

# Technical Memorandum: Performance Measures

## Introduction

The Regional Connectors Study (RCS) scope of work includes a vision statement and a task to develop goals, objectives, and performance measures for the project. This work was carried out in the spring and early summer of 2019 through a series of meetings with the RCS Working Group. The study performance measures were approved by the RCS Steering Committee on July 9, 2019. This memorandum documents the development process and approved performance measures for the RCS scenario planning. These performance measures, and any that may be refined or added in the course of the model development process, will be reported for the scenario-based analyses, and a subset of the measures will be selected in Phase 3 for evaluating the performance of the Regional Connector alternatives in the process of selecting candidate alternatives.

## Vision and Goals

At the RCS Working Group meeting on March 28, 2019, the study team kicked off the development of project Vision and Goals (see attachment A). The Working Group affirmed the project Vision as stated in the “Guidance for Scope of Work” of the RCS Request for Proposals. The Vision states that the RCS study will:

*Establish a regional long-term vision that investigates 21<sup>st</sup> century transportation options that connect the Peninsula and the Southside across the Hampton Roads Harbor that enhance economic vitality and improve the quality of life in the region.*

Through a series of discussions in the March 28<sup>th</sup> and April 11<sup>th</sup> RCS Working Group meetings, a set of themes were established to shape the project goals and objectives, and these were combined into a final draft set of goals and objectives that were presented in the RCS Working Group Webinar #5 on May 2, 2019, along with a draft set of performance measures. With input from the Working Group, the goals and objectives were refined and approved for referral to the Steering Committee in June. The approved goals and objectives for the RCS are shown in Figure 1. The detail of the initial study themes that were synthesized into the final goals and objectives is provided in Attachment A.

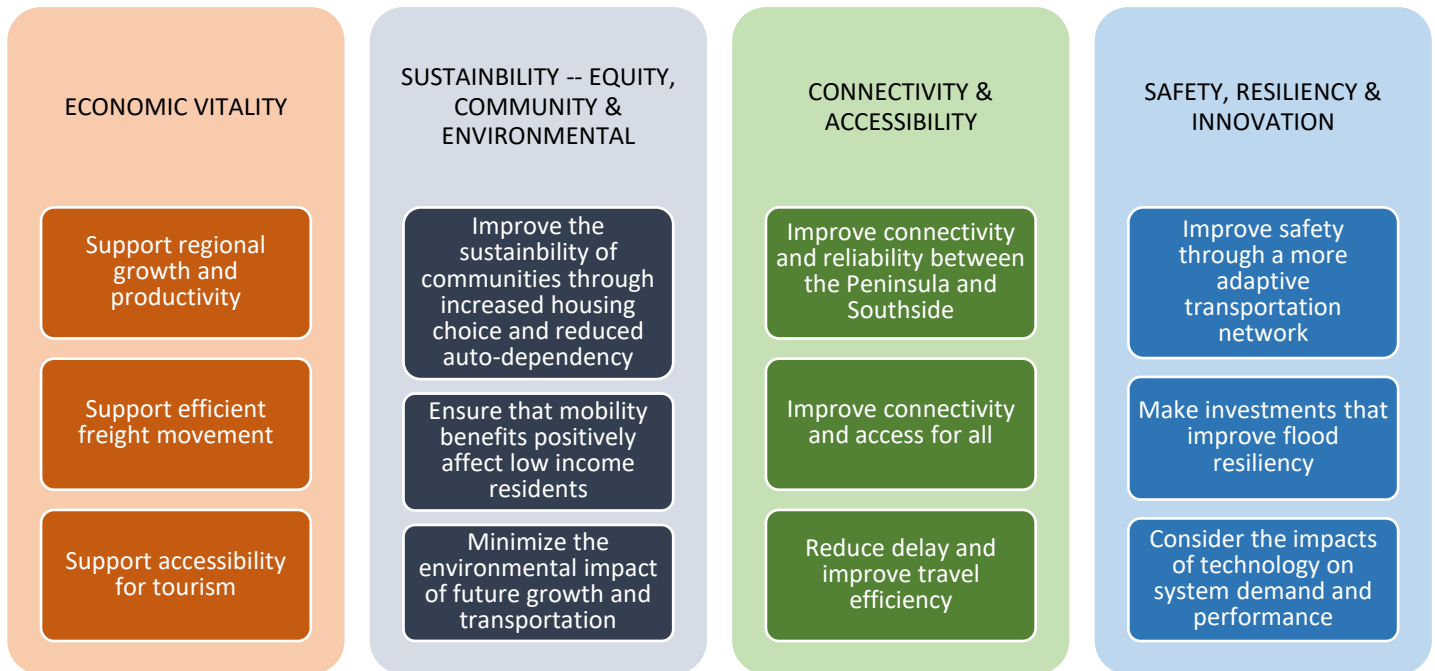


Figure 1. Regional Connector Study Goals and Objectives

## Performance Measures

The RCS Working Group discussed concepts and priorities for the performance measures in their April 11, 2019 meeting, after which they requested the consultant team to develop a recommended set of performance measures. The framework provided in the Working Group meetings shaped the content of the draft performance measures. The performance measures also were shaped by the following guiding principles for developing strong performance measures:

- Specific – it is clear what you are measuring
- It accurately reflects the goal/objective that you are trying to accomplish
- The units make sense (dollars, hours, jobs, etc.)
- Only add complexity if it adds meaning (ex: VMT per capita is meaningful)
- Spatial – some measures can be both summarized regionally and shown spatially, and both have value
  - Ex: congestion can be summarized (regional hours of delay) but also mapped on the network
- Comparative – it focuses on a meaningful comparison
  - Ex: compared to 2045 baseline, compared to the same scenario with other RCS alternatives, etc.

The draft performance measures were initially developed in relation to the objectives – each began as a specific measure grounded in one objective. However, the Working Group noted that, once defined, many performance measures add insight to multiple objectives. Therefore, the draft performance measures are presented in a matrix format, denoting the relevant objectives for each measure. The full set of draft performance measures is shown in Figure 2. As indicated in the second and third columns of Figure 2, some of the measures focus primarily on the scenario land use outcomes, and others focus primarily on the transportation network outcomes. The first set of measures (“Scenario Measures”) will only be presented for the four land use scenarios: 2045 Baseline, Greater Growth on the Water, Greater Growth in Urban Centers, and Greater Suburban/Greenfield Growth. As mentioned above, the final set of performance measures may include some adjustments and additions based on the final model runs to be able to highlight the most meaningful measures that show clear differences between the scenarios based on each model’s outputs. When the scenario model runs are performed with the RCS Alternatives, the results will focus on the “Candidate Project Measures.” Note that many measures, particularly those with accessibility and/or economic components, fall in both categories.

Several terms used in the performance measures reflect important transportation and regional planning concepts. These terms are explained as follows.

- **Accessibility** – the collective ability of travelers to access specified types of destinations (such as jobs) within a reasonable travel time by the specified mode of travel (automobile, transit, etc.) on the transportation network
- **Reliability** – the predictability of travel times; for example, the amount of extra time that must be allowed for a certain trip to accommodate the worst level of recurring congestion
- **Productivity** – the economic value of time lost or gained through travel, such as time spent in traffic congestion or time gained in higher-speed travel or shorter commutes
- **Mode Share Index** – the profile of the share of travel for each mode (automobile, transit, bike, etc.) for a particular area such as a traffic analysis zone (TAZ).
- **Place Types** – land use categories that describe distinctly different development patterns such as “mixed use residential” and “neighborhood commercial”
- **Delay** – the difference between congested and uncongested travel times
- **Circuitry** – the difference between the distance of a route traveled on the network and the straight-line distance between origin and destination
- **Bottlenecks** – congestion hot-spots that create upstream congestion, such as lane reductions or busy interchange weaving areas

Several measures begin with “Change in” in parentheses – this indicates that the baseline metric will be reported for the 2045 Baseline scenario, and the Greater Growth Scenario performance will be reported as the change in that metric relative to the 2045 Baseline. The

performance measures will be provided in a dashboard format to facilitate understanding and comparisons of the data by the RCS Working Group, RCS Steering Committee, stakeholders, and the public.

