REGIONAL TRANSPORTATION PLAN 2050

MOVING SOUTH JERSEY FORWARD

APPENDIX E
CMP ACTIVITY REPORT

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Photo: Large Farm, Salem County, New Jersey

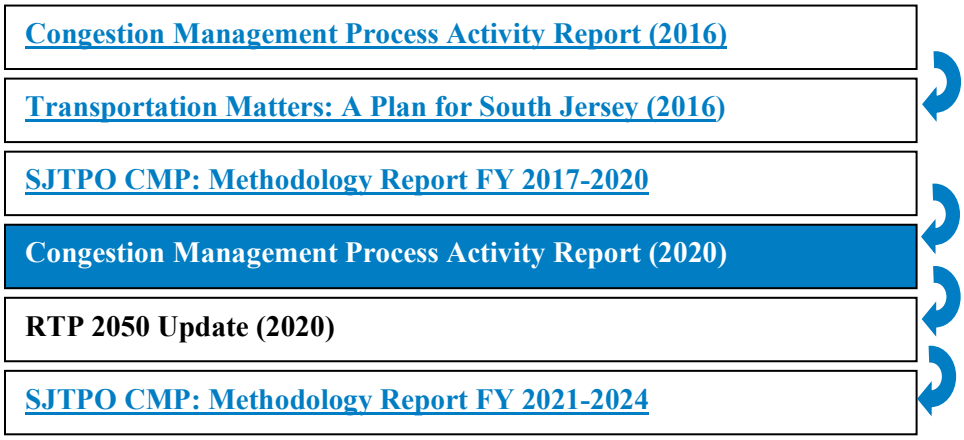
FY 2020 SJTPO CONGESTION MANAGEMENT PROCESS ACTIVITY REPORT

Contents

1. Introduction

A detailed description of the SJTPO Congestion Management Process (CMP) is provided in the FY 2017 Congestion Management Process: Methodology Report. SJTPO followed the approved methodology when conducting congestion management related activities and projects through FY 2020. The FY 2020 CMP Activity Report documents SJTPO's CMP deployment and CMP related activity. The CMP Activity Report details all congestion planning activities for the current RTP cycle, including SJTPO's utilization of the newly available archived travel time data. The report also documents project-oriented planning efforts, such as assisting SJTPO subregions in developing congestion relief projects and working with the New Jersey Department of Transportation (NJDOT) to select congested locations for possible future Problem Statements prepared by the department. Figure 1. Timetable of SJTPO CMP-Related Documents, below, summarizes the chronological order and the relationship for the CMP-related documents.

Figure 1. Timetable of SJTPO CMP-Related Documents



1.1 Congestion Management Process

1.1.1 Requirement

Federal transportation law requires that Transportation Management Areas (TMAs), such as SJTPO, construct and implement a CMP as part of their overall regional transportation planning process. A TMA is a metropolitan area with population exceeding 200,000[1].

The SJTPO congestion planning process is based on the workflow detailed in the FHWA Congestion Management Process Guidebook and on SJTPO's vision statement, as detailed in *RTP 2050: Moving South Jersey Forward* - "A transportation system, based on regional collaboration, that moves people and goods in a safe and effective manner, inclusive of all modes and users."

1 **SEE** DESIGNATION OF TRANSPORTATION MANAGEMENT AREAS

Congestion management processes are to have the following elements:

- Development of congestion management objectives
- Establishment of measures of multimodal transportation system performance
- Collection of data and system performance monitoring that is used to define congestion's extent, duration, and causes
- Use of analytic tools to define and identify congestion within a region
- Identification and assessment of congestion management strategies
- Selection of appropriate strategies to reduce congestion or mitigate the impacts of congestion
- Advancement of congestion management strategies into the funding and implementation stages
- Evaluation of the effectiveness of implemented strategies and of the CMP itself

The FY 2017 SJTPO CMP Methodology Report incorporates all the above. This document includes all features in the Methodology Report that were deemed relevant or reasonable.

1.1.2 Background

Congestion management systems are continually used and improved upon. Knowledge has increased, data has become more accessible, tools have been enhanced, and intelligent transportation systems have expanded.

The CMP itself has also evolved, including current practices that link management, operations, and planning. The CMP includes steps that utilize travel demand reduction and operational management strategies to keep environmental impact to a minimum.

1.1.3 CMP Description

The CMP is to be a regionally accepted, systematic process that integrates management and operations for managing congestion for a multimodal transportation system. In addition, the CMP provides accurate and up-to-date information on transportation system performance.

1.2 SJTPO's CMP Approach

SJTPO follows the data-driven eight step CMP approach, as prescribed by the FHWA. To accomplish this, SJTPO relies on quantitative and qualitative data and information. Qualitative data and information are contributed from SJTPO's partner agencies. As such, data collection and analysis are an important part of SJTPO's CMP. SJTPO also follows the FHWA guidelines for prioritizing general congestion management strategies, which are discussed in Section 4.

1.3 SJTPO's CMP Deployment

The FY 2017 SJTPO CMP Methodology Report documents the congestion management process. The Activity Report documents SJTPO's CMP deployment or CMP activity. SJTPO has organized this report based on the eight-step process, as prescribed in the FHWA Performance Management Guidebook. The first three steps were performed as a result of developing the methodology.

The FY 2017 SJTPO CMP Methodology Report documents in more detail, the following steps:

- **Step 1** Establishing Regional Objectives
- **Step 2** Defining the CMP Network
- **Step 3** Developing Multi-modal Performance Measures

This CMP Activity Report contains sections that relate to the CMP's Steps 4 through 8:

- **Step 4** Collect Data/Monitor System Performances (Section 2 & 3)
- **Step 5** Analyze Congestion Problems and Needs (Section 3)
- **Step 6** Identify and Assess Strategies (Section 4)
- **Step 7** Program and Implement Strategies (Section 5)
- **Step 8** Evaluate Strategy Effectiveness (Section 6)

SJTPO considers CMP Steps 4 through 8 as CMP deployment or CMP activities. They are documented in this report in Sections 2 through 6 below. Section 2 includes the congested bottleneck locations that were identified as a result of the data collection and analysis. The locations of interest are ranked for the state and the local roads.

