

# KENT COUNTY



## Transportation Operations Management Plan

April 2021 Report







# EXECUTIVE SUMMARY

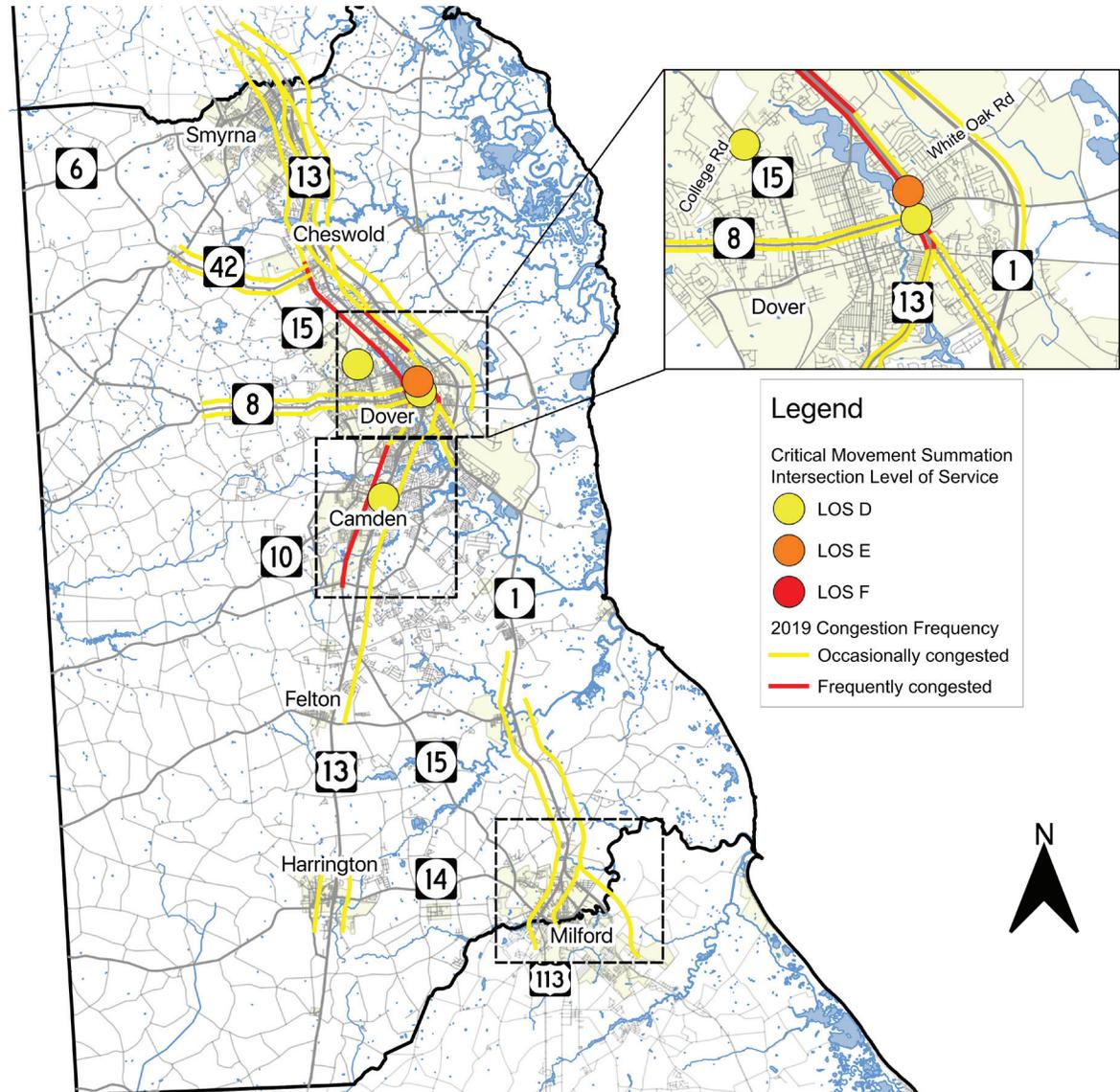
The Kent County Transportation Operations Management Plan (TOMP) applies DelDOT's extensive traffic data to identify congested areas in Kent County and recommend solutions.

Kent County's population growth and the related residential and commercial development are adding traffic to the roadways, which is expected to get worse as growth continues. Analysis of traffic data revealed the "hotspots" shown on this map in Dover, Camden, and Northern Milford. In these areas, congestion slows Kent County travelers, especially during peak hours.

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

- **Add monitoring devices** to provide more robust data regarding the incidence and causes of congestion
- **Improve intersection and corridor operations** through signing, striping, and geometric modifications
- **Engage in transportation planning** in conjunction with urban development plans to address the effects of population growth and sprawl

## Congestion Hotspots





# TABLE OF CONTENTS

<b>Introduction</b> .....	<b>1</b>	Mitigating Congestion .....	17
<b>About Kent County</b> .....	<b>2</b>	Congestion Hotspot: Dover .....	18
Traffic Growth .....	3	<b>Projects in the Pipeline</b> .....	<b>19</b>
Recent Improvements .....	4	<b>Short-term Recommendations</b> .....	<b>19</b>
Causes of Congestion .....	5	<b>Medium-term Recommendations</b> .....	<b>19</b>
<b>Planning for Nonrecurring Congestion</b> .....	<b>6</b>	Congestion Hotspot: Camden .....	20
<b>Responding to Nonrecurring Congestion</b> .....	<b>6</b>	<b>Projects in the Pipeline</b> .....	<b>21</b>
<b>2019 Traffic Analysis</b> .....	<b>8</b>	Congestion Hotspot: Northern Milford .....	22
Traffic Peaks .....	8	<b>Projects in the Pipeline</b> .....	<b>23</b>
<b>Commuter Traffic</b> .....	<b>8</b>	<b>Short-term Recommendations</b> .....	<b>23</b>
<b>Summer Weekend Traffic</b> .....	<b>8</b>	ITMS Enhancements .....	24
Using Data to Monitor Traffic Operations .....	9	<b>Enhanced Monitoring</b> .....	<b>24</b>
Travel Time Analysis .....	11	<i>DE 8</i> .....	<b>24</b>
<b>Weekday Morning Peak</b> .....	<b>11</b>	<i>US 13 Alt (Main Street)</i> .....	<b>24</b>
<b>Weekday Evening Peak</b> .....	<b>12</b>	<i>US 13 and DE 10</i> .....	<b>24</b>
<b>Weekend Peaks</b> .....	<b>13</b>	<i>DE 14</i> .....	<b>24</b>
Congestion Frequency .....	14	<i>DE 15</i> .....	<b>24</b>
Intersection Capacity .....	15	<b>Areas to Watch</b> .....	<b>25</b>
Congestion Hotspots .....	16	<b>Use of Artificial Intelligence</b> .....	<b>25</b>
<b>Recommendations</b> .....	<b>17</b>	<b>Dilemma Zone</b> .....	<b>25</b>
		<b>Incident Management</b> .....	<b>25</b>
		<b>Next Steps</b> .....	<b>26</b>



# INTRODUCTION

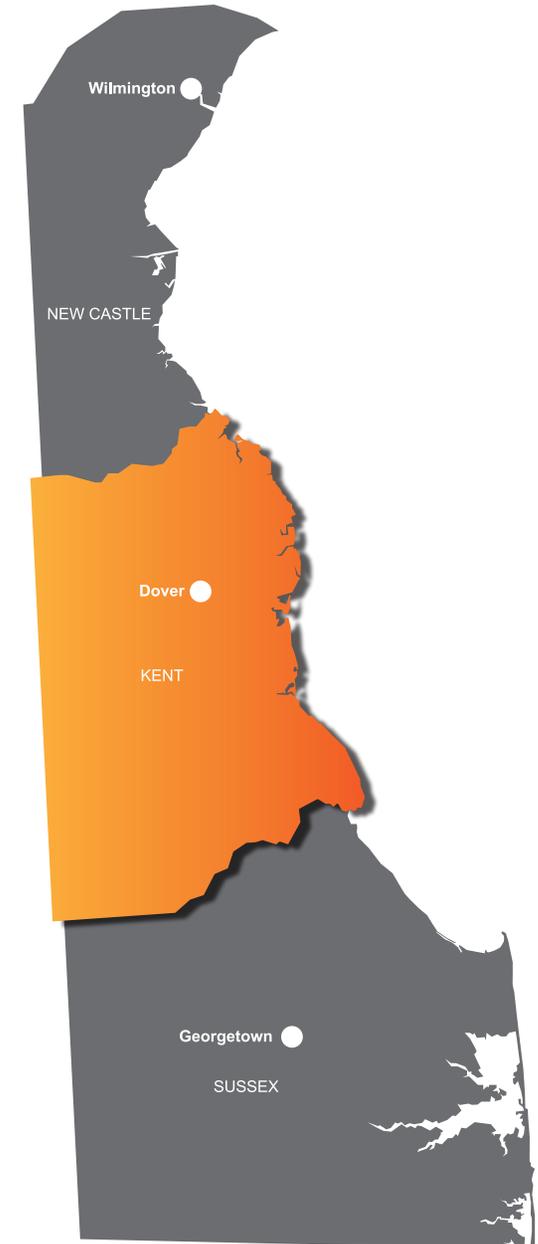
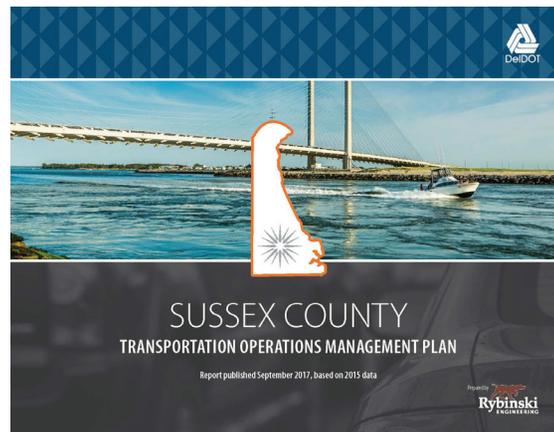
The Delaware Department of Transportation (DelDOT) issues and updates Transportation Operations Management Plans (TOMPs) for each of Delaware's three counties on a rotating basis. The Sussex County TOMP was issued in 2017. This TOMP is for Kent County. The next will be the New Castle County TOMP.

This Kent County TOMP applies big data from DelDOT's Transportation Management Center (TMC) to understand traffic operations in the county, identify problem areas, and recommend solutions. It begins with an introduction to Kent County and the causes of congestion here.

The report continues with an analysis of 2019 traffic data from DelDOT's TMC. Data analysis focuses 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 of what's going on.

Based on this information, this TOMP identifies "hotspots" where congestion keeps drivers from reaching their destinations on time. It then recommends 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 TOMP will feed into DelDOT's project prioritization process, which uses not only this operations data but also inputs such as safety data, environmental justice challenges, and multimodal mobility to select high-impact corridors for improvement. Identified projects are then submitted into the Capital Transportation Program, a document that identifies anticipated capital investments, turning the recommendations on these pages into reality.





# ABOUT KENT COUNTY

Kent County is characterized by diverse land use, from farms to urbanized areas around Dover and Camden.

Dover is the capital of Delaware; the state government is a major employer. It is also home to Delaware State University, which has nearly 5,000 students, as well as the Dover Air Force Base, the largest and busiest air freight terminal in the Department of Defense.

From 2010 to 2015, Kent County saw an average population increase of 1.3% per year. West Dover and Camden in particular have developed significantly. The increase from 2015 to 2025 is expected to be about 0.8% each year.

The City of Dover issued a comprehensive plan in 2019 that takes a holistic view at the area and creates goals to help improve the city and its residents. The findings and recommendations in this TOMP align with those of the City's comprehensive plan.

The Dover/Kent Metropolitan Planning Organization (MPO) also recently finalized and adopted Innovation 2045 — a long-range plan outlining Kent County transportation improvements and projects spanning from 2020-2045. As a partner in this TOMP report, Dover/Kent MPO's Innovation Plan shares many of the same mobility goals as this TOMP.



