Congestion Management Process

2022 Monitoring Report

Southwest Washington Regional Transportation Council

Congestion Management Process
2022 Monitoring Report

Clark County
Skamania County
Klickitat County
City of Vancouver
City of Camas
City of Washougal
City of Battle Ground
City of Ridgefield
City of La Center
Town of Yacolt
City of Stevenson
City of North Bonneville
City of White Salmon
City of Bingen
City of Goldendale
C-TRAN
Washington DOT
Port of Vancouver
Port of Camas-Washougal
Port of Ridgefield
Port of Skamania County
Port of Klickitat
Cowlitz Indian Tribe
Metro
Oregon DOT
14th Legislative District
17th Legislative District
18th Legislative District
20th Legislative District
49th Legislative District

Clark County, Washington

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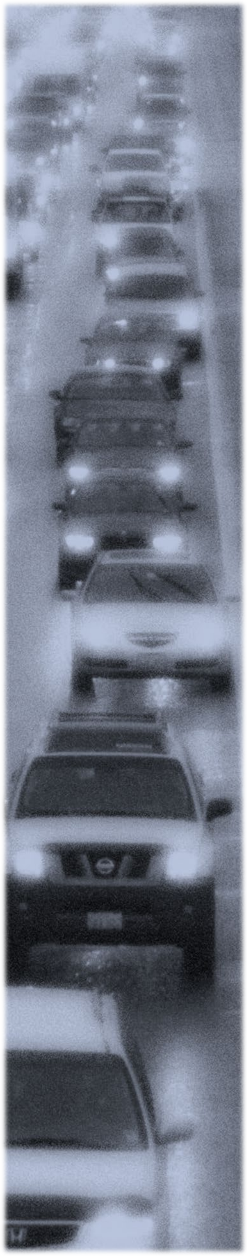


Congestion is defined as the level at which transportation system performance is no longer acceptable due to traffic interference resulting in decreased speeds and increased travel times. Traffic congestion is an inherent result of a healthy economic urban area. It is important to note that high traffic volumes that may result in congestion can also be a sign of growth and economic vitality. While it may be impossible to remove all congestion totally, congestion needs to be managed in order to provide a reliable transportation system for users.

The ability to increase highway capacity as a means to relieve congestion is limited by constrained financial resources, as well as by physical and natural environmental factors. Therefore, the prime consideration should be improvement to key bottlenecks and the operation and management of the transportation system.

The *Congestion Management Process: Monitoring Report* offers information to Southwest Washington Regional Transportation Council[1] (RTC) for implementing a Congestion Management Process (CMP). The CMP is a way to:

- monitor, measure, and diagnose the causes of congestion on the regional transportation system;
- evaluate and recommend strategies to manage regional congestion; and
- evaluate the performance of strategies put in practice to manage or improve congestion.

Background

The CMP is required to be developed and implemented as an integral part of the regional planning process in Transportation Management Areas, regions with more than 200,000 people.

Federal regulation 23 CFR 450.322(c)[2] identifies the required components of a CMP:

1. Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring congestion, identify and evaluate alternative strategies, provide

[1] *https://www.rtc.wa.gov/*
[2] *https://www.ecfr.gov/current/title-23/chapter-I/subchapter-E/part-450/subpart-C/section-450.322*

High traffic volumes that may result in congestion can also be a sign of growth and economic vitality.

information supporting the implementation of actions, and evaluate the effectiveness of implemented actions.

2. Definition of congestion management objectives and appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures should be tailored to the specific needs of the area and established cooperatively by the State(s), affect MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area.

3. Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area.

4. Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combination of strategies, are some examples of what should be appropriately considered for each area:

   (i) Demand management measures, including growth management and congestion pricing

   (ii) Traffic operational improvements

   (iii) Public transportation improvements

   (iv) ITS technologies as related to the regional ITS architecture, and

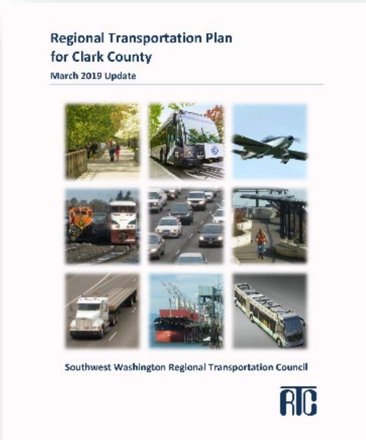
   (v) Where necessary, additional system capacity

5. Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation.

6. Implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures. The results of this evaluation shall be provided to decision makers and the public to provide guidance on selection of effective strategies for future implementation.

Overall Process

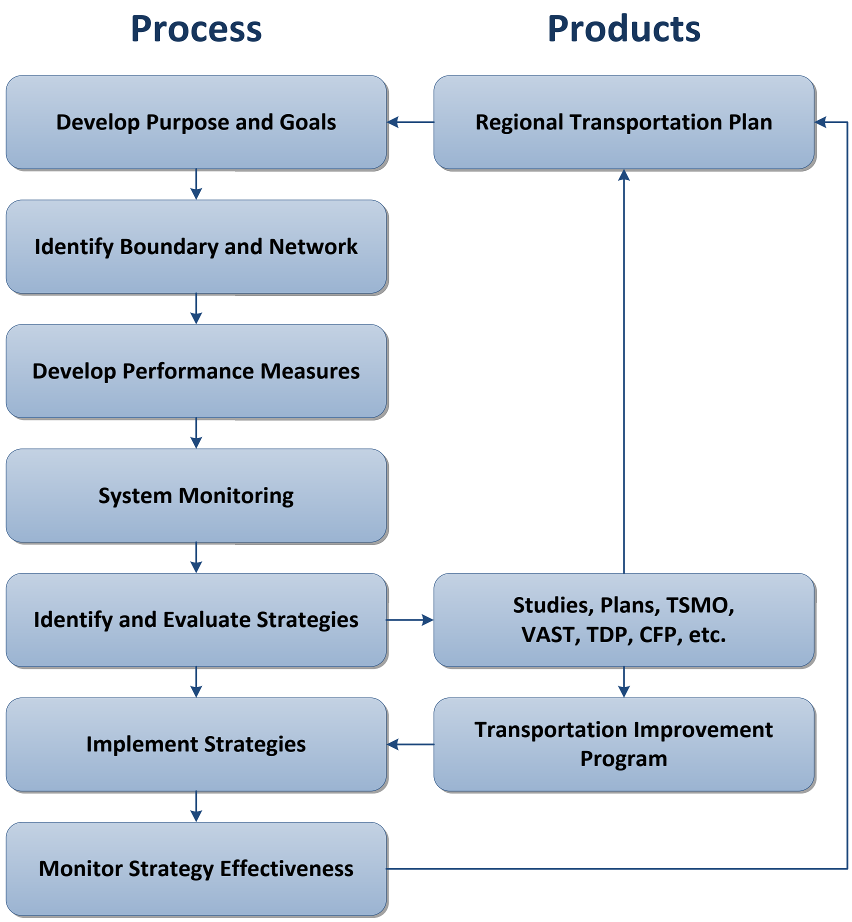
The overall Congestion Management Process used by Southwest Washington Regional Transportation Council incorporates the following steps:



- Develop purpose, goals and objectives
- Identify boundary and network
- Develop performance measures
- Monitor system performance
- Identify and evaluate strategies
- Implement strategies
- Monitor strategy effectiveness

The integration of the Congestion Management Process into the overall MPO planning process is displayed in the following figure.

Figure 1: Congestion Management Process and Products



The process begins with the development of purpose, goals, and objectives that will be used to guide the overall Congestion Management Process. These purpose, goals, and objectives support those contained in the Regional Transportation Plan[3]. The

[3] *https://www.rtc.wa.gov/programs/rtp/clark*

boundary and network are identified to focus efforts on the regionally significant corridors. Performance measures are developed to help ensure that the program is achieving the desired goals. System Monitoring is performed to measure system performance. System monitoring is then used to identify system deficiencies. Identified system deficiencies are utilized to identify potential strategies.

Strategies are further analyzed through regional and local studies, plans, and programs. Strategies are then incorporated into the Regional Transportation Plan. Projects and strategies identified through the Congestion Management Process and contained in the Regional Transportation Plan are then programmed and implemented through the Transportation Improvement Program[4] based on selection criteria and funding allowances. The overall Transportation Improvement Program selection criteria prioritize projects and programs identified through the Congestion Management Process. As part of the annual Congestion Management Process, the congestion trends and effectiveness of implemented projects are analyzed based on performance measures.

Purpose, Goals and Objectives

The purpose of the CMP is to establish a process that provides for effective management and operation of the transportation system in congestion management corridors to provide travel reliability.

Transportation projects and strategies identified in the CMP should meet the goals for the region's long-range transportation planning process as listed in the Regional Transportation Plan (RTP) for Clark County. These RTP goals include:

Economy
Support economic development and community vitality.

Safety and Security
Ensure safety and security of the Transportation System.

Accessibility and Mobility
Provide reliable mobility for personal travel and freight movement, as well as access to locations throughout the region and integrity of neighborhoods, accomplished through development of an efficient, balanced, multi-modal regional transportation system.

[4] *https://www.rtc.wa.gov/programs/tip/*

Management and Operations

Maximize efficient management and operations of the transportation system through transportation demand management and transportation system management strategies.

Environmental

Protect environmental quality and natural resources and promote energy efficiency.

Vision and Values

Ensure the RTP reflects community values to help build and sustain a healthy, livable, and prosperous community.

Finance

Provide a financially viable and sustainable transportation system.

Preservation

Maintain and preserve the regional transportation system to ensure system investments are protected.

The following objectives were used to guide the development of RTC's Congestion Management Process:

- Focus upon congestion
- Emphasize regional travel perspective
- Support the local and regional transportation decision-making process
- Increase public awareness of congestion issues and tradeoffs

Development type, density, and location influence regional travel patterns; and transportation access influences land use and development.

Congestion Management Boundary and Network

Congestion Management Network

The boundary of the Vancouver/Clark County Congestion Management System includes the major interregional corridors and major arterial corridors connecting cities to the base congestion management network: I-5, SR 14, SR 501, SR 502, SR 503, and La Center Road. Congestion management corridors connect Battle Ground, Ridgefield, and La Center to Vancouver and the CMP's base network.

The first step in defining the congestion management network was to identify a set of candidate facilities and corridors. Only regionally significant corridors were considered as candidates for the network. Regionally significant corridors were defined as facilities that are part of the Regional Transportation System as identified in the Regional Transportation Plan (RTP).

The initial congestion management network was refined from the list of candidate corridors. Using federal guidelines to include facilities with "existing or potential recurring congestion," professional judgment was used to identify corridors with existing congestion and those likely to become congested.

The scope of the congestion management network includes 31 regionally significant transportation corridors within the Clark County, Washington region as listed in Table 2 (page 12) and illustrated on Map 1 (page 13).

Corridor Concept

An important step in defining the congestion management network is to define the basic unit for describing the network and performing analyses. For the Vancouver/Clark County congestion management network, transportation corridors were selected as the congestion management unit.

The congestion management corridors can be made up of more than one transportation facility. A single corridor can include multiple roadways where there are parallel facilities that serve the same travel shed. Data is reported for individual roadways even if they are grouped into one congestion management corridor. The endpoints for each corridor represent locations where the characteristics of the corridor change significantly.

Individual corridors, where appropriate, are made up of more than one facility.

Each roadway within a corridor is further divided into a series of segments. A segment is the portion of roadway between major intersections or interchanges. To allow for consistent operational analysis, corridor segments were developed such that the capacity and number of lanes remain the same within each segment.

Land Use

Land use and transportation are interrelated, in that land use and travel interact with each other. The type of development, the density, and its location in the urban landscape influence travel patterns. On the other hand, the level of access to and from the transportation facility to the adjacent land use can affect the development patterns.

In order to better understand RTC's regional Congestion Management Network, it is important to have some understanding of the land use surrounding the congestion management corridors. Map 2 (page 14) illustrates the Congestion Management Corridors and a generalized map of the comprehensive land use within the region.

For the purpose of travel demand modeling, future forecasts of population and employment resulting from the comprehensive land use plan have been developed. Table 1 illustrates the 2016 population and employment for Clark County, along with the 2040 forecast that has been adopted for use in the long-range Regional Transportation Plan.

Table 1: Population and Employment

	2016	2040
Population	461,010	600,361
Employment	155,000	241,499

Multimodal

In addition to the road network it is important not to overlook modes such as walking, bicycling, and transit and to the degree that they can be improved to help mitigate congestion.

The Clark County Bicycle and Pedestrian Master Plan[5] provides a 20-year vision and implementation strategy for active modes. The C-TRAN website[6] provides information on the 2022-2027 Transit Development Plan[7] and 20-year future plan[8] for the regional transit system.

The CMP supports bicycle, pedestrian, and transit systems along and adjacent to the CMP network.

Transit Service

The region's Public Transportation Benefit Authority (C-TRAN) provides transit services within Clark County and to Portland, Oregon. C-TRAN also provides connections with neighboring transit service providers in Portland, Oregon, Skamania County, and Cowlitz County. Map 3 (page 8) illustrates fixed bus routes

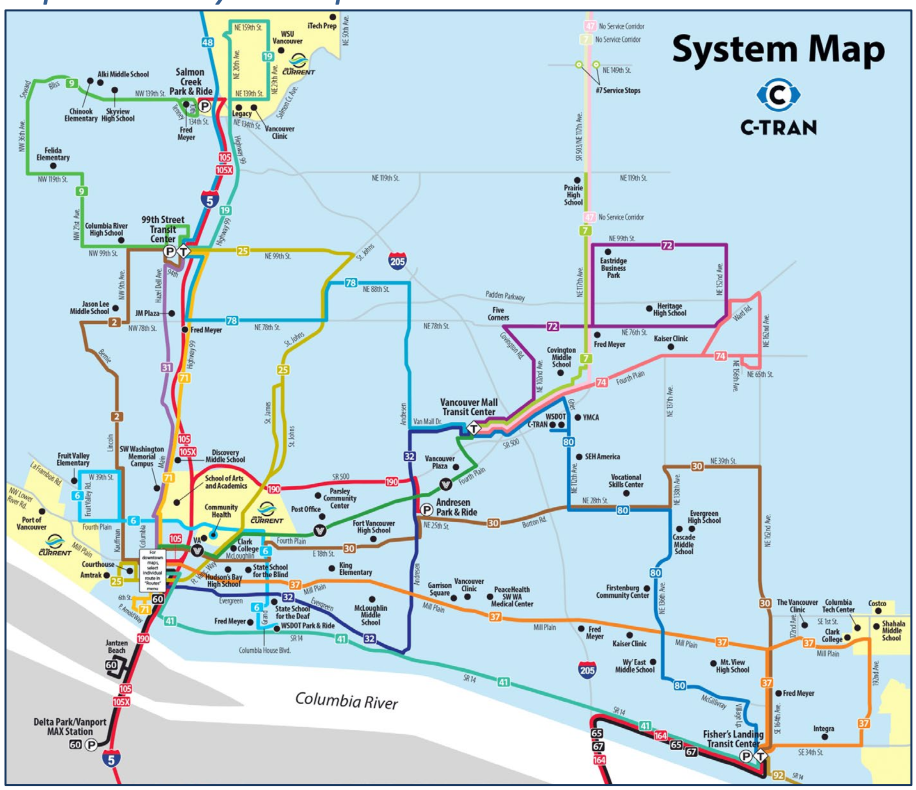
[5] *https://clark.wa.gov/community-planning/documents-and-maps*
[6] *https://www.c-tran.com/*
[7] *https://www.c-tran.com/images/Reports/C-TRAN_2022-2027_Transit_Development_Plan.pdf*
[8] *https://www.c-tran.com/about-c-tran/reports/c-tran-2030*

The regional travel model estimates approximately 47% of households and 68% of employment are within one-fourth mile of PM peak period fixed route transit service.

within Clark County. In addition to fixed route service, C-TRAN provides service to their fixed route system from the cities of Camas, La Center, and Ridgefield with *The Current*. The regional travel model estimates approximately 48% of the households and 72% of employment are currently within walking distance of transit. By 2040 those within walking distance to transit will decline to 41% of the households and 56% of employment.

C-TRAN also provides paratransit service for those unable to ride C-TRAN's fixed bus service, through their C-VAN service.

Map 1: C-TRAN System Map



Relationship to Regional Plans

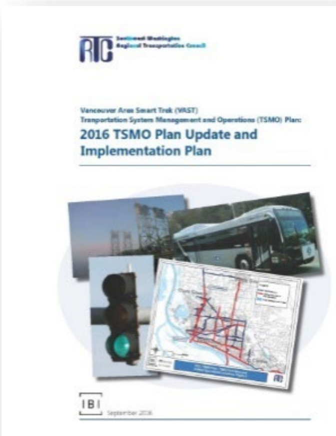
The CMP is one of the federally required components of the regional transportation planning process. It is integrated with the Regional Transportation Plan (RTP), the Transportation Improvement Program (TIP), and other regional plans and processes. For example, a TIP selection criterion rewards projects for consistency with the CMP.

Preservation and Maintenance

One of the region's goals is to ensure that sufficient money is available to preserve and maintain the transportation system that the region has already built. Agencies and jurisdictions have set standards for preserving and maintaining their existing transportation system. As the transportation system ages, preservation and maintenance costs are likely to take up a greater percentage of available transportation revenues.

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) programs focus on reducing travel demand, particularly at peak commute hours. TDM strategies can make more efficient use of the current roadway system and can reduce vehicle trips. It is important for the region to support Transportation Demand Management strategies that help the region make the best use of the existing road system.

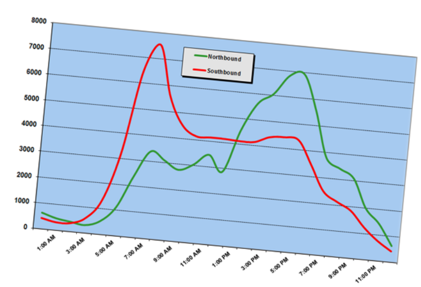


Transportation Systems Management and Operations (TSMO)

The focus of RTC's Transportation Systems Management and Operations program is on low-cost, quickly implemented transportation improvements that aim to optimize the existing transportation network. Examples include low-cost technology-based strategies and physical improvements that improve operation of the transportation system. It is important for the region to support Transportation Systems Management and Operations that enhance the existing transportation system. RTC has an adopted Regional Transportation Systems Management and Operations Plan.

Performance Measures

Performance measures are used to determine the degree of success that a project or program has had in achieving its stated goals. In other words, performance measures are a way to track progress. Performance measures are used to track the region's progress in reducing and managing congestion. For the purpose of this report, both systemwide and peak period performance measures are utilized.



There are a number of performance measures that the region would like to use or expand, but there are limitations due to current availability of data. The following section identifies the data elements that are collected and analyzed. Chapter II includes the measurement of these performance measures.

We use performance measures to track the region's progress in reducing and managing congestion.

Data Elements

Data is collected on the following elements: traffic counts, travel time, automobile occupancy, and transit. In addition, RTC compiles and collects other measures of system performance, such as highest volume intersections, Columbia River bridge volumes, and park and ride usage.

The collected data serves as the basis for developing performance measures. Performance measures in the Congestion Management Process are categorized according to the region's overall transportation goals. It is also important to note that performance measures are collected and analyzed under the Regional Transportation Plan, Transportation Improvement Program, and other regional programs.

Performance Measures

Economy

- Truck Percentage
- Vehicle Volumes
- Columbia River Traffic Volumes

Safety and Security

- Collision Factors

Accessibility and Mobility

- Population Compared to Transit
- Employment and Population within 1/3 mile of Transit
- Transit Routes and Peak Headways

Management and Operations

- Volume-to-Capacity Ratio
- Average Speed
- Speed vs. Posted Speed
- Vehicle Occupancy Rates
- Busiest Intersections

Vision and Values

- Comprehensive Land Use
- County Bicycle and Pedestrian Plan

Finance

- None. Covered in RTP and TIP

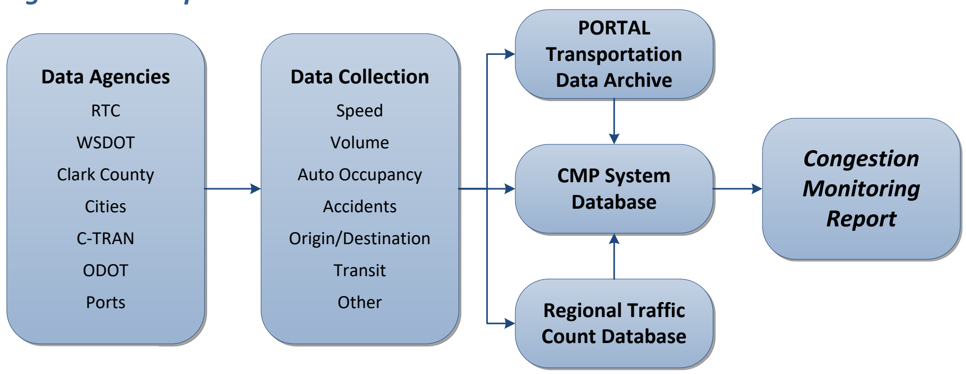
Preservation

- None. CMP supports preservation as a primary strategy

Data Collection

RTC is the lead agency for the collection of traffic congestion data. Some of the data is regularly collected by other transportation agencies within the Clark County region. RTC organizes a process for collecting all of the data. The flow for the collection of transportation data is illustrated in Figure 2.

Figure 2: Transportation Data Flow



Intelligent Transportation Systems (ITS) technology is automating the collection of data. In addition, the region has initiated a transportation data archive system called PORTAL to enhance data availability, ease its retrieval, and assist with the analysis of transportation data to support performance monitoring.

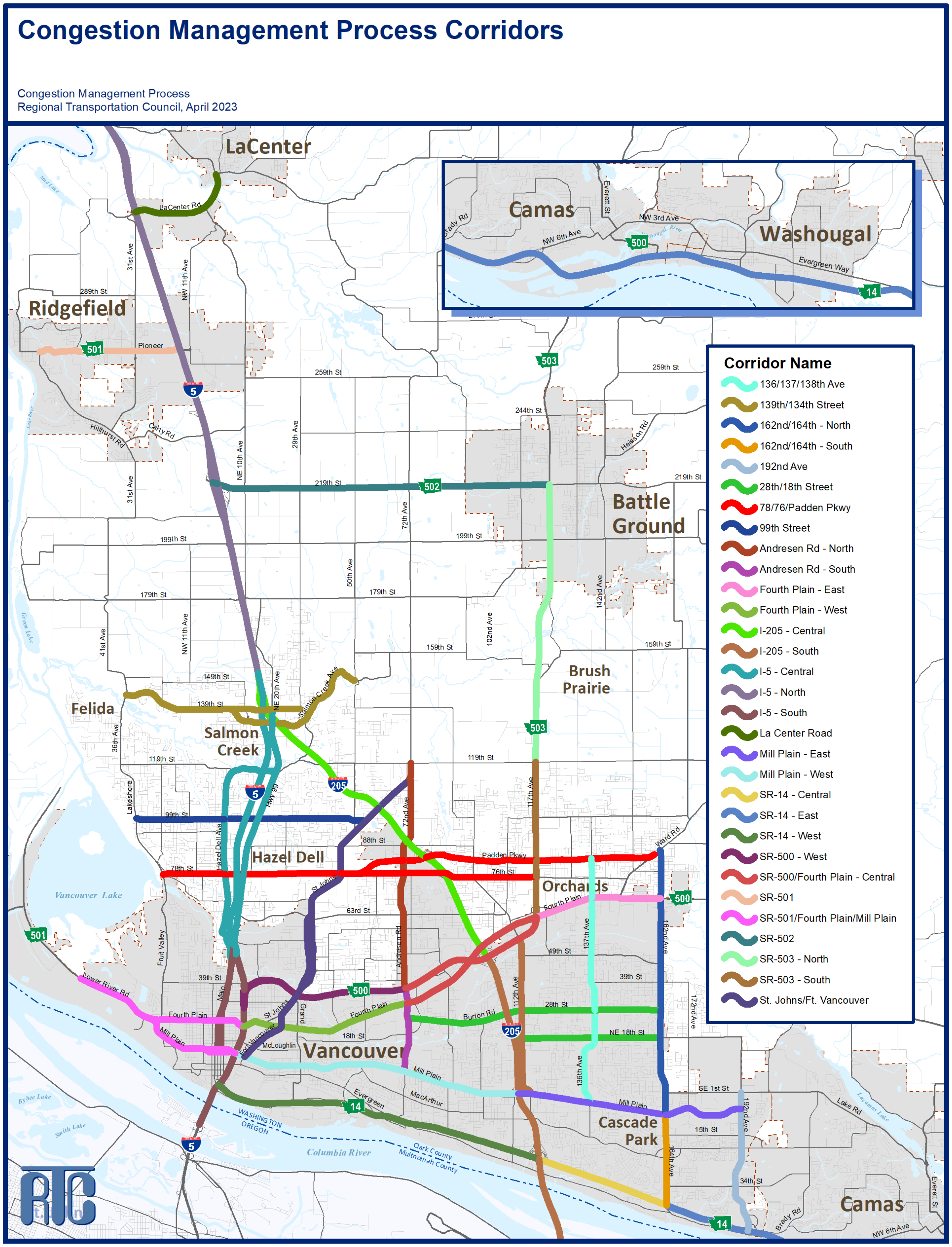
Data Analysis and System Performance

Transportation data is analyzed and validated for use in the Congestion Management Process. The collected data is then applied to develop system performance measures for the transportation corridors. System performance data is then illustrated through text, tables, and maps. The system performance data and maps are then used to identify system deficiencies and needs.