SJTPO is a part of NJDOT's Mobility and Congestion Relief Problem Statement Development Process Subcommittee. State road congestion issues are conveyed to NJDOT through this subcommittee for candidate Problem Statements prepared by the department. SJTPO also participates in the state congestion management process. SJTPO acts as a conduit between SJTPO's planning partners and NJDOT in this respect.

Section 3 displays the results of SJTPO's network congestion performance evaluation. This information may be used to improve the network's overall congestion management performance.

The locations of interest for the local roads on the federal aid system flow into the SJTPO project development pipeline (Section 4 and Section 5). Through consultant-led technical studies, SJTPO staff, partner agencies, and consultants participate in the various stages of the project development pipeline.

2. Identifying Congested Locations

2.1. Quantitative Data Collection using Probe Data Analytics (PDA) Suite

The Probe Data Analytics (PDA) Suite tool was used to analyze the archived travel time data. The PDA's Suite Bottleneck Ranking Tool was used to locate bottleneck conditions, allowing sources of recurring congestion to be identified. The FY 2017 CMP Methodology Report contains a detailed description and explanation of the Bottleneck Tool. The top 10 congested state/authority roadways and the top 10 county/local roadways are included in this report. As an update to the data provided in the FY 2017 CMP Methodology Report, 2018 data was used (January 1, 2018 through December 31, 2018). SJTPO conducted a network-wide scan of roads within the four county SJTPO region that are on the PDA Suite network; although not all roads in the SJTPO region are part of the network. While the PDA Suite network includes

all the major Interstates, Authority, US, and State routes, it only covers a minimal number of county and local roads.

2.2. Update to Data used from PDA Suite

The current FY 2017 CMP Methodology Report uses 2017 PDA suite and ranks by a different bottleneck ranking metric. The Methodology Report needs to be updated for the PDA's Suite new bottleneck ranking metrics and most recent bottleneck ranking data. Although the PDA Suite's Bottleneck Ranking algorithm for identifying bottlenecks remains unchanged, the University of Maryland's Center for Advanced Transportation Technology (CATT) Lab staff have developed some additional metrics to improve the bottlenecked lists, such as speed differential, congestion, and total delay. The lists provided in the FY 2017 CMP Methodology Report were ranked by base impact factor, whereas the new ranking methodology ranks by congestion. Base impact is a sum of the queue lengths over the duration of each bottleneck. The congestion-metric weights the queue length (each minute) by the measured speed as a percentage of free-flow speed. The congestion metric is used when you want to identify and rank bottlenecks from the individual vehicle perspective. As queue lengths do not capture motorist delay, the new metrics incorporate estimates of travel time delay per vehicle (i.e. the delay experienced by a single motorist), as well as overall travel time delay (i.e. the delay incurred to all vehicles at a given bottleneck). The travel time delay per vehicle based on the length of the queue (base impact) is estimated as well as the speed drop within the queue. Base impact metric estimates the spatial impact of congestion, whereas the congestion total delay metrics estimate the cost to society.

It should also be noted that there was a low occurrence of local roadways in the new Top 200 bottleneck locations generated using the congestion metric. A lower occurrence can be explained by the changes in the roadways included in the "Other" category. "Other" now includes the Garden State Parkway and Atlantic City Expressway, which are a higher classification of roadway with much greater traffic volumes than county/local roadways. In order to focus on county/local roadways, a query was run using the "Other" category. SJTPO manually filtered out any location associated with the Parkway or Expressway for the four counties. The locations are listed in Table 2: Top 10 Bottleneck Locations – SJTPO Region (County/Local).

2.3. Bottlenecked Locations

The congested bottleneck locations, generated from the PDA Suite, are identified as Locations of Interest. There are two lists that depict the Top 10 Locations of Interest on separate classifications of roadways:

- Table 1: Top 10 Bottleneck Locations – SJTPO Region (State/Authority) includes state/authority roadways,
- Table 2: Top 10 Bottleneck Locations – SJTPO Region (County/Local) includes county/local roadways

Also, the Top 10 Locations of Interest for each separate classification of roadways were mapped. Figure 2. Map of Top 10 State/Authority Roadway Bottleneck Locations maps the Top 10 state/authority roadways, whereas Figure 3. Map of Top 10 County/Local Roadway Bottleneck Locations maps the Top 10 county/local roadways. Each bottlenecked location is mapped by the longitude and latitude provided by the PDA Suite and each point is labeled with its appropriate rank number.

Both lists were presented to SJTPO's partner agencies for feedback. SJTPO requested feedback to determine if there were any locations that were believed to be outliers or if a location should be added to the list. Also, additional comments on the causes/reasons for congestion at a location on the list were requested.

State roadways in Table 2: Top 10 Bottleneck Locations – SJTPO Region (County/Local) will be discussed with NJDOT's Mobility and Congestion Relief Problem Statement Development Process Subcommittee. NJDOT may consider the roadways for possible future Problem Statements, through coordination with NJDOT. County and local roadways that appear in Table 2: Top 10 Bottleneck Locations – SJTPO Region (County/Local) will be considered for possible future action/projects. The locations are ranked in order of the congestion metric, as calculated within the PDA Suite.

