsylvania to Wilmington as well as by locals shopping, dining, or working at one of the many stores, restaurants, and office parks in the area. These businesses provide jobs, but their many entrances, exits, and intersections create the consistent delays seen between Silverside Road and Murphy Road. DART Route 2 provides fixed-route bus service through the corridor between Wilmington and just south of the PA border. It is one of the top six routes within the county based on average weekday ridership (May to September 2022).

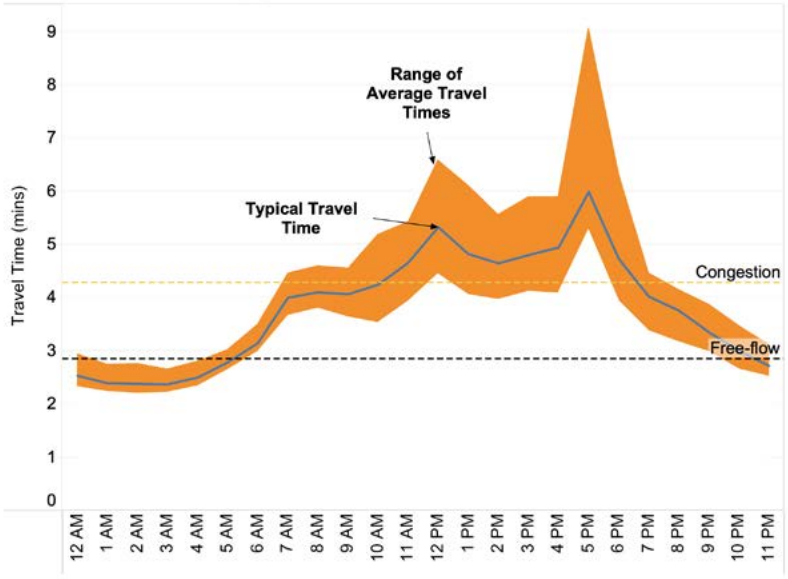
Traffic signal coordination along a road with such high demand presents a challenge. Operators must provide signal green times not only to vehicles traveling north and south along US 202, but also to the many pedestrians and bicyclists on the corridor. The Concord Pike (US 202) Corridor Master Plan, published by WILMAPCO, describes causes of congestion, previous and future development, and a future vision for the corridor.

Completed Projects (since 2019)

1. **Increase bus frequencies**
   As part of the Concord Pike Master Plan, the frequency of buses traveling along US 202 was increased. Time between buses after 6 PM was reduced from every 60 minutes to every 40 to 50 minutes.
2. **Restripe US 202 to provide an additional travel lane**
   US 202 northbound was restriped to add a fourth through lane between Murphy Road and Astra Zeneca Road.

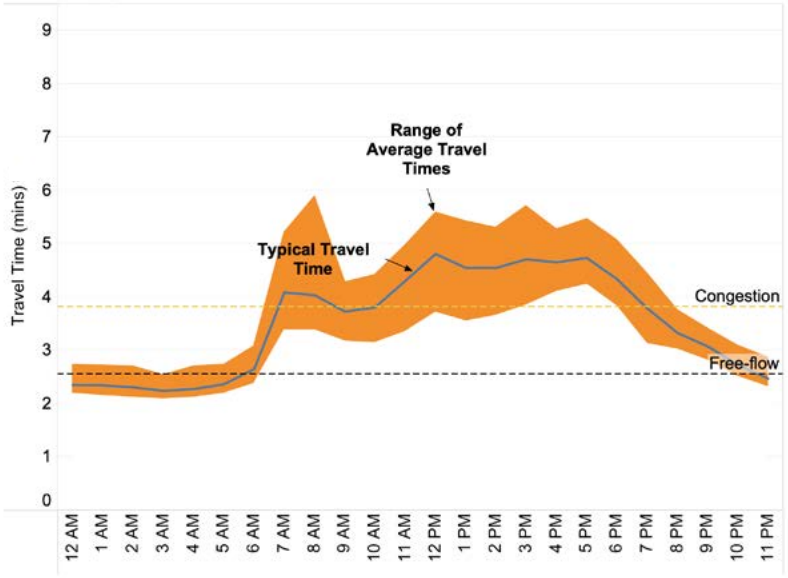


2019 NB US 202 Average Hourly Weekday Travel Times From Silverside Rd to Murphy Rd



Delays along northbound US 202 can occur between 7 AM and 8 PM and are common between 10 AM and 7 PM. The worst delays occur at 5 PM. Southbound US 202 typically experiences congestion during the AM peak and between 10 AM and 7 PM.

2019 SB US 202 Average Hourly Weekday Travel Times From Murphy Rd to Silverside Rd



Recommended Projects

3. **Implement leading pedestrian intervals (LPI)**
   The Concord Pike Master Plan recommends prioritizing pedestrian safety and mobility across US 202. The LPI gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication, which can help the pedestrian better establish their presence before a vehicle.

4. **Reduce off-peak cycle lengths**
   Reducing traffic signal cycle lengths off-peak can reduce delays experienced by people crossing the roadway when longer green times are not needed to process vehicles on the mainline.

5. **Study impact of pedestrian crossing islands and two-stage phasing**
   Pedestrian islands would improve pedestrian safety and mobility while allowing traffic signal timings to be better optimized to reduce driver delays by progressing pedestrians through the intersection in two signal phases. This study should weigh the trade-offs associated with implementation and determine whether pedestrian crossing islands are worth pursuing.

6. **Study alternate intersection treatments at the US 202 & Powder Mill Road/ Murphy Road, US 202 & Sharpley Road, US 202 & Silverside Road, and US 202 & Mt Lebanon Road intersections**
   These intersections are critical to mobility along US 202 and are unable to serve any more vehicles with their current configurations. Alternate configurations such as roundabouts, restricted turning movements, and grade separation should be evaluated for future consideration. Alternate treatments must consider the needs of people walking, bicycling, and riding transit as well as those who are driving.

7. **Study impact of constructing a multiway boulevard**
   The Concord Pike Master Plan recommended a multiway boulevard, where feasible, which would separate local and through traffic along US 202. This would reduce delays for through traffic and provide a safer built environment for local traffic, pedestrians, and bicyclists.

Hotspot C: Northwest of Wilmington, DE 48 and DE 52

Length: 1.8 miles (DE 48), 1.7 miles (DE 52)
Controlling Intersection: DE 48 & DE 141

Wilmington is a major employment center in New Castle County. Many people who work in the city rely on DE 52 and DE 48 (Lancaster Avenue) for their commute. Although DE 52 and DE 48 between DE 2 and DE 141 are typically congested only during the AM and PM peaks, delays do sometimes occur throughout the day.

DE 52 and DE 48 serve both through and local traffic. Residential developments, schools, and businesses line both roads. This mix in traffic results in slow speeds and delays. A large mixed-use development at Barley Mill Plaza, currently under construction, will increase traffic volumes in the area. Additional information concerning development in the area is in the DE 141 20 Year Transportation and Land Use Plan.

The DE 48 & DE 141 intersection was under construction during the 2019 data collection period. Construction may have exacerbated the delays and travel times observed.

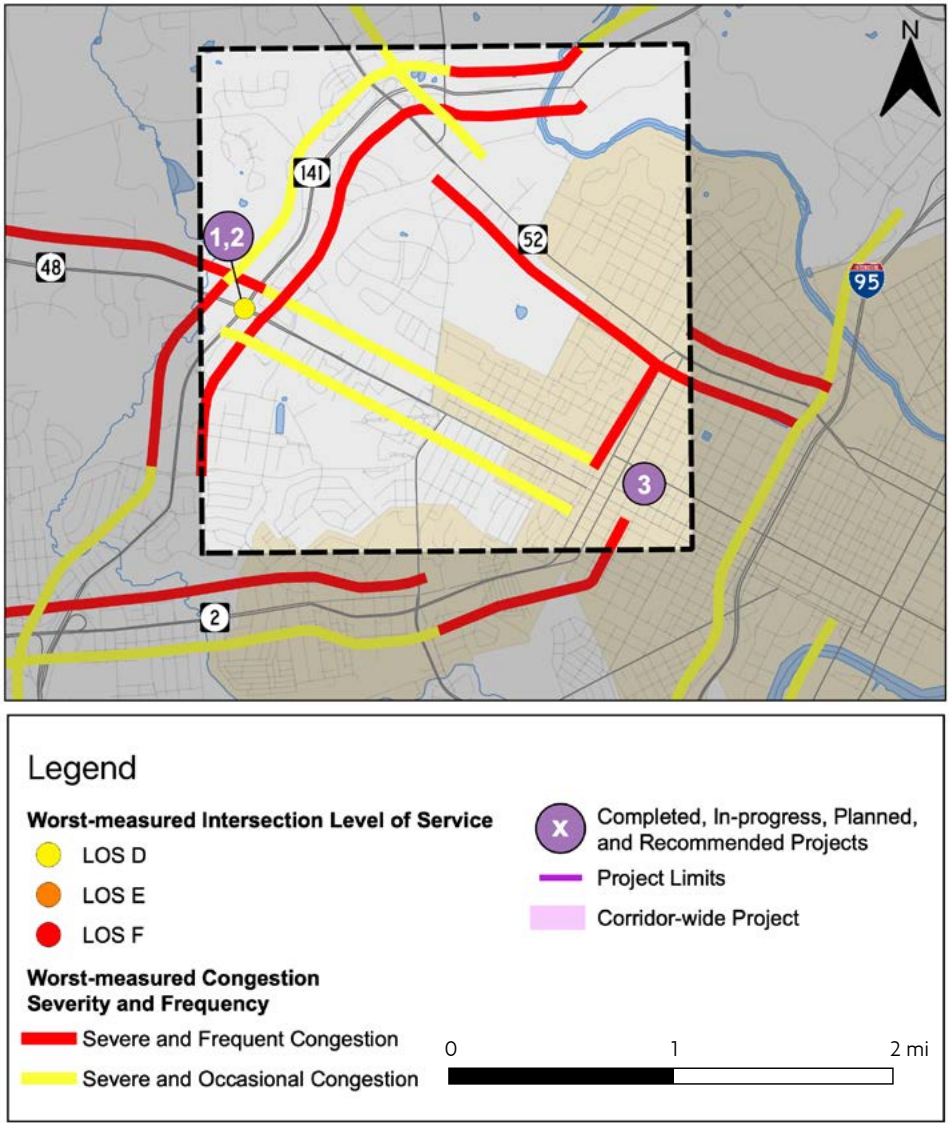
Traffic in both directions along DE 48 between DE 2 and DE 141 is not typically congested, although average travel times during the AM peak can sometimes approach 10 minutes eastbound and 14 minutes westbound, representing delays of 4 and 8 minutes, respectively. Along eastbound DE 52, average travel times during the AM peak are typically 3 to 3.5 minutes but can approach 6.5 minutes. In uncongested conditions, this trip takes 2.5 minutes.

Projects Completed Since 2019

1. **Improve pedestrian facilities at the DE 48 & DE 141 intersection**
   Pedestrian facilities were improved through the addition of crosswalks along each leg of the intersection.

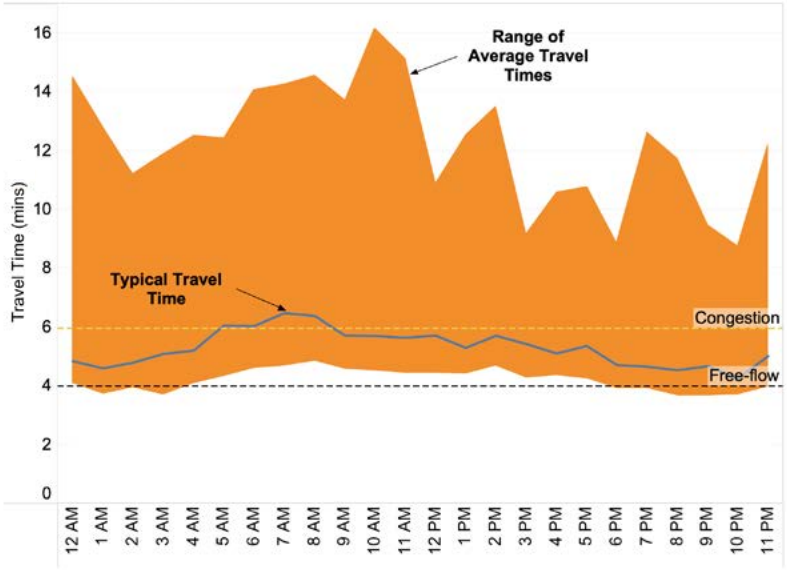
Recommended Projects

2. **Provide grade separation at DE 48 & DE 141**
   Senate Resolution 10 identified the DE 48 & DE 141 intersection as a key intersection that currently restricts mobility along both DE 48 and DE 141. A traffic engineering study was performed to evaluate potential improvements to the LOS. Two solutions that propose grade separation at the intersection were found to improve operations while minimizing property impacts. It is recommended that DelDOT reconstruct the intersection in accordance with the conclusions of the Senate Resolution 10 traffic engineering study.

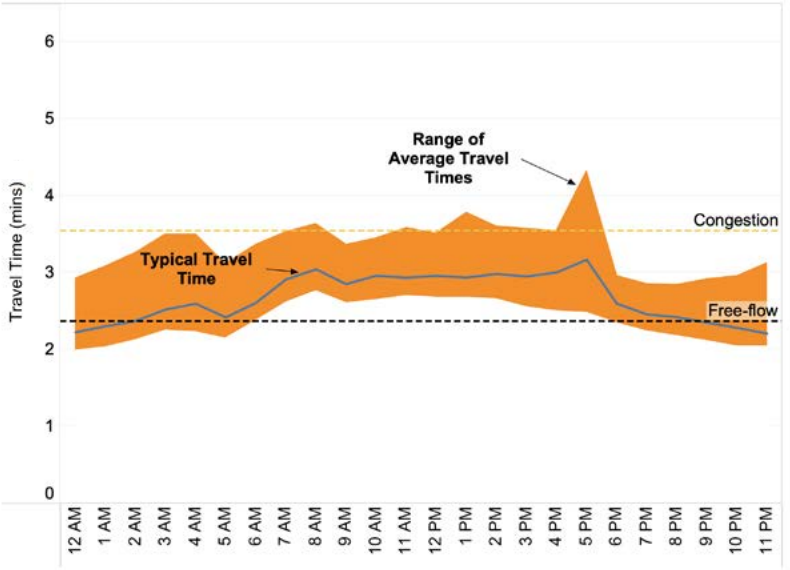


3. **Evaluate signal timing and coordination of Wilmington traffic signals**
   Signal timing and coordination adjustments may reduce delay between DelDOT and City-owned signals along DE 52, DE 48, and DE 2.