## Traffic Growth

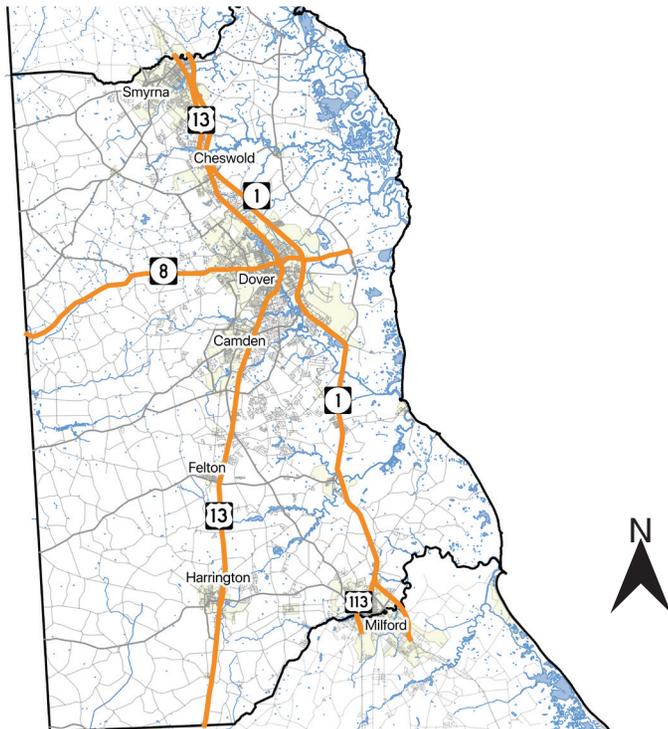
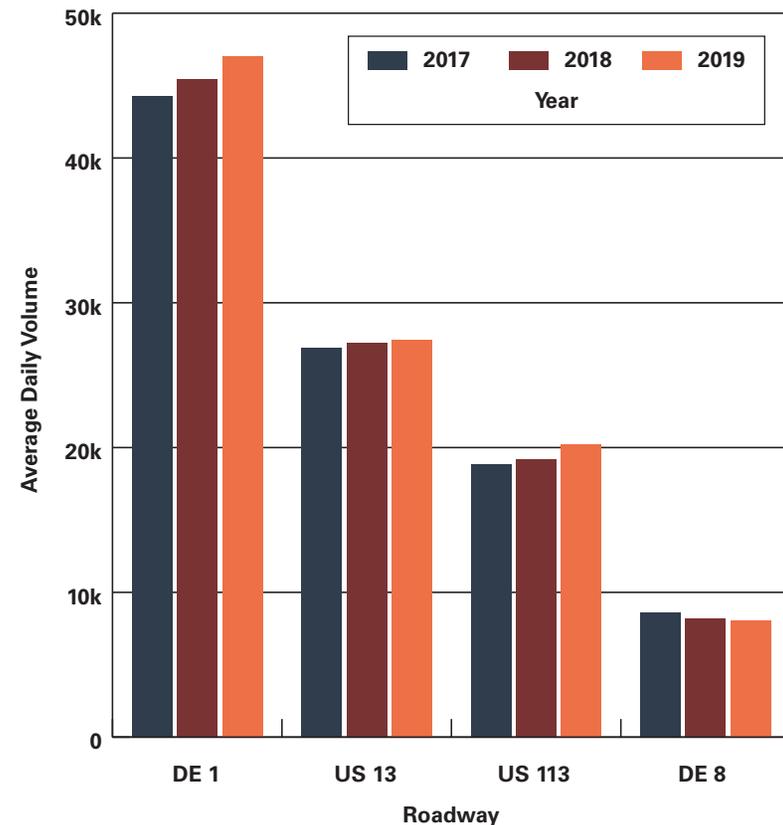
Along with population growth, DelDOT is able to use 24/7 operations data to look at volume growth and traffic patterns across the state, including on four of Kent County’s major roadways:

- DE 1 is a north-south roadway that functions as a freeway along nearly all of its length in Kent County. As a freeway, it has greater capacity and higher volume than the other major roads.
- US 13 is a major north-south arterial roadway with signalized intersections. It is home to hundreds of consumer-oriented businesses such as restaurants and retail stores. Many of these businesses, as well as local streets, have direct access points on US 13.

- US 113, an arterial roadway with traffic signals, splits off from DE 1 in the southern part of Kent County, heading southwest as DE 1 continues southeast.
- DE 8 runs east-west through Dover and the surrounding area as an urban arterial.

From 2017 to 2019, traffic volume on most of these key routes increased. The greatest increase was on DE 1. Volumes on US 13 and US 113 also increased, though not as much. Volume on DE 8 decreased slightly.

**2017-2019 Average Daily Volumes**



## Recent Improvements

Improvements to Kent County's roadway system completed between 2017 and 2019 may already be improving congestion depending upon the project completion date, but the effects may not be apparent in the 2019 data on which this report is based.

### Project: Toll plaza reconfiguration, completed Fall 2018

**Where:** DE 1 in Dover

**Why:** Improve throughput at the toll plaza to relieve congestion, especially during peak hours

**What:** The plaza now has two highway-speed toll lanes for E-ZPass users, reducing the need for drivers to merge and slow for the toll lanes.

### Project: Construction of POW/MIA Parkway, completed Fall 2017

**Where:** West Dover

**Why:** Improve safety and mobility in and out of West Dover; reduce congestion, reduce through traffic on local roads and in historic areas

**What:** 3.2 miles of new roadway, including bike facilities and shared use paths, connects DE 15/North Street to US 13, with direct connections to residential areas. The intersection of North Street and Saulsbury Road, at the north end of the new roadway, has new through and turning lanes to facilitate traffic flow.

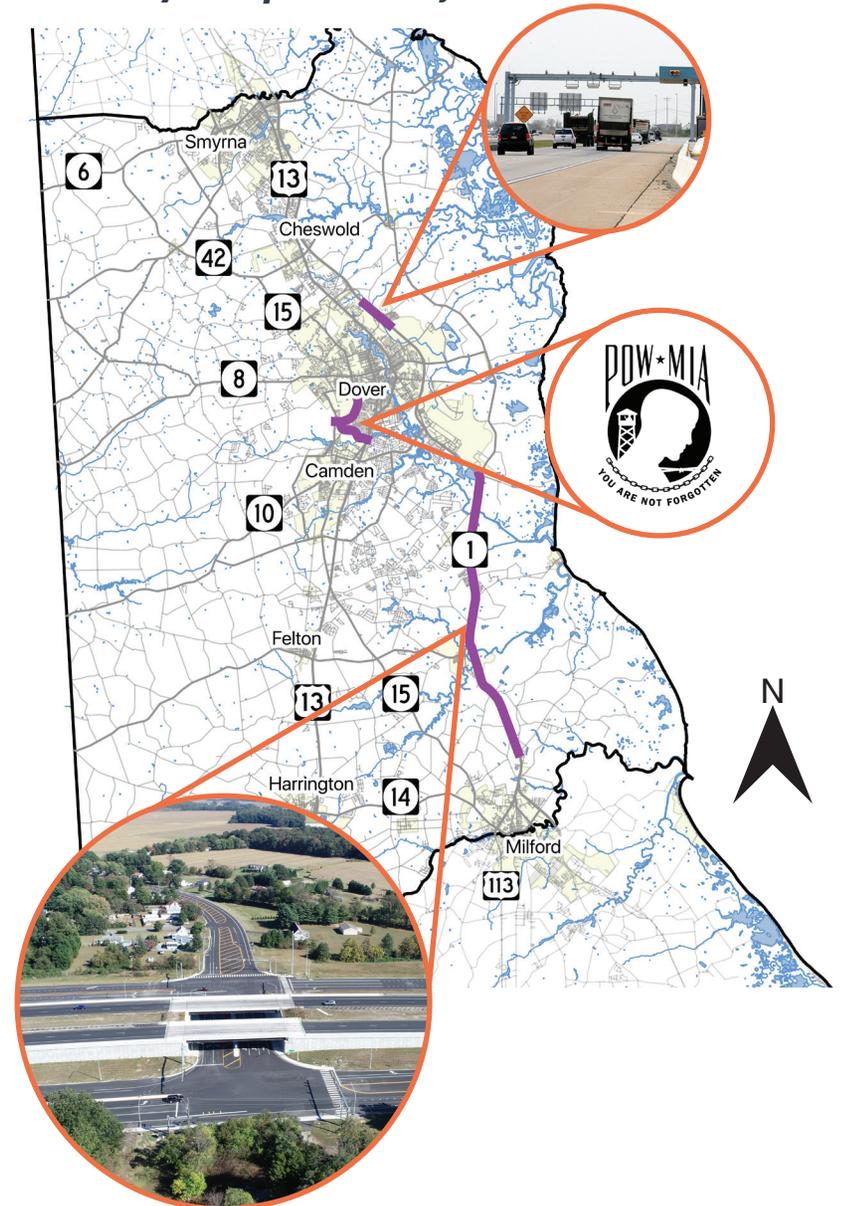
### Project: Grade-separated interchanges on DE 1<sup>1</sup>, completed Summer 2019

**Where:**  
Little Heaven  
South Frederica  
Thompsonville

**Why:** Improve safety and allow through traffic on DE 1 to proceed without stopping

**What:** Signalized and stop controlled intersections have been replaced with three freeway-style grade-separated interchanges.

## Recently Completed Projects



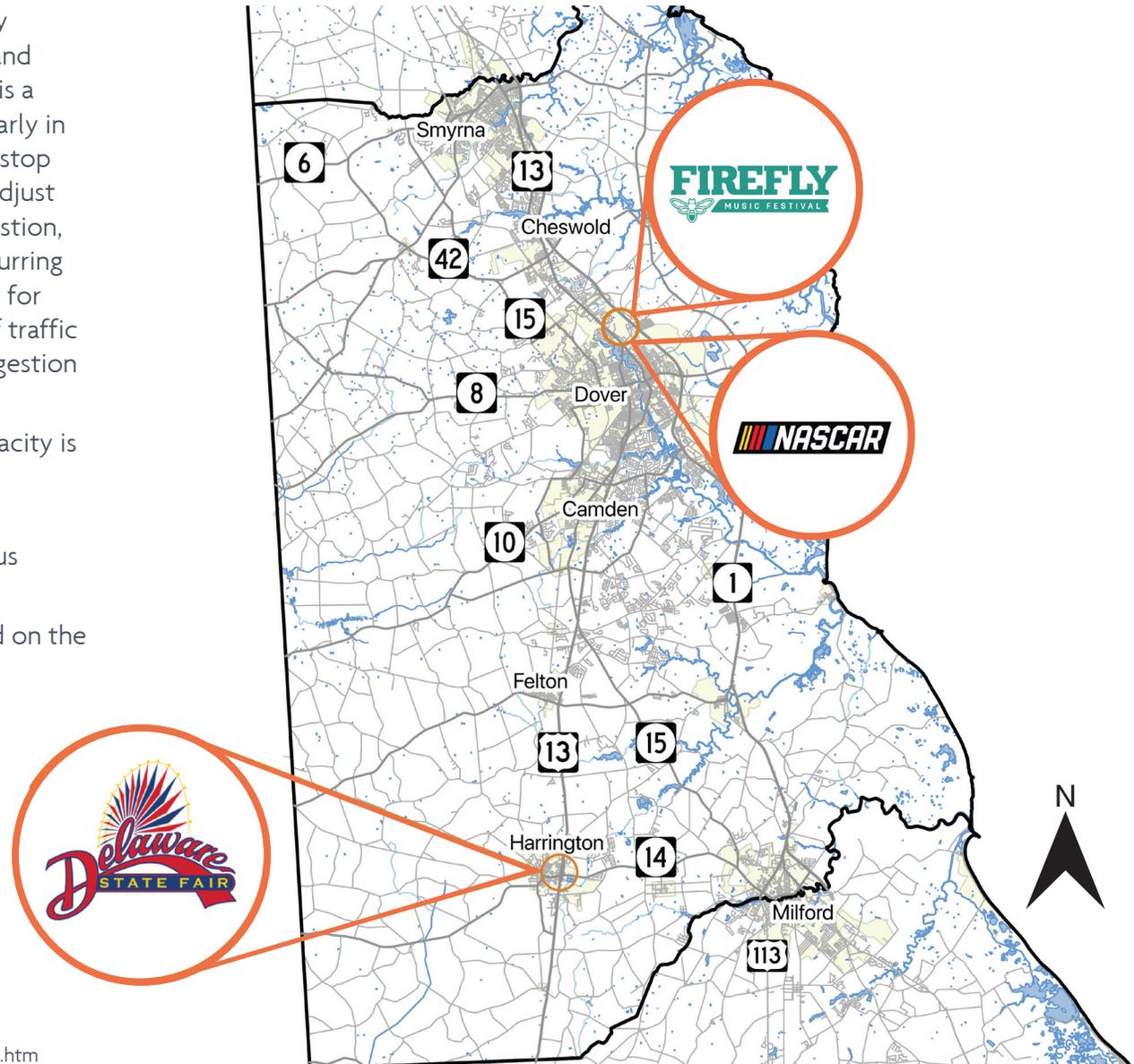
<sup>1</sup> See <https://deldot.gov/Programs/itms/pdfs/Benefits-of-DE1-GSI-Projects.pdf> for details on the three grade-separated interchanges in Kent County.

## Causes of Congestion

Traffic congestion on roadways comes in many forms and always ties back to traffic demand and roadway capacity being out of balance. There is a certain amount of “acceptable delay,” particularly in more urbanized areas where drivers expect to stop in densely signalized areas. While drivers can adjust their schedules to account for recurring congestion, such as commuter traffic in Dover, it is nonrecurring congestion that causes unexpected headaches for drivers. Nationwide it is estimated that 50% of traffic congestion is nonrecurring<sup>2</sup>. Nonrecurring congestion occurs when:

- 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 such as those pictured on the map, demand is higher due to visitors

## Nonrecurring Congestion: Special Events

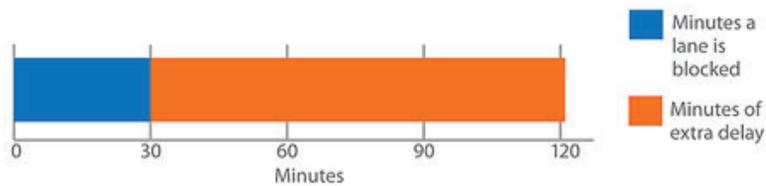


<sup>2</sup>[https://ops.fhwa.dot.gov/program\\_areas/reduce-non-cong.htm](https://ops.fhwa.dot.gov/program_areas/reduce-non-cong.htm)

## Planning for Nonrecurring Congestion

Some nonrecurring congestion is planned or predictable. When the nonrecurring congestion is planned, like a construction closure or special event, DelDOT studies the impacts ahead of time, and develops and implements solutions to mitigate traffic during the event. DelDOT's proactive and collaborative approach to managing the Firefly music festival is a prime example of how effective transportation management can be, handling extreme increases in traffic demand.

Where possible, DelDOT even studies nonrecurring congestion issues caused by weather or crashes through monitoring of high-risk areas, like a construction zone.