Atlantic = Cape May = Cumberland = Salem =

Table 1: Top 10 Bottleneck Locations – SJTPO Region (State/Authority)

Rank	Location	Direction	Average duration	Average max length (miles)	Occurrences	Impact Factor	Congestion
1	US-322 W @ W END AVE	WESTBOUND	4 h 43 m	1.30	202	127,491	158,770
2	US-322 W @ CAPTAIN JOHN A O'DONNELL PKWY	WESTBOUND	7 h 33 m	0.55	162	68,043	94,462
3	NJ-47 S @ NJ-83	SOUTHBOUND	41 m	3.77	277	56,434	80,371
4	US-322 E @ CR-575/WRANGLEBORO RD	EASTBOUND	6 h 25 m	0.36	215	40,896	58,871
5	GARDEN STATE PKY S @ NJ-52/EXIT 30	SOUTHBOUND	14 m	6.06	321	29,835	54,978
6	US-9 N @ W DELILAH RD	NORTHBOUND	3 h 48 m	0.49	27	37,028	50,595
7	CR-575 S @ US-40/US-322/BLACK HORSE PIKE	SOOUTHBOUND	53 m	1.96	11	37,983	45,959
8	NJ-47 N @ US-9	NORTHBOUND	3 h 3 m	0.54	71	34,993	45,359
9	CR-575 N @ US-40/US-322	NORTHBOUND	49 m	1.93	0	34,640	43,228
10	NEW JERSEY TPKE S @ I-295/US-40/NJ-49/1ST AVE/EXIT 1	SOUTHBOUND	20 m	1.56	491	14,127	42,906

Atlantic = Cape May = Cumberland = Salem =

Table 2: Top 10 Bottleneck Locations – SJTPO Region (County/Local)

Rank	Location	Direction	Average duration	Average max length (miles)	Occurrences	Impact Factor	Congestion
1	CHRISTOPHER COLUMBUS BLVD S @ ATLANTIC AVE	SOUTHBOUND	3 h 16 m	0.34	0	24,589	34,366
2	~~CR-552-SPUR~~ BROAD ST/MAYS LANDING RD E @ E SHERMAN AVE*	EASTBOUND	9 m	3.4	0	11,411	13,578
3	PENNSVILLE AUBURN RD E @ N HOOK RD	EASTBOUND	34 m	0.52	0	6,552	13,304
4	~~CR-552-SPUR~~ BROAD ST/MAYS LANDING RD W @ N 3RD ST*	WESTBOUND	8 m	3.41	1	10,967	12,558
5	ATLANTIC AVE W @ CAPTAIN JOHN A O'DONNELL PKWY/N BOSTON AVE	WESTBOUND	27 m	0.84	5	8,216	9,336
6	ATLANTIC AVE E @ N MISSOURI AVE	EASTBOUND	25 m	0.83	3	7,605	8,455
7	CR-561-SPUR/MAYS LANDING RD S @ 12TH ST	SOUTHBOUND	6 m	2.21	1	4,849	7,898
8	ATLANTIC AVE W @ S ALBANY AVE	WESTBOUND	56 m	0.30	5	5,541	7,256
9	CR-561-SPUR/MAYS LANDING RD S @ 8TH ST	SOUTBOUND	4 m	2.33	2	3,984	6,112
10	ATLANTIC AVE E @ CAPTAIN JOHN O'DONNELL PKWY/N BOTSON AVE	EASTBOUND	57 m	0.22	0	4,598	5,950

*Roadway location relabeled as Broad Street/Mays Landing Road based upon county/municipality feedback indicating that the County Route ends at 7th Street. Also, location should not be on the list as county/municipality stated it is a false positive.

2.4. Qualitative Data Collection from the SJTPO Technical Advisory Committee

Feedback on the top 10 bottleneck locations for both state/authority roadways and for county/local roadways were obtained from SJTPO's partner agencies. Although there were no additional congestion locations identified by SJTPO's planning and engineering partners, general comments about the bottleneck lists were made, with limited comments on specific locations on the list. All comments are summarized, below. SJTPO will continue to coordinate with the University of Maryland's CATT lab on addressing these comments in future PDA Suite data that SJTPO utilizes and evaluates.

General Comments/Questions

- Overall, there are locations on the list that are not continually congested daily. Specific locations that were identified as not continually congested are provided in the "Specific Comments" section below.
    - *SJTPO response: SJTPO will continue to work with the University of Maryland CATT Lab Support Team on screening out locations that are not continually congested daily. The reasoning for locations showing up on the list when they are not continually congested daily (or not showing up when they should) may be due to the reference speed data that is provided to them from their data providers (INRIX and HERE). If the reference speed value is "unreasonably" high or low for a given road segment that will skew the congestion metrics.*
- Roadways are on the top bottleneck lists with a high congestion metric value but do not have any occurrences or events/incidents.
    - *SJTPO response: SJTPO reached out to the University of Maryland CATT Lab Support Team for clarification. If the current (observed) speed drops below 60% of the free flow speed for less than 5 minutes, that occurrence won't be reported as a separate occurrence, but will still contribute to roll-up impact metrics. Taking this into account, a location can have a 'high congestion metric' even though the number of "occurrences" in a location is zero. An "occurrence" is a bottleneck instance while an "event" is an incident, such as a crash, collision, struck animal, or similar.*
- The Head Location just displays the specific roadway in question with the intersection that is furthest downstream. The length of the bottleneck segment is not displayed. Additional information in the tables should be provided that includes what intersections are included in the segment or just simply stating the start and end locations. This way when reading the lists, one can clearly know where the bottleneck segment starts/ends and would also know what other intersections are included in the segment.
    - *SJTPO response: For future updates to the CMP report/bottleneck lists, SJTPO will incorporate an additional column in the table that specifies the start and end locations of the bottleneck corridor. SJTPO has reached out to the University of CATT Lab regarding this request, where they are going to investigate to see if it is feasible to add this data as an additional column to the table that is automatically generated in the PDA Suite Bottleneck Ranking Tool.*