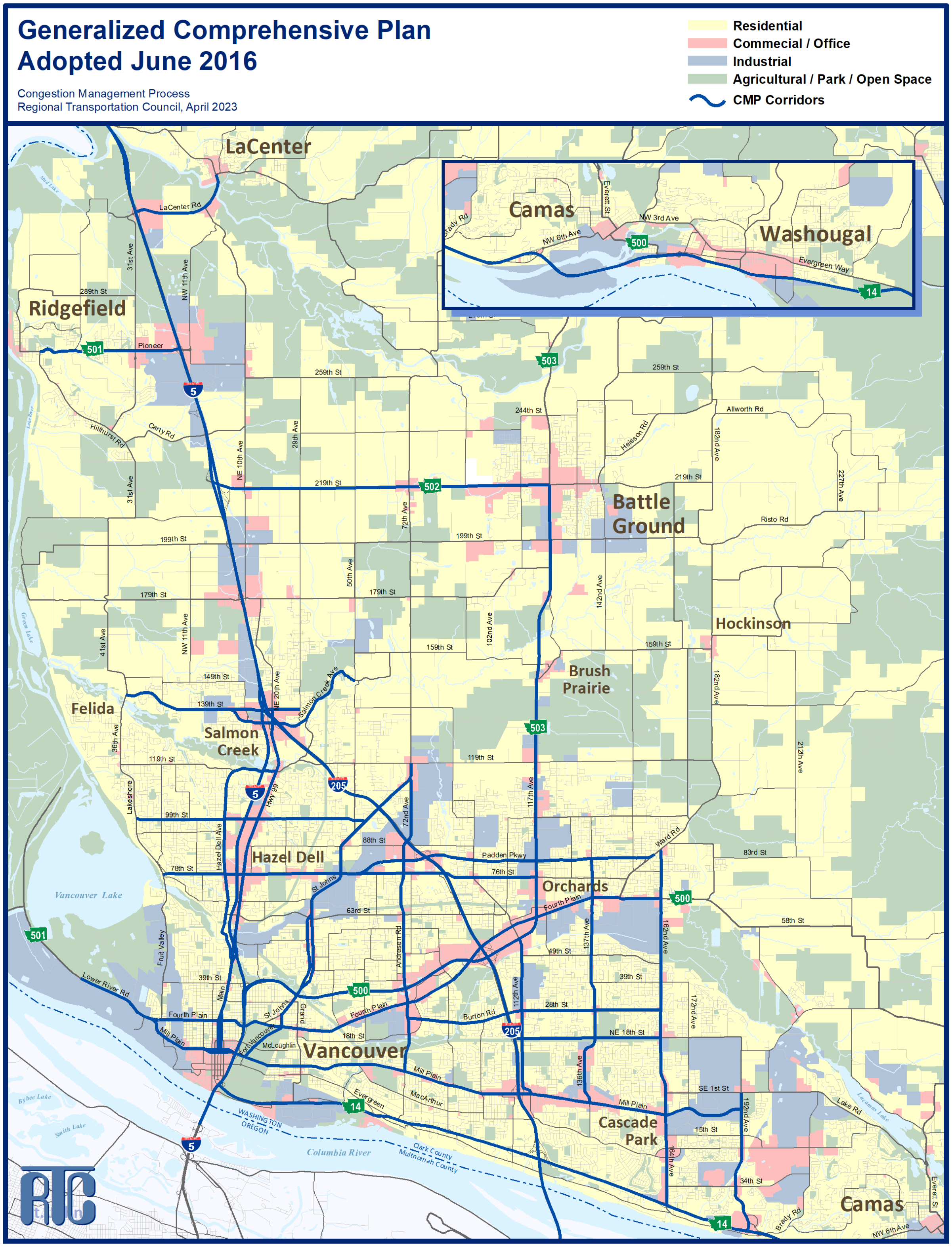
Table 2: Corridors in the Congestion Management Network

Corridor Name	Facilities	Endpoints	
I-5 North	I-5	County Line	I-205 Junction
I-5 Central	I-5, Highway 99, Hazel Dell Avenue	I-205 Junction	Main Street
I-5 South	I-5, Main Street	Main Street Interchange	Jantzen Beach
I-205 Central	I-205	I-5 Junction	SR 500
I-205 South	I-205, 112th Avenue	SR 500	Airport Way
Saint Johns	Saint Johns Road, Saint James Road, Fort Vancouver Way	NE 72nd Avenue	Mill Plain Boulevard
Andresen North	Andresen Road / NE 72nd Avenue.	119th Street	SR 500
Andresen South	Andresen Road	SR 500	Mill Plain Boulevard
SR 503 North	SR 503	SR 502	119th Street
SR 503 South	SR 503	119th Street	Fourth Plain, SR 500
137th Avenue	136th, 137th, 138th Aves.	Padden Parkway	Mill Plain Boulevard
162nd Avenue North	162nd, 164th Avenues	Ward Road	Mill Plain Boulevard
164th Avenue South	164th Avenue	Mill Plain Boulevard	SR 14
192nd Avenue	192nd Avenue	SE 1st Street	SR 14
SR 14 West	SR 14	I-5	I-205
SR 14 Central	SR 14	I-205	164th Avenue
SR 14 East	SR 14	164th Avenue	Evergreen Highway
SR 501, Fourth Plain	SR 501, Mill Plain, Fourth Plain	I-5	NW 26th Street
Mill Plain West	Mill Plain Boulevard	I-5	I-205
Mill Plain East	Mill Plain Boulevard	I-205	192nd Avenue
Fourth Plain West	Fourth Plain	I-5	Andresen Road
SR 500 West	SR 500	I-5	Andresen Road
Fourth Plain, SR 500 Central	SR 500, Fourth Plain	Andresen Road	SR 503
Fourth Plain East	Fourth Plain	SR 503	162nd Avenue
78th Street, Padden Parkway	78th Street, 76th Street, Padden Parkway	Lakeshore Avenue	Ward Road
99th Street	99th Street	Lakeshore Avenue	Saint Johns Boulevard
28th Street, 18th Street	28th Street, Burton Road, 18th Street	Andresen Road	164th Avenue
134thStreet, 139th Street	134th Street, 139th Street, Salmon Creek Avenue	NW 36th Avenue	WSU Entrance
SR 502	SR 502	I-5	SR 503
SR 501	SR 501	I-5	9th Street *(Ridgefield)*
La Center Road	La Center Road	I-5	East Fork Lewis River

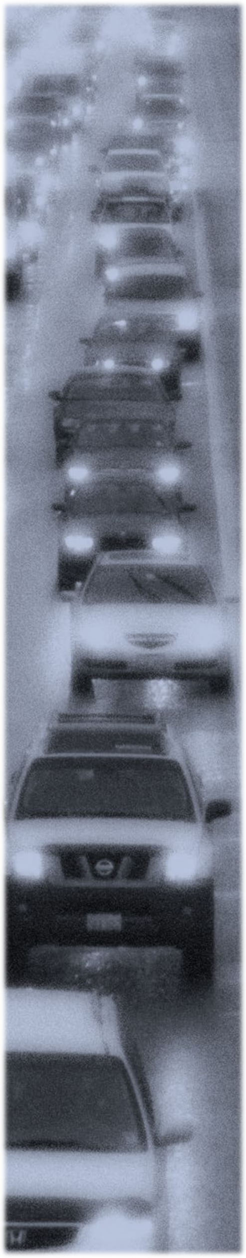
Map 2: Congestion Management Network



Map 3: Land Use



Chapter 2: System Monitoring



Chapter 2 contains a narrative and visual display of the system performance measures contained in the Congestion Management Process.

System monitoring is described in two sections. The first, **System Performance Measures**, consists of data compiled for measuring system performance at the corridor level. It is comprised of data that supports the analysis of the Congestion Management System. The second, **Areas of Concern**, uses shorter segment transportation data, with supporting data[9] provided online, to identify specific segments with congestion concerns related to volume-to-capacity ratio and speed.

There are many causes of traffic congestion, including bottlenecks, traffic incidents, bad weather, construction, poor signal timing. The source of congestion can vary from one corridor to another, such that the strategies to improve capacity must be tailored to each corridor.

This report measures and quantifies average weekday morning and evening peak period "congestion" consistently across the congestion management corridors, through the use of performance measures.

System Performance Measures

Volumes: Vehicle Volumes

AM and PM peak-hour vehicle volumes were compiled from the regional traffic count database[10] and the regional transportation data archive, PORTAL[11], housed by Portland State University. Volumes represent traffic counts within each corridor and provide a good comparison of the relative difference in travel demand among the congestion management corridors.

Peak-hour traffic volumes for the congestion management corridors are delineated by four volume range categories. These categories are intended to provide a regional picture of travel flows for the Clark County region.

PM peak-hour trends are similar to AM peak-hour trends, although most congestion management corridors carry higher volumes during the PM peak.

Map 4 (page 28): During the PM peak, I-5, I-205 and SR 14 display volumes greater than 3,000 vehicles per hour. Within the region, facilities carrying more than 1,500 vehicles in the PM peak hour include segments of SR 14, SR 500, SR 503, Mill Plain,

[9] *https://www.rtc.wa.gov/programss/cmp/*
[10] *https://www.rtc.wa.gov/data/traffic/*
[11] *https://trec.pdx.edu/content/portal-transportation-data-archive-portland-vancouver*

Fourth Plain, Padden Parkway, 134th Street, Andresen Road, and 162nd/164th Avenue.

AM and PM peak-hour vehicle volumes were compiled from the regional traffic count database.

Volumes: Highest Volume Intersections

Table 3 displays the highest volume intersections in 2022 based on the total number of vehicles entering an intersection on an average weekday. At-grade intersections along some of the busiest arterials of Mill Plain, Fourth Plain, Padden Parkway, and SR 503 dominate the list.

Table 3: Highest Volume Intersections

Rank	East/West	North/South	Volume
1	Fourth Plain	SR 500/SR 503	68,000
2	Padden Parkway	SR 503	61,000
3	Mill Plain Blvd.	Chkalov Drive	58,000
4	Padden Parkway	Andresen Road	57,000
5	Mill Plain Blvd.	NE 136th Avenue	56,000
6	Fourth Plain	Andresen Road	51,000
7	Mill Plain Blvd.	SE 164th Avenue	50,000
8	Mill Plain Blvd.	NE 120th Avenue	50,000
9	SR 502	SR 503	48,000
10	NE 78th Street	Highway 99	39,000

The Interstate Bridge reached capacity during peak hours in the early 1990s.

Volumes: Columbia River Bridge Volumes

The Interstate Bridge (I-5) carried approximately 33,500 vehicles a day in 1961. Volumes had increased to over 108,000 vehicles a day by 1980. With the opening of the Glenn Jackson Bridge (I-205) in late 1982, total Columbia River crossings had increased to 144,000 vehicles a day by 1985. Glenn Jackson Bridge traffic volumes began to exceed Interstate Bridge traffic volumes on a daily basis in 1999. Total bridge crossings have declined twice since 1961, in 1974 (oil embargo) and 2006-2008 (Great Recession). The Glenn Jackson Bridge had its first vehicle volume decline ever in 2008. Currently total Columbia River crossing are averaging over 300,000 vehicles a day. Table 4 shows the historical growth in Columbia River bridge crossings since 1980.

Both Columbia River bridges are suffering daily congestion during morning and evening peak periods. The Interstate Bridge had reached capacity during peak hours in the early 1990s, and the Glenn Jackson Bridge, in the mid 2000s. With both Columbia River bridges at capacity in the peak periods, peak spreading has occurred. Peak spreading leads to a flattening and longer peak period as trips shift to times immediately before and after the peak demand. The impact of this type of congestion means that the peak period can last three or more hours.

During the COVID-19 pandemic of 2020, traffic volumes on both Columbia River bridges dropped about 17% over 2019 volumes. In 2022 average daily river crossing volumes are still about 3.7% lower than prepandemic volumes.

Table 4: Average Weekday Traffic across the Columbia River

Year	I-5	I-205	Total
1980	108,600	N/A	108,600
1990	95,400	87,100	182,500
2000	126,900	132,100	259,000
2010	126,700	145,500	272,200
2020	120,400	140,200	260,600
2022	135,400	158,000	293,400

Capacity: Corridor Capacity Ratio

The corridor capacity ratio is an aggregation of the volume/capacity ratios for the individual general purpose segments that make up a facility within a corridor. The corridor capacity ratio is calculated for both the AM and PM peak hours and for the peak directions of travel within a corridor. For each segment in a corridor, the volume/capacity ratio, vehicle miles traveled, and vehicle miles traveled weighted by volume/capacity ratio (the product of the volume/capacity ratio and vehicle miles traveled) for the peak hour are calculated. The corridor capacity ratio is the sum of the weighted link ratios.

The corridor capacity ratio is an indicator of congestion. The higher the ratio, the more traffic congestion a driver is likely to experience. A corridor with capacity ratio above 0.90 is very congested, and a corridor capacity ratio between 0.80 and 0.89 will feel congested.

The highest volume to capacity ratio corridors includes the following:

Slow corridor travel speed can be an indicator of delay and congestion.

1. I-5: Main Street to Jantzen Beach(AM) – >1.00
2. Main Street, Ross St. to Mill Plain (AM) – 0.93
3. SR 14, I-205 to 164th Av. (PM) – 0.89
4. I-205, SR 500 to Padden (PM) – 0.84
5. I-205, Padden to SR 500 (AM) – 0.81
6. I-5: Jantzen Beach to Main Street (PM) – 0.81
7. SR 503, Fourth Plain to NE 119th St. (PM) – 0.79

Map 5 (page 24): Much of the AM period congestion can be attributed to the demand for crossing the two interstate bridges into Oregon. The AM periods show congestion along major facilities such as I-5 South, Main Street, I-205 Central, and SR 14 Central.

Map 6 (page 25): In the PM period, the worst congestion is shown along the same corridors as the AM congested corridors. In the PM period the I-5 and I-205 Columbia River bridges limit vehicle flow from Oregon, which benefits the congestion levels on the Washington side of the Columbia River.

Map 7 (page 26): In addition to existing corridor capacity ratio, the 2040 PM corridor capacity ratio was calculated using the regional travel forecasting model. The 2040 model shows that the full funding of planned transportation improvements positively impacts future corridor capacity.

Speed: Auto Travel Speed

2022 travel time data for the congestion management corridors is sourced from TomTom Traffics Stats, a big-data provider of speed data gathered from GPS and in-vehicle navigation systems. This new dataset provides thousands of observations from probe vehicles for every hour of the day. This robust dataset has replaced RTC's floating car method for collecting travel times. Travel speed is computed from the median travel time data for each corridor for Tuesdays, Wednesdays, and Thursdays in October. It consists of utilizing the median travel time and distance to calculate the median travel speed in the peak period for through movements.

Slow corridor travel speed can be an indicator of delay and congestion. Better progression and coordination between signals will improve overall travel time, reliability, and safety. The lowest speed corridors include:

1. Main Street, I-5 to Mill Plain (AM)– 25 mph
2. Fourth Plain, I-5 to NW 26th Av. (PM) – 25 mph
3. NE 139th St., NW 36th Ave. to NE 29th Ave (AM) – 25 mph
4. Main Street, I-5 to Mill Plain (PM)– 26 mph
5. Mill Plain, I-5 to Fourth Plain (AM) – 27 mph

6. SR 500, Andresen to I-5 (AM) – 27 mph
7. NE 136th Av., Mill Plain to Padden (PM) – 27 mph
8. NE 164th Av., SR 14 to Mill Plain (PM) – 27 mph

Map 8 & 9 (pages 28-29): Corridor travel speeds have improved since the start of the COVID-19 pandemic and continue to be 25 mph or better in every congestion management corridor in both the AM and PM. Active transportation management projects deployed in the I-5 and I-205 corridors in 2020 have benefited travel times for both Columbia River bridge appraoches in the AM.

Speed: Speed as Percent of Speed Limit

Median travel speed was converted to a percent of posted speed limit for each of the congestion management corridors. This was intended to provide another measure of the delay along the corridor.

As development occurs along the corridors, travel speed often decreases because of congestion, multiple driveways, and additional traffic signals. One of the difficulties is in balancing access to land uses and maintaining the throughput travel speed.

The speed percentages for the freeway facilities are generally between 95% and 105% of the posted speed limit, while facilities with multiple signalized intersections and driveways are generally between 60% and 80% of the posted speed limit. When speeds drop below 50% of the posted speed limit, it is an indication of congestion or poor traffic management. The lowest speed percentage or worst performing corridors compared to posted speed limit include:

1. SR 500, Andresen Rd. to I-5 (AM) – 49%
2. SR 14, I-205 to I-5 (AM) – 53.9%
3. I-5, Main St. to Jantzen Beach (AM) – 62.7%
4. NE 164th Av., SR 14 to Mill Plain (PM) – 66.9%
5. SR 501/Pioneer St., I-5 to S 9th Av. (PM) – 67.4%

Map 10 (page 30): In the AM period, SR 500 West (49%) and SR 14 West (53%) operate significantly below the posted speed as flows to I-5 southbound are metered to provide greater reliability and safety to I-5 South. I-5 South speeds have increased from 20% of the posted speed in 2019 to over 60% of the posted speed in 2022.

Map 11 (page 31): In the PM period, 164th Avenue and SR 501/Pioneer St. operate at 67% below the posted speed limit.

Occupancy: Vehicle Occupancy

Average automobile occupancy is calculated by observing passenger cars at a given location and the number of people in each vehicle. The number of people divided by the number of passenger cars is the average automobile occupancy for that location. Trucks, buses, and other commercial vehicles are excluded from average automobile occupancy. Data is collected for the AM and PM time periods.

Table 5: Average Automobile Occupancy by Time of Day

Facility Type	AM	PM
Freeway *	1.11	1.17
Arterial	1.12	1.25

* *Freeway includes I-5, I-205, SR 14, and SR 500*

The AM time period displays a lower average automobile occupancy, with the AM average automobile occupancy at 1.11 persons per vehicle. The PM average automobile occupancy rate is approximately 1.21 persons per vehicle.

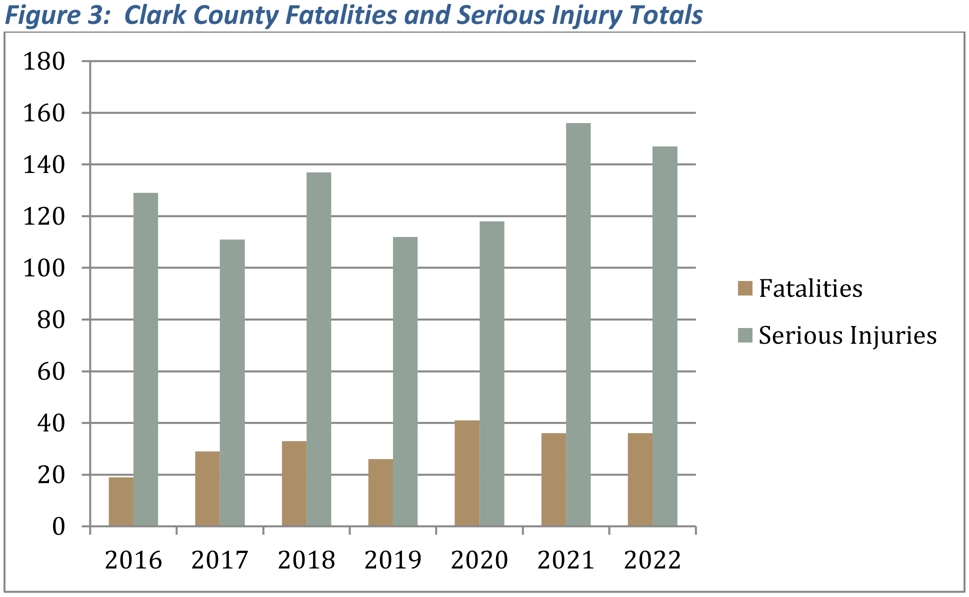
It may be that the AM peak period is more of a traditional commute time, while the PM peak period likely has a greater percentage of discretionary trips, such as shopping where drive-alone trips are less prominent.

Safety: Collisions

Safety for all modes of travel is an important component of the regional transportation planning process. Congestion often occurs as a result of collisions or other incidents that temporarily reduce a road's capacity. As such, the region has adopted MAP-21 Safety Targets. RTC has agreed to plan and program projects so that our region contributes towards the accomplishment of Washington State's Strategic Highway Safety Plan: Target Zero.

Over the last few years, the trend for serious injuries has been increasing, with fatalities hovering near 40 per year.

Figure 3: Clark County Fatalities and Serious Injury Totals



Clark County traffic safety priorities are set based upon the most frequently cited contributing factors for fatalities between years 2020-2022. Speed, young drivers, and running off the road are the most common collision factors associated with fatalities. Young drivers and running off the road are also the most common factors in serious injuries as well. Table 6 lists the statewide priority factors with Clark County numbers:

Table 6: Clark County Priority Collision Factors

Collision Factors	Total Fatalities	Percent	Total Serious Injuries	Percent
Speeding	38	33.63%	109	25.89%
Young Driver 16-25	37	32.74%	168	39.90%
Run off the Road	37	32.74%	143	33.97%
Intersection Related	28	24.78%	130	30.88%
Impaired Driver	23	20.35%	90	21.38%
Distracted Driver	24	21.24%	78	18.53%

Trucks: Truck Percentage

Traffic counts are collected at several locations where vehicles are classified according to the number of axles. This provides a measure of trucks as a percentage of all vehicles traveling on the roadway. Trucks are defined as vehicles with more than two axles, such as typical tractor trailer rigs, traveling on the roadway during the peak period. It is important to note that trucks often travel outside of peak periods to avoid congestion.

Map 12 (page 32): Overall, I-5 North and Mill Plain west of I-5 display the highest percentage of truck volumes during the PM peak period, with truck percentages greater than 8 percent.

In the AM period, the percentage of trucks is generally higher, with Mill Plain and Fourth Plain west of I-5 averaging around 15% trucks during the morning commute, while St. Johns Road averages 10% trucks.

The State Freight and Goods Transportation System classify roadways according to the annual gross freight tonnage they carry. This system designates I-5, I-205, and portions of SR 14 as the highest tonnage facilities T1- (more than 10 million tons). Many of the principal arterials and other state highways are designated as T2 facilities, which carry 4 to 10 million tons.

