CHAPTER 4 .
SYSTEM PERFORMANCE

Over the past decade, performance-based transportation planning has evolved to be an essential part of the statewide and metropolitan transportation planning process. During this time regional transportation planning agencies have been expanding the role of performance management—a strategic approach that uses data to help monitor and achieve desired outcomes—in their decision-making processes. Performance management is credited with improving project and program delivery, informing investment decision making, focusing staff on leadership priorities, and providing greater transparency and accountability to the public.

The Moving Ahead for Progress in the 21st Century (MAP-21) Act of 2012 set in motion the requirement to have a performance-driven, outcomes-based, transportation planning and decision-making process. Transportation performance management is systematically applied as part of an ongoing process. The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, was signed into law in November 2021. The IIJA continues the performance management approach to planning and programming and funds the enhancement of transportation systems' performance with a focus on repairing and rebuilding transportation infrastructure, improving transportation options, and supporting climate change mitigation, resilience, equity, and safety for all users.

Performance Based Planning and Programming

In an effort to measure and improve the performance of our regional transportation systems, a national performance-based planning and programming (PBPP) process has been established. Federal transportation legislation requires State Departments of Transportation, MPOs, and transit operators to conduct PBPP by carrying out the following activities:

The purpose of PBPP is to ensure that transportation investment decisions, both for long-term planning and short-term funding, are oriented toward meeting established goals and to inform decision making. For RTC, these decisions focus on achieving desired RTP goals and objectives for the Clark County region's multimodal transportation system. The RTP goals and objectives can be found in Chapter 3 – Meeting Future Needs. As mentioned above, performance-based planning and programming is organized into five performance areas within the seven national goals. RTC incorporated these seven-national planning goals and the 10 federal planning factors into the development of the 2024 RTP.

Progress toward these goals is measured through use of performance measures and targets, integrated into performance-based plans, programs, and projects by RTC and WSDOT.

In addition to monitoring performance towards the national goals and planning factors, WSDOT also provides a policy framework to assess and monitor the performance of the transportation system. Table 4-1 outlines how the RTP goals align with federally mandated performance measures, the federal planning factors, and the Washington policy framework.

Table 4-1. RTP Goals and Federal Performance Measures and Factors

RTP Goals	Federal Performance Measures	Federal Planning Factors	Washington Policy Framework
Safety and Security	Safety	Safety	Safety
	Public Transportation Agency Safety Action Plan	Public Transportation Agency Safety Action Plan	
Economic Vitality and Quality of Life	System Performance (Reliability)	Economic Vitality	Economic Vitality
		System Efficiency	Health and the Environment
	Freight Movement	Transit and Tourism	
	Congestion Reduction	Environment and Quality of Life	
Accessibility and Mobility	Transit Asset -Management Plan	Accessibility and Mobility	Mobility
	Infrastructure Condition	Multimodal Integration and Connectivity	Preservation
	Public Transportation Agency Safety Action Plan	System Preservation	Stewardship
		System Efficiency	
		Transit and Tourism	
Sustainability and Resiliency	System Performance (Reliability)	Resiliency and Reliability	Health and the Environment
	Freight Movement	Environment and Quality of Life	Stewardship
	Congestion Reduction		
	Infrastructure Condition		

Federal Performance Measures

The RTC is mandated by the federal government to follow a set of predetermined performance measures under the following five performance areas:

Each of these performance management categories have measures assigned to them to ensure that goals are being met. Target areas are data collection points to evaluate whether the measure is working effectively enough to meet the performance area. Table 4-2 displays each of the performance areas and the measure and indicators used to evaluate each area. A more detailed description of each of the performance areas can be found in Appendix K.

Table 4-2. Performance Measures and Targets

Transportation Performance Management Category/Plan	Measure	Target Areas
Safety (PM1)	Safety	Number of fatalities
		Rate of fatalities per 100 million vehicle miles traveled
		Number of serious injuries
		Rate of serious injuries per 100 million vehicles traveled
		Number of non-motorized fatalities and serious injuries
Infrastructure Condition (PM2)	Pavement Condition	Percent of pavement on the interstate system in good condition
		Percent of pavement on the interstate system in poor condition
		Percent of pavement on the non-interstate national highway system in good condition
		Percent of pavement on the non-interstate national highway system in poor condition
	Bridge Condition	Percent of bridges in good condition
		Percent of bridges in poor condition
System Performance, Freight, and Congestion Mitigation and Air quality (PM3)	Traffic Congestion	Percent of person miles traveled on the Interstate that are reliable
	Travel Time Reliability	Percent of person miles traveled on the non-interstate National Highway System that are reliable
	Freight Reliability	Truck travel time reliability index
Transit Asset Management (TAM) Plan	Rolling Stock	Percent of revenue vehicles by type exceeding the useful life benchmark
	Equipment	Percent of non-revenue vehicles by type exceeding the useful life benchmark
	Facilities	Percent of facilities by group rated under 3.0 on the Transit Economic Requirements Model scale
	Infrastructure	Percent of track segments by mode under performance restrictions
Public Transportation Agency Action Plan (PTASP)	Fatalities	Total number of reportable fatalities and rate per vehicle revenue miles by mode
	Injuries	Total number of reportable injuries and rate per vehicle revenue miles by mode
	Events	Total number of reportable events and rate per vehicle revenue miles by mode
	Reliability	Mean distance between major mechanical failures by mode

Congestion Management Process (CMP)

As the federally designated MPO for the Clark County region, RTC is required by federal law to maintain a Congestion Management Process (CMP). A CMP is a systematic process and tool for managing and monitoring traffic congestion and for identifying improvement strategies to alleviate the congestion. Federal regulations are not prescriptive regarding the methods and strategies of a CMP. This flexibility allows RTC to design appropriately for their individual needs. In May 2023, the RTC Board adopted the 2022 Congestion Management Report. See Appendix L.

