Methodology of Applying the HRTPO Project Prioritization Tool to the Scoring of 2050 Long-Range Transportation Plan Candidate Projects

Description of Calculations: Project Utility, Economic Vitality, and Project Viability

October 2025

Background Section

The following “background” columns in the Project Prioritization Tool are used to calculate values for certain Tool Performance Measures, mostly for the Project Utility leg of the Tool.

INRIX Data

Describes whether travel time and speed data collected by INRIX is available on that roadway segment for the analysis.

Existing capacity

For both Highways and Bridges/Tunnels, the existing capacity is based on the daily volume that is the threshold between LOS E & F based on the existing roadway class of that segment.

Future capacity

For both Highways and Bridges/Tunnels, the future capacity is based on the daily volume that is the threshold between LOS E & F based on the proposed roadway class of that segment.

ADT

For both Highways and Bridges/Tunnels, ADT was determined by using the existing weekday volumes for each segment within the project limits weighted by each segment length. If the facility does not currently exist, a value of “N/A” is listed and the existing weekday volume for the parallel facility is used.

Future ADT

The Regional Travel Demand Model was used to calculate the Future Average Daily Traffic (ADT) for highway, interchange, bridge & tunnel, and intermodal projects. Model forecasts were conducted for each scenario: Baseline, Greater Growth in Urban Areas, Greater Growth in Suburban Areas, and Greater Growth in Inland Areas based on scenario narratives (population and employment, freight, Connected and Autonomous Vehicle, Mobility as a Service/Ride Sharing, etc.). Forecasted volumes across scenarios were averaged.

Estimated Cost of Project

Estimated costs of projects are expressed in both Year-of-Expenditure (YOE) and Current Year dollars. For prioritization purposes, Current Year dollars are used to evaluate Cost Effectiveness. For fiscal-constraint purposes, YOE dollars are used.

Cost estimates were submitted by stakeholders in either YOE or Current Year dollars or were developed by HRTPO staff looking at comparable project types. To convert estimates, a 3% planning level inflation factor was used based on the estimated project opening year. Planning level time bands were created (Near, Middle, Far) and a midpoint inflation factor assigned to each time band.

Midpoint Inflation Factor for each Time Band:

Midpoint Inflation Factor for each Time Band		
Near	(2026-2034)	1.159
Middle	(2035-2042)	1.469
Far	(2043-2050)	1.860

Future Daily VMT
Future ADT multiplied by length of project.

Bridge Detour Length (Bridge and Tunnel)
The bridge detour length is the length in miles of the shortest path from one end of the bridge/tunnel to the other end, in the event that the bridge/tunnel is out of service.

Bridge Detour VMT
The bridge detour VMT was calculated by multiplying the most recent weekday count by the segment length for each segment along the shortest detour route.

Project Utility – Roadways

Congestion Level (Highway and Bridge/Tunnel)

(a) Percent Reduction between Existing and Future Volume to Capacity (V/C) Ratios
(Existing V/C-Future V/C)/Existing V/C

For new roadways: Existing V/C and Future V/C of parallel facility

(b) Existing Peak Period Congestion Level (TTI) and Existing Peak Period Level of Service (No Inrix Data)
Congestion levels were determined using the travel time index (TTI) for roadways with INRIX data and using Level of Service for roadways where INRIX data is not available. The travel time index is a ratio that compares travel times on a particular roadway segment during peak travel periods with travel times during uncongested, free-flow conditions. The higher the travel time index, the more congested the roadway is.

HRTPO uses the following thresholds to determine congestion levels based on the travel time index:

Travel Time Index	Freeway	Arterials
Low	TTI < 1.15	TTI < 1.25
Moderate	1.15 ≤ TTI < 1.30	1.25 ≤ TTI < 1.40
Severe	TTI ≥ 1.30	TTI ≥ 1.40

Level of service is a measure used to describe congestion levels based on Highway Capacity Manual analysis methods. Congestion levels based on Levels-of-Service are shown in the following table:

Congestion Level	HCM LOS
Low	A-C
Moderate	D
Severe	E-F

The worst TTI and LOS during the day for that roadway segment is used, regardless of direction or peak period.