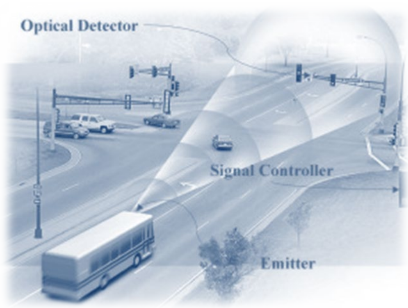
Transit: Corridor Routes and Headways

Table 7 lists C-TRAN routes operating in each congestion management corridor, as well as the AM and PM peak frequencies for each route. Local bus routes are denoted by two-digit routes and commuter routes with three digits. C-TRAN's Bus Rapid Transit (BRT) service is called *The Vine*, and *The Current* is an on-demand rideshare service that provides point-to-point service within defined areas (see Map 3 on page 8).

Table 7: 2022 C-TRAN Routes and Frequencies – North/South Corridors

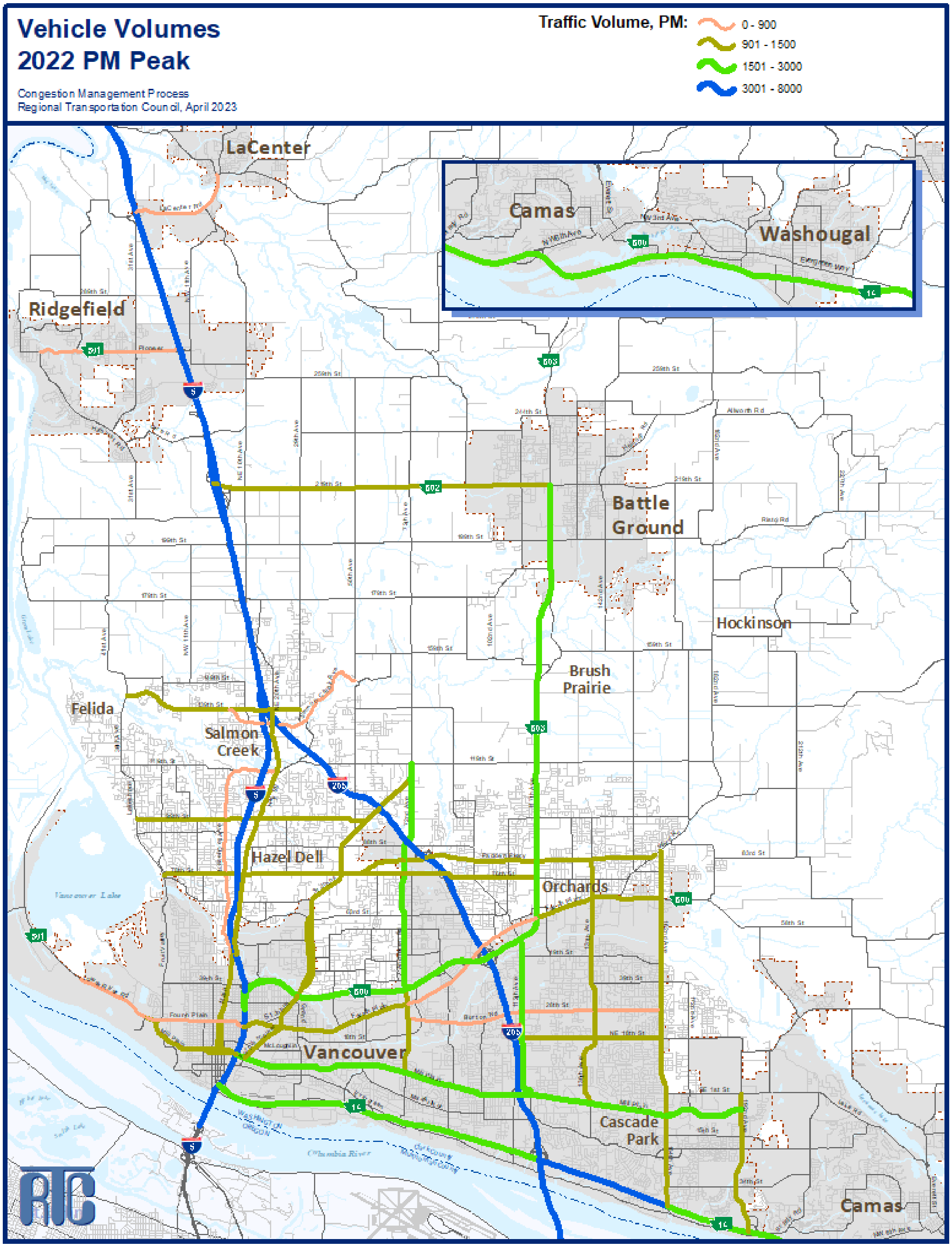
Corridor Name	C-TRAN Routes (frequencies)
I-5 North	48 (1 hour), The Current
I-5 Central	105 (20 min.)
Highway 99	19 (30 min.), 71 (15 min.)
Hazel Dell Ave	31 (30 min)
I-5 South	105 (20 min.), 190 (15 min), 60 (15 min.)
Main Street	31 (30 min), 71 (30 min.)
I-205 Central	none
I-205 South	65 (15 min), 67 (15 min.) 164 (15 min.)
NE 112th Avenue	80 (30 min.)
Saint Johns	25 (30 min.)
Andresen North	78 (30 min.)
Andresen South	32 (30 min.)
SR 503 North	47 (once AM and once PM)
SR 503 South	47 (once AM and once PM), 7 (30 min.)
137th Avenue	80 (30 min.)
162nd Avenue North	30 (30 min.)
164th Avenue South	30 (30 min.), 37 (30 min.)
192nd Avenue	37 (30 min.)
SR 14 West	41 (twice AM and twice PM)
SR 14 Central	41 (twice AM and twice PM), 65 (15 min.), 64 (30 min.) 164 (20 min.)
SR 14 East	92 (30 min.)
SR 501, Fourth Plain	6 (30 min.)
Mill Plain/SR 501	2 (1 hour), 25 (30 min.), 37 (30 min.), 105 (20 min.)
Mill Plain West	37 (15 min.)
Mill Plain East	37 (15 min.)
Fourth Plain West	6 (30 min.)
SR 500 West	190 (15 min.)
Fourth Plain Central	Vine (15 min.), 7 (30 min.), 72 (30 min.), 74 (1 hour), 80 (30min.)
SR 500 East	none
Fourth Plain East	74 (1 hour)
78th Street	2 (1 hour), 72 (30 min.), 78 (30 min.)
Padden Parkway	none
99th Street	2 (1 hour), 9 (1 hour), 25 (30 min.)
18th Street	none
28th Street	30 (30 min.), 80 (30 min.)
134th Street	none
139th Street	9 (1 hour)
SR 502	none
SR 501	The Current
La Center Road	The Current

In 2017 C-TRAN, in coordination with WSDOT, implemented bus-on-shoulder operations on SR 14 between NE 164th Av. and I-205 in both directions. This allows C-TRAN buses to operate on the shoulders of SR 14 when speeds in general purpose lanes drop below a predetermined speed. Bus-on-shoulder operations were expanded in 2020 to include I-5 southbound between NE 99th Street and the Interstate Bridge, along with I-205 across the Glenn Jackson Bridge in both directions.

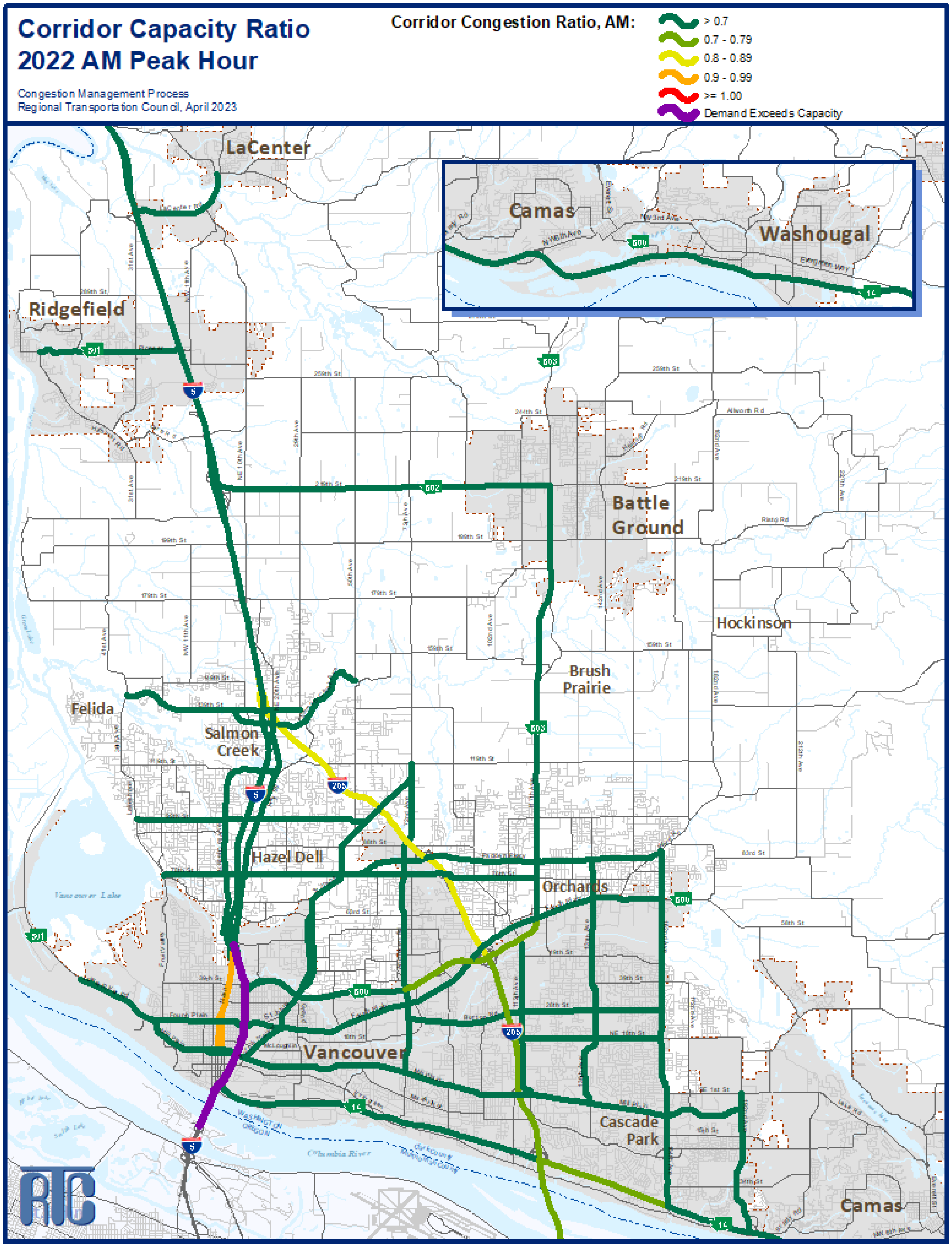


After opening its first BRT route along the Fourth Plain corridor January 2017, C-TRAN is currently constructing a second BRT route in the Mill Plain corridor and planning an additional BRT route along Highway 99/Main Street. The addition of high capacity transit routes expands modal options and increases mobility for Fourth Plain, Mill Plain, and Highway 99/Main Street – three of the region's busiest corridors.