Source: FHWA

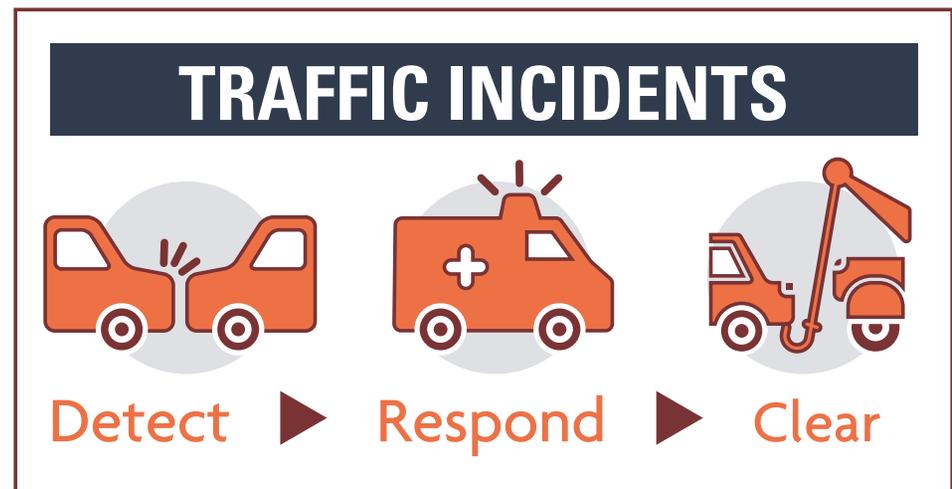
## Responding to Nonrecurring Congestion

Despite a proactive approach to predicting traffic congestion, there will always be random incidents on the transportation system. In these instances, DelDOT is poised and ready to clear the incident as quickly as possible, while maintaining safety for all involved. Studies show that every minute a lane is blocked creates an extra four minutes of delay<sup>3</sup>. By the time an incident is cleared, there can be a real mess out on the transportation network, and it can take a long time to go back to normal conditions even after clearance. Simply stated: the better the response, the smaller the impact.

Where targeted improvements at specific locations are ideal for improving recurring congestion hotspots, the best defense against nonrecurring congestion is a statewide system of 24/7/365 monitoring, control, and information. That system is Delaware's integrated transportation management system (ITMS). DelDOT's transportation management technicians at the transportation management center (TMC):

- use advanced technologies to detect incidents as quickly as possible
- apply sophisticated tools to evaluate each incident and prepare the appropriate responses
- manage traffic around the scene and in the surrounding area
- watch over incident clearance to aid swift progress
- keep travelers informed throughout each incident

Even if the transportation system were to have all the necessary capacity for recurring traffic demand, the threat of nonrecurring congestion would always exist.



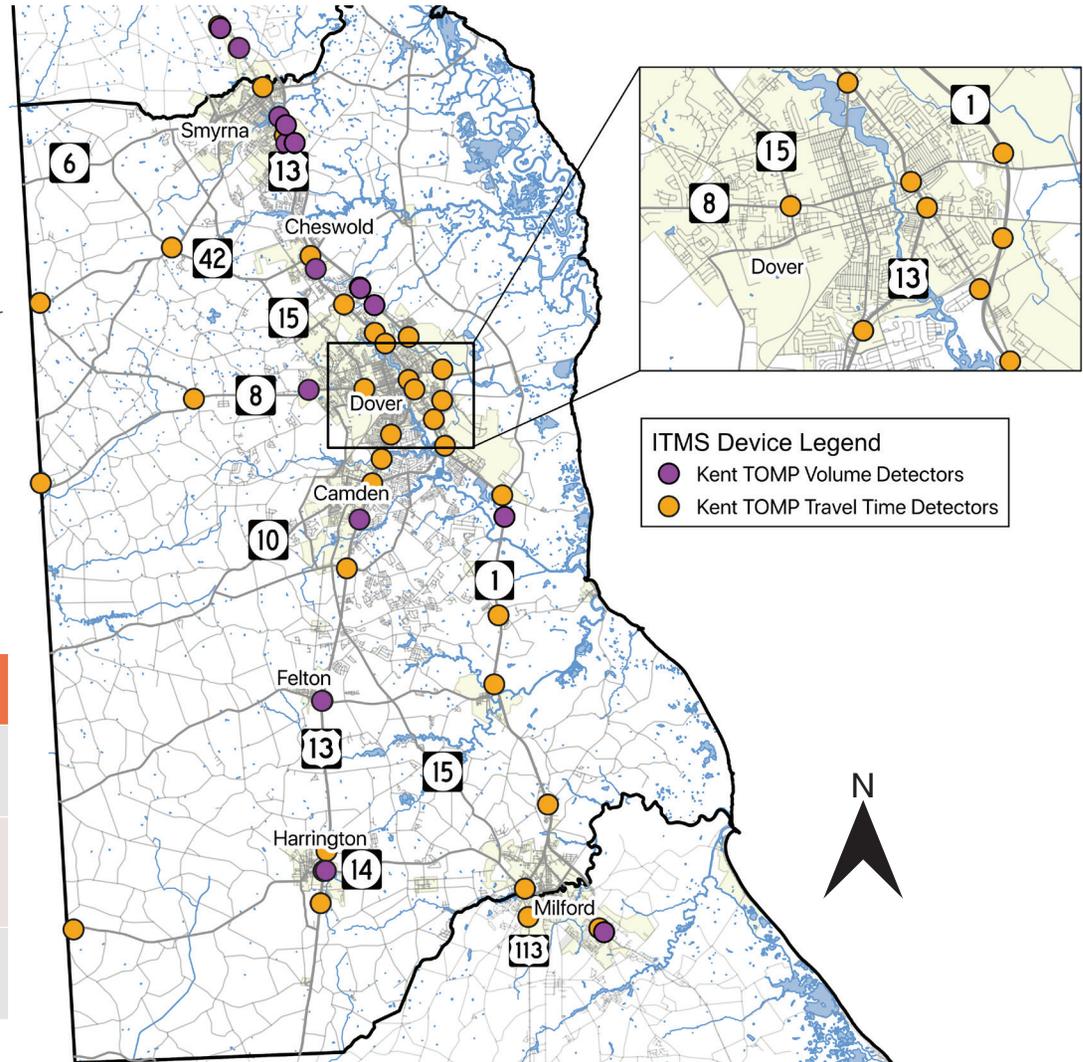
<sup>3</sup>[https://ops.fhwa.dot.gov/eto\\_tim\\_pse/timtoolbox/products/brochure.htm](https://ops.fhwa.dot.gov/eto_tim_pse/timtoolbox/products/brochure.htm)

The information in this report on traffic conditions in Kent County comes from DelDOT’s extensive intelligent transportation management system. Devices ranging from radar detectors to in-pavement traffic counters and from cameras to water level meters give DelDOT the ability to monitor traffic in real time, 24/7, and to compile data over time to analyze trends.

This report focuses on volume and travel time data pulled from Wavetronix, signal system loops, and Bluetooth detectors. 2019 data was pulled and analyzed, the last full year for which information is available—and, crucially, before the COVID-19 pandemic affected traffic volumes.

DelDOT has continued to monitor traffic patterns and trends during COVID-19. While travel patterns have changed, they have not yet stabilized to what could be considered a “new normal” that could be used for planning purposes.

### ITMS Devices



Device Type	What It Provides
Bluetooth Detectors	Travel times, origin/destination data
Wavetronix Radar Detectors	Traffic volume, speed, and length-based classification data
Traffic Signal System Detectors	Traffic volume and delay



# 2019 TRAFFIC ANALYSIS

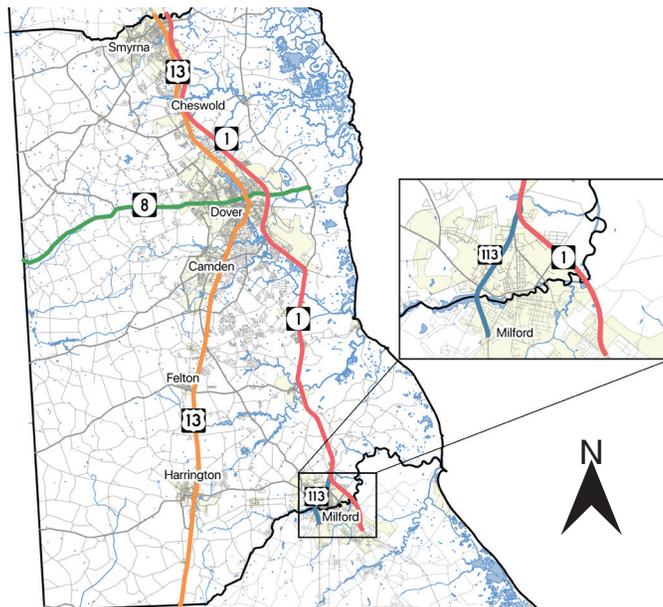
## Traffic Peaks

### Commuter Traffic

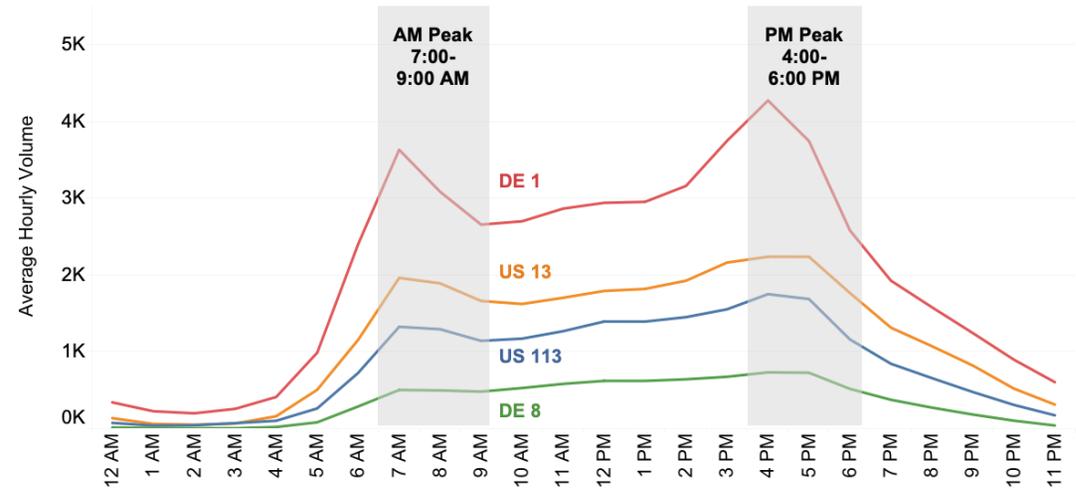
Weekday peak hour traffic, predictably, occurs between 7 AM and 9 AM and between 4 PM and 6 PM. Evening peak volumes tend to be higher than morning peak volumes. The variation between peak hours and other times is most pronounced on DE 1, which also carries by far the highest volume of traffic.

### Summer Weekend Traffic

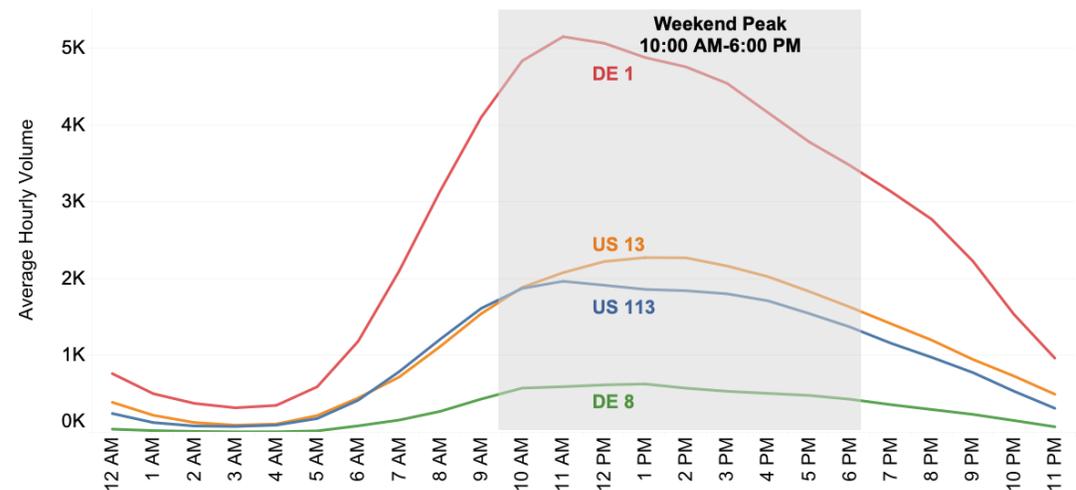
Summer weekend peaks are not as distinct as weekday peaks, but the volumes tend to be higher than in other seasons and are sustained throughout the day, 10 AM to 6 PM. Again, DE 1 has by far the most volume and the most pronounced variation.



## 2019 Weekday Peaks Along Major Routes

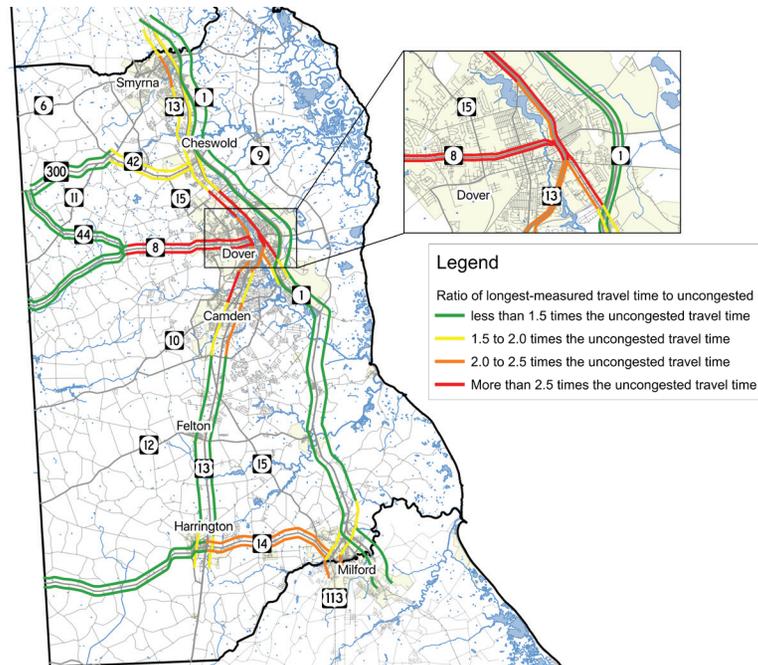


## 2019 Summer Weekend Peaks Along Major Routes



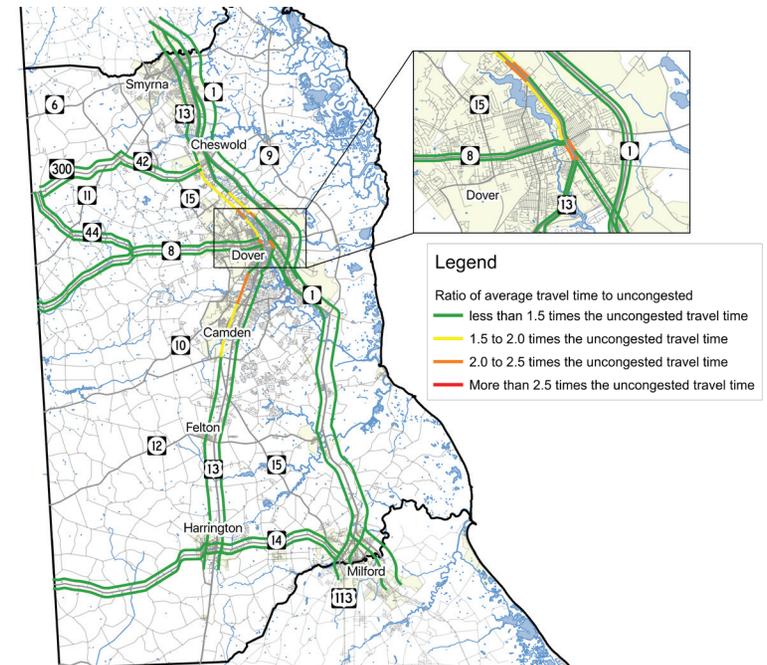
# Using Data to Monitor Traffic Operations

How can we use this data to determine where congestion is? We know traffic congestion occurs when traffic **demand** exceeds roadway **capacity**. This imbalance of demand and capacity can be found by monitoring delay. Delay is simply an overage in travel time over a section of roadway. For example, it should have taken me 20 minutes, but I experienced a 10-minute delay and got there in 30 minutes. This notion of “how long does it take me to get there compared to what I expect” is reflected in an analytical concept known as “travel time reliability” endorsed by the Federal Highway Administration. By comparing longest-measured<sup>4</sup> travel times to uncongested travel times over long periods, we can identify congested areas on Delaware’s roadways. Similarly, we can compare average travel times to uncongested travel times for those same periods to get a travel time index, giving an idea of typical conditions.