- Some locations (for example, US-322 W @ CAPTAIN JOHN A O'DONNELL PKWY and US-322 E @ CR-575/WRANGLEBORO RD) have very unreasonably long average daily durations (i.e. 7 h 33 m and 6 h 26 m, respectively).
    - *SJTPO response: The "Average Daily Duration" metric gives the number of minutes per day that a given location was in a congested state. For instance, if a particular bottleneck location is typically congested for 1.5 hours during morning rush hour, 1 hour during evening rush hour, and a total of 1 hour spread across the ten other time periods during the day, the total for this metric would be 3.5 hours. As the query was done over a five-day period, the time congested over five days may be [3 hrs, 3 hrs, 4 hrs, 5 hrs, 2.5 hrs], which would result in an average daily duration of 3.5 hours.*
    - *SJTPO also reached out to the University of Maryland CATT Lab Support Team for additional clarification, who indicated that while a 6 hour average daily duration is high, it is relatively consistent with other locations in those areas. The value for this metric pertains to the "head location," i.e. how many hours in a typical day is that head segment congested. Thus, it is not affected by the length of the queue that backs up behind that point. It will typically be the case; however, that those locations which have long queues tend also to be congested more of the time.*
- What determines when a location is congested/has a bottleneck and how does it relate to the posted speed limit?
    - *SJTPO Response: A bottleneck location is considered congested when the current (observed) speed drops below 60% of the reference (free flow) speed. If the free-flow speed is 60 mph, once the current speeds drop below 24 mph (60% of the free-flow speed) the location is considered congested.*
    - *SJTPO also reached out to the University of Maryland CATT Lab Support Team for additional clarification. They stated that they use the "reference speed" value that is provided by the data providers (e.g., INRIX and HERE) as the definition of free-flow speed. The magnitude of this "reference speed" value will affect the calculated metrics related to congestion. If that value is "unreasonably" high or low for a given road segment, the congestion metrics will be skewed, including average daily duration.*
    - *SJTPO has also reached out to the University of Maryland CATT Lab regarding our request to add the reference speed data as a field to the Bottleneck Ranking tables. They are going to investigate to see if it is feasible to add this data as an additional column to the table that is automatically generated in the PDA Suite Bottleneck Ranking Tool.*

Specific Comments

- *Route 47/Route 9, Route 47/Route 83 and 34th Street and Route 52/9th Street (Cape May County)*: these locations are the result of extreme summer volume and saturation of the approach highways. Possible improvements are limited, as congestion generally occurs on Saturdays from June to September.
- *Ferry Road (Cape May County)*: The county is not aware of congestion/backups, as the roadway does not experience congested queues routinely. Ferry discharged vehicles may be a reason for some congestion; however, it would not result in any significant long-term backups, as noted. Therefore, these locations are an outlier.
- ~~CR-552-Spur~~ Broad St/Mays Landing Rd E @ Sherman Ave and CR-552-Spur Broad St/Mays Landing Rd W @ N 3rd St (Cumberland County): The two county/municipal locations (#2 and #4)

in Cumberland County, should be removed from the list of congested locations. The location is designated as Broad Street (in Millville, NJ) from 3rd Street to the east of Crest Avenue; whereas, from Crest Avenue to Sherman Avenue, the roadway is Mays Landing Road in Vineland, NJ. The two congested locations (#2 and #4) are the same roadway, but in opposite directions (eastbound/westbound), with the limits of Broad Street/Mays Landing Road from 3rd Street to Sherman Avenue. Both the City of Vineland and Cumberland County believe these locations are not a congestion issue, given the rural area.

- CR 552 (Sherman Avenue), from Route 47 (Delsea Drive) to Route 55 (in Vineland): The City of Vineland and Cumberland County stated that this location should be added to the Top 10 Bottleneck Locations – SJTPO Region (County/Local) list, as it is one of the two most congested locations in Cumberland County. This segment of the Sherman Avenue corridor generally backs up throughout the day, particularly in the peak hours. This location is a heavily traveled major east-west roadway, which results in a lot of congestion and delay. In addition to regular use by emergency vehicles due to the Regional Medical Center, both the Cumberland County Technical Education Center and Rowan College of South Jersey, Cumberland Campus are located immediately adjacent to the corridor. Residents also use this corridor to cut through the City. It should also be noted that this location does not show up in the full County/Local Bottleneck Ranking list from the PDA Suite for the SJTPO region.
- High Street/ CR 667 (Sharp Street), from Route 47 (Delsea Drive) to Route 49 (in Millville): The City of Vineland and Cumberland County stated that this location should also be in the Top 10 Bottleneck Locations – SJTPO Region (County/Local) list, as it is the second most congested location in Cumberland County. The High Street/ CR 667 (Sharp Street) is a heavily traveled north south corridor connecting the residential west side of Millville to Cumberland County's major commercial district along NJ 47 (Delsea Drive/Second Street) in the vicinity of the NJ 55 interchange. The corridor is generally congested throughout the day, but especially both ends at peak hours due to traffic signal queuing. The north end is also congested at two localized peak times due to the presence of Millville's Lakeside Middle School. It should also be noted that this location does not show up in the full County/Local Bottleneck Ranking list from the PDA Suite for the SJTPO region.