2019 WB DE 48 Average Hourly Weekday Travel Times From DE 2 to DE 141

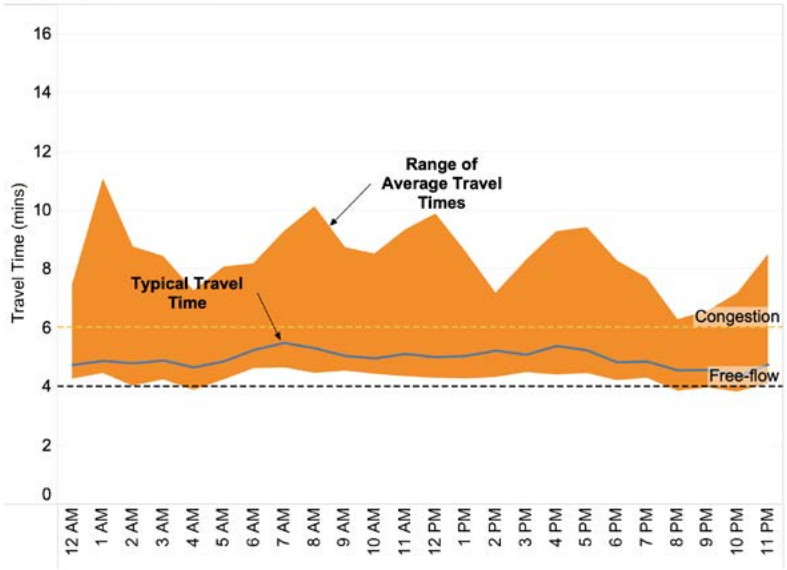


2019 WB DE 52 Average Hourly Weekday Travel Times From DE 2 to DE 100

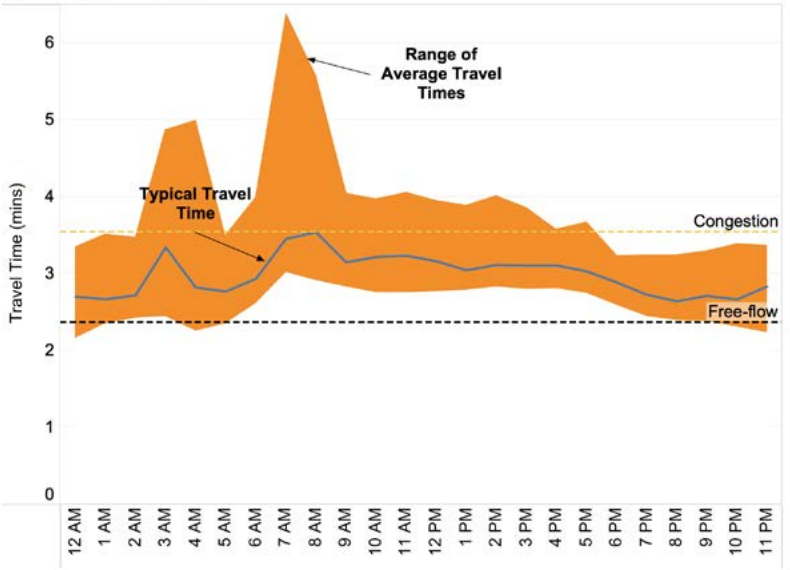


Drivers traveling westbound along DE 48 can expect congestion during the AM peak. Delays are possible throughout the day, as indicated by the wide orange band. Congestion along DE 52 is not typical, but it does occur during the AM and PM peaks when commuters travel to and from downtown Wilmington. Overnight spikes in travel times along both roads are due to non-recurring incidents such as construction projects and crashes.

2019 EB DE 48 Average Hourly Weekday Travel Times From DE 141 to DE 2



2019 EB DE 52 Average Hourly Weekday Travel Times From DE 100 to DE 2



Hotspot D: DE 2, DE 72 to DE 41

Length: 5.6 miles

Controlling Intersections: Red Mill Road, Harmony Road, Milltown, DE 7, Duncan Road, DE 41

DE 2 is a major east-west route that connects Newark and Wilmington. Along DE 2 are numerous commercial establishments and dining options that serve not just neighboring residential areas, but New Castle County as a whole. DART Route 6 provides fixed-route bus service through the corridor between Wilmington and Newark. It is one of the top six routes within the county based on average weekday ridership (May to September 2022).

Drivers experience congestion on westbound DE 2 beginning in the early lunch hours through the PM peak.

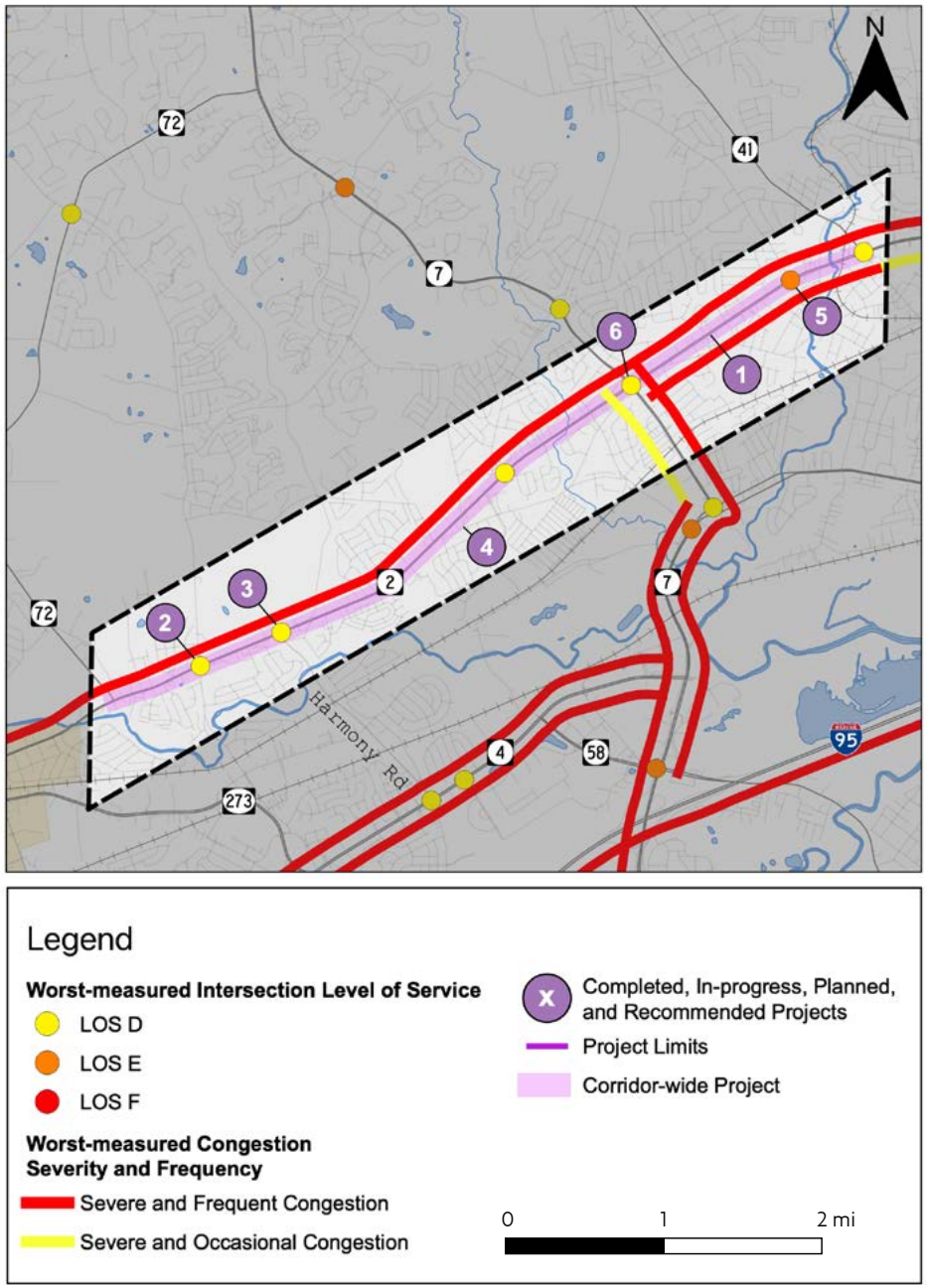
Delays are longest during the PM peak, when average travel times are typically around 15 minutes westbound and sometimes approach 22 minutes, compared to 9 minutes in uncongested conditions.

Completed Projects (since 2019)

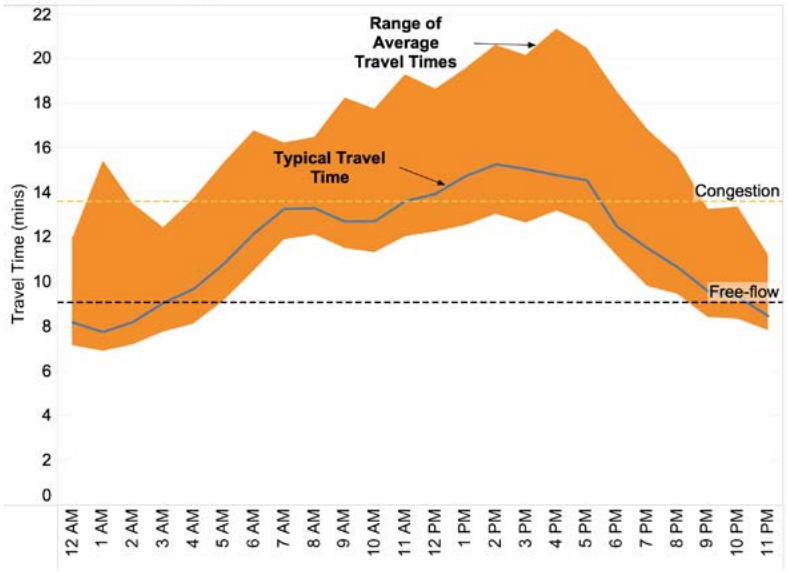
1. **Implement Pedestrian Access Routes (PAR) improvement along DE 2, Kirkwood Highway, DE 7 to Duncan Road**
   Pedestrian improvements were provided along both sides of DE 2 to improve pedestrian mobility and ensure pedestrian facilities meet Americans with Disabilities Act (ADA) standards.

Planned Projects

2. **Implement DE 2 & Red Mill Road intersection improvements** (construction 2023)
   This project will convert the northbound right-turn lane to a northbound shared through/right-turn lane, add a second eastbound left-turn lane, and construct bike lanes and crosswalks across the northbound and eastbound legs. These changes are intended to address congestion and safety concerns due to frequent crashes.

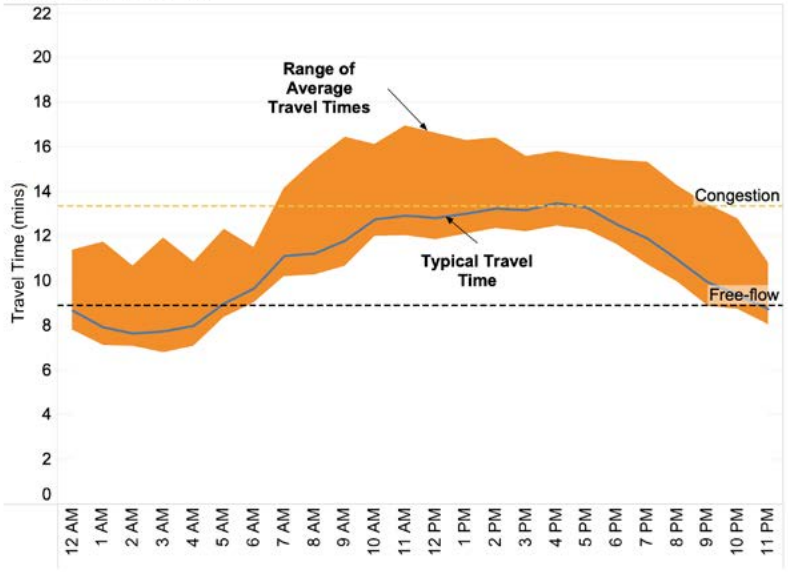


2019 WB DE 2 Average Hourly Weekday Travel Times
From DE 41 to DE 72



Drivers traveling westbound along DE 2 can expect regular congestion during the PM peak. Congestion is not as common during the AM peak, but delays can occur throughout the day.

2019 EB DE 2 Average Hourly Weekday Travel Times
From DE 72 to DE 41



3. **Implement DE 2 at Darwin Drive/Harmony Road Improvements** (construction 2023)
   Due to safety concerns identified through DelDOT's 2018 Hazard Elimination Program, the DE 2 median crossover at Darwin Drive will be closed. The eastbound left-turn lane at Harmony Road will be extended by 150 feet to accommodate additional turning volumes.

Recommended Projects

4. **Conduct a subregional study of the DE 2 corridor**
   A subregional study like the Concord Pike Master Plan would holistically evaluate the relationship between the land uses and development along DE 2 and the traffic demand. Current and future conditions would be considered, and a long-term vision for the role that DE 2 will play in the transportation network would be developed.

5. **Study potential improvements at the DE 2 & Duncan Road intersection**
   The intersection of DE 2 & Duncan Road currently operates at LOS E, meaning it cannot accommodate any additional demand, but traditional improvements would require acquisition of new right of way. A study looking at intersection improvements involving right-of-way acquisition is recommended to determine how to best improve mobility as traffic demand increases. Safety impacts should also be evaluated.

6. **Provide grade separation at DE 2 & DE 7 intersection**
   Various strategies were analyzed for improving operations at the DE 2 & DE 7 intersection as part of Senate Resolution 10. The findings show that it is possible to provide grade separation by elevating left turns within the existing right of way. This improvment would significantly reduce delay.