***Congested Condition (Travel Time Reliability)***

$$\frac{\text{Longest-Measured Travel Time}}{\text{Uncongested Travel Time}}$$



***Typical Condition (Travel Time Index)***

$$\frac{\text{Average Travel Time}}{\text{Uncongested Travel Time}}$$

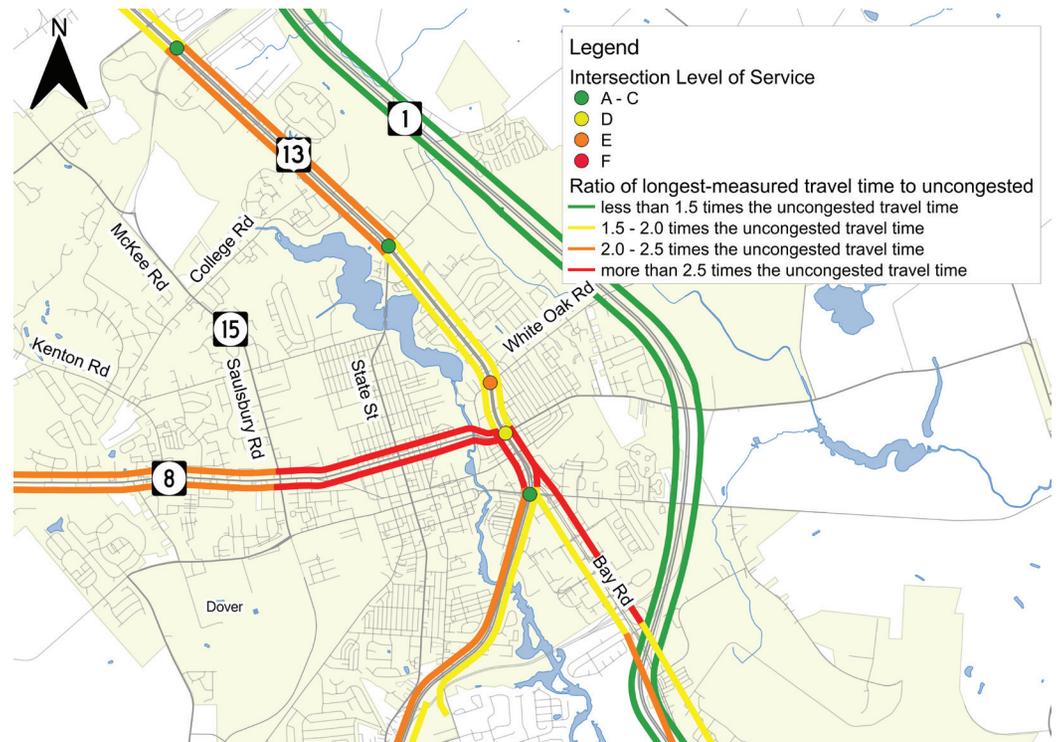
<sup>4</sup>“Longest-measured” is represented by the 95th percentile travel time, meaning only 5% of hours recorded have travel times higher than this value. Outliers have been excluded before finding the 95th percentile travel time.

In addition to monitoring delay, we monitor traffic volumes to measure traffic demand, and to study the imbalance of demand and capacity. By pairing travel times and volumes together, we can also see how many vehicles are impacted by delays.

Particularly in urban areas, looking at an intersection's demand and capacity along with travel time on its adjacent links is important in understanding traffic operations. Intersection critical movement summation (CMS) is a quick, hands-on look at an intersection's demand and capacity, that is, an intersection's ability to process the traffic volume given its current lane configuration and signal phasing.

Traffic demand can be difficult to estimate, adding to the importance of considering multiple data types. Traffic volumes are counted at a point, and if there is congestion at that point, the count does not perfectly reflect traffic demand. In other words, if there are backups, the number of travelers that *want* to get through that point is greater than the number of travelers that actually *do* get through that point. That said, using traffic counts to estimate traffic demand is common practice and an effective starting point. By additionally considering travel time measurements, analysts are able to get a full 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). Both of these scenarios can be seen along US 13 in Dover.

The rest of this section takes a look at each of these metrics, congested conditions (travel time reliability), typical conditions (travel time index), and intersection CMS, across the three traffic peaks identified on [page 8](#) before layering them together to identify Delaware's congestion hotspots.



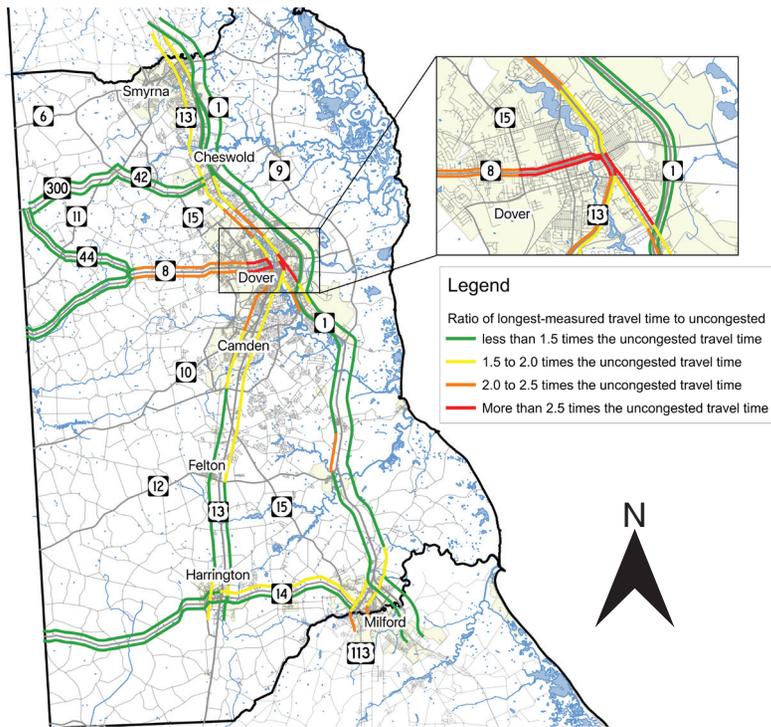
# Travel Time Analysis

Below and on the following pages, we see both the congested and typical conditions during each of the three traffic peaks. Based on industry guidance, if the longest-measured travel times are greater than 1.5 times the uncongested travel time, the segment is considered to be unreliable. As you can see, typical conditions always appear better than congested conditions. The same segments which are typically congested become more congested as we look at longest-measured travel times.

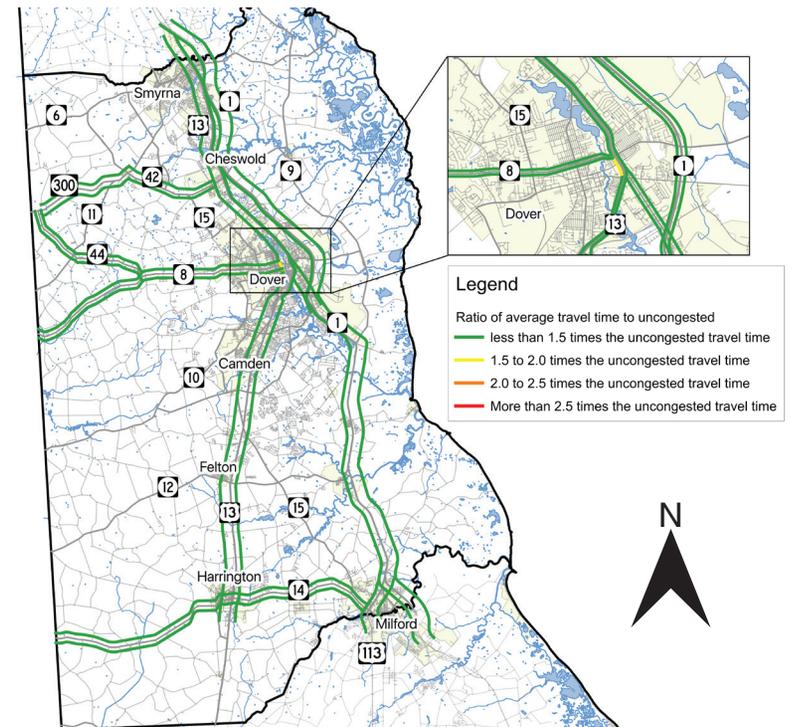
These two metrics, travel time reliability and the travel time index, are key factors in determining congestion frequency, described on [page 14](#).

## Weekday Morning Peak

Kent County typically is not congested during the AM peak, however when incidents do occur or traffic slows down, traffic congestion centers around Dover.



**AM Weekday Congested Conditions**  
(Travel Time Reliability)

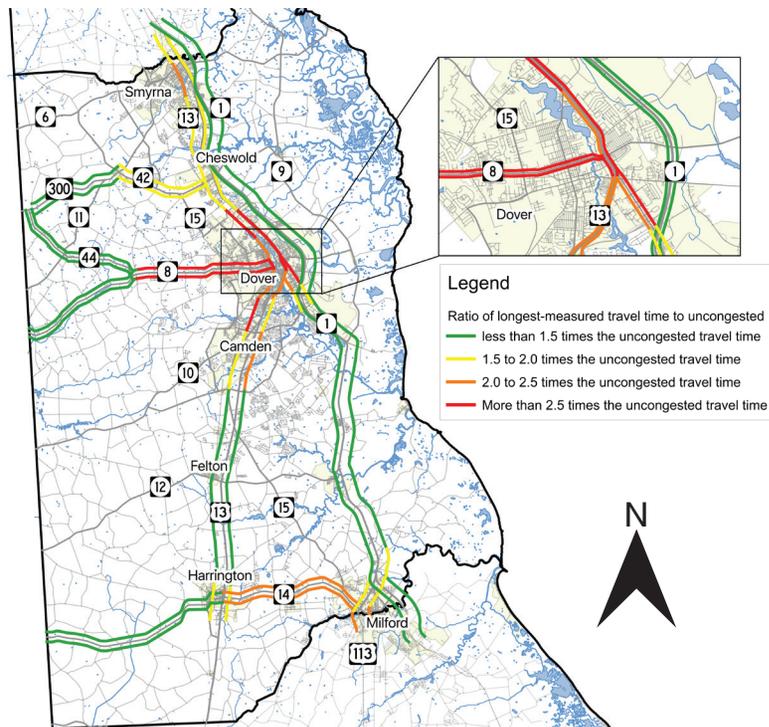


**AM Weekday Typical Conditions**  
(Travel Time Index)

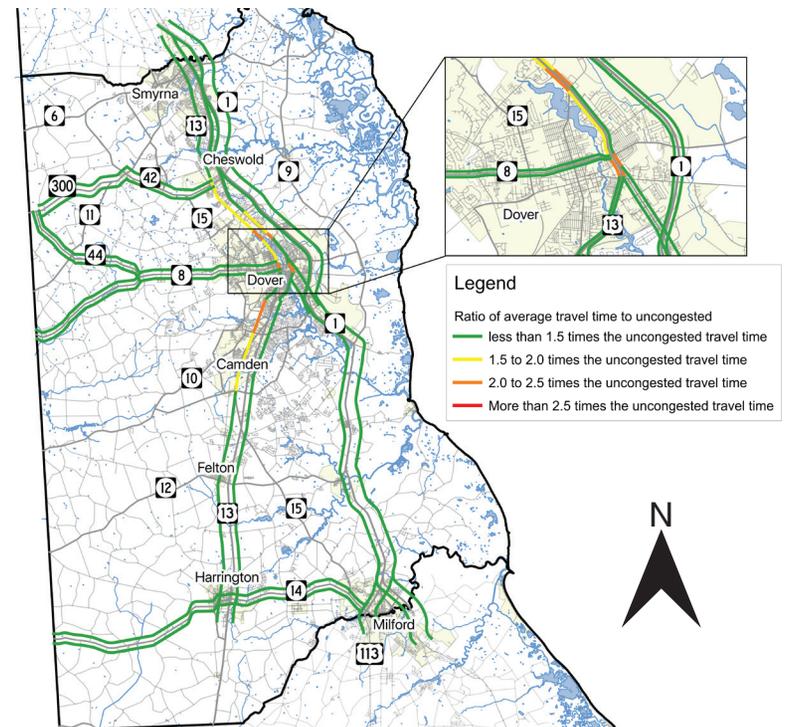
## Weekday Evening Peak

The PM peak, weekdays from 4 PM – 6 PM, is the most congested time in Kent County. Even in typical conditions, slowdowns are common on US 13 from Cheswold to Camden.