Figure 2. Map of Top 10 State/Authority Roadway Bottleneck Locations

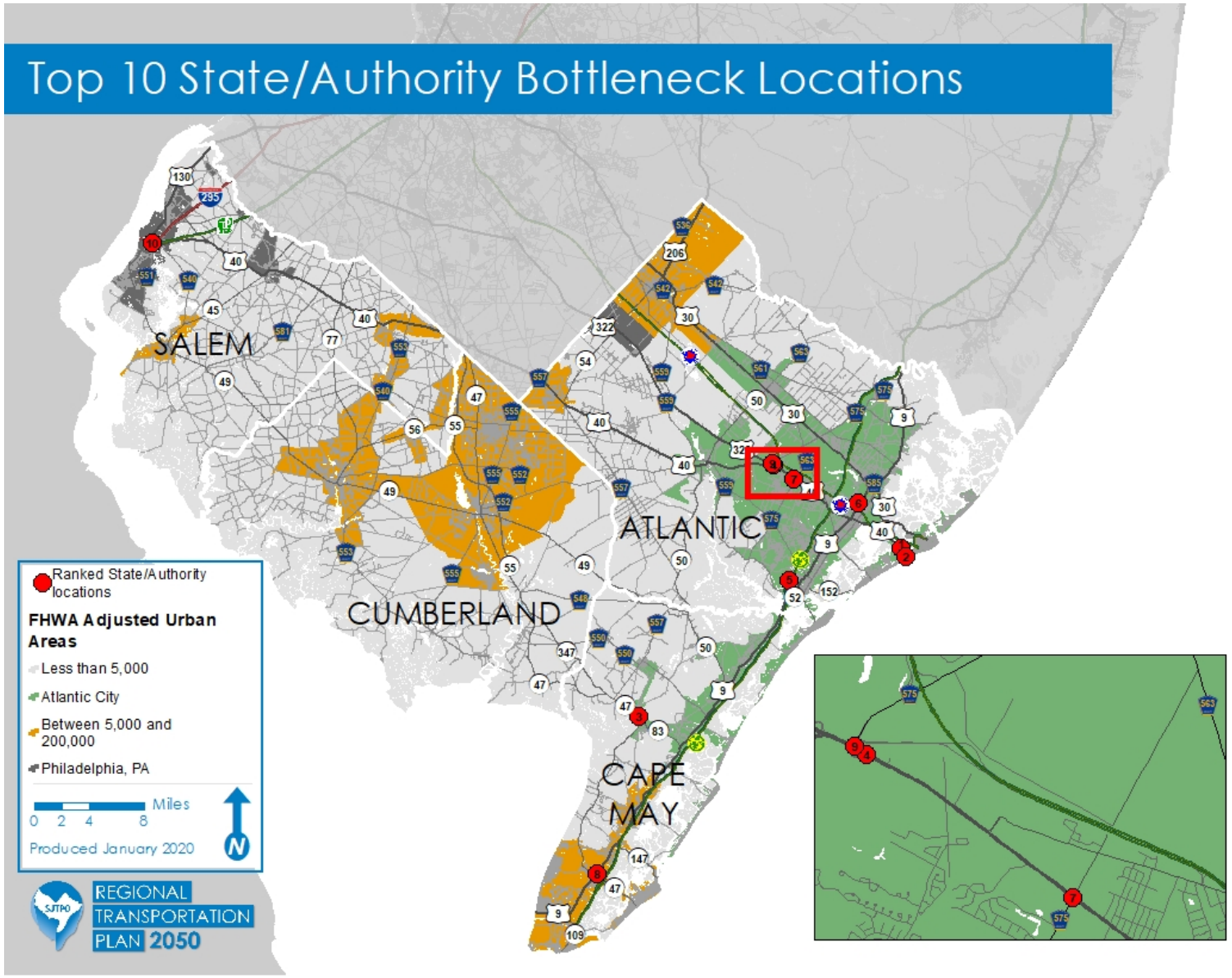
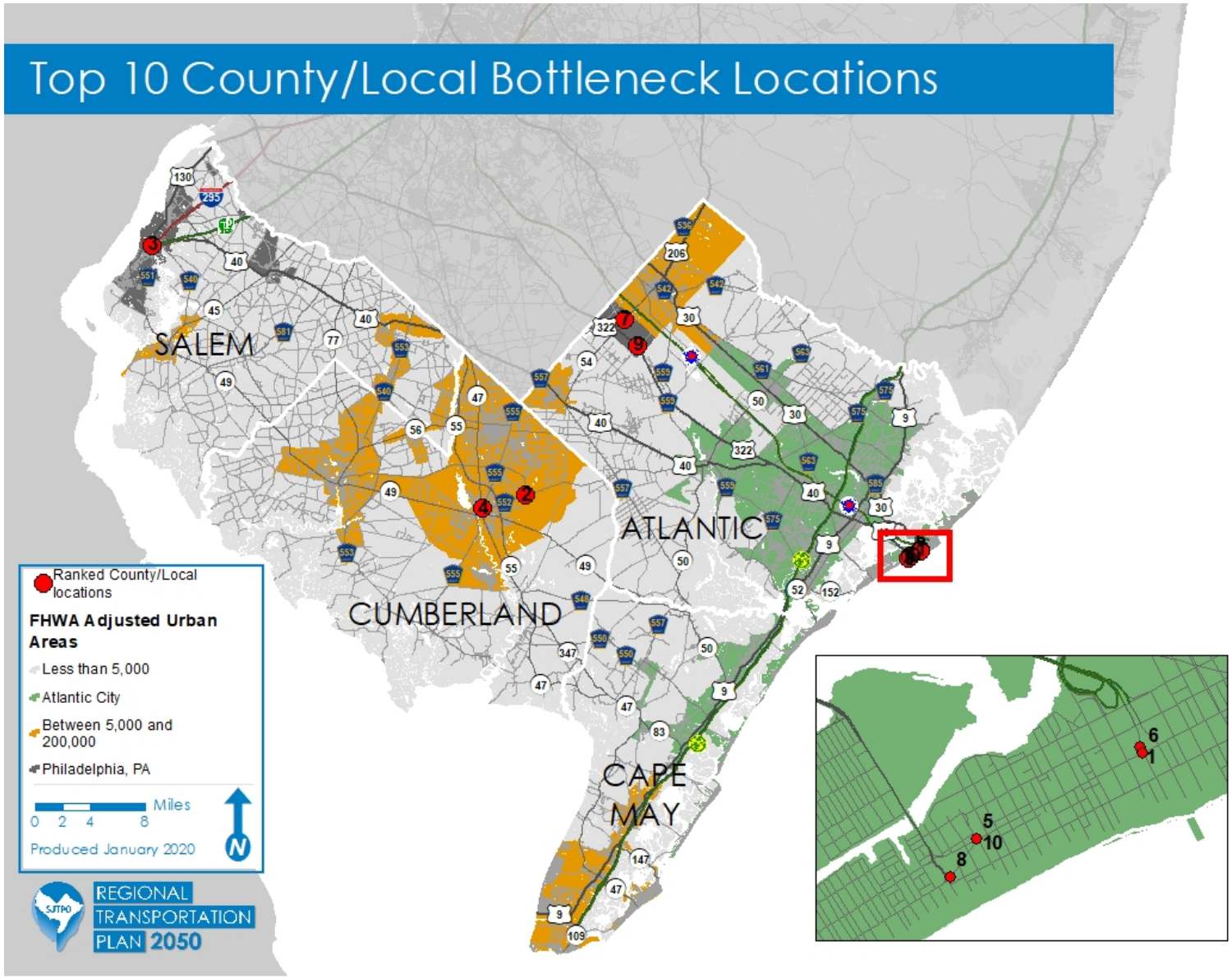