Hotspot E: Newark Area

Controlling Intersections: DE 2 & Cleveland Avenue, DE 2 & DE 273, DE 72 & Wyoming Road, DE 896 & Chestnut Hill Road, DE 896 & Welsh Tract Road

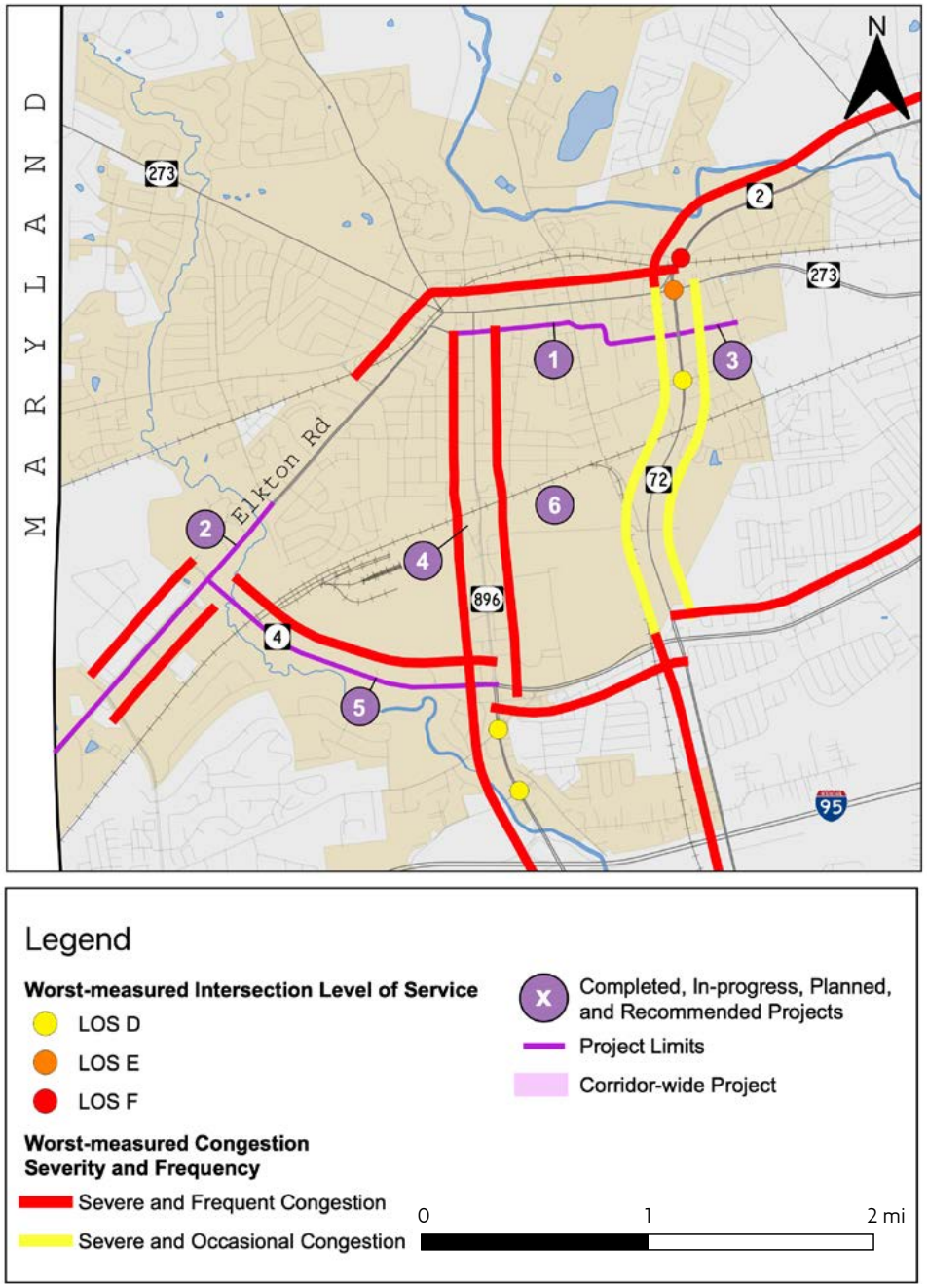
Congestion in Newark often begins in the AM peak and extends through 9 PM.

Congestion is particularly noticeable near the University of Delaware, where railroad crossings and irregular pedestrian movements can cause unexpected delays. Between DE 4 and Main Street, delays along South College Avenue during the PM peak are typically 3 minutes in both directions. Congestion sometimes leads to travel times four times as long as in uncongested conditions.

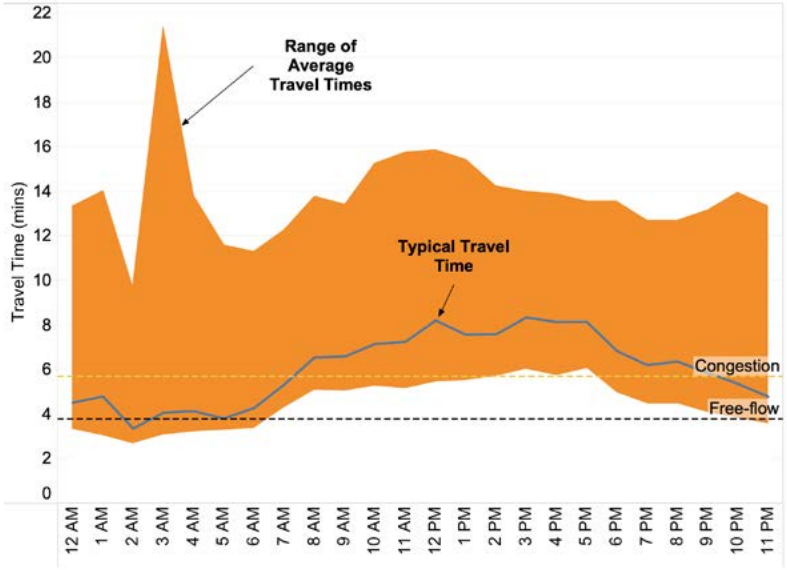
The Newark Transportation Improvement District (TID) aims to improve the transportation network as new developments are built. Projects identified by the TID include efforts to promote alternate modes of travel, such as construction of new bike facilities.

Completed Projects (since 2019)

1. **Implement Delaware Avenue Separated Bikeway – Orchard Road to Library Avenue**
   A new two-way separated bicycle facility was added to accommodate both eastbound and westbound bicyclists between Orchard Road and Library Avenue. Improvements to pedestrian facilities and intersections along the corridor also were completed.
2. **Implement Elkton Road, MD Line to Casho Mill Road project**
   This project added a third eastbound through lane between Otts Chapel Road and DE 4, as well as upgraded bicycle and pedestrian facilities.
3. **Implement Delaware Avenue Extension to Marrows Road**
   As part of the Grove development, Delaware Avenue was extended east to Marrows Road, improving connectivity and reducing traffic demand along DE 4 and DE 273.

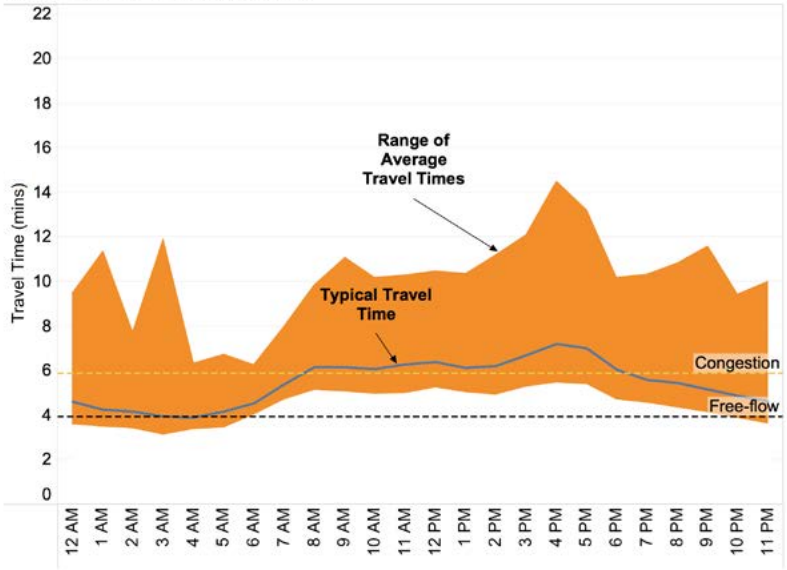


2019 SB College Ave Average Hourly Weekday Travel Times From DE 273 (Main St) to DE 4



Drivers traveling southbound on College Avenue regularly experience congestion between 7 AM and 9 PM, with average travel times that regularly exceed 1.5 times the free-flow travel time. Conditions are particularly congested between 12 PM and 5 PM, when typical travel times exceed 8 minutes, more than 2 times the travel time under ideal conditions. During the PM peak, all vehicles experience congestion. Drivers traveling northbound on College Avenue regularly encounter congestion between 8 AM and 6 PM, though the delays are not as long as for southbound travel. The large orange bands in both directions throughout the day indicate that long delays are possible at all hours. The reason may be the decision to prioritize student-pedestrian movement in the campus area. Spikes in travel times seen outside of daytime and peak hours are likely due to limited sample sizes.

2019 NB College Ave Average Hourly Weekday Travel Times From DE 4 to DE 273 (Main St)



Projects in Progress

4. **Expand the Newark Regional Transportation Center**
   The expansion of the Newark train station will allow for expanded SEPTA rail services and ensure ADA compliance.

Planned Projects

5. **Reconstruct DE 4, Elkton Road to DE 896** (construction TBD)
   This project will reconstruct the concrete pavement and widen DE 4 to provide two continuous lanes from Elkton Road to DE 896. Existing structures over the Christina River and Amtrak's Northeast Corridor will be improved as part of the widening. This additional capacity will remove a bottleneck that currently exists where DE 4 narrows from two lanes in each direction to one.

6. **Implement Newark TID projects** (TBD based on TID parameters)
   The Newark TID has identified a number of projects that will be implemented as the development continues in the university area. The goal of the projects is to ensure intersection LOS does not fall below LOS E through 2045.

Hotspot F: Churchman's Crossing Area, DE 4 and DE 7

Length: 2.7 miles (DE 4), 0.6 miles (DE 7)
Controlling Intersections: DE 4 & DE 273/Salem Church Road, DE 4 & Harmony Road, DE 4 & Samoset Dr, DE 7 & DE 58

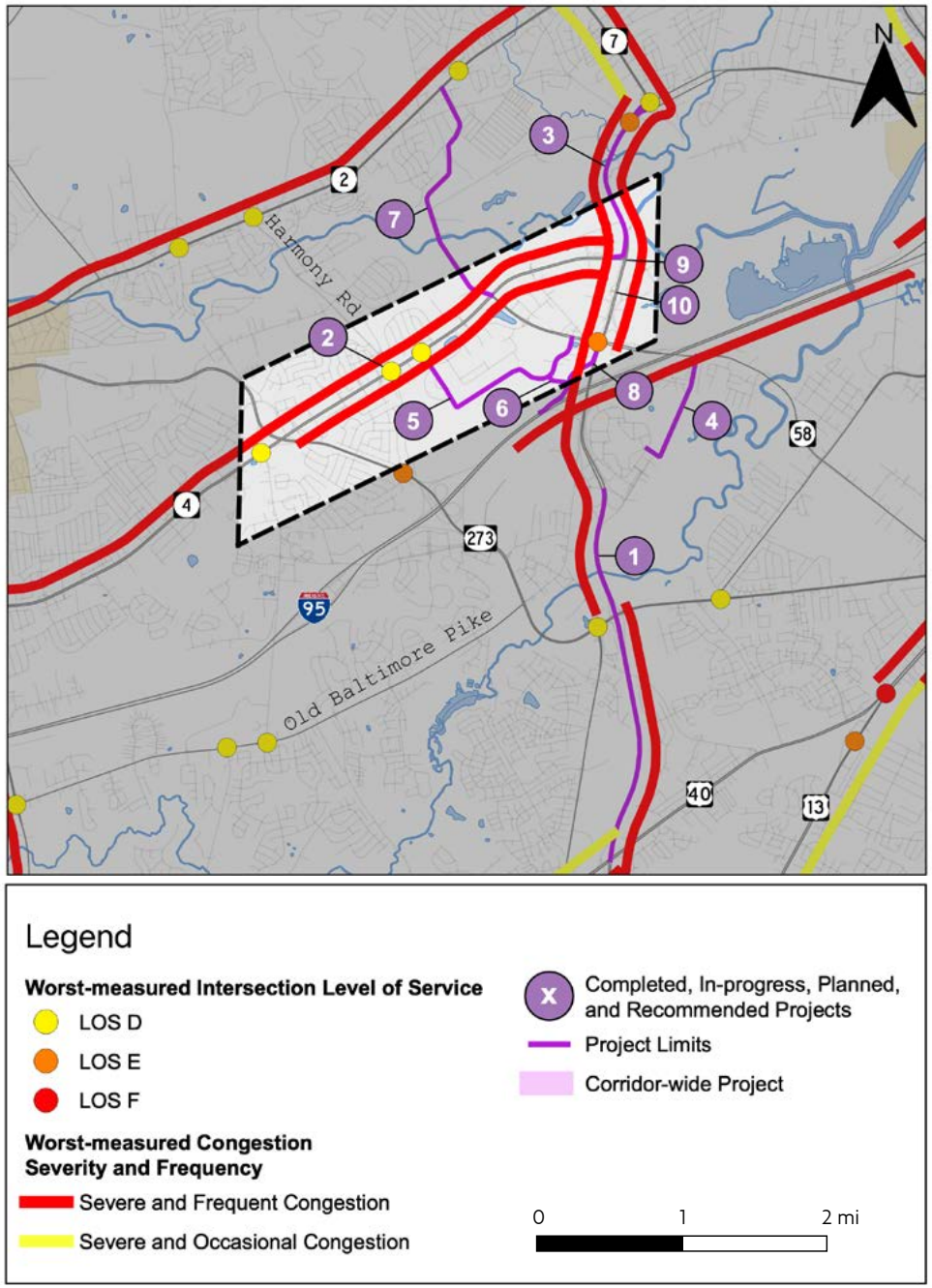
The Churchman's Crossing area of New Castle County is centrally located along I-95. The area includes residential, commercial, and institutional development. Christiana Hospital, the Stanton campus of Delaware Technical and Community College, the Delaware Park racetrack and casino complex, and Christiana Mall are in the area. These and other area businesses employ nearly 40,000 workers. DART Route 33 provides fixed-route bus service through the corridor linking Wilmington, the mall, and Newark. It is one of the top six routes within the county based on average weekday ridership (May to September 2022).