(c) Congestion Duration

In addition to the peak period congestion level detailed previously, the 2050 LRTP Project Prioritization Process also uses congestion duration as a congestion measure. Congestion duration represents the number of 15-minute periods during each 4-hour peak period (5-9 am and 3-7 pm) where severe congestion is present. The peak period with the longer duration of congestion is used for each segment (i.e., if the segment is congested for 30 minutes in the AM Peak and 60 minutes in the PM Peak, the 60 minutes value is used.) The maximum congestion duration for each project is 16 15-minute intervals.

The thresholds for congestion duration are as follows:

Congestion Duration	
Very High	9 - 16
High	7 - 8
Medium-High	5 - 6
Medium	3 - 4
Medium-Low	1 - 2
Low	0

(d) Person Throughput and Delay

The 2050 LRTP Project Prioritization Process uses two measures from the SMART SCALE prioritization process to evaluate congestion mitigation: Change in Person Throughput and Change in Person Hours of Delay.

Person throughput measures the change in corridor total (multimodal) person throughput attributed to the project. More information on how person throughput is calculated for each project type can be found in the SMART SCALE Technical Guide.
The thresholds for person throughput are as follows:

Person Throughput	
Very High	800 +
High	600 - 799
Medium-High	400 - 599
Medium	200 - 399
Medium-Low	1 - 199
Low	0

Person Hours of Delay measures the change in the number of peak period person hours of delay in the project corridor. More information on how person hours of delay is calculated for each project type can be found in the SMART SCALE Technical Guide.

The thresholds for person hours of delay are as follows:

Person Hours of Delay	
Very High	200 +
High	100 - 200
Medium-High	50 - 100
Medium	25 - 50
Medium-Low	1 - 25
Low	< 1

(e) Impact to Nearby Roadway
Future ADT – Existing ADT
For new roadways: Future ADT

Congestion Level (Interchange)

(a) Existing Queue Conditions
Based on Number of Interstate and Arterial Approaches from where queues currently form (1 to 4 approaches).

(b) Queue Improvements
Number of Interstate and Arterial Approaches improved by project (1 to 4 approaches).

(c) Person Throughput and Delay
These measures are the same as the ones used for the Highway type projects.

(d) Number of Movements Added or Improved
Based on added or improved left and right movements (Max: 8 movements).

Travel Time Reliability

(a) Level of Travel Time Reliability (LOTTR)

Although roadway congestion is prevalent in many areas of Hampton Roads, congestion levels are not always the same each day. Congestion levels can vary greatly from day to day due to a variety of factors such as crashes, severe weather, special events, or work zones. Travel time reliability is defined as how steady travel times are over the course of time, as measured generally from day to day.

The measure used in the 2050 LRTP Project Prioritization Process is the Level of Travel Time Reliability (LOTTR). The LOTTR is defined as the ratio of the 80th percentile travel time to the mean (50th percentile) travel time over the course of a year for four reporting periods: weekday morning peak (6-10 am), weekday midday (10 am – 4 pm), weekday afternoon peak (4 pm – 8 pm), and weekends (6 am – 8 pm). The highest of these four periods and the highest direction is the LOTTR used in this process.

The thresholds for Level of Travel Time Reliability are as follows:

Level of Travel Time Reliability	
Very High	1.30+
High	1.25 – 1.299
Medium-High	1.20 – 1.249
Medium	1.15 – 1.199
Medium-Low	1.10 – 1.149
Low	1.00 – 1.09

(b) Truck Travel Time Reliability (TTTR)

The reliability of freight movement can be calculated using a metric referred to as the Truck Travel Time Reliability (TTTR) Index. The TTTR ratio is defined as the ratio of the 95th percentile travel time for trucks to the mean (50th percentile) travel time for trucks over the course of a year for five reporting periods: weekday morning peak, weekday midday, weekday afternoon peak, weekends, and overnight. The highest of these five periods and the highest direction is the TTTR used in this process.