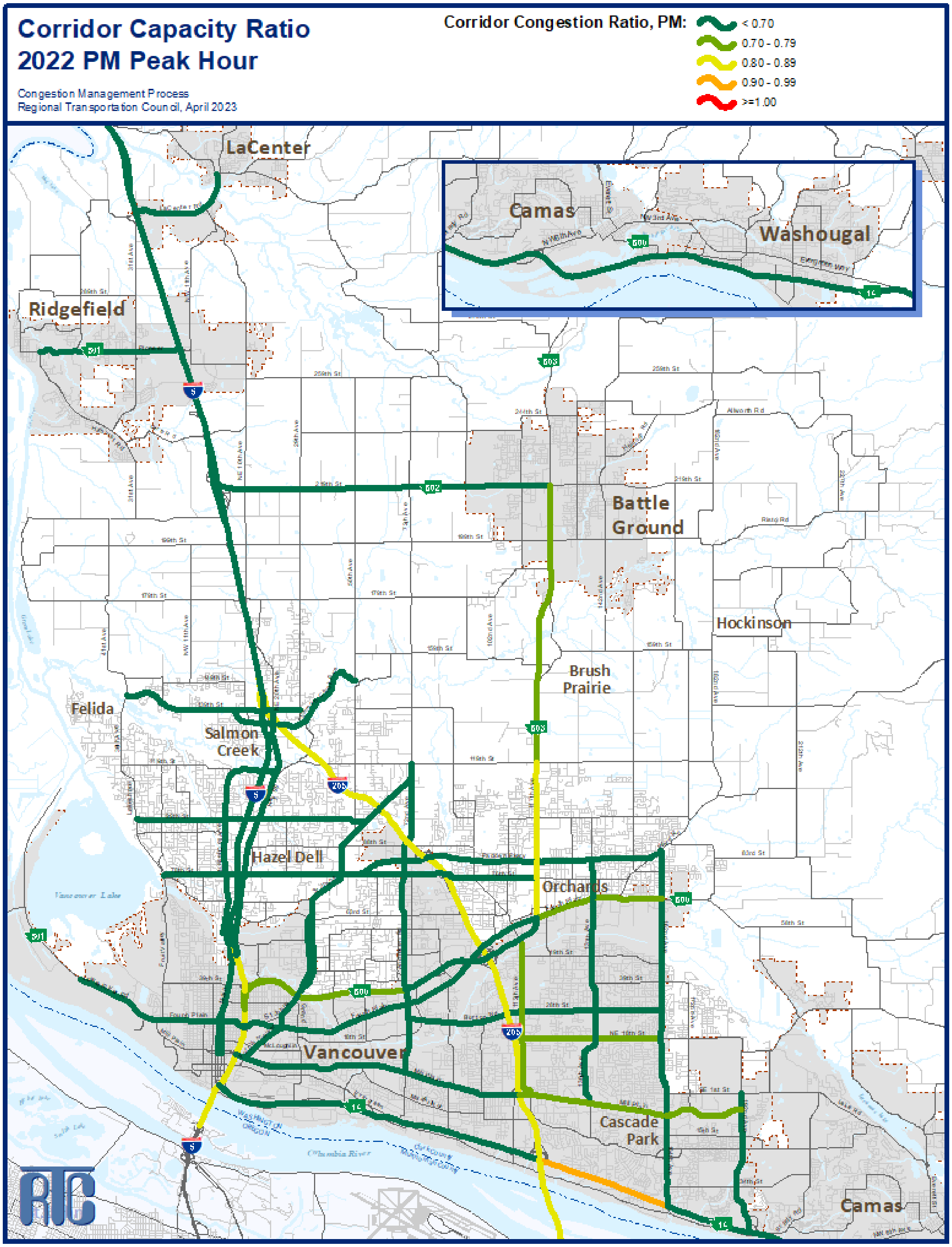
Map 4: PM Vehicle Volumes



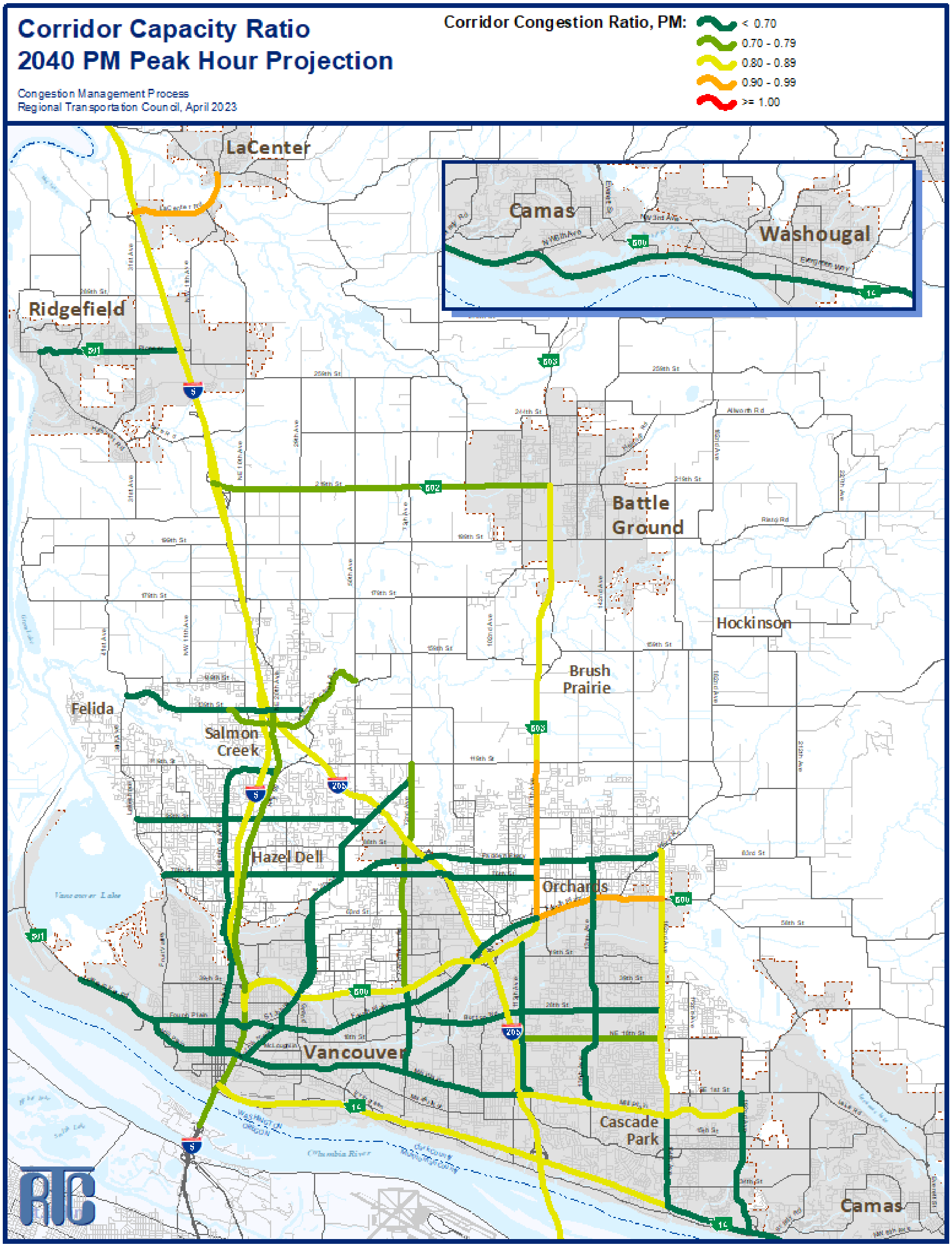
Map 5: AM Capacity Ratio



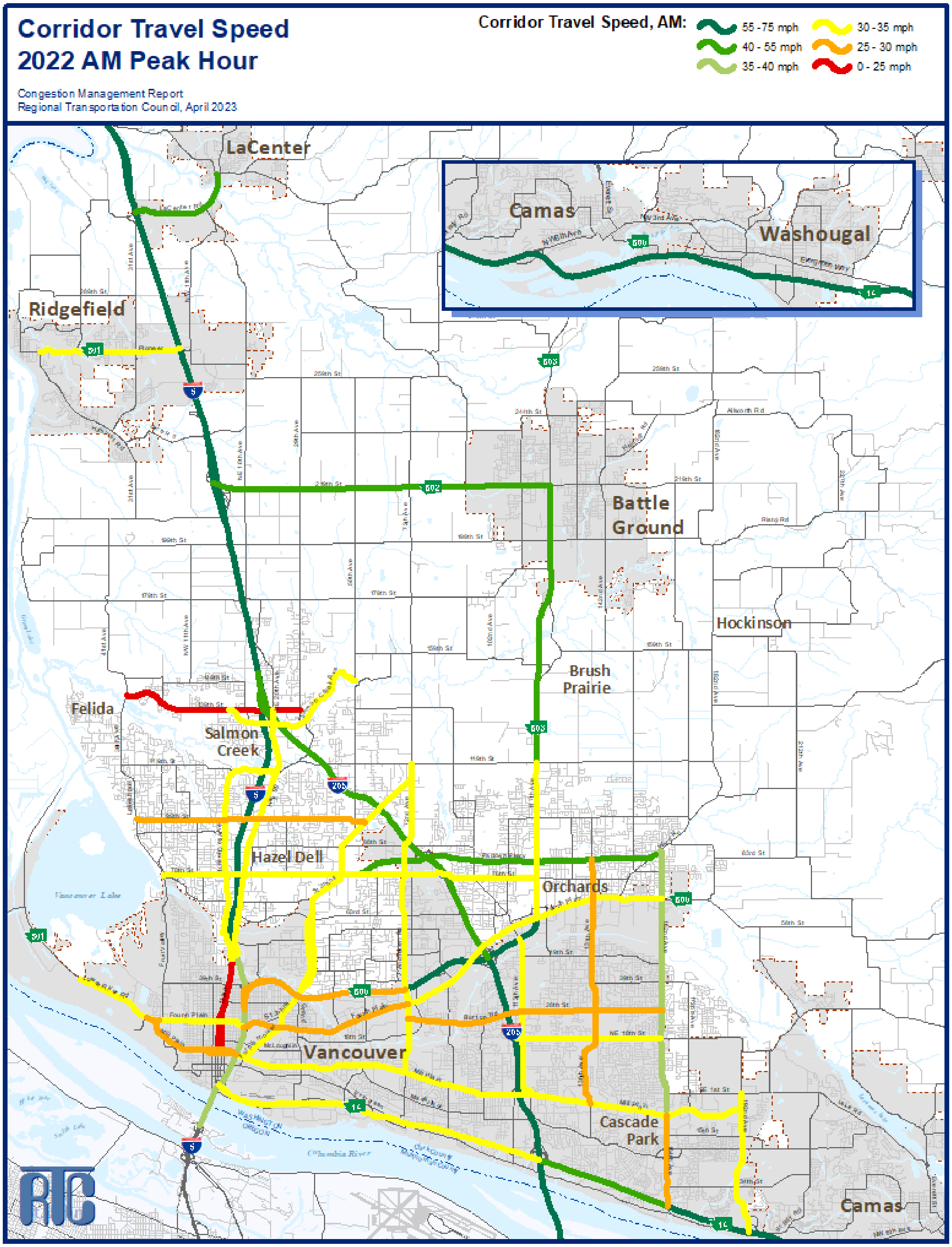
Map 6: PM Capacity Ratio



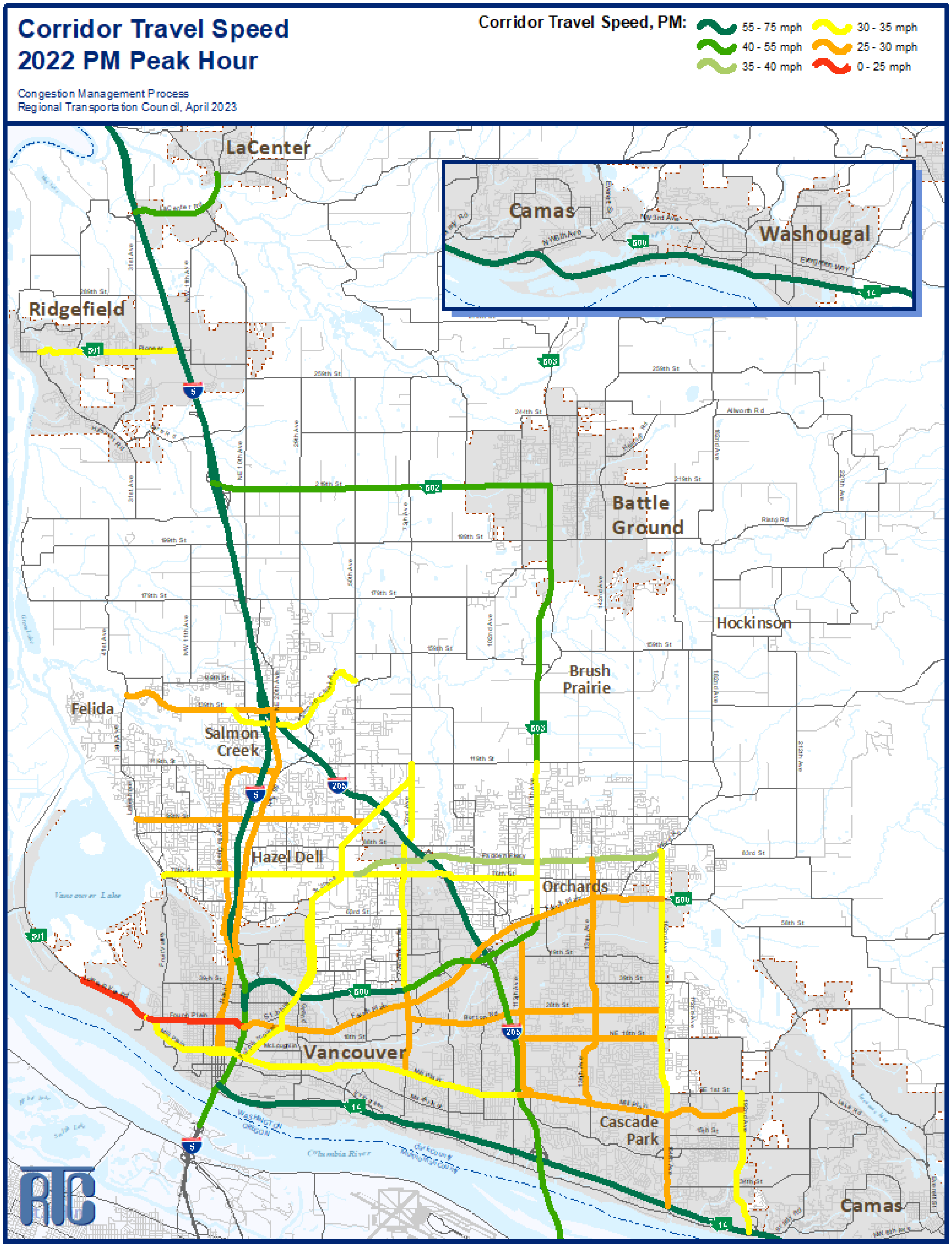
Map 7: 2040 PM Capacity Ratio



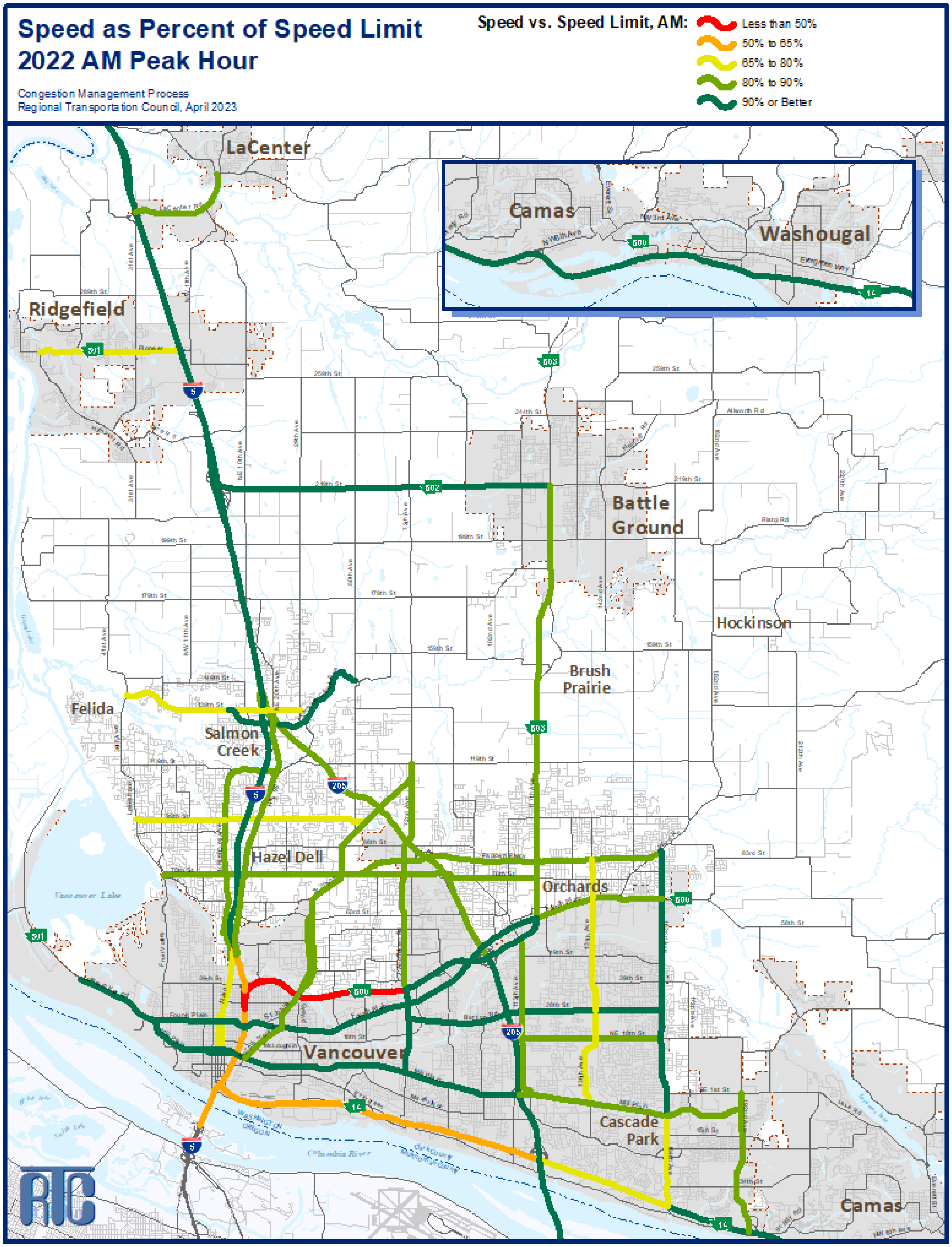
Map 8: AM Corridor Travel Speed



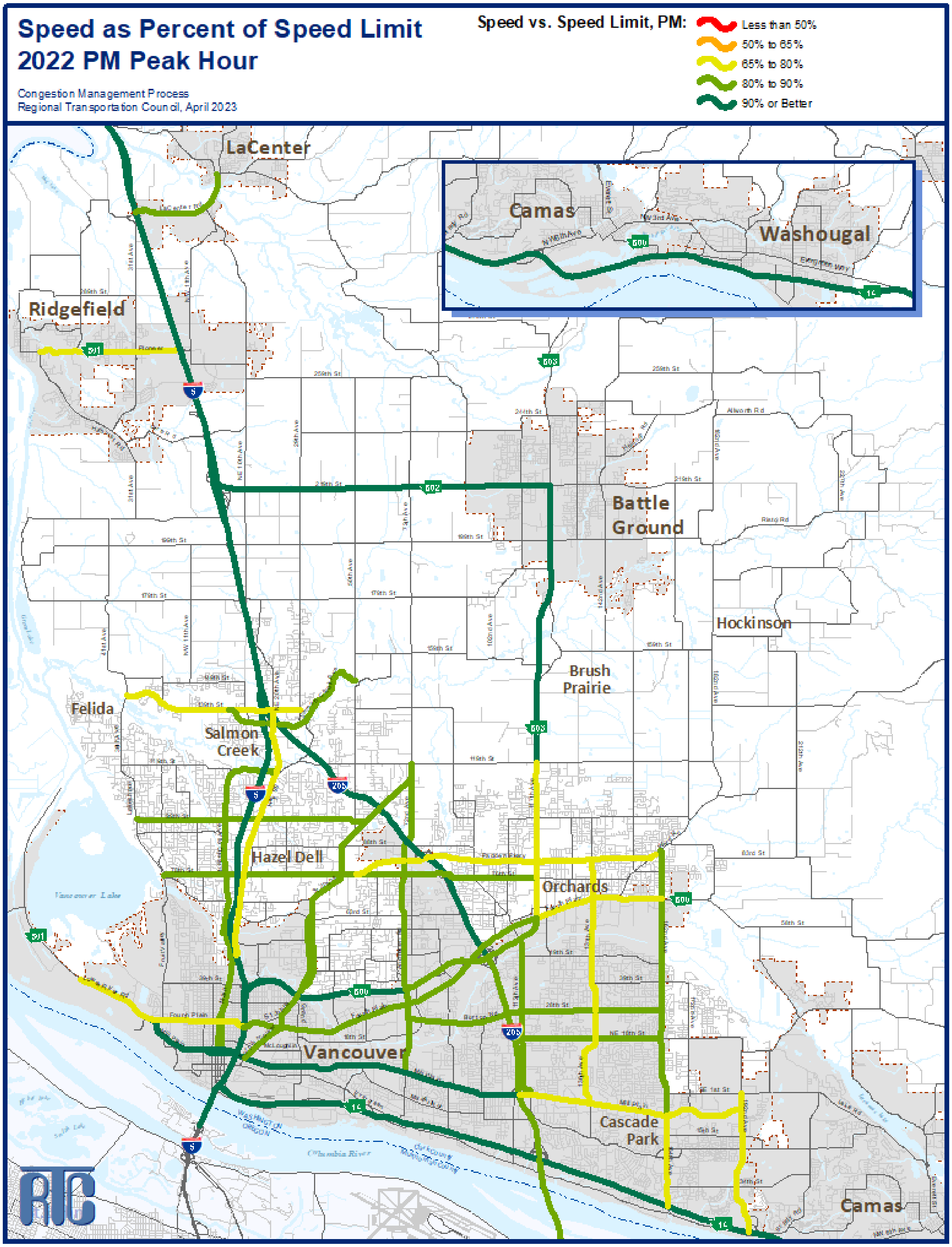
Map 9: PM Corridor Travel Speed



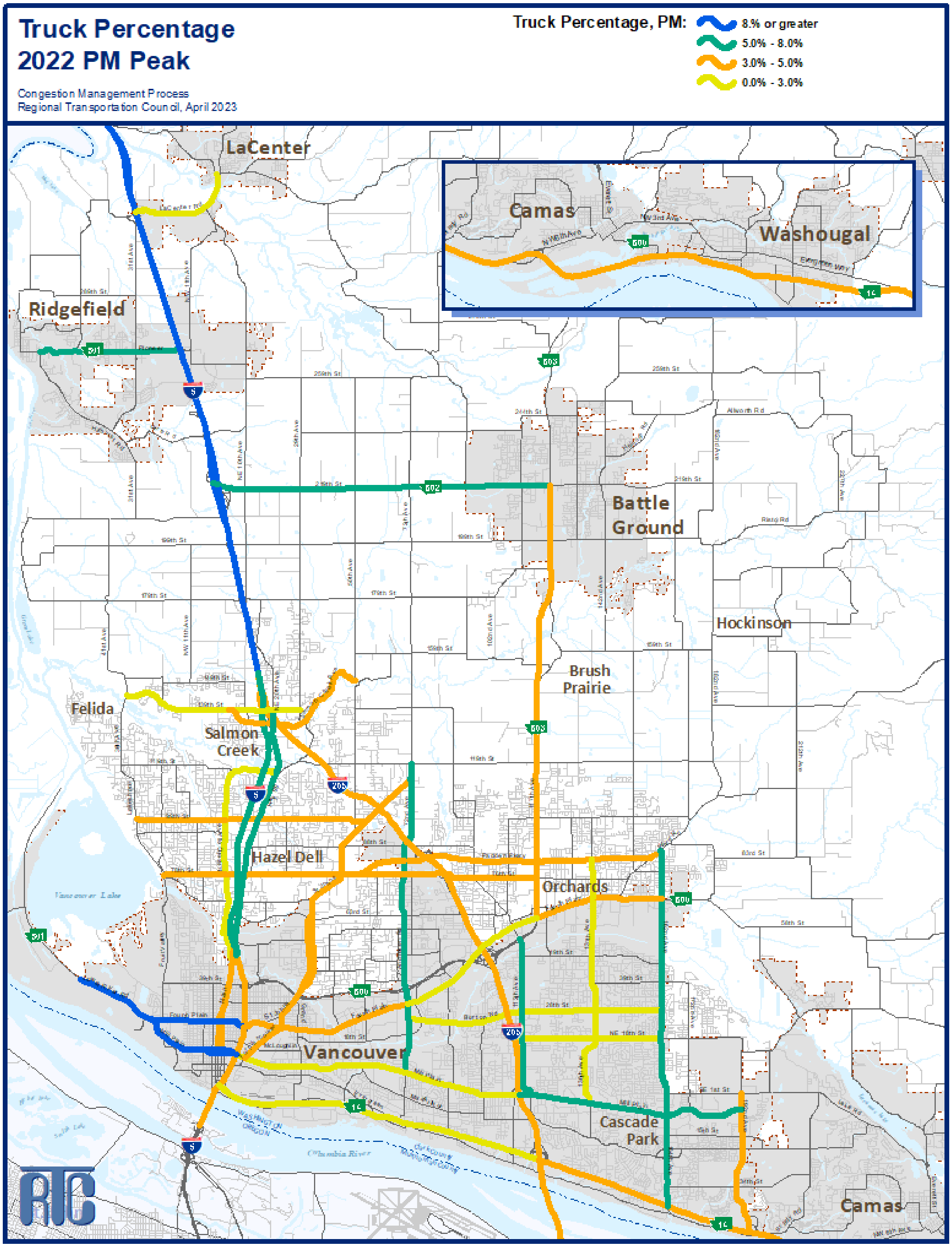
Map 10: AM Speed as a Percent of Speed Limit



Map 11: PM Speed as a Percent of Speed Limit



Map 12: PM Truck Percentage



Areas of Concern

Using the individual CMS corridor segment data, areas of concerns were identified. Areas of concern are defined as segments within an individual corridor with a volume-to-capacity (V/C) ratio greater that 0.9 or a travel speed 50% or less of the posted speed limit.

Volume-to-Capacity Ratio

The volume-to-capacity ratio identifies road segments where current volumes are approaching road capacity. This limitation on road capacity leads to congestion.

Map 13 (page 34): Prominent volume-to-capacity ratio areas of concern in the AM peak period are associated with the bottlenecks on the two interstates as they approach the bridges. The AM period shows a high volume-to-capacity ratio with related poor system performance on portions of I-5, Main Street, and I-205.

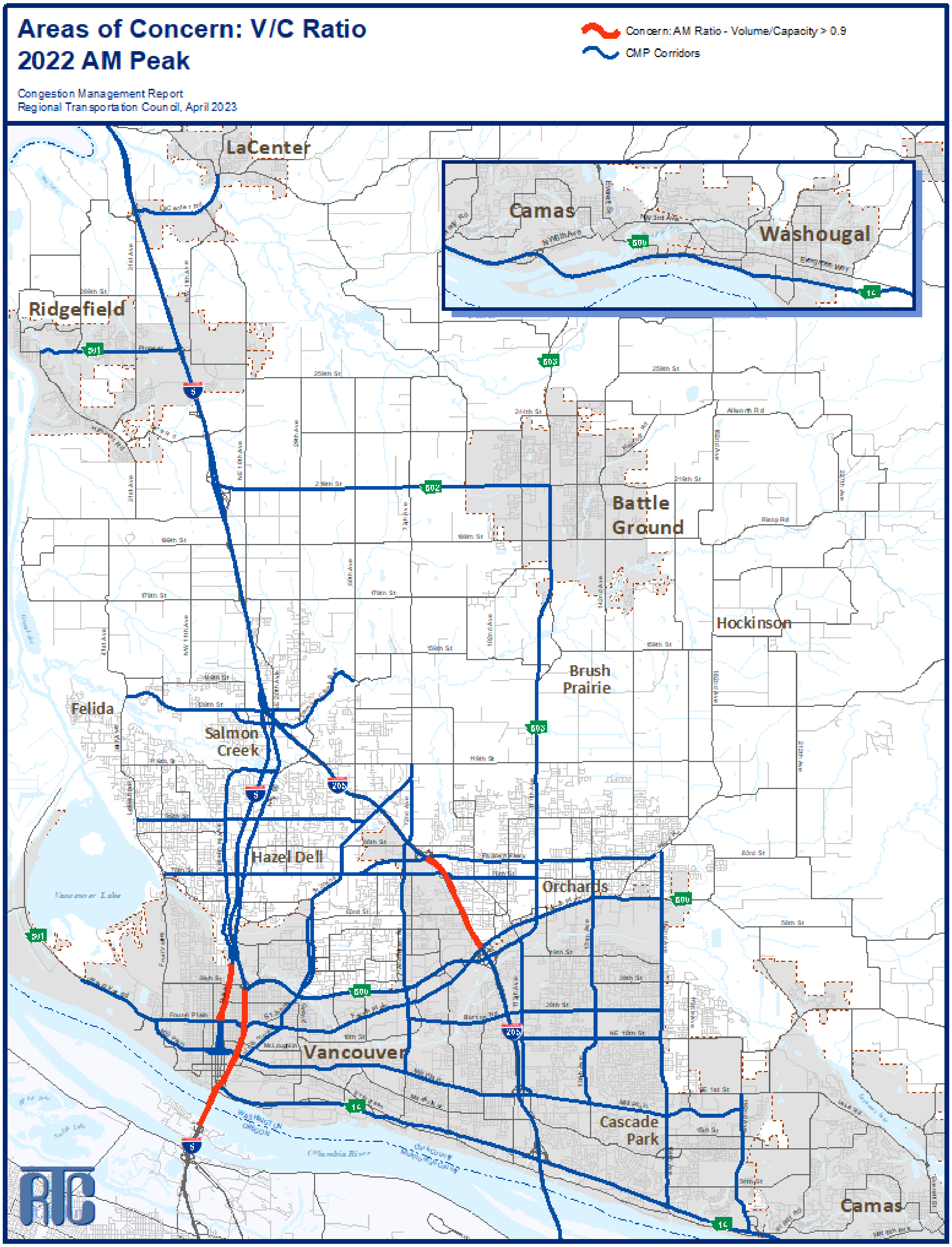
Map 14 (page 35): In the PM period, additional volume-to-capacity ratio areas of concern showed up. The PM period shows congestion on portions of I-5, I-205, SR-14, SR-500, and NE 18th Street.

Speed

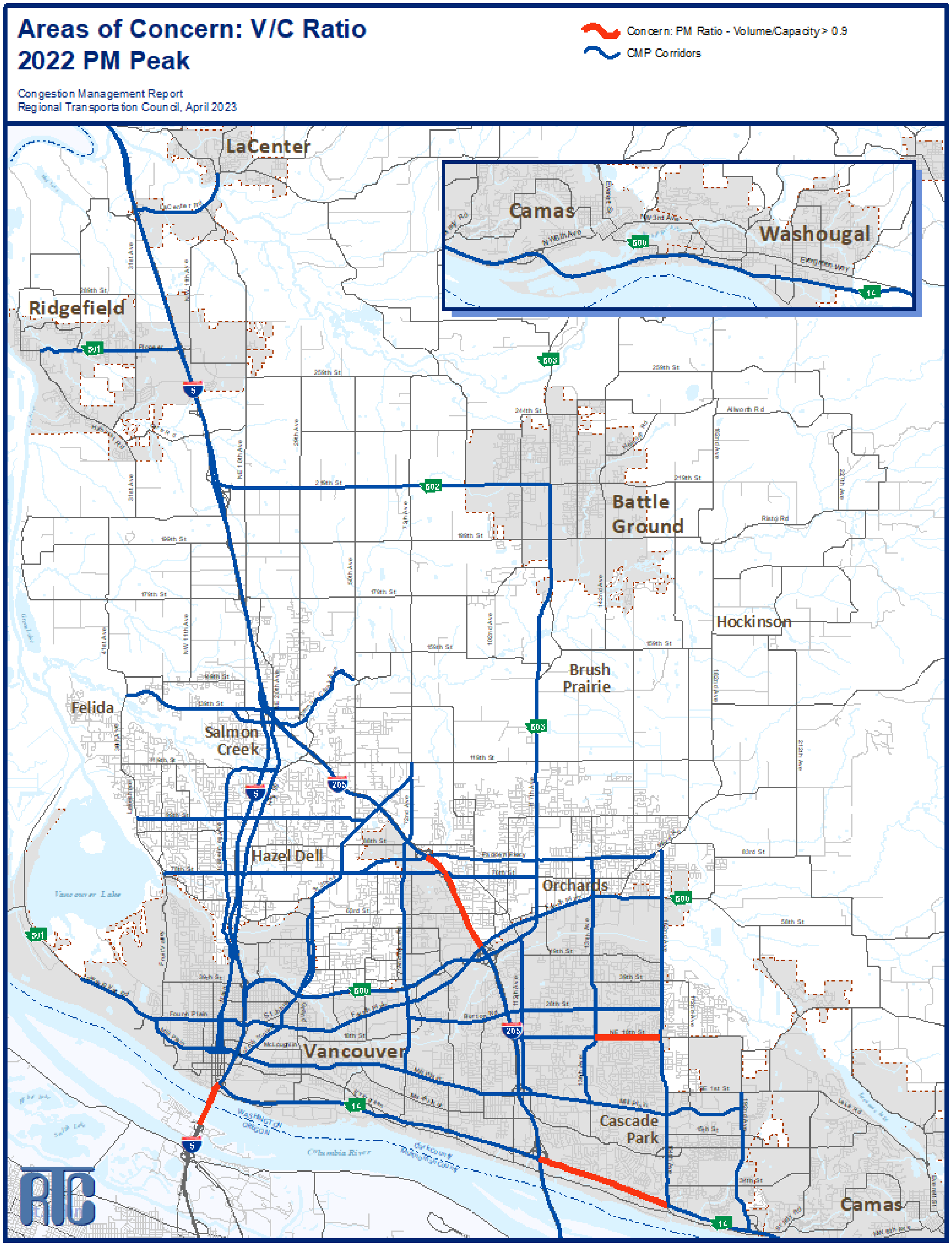
A travel speed lower than 50% of the posted speed limit is an indicator of delay, which can result in congestion. Often these speed areas of concern occur at major bottlenecks or locations with multiple traffic signals in close proximity or at a high-volume intersection.

In 2022 only two corridors operated at travel speed lower than 50% of the posted speed: westbound SR 500 west and westbound SR 14 west in the morning peak. At both of these locations, ramp meters stop vehicles as they approach the southbound on-ramps to I-5 just north of the Interstate Bridge. These ramp meter—in conjunction with other ramp meters, variable message signs, and variable speed signage—help to maintain throughput on southbound mainline I-5 during the AM peak.

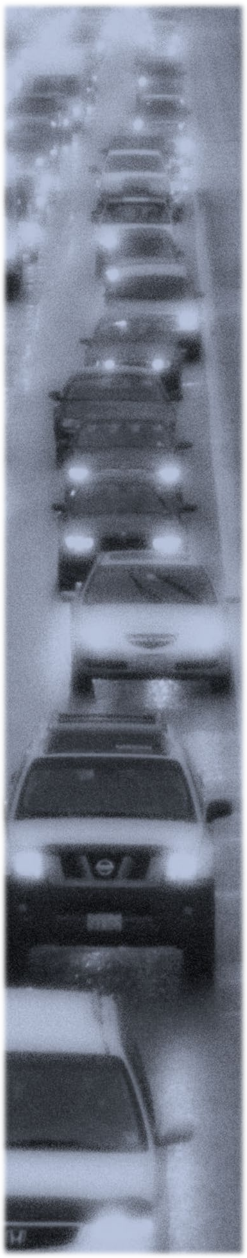
Map 13: AM Areas of Concern: Volume-to-Capacity Ratio



Map 14: PM Areas of Concern: Volume-to-Capacity Ratio



Chapter 3: Strategies



Because each roadway corridor has its own characteristics, congestion management efforts must be tailored to meet the needs of a roadway. Transportation professionals must employ a variety of strategies to manage congestion effectively.