Drivers generally experience congestion in the area between 7 AM and 6 PM. Congestion both is severe and occurs frequently in the area. Congestion is worst along DE 4 between DE 7 and DE 273 during the weekday PM peak, with typical travel times of 7 minutes eastbound and 7.5 minutes westbound, compared to the uncongested travel time of 4 minutes in each direction. DE 7 experiences similar levels of congestion between DE 4 and DE 58.

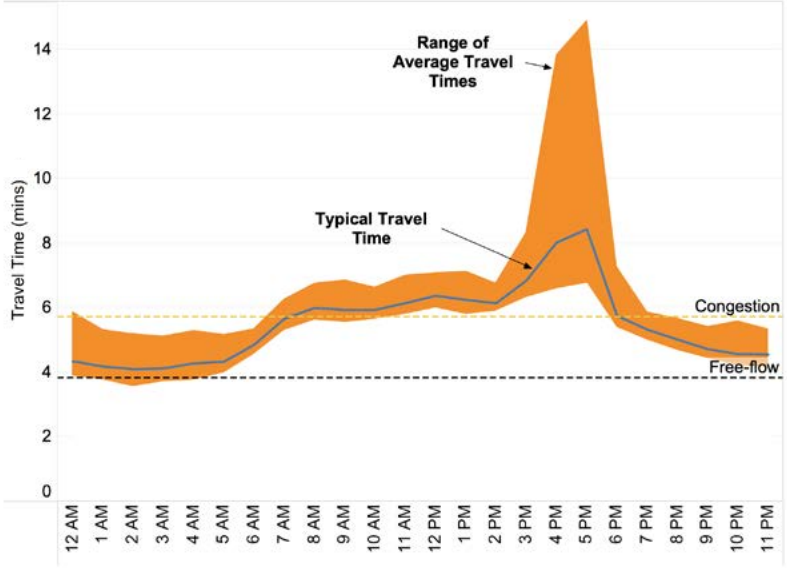
The Churchman's Crossing Plan Update led by WILMAPCO, DelDOT, and New Castle County took a holistic look at the impact of regional development and demographic trends. The plan recommends strategies to achieve the community vision for the area, which includes additional development and a transportation network that provides safety, accessibility, and mobility for all modes.

Planned Projects

1. **Implement DE 1 Widening, Road A to South of US 40** (construction TBD) Widening DE 1 from Road A (an access road near Christiana Mall) to south of US 40 will reduce congestion, improve safety, increase connectivity within the transportation network, enhance DelDOT's ability to respond to incidents, and support evacuations ahead of storms.

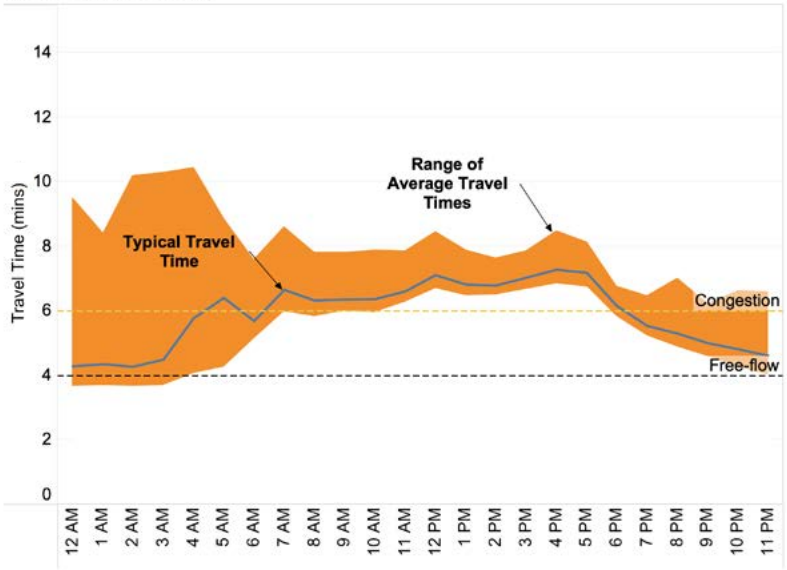


2019 WB DE 4 Average Hourly Weekday Travel Times From DE 7 to DE 273



Drivers traveling westbound on DE 4 experience the most significant congestion in the Churchman's Crossing area; they can expect to spend at least 1.5 times the free-flow travel time between 7 AM and 6 PM. Delays are longer during the PM peak, when average travel times regularly double, and can sometimes triple, the free-flow travel time. Eastbound DE 4 experiences regular congestion throughout the day, but delays do not reach the same levels as for westbound traffic. The wide orange band for eastbound DE 4 in the early morning hours results from small sample sizes being influenced by a few incidents.

2019 EB DE 4 Average Hourly Weekday Travel Times From DE 273 to DE 7



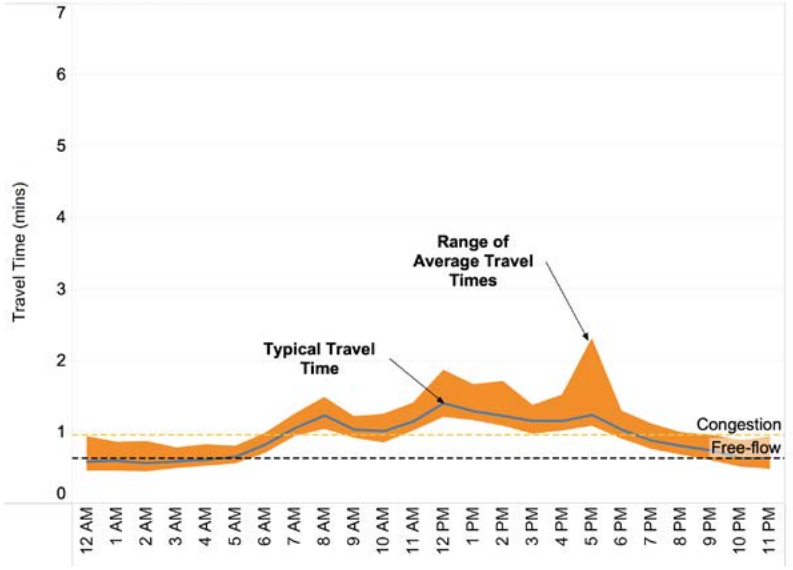
2. **Implement DE 4 & Harmony Road Intersection Improvements** (construction 2025)
   Intersection improvements include adding turn lanes, improving the overall geometry of the intersection, and providing pedestrian, bicycle and transit improvements to help reduce delays while also improving safety.
3. **Implement DE 4, Ogletown Stanton Road/DE 7, Christiana Stanton Road Phase I, Stanton Split** (construction TBD)
   This project will reduce delays by adding capacity. An eastbound left-turn lane onto Telegraph Road will be added to the existing road configuration, and the storage length for the southbound left-turn lane along DE 7 will be increased. Additionally, a third westbound through lane will be added on DE 4 at DE 7.
4. **Implement improvements from Cavaliers Country Club Traffic Impact Study**
   As part of the Cavaliers Country Club redevelopment, improvements will be made along Churchman's Road, and a connection between Churchman's Road and Christiana Mall will be provided. These changes will improve circulation of local traffic and reduce the impact that increased development is projected to have on delays.

Recommended Projects

5. **Re-establish connection between Samoset Drive and Continental Drive**
   The Churchman's Crossing Update recommended re-establishing the connection between Samoset Drive and Continental Drive. The connection would improve circulation and reduce delays on DE 4 and Churchman's Road by providing an alternate route.
6. **Improve access from Continental Drive to I-95**
   Also recommended by the Churchman's Crossing Update, this project would construct a new on-ramp to I-95 southbound from Continental Drive. This improvement would reduce demand and therefore queuing and delays along Churchman's Road.
7. **Extend Churchman's Road from DE 4 to DE 2**
   Recommended as part of the Churchman's Crossing Update, a new section of Churchman's Road that would stretch from DE 4 to DE 2 can improve the connectivity of the transportation network and reduce congestion currently seen on Harmony Road and DE 7.

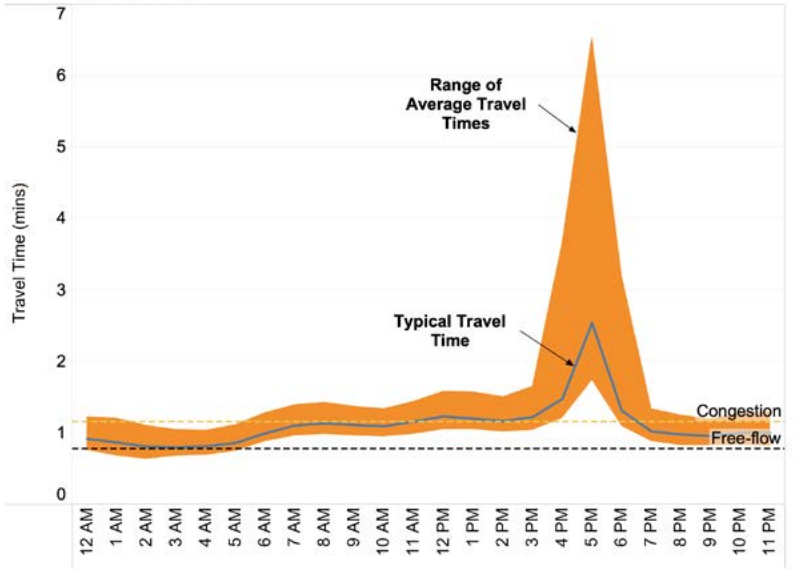
8. **Connect southbound DE 1 to southbound I-95**
   Recommended as part of the Churchman's Crossing Update, creating a direct connection from southbound DE 1 to southbound I-95 would eliminate the need for southbound DE 7/DE 1 traffic to use the DE 58 & DE 4 intersection to access southbound I-95. This link would improve operations at the DE 58 & DE 4 intersection and reduce travel times for vehicles accessing southbound I-95.
9. **Implement DE 4 and DE 7 intersection improvements**
   Restriping the existing shared westbound left-and-through lane as a left-turn-only lane and replacing the existing traffic signal heads as necessary will allow DelDOT to convert the signal timing to accommodate concurrent eastbound and westbound left turns. This change would improve signal coordination and reduce delays along DE 7.
10. **Study impact of pedestrian crossing islands and two-stage phasing at the AAA Boulevard & DE 7 intersection**
    Two-stage pedestrian crossings improve pedestrian safety and signal efficiency. The AAA Boulevard & DE 7 intersection is a strong candidate for implementing a two-stage pedestrian crossing due to its lower side-street vehicle demand and long existing crosswalk. This study should weigh the trade-offs associated with installing a pedestrian crossing island and two-stage phasing.

2019 NB DE 7 Average Hourly Weekday Travel Times From DE 58 to DE 4



Southbound traffic along DE 7 experiences a spike in delays during the PM peak, when commuters make their way to the I-95 and DE 1 interchange. Northbound traffic along DE 7 experiences congestion between 7 AM and 6 PM, although delays are more predictable and less severe than in the southbound direction.

2019 SB DE 7 Average Hourly Weekday Travel Times From DE 4 to DE 58




RITE AID

Hotspot G: I-95, DE 1 to DE 141/I-295

Length: 3 miles

The interchanges of I-95 with DE 1 and with DE 141/I-295 are not typically congested, but they do experience some congested conditions during the AM and PM peaks.

The delays along I-95 between DE 1 and DE 141/I-295 are the result of large numbers of drivers changing lanes to exit onto DE 141 and I-295. On I-95 northbound, drivers are forced to merge from three lanes into two lanes along I-295. This merge reduces capacity and causes long queues that impact even drivers who plan to continue along I-95. Although delays are not typical, they can be severe when demand exceeds capacity. Northbound travel times have been observed to exceed 9 minutes for a trip that should last just 2.5 minutes in uncongested conditions.

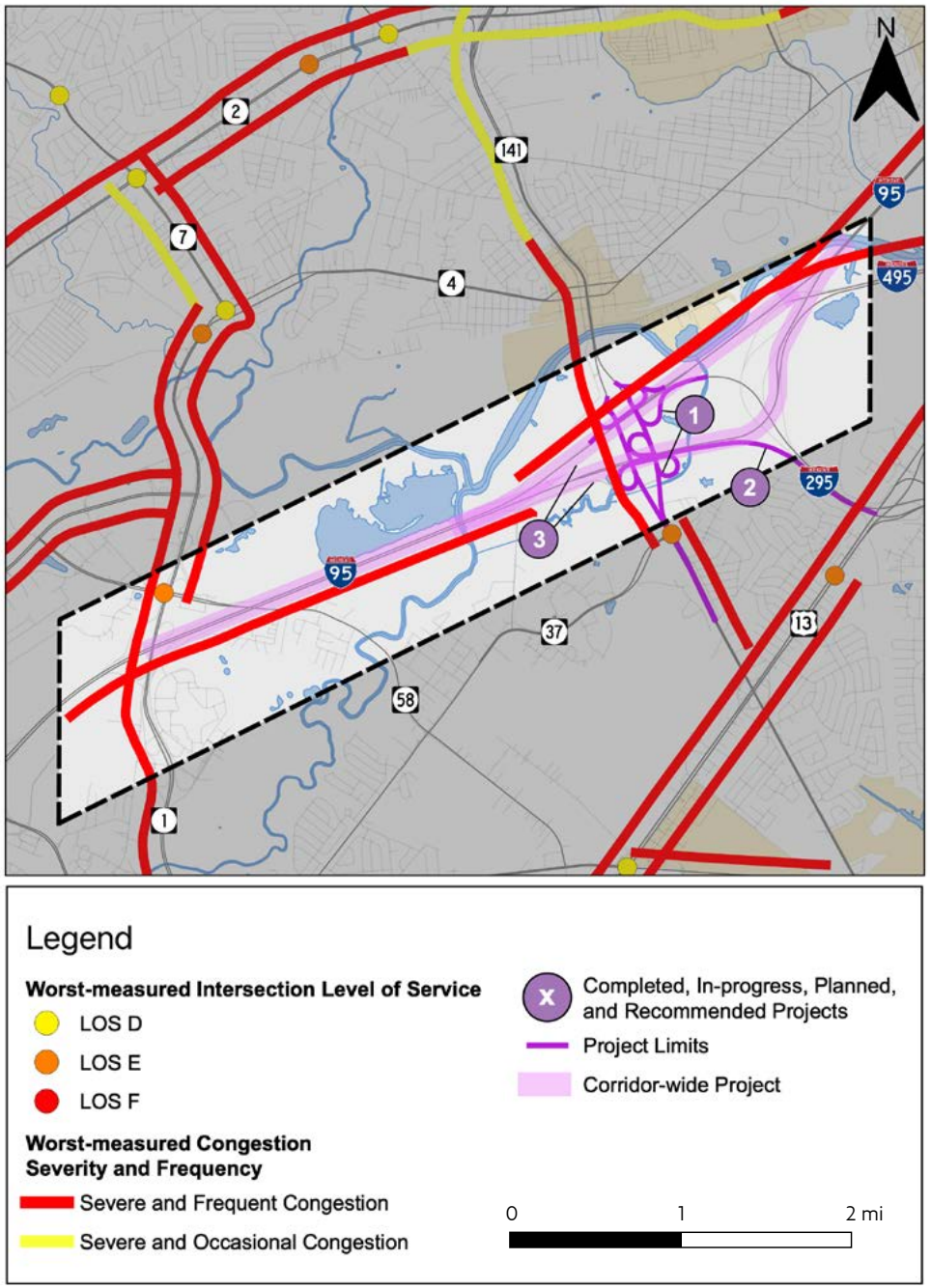
The ramps connecting I-95 and DE 141 were under construction during the 2019 data collection period. This construction had a negative impact on travel times and resulted in increased delays.