The congestion on DE 14 near Harrington is likely to be a product of construction in the area during data collection, as noted later in this report (see page 24).



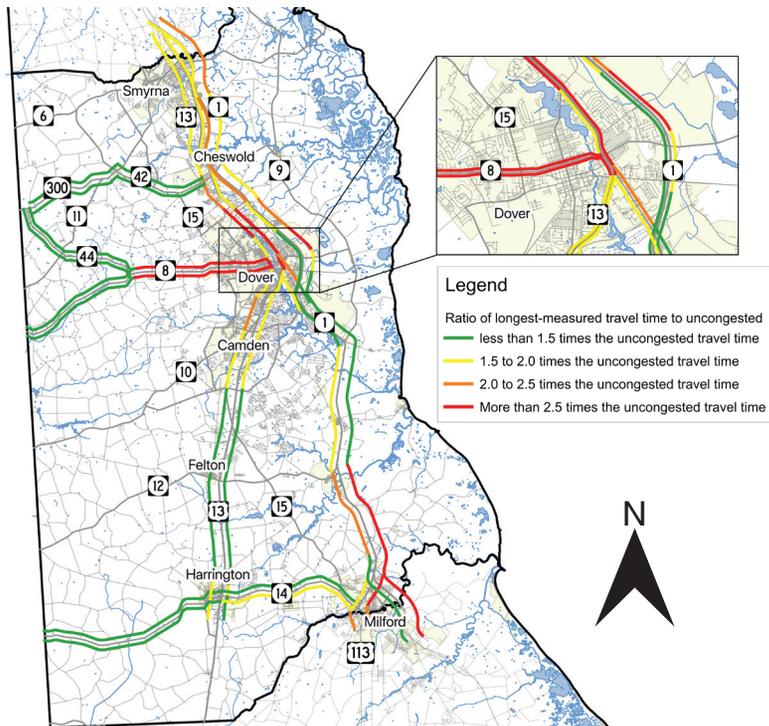
**PM Weekday Congested Conditions**  
(Travel Time Reliability)



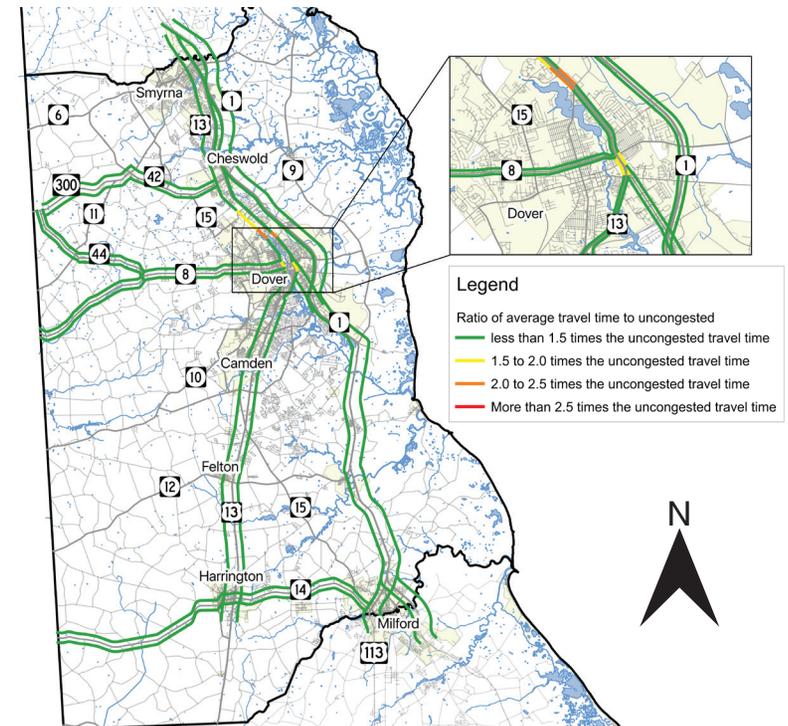
**PM Weekday Typical Conditions**  
(Travel Time Index)

## Weekend Peaks

Typically uncongested, weekends in Kent County can become severely congested on nice beach days when people flock to Sussex County. Congestion on weekend peaks (10 AM to 6 PM on Saturdays and Sundays from Memorial Day weekend through Labor Day) is worst on DE 1, with somewhat less severe delays on US 13. Another congestion area is the merge of US 113 and DE 1.



**Summer Weekend Congested Conditions**  
(Travel Time Reliability)



**Summer Weekend Typical Conditions**  
(Travel Time Index)

## Congestion Frequency

Because we know data layering will always give the most complete picture of traffic operations, travel time reliability (congested conditions) was layered with the travel time indices (typical conditions) to calculate congestion frequency on Kent County's roadways. Congestion frequency is one of the metrics used in identifying congestion hotspots, as shown on [page 16](#).



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

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

If the longest-measured *and* average travel times are *less than* 1.5 times the uncongested travel time, the segment is **uncongested**. Traffic demand on these segments is expected to be below the roadway capacity.

If the longest-measured travel time is *greater than* 1.5 times the uncongested travel time, but the average travel time is *less than* 1.5 times the uncongested travel time, the segment is **occasionally congested**. On average, traffic demand is below the roadway capacity, however, when congestion does occur, it tends to be severe.

If the longest-measured *and* average travel times are *greater than* 1.5 times the uncongested travel time, the segment is **frequently congested**. On average, traffic demand on these segments exceeds the roadway's capacity during peak periods, resulting in severe congestion.

# Intersection Capacity

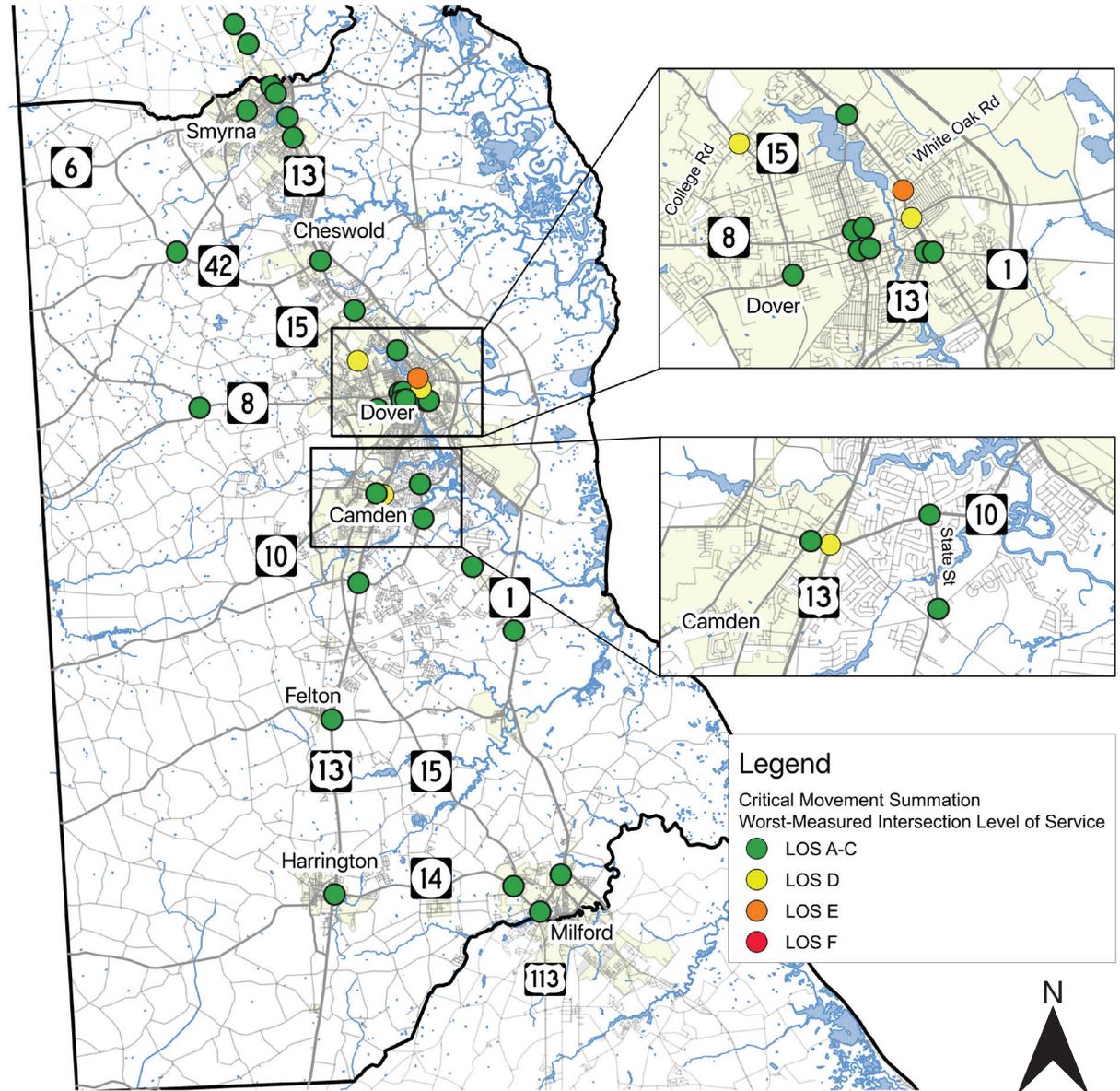
Traffic engineers conducted intersection traffic counts and analysis at the locations shown on the map.

A good level of service (LOS) means the location should be able to handle the traffic, and a bad level of service (D or worse) means vehicles will wait more than one traffic signal cycle, even with improved signal timings. Traffic signal cycles typically range from 2 to 3 minutes.

Just 4 intersections analyzed were revealed to reach LOS D or worse.

- US 13 at White Oak Road in Dover: LOS E (weekday PM peak)
- US 13 at DE 8 in Dover: LOS D (weekday PM peak)
- Mckee Road at College Road in Dover: LOS D (weekday PM peak)
- US 13 at DE 10 (N) / Lebanon Road in Camden: LOS D (weekday AM and PM peaks)

## CMS Locations



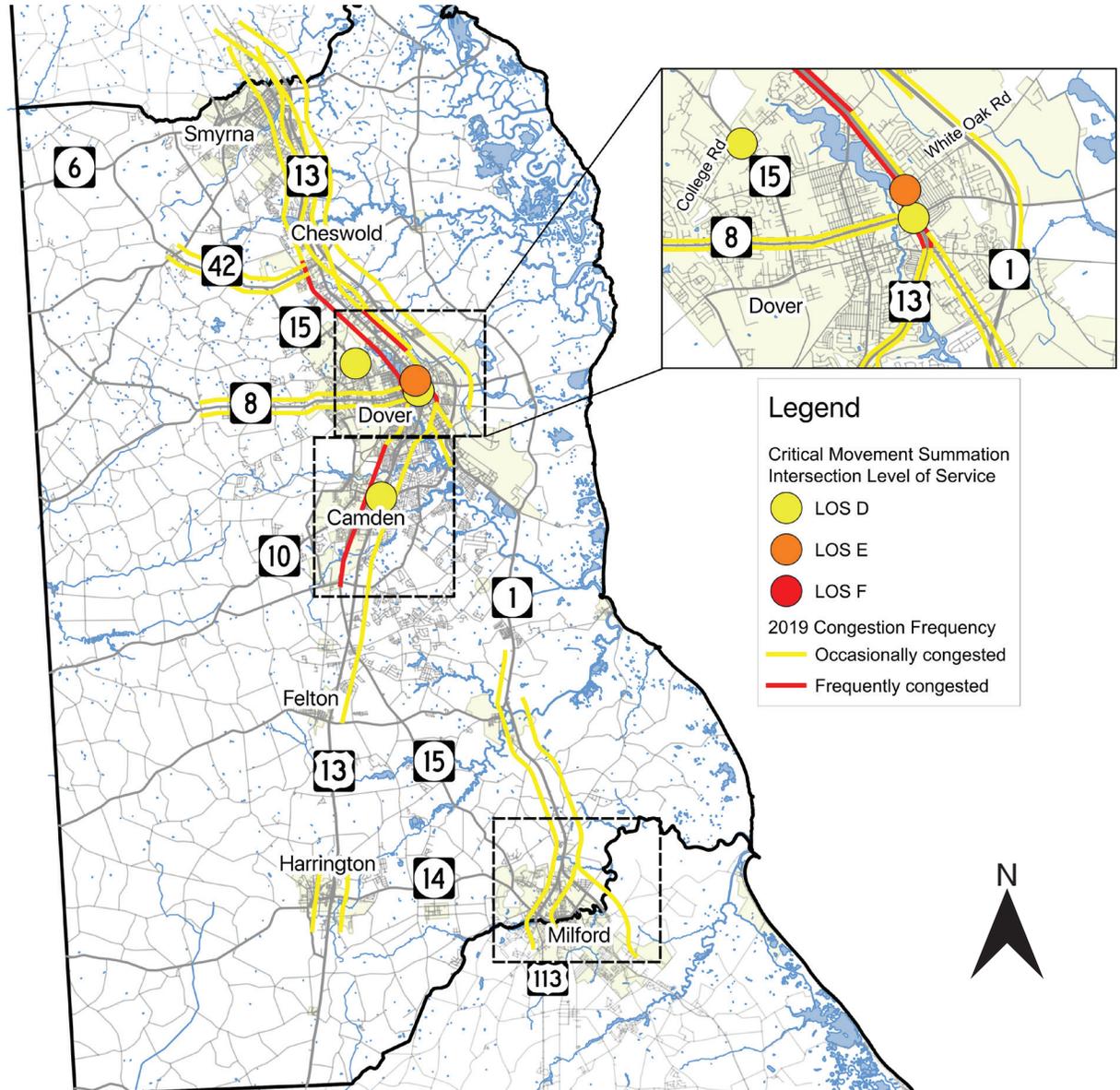
# Congestion Hotspots

Intersection capacity and analysis of congestion frequency reveal three hotspots where congestion has significant impact on mobility in Kent County:

- Dover
- Camden
- Northern Milford

The next section offers recommendations to address recurring congestion across the county and specifically within the hotspots identified. Recently completed, ongoing, or planned projects that are expected to alleviate congestion on key corridors are also outlined.