RTC's annual CMP report, dating back to 2000, highlights data collection and transportation corridor analysis efforts over the years. Over time, the report has been expanded to include travel time, speed, vehicle occupancy, transit ridership, bus capacity, intersection delay, areas of concern, and other transportation system related information. The annual CMP report focuses on delivering improved transportation system performance information to decision-makers who must identify the most cost-effective strategies for addressing transportation congestion and improving mobility.

The Congestion Management Process

Quality of life and economic prosperity in the region depends on efficient mobility for both people and goods. There is recognition that strategic expansion of capacity is needed at key bottlenecks. Capacity expansion should occur after lower-cost efforts have been made to improve existing facilities' operations. The CMP focuses on delivering improved transportation system performance information to decision-makers who must identify the most cost-effective strategies for addressing transportation congestion and improving mobility and travel reliability.

The RTP focuses on improving mobility and system reliability. Efforts to address congestion in the Clark County region focus on improving system reliability and expanding our mobility options. Reliability is the degree to which congestion in a given travel corridor is affected by non-routine events. Improving reliability means travelers do not have to budget as much extra time to arrive on time at their destinations, even when routine congestion exists. While it is impossible to eliminate congestion, it must be actively managed to provide a reliable transportation system for users and better connect goods to the market and support travel across the region. Because the addition of capacity is constraint by financial resources as well as physical factors and environmental resources, strategies to manage capacity, such as travel demand reduction, increased transit access, making it easy for people to walk or bike instead of drive, and operational management of the existing and future transportation system, should be prime strategies to increase the capacity of a roadway, as they are often more effective in the long-term, and often less expensive to implement.

The CMP includes a systematic process for determining acceptable mobility levels in the Clark County region, measuring the effectiveness of transportation strategies on the transportation system, and prioritizing changes to strategies as needed. RTC will continue to establish and implement the most relevant and feasible CMP performance measures and congestion management strategies, which should be considered and refined iteratively in conjunction with other transportation planning processes.

Regional Performance

The 2024 RTP establishes a visionary policy framework that serves as the blueprint for our region. The RTP calls for identifying and developing metrics to measure progress made towards achieving the goals and objectives of the RTP. The intent is to monitor a select group of criteria that pertain to each of the RTP goals and measure them against established goals or national averages.

By using this format of data-driven, performance-based monitoring, RTC will be able to compare results of the measures to ensure progress is made towards the RTP goals, and if not, this monitoring will allow RTC and other partners to adjust projects and programs as necessary to realign with meeting the RTP goals.

The RTP system performance measures comprise both of metrics that can be measured today through the regional travel demand model, and those that will begin tracking after the adoption of the 2024 RTP. The regional travel demand model uses a base year of 2020. Although the base year is 2020, the data is not reflective of the impacts of the COVID-19 pandemic. The forecasted year is set in 2045—with a no-build outcome and RTP build outcome. The No-Build scenario reflects how the system would operate if no additional improvements are made to the system beyond what's already funded over the next six years. The performance measures used in the travel demand model represent an average of weekday travel conditions.

Regional Travel Demand Model

The Regional Travel Demand Model is a strategic planning tool that is the outcome of a coordinated planning effort conducted by RTC. Through a collaborative process, RTC engages with local planners, engineers, and economic development staff to develop population, employment, and transportation forecasts to identify a list of transportation projects throughout the metropolitan planning area the help to meet the needs and vision behind the RTP goals.

RTC uses a regional travel forecast model to forecast traffic and travel in the Clark County region. Data input into the transportation model includes population and employment, both for existing conditions and the forecast year. Future population and employment assumptions are developed to be consistent with local transportation plans. Transportation networks including roadways and transit routes for existing conditions and the forecast year also serve as major data inputs. The model estimates travel demand by evaluating the location and amount of population and employment by geographic location, and understanding the capacity, travel speed and connectivity offered by the roadway and transit system. Travel demand forecasting predicts the number, purpose, origin and destination, and route of "trips" on a transportation network as a function of land use patterns.

The RTC model is a standard "Four-Step" which is utilized across the country by both small and large MPOs. There are four major steps to the model:

- **Trip Generation** – How many trips are made?
- **Trip Distribution** – Where do trips go?
- **Mode Choice** – How are trips made (vehicle/bus)?
- **Trip Assignment** – What route did each trip travel?

The process of travel demand forecasting uses what we know about the existing world to predict what conditions will be like in the future. The forecast is not a guess or an estimate, but a projection based on empirical data and reasonable as-

sumptions about the future. RTC's Regional Travel Demand Model is a system of models that use mathematical equations to represent the choices made by people when they travel. The modeling system used by RTC is regularly reviewed by the appropriate federal agencies and peer review panels to ensure that it meets federal guidelines and the standard practices of other travel demand models used throughout the country.

The RTC model was built to include three scenarios to carry out analysis of existing and future transportation needs: 2020 Baseline Year, 2045 No-Build, and 2045 Constrained. The 2020 Baseline year includes 2020 traffic volumes on the 2020 network. The 2045 Constrained scenario includes forecast 2045 traffic volumes on the highway network with the regional projects from the 6-Year RTP and 20-Year RTP project lists. Model results for the 2045 Constrained scenario includes projects that are expected to be fiscally constrained in the next 20 years.