June 21, 2019	GOALS →		ECONOMIC VITALITY			SUSTAINABILITY -- EQUITY, COMMUNITY & ENVIRONMENTAL			CONNECTIVITY & ACCESSIBILITY			SAFETY, RESILIENCY & INNOVATION		
	OBJECTIVES →		Support regional growth and productivity	Support efficient freight movement	Support accessibility for tourism	Improve the sustainability of communities through increased housing choice and reduced auto-dependency	Ensure that mobility benefits positively affect low income residents	Minimize the environmental impact of future growth and transportation	Improve connectivity and reliability between the Peninsula and Southside	Improve connectivity and access for all	Reduce delay and improve travel efficiency	Improve safety through a more adaptive transportation network	Make investments that improve flood resiliency	Consider the impacts of technology on system demand and performance
Performance Measures ↓	Scenario Measure	Candidate Project Measure												
(Change in) Lost productivity from delay	■	■	✓							✓	✓			
(Economic impact of change in) Labor market accessibility	■	■	✓						✓	✓	✓			
Performance on the freight network - total delay + spatial results	■			✓					✓		✓			
Change in hours of delay on freight network		■		✓					✓		✓			
Economic impact of change in delay and reliability on the freight network		■		✓										
(Change in) Percent of freight traffic on secondary streets - total + spatial	■	■		✓				✓				✓		
Traffic volumes at at-grade rail crossings		■						✓			✓	✓		
(Change in) Accessibility to major tourist attractions	■	■			✓									
Percent of population in multi-family housing	■					✓								
(Change in) Mode share index	■	■				✓								
(Change in) Transit ridership	■	■				✓								
Percent of growth near key destinations	■					✓								
Average trip length by purpose		■				✓				✓	✓			
Percent of jobs/pop within (15 min) drive time to airport or Amtrak station	■	■			✓					✓				
Ratio of user costs for low income travelers to all user costs (ratio of savings)	■	■					✓							
Low income household access to employment	■	■					✓							
Percent of growth near transit stops	■					✓	✓	✓						
Percent of growth in urban place types	■							✓						
(Change in) cost of emissions	■	■						✓						
Percent of growth on formerly undeveloped land (per 2016 Land Cover Data)	■							✓						

Figure 2. Regional Connector Study Goals, Objectives, and Performance Measures

June 21, 2019	GOALS →		ECONOMIC VITALITY			SUSTAINABILITY -- EQUITY, COMMUNITY & ENVIRONMENTAL			CONNECTIVITY & ACCESSIBILITY			SAFETY, RESILIENCY & INNOVATION		
	OBJECTIVES →		Support regional growth and productivity	Support efficient freight movement	Support accessibility for tourism	Improve the sustainability of communities through increased housing choice and reduced auto-dependency	Ensure that mobility benefits positively affect low income residents	Minimize the environmental impact of future growth and transportation	Improve connectivity and reliability between the Peninsula and Southside	Improve connectivity and access for all	Reduce delay and improve travel efficiency	Improve safety through a more adaptive transportation network	Make investments that improve flood resiliency	Consider the impacts of technology on system demand and performance
Performance Measures ↓	Scenario Measure	Candidate Project Measure												
(Change in) Delay on cross-harbor trips [time and dollar value]	■	■							✓		✓			
(Change in) Circuity of cross-harbor trips	■	■							✓		✓			
(Change in) Reliability for cross-harbor trips [time and dollar value]	■	■							✓					
(Change in) Cross-harbor accessibility									✓	✓				
(Change in) Multimodal accessibility to jobs	■	■								✓				
(Change in) Accessibility index by mode	■	■								✓				
Performance of the transit-serving roadway network [i.e., average speed]	■	■								✓				
(Change in) Regional delay [total + spatial]	■	■									✓			
System reliability	■										✓			
Reliability cost savings		■									✓			
(Change in) User cost	■	■					✓				✓			
Bottlenecks on identified priority military routes		■	✓								✓			
Bottlenecks on identified evacuation routes (daily peak conditions)		■									✓			
Cost of forecasted crashes	■	■										✓		
Percent of trips by automated vehicles	■											✓		
(Change in) Percent of travel using facilities with adaptive technologies [e.g., V2I, ITS]	■	■										✓		
Percent of growth near flood-prone areas	■							✓					✓	
(Change in) Transportation network impact from flood-prone conditions [e.g., delay, trip length, and/or circuity]	■	■						✓					✓	
Reliability enhancement from technology	■													✓
Induced trip demand from technology	■													✓

Figure 2 Continued. Regional Connector Study Goals, Objectives, and Performance Measures

Attachment A: Summary of Vision, Goals, Objectives Workshop March 28, 2019



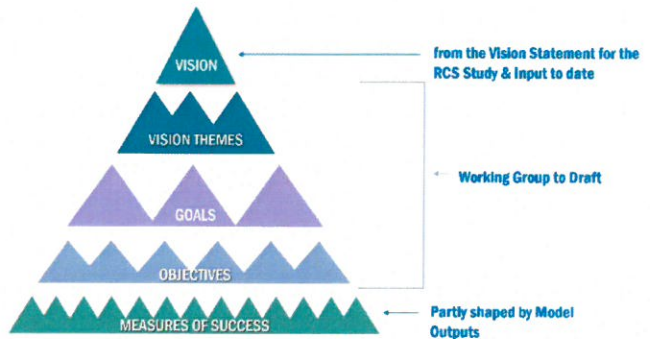
# Draft Goals and Objectives

## Background

The following discussion of Draft goals and objectives for the HRTPO Regional Connectors Study is based on input from the March 28<sup>th</sup>, 2019 Working Group meeting. It incorporates results from the earlier regional survey conducted in Phase 1 as well as discussion and feedback from the Working Group meeting.