## Congestion Hotspots





# RECOMMENDATIONS

## Mitigating Congestion

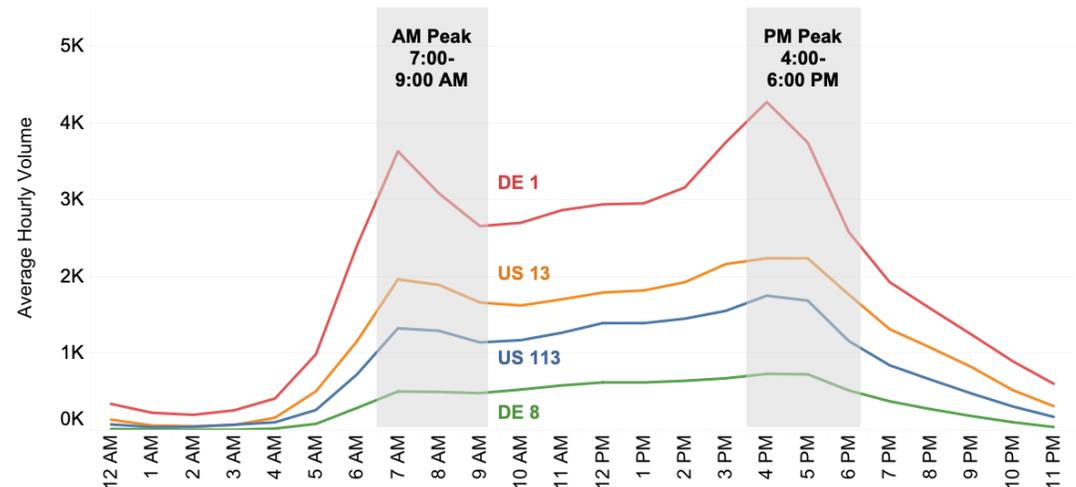


We know congestion is a result of demand exceeding capacity. So how can we help mitigate congestion? Either increase capacity or reduce the demand.

In Kent County, congestion typically is only a concern during peak hours, so by shifting demand to other times of the day, there will be less stress on the roadway's capacity during peak hours. As many employers and employees have shifted to a remote or hybrid work environment during the COVID-19 pandemic, continuing some of these work habits in the future will lessen demand on Kent County's roadways. When possible, travelers should consider not driving through these congestion hotspots during the peak hours identified on the following pages, notably on weekdays from 4 PM - 6 PM in more urbanized areas like Dover and Camden.

Similarly, travelers should consider taking advantage of other modes of transportation available in Kent County, such as transit, walking, and biking. The TMC has a number of resources, including a mobile app, interactive web map, radio broadcasts, and variable message signs that inform travelers of current conditions on the road. Drivers should check these resources when traveling to make informed decisions about when to travel, which route to take, and which mode to use.

### 2019 Weekday Peaks Along Major Routes



## Congestion Hotspot: Dover

Congestion often begins in the Dover area after the AM peak and extends through 7 PM. Travelers should consider using alternate modes, such as transit, when shopping, dining, or working in the Dover area.

Remember that traffic congestion on roadways always ties back to traffic demand and roadway capacity being out of balance. In Dover, congestion along US 13 is most severe during the weekdays throughout lunchtime and the PM peak, when more drivers are on the road, likely running out to grab lunch or heading home after work. During this time, delays between Scarborough Road and Bay Road sometimes approach 15 minutes in each direction. This means vehicles are spending roughly 3 times as long on this stretch of roadway than during free-flow conditions.

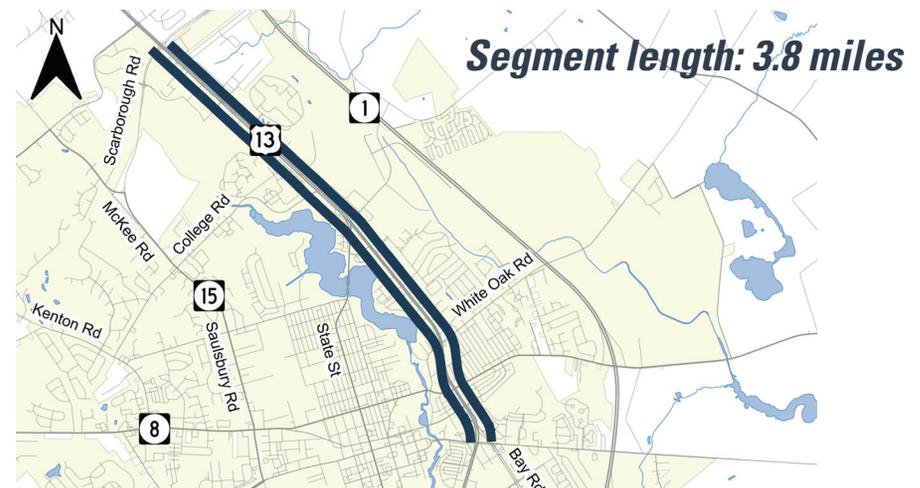
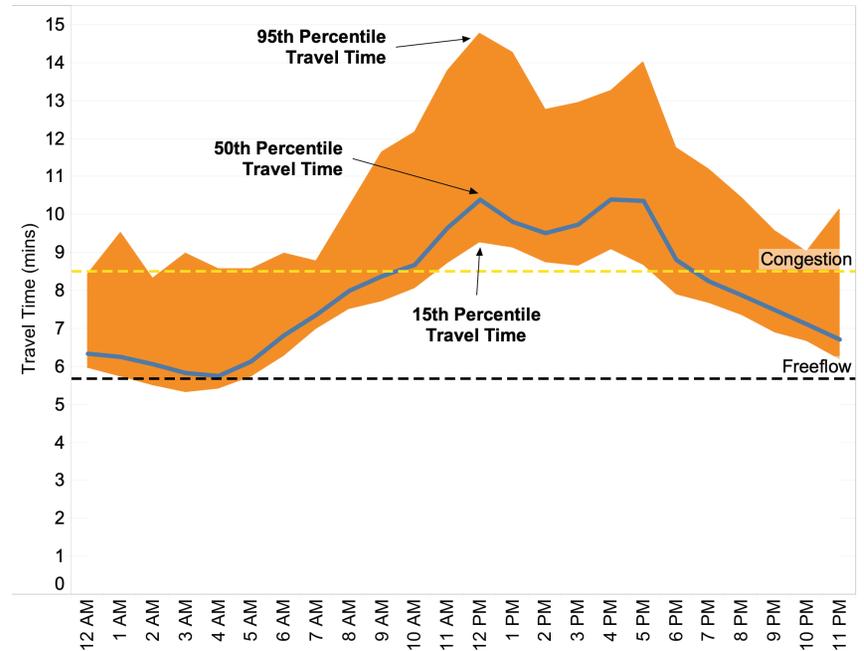
On US 13, traffic is impacted by the many business entrances and exits that line the road, as well as local roads. Travel speeds on DE 8 are impacted by densely spaced intersections and on-street parking. In densely signalized and active areas like Dover, there is some amount of necessary delay on US 13. Coordinating traffic signals along corridors is a balancing act, giving green time not only to drivers along the main road, but also to pedestrians and bicyclists who need to safely cross the road, and to drivers exiting side streets and businesses who are waiting to turn onto US 13.

Besides regular commuter traffic, vehicles traveling to special events in and around Dover, including the Firefly Music Festival, NASCAR races, and events on the Delaware State University campus, also contribute to congestion.

### US 13 travel times through Dover

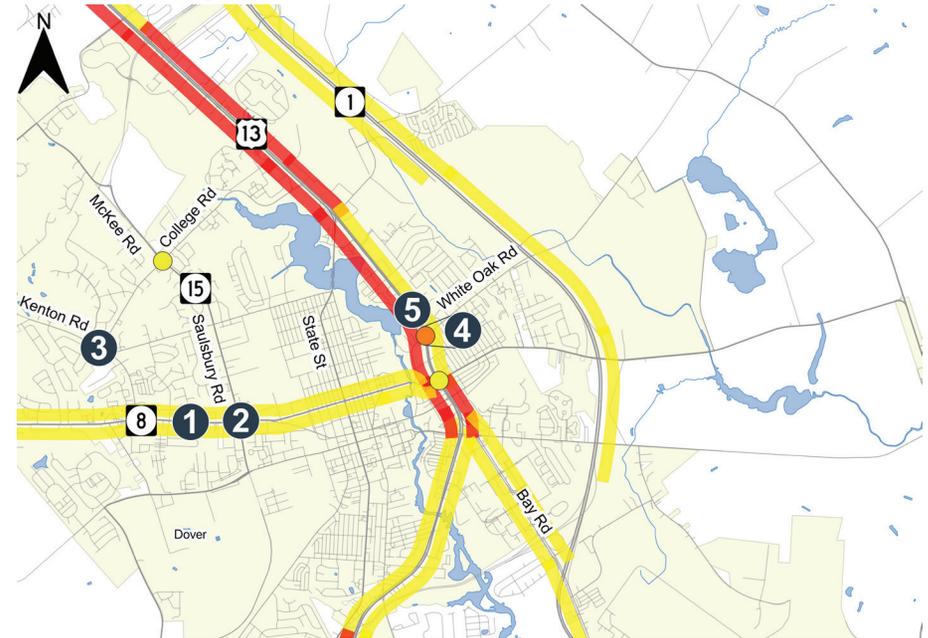
Weekday PM peak	NB	SB
Uncongested travel time	5.5 min	5.5 min
Average travel time	9.5 min	9.5 min
Longest-measured travel time	18.5 min	15.5 min

## 2019 NB US 13 Weekday Travel Times From Bay Rd to Scarborough Rd



Projects in the pipeline	Expected Completion Date
<p><b>1</b> Conducting a needs study on DE 8 DelDOT and Dover/Kent MPO will conduct a needs study on DE 8 to help pinpoint causes of congestion and make recommendations accordingly.</p>	2025
<p><b>2</b> Improving the intersection of DE 8 and DE 15 Adding a through lane on DE 15 (Saulsbury Road) should relieve congestion at this intersection.</p>	2021-2022
<p><b>3</b> Kenton Road and College Road corridor updates While the new POW/MIA Parkway is resolving many mobility issues south of DE 8, there are still mobility issues north of DE 8, particularly moving east/west. Capacity upgrades will be considered along Kenton Road and College Road as development continues to build up around them.</p>	2027

### Dover Hotspots

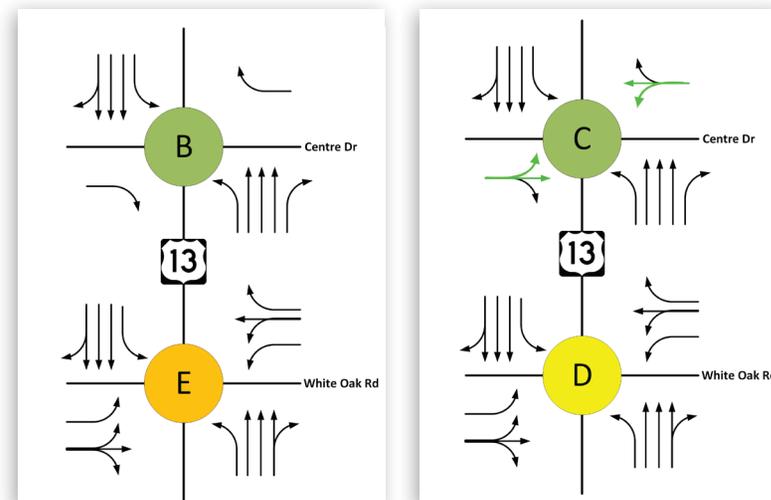


### Short-term recommendations

- 4** Consider a two-stage pedestrian crossing  
A two-stage pedestrian crossing should be considered at US 13 at White Oak Road to improve operations through the intersection. This improvement was already evaluated and recommended from a safety perspective in the US 13 Pedestrian Safety Audit completed by DelDOT in June 2020<sup>5</sup>.

### Medium-term recommendations

- 5** Improve the intersection of White Oak Road at US 13  
As shown in the diagram to the right, allowing left turns onto US 13 from Center Drive, farther north along US 13, would alleviate stress at the intersection of White Oak Road and US 13, where heavy side street movements currently cause delays.