RTC's regional travel demand model produces a number of measures that are useful when evaluating transportation policy, plans and projects, including: directional link volumes, vehicle miles traveled, vehicle hours traveled, vehicle hours of delay, volume/capacity ratios, etc. The model's analysis is used to inform regional transportation policy decisions and provide forecasts for use in the development of transportation plans, studies, and projects. Performance measures, in terms of speed, vehicle miles traveled, lane miles of congestion and vehicle hours of delay are calculated within the model. Key stakeholders include RTC, governmental partners (counties and cities), Washington State Department of Transportation, C-TRAN, the ports of Vancouver, Camas/Washougal, and Ridgefield, and private sector clients. As Clark County is a part of the larger Portland/Vancouver metropolitan area, subsequently the RTC's travel model is part of Metro's transportation model.

Regional Model Limitations - While the model serves as a useful tool to support performance evaluation around each RTP goal, it is important to note that the travel demand model has limitations. For one, the model is dependent on data collected from other agencies, and other agencies forecast projects and programs into the future in different ways that are not compatible with the model RTC uses. Further, the model covers a 4-county region broken into 2,162 transportation analysis zones (TAZs). The regional nature of the model inputs and outputs limits the model's sensitivity at the local scale. For example, when calculating access to active transportation facilities or transit, the model evaluates this access across the county, including rural areas where little development exists. Therefore, data for these indicators skew negatively towards accessibility for these modes across the region even though the majority Clark County residents live in urbanized areas with these facilities. Furthermore, areas defined as nonequity and equity areas today are defined as such in the forecast model into 2045. However, as population growth continues, land uses change, and transportation networks evolve, these areas will likely change in definition by 2045.

Clark County Travel Study - The Southwest Washington Regional Transportation Council (RTC) conducts a household travel survey to better understand how household demographics and related travel behaviors change over time in Clark County. The results of the travel study are then used to refine the travel demand model.

The last survey was conducted in 2009. Since that time, the region has experienced rapid growth and increasing levels of congestion, creating a new environment that impacts household travel choice behavior. Technological changes, emerging societal trends and changes introduced by the COVID pandemic are additional factors that influence today's household travel activities.

At least 2,000 households throughout Clark County are expected to participate between April and December 2023. Randomly selected households will be invited to participate by a mailed invitation. Invited households will have the option to complete the survey online, by phone, or through a smartphone app. The survey will involve questions about general household information as well as travel details for given weekdays. All individual and household information collected in this study will remain strictly confidential. Results from travel behavior and household activity surveys provide valuable information that can be used to refine and update the regional travel forecast model.

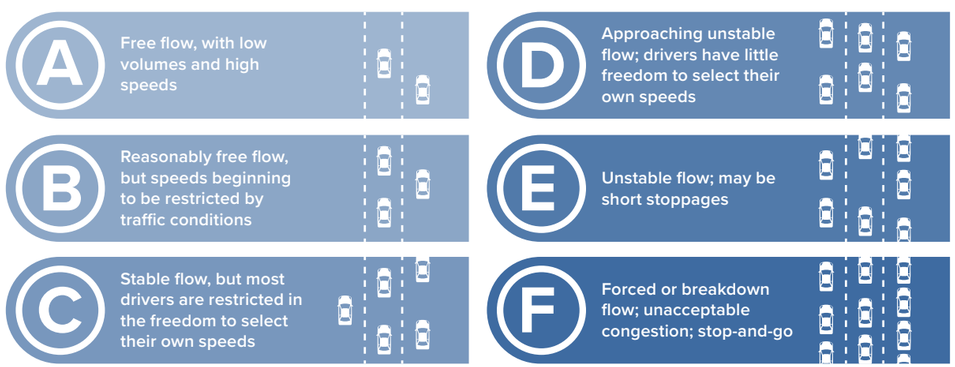
Level of Service Standards and Growth Management Act Concurrency

Level of service (LOS) is the term used to refer to a collection of measures of automobile congestion and travel time delay, and it is among the longest-standing and most widely adopted metrics for reporting transportation system performance in the country. LOS is intended to represent a traveler's perception of the quality of service provided by an individual intersection or roadway segment, as measured by the standard of free-flowing automobile traffic. LOS is also intended to easily communicate the results of detailed technical analyses to non-technical audiences. While LOS is widely used to describe roadway performance, LOS based on car travel does not reflect travelers' ability to get around using different modes like buses, biking, or walking. WSDOT considers additional measures, based on input from project stakeholders, to assess the performance of the overall transportation system.

The Growth Management Act (GMA) requires the establishment of a transportation LOS standard to be used as a benchmark for evaluating the performance of the transportation system. The LOS standard is also used as a benchmark to determine transportation concurrency – a GMA requirement that transportation improvements or services will be available to serve proposed development at the time of development or within six years of the development. GMA states that LOS standards should be established locally, and standards should be regionally coordinated with regional transportation Planning Organizations and WSDOT. These standards are used to identify deficient facilities and services and by local governments to judge if transportation funding is adequate to support land use development. Highways of statewide significance are exempt from concurrency requirements.