The thresholds for Truck Travel Time Reliability are as follows:

Truck Travel Time Reliability	
Very High	2.00+
High	1.80 – 1.999
Medium-High	1.60 – 1.799
Medium	1.40 – 1.599
Medium-Low	1.20 – 1.399
Low	1.00 – 1.199

Infrastructure Condition (Bridge and Tunnel Only)

(a) Bridge State of Good Repair Ratings

The 2050 LRTP Project Prioritization Process uses four measures from VDOT's State of Good Repair (SGR) maintenance prioritization program to evaluate bridge condition: Importance Factor, Condition Factor, Design Redundancy Factor, and Structure Capacity. Information on how VDOT calculates these four factors are included on VDOT's SGR Bridge website.

The scores from these four factors are weighted based on the weights used in the SGR program. These weights are 30/80 for Importance Factor, 25/80 for Condition Factor, 15/80 for Design Redundancy Factor, and 10/80 for Structure Capacity.

(b) Age of Tunnel

The age of tunnel reported is the oldest tunnel within project limits.

(c) Last Major Repair

Provided by stakeholders (based on horizon year).

(d) Costs for Necessary Repairs/Upgrades

Provided by stakeholders.

System Continuity, Connectivity, and Resiliency

(a) Degree of Regional Impact

Regional, Multi-jurisdictional, Local. Provided by stakeholders.

(b) Project Improves Vehicular Access to Major Employment and Population Centers

Medium and High density (population and employment) TAZs were identified in GIS. Access was determined via a spatial overlay analysis using GIS. Results were combined with Regional Significance. Scoring opportunities: Yes-Regional, Yes-Multi-jurisdictional, Yes-Local, No.

(c) Minimizes Trip-Loss During Disruptive Events

This measure evaluates the ability of a project to maintain mobility during disruptive hazard events, such as flooding or storm surge. The analysis estimates the percentage of trips retained under hazard conditions compared to baseline conditions without the project. Calculations were conducted using the Volpe Resilience and Disaster Recovery Benefits Analysis Tool, which models network trip retention across multiple hazard scenarios (3-ft sea level rise, 3-ft sea level rise with 10-year storm surge, 3-ft sea level rise with 100-year storm surge, and 4.5-ft sea level rise with 100-year storm surge). Results were averaged across scenarios to determine each project's performance.

Trip Retention During Disruptive Events Scoring Thresholds	
High	≥ 90% of trips retained
Medium	75–89% of trips retained
Low	50–74% of trips retained
No Points	< 50% of trips retained

(d) Project is in a vulnerable area for sea level rise/storm surge/recurrent flooding

This measure identifies whether a project is located within an area projected to experience sea level rise or storm-surge-related flooding during the 2050–2080 planning horizon. Vulnerability was assessed using the Hampton Roads Regional Sea Level Rise Policy and the Volpe Resilience and Disaster Recovery Tool Suite, which evaluates flooding exposure under multiple hazard conditions.

2050 LRTP Flooding Scenarios based of Hampton Roads Regional Sea Level Rise Policy:

2050 LRTP Flooding Scenarios	
Baseline	3-ft Sea Level Rise (SLR)
Urban	3-ft SLR + 10-year storm surge
Suburban	3-ft SLR + 100-year storm surge
Inland	4.5-ft SLR + 100-year storm surge

GIS overlay analysis was used to determine the percentage of the project footprint within inundated areas, accounting for elevated structures. Scoring options:

- Vulnerable – Project area intersects forecasted inundation zones under one or more hazard scenarios
- Not Vulnerable – Project area remains outside forecasted inundation zones under all hazard scenarios

If vulnerable, stakeholders were asked to identify whether adaptation strategies or design features have been developed to address future sea level rise, storm surge, or recurrent flooding (responses: Improvements/strategies developed, No, or N/A if not vulnerable).