Existing (left) and Proposed (right) LOS of Center Drive and White Oak Road

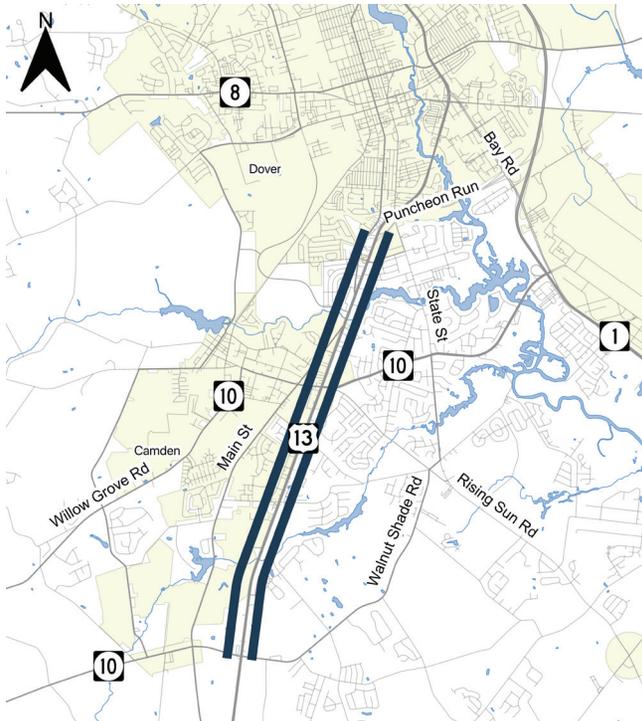
<sup>5</sup>[https://deldot.gov/Programs/DSHSP/index.shtml?dc=pedestrian\\_safety](https://deldot.gov/Programs/DSHSP/index.shtml?dc=pedestrian_safety)

## Congestion Hotspot: Camden

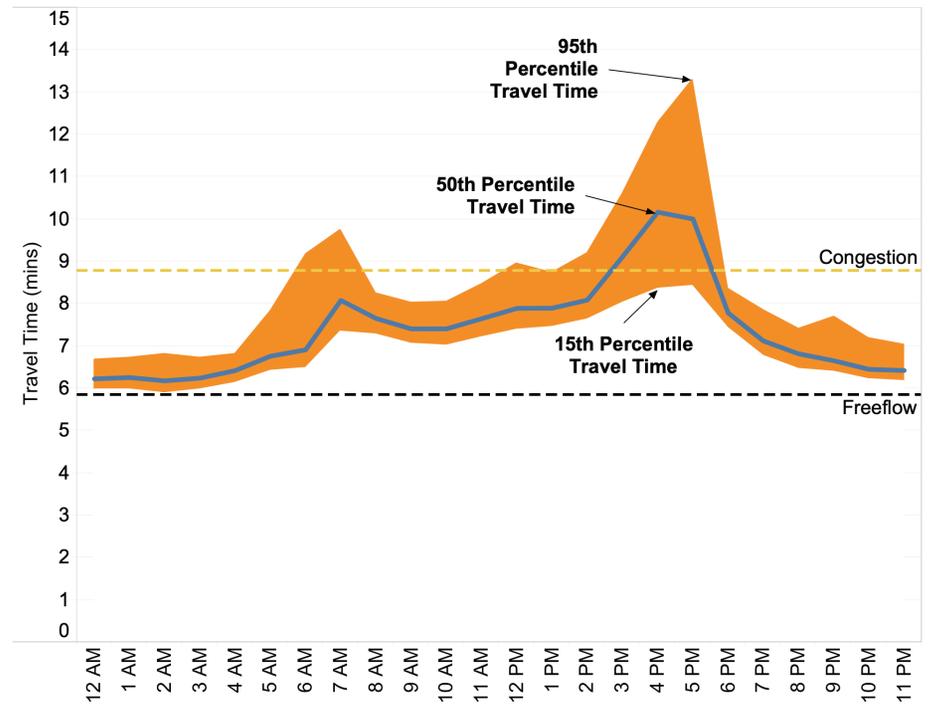
With development burgeoning around Camden, drivers experience congestion on US 13 during peak hours when traffic demand is high, often starting around 2 PM when schools let out and continuing through 6 PM.

Congestion is worst between the Puncheon Run Connector and Walnut Shade Road during the weekday PM peak, when it takes travelers nearly 12 minutes northbound and more than 15 minutes southbound, compared to the uncongested travel times of about 6 minutes in each direction. This means vehicles are spending twice as long on the roadway during the PM peak as compared to uncongested conditions.

**Segment length: 4.7 miles**



## 2019 SB US 13 Weekday Travel Times From Puncheon Run to Walnut Shade Rd



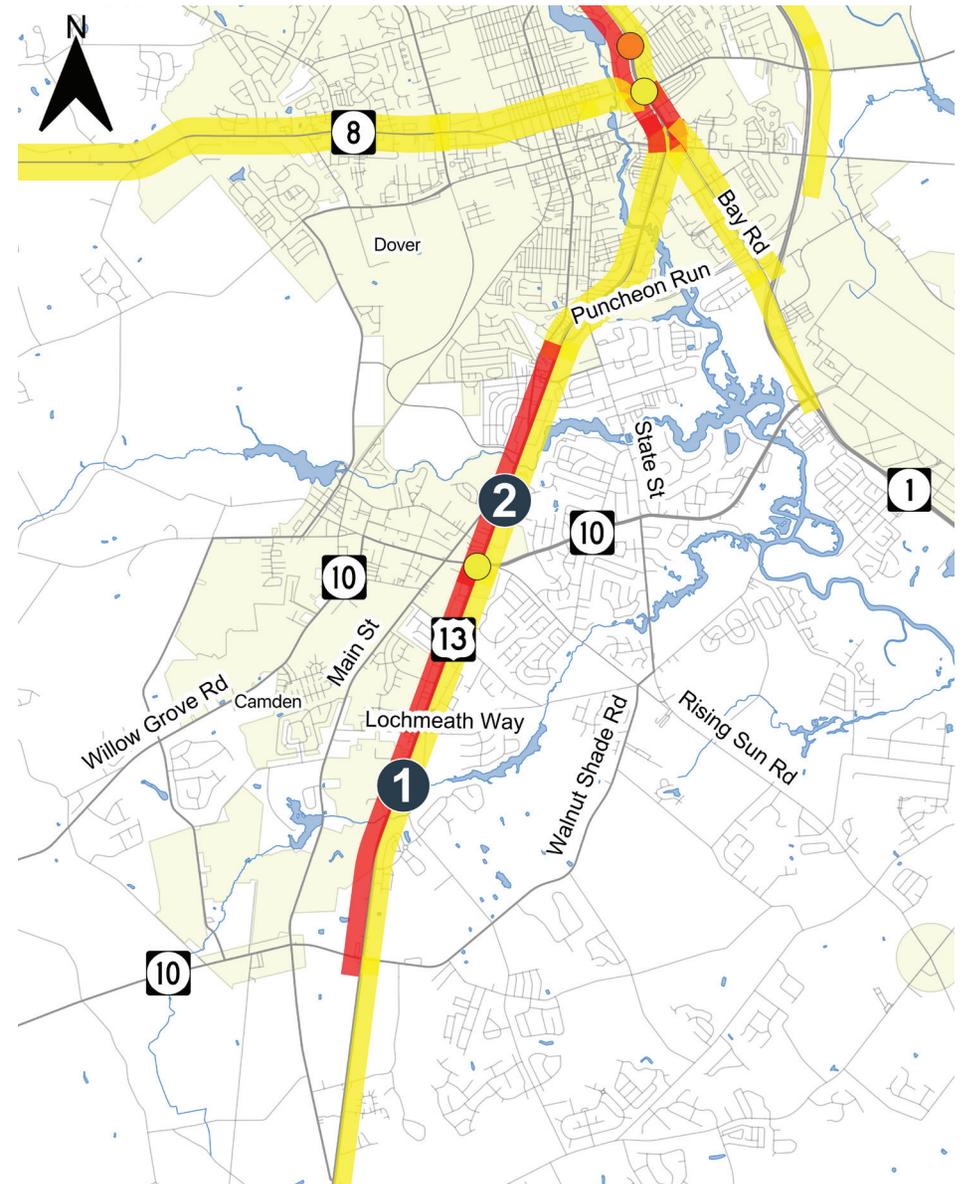
## US 13 travel times through Camden

Weekday PM peak	NB	SB
Uncongested travel time	6 min	6 min
Average travel time	8 min	10 min
Longest-measured travel time	11.5 min	15.5 min

Projects in the pipeline	Expected Completion Date
<p><b>1</b> Widening US 13 within Camden city limits</p> <p>The widening is planned as two projects to be implemented in sequence: widening US 13 from the Puncheon Run Connector to Lochmeath Way, and from Lochmeath Way to Walnut Shade Road. Adding one lane in each direction will increase the capacity of US 13 and is expected to alleviate congestion.</p>	2022-2026
<p><b>2</b> Constructing new roadways that bypass downtown Camden</p> <p>This construction also is planned as two concurrent projects: the West Camden Bypass and the East Camden Bypass. The combined roadway is expected to alleviate congestion on downtown portions of US 13 and DE 10.</p>	2023-2025

No additional recommendations are proposed because the already planned projects are expected to alleviate congestion.

## Camden Hotspots

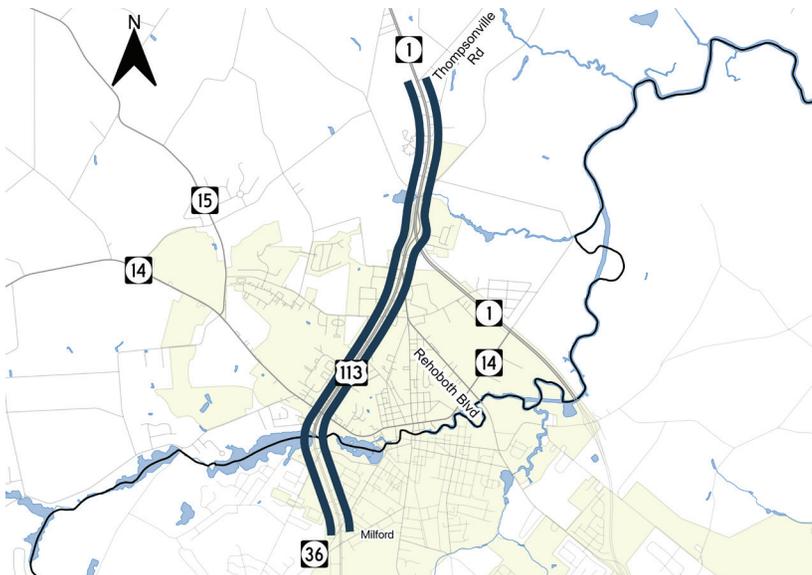


## Congestion Hotspot: Northern Milford

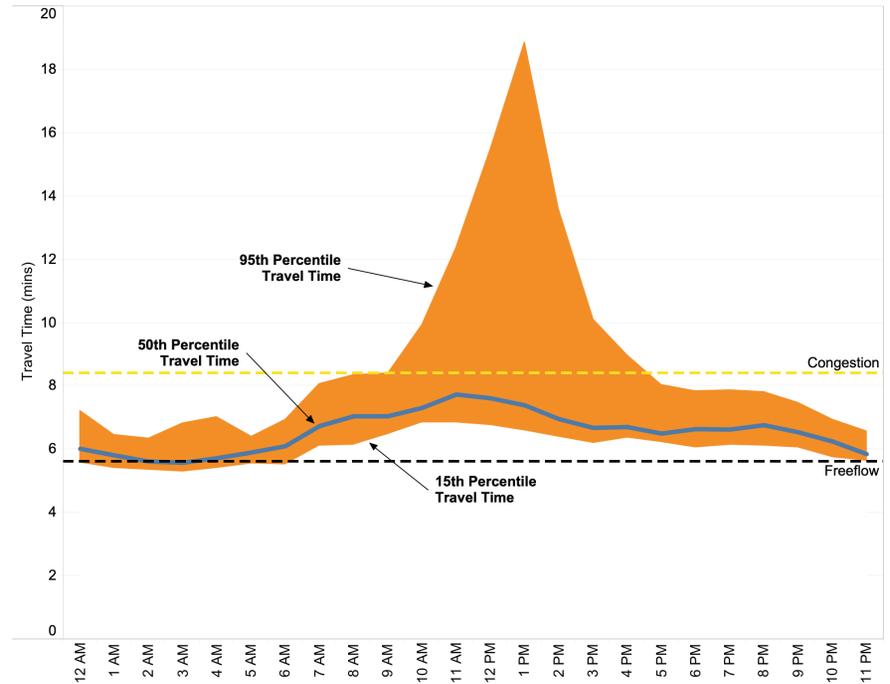
Though typically uncongested, delays through Northern Milford may spike throughout the day on summer weekends as people head to and from the beach. Travelers should consider using alternate modes, carpooling with others, or driving to the beach outside of these peak hours to reduce the traffic demand.

DE 1 is the main route toward the beaches in Sussex County. In the southernmost part of Kent County, congestion is heavy during summer weekends. As drivers approach the interchange where US 113 splits off from DE 1, they must decide whether to continue on DE 1 or try US 113 as an alternate route. In the opposite direction, drivers coming from the south into Kent County are driving at freeway speeds before quickly approaching a short merge area. For drivers using US 113, congestion is worst during the summer weekend peak where northbound delays between DE 36 and Thompsonville Road approach more than fifteen minutes.