Transportation Planning Efforts

RTC is involved in a number of transportation planning efforts intended to address the impacts of traffic congestion. The following is a list of current transportation planning efforts:

The Regional Transportation Plan[12] for Clark County (RTP) is the most prominent planning document. The plan is designed to be a guide for the effective investment of public funds for regional transportation needs over a 20-year period. The region uses a wide range of data to develop a regional travel demand forecasting model. Using the model, the Region can identify where future congestion is most likely to occur. The Regional Transportation Plan was adopted in March 2019.

The Transportation System Management and Operations Plan[13] (TSMO) was updated and adopted by the RTC Board in September 2016. TSMO focuses on low-cost, quickly implemented transportation improvements that aim to utilize existing transportation facilities more efficiently. TSMO combines advanced technologies, operational policies and procedures, and existing resources to improve coordination and operation of the multimodal transportation network.

The C-TRAN 20-year Transit Development Plan[14] was adopted in 2010 and updated in 2016. This planning process is designed to build upon existing service and develop future operating scenarios for public transit. The plan incorporates the recommendations of the High Capacity Transit System Plan.

The Commute Trip Reduction (CTR) program is intended to improve transportation system efficiency, conserve energy, and improve air quality by decreasing the number of commute trips made by people driving alone. The City of Vancouver is implementing their CTR plan through Destination Downtown[15].

The 2022 Human Services Transportation Plan for Clark, Skamania, and Klickitat Counties[16] summarizes the transportation needs for people who, because of disability, low income, or age, face transportation challenges. It also identifies the transportation activities to respond to these challenges.

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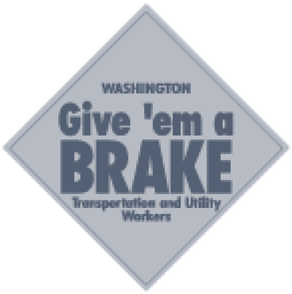
[12] *https://rtc.wa.gov/programs/rtp/clark/*
[13] *https://rtc.wa.gov/programs/vast/docs/tsmoReport2016.pdf*
[14] *https://www.c-tran.com/about-c-tran/reports/c-tran-2030*
[15] *https://www.cityofvancouver.us/eph/page/destination-downtown*
[16] *https://rtc.wa.gov/programs/hstp/*



RTC 's Urban Freeway Corridor Operations (UFCO) Study[17] used a data-driven process to develop lower cost, positive-benefit improvement opportunities for the four main corridors of the greater Vancouver highway system. The study developed recommended spot and system strategies that could be pursued for implementation in the near term (10-15 years).

Identify and Evaluate Transportation Strategies

The information and data contained in the System Monitoring chapter is used to identify appropriate congestion management strategies for the region. The identification and selection of strategies for a particular segment or corridor should be tied to the specific congestion issue. RTC will work collaboratively with member agencies to identify and advance appropriate strategies for managing congestion.

Strategies are detailed in the CMP Toolbox. The intent of the CMP Toolbox is to provide a reference for the development of alternative strategies for consideration in corridor development in relationship to the Regional Transportation Plan.

Objectives of Strategies

Reducing congestion in the region will require accomplishing the following objectives:

- Preservation and maintenance of the existing system
- Improving system performance through operation and management strategies
- Where possible, shifting trips to other modes
- Addition of auto capacity at key bottlenecks

CMP Toolbox

One of the components of RTC's Congestion Management Process is a toolbox of congestion reduction and mobility strategies. The intent of this toolbox is to encourage ways to deal with congestion and mobility issues prior to traditional roadway widening projects. Prior to adding single occupant vehicle (SOV) capacity, agencies and jurisdictions should give consideration to the various strategies identified in this section. Usually multiple strategies are applicable within a corridor, while other strategies are intended to be applied regionwide.

The CMP Toolbox strategies were assembled to provide a wide range of strategies that could be used to manage congestion. They are arranged so that the strategies

[17] *https://www.rtc.wa.gov/reports/misc/rtcUFCOStudy.pdf*

are considered in order from first to last. Even with the addition of capacity, many of the strategies can be implemented with the project to ensure the long-term management of a capacity project.

System Preservation and Maintenance

Preservation and maintenance of existing systems is essential to mobility.

Essential for continued transportation mobility is the preservation and maintenance of the existing roadway, bridge, ports, rail, transit, bicycle, pedestrian, and other systems.

Safety Improvements

It is vital that the region build and maintain a transportation system that provides a safe and secure means of travel by all modes. The type of safety improvement is dependent on the need at each location.

Transportation Demand Management

Transportation Demand Management: Options such as alternative work hours, telecommuting, ridesharing, and other options can remove, shift, or combine trips to reduce overall demand during peak periods. Many of these strategies can be successfully implemented through a Commute Trip Reduction (CTR) program.

Transit Improvements

Bus Route Coverage

Provides better transit accessibility to a greater share of the population.

Bus Frequencies and Transit Amenities

Makes transit more attractive to use.

Park-and-Ride Lot

In conjunction with express bus service, can encourage the use of transit for longer distance commute trips.

High Capacity Transit

Provides a higher transit service to maximize transit usage within urban corridors.

Bicycle and Pedestrian Improvements

New Sidewalks and Bicycle Lanes, Separated Pathways, and Trails

Provides better pedestrian and bicycle accessibility to a greater share of the population. Also increases the perception of pedestrian and bicycle safety.

Bicycle Amenities

Bicycle racks, lockers, and other bicycle amenities at transit stations and other trip destinations increase security and provide incentives for using bicycles.

Pedestrian-Oriented Development

Building setback restrictions, streetscape, and other pedestrian-oriented development can be codified in zoning ordinances to encourage pedestrian activity.

Bicycle and Pedestrian Safety

Maintaining lighting, signage, striping, traffic control, and other safety improvements can increase bicycle and pedestrian usage.

Transportation System Management and Operations

Traffic Signal Coordination

This improves traffic flow and minimizes stops on arterial streets.

Incident Management System

This is an effective way to alleviate non-recurring congestion. Primarily applicable on freeways.

Ramp Metering

This allows freeway to maintain flow rates, resulting in improved operations and reducing congestion on freeways.

Highway Information Systems

These systems provide travelers with real-time information that can be used to make trip and route decisions.

Advanced Traveler Information Systems

This provides data to travelers in advance by computer or to other devices.

Access Management

Left Turn Restrictions

Turning vehicles can impede traffic flow and are more likely to be involved in collisions.

Consolidation or Relocation of Driveways

In some situations, increasing or improving access to property can improve traffic flow and reduce collisions.

Interchange Modification

Modification of interchanges can reduce weaving and improve traffic flow.

Minimum Intersection/Interchange Spacing

Appropriate spacing of intersection/interchanges can reduce number of conflict points and merge areas, resulting in fewer incidents and better traffic flow.

Collector-Distributor Roads

Collector-distributor roads are used to separate interchange traffic from through traffic at closely spaced interchanges, resulting in fewer incidents and better traffic flow.

Land Use

Mixed-Use Development

This can allow many trips to be made in an area by walking rather than use of a vehicle.

Infill and Densification

This takes advantage of existing infrastructure rather than requiring new infrastructure to be built.

Transit Oriented Development

Allows improved pedestrian access from transit to housing and businesses.

Parking Enforcement

Enforcement of existing regulations can improve traffic flow in urban areas.

Location Specific Parking Ordinances

Parking requirements can be adjusted for factors such as availability of transit, mix of land use, and pedestrian-oriented development that reduces the need for on-site parking.

Carpool/Vanpool Parking

Preferential, reduced, or free parking for carpool/vanpool can provide an incentive and reduce parking demand.

Roadway Improvements

Geometric Design Improvements

Addition of turn lanes at intersections, roundabouts, improved sight distance, auxiliary lanes, and other geometric improvements can reduce congestion by removing bottlenecks.

Upgrade Roads to Urban Standards

Upgrading from rural roads to urban standards with improved geometry, bicycle lanes, sidewalks, and transit amenities can improve traffic flow for all modes.

Grade Separation

Upgrade high volume intersection to an interchange or grade-separated facility can significantly reduce traffic delay and reduce congestion.

Road Widening to Add Travel Lanes

Can increase capacity and remove congestion.

Strategy Implementation

The CMP provides information to help guide the investment of transportation funding toward improving congestion.

RTC's Congestion Management Process provides a tool for monitoring the region's traffic congestion. The CMP provides information to help guide the investment of transportation funding toward improving congestion. Information developed through the Congestion Management Process will be applied through the RTC regional transportation planning process.

In coordination with WSDOT, C-TRAN, and local agencies, RTC utilizes the Congestion Management Process to identify transportation system needs. This effort is supported by regional studies, local capital facility plans, regional transportation models, and other planning efforts, which all feed into the development of the Regional Transportation Plan[18] (RTP). Needs are developed based on a planning level analysis that considers how various strategies can address congestion prior to adding capacity. Identified congestion needs are then incorporated into Regional Transportation Plan recommendations. Project sponsors must then give consideration to the various strategies from the CMP Toolbox as projects move forward to implementation.

Local project priorities are then submitted to RTC and prioritized through the regional Transportation Improvement Program[19] (TIP), which selects priority

[18] *https://www.rtc.wa.gov/programs/rtp/*
[19] *https://www.rtc.wa.gov/programs/tip/*

projects for implementation. For the purpose of selecting projects to fund through the TIP process, additional points are awarded to a project that:

- is located on the CMP Network
- addresses congestion
- incorporates alternative modes
- incorporates Transportation System Management Alternatives

Monitor Strategy Effectiveness

This report contains data that allows for the continuing development and updating of information to track the performance of the regional transportation system and implemented strategies.

In assessing the degree to which the CMP strategies address congestion issues, projects are tracked through the project implementation process; and results are reported back to regional technical committees. As part of the project implementation process, all regionally selected projects are required to complete a before-and-after analysis that identifies project goals and outcomes.

Strategy Corridor Analysis

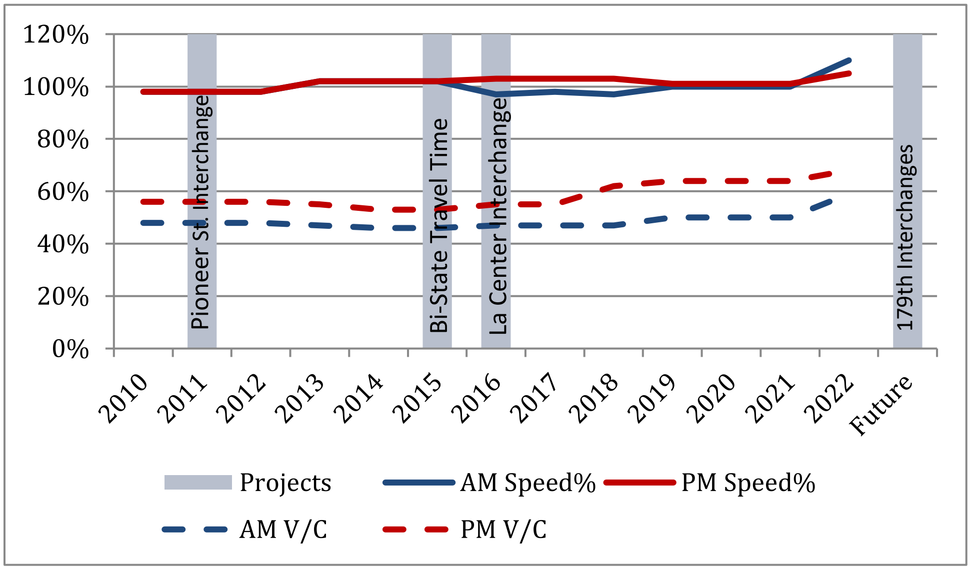
This section displays the linkages between transportation infrastructure improvements and corridor performance. System infrastructure improvements often impact the operation within a corridor. Sometimes a project removes a localized bottleneck, while other projects have corridor-wide impacts.

The following graphs show overall corridor travel speed compared to posted speed limit and volume-to-capacity ratio in comparison to implemented and future infrastructure improvements. This analysis is for each facility as a whole and is not necessarily an indicator of individual bottlenecks. Roadways are likely to experience corridor-wide congestion when average travel speed falls under 60 percent of posted speed limit or when average volume-to-capacity ratio is greater than 90 percent.

I-5 North, County Line to I-205 Junction

Neither speed nor capacity indicates potential corridor-wide congestion. Corridor improvements are reflective of the need for improved access to the corridor. Future corridor improvements include the reconstruction of the 179th Street interchange.

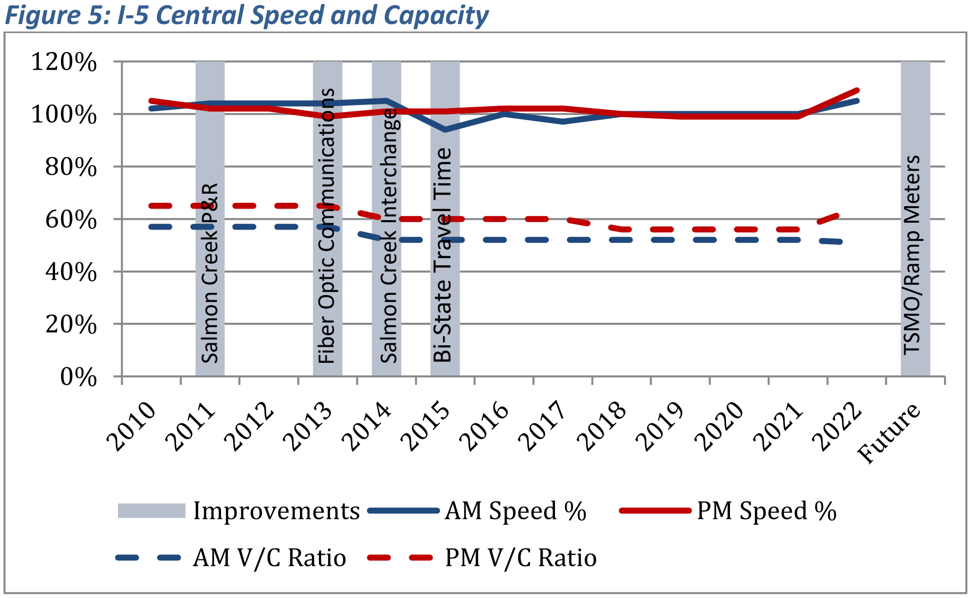
Figure 4: I-5 North Speed and Capacity



I-5 Central, I-205 Junction to Main Street

Neither existing speed nor capacity indicates potential corridor-wide congestion. The southern portion of this corridor can be impacted by morning congestion from the I-5 South corridor. Future corridor improvements include variable speed limits and dynamic ramp metering.

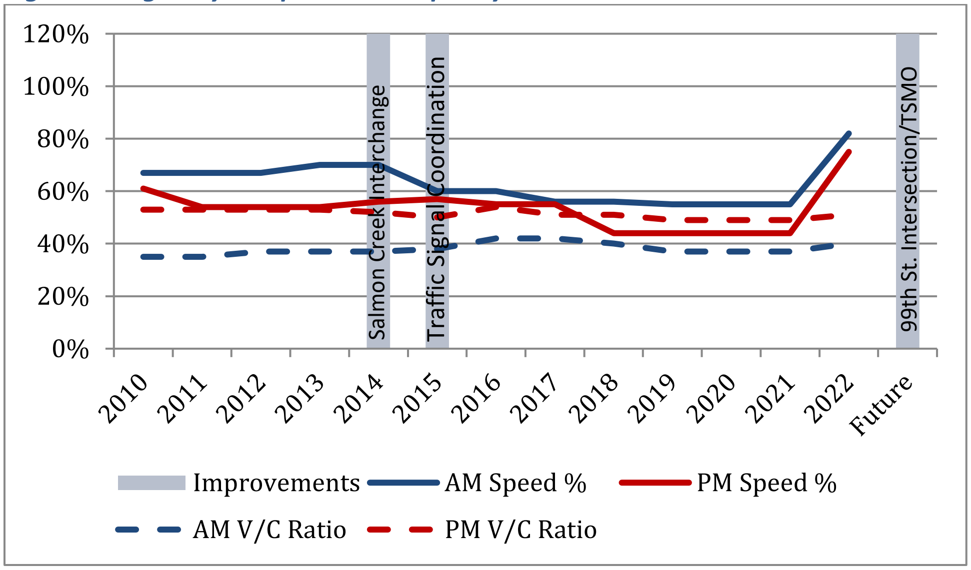
Figure 5: I-5 Central Speed and Capacity



Highway 99, 139th Street to I-5

The morning and evening speeds indicate potential corridor-wide congestion. Future corridor enhancements include select road improvements, TSMO, and transit projects.

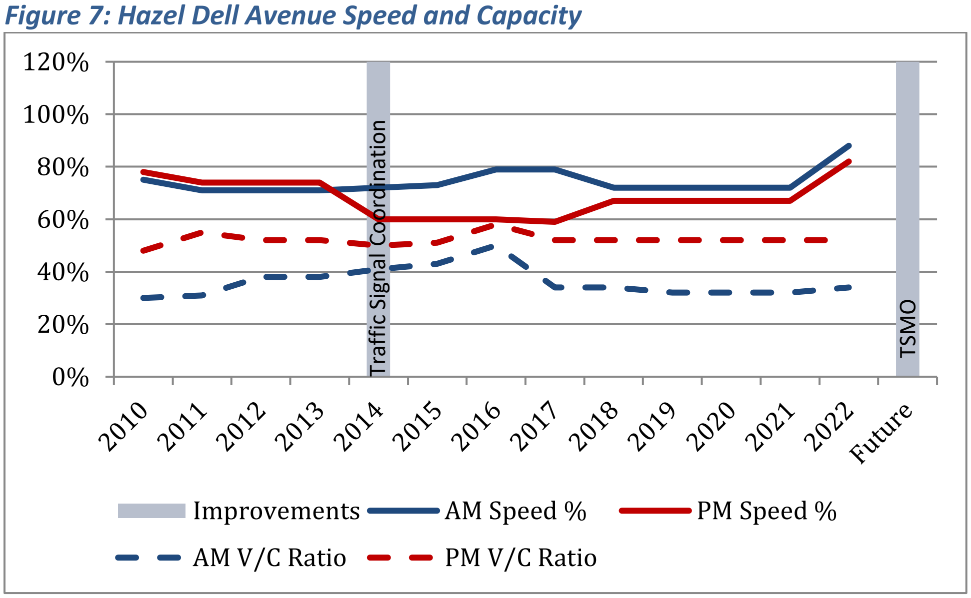
Figure 6: Highway 99 Speed and Capacity



Hazel Dell Avenue, Highway 99 to 63rd Street

Neither existing speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

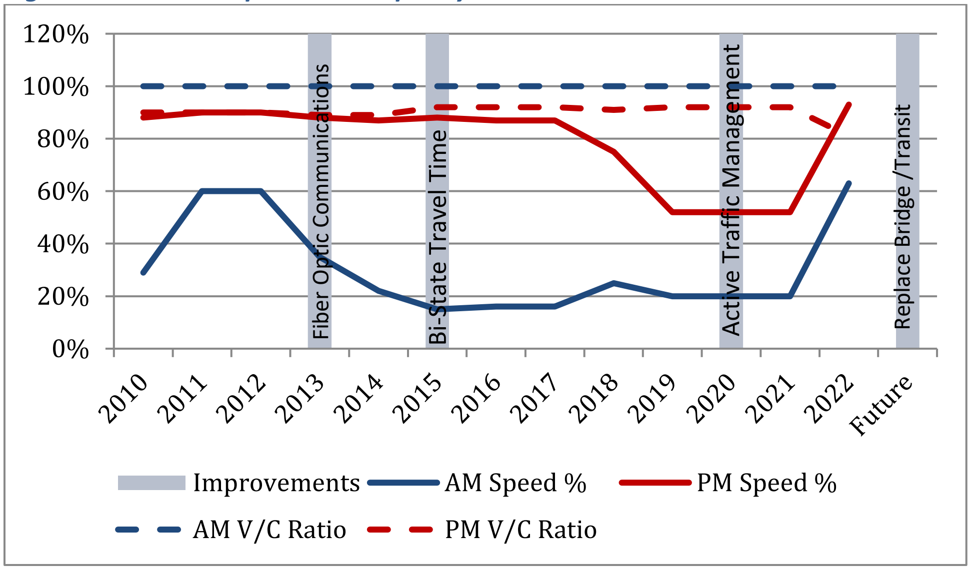
Figure 7: Hazel Dell Avenue Speed and Capacity



I-5 South, Main Street to Jantzen Beach

Both morning and evening speed and capacity indicate a pattern of corridor-wide congestion. Future corridor improvements include a new I-5 Bridge, interchanges and active traffic management in the northbound direction. Recent active traffic management has shown positive results in the morning hours.

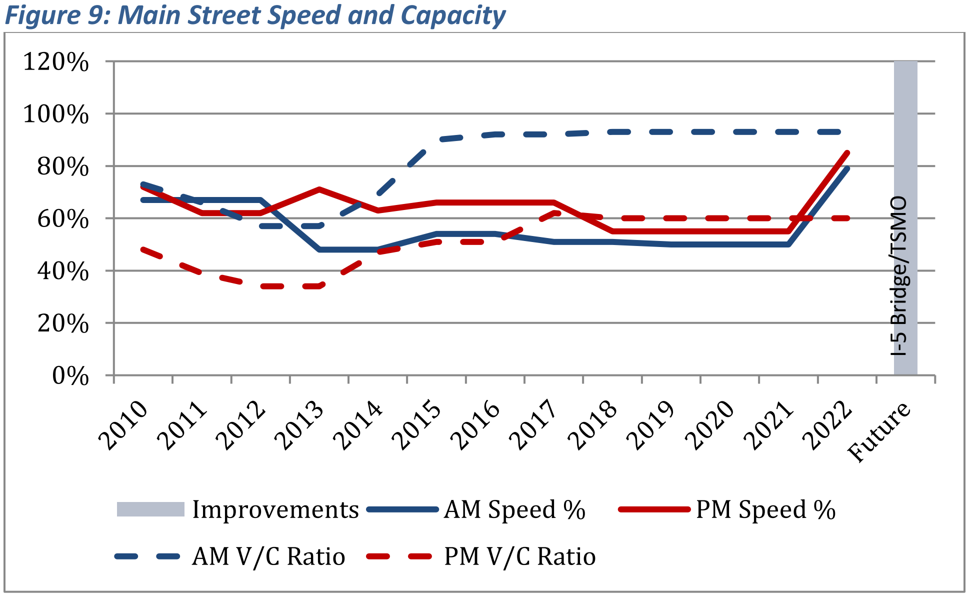
Figure 8: I-5 South Speed and Capacity



Main Street, I-5 to Mill Plain

Morning and evening speed and morning capacity indicate a pattern of corridor-wide congestion, as trips divert from the congested I-5 corridor. Future corridor improvements include I-5 Bridge replacement and ramp meters, and TSMO projects.

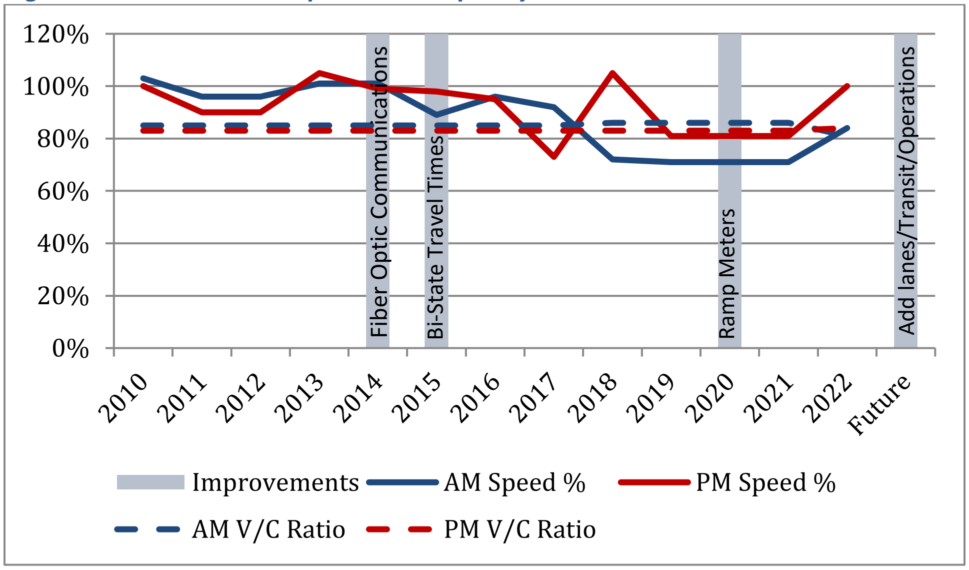
Figure 9: Main Street Speed and Capacity



I-205 Central, I-5 to SR 500

Corridor data indicates a busy corridor that is near capacity. Over the last few years, the morning and evening speed variation indicates a corridor that is near maximum capacity. Future corridor improvements include additional auxiliary lanes, transit, ramp meters, and other operational projects.