LOS standards represent the minimum performance level desired for transportation facilities and services within the region. They are used as a gauge to evaluate the quality of the transportation system. LOS is typically expressed as a letter score from LOS A, representing free flow conditions with minimal delays, to LOS F, representing breakdown flow with high delays. Intersection LOS is based on the average delay experienced by a vehicle traveling through an intersection. Delay at a signalized intersection can be caused by waiting for the signal or waiting for the queue ahead to clear the signal. Delay at unsignalized intersections is caused by waiting for a gap in traffic or waiting for a queue to clear the intersection. Most state highways are classified as LOS D in urban areas and LOS C in rural areas, but there are exceptions. The region's adopted standards for non-HHS state highways, E for urban areas and C for rural, in accordance with RCW 47.80.030(1)(c).

LOS metrics can provide a useful framework for understanding the operation of the system and its impacts on users. LOS is intended to represent a traveler's perception of the quality of service provided by an individual intersection or roadway segment, as measured by the standard of free-flowing automobile traffic. LOS is also intended to easily communicate the results of detailed technical analysis to non-technical audiences.



Level of Service Standards on Highways of Statewide Significance and Highways of Regional Significance - Congestion and Levels of Service continue to be issues of significance for Clark County as the region continues to experience rapid growth. In 1998 the Washington State Legislature passed House Bill 1487, otherwise known as the Level of Service (LOS) Bill. The Bill set new requirements relating to transportation and growth management planning. The LOS Bill aimed at clarifying how state-owned transportation facilities should be planned for and included in city and county comprehensive plans required under the Growth Management Act. The intent of the legislation was to enhance the coordination of planning efforts and plan consistency at the local, regional and state levels.

The key requirements to the bill are listed below:

- Designation of Highways of Statewide Significance (HSS). The State must give higher priority to correcting identified deficiencies on transportation facilities of statewide significance. In the Clark County region the HSS system is I-5, I205, SR-14 and SR-501 between I-5 and the Port of Vancouver.
- State-owned facilities, including Highways of Statewide Significance, to be included in local plans.
- Level of Service for Highways of Statewide Significance is set by the State in consultation with other jurisdictions.
- Level of Service for regional state highway facilities (not part of the HSS) to be set through a Regional Transportation Planning Organization (RTPO) coordinated process with state, regional and local input.
- Highways of Statewide Significance are statutorily exempt from local concurrency requirements.
- The LOS Bill does not address concurrency requirements for regional state highway facilities.

For the HSS system the Bill requires that the transportation element of the comprehensive plan address the land use impact on the state highway facilities. The State, in consultation, will set the LOS for the HSS system and they are exempt from local concurrency analysis. In Clark County, WSDOT has established a LOS 'C' for rural HSS facilities and 'D' for urban HSS facilities.

Non-HSS state highways, otherwise known as Highways of Regional Significance, in Clark County include SR-500, non-HSS segments of SR-501, SR-502, and SR-503 must also be addressed in the comprehensive plan, and have LOS set in coordination with the RTPO. The law is silent in terms of including or exempting them from local concurrency rules. In December 2001, the RTC Board adopted LOS 'E' or better for non-HSS urban state highway facilities and LOS 'C' or better on rural non-HSS facilities.

Local agencies should incorporate the LOS standards established for both the Highways of Statewide Significance and regional state highway facilities (or nonHSS) into the transportation elements of their Comprehensive Growth Management Plans. Once local Growth Management Plans are updated, RTC must certify that the local transportation elements are consistent with the Regional Transportation Plan, include LOS standards for the HSS and non-HSS segments and describe the impacts of land uses on the state highway system.

Clark County Region Needs and Challenges by RTP Goal

Expected major changes for our region's future include rapidly changing growth patterns, evolving lifestyle choices, stresses on the quality of our human and natural environments, public health risks, and the ramifications of past planning practices and policies. This RTP strives to address these challenges, while providing for our transportation needs. For us to have a successful regional plan, we must develop metrics to track the strategies needed to address the following needs/challenges:

Safety and Security

- Increasing safety for all users
- Identifying metrics to develop effective countermeasures – identifying the causes of crashes in the region and finding effective strategies.

Economic Vitality and Quality of Life

- Ensuring equity throughout the transportation system
- Enhancing connectivity and access for freight movement

Accessibility and Mobility

- Ensuring access for all to employment, goods, and services
- Addressing the mobility needs of an aging population.
- Expanding mobility connectivity for active transportation users
- Understanding and addressing the types and causes of congestion.

Sustainability and Resiliency

- Maintaining the existing system in a state of good repair
- Reducing energy usage and greenhouse gas emissions
- Increasing system resiliency
- Preserving aging infrastructure

Measuring into the Future: RTC Performance Measures

RTC is committed to developing performance measures, in addition to the required federal performance, to evaluate progress towards RTP goals and performance of the regional transportation network. The 2024 performance measures can be analyzed currently from regional model output or through GIS analysis. There are additional desired measures for which data is not currently available but that RTC will strive to report in the 2029 RTP. Table 4-3 displays the RTP performance measures by RTP goal, and identifies them as measures that are already analyzed due to being a federal requirement, being available through the existing regional model and census or GIS data, or will be tracked in the next RTP update.