The March 28<sup>th</sup> Working Group meeting resulted in a basic affirmation of the project Vision as stated in the “Guidance for Scope of Work” of the Regional Connector Study Request for Proposal. It also resulted in a series of Vision Themes derived from the Vision statement that formed the basis for initial Goals for the study. Below are the results of the Working Group discussions along with a first draft at developing a Draft Goals and Objectives Framework for review by the Working Group. These Draft Goals and Object are intended to feed into the modeling efforts for the Regional Connectors Study, which will then help to shape Measures of Success.

This document will be sent to the Working Group for their review and comment prior to their next work session on April 17<sup>th</sup>, 2019.



## PART 1 – INPUT FROM WORKING GROUP MEETING

### Vision Statement

Below is the Vision Statement as defined in the RCS Study RFP:

*“This study should establish a regional long-term vision that investigates 21<sup>st</sup> century transportation options that connect the Peninsula and the Southside across the Hampton Roads Harbor that enhance economic vitality and improve the quality of life in the region.”*

(from the “Guidance for Scope of Work” of the Regional Connector Study RFP)

### Vision Themes

The March 28<sup>th</sup> discussion included a list of seven vision themes, to help guide development of goal statements. These vision themes included:

1. Economic Vitality
2. Out-Region Connectivity
3. In-Region Connectivity
4. Safety
5. Multimodal Accessibility
6. Congestion Relief
7. Quality of Life



## Draft Goals

In the March 28<sup>th</sup> discussion, based on Working Group discussions, the Vision Themes were further refined into a series of 10 goal categories that could start to suggest potential goals for the study:

1. Economic Vitality
2. Connectivity
3. Adaptability
4. Resilience
5. Environment
6. Safety
7. Congestion Relief
8. Accessibility
9. Reliability
10. Quality of Life

## Draft Objectives

Also, in the March 28<sup>th</sup> meeting, the Working Group members were asked to brainstorm initial draft Objectives under each one of the Goal categories that were developed. These were not intended to be final objectives, given the short time in the meeting for brainstorming but were intended to get the discussion started for further refinement in this document, for written feedback after review of this document and for affirmation in the April 17<sup>th</sup> meeting.

Their ideas were recorded on sticky notes and the results of their input are summarized below, verbatim as they were written:

### Economic Vitality

- Sustain and develop industry and technology sectors
- Maintain port competitiveness
- Sustain existing economic strengths and support upcoming/future economic opportunities
- Capitalize on freight to create local and regional development and redevelopment opportunities

### Connectivity

- Improve access and frequency of transit throughout the region
- Regional multimodal connectivity (including transit)

### Adaptability

- Ability to change to new technology
- Adaptability to emerging technology implementation
- More smart road/technology research and implementation (locally)
- Encourage progressive adaptability – 5H – drones – air space

### Resilience

- Maximize resources – military, waterways, ocean and diversity

- Provide alternative routes to aid congestion and or unplanned instances, i.e., wrecks, infrastructure failure (use of technology as a factor?)

#### Environment

- Environmentally and economically responsible water quality requirements (tourism and seafood industries)
- Optimize modes to benefit air and water quality

#### Safety

- Roads high enough for hurricane evacuation flooding
- Military readiness in times of massive activation

#### Congestion Relief

- Provide alternatives to existing Hampton Roads harbor crossing
- Connectivity + travel time reliability

#### Accessibility

- Access to oceanfront and affordable housing
- Regional accessibility – limit recurring congestion, limit non-recurring congestion (reliability) and connectivity in network
- Transit dependent population - mobility

#### Reliability

- Limit travel delay
- Resilient system
- Reliability – more VDOT emergency response → area expansion (major local roads?)

#### Quality of Life

- Network context – facility context is appropriate for regional types
- Natural resources or resources – maximize
- Appropriate freight network – truck movements are effectively served on appropriate facilities (shouldn't degrade livability/safety)

## PART 2 – DRAFT GOALS & OBJECTIVES FRAMEWORK FOR REVIEW

In this part of the document, the consultant team has – with the Working Group's direction – attempted to put the input received from the March 28<sup>th</sup> meeting into a draft Goals & Objectives Framework for review and comment by the Working Group. We have taken the initial objectives brainstormed by the Working Group in the meeting and added to them using input and information from stakeholder interviews, the public survey and our understanding of the purpose of the Regional Connector Study as a whole. We have also fleshed out the Goal categories into more complete Goal statements in sentence form for consideration.