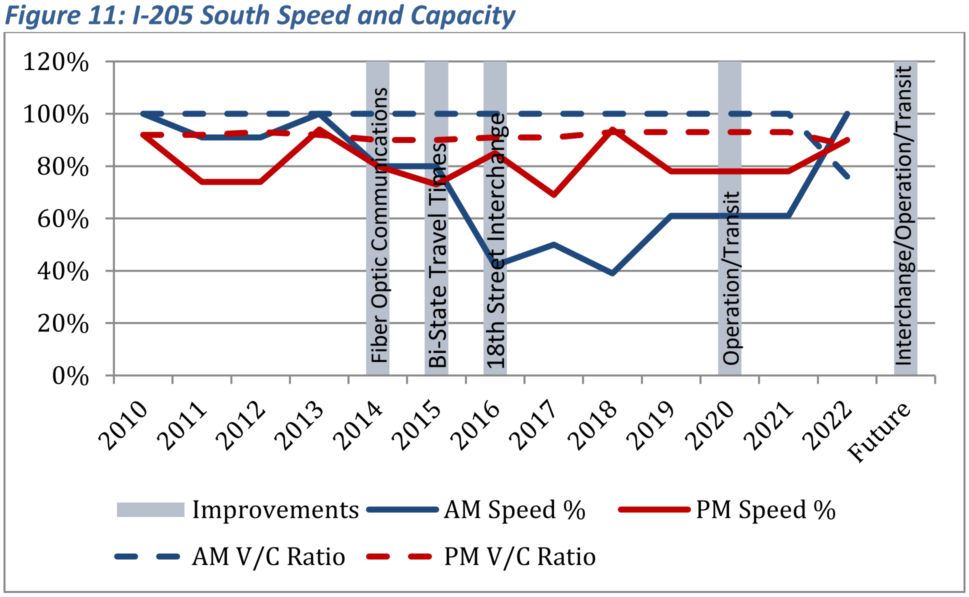
Figure 10: I-205 Central Speed and Capacity



I-205 South, SR 500 to Airport Way

Morning speed and capacity indicate significant congestion, while evening speed and capacity indicate the corridor is near capacity. Future corridor improvements include interchange modifications, transit, ramp meter, and operational projects.

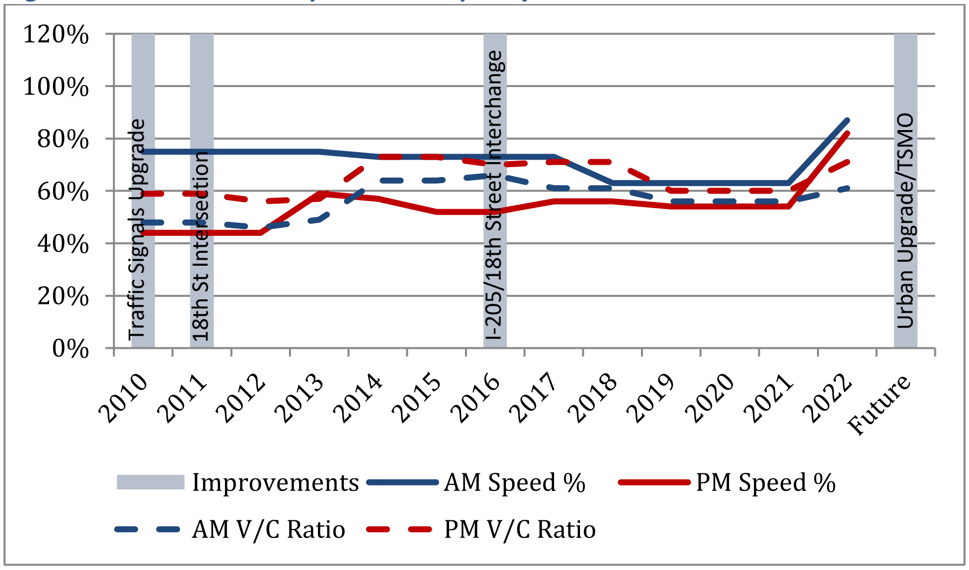
Figure 11: I-205 South Speed and Capacity



112th Avenue, SR 500 to Mill Plain

Evening speed indicates potential corridor-wide congestion. Future corridor improvements include urban road upgrades, signal timing, and TSMO projects.

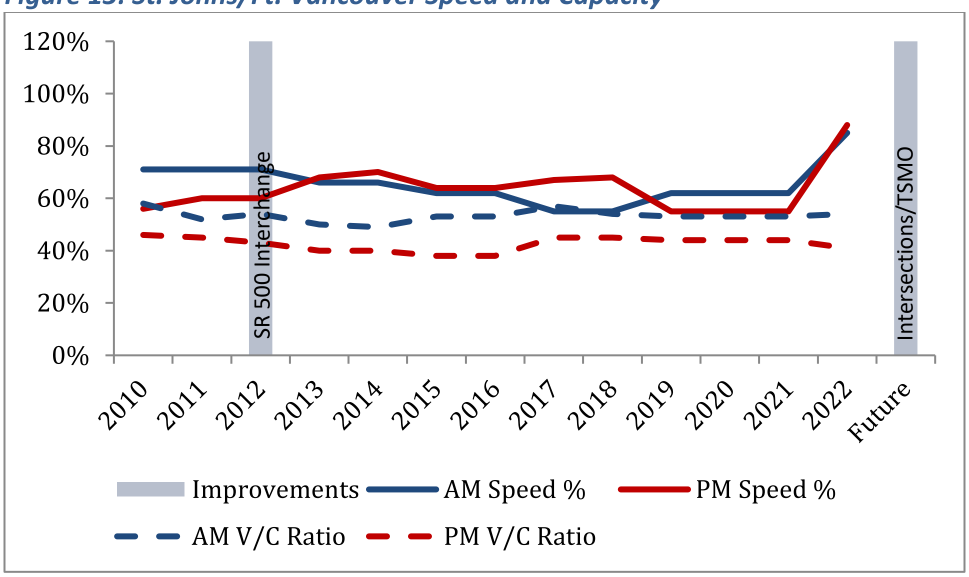
Figure 12: 112th Avenue Speed and Capacity



St. Johns/Ft. Vancouver, 72nd Avenue to Mill Plain

Evening speed indicates potential corridor wide congestion. Future corridor improvements include intersection, signal timing, and TSMO projects.

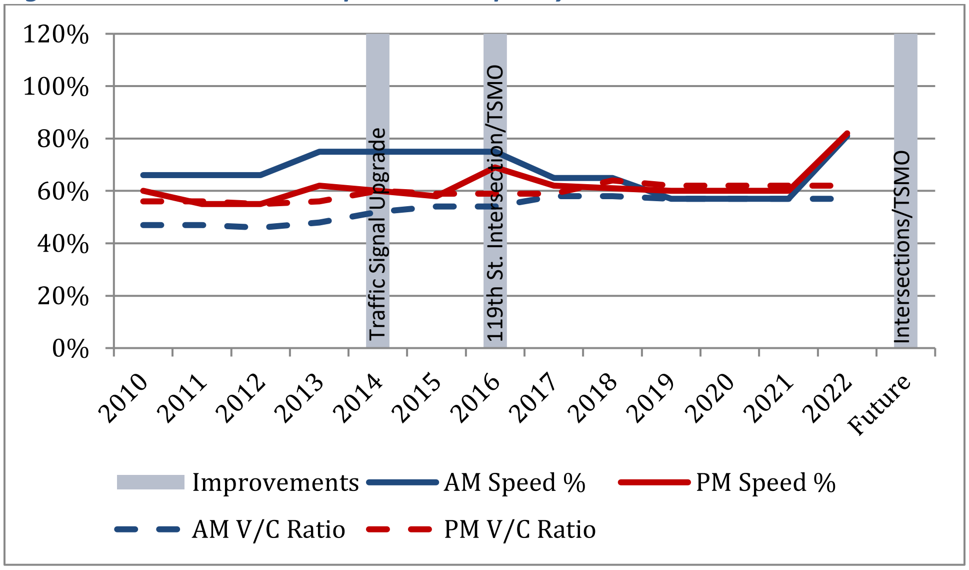
Figure 13: St. Johns/Ft. Vancouver Speed and Capacity



Andresen North, 119th Street to SR 500

Morning speed indicates potential corridor-wide congestion. Future corridor improvements include intersection, signal timing, and TSMO projects.

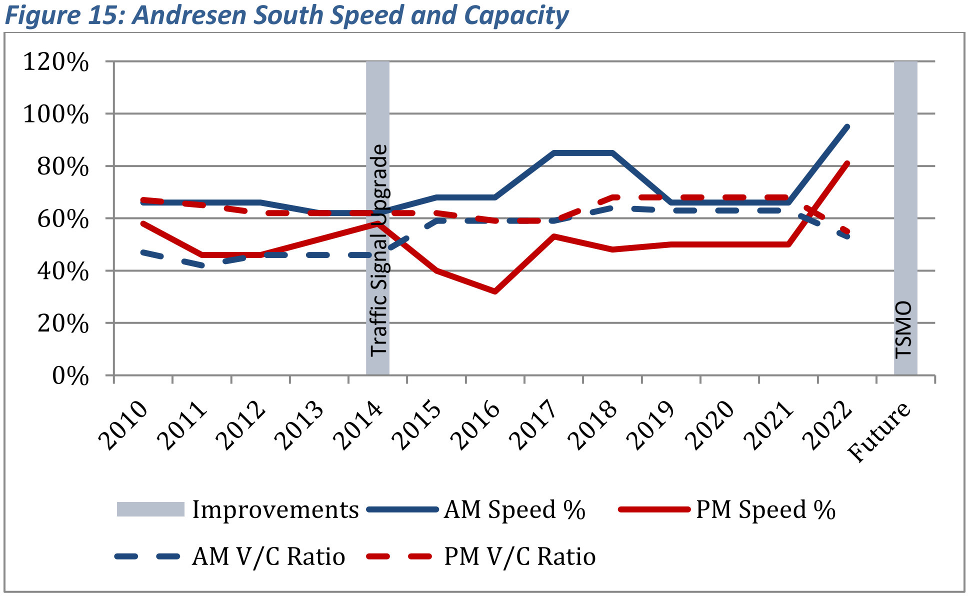
Figure 14: Andresen North Speed and Capacity



Andresen South, SR 500 to Mill Plain

Evening speed indicates congestion in the corridor. Future corridor improvements include signal timing and TSMO projects.

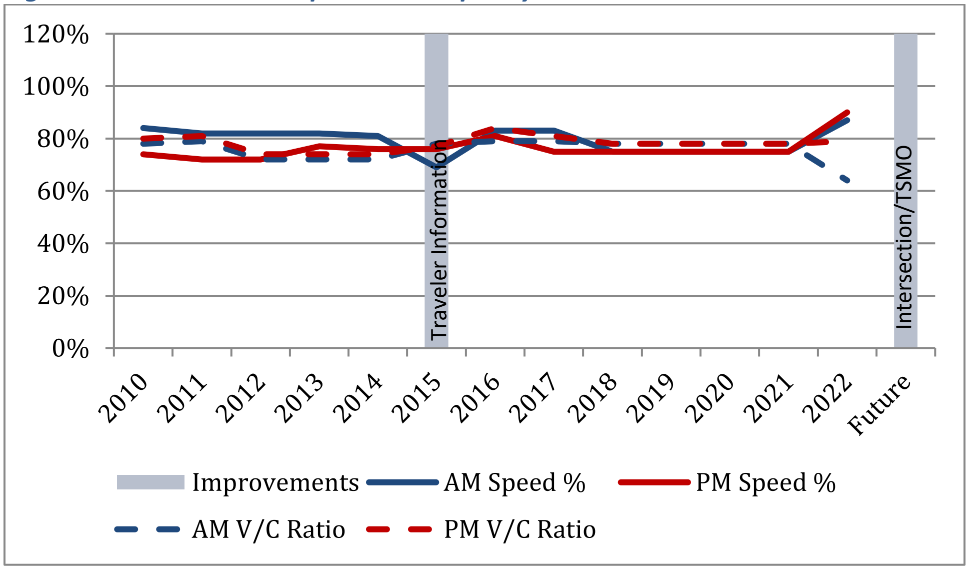
Figure 15: Andresen South Speed and Capacity



SR 503 North, SR 502 to 119th Street

Corridor data indicates a very busy corridor that is near capacity. Future corridor projects include SR 502/SR 503 intersection improvement and TSMO projects.

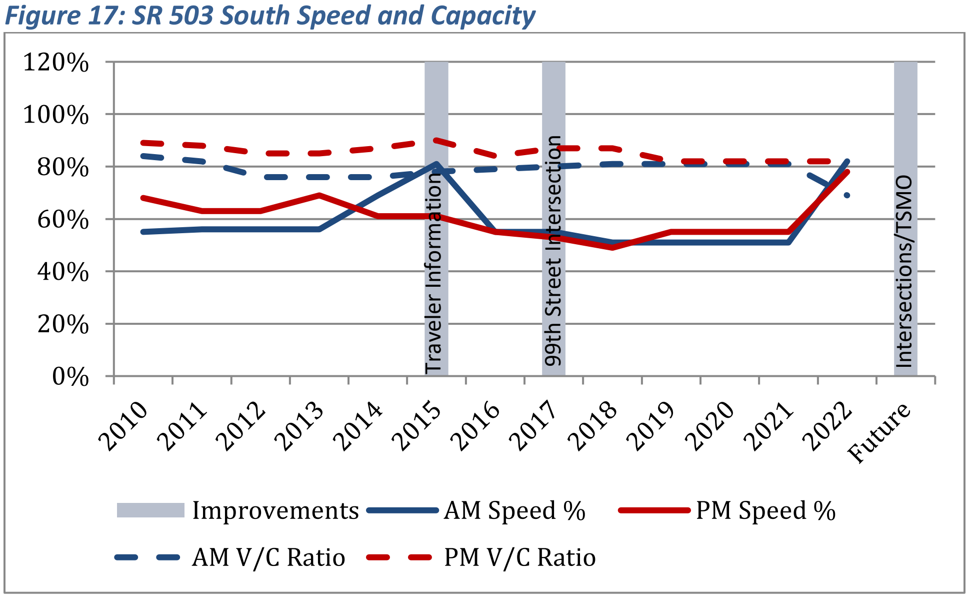
Figure 16: SR 503 North Speed and Capacity



SR 503 South, 119th Street to Fourth Plain

This is a busy corridor that indicates corridor-wide congestion associated with capacity and speed. Future corridor improvements include Fourth Plain intersection improvements, access management, and TSMO projects.

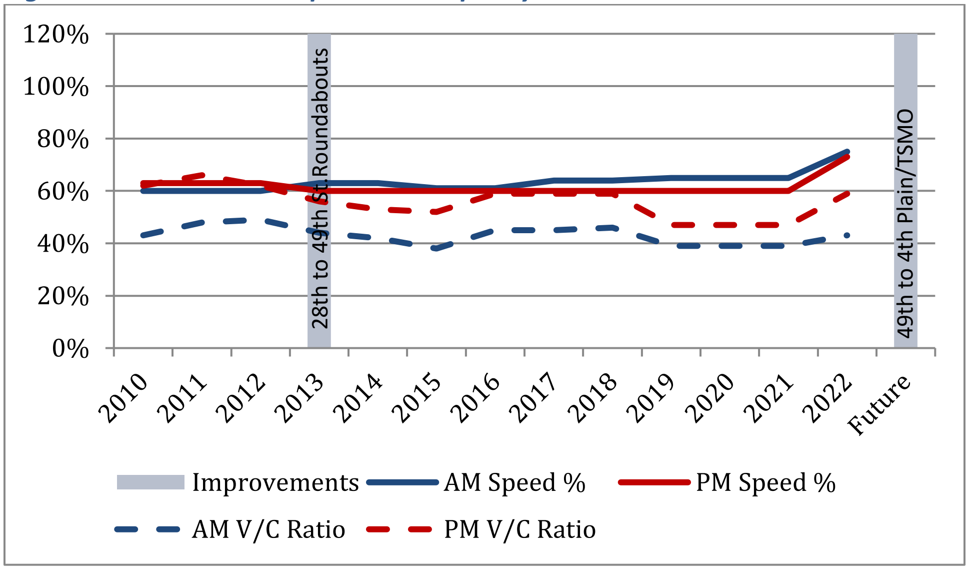
Figure 17: SR 503 South Speed and Capacity



137th Avenue, Padden Parkway to Mill Plain

Neither speed nor capacity indicates corridor-wide congestion. Future corridor projects include road improvements between 49th Street and Fourth Plain and TSMO improvements.

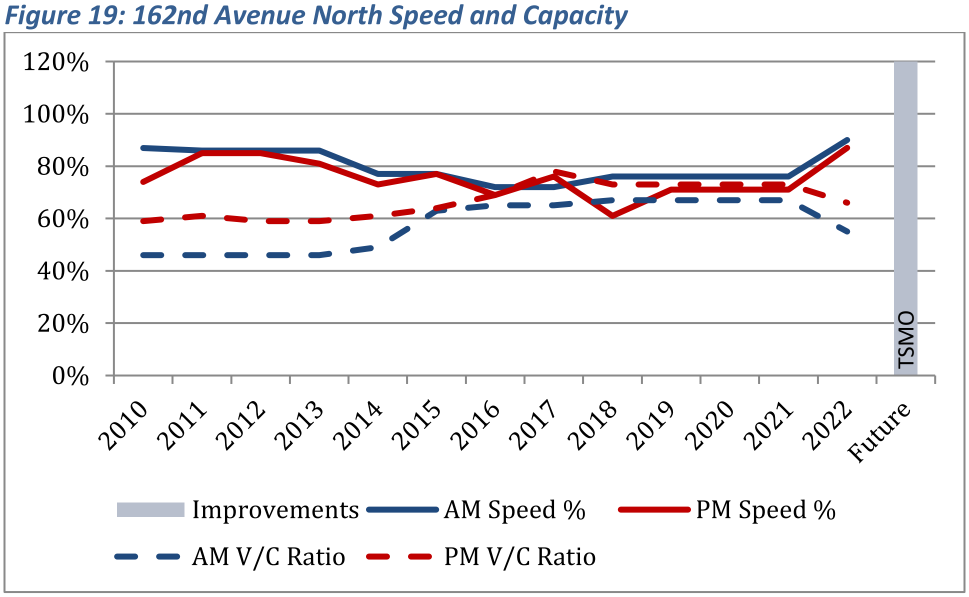
Figure 18: 137th Avenue Speed and Capacity



162nd Avenue North, Ward Road to Mill Plain

This is an increasingly busy corridor. Speed does not indicate corridor-wide congestion. Future corridor improvements include TSMO projects.

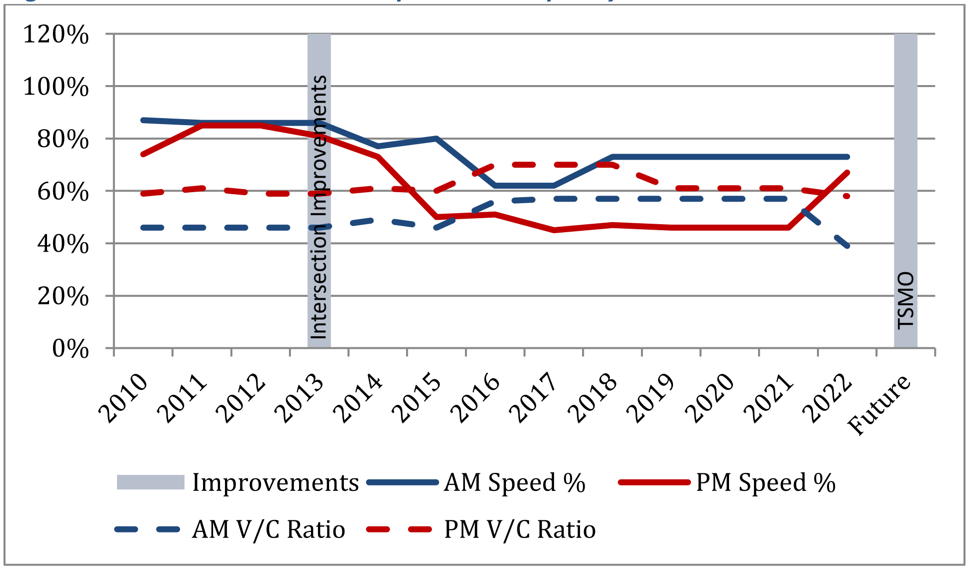
Figure 19: 162nd Avenue North Speed and Capacity



164th Avenue South, Mill Plain to SR 14

Since 2015, evening speed has shown a sharp decline, indicating substantial congestion. Future corridor improvements include signal timing and TSMO projects.