Completed Projects (since 2019)

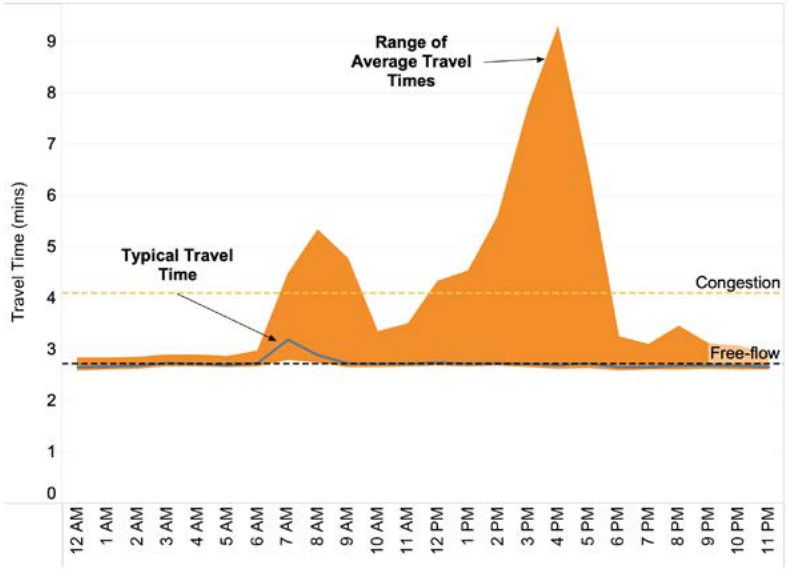
1. **Implement DE 141 Improvements, I-95 to Jay Drive**
   DE 141 was widened at Commons Boulevard to provide additional through lanes. Three left-turn lanes were provided from Commons Boulevard to DE 141. Additionally, the bridges over southbound I-95 were reconstructed to improve current and future traffic operations and to improve safety. Operations should continue to be monitored to quantify the benefits of the project.

Planned Projects

2. **Implement I-295 Northbound, DE 141 to US 13 project**
   (construction 2024) The purpose of the project is to increase capacity along I-295 northbound by providing an additional lane between the I-95 & DE 141 interchange and US 13. The improvements should help alleviate the congestion associated with the I-95 northbound to I-295 northbound exit.

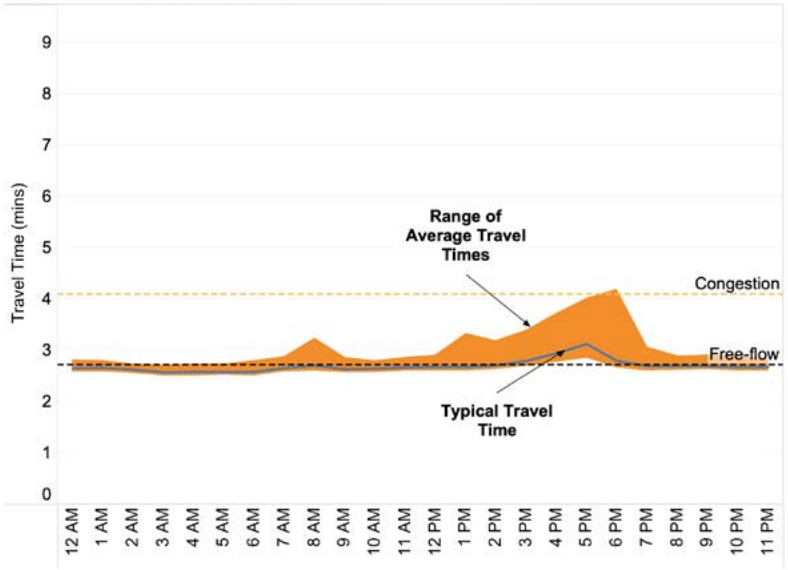


2019 NB I-95 Average Hourly Weekday Travel Times
From SR 1 Interchange to DE 141/I-295 Interchange



Drivers along northbound I-95 between the DE 1 and DE 141/I-295 interchanges do not typically experience average travel times that exceed 1.5 times the free-flow travel time. However, delays are observed during the AM and PM peaks with, average travel times sometimes exceeding three times the free-flow travel time. The large orange peaks indicate a lack of predictable conditions on the roadway. Southbound traffic rarely encounters congestion between the two interchanges.

2019 SB I-95 Average Hourly Weekday Travel Times
From DE 141/I-295 Interchange to DE 1 Interchange



Recommended Projects

3. **Implement a queue warning system with dynamic speed limits on I-95**
   Using ITMS data to power a queue warning system in conjunction with dynamic speed limits along I-95 would enable drivers to make informed decisions about which route to take and would improve safety by slowing vehicles gradually ahead of congestion.

Hotspot H: New Castle Area, US 13 and DE 273

Length: 5.4 miles (US 13), 1.4 miles (DE 273)
Controlling Intersections: US 13 & DE 273, US 13 & Boulden Boulevard

Congestion in the New Castle area occurs regularly during the weekday AM and PM peaks, when traffic demand is high on US 13 between US 40 and I-495 and on DE 273 between US 13 and DE 141.

US 13 is a critical north-south roadway that serves interstate freight traffic; the New Castle Airport; patrons of numerous businesses; and travelers seeking to access I-495, I-295, the Port of Wilmington, and the City of Wilmington. These generate significant demand along the road and produce delays. DART Route 13 provides fixed-route bus service through the corridor linking Claymont, Wilmington, and areas near the US 13 and US 40 split. It is one of the top six routes within the county based on average weekday ridership (May to September 2022).

DE 273 stretches east-west across New Castle County, connecting Newark, I-95, DE 1, US 13, DE 141, and New Castle. Between US 13 and DE 141, DE 273 is lined with businesses and warehouses.

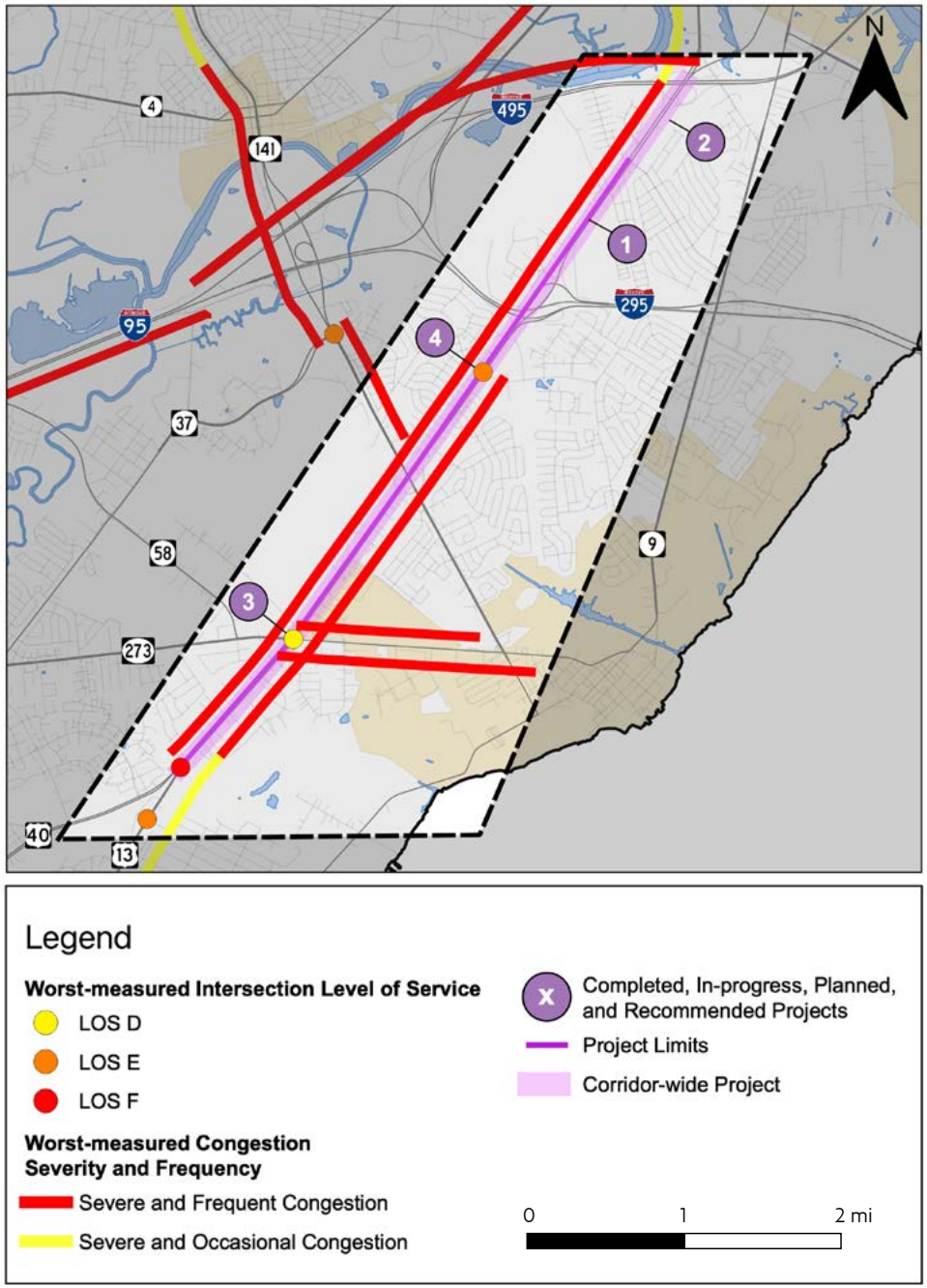
Delays are particularly long during the PM peak, when southbound travel times along US 13 average more than two times the uncongested travel time and sometimes approach four times the uncongested travel time.

Planned Projects

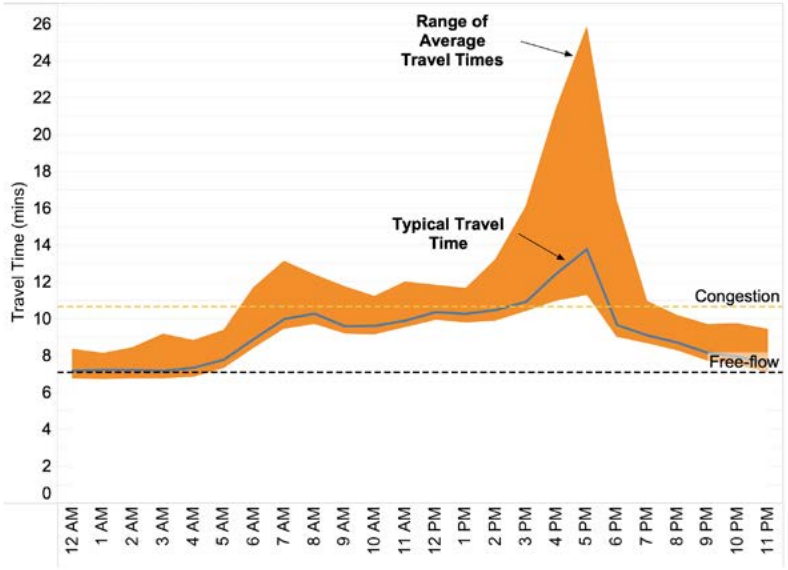
1. **Implement US 13, US 40 to Memorial Drive Pedestrian Improvements**
   In order to promote pedestrian, bicycle, and bus mobility and make travel safer along US 13, DelDOT plans to expand the bus bike right turn (BBRT) lane and improve sidewalks and median treatments.

Recommended Projects

2. **Conduct a safety and mobility study along US 13**
   A comprehensive study reviewing operations and safety along US 13 can help identify best actions toward enhancing the corridor for safety and mobility of all modes.

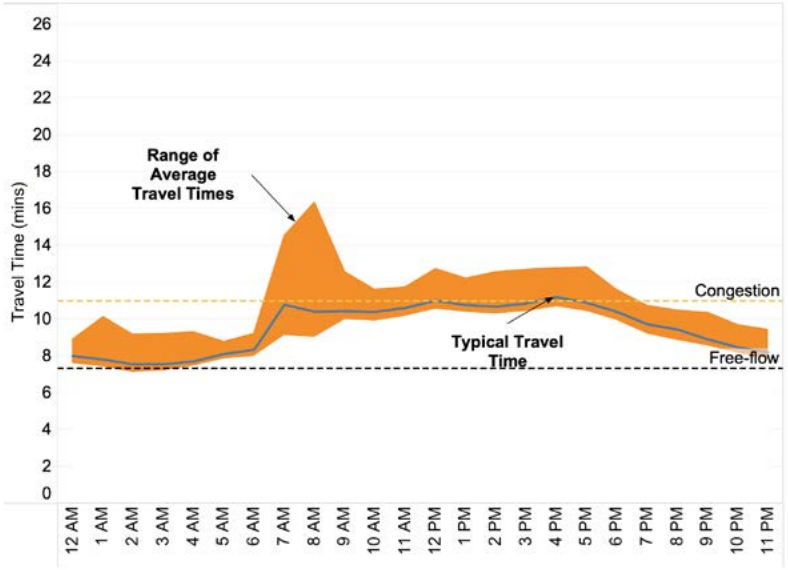


2019 SB US 13 Average Hourly Weekday Travel Times From I-495 to US 40



Average travel times along US 13 southbound regularly approach the congestion threshold during the AM peak period and can rise to nearly 13 minutes. After the AM peak, travel times typically remain below the congestion threshold until the PM peak, when they typically reach 14 minutes and sometimes approach 26 minutes for a trip that takes only 7 minutes under free-flow conditions.