(e) Level of access provided by the candidate project to critical facilities or areas (e.g., hospitals, Fire-EMS, emergency shelters, dense employment area, and single entry/exit point for flood prone areas or neighborhoods)

Critical areas and facilities were identified in GIS. The level of access provided by each candidate project was determined through a spatial overlay analysis using GIS, evaluating proximity and connectivity to these facilities.

Access Proximity for Critical Facilities/Areas	
Hospitals	4 miles
Emergency Shelters	1 mile
Fire/EMS	1 mile
Single Entry/Exit Areas	2 miles

Scoring thresholds:

Level of Access to Critical Facilities/Areas	
High	> 14 Critical Facilities
Medium	6 – 14 Critical Facilities
Low	1 – 5 Critical Facilities
No	0 Critical Facilities

(f) Maintains Access to Critical Areas/Facilities During Disruptive Events

This measure evaluates the extent to which a project preserves access to critical facilities or areas (hospitals, emergency shelters, fire, EMS stations, single point entry/exit communities, and key employment areas) during disruptive events. Using GIS-based spatial overlay analysis and the Volpe Resilience and Disaster Recovery TAZ Metrics Tool, trip retention to critical facilities was calculated for each hazard scenario. The Baseline percentage of retained access was used to classify each project (future analysis will average the percentage of retained access across all scenarios). Scoring measure: Yes (High/Medium), No (Low/No).

Maintaining Access to Critical Facilities/Areas Scoring Thresholds	
High	≥ 90% of access retained
Medium	75–89% of access retained
Low	50–74% of access retained
No Points	< 50% of access retained

(g) Addresses a Gap

GIS spatial overlay analysis conducted to determine if the candidate project provides improved access crossing a barrier such as a body of water or rail. Stakeholders could also indicate if candidate project addresses a social equity gap. Yes/No response.

Safety and Security

(a) Reduction of EPDO of Fatal and Injury Crashes

For Highways, Bridges/Tunnels, and Interchanges, the 2050 LRTP Project Prioritization Process uses two measures from the SMART SCALE prioritization process to evaluate safety: Reduction of Equivalent Property Damage Only (EPDO) of Fatal and Injury Crashes and Reduction of EPDO Rate of Fatal and Injury Crashes.

Reduction of EPDO of Fatal and Injury Crashes measures the weighted fatal and injury crashes expected to be reduced due to project implementation using VDOT crash modification factors. Using EPDO crashes and crash rates provide more weight to those more severe crashes by placing a weight of 170 on fatal and severe injury crashes, a weight of 20 on moderate injury crashes, and a weight of 10 on minor injury crashes. These are the same weights that are used in the SMART SCALE process. The crash data used in this analysis is from the years 2019-2023, as is the VMT for calculating the rate.

More information on how Reduction of EPDO of Fatal and Injury Crashes is calculated for each project type can be found in the SMART SCALE Technical Guide.

The thresholds for Reduction of EPDO of Fatal and Injury Crashes are as follows:

Reduction of EPDO of Fatal and Injury Crashes	
Very High	100+
High	75 – 100
Medium-High	50 – 75
Medium	25 – 50
Medium-Low	0 – 25
Low	Increase in EPDO

(b) Reduction of EPDO Rate of Fatal and Injury Crashes

Reduction of EPDO Rate of Fatal and Injury Crashes measures the weighted fatal and injury crashes expected to be reduced per 100 million vehicle-miles of travel due to project implementation using VDOT crash modification factors. The weights and crash data used is the same as is used in the Reduction of EPDO of Fatal and Injury Crashes section. More information on how Reduction of EPDO Rate of Fatal and Injury Crashes is calculated for each project type can be found in the SMART SCALE Technical Guide.