Figure 3. Map of Top 10 County/Local Roadway Bottleneck Locations



3. Regional Network Congestion Management Performance

In this section, SJTPO used performance measures that depict network-wide congestion management performance. These indicators therefore are not used to identify specific locations of interest, rather, they are used to monitor the overall performance of the network. Data from multiple years and planning cycles allow for trends to be documented. If data for multiple time periods is not available, the data collected for a single time period will establish a benchmark for future trend analysis. Evaluating the network performance is part of Step 8 of the CMP Methodology Process. The performance measures in Figure 4. Map of Top 10 County/Local Roadway Bottleneck Locations relate to the network's congestion management performance. The data was obtained from the PDA Suite's Performance Summaries Tool. The performance measures depicted, below, are Planning Time Index and Travel Time Index. The planning time index is the ratio of 95th percentile travel time to free flow travel time. It represents how much total time a traveler should allow to ensure on-time arrival. For example, a planning time index of 1.27 means that for a trip that takes 15 minutes in light traffic a traveler should budget a total of 19 minutes to ensure on-time arrival 95% of the time. Travel time index is the ratio of peak-period to non-peak period travel time. It is a measure of average conditions that tells a person how much longer, on average, travel times are during congestion compared to during light traffic[2].

Figure 4. Map of Top 10 County/Local Roadway Bottleneck Locations[3]

Travel Delay Planning Time Index	2016	2017	2018
NJ & US Routes	1.27	1.29	1.27
County & Local Routes	1.26	1.27	1.27

Travel Delay Travel Time Index	2016	2017	2018
NJ & US Routes	1.05	1.06	1.05
County & Local Routes	1.04	1.04	1.05

The above data indicates a slight increase in congestion in the SJTPO region between 2016 and 2017, but a slight decrease between 2017 and 2018. Between the three years being analyzed, the planning time index and travel time index relatively stay the same, meaning congestion has neither increased nor decreased. Also, the travel time index is relatively close to one, depicting that average conditions are minimally congested. The SJTPO region has relatively little congestion compared to other parts of the state and the country. Although congestion is not the most important issue for SJTPO's region, SJTPO is committed to implementing projects and programs to make SJTPO's network as efficient as possible. These projects and programs are detailed in the next section.

4. Identify and Assess Strategies

A wide variety of strategies, including demand management, operational improvements, and multimodal facilities/services were identified in the FY 2017 CMP Methodology Report. Several strategies are identified in the FHWA CMP Guidebook and are included with the understanding that not all strategies are

2 See FHWA Travel Time Reliability

3 NJ & US includes only routes designated NJ or US; does not include Interstate, ACE, or Parkway. County & Local Routes are those under county or municipal jurisdiction that are part of the PDA Suite road inventory. Months measured are from January through December each year, all days of week from 6:00AM to 7:00 PM

appropriate in all contexts. Innovative strategies identified as part of FHWA Every Day Counts initiative, such as Adaptive Signal Control, shall also be considered.

4.1. Strategy Identification

The FHWA CMP Guidebook outlines these general strategy categories:

- **Reduce Demand** – for motorized vehicular capacity on congested corridors
- **Shift Mode of Trip** – from single-occupant vehicles to more capacity-efficient modes
- **Improve Operations** – specifically the operational aspects of congested corridors
- **Increase Capacity** – of the congested corridors to accommodate additional traffic

Strategies should contribute to congestion relief, but contributions to other regional objectives, such as safety and multimodal mobility must also be considered. Increasing single-occupancy vehicle (SOV) capacity shall not be considered as a first choice. Alternatives to additional SOV capacity shall be given priority according to Federal guidance.

Strategies that will be evaluated will include, but are not limited to, the following:

- Demand Management Strategies
- Traffic Operations Strategies
- Intelligent Transportation Systems (ITS) Strategies
- Public Transportation Strategies
- Road Capacity Strategies

Additional information on these strategies can be found in the FY 2017 CMP Methodology Report. The strategies identified should be considered in collaboration with the appropriate implementing agencies and local stakeholders.

4.2. Strategy Assessment

Each strategy shall be assessed in comparison to the four CMP objectives outlined in Section 3.1 of the FY 2017 CMP Methodology Report. Strategy assessment shall be conducted collaboratively with partner agencies. Methods available to evaluate strategies include:

- Research literature review;
- Travel demand modeling;
- Traffic simulation modeling;
- Experience or evaluations of strategies; and
- Technical studies

Studies from the current or prior planning cycles may lead to projects in this or future planning cycles. Studies may also lead to programs or operational policies that are carried out by SJTPO's planning partners. During the study process, SJTPO and its partners will reach a consensus on the solutions after evaluating the alternatives. The projects or solutions that are detailed in the following section were the result of studies conducted either by consultants, SJTPO staff, or SJTPO subregions. SJTPO staff utilizes tools, such as Synchro, to identify and assess strategies that may evolve into projects.