2019 NB US 13 Average Hourly Weekday Travel Times From US 40 to I-495



3. **Improve US 13 & DE 273 intersection**
   By reconstructing the left-turn dividing island on the northbound approach so it is set further back from the intersection, DelDOT could change the signal phasing to accommodate concurrent left turns. This would improve the level of service and allow the intersection to process more vehicles through each signal cycle.

4. **Improve US 13 & Boulden Boulevard intersection**
   Intersection capacity could be increased by: reconstructing the northbound and southbound left-turn islands to sit further away from the intersection; removing the median along the westbound approach; adding another westbound left-turn lane; and converting the shared westbound left-and-through lane to a through-only lane. These changes would allow for concurrent left-turn phasing for the eastbound and westbound approaches.

Hotspot I: DE 896, I-95 to Porter Road

Length: 4.3 miles

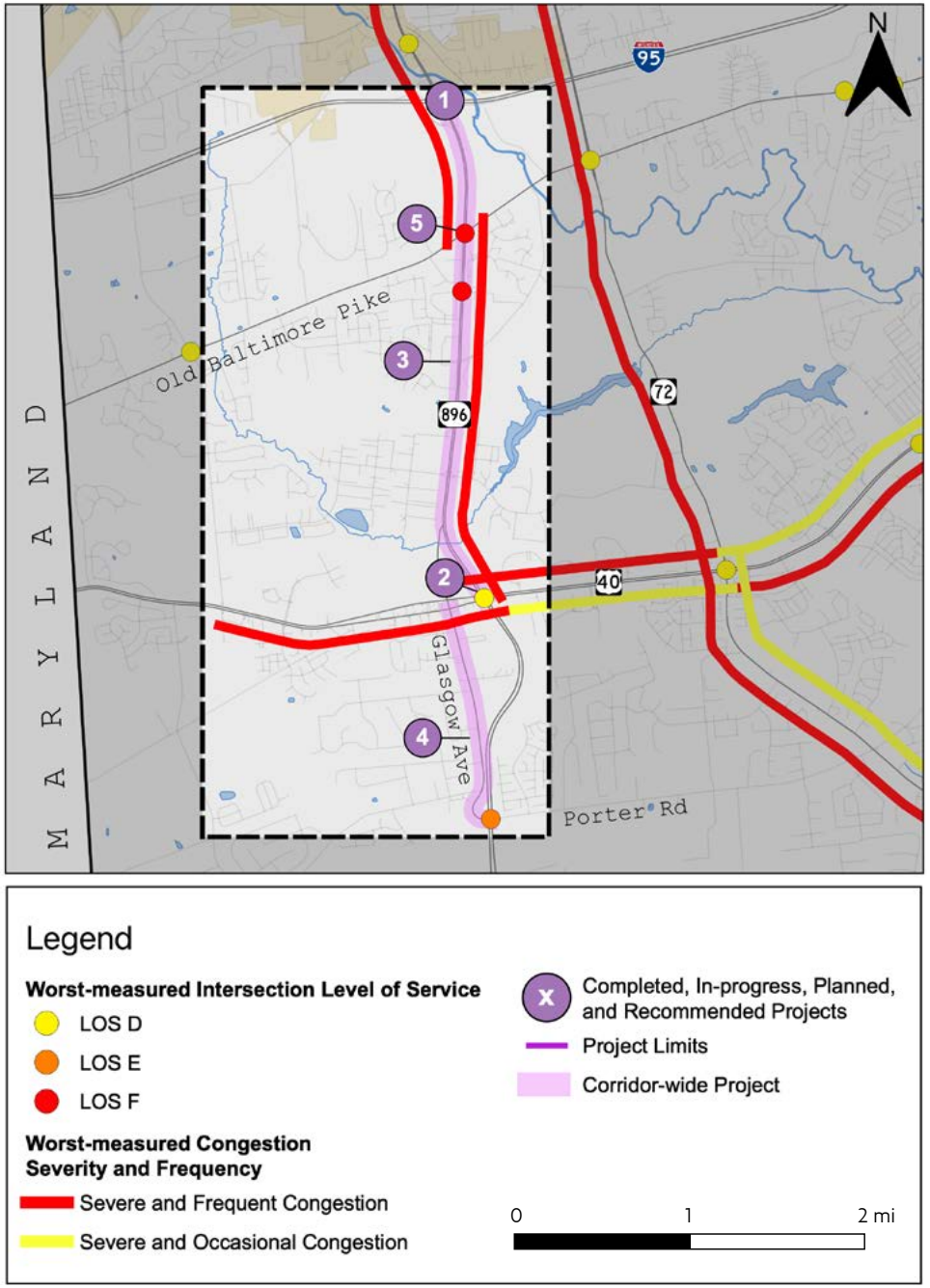
Controlling Intersections: US 40, I-95, and Old Baltimore Pike

Congestion occurs on DE 896 between US 40 and Old Baltimore Pike during the AM and PM peaks when traffic demand is high. Residential areas in southern New Castle County are growing quickly, and DE 896 is one of the primary north-south roads used to access many destinations in the western portion of northern New Castle County, including many places of employment.

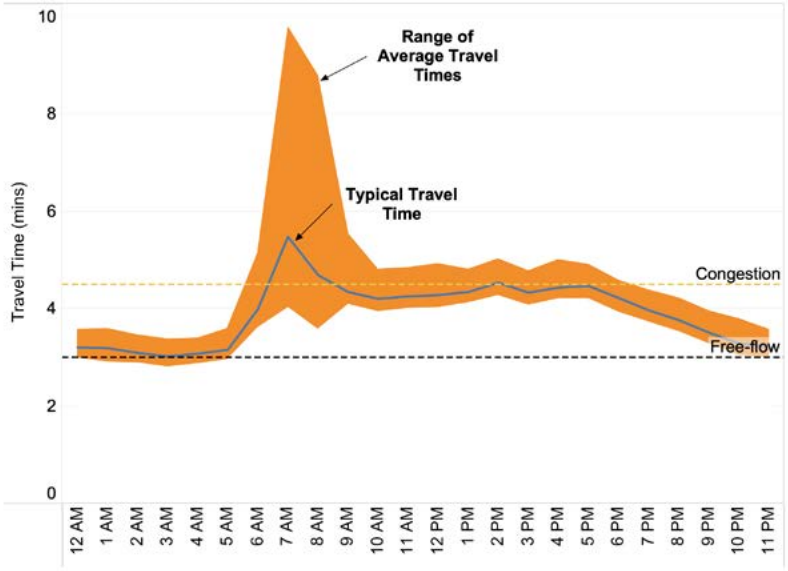
Delays on DE 896 are also impacted by travelers seeking to avoid tolls along I-95. Some drivers use DE 896 to access parallel routes such as Old Baltimore Pike and US 40. The effects of this additional demand are especially noticeable during the weekday AM peak in the northbound direction, when average travel times are 1.5 times the uncongested travel time and sometimes approach 10 minutes, more than three times the uncongested travel time.

Planned Projects

1. **Implement I-95 and DE 896 Interchange project** (construction 2023)
   This project will construct redesigned interchange ramps to improve safety and reduce congestion.
2. **Implement US 40 and DE 896 Improvements** (construction TBD)
   This project will construct a grade-separated interchange at the current signalized intersection of US 40 and DE 896, improving safety and relieving congestion.
3. **Widen DE 896, US 40 to I-95** (construction TBD)
   This project will widen DE 896 to add an additional through lane in each direction between US 40 and I-95. By adding capacity, DelDOT can expect less severe delays.

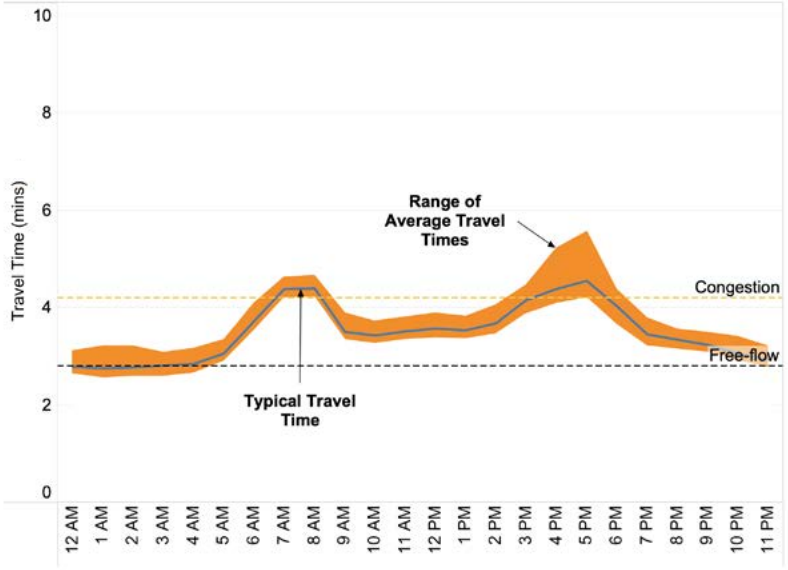


2019 NB DE 896 Average Hourly Weekday Travel Times From US 40 to Old Baltimore Pike



Average travel times along northbound DE 896 between US 40 and Old Baltimore Pike are longest during the AM peak, as commuters drive north to Newark and I-95. The wide orange band during the AM peak indicates that travel times are not predictable, so unexpected delays may occur.

2019 SB DE 896 Average Hourly Weekday Travel Times From Old Baltimore Pike to US 40



4. **Implement Glasgow Avenue, DE 896 to US 40 project** (construction TBD)
   By reducing travel lane width, modifying shoulders, adding turn lanes and transit amenities, and providing bicycle and pedestrian accommodations on both sides of Glasgow Avenue, DelDOT will improve safety along Glasgow Avenue and encourage locals to use Glasgow Avenue when possible to reduce travel demand along DE 896.

Recommended Projects

5. **Improve DE 896 & Old Baltimore Pike intersection**
   The intersection of DE 896 and Old Baltimore Pike is currently one of the primary constraints to mobility along DE 896. DelDOT should consider reducing or removing the existing median east of DE 896 to provide enough space to restripe the westbound approach to include two left-turn-only lanes and one westbound through lane. This change would allow for westbound left turns to proceed concurrently with eastbound left turns, improving signal operations.

Hotspot J: US 40, MD Line to DE 1

Length: 7.7 miles
Controlling Intersections: DE 896, DE 72, Church Road, Governor's Square, and DE 7

US 40 is a major east-west route that runs the length of New Castle County from Elkton, MD, in the west to US 13 in the east. The many businesses, restaurants, residential areas, and major intersecting roads, including DE 896 and DE 1, cause delay for travelers as early as the AM peak and as late as 7 PM.

These delays occur in both directions between Pleasant Valley Road and DE 1 throughout the day. During the PM peak, eastbound average travel times are typically 16 minutes and sometimes exceed 22 minutes, compared to an uncongested travel time of 9.5 minutes. Westbound average travel times are typically 16.5 minutes and can approach 24 minutes, compared to an uncongested travel time of 10.5 minutes.

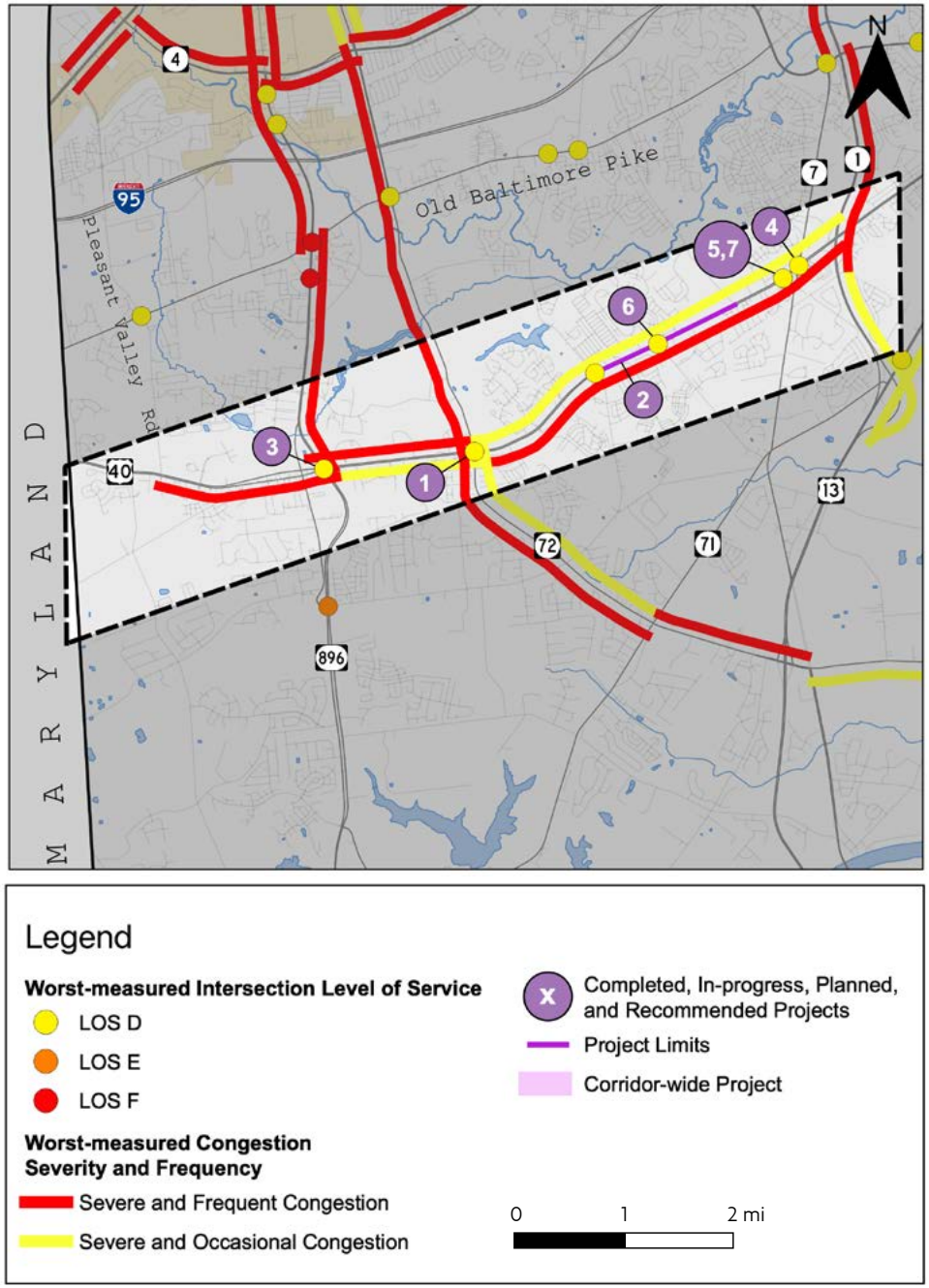
Due to its importance to New Castle County's transportation network, US 40 is monitored annually as part of the US 40 2020 Corridor Monitoring and Triggering Report, which looks at land development, traffic trends, safety, and transit use in order to recommend projects as triggering thresholds are met.