**Segment length: 4.1 miles**



## 2019 NB US 113/DE 1 Summer Weekend Travel Times From DE 36 to Thompsonville Rd



## US 113/DE 1 travel times through Northern Milford

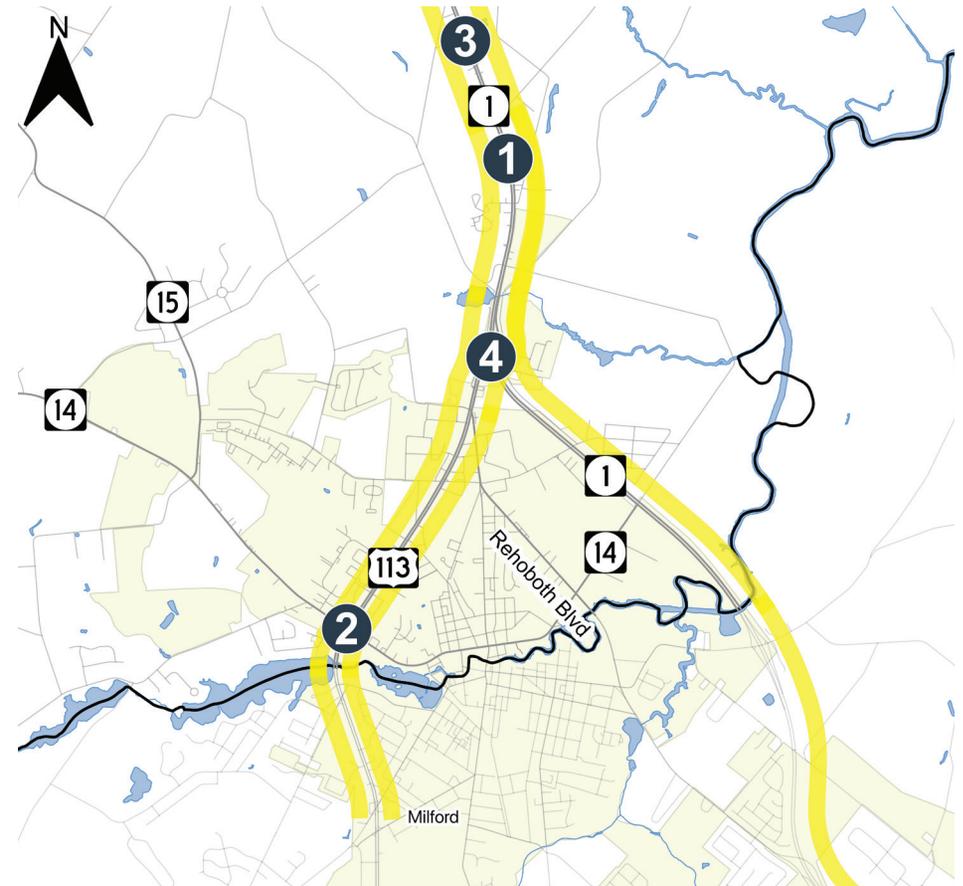
Summer weekend peak	NB	SB
Uncongested travel time	5.5 min	5 min
Average travel time	7.5 min	6.5 min
Longest-measured travel time	21.5 min	9.5 min

Projects in the pipeline	Expected Completion Date
<p><b>1</b> Installing variable message signs to inform southbound travelers of travel times on DE 1 and US 113. Giving drivers information in advance can give them time to make safer choices. Though the DE 1/US 113 split is located in Kent County, the effects of congestion here are most apparent in Sussex County. The 2017 Sussex County TOMP has a fuller examination of the issues at this split<sup>6</sup>.</p>	2021
<p><b>2</b> Improving the intersection of US 113 with DE 14 Less than a mile south of the split from DE 1 on US 113, this congested intersection has a higher-than-average crash rate, posing a problem for both vehicles and pedestrians. Changes to improve mobility and safety include adding a through lane on the westbound DE 14 approach, upgrading signal equipment, and adding crosswalks and bike lanes.</p>	2023-2024
<p><b>3</b> Conducting the DE 1 capacity study north of merge area. DelDOT is assembling a corridor capacity plan for DE 1, with a goal of conceptualizing recommendations for increasing capacity, including the addition of a third northbound lane.</p>	2021

### Short-term recommendations

- 4** Conduct a study of the northbound merge area to evaluate short-term improvements to mobility and safety. Measures such as signing, striping, extending the merge area, flexi-posts, and transverse rumble strips may all be evaluated from an operations and maintenance perspective.

### Northern Milford Hotspots



<sup>6</sup><https://deldot.gov/Publications/reports/ITMS/pdfs/ITMS-Sussex-County-TOMP.pdf>

## ITMS Enhancements

Better data enables better decisions. DelDOT is making many efforts statewide to enhance the integrated transportation management system (ITMS) network, both in the device coverage and in the technology itself.

### Enhanced Monitoring

DelDOT plans to add new traffic monitoring devices in several locations in Kent County, as shown on this map.

Expanded monitoring in the following areas will help real-time transportation management and data collection to determine the extent to which these areas experience congestion. Only with more complete data can engineers and planners decide whether these areas are congestion hotspots where improvements should be planned.

**DE 8** Expanding DelDOT's Bluetooth program to include additional coverage on DE 8 will help DelDOT to pinpoint and manage congestion more efficiently. Bluetooth travel times along this corridor will be an important piece in planning efforts along this corridor, including the DE 8 needs study.

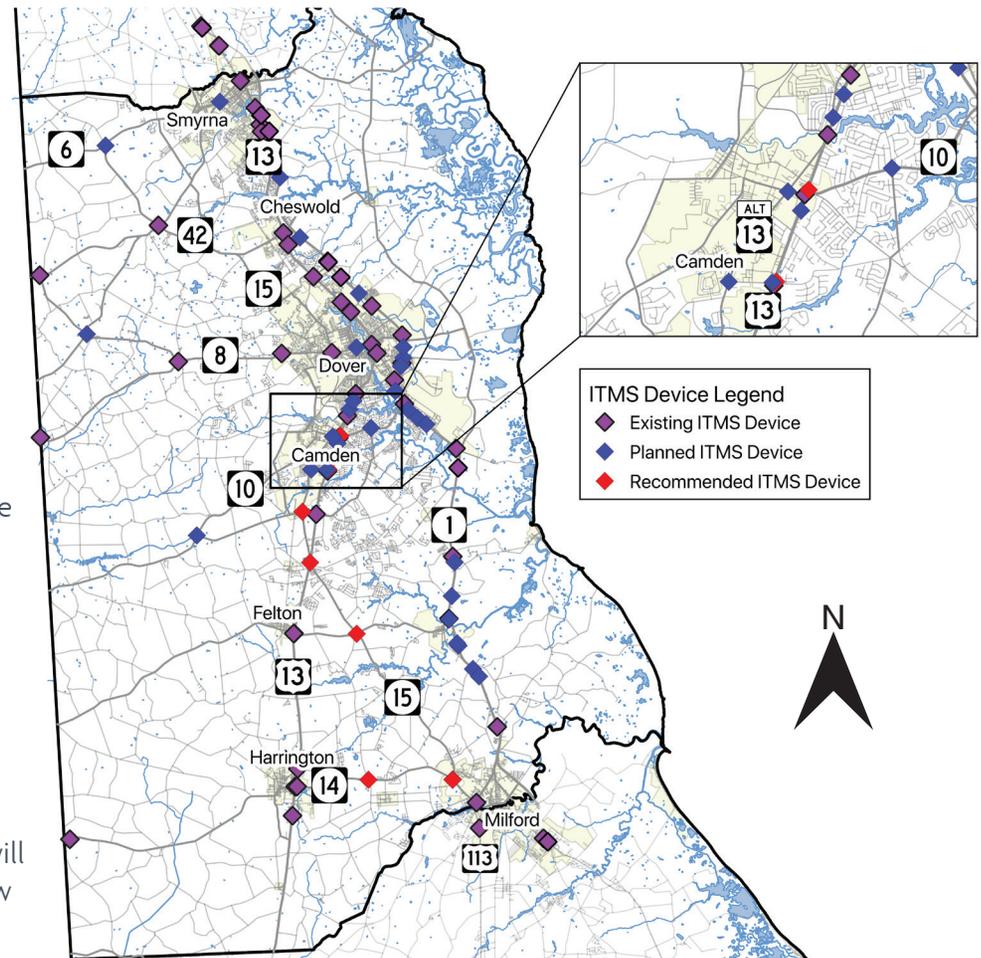
**US 13 Alt (Main Street)** Bluetooth travel time data would enable planners to assess the impact of projects on US 13 Alt and to identify new areas of concern.

**US 13 at DE 10** Already a location plagued by congestion and higher-than-average crash rates, adding a continuous turning movement count camera will help enable monitoring to determine if modifications to improve traffic flow and safety are necessary as development increases in the area.

**DE 14** The source of this congestion may have been construction at the intersection of Killens Pond Road with DE 14 between March and December 2019. New Bluetooth detection devices and signal system loops are needed to pinpoint whether and where congestion is occurring.

**DE 15** DE 15 connects US 13 and US 113/DE 1, but there are currently no monitoring devices on this road. New Bluetooth devices and system loops would show whether DE 15 experiences recurring congestion. If so, engineers and planners can use this data to devise solutions.

## Planned ITMS Devices



## Areas to Watch

While not classified as congestion hotspots in this report, there are a handful of “borderline” locations in Kent County that experience occasional congestion that should also be monitored as growth continues. US 13 and DE 1 through Smyrna should also be monitored as a main connection in and out of New Castle County. Notably the intersection of US 13 and DE 42 may be an area to watch as development continues to the north and the west and is expected to be studied as a part of the Cheswold Transportation Improvement District currently under development.

## Use of Artificial Intelligence

DelDOT is working toward using artificial intelligence (AI) as part of its integrated transportation management system, with the help of a \$5 million grant from the Federal Highway Administration.

Delaware’s transportation system is bigger than what can reasonably be monitored by the human eye. Computers, powered by AI and machine learning, can be trained to make operations decisions that are now made by technicians in DelDOT’s Transportation Management Center (TMC). As the AI system learns Delaware’s roadways and congestion hotspots, it can begin to predict when and where congestion will occur and adjust signal timings accordingly — eliminating the problem before it even begins. This ability to predict, correct, and flag issues will allow TMC technicians to perform their job with more efficiency and improve traffic flow for the traveling public.

## Dilemma Zone

DelDOT has an ongoing effort on US 13 in Smyrna to install a Dilemma Zone warning system, which will use Wavetronix radar sensors to automatically adjust the signal timing if it senses a vehicle is approaching a soon-to-be red light without sufficient time to stop. Being able to make these small adjustments has the potential to greatly increase safety at signalized intersections. Increasing safety and reducing crashes would also improve mobility.

## Incident Management

Incident management involves an incident response team and a complex toolbox. DelDOT has proactively invested in valuable planning, teamwork, and incident management training for over 20 years. Continuing the TMC’s commitment to monitoring, detection, and communication will help DelDOT keep people moving no matter the incident.



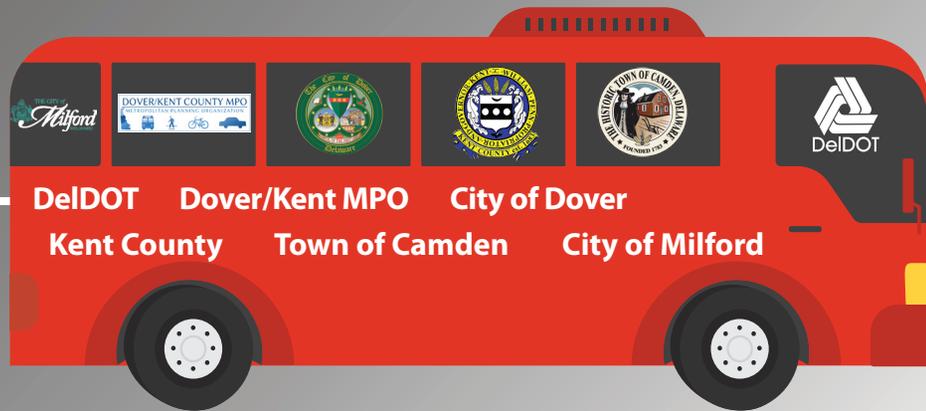


# NEXT STEPS

The purpose of this TOMP is to give DelDOT and agency partners the data they need to make informed decisions to improve mobility in Kent County. DelDOT's TMC and Planning sections analyzed operations data to identify congestion hotspots. Recommendations were made and discussed with DelDOT's Traffic section, the Delaware Transit Corporation, Dover/Kent MPO, and the City of Dover.

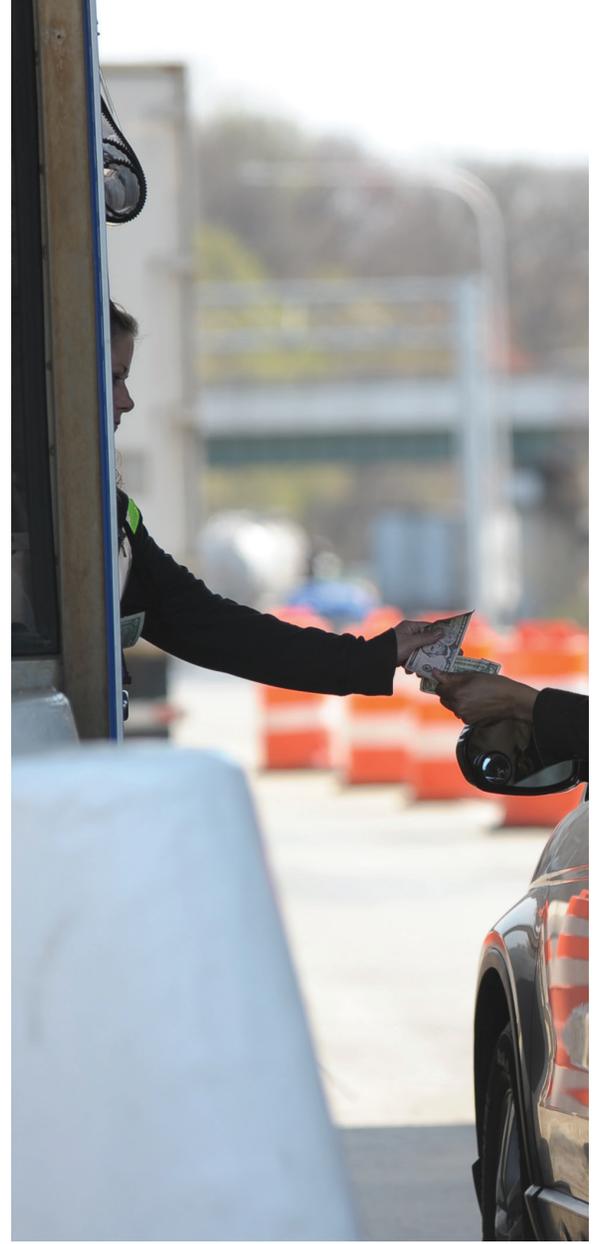
This TOMP will feed into DelDOT's project prioritization process, which uses not only this operations data but also inputs such as safety data, impact of environmental justice, and multimodal mobility to select high-impact corridors for improvement. Identified projects are then submitted into the Capital Transportation Program, a document that identifies anticipated capital investments, turning the recommendations on these pages into reality. DelDOT TOMP managers will continue to meet on a regular basis to track the progress of these projects and recommendations, releasing updates on the soon-to-be-released TOMP website.

The goal is to keep Kent County moving to make it an even greater place to live, work, and play.



## Coming Soon: Comprehensive TOMP Website

DelDOT is building an interactive site to make TOMP information more easily available to agency partners and the traveling public. Interactive maps will display information about traffic growth, travel times, congestion hotspots, and recommendations for improvement, along with background about the development of the county TOMPs.



# KENT COUNTY



## Transportation Operations Management Plan

April 2021 Report