Table 4-3. RTC Performance Measures

Goals	Performance Measure	Target Areas	Federal Performance Measure	2024 RTP Regional Performance Measure	Desired Measure for 2029 RTP
Safety and Security	Fatalities and serious injuries rate	Number of fatalities, per 100 million vehicle miles traveled	X		
		Number of serious injuries, per 100 million vehicle miles traveled	X		
		Miles of Level 1 and 2 Level of Traffic Stress (LTS) bike facilities on the regional network			X
Economic Vitality and Quality of Life	Freight Movement	Truck Travel Time Reliability Index	X		
	System Reliability	Percent of person miles traveled on the interstate that are reliable	X		
		Percent of person miles on the non-interstate national highway system that are reliable	X		
		Percent of thruway roads where speeds are 75% of posted speed or less for two or more hours per day		X	
		Percent of principal arterials where speeds are 80% of posted speed or less, for two or more hours per day		X	
	Percentage of non-SOV Travel	Percentage of work and nonwork trips by auto drivers		X	
		Percentage of work and nonwork trips by shared rides		X	
		Percentage of work and nonwork trips by transit riders		X	
		Percentage of work and nonwork trips by nonmotorized users		X	
	Congestion Reduction	Annual hours of peak-hour excessive delay	X		
		Percentage of active transportation trips per day			X
		Percent of mode share shift from car to active transportation between 2024 RTP and 2029 RTP		X	
Accessibility and Mobility	Pavement	Percent of pavement on the interstate system in good condition	X		
		Percent of pavement on the interstate system in poor condition	X		
		Percent of pavement on the non-interstate national highway system in good condition	X		
		Percent of pavement on the non-interstate national highway system in poor condition	X		
Accessibility and Mobility (cont'd)	Bridge	Percent of bridges in good condition	X		
		Percent of bridges in poor condition	X		
	Rolling Stock - Transit	Percent of revenue vehicles by type exceeding the useful life benchmark	X		
		Percent of non-revenue vehicles by type exceeding the useful life benchmark	X		
	Access to a Transit facility	Percent of population within a 1/3 mile of a transit facility		X	
		Percent of population within a 1/3 mile of a high-frequency transit facility		X	
		Percent of equity areas within a 1/3 mile of a transit facility		X	
		Percent of equity areas with a 1/3 mile of a high-frequency transit facility		X	
	Transit	Transit Service Boarding		X	
		Transit Service Hours		X	
		Percentage of all transit trips per day			X
		Percentage trips of high frequency transit per day			X
		Percent of mode share shift from car to transit between 2024 RTP and 2029 RTP			X
		Miles of fixed route transit service			X
	Access to an Active Transportation Facility	Percentage of active transportation trips per day			X
		Percent of mode share shift from car to active transportation between 2024 RTP and 2029 RTP			X
	Equity	RTP Investment in Equity Areas		X	
		Percent of households within a 1/3 mile of a school (private or public, elementary, middle, or high school)			X
Sustainability and Resiliency	VMT Reduction Target	VMT and VMT per capita		X	
		VMT and VMT per capita by equity area		X	
	GHG emissions reduction	TBD - XX% by 2050			X

RTP Performance

This section provides a summary of how each of the RTP goals are progressing by performance measure, broken down by metrics analyzed following federal requirements and metrics currently available through the regional travel demand model, census and GIS data. Measures that will be tracked in the next RTP update are also listed. A detailed description and analysis of the federal performance measures can be found in Appendix K.

Federal Performance

In collaboration with MPOs, WSDOT develop targets to document future performance expectations. MPOs have the option to set their own targets or adopt the one set by the state. RTC supports the federal performance targets set by WSDOT and C-TRAN and has agreed to plan and program projects, including those in the RTP and TIP, so that they contribute to the achievement of the federal performance targets. Targets are reported annually to document progress. A 5-year rolling average is calculated for each performance measure. The rolling 5-year average value is set as the baseline performance. Table 4-4 provides a summary of the baseline assessment for each federal performance measure.

Table 4-4. Federal Performance Measures

RTP Goal	Federal Performance Measure		Target Area	Baseline[1]	Expected to Meet Target
Safety	Safety target set to achieve zero fatal and serious injury crashes by 2030	1-Year target 25.8	Number of fatalities	30.1	No
		1-Year target 0.856	Rate of fatalities per 100 million VMT	0.999	No
		1-Year target 100.5	Number of serious injuries	117.3	No
		1-Year target 3.313	Rate of serious injuries per 100 million VMT	3.866	No
		1-Year target 24.6	Number of nonmotorized fatalities and serious injuries	28.7	No
Economic Vitality and Quality of Life	Ratio of peak travel times to a “normal” travel time	4-Year target 72.5%	System Reliability - Person-miles traveled on the interstate that are reliable	82.4%	Yes
		4-Year target 88.4%	System Reliability - Person-miles traveled on the non-interstate NHS that are reliable	87.8%	Yes
	Ratio of peak truck travel times to a “normal” travel time	4-Year target 1.53%	Freight Movement - Truck travel time reliability	1.49	Yes
Accessibility and Mobility	Transit Asset Management	4-Year target 80%	Rolling Stock/Vehicles – Percentage of each vehicle class at or below useful life benchmark		
		4-Year target 70%	Facilities – Percentage of each facility class greater than2.5 Transit Economic Requirements Model scale		
		4-Year target 70%	Equipment – Percentage of equipment class or below useful life benchmark		
Sustainability and Resiliency	Pavement Condition -Targets set to assess the condition of pavements and bridges on the NHS	4-Year target 30.0%	Interstate System in Good Condition	46.0%	Yes
		4-Year target 4.0%	Interstate System in Poor Condition	1.9%	No
		4-Year target 45.0%	Non-interstate System in Good Condition	20.3%	Yes
		4-Year target 5.0%	Non-interstate System in Poor Condition	4.2%	Yes
	Bridge Condition	4-Year target 30%	Percent of NHS bridges in good condition	32.8%	Yes
		4-Year target 10%	Percent of NHS bridges in poor condition	8.8%	Yes

1 Measures under the Safety performance - RTC portion of the State safety target for 2019-2023 (5-year rolling average). Measures under the Economic Vitality and Quality of Life and Sustainability and Mobility performance – $-year targets are set instead of using a 5-year rolling average. Measures under the Accessibility and Mobility performance – C-TRAN’s TAM establishes 4-year targets – TAM targets informs when to repair/refurbish/replace equipment.