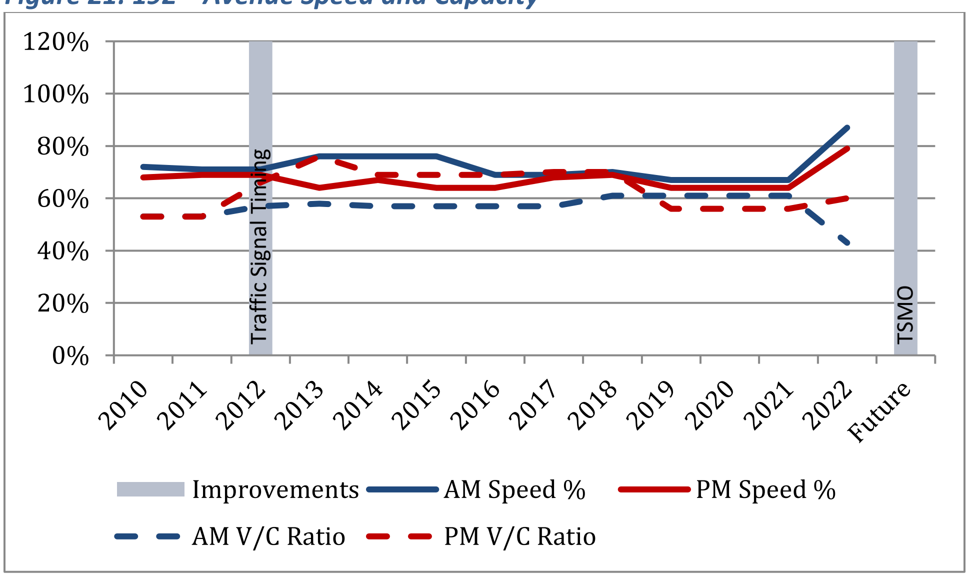
Figure 20: 164th Avenue South Speed and Capacity



192nd Avenue, SE 1st Street to SR 14

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

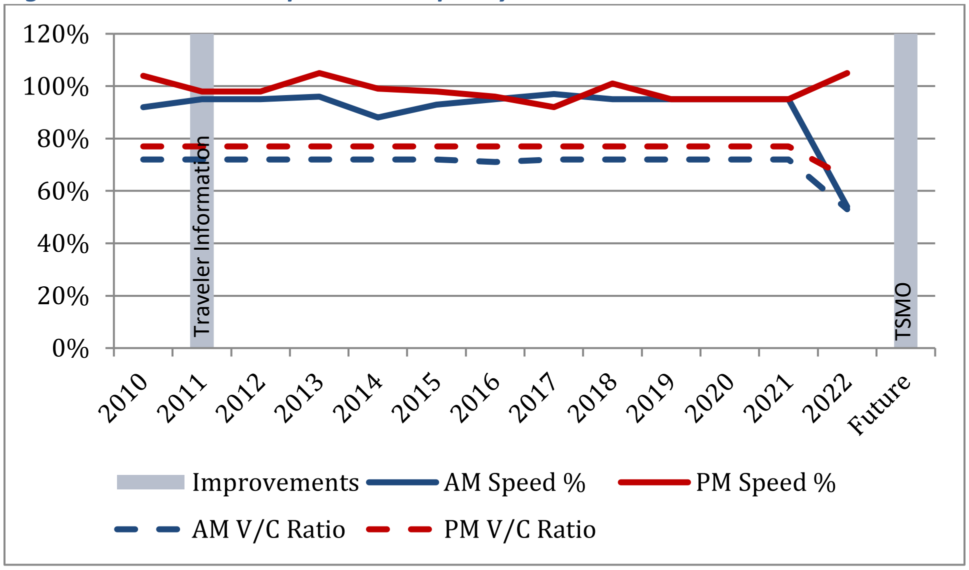
Figure 21: 192nd Avenue Speed and Capacity



SR 14 West, I-5 to I-205

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

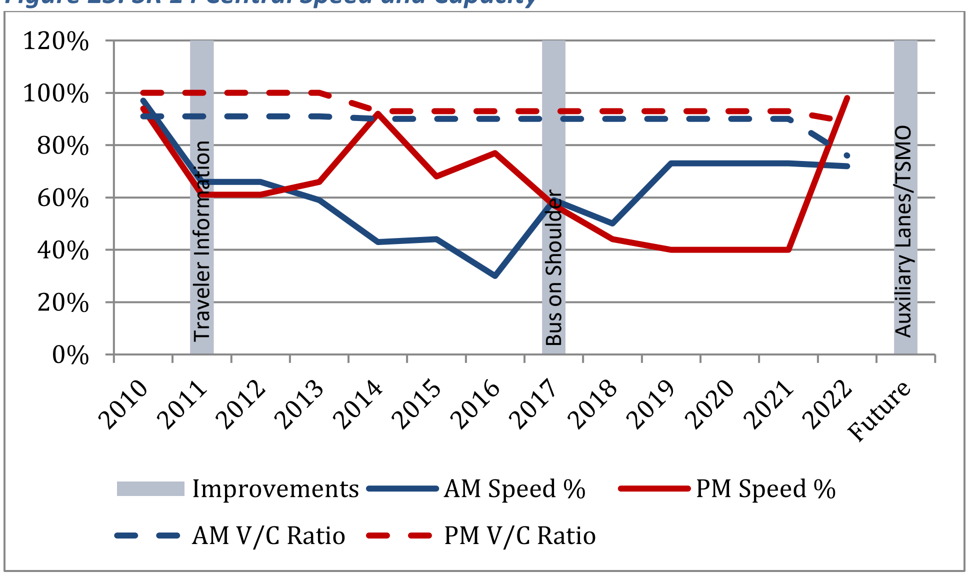
Figure 22: SR 14 West Speed and Capacity



SR 14 Central, I-205 to 164th Avenue

Both speed and capacity indicate both morning and evening corridor-wide congestion. Future corridor improvements include auxiliary lanes, interchange reconfiguration, and TSMO projects.

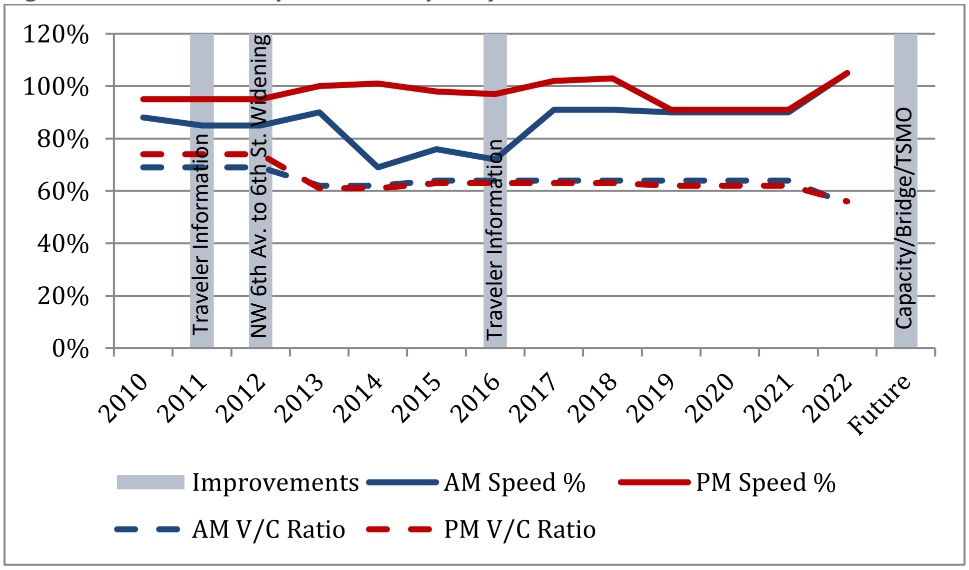
Figure 23: SR 14 Central Speed and Capacity



SR 14 East, 164th Avenue to County Line

Neither speed nor capacity indicates potential corridor-wide congestion. This corridor can be impacted by morning congestion backup from I-205. Future corridor improvements include added access and capacity, replacement of West Camas Slough Bridge, and TSMO projects.

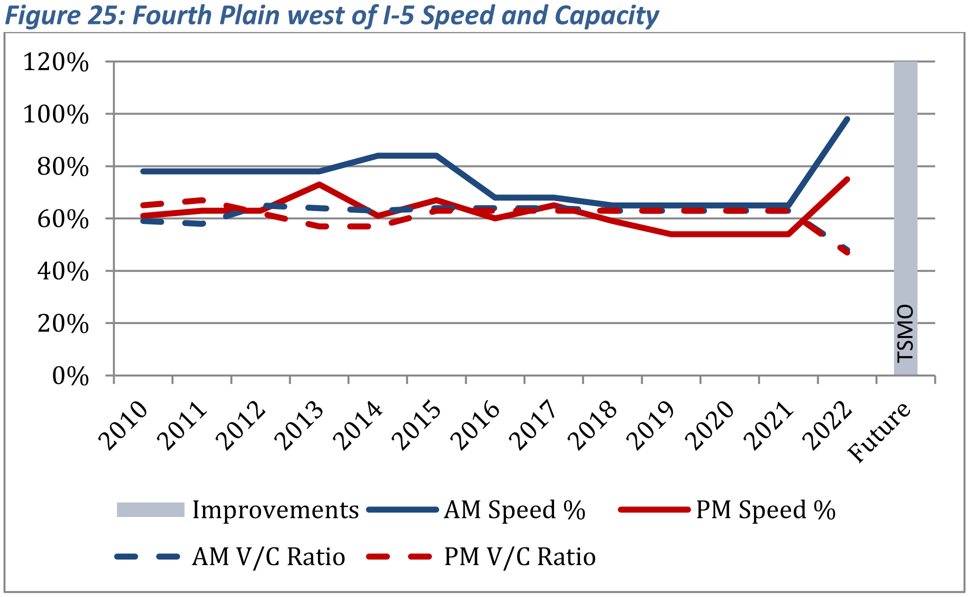
Figure 24: SR 14 East Speed and Capacity



Fourth Plain, I-5 to Port of Vancouver

Evening speed indicates potential congestion. Future corridor improvements include signal timing and TSMO projects.

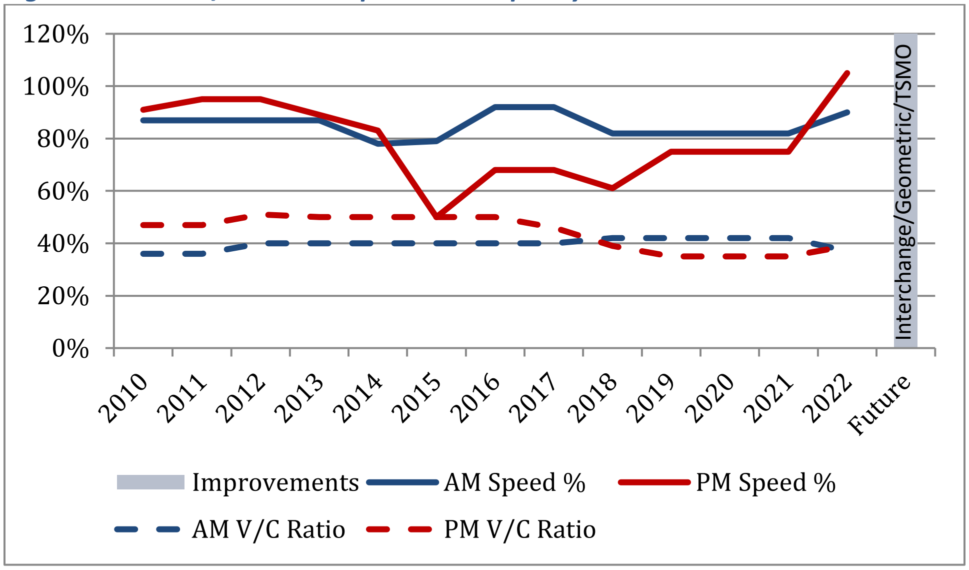
Figure 25: Fourth Plain west of I-5 Speed and Capacity



SR 501/Mill Plain, I-5 to Fourth Plain

Neither speed nor capacity indicates corridor-wide congestion. The decrease in speed in 2015 was due to the construction of an apartment complex in the corridor. Future corridor improvements include both road and interchange modifications to improve freight movement.

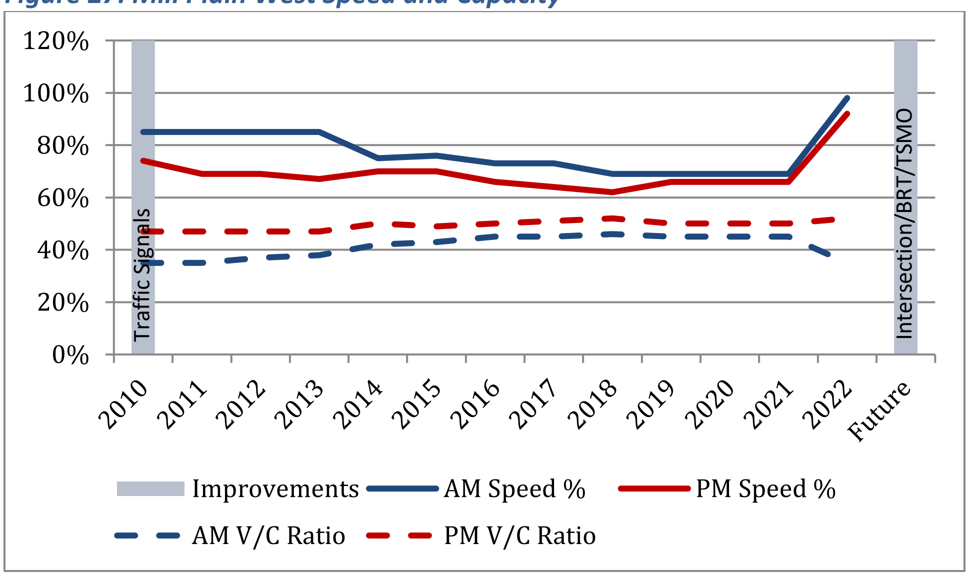
Figure 26: SR 501/Mill Plain Speed and Capacity



Mill Plain West, I-5 to I-205

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include 104th/105th intersection realignment, BRT, and TSMO projects.

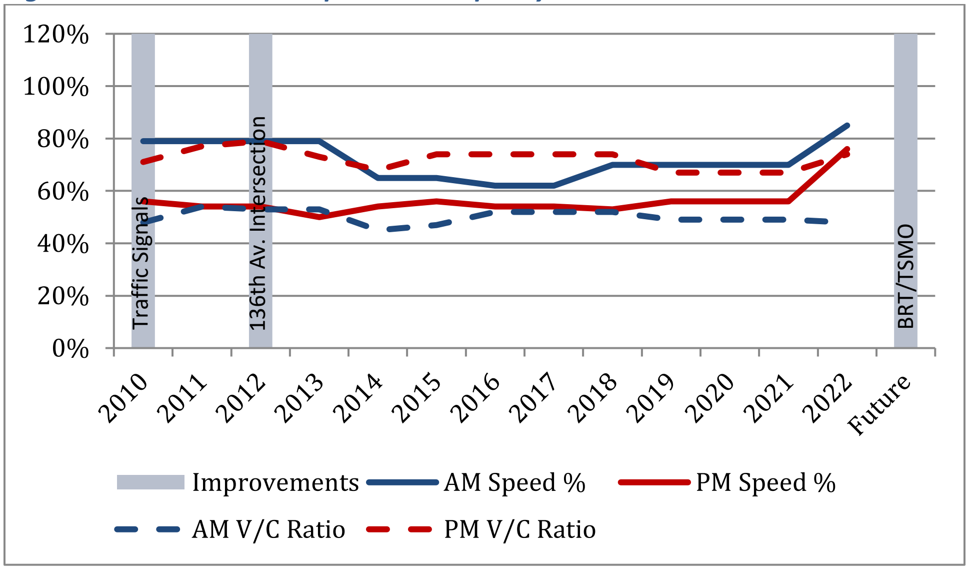
Figure 27: Mill Plain West Speed and Capacity



Mill Plain East, I-205 to 192nd Avenue

Evening speed indicates potential corridor-wide congestion. Future corridor improvements include BRT and TSMO projects.

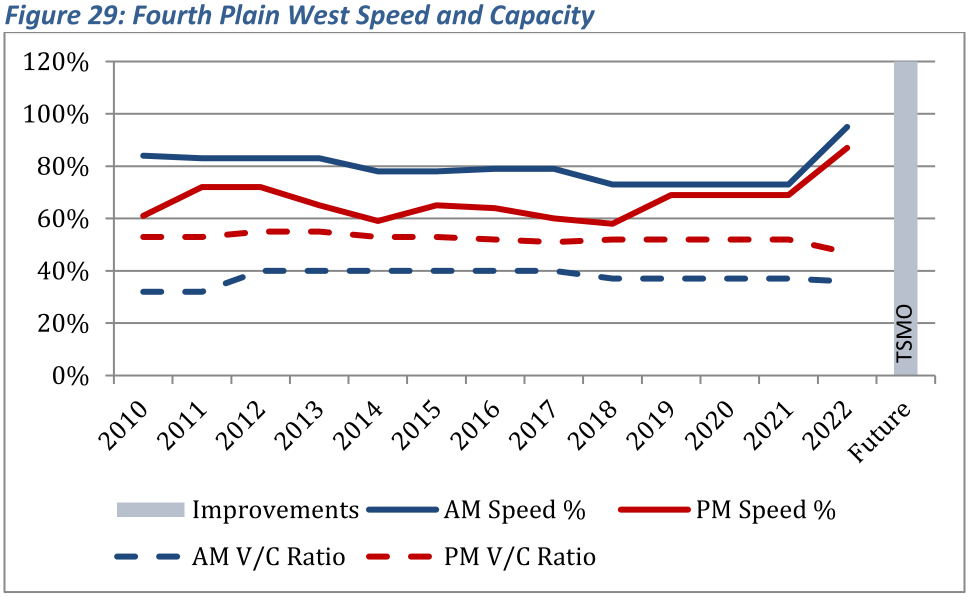
Figure 28: Mill Plain East Speed and Capacity



Fourth Plain West, I-5 to Andresen Road

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include road diet near I-5 and TSMO projects.

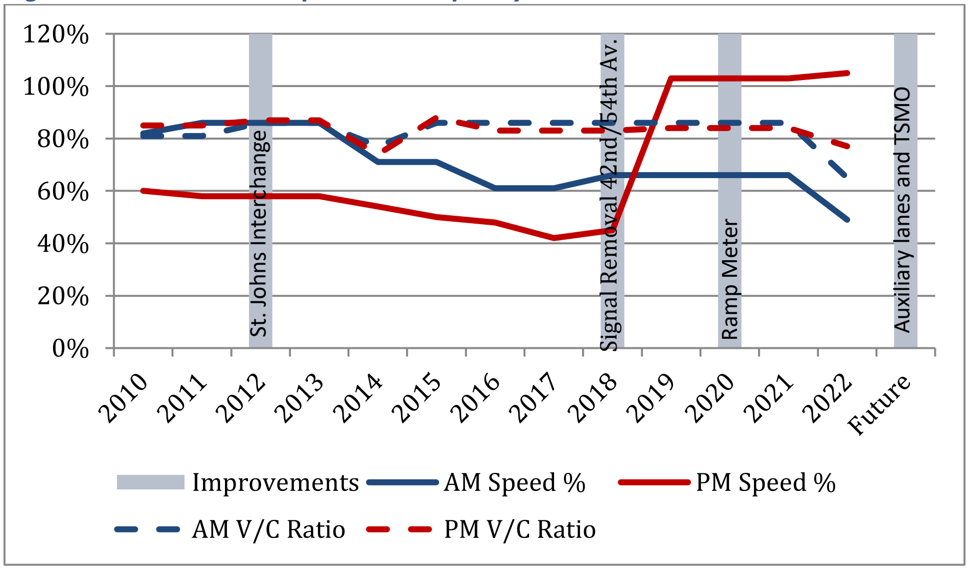
Figure 29: Fourth Plain West Speed and Capacity



SR 500 West, I-5 to Andresen Road

Evening speed indicates corridor-wide congestion. WSDOT removed signals at 42nd and 54th avenues in November 2018. Future corridor improvements include auxiliary lanes and TSMO.

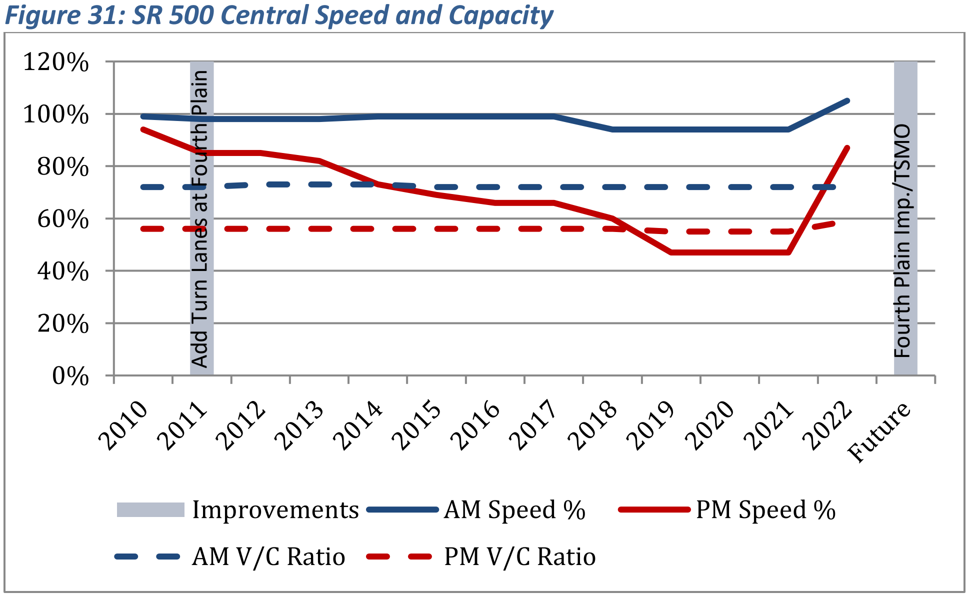
Figure 30: SR 500 West Speed and Capacity



SR 500 Central, Andresen Road to SR 503/Fourth Plain

Evening speed indicates congestion. All of the congestion can be attributed to the SR 500/Fourth Plain/SR 503 intersection. Future corridor improvements include improvements at Fourth Plain, auxiliary lanes, and TSMO projects.

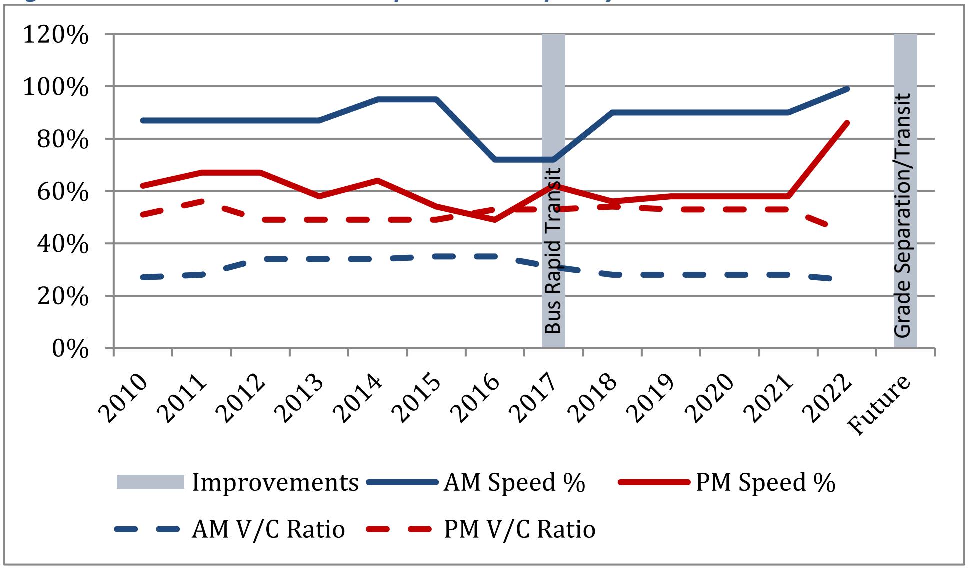
Figure 31: SR 500 Central Speed and Capacity



Fourth Plain Central, Andresen Road to SR 503

Evening speed indicates potential corridor-wide congestion. The Vine BRT construction impacted speed in year 2016. Future corridor improvements include intersection upgrade at SR 500/Fourth Plain and TSMO projects.

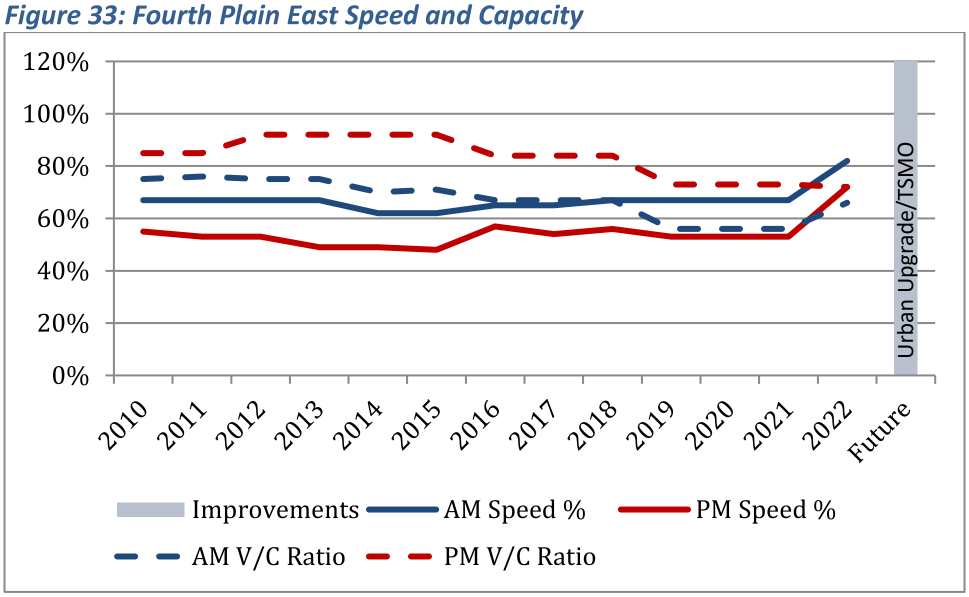
Figure 32: Fourth Plain Central Speed and Capacity



Fourth Plain East, SR 503 to 162nd Avenue

Both evening speed and capacity indicate corridor-wide congestion. In 2016, speed percentage improved as speed was lowered in the corridor. Future corridor improvements include intersection improvements at SR 503/Fourth Plain, transit, and TSMO projects.