5. Program and Implement Strategies

CMP Strategies are implemented through the SJTPO Transportation Improvement Program (TIP), the SJTPO Unified Planning Work Program (UPWP), and through the work programs of SJTPO's partner agencies. SJTPO participates in the planning process of NJDOT and other partners. It is in this capacity that SJTPO strives to implement strategies that are shared with other organizations.

Although other avenues are used, specific projects programmed in the TIP are the most direct method of implementing the CMP strategy. CMP strategies can be at the regional, corridor, or project levels. An example of regional strategy is Cross County Connection Transportation Management Association (CCCTMA) activities. CCCTMA focuses on transportation demand management strategies, which are strategies that centers on travel demand (vs the infrastructure side), and encourage people to use alternative modes of transportation, such as transit, ridesharing, walking, biking, and telework. Corridor strategy examples may include traffic signal coordination, addition of bicycle lanes, and operational improvements.

Not all congestion related projects are restricted to only using CMAQ funding. Various projects that include congestion mitigation in the scope of work may utilize other funding programs. As such, there are several different funding sources in the TIP that SJTPO's subregions can utilize each fiscal year. Projects may utilize funds from programs like Congestion Mitigation and Air Quality (CMAQ), Highway Safety Improvement Program (HSIP), Safe Routes to School (SRTS), or Transportation Alternatives Program (TAP). Other funding sources are also available for use. One project in the SJTPO region, initially funded with CMAQ funding for design is utilizing funds made available through the Infrastructure Bank (I-Bank) for construction, as the project cost far exceeded SJTPO's resources.

The following tables contain the projects that are part of the SJTPO CMP effort. Project funding is made available for various phases of work, including design (DES), right-of-way (ROW), or construction (CON). Table 3: SJTPO's Authorized Projects, FY 2017-2019 contains a list of SJTPO's projects that were authorized between FY 2017-2019 as part of SJTPO's CMP effort. SJTPO has authorized over $8.0 million for projects during that time period related to congestion mitigation and/or air quality improvements. Table 4: SJTPO's Programmed Projects, FY 2020+ contains a list of projects that are programmed for authorization in the upcoming fiscal years (FY 2020+). There is over $20.0 million of projects programmed for authorization in FY 2020 and beyond.

Table 3: SJTPO's Authorized Projects, FY 2017-2019

Congestion Management Projects	Funding Source	Phase	Project Sponsor	Cost (millions)	Year of Authorization
Atlantic County Route 629 Pedestrian and Traffic Signal Improvements	CMAQ	DES	Atlantic County	$0.912	FY 2017
Atlantic Avenue Improvement Project	TAP	CON	Atlantic City	$0.844	FY 2017
Purchase of eight (8) Unleaded-Fuel Mini Buses	CMAQ	Flex to NJ Transit	AC Transportation Unit	$0.660	FY 2017
Purchase of 9 Low-Emission Unleaded Fuel Powered Mini-Buses	CMAQ	Flex to NJ Transit	AC Transportation Unit	$0.660	FY 2017
Atlantic Avenue Transit Path Extension	TAP	CON	Egg Harbor City	$0.296	FY 2018
Somers Point Bikeway Extension	TAP	DES	Somers Point	$0.090	FY 2018
Margate-Ventnor Bicycle Infrastructure Project	CMAQ	DES	Atlantic County	$0.035	FY 2018
Cape May County Route 621 (New Jersey Ave) Improvements	CMAQ	DES	Cape May County	$0.306	FY 2017
Procurement of 7 low emission unleaded fuel powered body on chassis mini-buses	CMAQ	Flex to NJ Transit	CMC Fare Free Transportation	$0.550	FY 2017
Seashore Road Missing Link	TAP	DES	Cape May County	$0.107	FY 2018
Somers Point Bikeway Extension Phase II	TAP	CON	Somers Point	$0.171	FY 2019
Cape May County Pilot Roundabout 2 (Woodbine)	HSIP	CON	Cape May County	$1.402	FY 2019
Sabater Elementary Safe Routes to School	SRTS	CON	City of Vineland	$0.304	FY 2017
Millville Broad Street Traffic Signal	CMAQ	DES	Cumberland County	$0.183	FY 2017
The Landis Avenue Signal Upgrades, Phase 2	CMAQ	CON	City of Vineland	$0.873	FY 2018
Cumberland County Traffic Signal Improvements	State Aid	CON	Cumberland Co.	$0.550	FY 2018
Centerton Traffic Signal Improvements	CMAQ	DES	Salem County	$0.042	FY 2017
Centerton Traffic Signal Improvements	CMAQ	CON	Salem County	$0.167	FY 2018
Regional Signal Timing Initiative	CMAQ	Study	SJTPO	$0.100	FY 2017

Table 4: SJTPO's Programmed Projects, FY 2020+

Congestion Management Projects	Funding Source	Phase	Project Sponsor	Cost (millions)	Anticipated Year of Authorization
Caspian Pointe Pedestrian and Bicycle Connection	TAP	CON	Atlantic City	$1.064	FY 2020
Margate-Ventnor Bicycle Infrastructure Project	CMAQ	CON	Atlantic County	$0.245	FY 2020
Atlantic County Route 629 Pedestrian and Traffic Signal Improvements	I-Bank	CON	Atlantic County	$10.000	FY 2020
Cedar Creek/Egg Harbor Lake Pedestrian Connection	TAP	CON	Egg Harbor City	$0.723	FY 2021
Improving Air Quality and Reducing Traffic Congestion through Biking in Ocean City	CMAQ	CON	Cape May County	$0.222	FY 2020
Roosevelt Boulevard/34th Street Advanced Traffic Signal Project	CMAQ	DES/ CON	Cape May County	$0.099/ $0.657	FY 2020/ FY 2021
Cape May Bikeway Network Expansion	SRTS	CON	Cape May County	$0.350	FY 2021
Garden Road & Mill Road Traffic Signalization	HSIP	ROW/ CON	City of Vineland	$0.247/ $1.978	FY 2020
Landis & Mill, Landis & Orchard Traffic Signal Upgrades	CMAQ	CON	City of Vineland	$0.548	FY 2020
Millville Broad Street Traffic Signal Upgrades	CMAQ	CON	Millville	$0.825	FY 2020
Maurice River Bikeway Trail - Phase V	TAP	CON	Millville	$0.517	FY 2020
Salem County Pilot Roundabout (Five Points)	HSIP	FD/ CON	Salem County	$0.124/ $1.052	FY 2020/ FY 2021
Salem County Roundabout (Six Points)	HSIP	FD/ ROW/ CON	Salem County	$0.124/ $0.100/ $1.052	FY 2020/ FY 2021/ FY 2022