Regional Performance

Analysis of the regional designated system using the travel demand model can yield data to analyze the percent of population who drives alone, share a ride, use transit or active transportation to complete their trips. The travel demand model uses 2020 as the baseline year, and includes 2020 traffic volumes on the 2020 network. It then compares the baseline data to the 2045 Constrained scenario, and No-Build scenario. The 2045 Constrained scenario includes forecast 2045 traffic volumes on the highway network with the regional projects from the 6-Year RTP and 20-Year RTP project lists. Model results for scenario includes projects that are expected to be fiscally constrained in the next 20 years.

It is important to note that while several of the performance measures listed in Table 4-3 cannot be reported on for this RTP, it is RTC's intent to build a performance measure foundation in this RTP. These performance measures that will help us track the progress in achieving the RTP goals. Progress for these new, additional performance measures will be reported on the 2029 RTP.

SAFETY AND SECURITY

All performance measures that can be reported on for safety and security currently fall under federal performance measures (see Table 4-4). RTC aims to start tracking additional regional performance measures related to safety and security in the 2029 RTP.

ACCESSIBILITY AND MOBILITY

Percentage of auto drivers, shared rides, transit riders, and nonmotorized users: Equity vs. Nonequity Areas

The data shown in Table 4-5 sets a baseline between equity areas and nonequity areas for those who drive alone, share a ride, use transit, or use active transportation to complete their trips. Based on this data, there are modest increases in equity areas sharing a ride, using transit, and using active transportation based on the model outputs for the 2045 Constrained scenario. There is also a modest decrease for equity areas in driving alone based on the model, although there is a slight increase nonequity area in driving alone. That said, the 2045 Constrained scenario shows less of an increase in driving alone than the non-build scenario when compared to the 2020 Baseline year.

Table 4-5. Weekday Trips by Mode

Weekday Trips by Mode (Equity/Nonequity Areas) - Clark County, All Trips						
	2020 Base		2045 No-Build		2045 Constrained	
	trips	share	trips	share	trips	share
Drive Alone	753, 742	46.0%	1,093,602	46.7%	1,077,889	46.1%
Equity Areas	465,534	45.4%	525,093	45.4%	515,462	44.5%
Nonequity Areas	288,208	47.1%	568,509	48.0%	562,427	47.5%
Shared Ride	646,317	39.5%	934,464	39.9%	938,674	40.1%
Equity Areas	394,914	38.5%	447,375	38.7%	448,658	38.8%
Nonequity Areas	251,403	41.1%	487,089	41.2%	490,016	41.4%
Transit	21,377	1.3%	35,340	1.5%	44,200	1.9%
Equity Areas	16,332	1.6%	26,330	2.3%	32,943	2.8%
Nonequity Areas	5,045	0.8%	9,010	0.8%	11,257	1.0%
Walk/Bike	127,897	7.8%	166,202	7.1%	168,854	7.2%
Equity Areas	32,491	3.2%	105,458	9.1%	107,199	9.3%

Weekday Trips by Mode (Equity/Nonequity Areas) - Clark County, All Trips						
	2020 Base		2045 No-Build		2045 Constrained	
	trips	share	trips	share	trips	share
Nonequity Areas	95,407	15.6%	60,743	5.1%	61,655	5.2%
School Bus	87,649	5.4%	111,041	4.7%	111,045	4.7%
Equity Areas	53,269	5.2%	53,116	4.6%	53,119	4.6%
Nonequity Areas	34,380	5.6%	57,924	4.9%	57,926	4.9%
Total Person Trips	1,636,982		2,340,649		2,340,662	
Total Equity Area Trips	1,024,890	62.6%	1,157,373	49.4%	1,157,380	49.4%
Total Nonequity Area Trips	612,092	37.4%	1,183,276	50.6%	1,183,282	50.6%

Transit Service Hours

The number of transit service hours is important for evaluating access and mobility because the transit service must be operating for people to use the service. Based on the model (Table 4-6), it is anticipated that there will be 2,502 more hours of transit service in the 2045 Constrained scenario compared to 2,034 more hours of transit service in the 2045 No-Build scenario. While it is important to note that transit revenue hours are slightly less in the 2045 Constrained scenario, the difference is almost negligible between the No-Build and Constrained scenarios at 33 more hours of transit service. This is likely due to the anticipated investments in implementing the BRT routes.

Table 4-6. Average Weekday Transit Revenue

Average Week Day Transit Revenue Hours Estimate			
Service	**2020**	**2045 No-Build**	**2045 Constrained**
TriMet Bus	5,439	6,822	6,786
LRT	902	832	999
Streetcar	174	183	184
Commuter Rail	14	11	11
BRT	-	250	600
C-TRAN	**655**	**1,068**	**1,035**
Other	206	259	276
Total	7,390	9,424	9,892

Transit Service Boardings

Based on the model (Table 4-7), it is anticipated that total transit boardings will nearly double from existing conditions today. While there is also a significant increase in total transit boardings in the 2045 No-Build scenario, it is important to note the difference between the 2045 No-Build and the 2045 Constrained scenario is 116,600 more total transit boarding in the 2045 Constrained scenario.