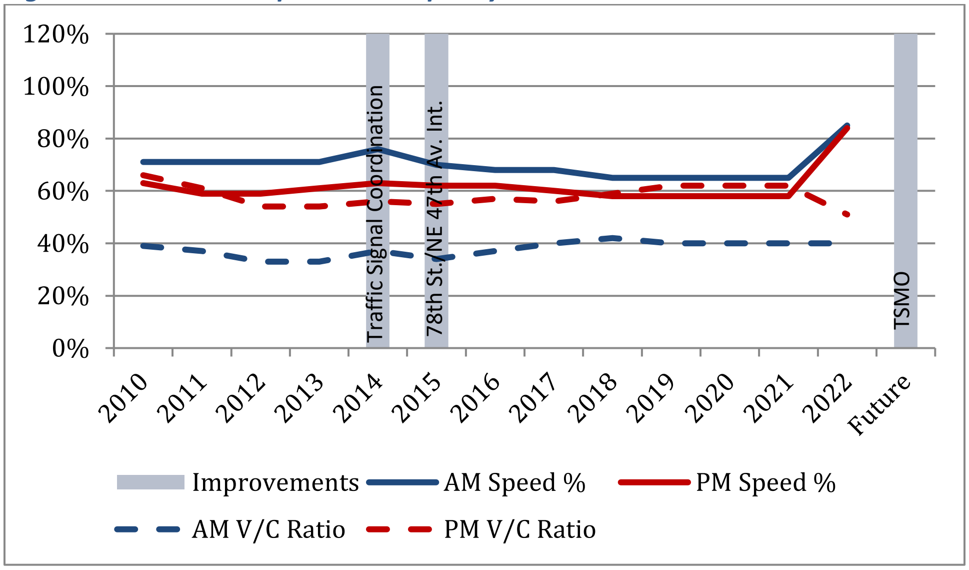
Figure 33: Fourth Plain East Speed and Capacity



78th Street, Lake Shore Avenue to SR 503

Evening speed indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

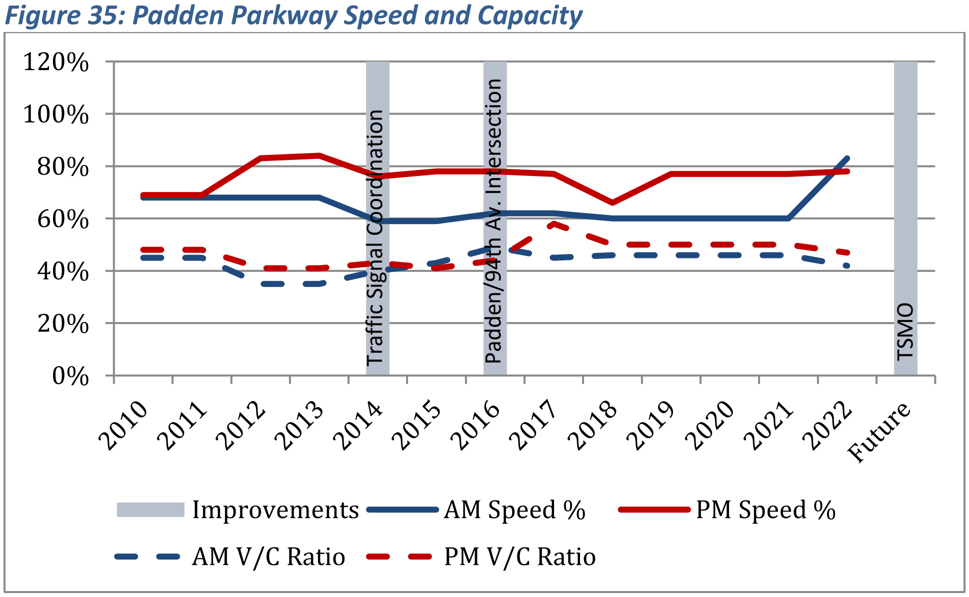
Figure 34: 78th Street Speed and Capacity



Padden Parkway, 78th Street to Ward Road

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

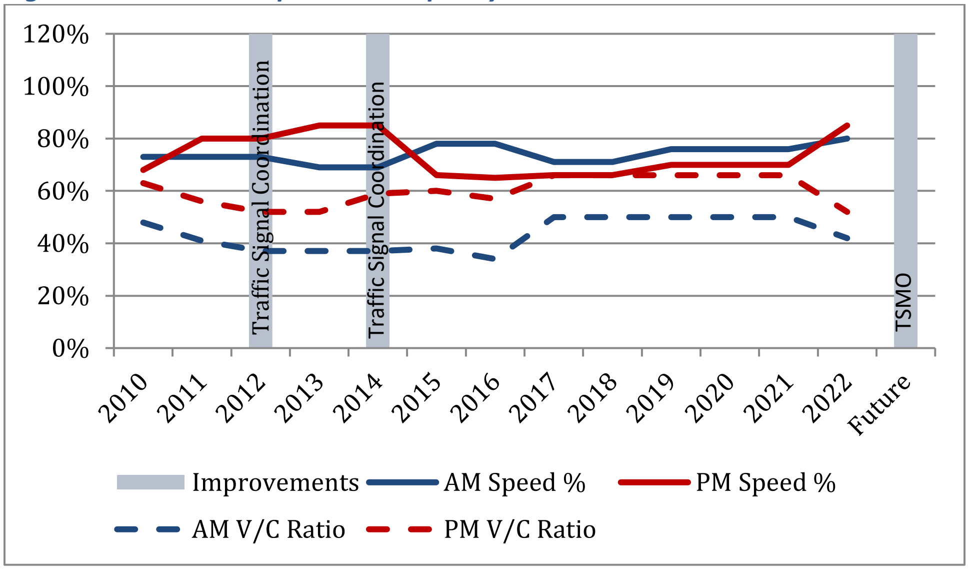
Figure 35: Padden Parkway Speed and Capacity



99th Street, Lake Shore Avenue to St. Johns Boulevard

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include TSMO projects.

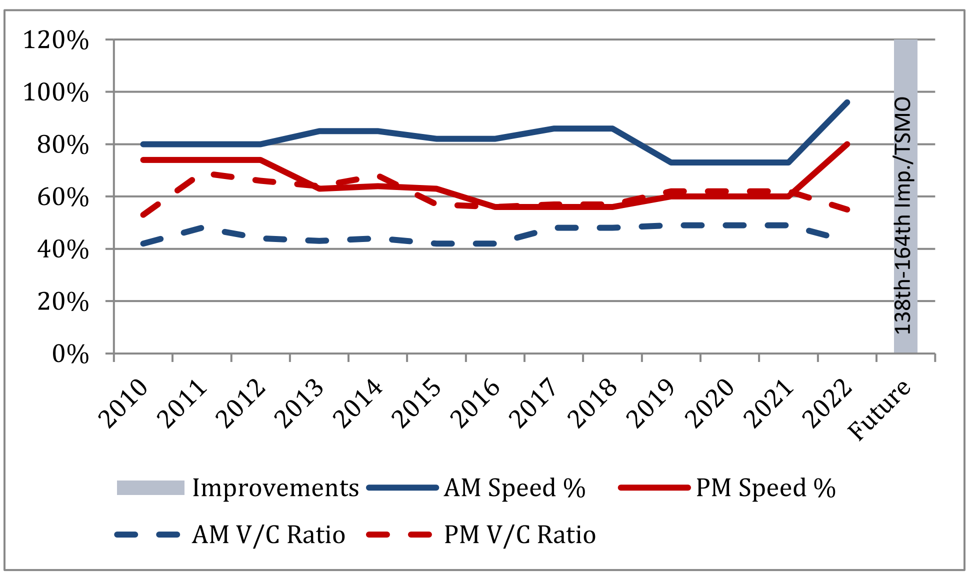
Figure 36: 99th Street Speed and Capacity



Burton Road, Andresen Road to 162nd Avenue

Evening speed indicates corridor-wide congestion. Future corridor improvements include urban upgrade from 138th Av. to 164th Av. and TSMO projects.

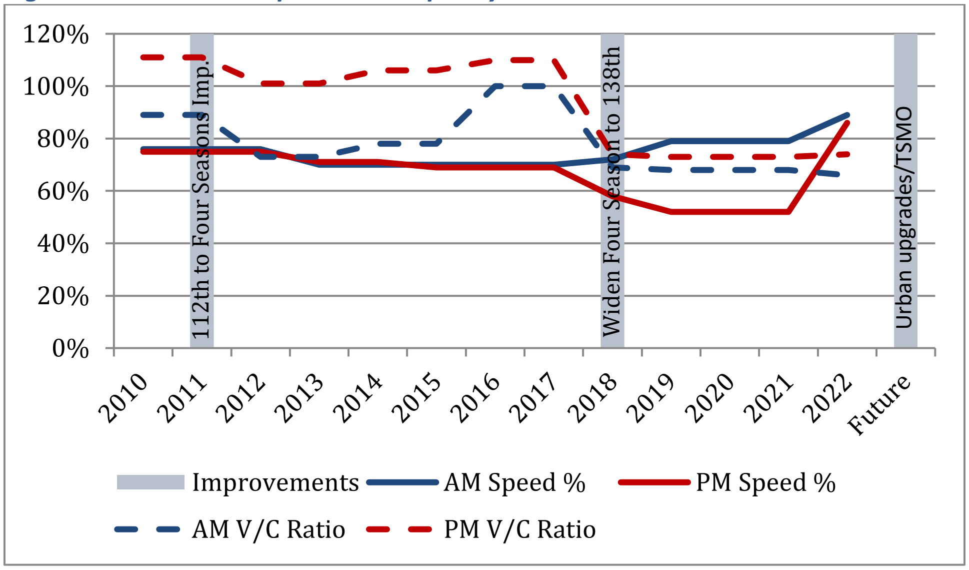
Figure 37: Burton Road Speed and Capacity



18th Street, I-205 to 162nd Avenue

Evening speed indicates corridor-wide congestion. Future corridor improvements include improving 138th Avenue to 162nd Avenue, transit, and TSMO projects.

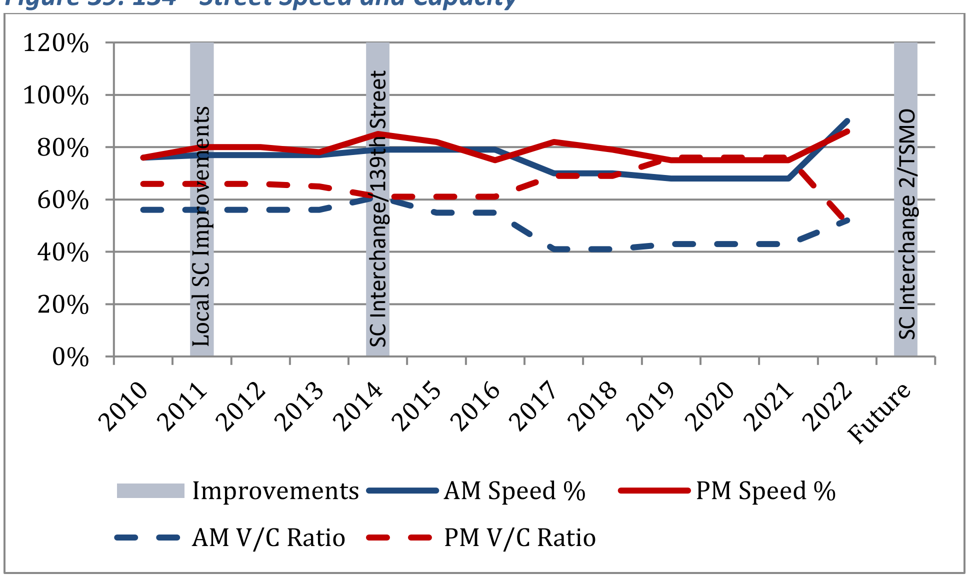
Figure 38: 18th Street Speed and Capacity



134th Street, 139th Street to 50th Avenue

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include Salmon Creek Interchange Phase 2, Salmon Creek Avenue improvements from WSU Entrance to NE 50th Avenue, and TSMO projects.

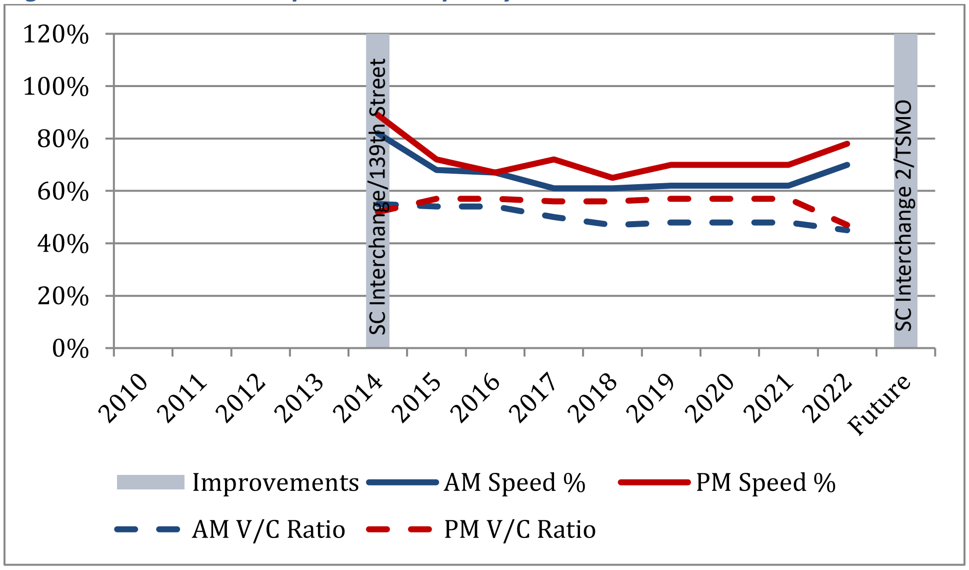
Figure 39: 134th Street Speed and Capacity



139th Street, NW 36th Avenue to NE 29th Avenue

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include Salmon Creek Interchange Phase 2 and TSMO projects.

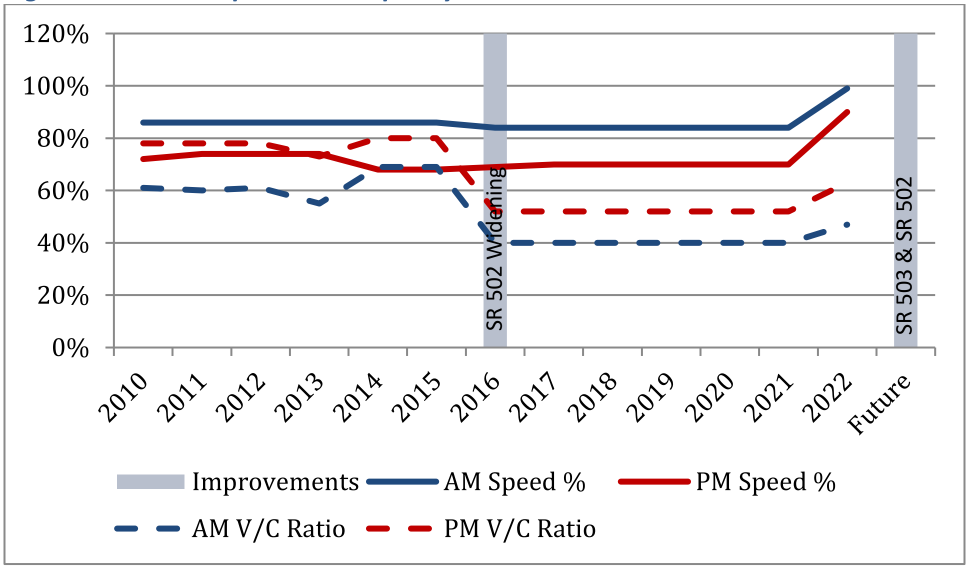
Figure 40: 139th Street Speed and Capacity



SR 502, I-5 to SR 503

Neither speed nor capacity indicates potential corridor-wide congestion. Future corridor improvements include SR 502/SR 503 intersection improvements.

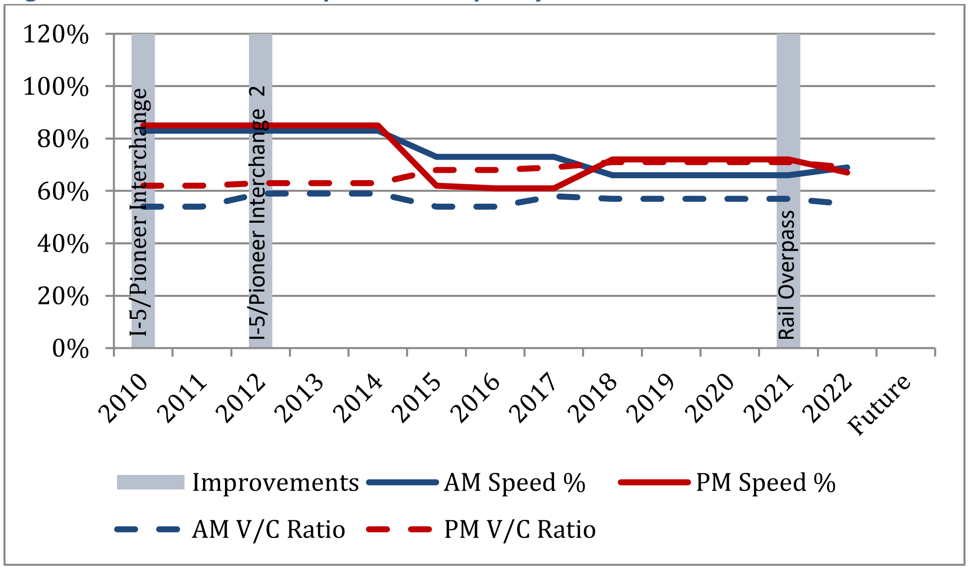
Figure 41: SR 502 Speed and Capacity



Pioneer Street (SR 501), I-5 to 9th Street

Neither speed nor capacity indicates potential corridor-wide congestion. The City of Ridgefield has a number of projects planned along the corridor to bring it up to urban design standards, including pedestrian facilities.

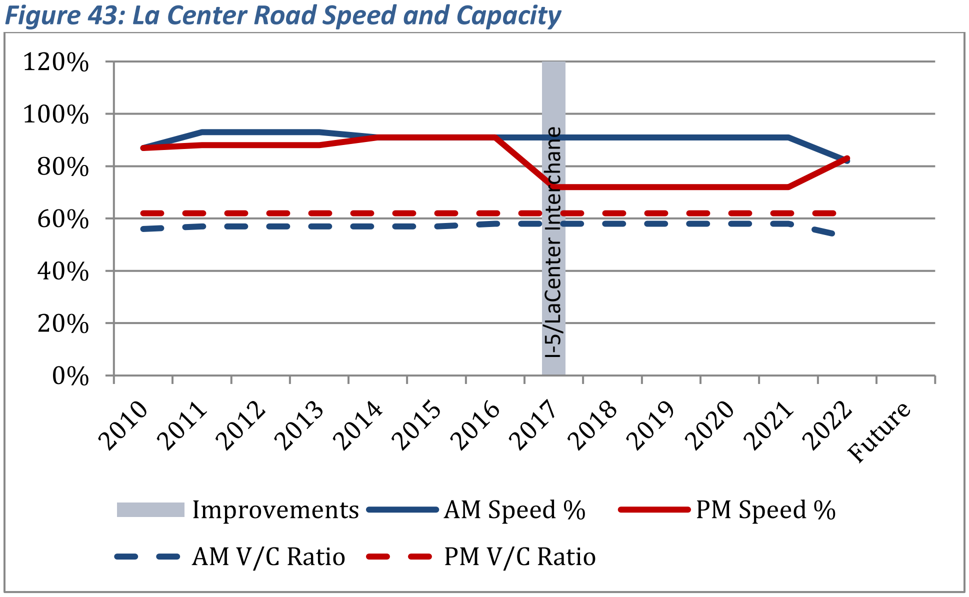
Figure 42: Pioneer Street Speed and Capacity



La Center Road, I-5 to East Fork Lewis River

Neither speed nor capacity indicates potential corridor-wide congestion. No future corridor improvements are planned.

Figure 43: La Center Road Speed and Capacity



Corridor Deficiencies

The corridor analysis shows that the Region needs to continue to focus on operational improvements and select capacity improvements and address strong demand for bistate travel. Table 9 identifies the corridors that should be the focus of capacity and speed reliability improvements:

Table 8: Corridors with Capacity and/or Speed Deficiencies

Corridor	Capacity	Speed	Needs
Highway 99		X	Intersection Improvements, Transit, and TSMO
I-5 South	X	X	I-5 Bridge Replacement, Interchanges, Transit, TSMO
Main Street	X	X	I-5 Bridge Replacement, Transit, and TSMO
I-205 South	X		Interchange modifications, transit, and TSMO
112th Avenue		X	Urban Upgrade, intersections, and TSMO
Grand/St. Johns		X	Intersection, signal timing, and TSMO
Andresen North		X	Intersection, signal timing, and TSMO projects
Andresen South		X	Intersection Improvement and TSMO
SR 503 South		X	Intersection improvement, Access Management, and TSMO
136/137/138 Ave.		X	Road improvements and TSMO
164th Av. South		X	Signal timing and TSMO
SR 14 Central	X	X	Auxiliary lanes and TSMO
Fourth Plain to Port		X	TSMO
SR 500 Central		X	Grade Separation, auxiliary lanes, and TSMO
Fourth Plain Central		X	Intersection improvement and TSMO
Fourth Plain East		X	Intersection improvements, transit, and TSMO
NE 78/76 Street		X	TSMO
Burton Road		X	Urban Upgrade and TSMO
18th Street		X	Urban upgrade, Transit and TSMO

Key Strategies

The implementation of the 20-year Regional Transportation Plan (RTP) is critical to support regional mobility and manage congestion. However, the lack of transportation revenue for key bottlenecks is contributing to worsening traffic conditions. The lack of progress on funding priority projects will result in delayed achievement of the Regional Transportation Plan benefits. The following are key projects to address congestion needs within Clark County:

Table 9: Key Congestion Needs

Identified Needs	In RTP	Funded
I-5 Interstate Bridge and Interchanges	✓	(P)
- I-5/Mill Plain Interchange (2026 Construction)		✓
- Bi-State Transit Expansion		
Freeway Operational Improvements (I-5, I-205, SR 14, SR 500)	✓	(P)
- Active Traffic Management I-205		✓
- Active Traffic Management SR 14		(P)
I-205/SR 14 Interchange		
I-205, SR 500 to Padden Widening	✓	
I-205/Salmon Creek Interchange Phase II	✓	
SR 14, I-205 to 164th Av. Widening	✓	✓
Major Intersection Upgrade	✓	
- SR 500/SR 503/Fourth Plain		
- SR 503/Padden Parkway		
- Andresen Rd./Padden Parkway		
- Fourth Plain/Andresen		
Arterial Operational Improvements	✓	
- Highway 99, 78th St. to 139th St.		
- Main Street, I-5 to Mill Plain		
- 112th Avenue, 28th St. to SR 500		
- St. Johns, Mill Plain to 72nd Av.		
- Andresen, Mill Plain to 119th St.		
- 136th/137th/138th Av., Mill Plain to Padden		
- 164th Avenue, SR 14 to Mill Plain		
- Mill Plain, 136th Av. to 192nd Av.		
- Fourth Plain, Port to 162nd Av.		
- SR 503, Fourth Plain to 99th St.		
- 78th/76th Street, Lakeshore to SR 503		
- Burton Road, Andresen to 162nd Av.		
- 18th Street, I-205 to 162nd Av.		
County-Wide Transit Expansion	✓	(P)
- Mill Plain BRT		(P)
- Local Routes		
- I-5/Highway 99 BRT		
- I-205 Bi-State Transit