The thresholds for Reduction of EPDO Rate of Fatal and Injury Crashes are as follows:

Reduction of EPDO Rate of Fatal and Injury Crashes	
Very High	1000+
High	750 – 1000
Medium-High	500 – 750
Medium	250 – 500
Medium-Low	0 – 250
Low	Increase in EPDO Rate

(c) Improvement to Incident Management or Evacuation

Yes/No based on official incident management or evacuation routes. Input by HRTPO staff.

(d) Diversion Impact Due to Failure (Bridges and Tunnels Only)

The diversion impact due to failure is calculated by multiplying the Existing ADT by the detour length, plus the existing detour route VMT.

Modal Enhancements

(a) Enhances Other Modes

0 to 3+ Enhancements. Provided by stakeholders.

(b) Provides Improved Access to Multimodal Choices

0 to 3+ Multimodal Choices. Provided by stakeholders.

Bridge-Tunnel Only

Provides Continuous Maritime Crossing.

Yes/No. Provided by stakeholders.

Project Utility – Intermodal/Freight

Better Accommodates Intermodal Movements

Degree of Conflict for Intermodal Movements
Conflict Free Intermodal Movements, Limited Conflict Intermodal Movements, Intermodal Movements Conflict. Provided by stakeholders.

Improves Rail or Vehicular Access

Project Improves Vehicular or Rail Access to Major Employment and Population Centers
Medium and High density (population and employment) TAZs were identified in GIS. Access was determined via a spatial overlay analysis using GIS. Results were combined with Regional Significance. Scoring opportunities: Yes-Regional, Yes-Multi-jurisdictional, Yes-Local, No.

Travel Time Reliability

(a) Level of Travel Time Reliability (LOTTR)
Although roadway congestion is prevalent in many areas of Hampton Roads, congestion levels are not always the same each day. Congestion levels can vary greatly from day to day due to a variety of factors such as crashes, severe weather, special events, or work zones. Travel time reliability is defined as how steady travel times are over the course of time, as measured generally from day to day.

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The thresholds for Truck Travel Time Reliability are as follows:

Truck Travel Time Reliability	
Very High	2.00+
High	1.80 – 1.999
Medium-High	1.60 – 1.799
Medium	1.40 – 1.599
Medium-Low	1.20 – 1.399
Low	1.00 – 1.199

System Continuity, Connectivity, and Resiliency

(a) Degree of Regional Impact

Regional, Multi-jurisdictional, Local. Provided by stakeholders

(b) Minimizes Trip-Loss During Disruptive Events

This measure evaluates the ability of a project to maintain mobility during disruptive hazard events, such as flooding or storm surge. The analysis estimates the percentage of trips retained under hazard conditions compared to baseline conditions without the project. Calculations were conducted using the Volpe Resilience and Disaster Recovery Benefits Analysis Tool, which models network trip retention across multiple hazard scenarios (3-ft sea level rise, 3-ft sea level rise with 10-year storm surge, 3-ft sea level rise with 100-year storm surge, and 4.5-ft sea level rise with 100-year storm surge). Results were averaged across scenarios to determine each project's performance.

Trip Retention During Disruptive Events Scoring Thresholds	
High	≥ 90% of trips retained
Medium	75–89% of trips retained
Low	50–74% of trips retained
No Points	< 50% of trips retained

(c) Project is in a vulnerable area for sea level rise/storm surge/recurrent flooding

This measure identifies whether a project is located within an area projected to experience sea level rise or storm-surge-related flooding during the 2050–2080 planning horizon. Vulnerability was assessed using the Hampton Roads Regional Sea Level Rise Policy and the Volpe Resilience and Disaster Recovery Tool Suite, which evaluates flooding exposure under multiple hazard conditions.