6. Evaluating Strategy Effectiveness

This part of the CMP involves evaluating both the strategies that were employed and the CMP itself. The CMP evaluation/monitoring step is a multi-level evaluation, meaning the projects, programs, and the entire process are monitored. The FHWA Guidebook identifies two general approaches for strategy evaluation:

1. **System-level performance evaluation** – using region-wide or system-level performance measurement; or
2. **Strategy effectiveness evaluation** - project-level or program-level analysis of conditions before and after the implementation of a congestion mitigation effort

The effectiveness of each project and program will allow for improvements to those projects and program types. It may also call for entirely different projects and programs when confronted with similar issues in the future. Before-and-after studies can be conducted on projects for which good baseline data has been collected. Relevant data for three years before and after a project or program is implemented is needed for an effective evaluation. The PDA Suite can be used to do this type of analysis. These will be done as part of a future work program. For example, for traffic signal improvement projects, baseline traffic simulation models are typically developed and capture the "before" conditions. After the upgraded signals have been in operation for some time, the "after" conditions can be developed, and the effectiveness of the signal upgrades can be determined. Projects that seek to promote transit, bicycle, or pedestrian modes can also be evaluated using before-and-after studies.

Archived operations data may also be used to evaluate strategy effectiveness for a wide variety of projects. As archived travel time data stretches back to 2014 for most of the SJTPO region, this data can serve as a "before" baseline for corridor-level projects. After improvements are made, the real-time data can be observed and compared against the baseline. For example, for the Garden State Parkway grade separation project in Cape May County, travel time and delay data can be compiled for the year prior to and the year following construction. For traffic signal improvement projects, the corridor travel time can also be evaluated using archived operations data.

SJTPO will also determine the effectiveness of its CMP in two ways. One is through a network performance evaluation as seen in Section 3. Another is through analysis of the SJTPO CMP's impact on the SJTPO RTP and the plans of SJTPO's partners. Also as seen in Section 5, SJTPO's CMP process has produced TIP projects. These TIP projects are part of *RTP 2050: Moving South Jersey Forward*. SJTPO will also evaluate the CMP effectiveness by monitoring the plans, projects, and programs of its planning partners.

7. Ongoing and Future CMP Activities

The studies, projects and programs are the result of staff and subregional activity that supports the CMP. SJTPO has a formal work task dedicated to Congestion Management and Relief Planning. Other UPWP staff activities also contribute to the CMP. Those activities are:

- Regional & Corridor Planning & Current Regional Issues
- Performance Based Planning
- Transportation Safety Planning
- Resiliency & Reliability Planning
- Intelligent Transportation Systems Planning
- Environmental & Air Quality Planning

- Transportation Improvement Program
- Administration & Internal Management

The Subregional and Technical Program portion of the UPWP include county staff activities and technical studies that are funded through SJTPO. Often, the activities and studies conducted by the counties contribute to reducing or preventing congestion in the region. Consultant-led technical studies may be conducted to evaluate strategies and provide recommendations. These studies can target individual intersections, corridors, or groups of corridors. Project development efforts conducted in the past have initiated projects in the City of Vineland, Atlantic County, Cape May County, and elsewhere in the SJTPO region. Consultants can bring outside expertise and new assessment methodologies, which are especially important when new or innovative strategies are being considered. Two related previous technical studies are detailed below.

- ***Regional Signal Timing Initiative:*** SJTPO recently completed a consultant-led technical study (FY 2018) for a regional signal timing initiative. Various county-jurisdiction signalized intersections throughout the SJTPO region were analyzed, with revised signal timings developed and implemented through the technical study. The revised timings are an enhancement, as they improve traffic flow and safety at the subject intersections.
- ***Program Support Data Collection:*** Within the last several work programs, SJTPO has programmed funds to allow for a consultant-led technical study whereby traffic counts can be conducted across the entire region. It should be noted that traffic counts are also collected as part of SJTPO's Subregional Work Program. The FY 2021 UPWP includes budget for the purchase of specialized cameras to collect vehicle, bicycle, and pedestrian volumes on county and municipal roadways of traffic cameras and/or bicycle/pedestrian counters. The purchase of the traffic data collection sensors was identified as a high priority by SJTPO's subregional partners.

SJTPO participates in the NJDOT Mobility and Congestion Relief Problem Statement Development Process Subcommittee. Congested locations on state highways are conveyed to NJDOT through this subcommittee for potential Problem Statements developed by the department. SJTPO previously submitted two Problem Statements to NJDOT, stated below, for review and consideration of congestion improvements. SJTPO will continue to work with its subregional partners and NJDOT's Mobility and Congestion Relief Problem Statement Development Process Subcommittee when selecting candidate congested locations for NJDOT problem statements. Candidate locations will be based on the PDA Suite Bottleneck Locations list and SJTPO's subregional partners local feedback and experience.

- ***Route 109 and Schellengers Landing Road*** – SJTPO has received feedback from NJDOT and is in the process of revising the problem statement and resubmitting for further analyzation.
- ***NJ 47 (Delsea Drive) and Sherman Avenue*** - NJDOT Bureau of Traffic Engineering performed a signal analysis and created new timing directives for 8 signals along the corridor (from High St to Sherman Ave). The new signal timing has been implemented.