There is a similar trend when comparing C-TRAN bus rapid transit (BRT) boardings between the 2045 No-Build and 2045 Constrained scenarios. BRT is a transit service that has a 15 minute or less headway. Bus service has more than a 15-minute headway and depending on the bus line, can be as long as an hour before the next bus arrives. As seen in Table 4-7, there were 4,100 C-TRAN BRT boardings in 2020. It is anticipated that this would increase to 31,900 C-TRAN BRT boardings in the 2045 Constrained scenario for 2045, whereas C-TRANs BRT would only increase to 24,300 boardings in the 2045 No-Build scenario. It is important to note that while regular C-TRAN bus boardings increase more so in the 2045 No-Build scenario, it is likely that some of those riders are opting for a BRT service instead.

Table 4-7. Average Weekday Transit Boardings

Average Weekday Transit Boardings				
Boardings				
Line(s)	**Service**	**2020**	**2045 No-Build**	**2045 Constrained**
Blue Line Max	LRT	53,200	79,900	80,500
Red Line Max	LRT	24,400	43,800	44,900
Green Line Max	LRT	22,000	30,700	-
Green/Purple SWC Line Max	LRT	-	-	65,500
Yellow/Orange Line Max	LRT	23,000	34,700	-
Yellow/Orange IBR Line Max	LRT	-	-	55,200
Commuter Rail	Commuter Rail	1,700	4,500	3,600
Division FX	BRT	-	-	11,100
TV Highway BRT	BRT	-	-	11,600
TriMet Bus	TriMet Bus	236,700	342,800	370,300
Streetcar	Streetcar	17,400	24,900	25,200
Tram	Other	800	1,600	1,000
C-TRAN BRT	**C-TRAN**	**4,100**	**24,300**	**31,900**
C-TRAN Bus	**C-TRAN**	**26,900**	**31,300**	**28,200**
Local Shuttle	Other	500	3,500	6,300
Other Bus	Other	2,600	4,900	5,300
Total		**413,300**	**644,300**	**760,900**

Percent of Households Within a 1/3 of a Transit or High-Frequency Transit Facility: Equity Areas vs. Nonequity Areas

Based on the model, it is anticipated that equity areas will have more access to a both a transit and high-frequency transit facility. It is anticipated that nonequity areas will see a slight decrease in being within a 1/3 mile of a transit facility. However, nonequity areas see a slight increase in having a 1/3 of a mile access to a high-frequency transit service.

Table 4-8. Households Near Transit and High-Frequency Transit

	2020 Base		2045 No-Build		2045 Constrained	
	households	**share**	**households**	**share**	**households**	**share**
Within 1/3 mile of Transit	98,193	52.5%	131,227	50.0%	131,318	50.0%
Equity Areas	78,960	68.0%	96,373	74.0%	96,646	74.2%
Nonequity Areas	19,233	27.0%	34,854	26.3%	34,671	26.2%
Within 1/3 mile of High Frequency* Transit	19,700	10.5%	47.719	19.2%	48,982	18.7%
Equity Areas	18,407	15.9%	43,819	33.7%	45,085	34.6%
Nonequity Areas	1,293	1.8%	3,900	2.9%	3,897	2.9%

*Transit with 15 minute headways or less

Table 4-9. Weekday Trips by Mode

Weekday Trips by Mode (Work/Nonwork) - Clark County, All Trips						
	2020 Base		2045 No-Build		2045 Constrained	
	trips	**share**	**trips**	**share**	**trips**	**share**
Drive Alone	753,742	46.0%	1,093,602	46.7%	1,077,889	46.1%
work	319,781	75.80%	466,243	76.10%	454,697	74.20%
nonwork	433,961	35.70%	627,360	36.30%	623,191	36.10%
Shared Ride	646,317	39.50%	934,464	39.90%	938,674	40.10%
work	54,972	13.00%	79,125	12.90%	83,758	13.70%
nonwork	591,345	48.70%	855,339	49.50%	854,917	49.50%
Transit	21,377	1.30%	35,340	1.50%	44,200	1.90%
work	14,581	3.50%	20,207	3.30%	26,398	4.30%
nonwork	6,796	0.60%	15,133	0.90%	17,802	1.00%
Walk/Bike	127,897	7.80%	166,202	7.10%	168,854	7.20%
work	32,491	7.70%	46,967	7.70%	47,695	7.80%
nonwork	95,407	7.90%	119,235	6.90%	121,159	7.00%
School Bus	87,649	5.40%	111,041	4.70%	111,045	4.70%
Total Person Trips	1,636,982		2,340,649		2,340,662	
Total Work Trips	421,824		612,541		612,549	
Total Nonwork Trips	1,215,158		1,728,108		1,728,113	
Non-SOV Trips*	795,592	**48.6%**	1,136,006	**48.5%**	1,151,728	**49.2%**
Bike + Walk + Transit*	149,275	**9.1%**	201,542	**8.6%**	213,054	**9.1%**

*Does not include School Bus trips in calculations

ECONOMIC VITALITY AND QUALITY OF LIFE

Percentage of Single Occupancy Vehicles, Shared Rides, Transit Riders, and Nonmotorized Users

The data on Table 4-10 sets a baseline for those who drive alone, share a ride, use transit, or use active transportation to complete their trips to work or nonwork locations. Based on this data, there are modest increases in sharing a ride, using transit, and using active transportation to complete both work and nonwork trips based on the model outputs for the 2045 Constrained scenario. There are also modest decreases in driving alone to work based on the model, although there is a slight increase in driving alone to nonwork locations.