Completed Projects (since 2019)

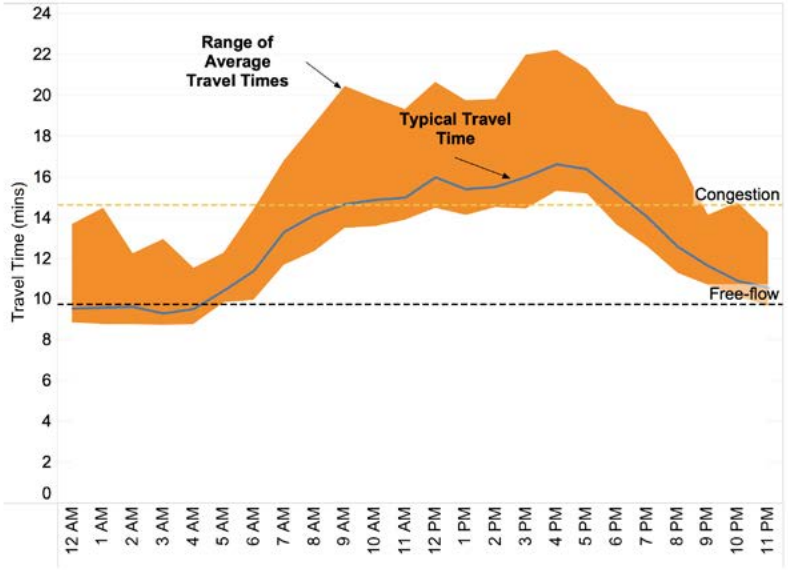
1. **Implement US 40 & DE 72 Intersection Improvements**
   Construction provided one additional northbound and southbound through lane, eastbound and westbound left-turn lanes, and improved facilities for pedestrians and bicyclists. These improvements increased the capacity of the intersection and improved multimodal connectivity.

Planned Projects

2. **Widen US 40 from Salem Church Road/Porter Road to Walther Road** (construction 2024)
   The US 40 widening project will provide an additional travel lane in each direction, increasing US 40's size from four lanes to six lanes, and will provide shared use paths on both sides of the roadway.

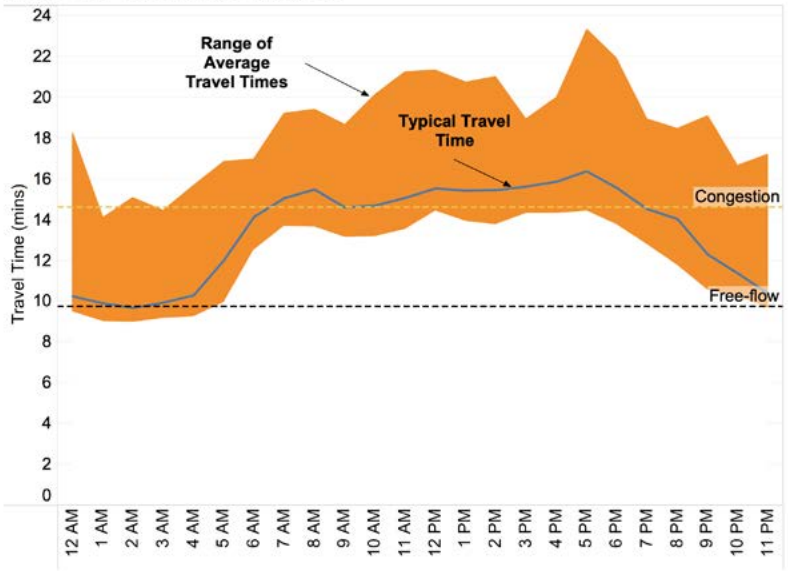


2019 EB US 40 Average Hourly Weekday Travel Times
From Pleasant Valley Rd to DE 1



Average travel times along US 40 eastbound regularly exceed the congestion threshold between 9 AM and 7 PM and are highest during the PM peak. The typical average travel time during the PM peak often exceeds 16 minutes and sometimes surpasses 22 minutes for a trip that takes less than 10 minutes under ideal conditions.

2019 WB US 40 Average Hourly Weekday Travel Times
From DE 1 to Pleasant Valley Rd



3. **Implement US 40 and DE 896 Improvements** (construction TBD)
   See description under DE 896 (Hotspot I).
4. **Implement US 40 & DE 7 grade-separated intersection**
   Providing grade separation to the US 40 and DE 7 intersection will reduce delays and improve safety.

Recommended Projects

5. **Implement Eden Square connector road**
   This project consists of a new two-lane connector road between the intersection of DE 7 and Old Hamburg Road and the southern corner of the Eden Square Shopping Center. When complete, this connector will serve as the sole access point to the shopping center. The existing signalized driveways on US 40 will be closed, improving traffic operations at the US 40 & DE 7 intersection and setting the stage for a future grade separation at US 40 & DE 7.
6. **Improve US 40 & Church Road intersection**
   The planned widening of US 40 would improve intersection operations to LOS B in both peaks. Addition of a two-stage pedestrian crossing across US 40 would further enhance operations by improving pedestrian safety and reducing the minimum green time required to serve movements from the minor streets.
7. **Improve US 40 & Governors Square intersection**
   Several improvements are recommended at the US 40 & Governors Square intersection. First, converting one of the existing westbound left-turn lanes to a westbound through lane and widening the westbound receiving lane area to receive the new westbound through lane would provide a large enough benefit to improve the existing level of service from LOS D to LOS C. Additionally, removal of the northbound and southbound medians would provide enough space for the approaches to be restriped to accommodate separating the northbound and southbound shared-left-and-through lanes to separate left-turn lanes and through lanes. These changes would allow signal phasing to be updated to accommodate northbound and southbound concurrent left-turns. Pedestrian mobility and signal timing efficiency could also be enhanced by constructing pedestrian crossing islands in the existing medians on US 40.

Hotspot K: DE 72, US 40 to DE 1

Length: 4.2 miles

Controlling Intersections: US 40

Although DE 72 between US 40 and DE 1 is typically uncongested, delays sometimes occur in the AM and PM peaks.

Congestion is worst during the weekday PM peak, when travel times can exceed 15 minutes in both directions, compared to 6 minutes in uncongested conditions.

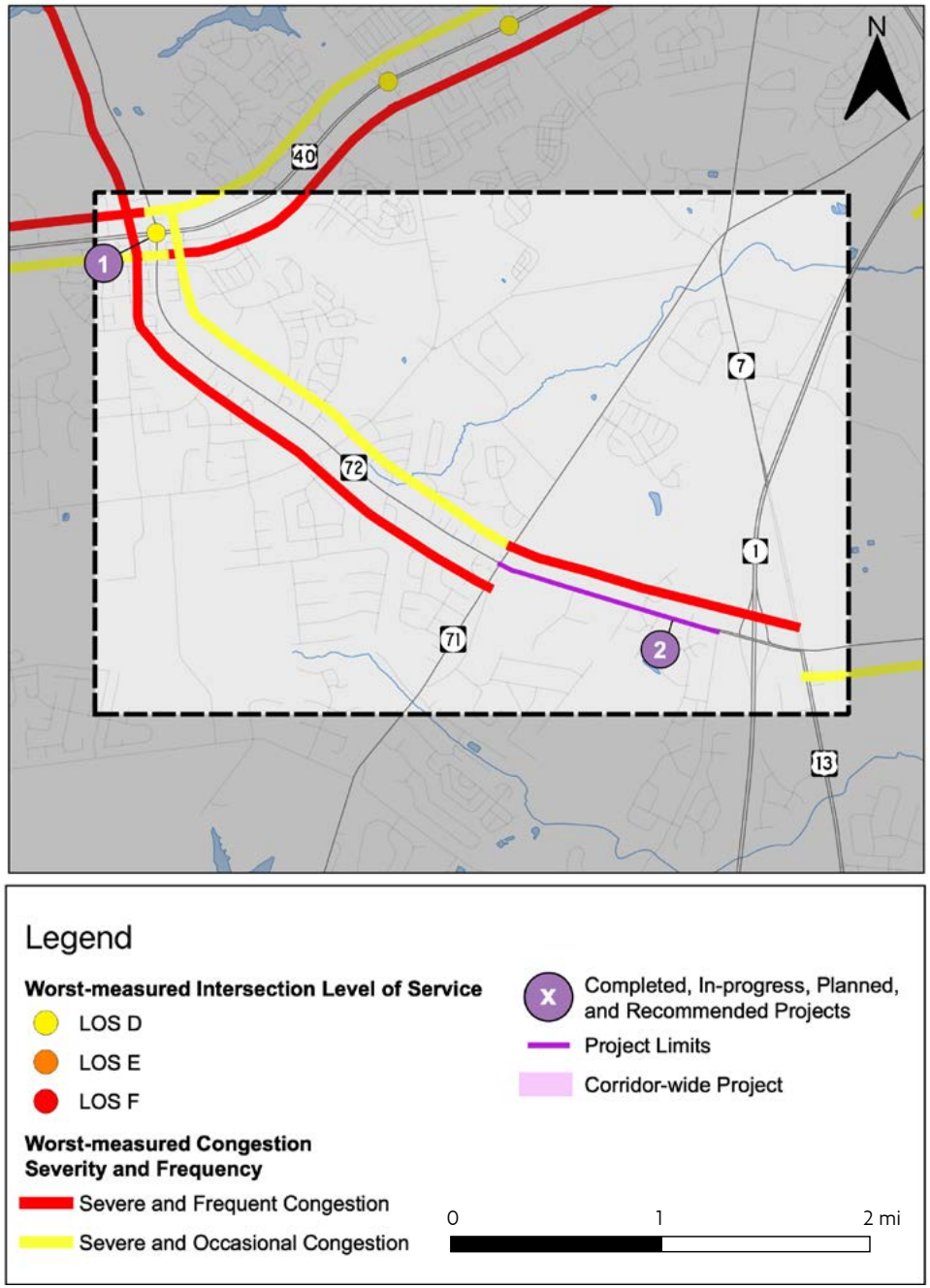
The intersection of US 40 & DE 72 underwent reconstruction during 2019. The construction, which extended south as far as Caravel Academy, limited the capacity of DE 72 and increased delays.

Completed Projects (since 2019)

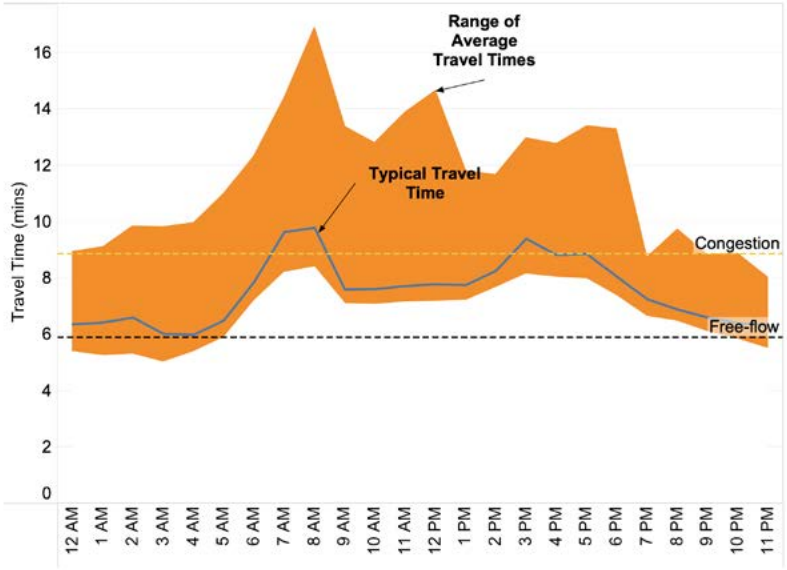
1. **Implement US 40 & DE 72 Intersection Improvements**
   See US 40 corridor recommendations on page 56.

Projects in Progress

2. **Implement DE 72, McCoy Road to DE 71 project**
   DE 72 will be widened to two lanes in each direction and a center two-way left-turn lane will be provided to improve traffic operations and safety. Pedestrian accommodations will also be provided.

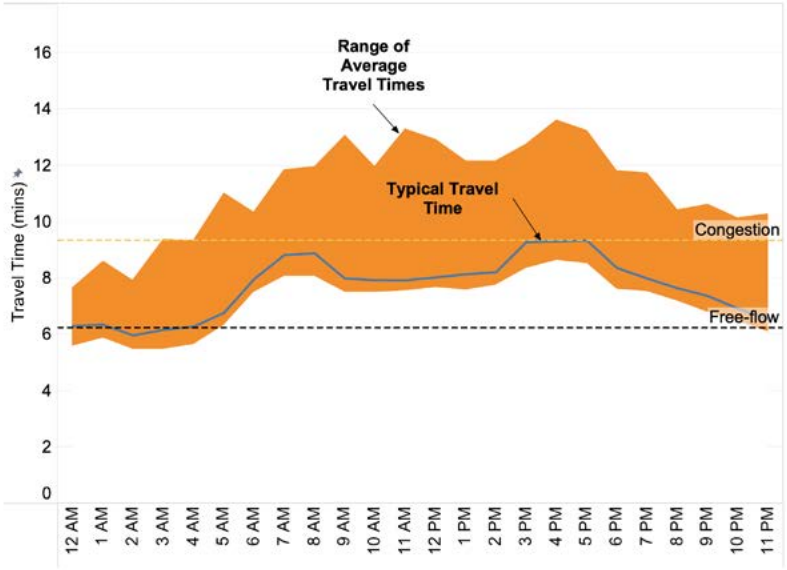


2019 NB DE 72 Average Hourly Weekday Travel Times
From DE 1 to US 40



Average travel times along DE 72 northbound typically exceed 1.5 times the free-flow travel time during the AM and PM peaks. The thickness of the orange band throughout the day indicates that long delays were possible on DE 72 at any time.