2050 LRTP Flooding Scenarios based of Hampton Roads Regional Sea Level Rise Policy:

2050 LRTP Flooding Scenarios	
Baseline	3-ft SLR
Urban	3-ft SLR + 10-year storm surge
Suburban	3-ft SLR + 100-year storm surge
Inland	4.5-ft SLR + 100-year storm surge

GIS overlay analysis was used to determine the percentage of the project footprint within inundated areas, accounting for elevated structures. Scoring options:

- Vulnerable – Project area intersects forecasted inundation zones under one or more hazard scenarios
- Not Vulnerable – Project area remains outside forecasted inundation zones under all hazard scenarios

If vulnerable, stakeholders were asked to identify whether adaptation strategies or design features have been developed to address future sea level rise, storm surge, or recurrent flooding (responses: Improvements/strategies developed, No, or N/A if not vulnerable).

(d) Level of access provided by the candidate project to critical facilities or areas (e.g., hospitals, Fire-EMS, emergency shelters, dense employment area, and single entry/exit point for flood prone areas or neighborhoods)

Critical areas and facilities were identified in GIS. The level of access provided by each candidate project was determined through a spatial overlay analysis using GIS, evaluating proximity and connectivity to these facilities.

Access Proximity for Critical Facilities/Areas	
Hospitals	4 miles
Emergency Shelters	1 mile
Fire/EMS	1 mile
Single Entry/Exit Areas	2 miles

Scoring thresholds:

Level of Access to Critical Facilities/Areas	
High	> 14 Critical Facilities
Medium	6 – 14 Critical Facilities
Low	1 – 5 Critical Facilities
No	0 Critical Facilities

(e) Maintains Access to Critical Areas/Facilities During Disruptive Events

This measure evaluates the extent to which a project preserves access to critical facilities or areas (hospitals, emergency shelters, fire, EMS stations, single point entry/exit communities, and key employment areas) during disruptive events. Using GIS-based spatial overlay analysis and the Volpe Resilience and Disaster Recovery TAZ Metrics Tool, trip retention to critical facilities was calculated for each hazard scenario. The Baseline percentage of retained access was used to classify each project (future analysis will average the percentage of retained access across all scenarios). Scoring measure: Yes (High/Medium), No (Low/No).

Maintaining Access to Critical Facilities/Areas Scoring Thresholds	
High	≥ 90% of access retained
Medium	75–89% of access retained
Low	50–74% of access retained
No Points	< 50% of access retained

(f) Addresses a Gap

GIS spatial overlay analysis conducted to determine if the candidate project provides improved access crossing a barrier such as a body of water or rail. Stakeholders could also indicate if candidate project addresses a social equity gap.

Modal Enhancements

(a) Enhances Other Modes

0 to 3+ Enhancements. Provided by stakeholders.

(b) Provides Improved Access to Multimodal Choices

0 to 3+ Multimodal Choices. Provided by stakeholders.

Project Utility – Transit

Congestion

Potential Trips Removed from Roadways.
Based on congestion of parallel highway facility. High, Medium, Low.

Existing Usage and/or Prospective Ridership

Estimated Usage/Ridership
Passengers per Day. Computed by dividing Estimated Annual Ridership (provided by stakeholders, regional travel demand model, or staff research) by assumed 250 working days per year.

System Continuity, Connectivity, and Resiliency

(a) Degree of Regional Impact
Regional, Multi-jurisdictional, Local. Provided by stakeholders.

(b) Project Improves Vehicular Access to Major Employment and Population Centers
Medium and High density (population and employment) TAZs were identified in GIS. Access was determined via a spatial overlay analysis using GIS. Results were combined with Regional Significance. Scoring opportunities: Yes and Regional, Yes but Not Regional, No.

(c) Minimizes Trip-Loss During Disruptive Events
This measure evaluates the likelihood that a transit project will maintain trip-making capacity during disruptive events such as flooding or storm surge. Project performance was assessed based on project type and vulnerability to flooding. Fixed Guideway and Rail projects were considered more resilient to storm impacts, while Ferry and Other modes were more susceptible to disruption.