Table 4-10. Average Weekday Trips by Mode (Clark County, Work and Non-Work Trips)

	2020 Base		2045 No-Build		2045 Constrained	
	trips	share	trips	share	trips	share
Drive Alone	753,742	46.0%	1,093,602	46.7%	1,077,889	46.1%
work	319,781	75.80%	466,243	76.10%	454,697	74.20%
non-work	433,961	35.70%	627,360	36.30%	623,191	36.10%
Shared Ride	646,317	39.50%	934,464	39.90%	938,674	40.10%
work	54,972	13.00%	79,125	12.90%	83,758	13.70%
non-work	591,345	48.70%	855,339	49.50%	854,917	49.50%
Transit	21,377	1.30%	35,340	1.50%	44,200	1.90%
work	14,581	3.50%	20,207	3.30%	26,398	4.30%
non-work	6,796	0.60%	15,133	0.90%	17,802	1.00%
Walk/Bike	127,897	7.80%	166,202	7.10%	168,854	7.20%
work	32,491	7.70%	46,967	7.70%	47,695	7.80%
non-work	95,407	7.90%	119,235	6.90%	121,159	7.00%
School Bus	87,649	5.40%	111,041	4.70%	111,045	4.70%
Total Person Trips	1,636,982		2,340,649		2,340,662	
Total Work Trips	421,824		612,541		612,549	
Total non-Work Trips	1,215,158		1,728,108		1,728,113	
Non-SOV Trips*	795,592	**48.6%**	1,136,006	**48.5%**	1,151,728	**49.2%**
Bike + Walk + Transit*	149,275	**9.1%**	201,542	**8.6%**	213,054	**9.1%**

*Does not include School Bus trips in calculations

30 Minutes by Auto Mode and 45 Minutes by Transit by Equity Area vs. Nonequity Area

The travel demand model sets a baseline for traveling to regional jobs either within 30 minutes by automobile or within 45 minutes by transit ride and compares results between equity and nonequity areas. It is important to note that the reason why the time frame for a transit ride is 15 minutes longer than a car ride is because studies have shown that people are more willing to use transit when transit rides are comparable to driving times.

Table 4-11 shows that equity areas see an increase in access to regional jobs both for driving an automobile and taking transit. Nonequity areas see a slight decrease in access to regional jobs when driving an automobile. Nonequity areas also a slight increase access to regional jobs by transit, although it is not as high as equity areas. This is in part due to more high-frequency transit routes being implemented in existing equity areas.

Table 4-11. 30 Minutes by Auto Mode and 45 Minutes by Transit

	2020 Base		2045 No-Build		2045 Constrained	
	jobs	share	jobs	share	jobs	share
Regional Jobs @ 30 min by Auto	391,361	32.8%	411,254	27.3%	484,154	32.1%
Equity Areas	442,270	37.0%	498,663	33.1%	607,107	40.3%
Nonequity Areas	308,342	25.8%	325,291	21.6%	363,254	24.1%
Regional Jobs @ 45 min by Transit	35,698	3.0%	50,635	3.4%	54,942	3.6%
Equity Areas	51,478	4.3%	88,150	5.9%	96,300	6.4%
Nonequity Areas	9,964	0.8%	13,740	0.9%	14,269	0.9%

Time Travel Reliability for Thruways and Principal Arterials for 2 or More Hours Per Day

Time travel reliability is defined in two ways: 1) percent of thruways where speeds are 75% of the posted speed or less, for two or more hours per day; and 2) percent of principal arterial reliability where speeds of 80% of posted speed or less, for two or more hours a day. Regardless of road type and scenario, it is expected that the percentage of lane miles that are unreliable will increase. However, it is anticipated that thruway lane miles will increase by 8.3 percent under the Constrained scenario for 2045 whereas the percentage of unreliable lane miles would increase by 13.3 percent in the No-Build scenario for 2045. It is also anticipated that principal arterials lane miles will also increase in percentage of unreliable lane miles by 6.2 percent under the Constrained scenario for 2045, whereas the percentage of unreliable lane miles would increase by 7.7 percent in the No-Build scenario.

Table 4-12. VMT Per Capita

2020			
	Lane Miles Total	**Unreliable Lane Miles**	**% Lane Miles Unreliable**
Thruways	372.509	28.673	7.7%
Principal Arterials	320.205	16.831	5.3%
2045 No-Build			
	Lane Miles Total	**Unreliable Lane Miles**	**% Lane Miles Unreliable**
Thruways	372.632	78.735	21.0%
Principal Arterials	320.699	41.806	13.0%
2045 Constrained			
	Lane Miles Total	**Unreliable Lane Miles**	**% Lane Miles Unreliable**
Thruways	379.259	60.825	16.0%
Principal Arterials	322.185	37.086	11.5%

SUSTAINABILITY AND RESILIENCY

VMT per Capita: Equity vs. Nonequity Areas

As shown on Table 4-12, it is anticipated that VMT will decrease overall in the 2045 Constrained scenario. It is also expected that VMT would decrease both for equity and nonequity areas.

Table 4-13. Time Travel Reliability for Thruways and Principal Arterials

	2020 Base		2045 Constrained	
	VMT	**per Capita VMT**	**VMT**	**per Capita VMT**
Clark County Households	4,613,551	9.12	5,945,598	8.84
Equity Areas	2,192,538	7.19	2,162,534	6.80
Nonequity Areas	2,420,013	12.06	3,783,065	10.65