2019 SB DE 72 Average Hourly Weekday Travel Times
From US 40 to DE 1



Hotspot L: DE 299 in Middletown

Length: 2.8 miles

Controlling Intersections: Silver Lake Road

DE 299 between DE 1 and Middletown-Warwick Road is the primary east-west road through Middletown. The road experiences congestion between 6 AM and 8 PM on weekdays, with delays holding at peak-hour levels throughout the day.

Traffic along DE 299 is impacted by the many businesses, restaurants, residential areas, and schools that line the roadway. DE 299 also connects US 301, DE 1, and US 13, three significant north-south roadways. As a result, during the PM peak, travel times between DE 1 and Middletown-Warwick Road can approach 29 minutes eastbound and 19 minutes westbound. These travel times represent delays of over 23 minutes and 14 minutes, respectively.

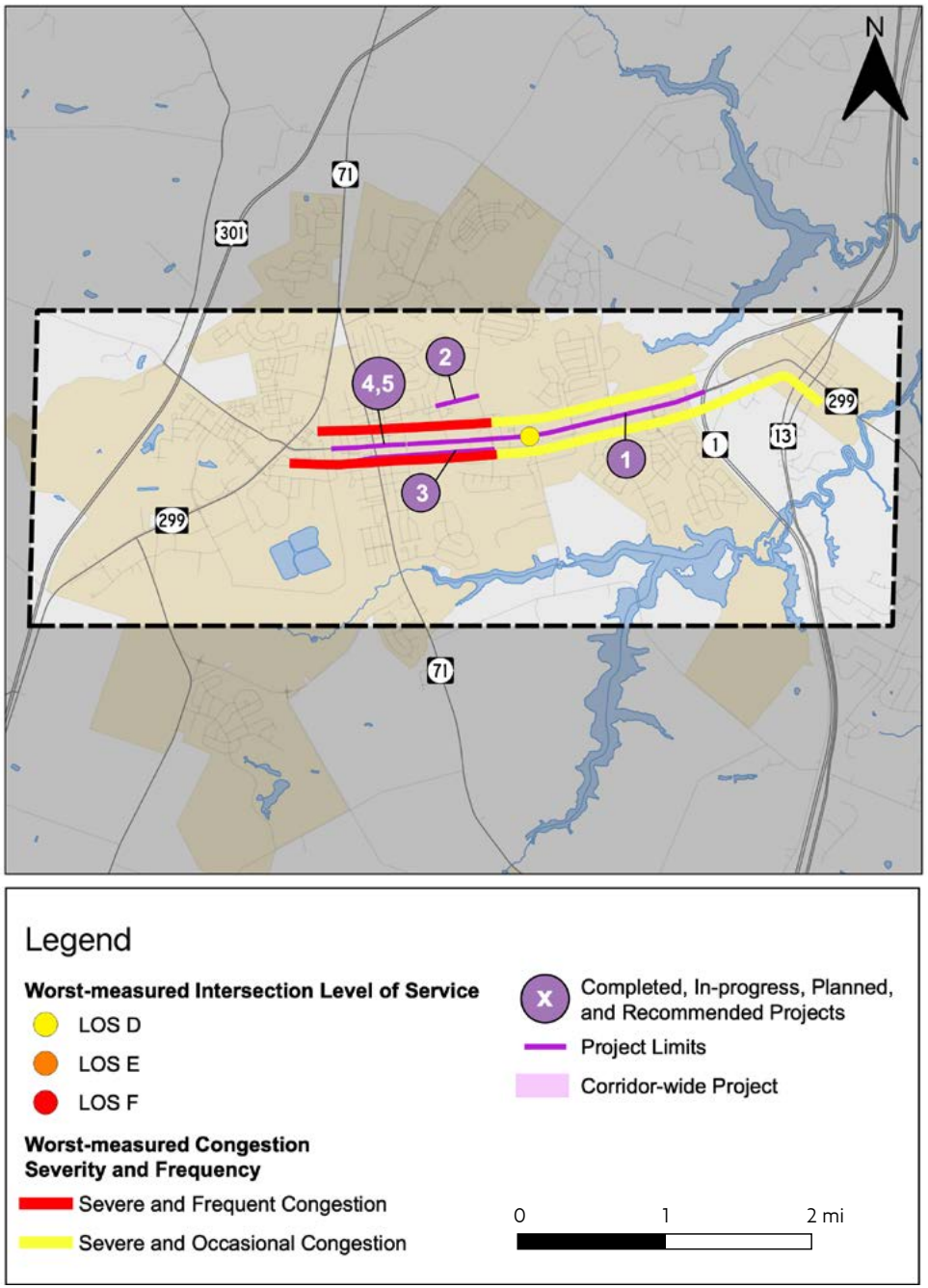
Two adjacent transportation improvement districts, the Eastown TID and the Westown TID, aim to improve the transportation network over the long term as development in Middletown continues. Projects planned as part of the TIDs would increase connectivity and potentially shift demand from DE 299 to other roadways. Additional information can be found on the DelDOT TID webpage.

Projects in Progress

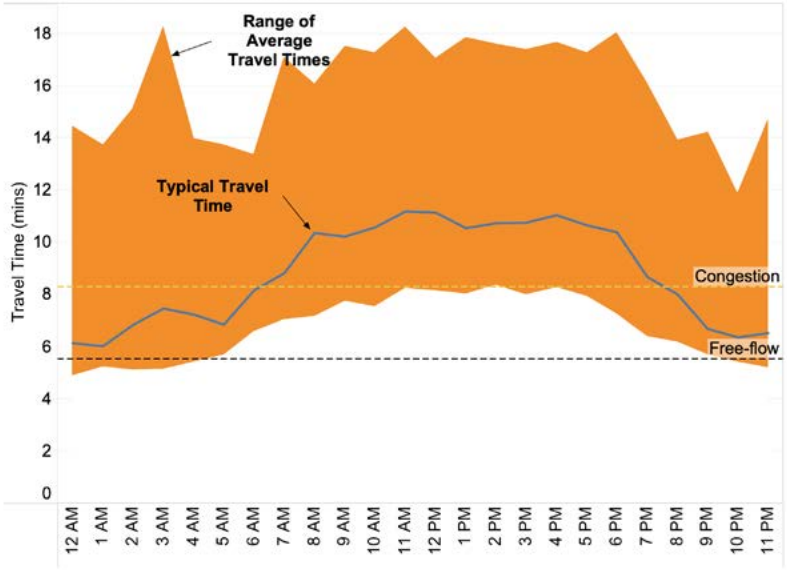
1. **Implement DE 299, DE 1 to Catherine Street project**
   This project is widening DE 299 to two lanes in each direction between DE 1 and Cleaver Farm Road, adding a center left-turn lane between DE 1 and Catherine Street. Sidewalks and a shared use path are also being constructed along DE 299.

Planned Projects

2. **Implement Lake Street Extension to Cleaver Farm Road**
   (construction TBD) As part of the improvements identified by the Eastown TID, Lake Street will be extended east to Cleaver Farm Road. The extension will improve mobility within Middletown and decrease reliance on DE 299 for east-west movements.

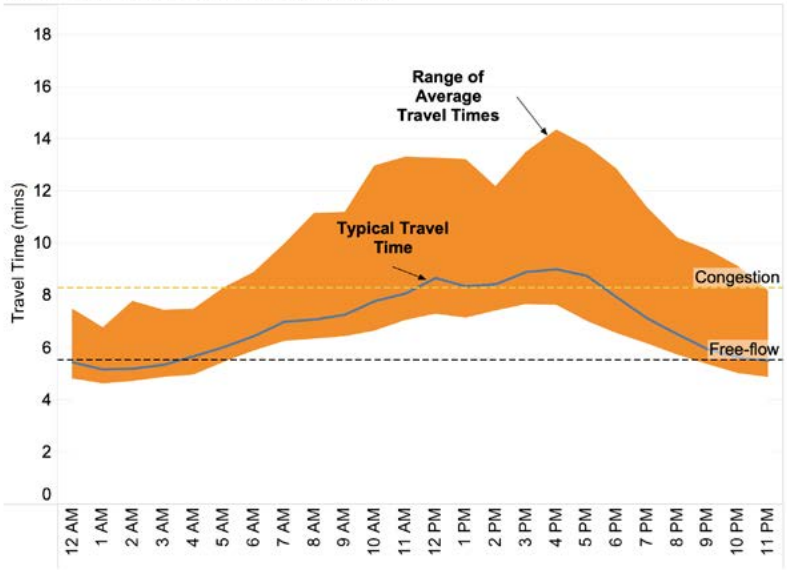


2019 EB DE 299 Average Hourly Weekday Travel Times From Middletown-Warwick Rd to DE 1



Eastbound traffic along DE 299 through Middletown regularly experienced average travel times above the congestion threshold on weekdays between 6 AM and 8 PM. Throughout the day, average travel times approached and even exceeded 18 minutes, compared to a free-flow travel time of just under 6 minutes. The large orange band across the graph indicates that long delays were possible at any time of the day.

2019 WB DE 299 Average Hourly Weekday Travel Times From DE 1 to Middletown-Warwick Rd



3. **Extend Green Street to Industrial Drive and Dickenson Boulevard** (construction TBD)
   Part of the improvements identified by the Eastown TID, the extension of Green Street east to Dickenson Boulevard and west to Industrial Drive will also improve circulation of local traffic within Middletown and provide an alternative to DE 299 for local vehicles traveling east and west through town.

Recommended Projects

4. **Study feasibility and impact of mini roundabouts at locations with two-way stop-control between Wood Street and Catherine Street**
   Congestion along DE 299 is partially caused by left-turning vehicles causing delays for vehicles behind them. Construction of mini roundabouts in locations which are currently two-way stop-controlled can reduce these delays while improving safety. The current footprint of DE 299 is limited by the surrounding businesses, but DE 299 may be able to accommodate mini roundabouts at two locations, Scott Street and Cox Street. The study should evaluate the impacts to operations, safety, and adjacent properties.

5. **Study impact of restricting left turns during peak hours between Wood Street and Catherine Street**
   Another potential solution for reducing delays along DE 299 is to install signage that would restrict left turns from DE 299 at locations between Wood Street and Catherine Street with two-way stop control during peak hours. These vehicles, which are waiting to turn left into residential areas on either side of DE 299, could make their turns at DE 71 or Catherine Street, allowing traffic to flow more smoothly when demand is highest.

NEXT STEPS

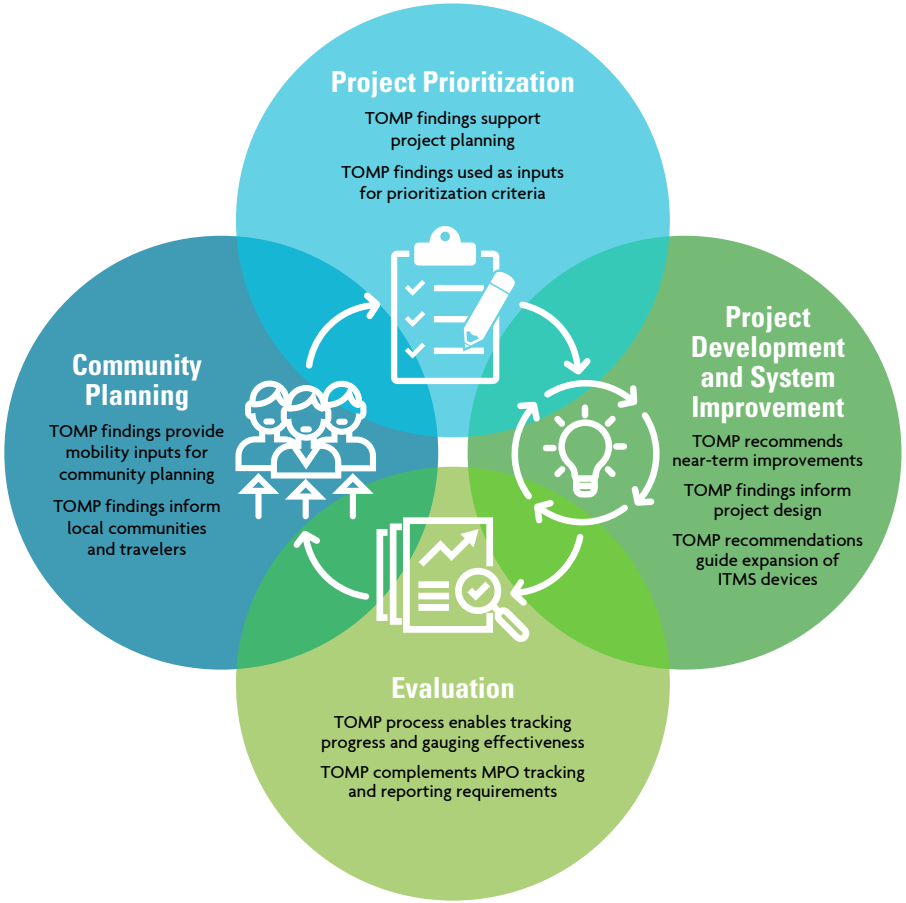
This TOMP is intended to provide DelDOT and agency partners such as WILMAPCO, New Castle County, and cities and towns the information they need to make data driven decisions aimed at improving mobility on the county's transportation network.

Future updates of each county TOMP will enable DelDOT to continue tracking trends, changes, and implications of COVID-19 on transportation operations.

The recommendations and data from this TOMP will provide input into DelDOT's project prioritization process to help identify projects for funding in the Capital Transportation Program.

As DelDOT TOMP managers track the progress of these projects and recommendations, updates will be released on the New Castle County TOMP website.

The role of TOMP in enhancing transportation



NEW CASTLE COUNTY

Transportation Operations Management Plan

December 2022 Report

Rybinski ENGINEERING

DelDOT