Project Type	Not Vulnerable to Flooding	Vulnerable to Flooding
Fixed Guideway/Rail	High	Medium
Ferry/Other	Low	No

(d) Project is in a vulnerable area for sea level rise/storm surge/recurrent flooding

This measure identifies whether a project is located within an area projected to experience sea level rise or storm-surge-related flooding during the 2050–2080 planning horizon. Vulnerability was assessed using the Hampton Roads Regional Sea Level Rise Policy and the Volpe Resilience and Disaster Recovery Tool Suite, which evaluates flooding exposure under multiple hazard conditions.

2050 LRTP Flooding Scenarios based of Hampton Roads Regional Sea Level Rise Policy:

2050 LRTP Flooding Scenarios	
Baseline	3-ft SLR
Urban	3-ft SLR + 10-year storm surge
Suburban	3-ft SLR + 100-year storm surge
Inland	4.5-ft SLR + 100-year storm surge

GIS overlay analysis was used to determine the percentage of the project footprint within inundated areas, accounting for elevated structures. Scoring options:

- Vulnerable – Project area intersects forecasted inundation zones under one or more hazard scenarios
- Not Vulnerable – Project area remains outside forecasted inundation zones under all hazard scenarios

If vulnerable, stakeholders were asked to identify whether adaptation strategies or design features have been developed to address future sea level rise, storm surge, or recurrent flooding (responses: Improvements/strategies developed, No, or N/A if not vulnerable).

(e) Level of access provided by the candidate project to critical facilities or areas (e.g., hospitals, Fire-EMS, emergency shelters, dense employment area, and single entry/exit point for flood prone areas or neighborhoods)

Critical areas and facilities were identified in GIS. The level of access provided by each candidate project was determined through a spatial overlay analysis using GIS, evaluating proximity and connectivity to these facilities.

Access Proximity for Critical Facilities/Areas	
Hospitals	4 miles
Emergency Shelters	1 mile
Fire/EMS	1 mile
Single Entry/Exit Areas	2 miles

Scoring thresholds:

Level of Access to Critical Facilities/Areas	
High	> 14 Critical Facilities
Medium	6 – 14 Critical Facilities
Low	1 – 5 Critical Facilities
No	0 Critical Facilities

(f) Maintains Access to Critical Facilities/Areas During Disruptive Events

This measure evaluates whether a transit project can maintain access to critical facilities and areas (such as hospitals, emergency shelters, or single entry/exit communities), during disruptive events. Scoring considers both the project's vulnerability to flooding and the mode's ability to operate under adverse conditions.

Project Type	Not Vulnerable to Flooding	Vulnerable to Flooding
Fixed Guideway/Rail	High	Medium
Ferry/Other	Low	No

(g) Addresses a Gap

GIS spatial overlay analysis conducted to determine if the candidate project provides improved access crossing a barrier such as a body of water or rail. Stakeholders could also indicate if candidate project addresses a social equity gap. Yes/No response.

User Benefit

(a) Annual Travel Time Savings

Estimates how much faster travelers can complete trips once a project is implemented compared to existing or baseline conditions. Captures both the total travel time saved by all riders and the average time saved per rider on an annual basis. To ensure consistency and comparability across all project types and modes, standardized travel speeds were applied to represent conditions with and without the project improvement.

- 10 miles per hour (mph) represents typical travel times without the project improvement (baseline condition).
- 24 miles per hour (mph) represents typical travel times with the project improvement (project condition).

Because detailed operating data were not available for every project, proxy measures were used to estimate project distances and ridership in a consistent manner. Each project was assigned a representative one-way distance (in miles), reflecting the typical length of travel within the project corridor or area of influence.

- For ferry projects, the distance represents shore-to-shore travel across the waterway.
- For station-based projects (e.g., new rail stops), the distance represents the portion of travel eliminated by the new access point.

Forecasted daily ridership estimates were obtained from the regional travel demand model where available. When model data was not available, ridership estimates were developed through stakeholder input, project studies, or HRTPO staff research.