The following draft Goals & Objectives Framework is specifically associated with the Regional Connectors Study. These goals and objectives should support the study vision statement, while also guiding work on the study. The purpose of this draft framework is not to limit the Working Group but simply to stimulate its work and discussion prior to and in their next meeting by providing additional “food for thought.” Space is provided in the right hand column for their comments.

<p><b>A. Economic Vitality</b> Support a diverse and resilient regional economy that sustains existing industry and builds on new economic opportunity.</p> <p><u><i>Economic Objectives:</i></u></p> <ol style="list-style-type: none"> <li>1. Sustain existing industry and technology sectors.</li> <li>2. Develop new industry and technology sectors.</li> <li>3. Invest in the Port of Virginia as an economic anchor for the region.</li> <li>4. Capitalize on the region's freight networks to create inter- and intra-regional economic opportunities.</li> </ol>	
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**B. Connectivity**

Invest in transportation facilities that will increase transportation connectivity throughout the Hampton Roads region, connecting intra- and inter-regional markets.

Connectivity Objectives:

1. Maintain and improve transportation connectivity with outside markets.
2. Maintain and improve intra-regional transportation connectivity, especially between the peninsula and southside.
3. Improve transit frequency and coverage throughout the region.
4. Increase multi-modal connectivity within region.

**C. Adaptability**

Plan for and invest in a transportation system that can easily adapt to any possible future scenarios.

Adaptability Objectives:

1. Research and anticipate emerging technologies and their effects on the regional transportation system.
2. Implement smart transportation strategies that incorporates new technologies.

**D. Resilience**

Strengthen the region's ability to avoid, mitigate and recover from hazards, adversity and unexpected trends.

Resilience Objectives:

1. Support a more diverse economy and population, through transportation capital investments that bring access and connectivity.
2. Develop transportation solutions that support the region's assets, such as the military, natural resources and diverse communities.
3. Establish alternative transportation routes, to aid congestion and or unplanned events, such as traffic accidents, infrastructure failure, natural hazards, etc.



**E. Environment**

Support and implement policies to protect natural resources and air and water quality in the Hampton Roads region.

Environmental Objectives

1. Quantify the environmental impacts of new growth and development on the region's natural resources.
2. Invest in environmentally sustainable modes of transportation, to contribute to higher air and water quality for the region.
3. Invest in transportation technologies for public systems that protect local natural resources.

**F. Safety**

Invest in a transportation system that helps to ensure the safe movement of people, goods and services throughout the Hampton Roads region.

Safety Objectives:

1. Invest in transportation facilities that will decrease the occurrence of traffic accidents, especially along critical connectors.
2. Invest in a resilient transportation system that allows for safe evacuation during hurricane and other major flood events.
3. Design a transportation system to ensure military readiness in times of massive activation.

**G. Congestion Relief**

Invest in a transportation system that helps support reliable travel and minimizes travel under congested conditions throughout the Hampton Roads region.

Congestion Relief Objectives:

1. Provide alternative transportation options to the existing Hampton Roads harbor crossings.
2. Invest in transportation improvements that more efficiently maximize the existing roadway capacities.
3. Establish policies and regulations for land use patterns that minimize the need for auto-dependent trips, reducing volumes on critical connectors.

#### H. Accessibility

Develop a transportation system that maximizes access to travel options and desired designations.

##### Accessibility Objectives:

1. Improve access to the oceanfront for the region's residents and visitors.
2. Improve the housing diversity and affordability in the Region.
3. Invest in transportation improvements equitably, in affluent and nonaffluent neighborhoods, while mitigating negative effects of new infrastructure.
4. Provide multi-modal solutions to transportation needs throughout the region.
5. Improve access between the region's residents and businesses for economic opportunity, especially in areas where water features create boundaries.

#### I. Reliability

Design a reliable and predictable transportation network that serves the entire Hampton Roads region.

##### Reliability Objectives:

1. Invest in transportation improvements that will limit travel delay times.
2. Support land use patterns that place less demand on the existing transportation network.
3. Develop a transportation network that is resilient and can quickly adapt to changing conditions.
4. Expand the coverage area and reliability of emergency response service, with a balanced emphasis on safety and restoration of roadway capacity.

**J. Quality of Life**

Develop a transportation system and land use policies that maximizes safety, efficiency, community integrity and individuals.

*Quality of Life Objectives:*

1. Ensure that new transportation investments are appropriate to the surrounding community and the region.
2. Protect the region's natural resources.
3. Provide greater access to natural resources, rural and urban areas.
4. Ensure that freight operations help to support, not degrade, the region's communities.