The difference in travel times between the baseline (10 mph) and project (24 mph) conditions was calculated for each project distance, doubled to account for round-trip travel, and multiplied by forecasted daily ridership. This value was then annualized over 250 workdays per year to determine the Total Annual Travel Time Savings (hours/year). Dividing that value by the forecasted annual ridership (daily ridership × 250) yielded the Average Annual Travel Time Savings per Rider (hours/rider/year), enabling fair comparison across projects of different sizes and modes.

Projects with greater travel-time savings per rider received higher scores, with points assigned on a sliding scale to recognize both high-performing projects and those providing moderate but meaningful efficiency improvements.

(b) New Project

Yes/No. Provided by stakeholders.

(c) Increased Travel Time Reliability

New or increased service is assumed to increase travel time reliability. Yes/No response.

(d) Operating Efficiency

Assesses the project's potential to provide significantly more cost-effective provision of service. More information on how Operating Efficiency is calculated for transit projects can be found in the DRPT Program Prioritization Technical Guidance.

(e) Accessibility (including ADA) and/or Customer Experience

Assesses the project's potential to significantly improve a customer's ability to access the system or a significant improvement in the ease of use of the system. More information on how Accessibility and/or Customer Experience is calculated for transit projects can be found in the DRPT Program Prioritization Technical Guidance.

(f) Safety and Security

Assesses the project's potential to significantly improve in safety or security. More information on how Safety and Security is calculated for transit projects can be found in the DRPT Program Prioritization Technical Guidance.

Modal Enhancements

(a) Enhances Other Modes

0 to 3+ Enhancements. Provided by stakeholders.

(b) Provides Improved Access to Multimodal Choices

0 to 3+ Multimodal Choices. Provided by stakeholders.

Project Utility – Active Transportation

Forecasted User Demand

Forecasted user demand calculated based off percent of adult commuters and regional commute share.

System Continuity and Connectivity

(a) Provides Access to Transit or Regional Activity Centers

Transit facilities and Regional Activity Centers (collected through stakeholder input and VTrans Activity Districts) identified in GIS. Access improvement determined via a spatial overlay analysis using GIS.
0 to 3+ Transit/Regional Activity Centers.

(b) Regional Significance

Regional, Multi-jurisdictional, Local. Determined using the following Active Transportation Regional Classification Matrix, along with stakeholder input.

	Shared-Use Path, Paved and Unpaved	One-Way & Two-Way Cycle Tracks	Buffered Bike Lane	Bike Lane	Other Bike/Ped Facilities (e.g., Bicycle Blvd, Sharrows, Signed Routes, Paved Shoulders, etc.)	Future Regional Trail Study
Part of Regional Trail System	Regional	Regional	Regional	Sub-Regional	Sub-Regional	Regional
2+ Localities	Regional	Regional	Regional	Sub-Regional	Local	N/A
1 Locality	Sub-Regional	Sub-Regional	Sub-Regional	Sub-Regional	Local	N/A

(c) Connections to Existing Bike/Pedestrian Facilities

Yes/No. Provided by stakeholders.

(d) Elimination of Barriers or Completion of Gaps Across a Major Barrier

GIS spatial overlay analysis conducted to determine if candidate project provides improved access crossing a barrier such as a body of water, rail, or provide an alternate bicycle/pedestrian path away from a major roadway. Stakeholders could also indicate if candidate project addresses a social equity gap. Yes/No response.

(e) Minimizes Trip-Loss During Disruptive Events

Qualitatively evaluates the likelihood that a facility will remain usable during disruptive events such as flooding or storm surge. Scoring considers both the surface condition (paved or unpaved) and whether the project area is vulnerable to flooding. Paved facilities are assumed to be more resilient to storm-related impacts, while unpaved facilities are more likely to experience washouts or closures.

Project Surface	Not Vulnerable to Flooding	Vulnerable to Flooding
Paved	High	Medium
Not Paved	Low	No

(f) Project is in a vulnerable area for sea level rise/storm surge/recurrent flooding

This measure identifies whether a project is located within an area projected to experience sea level rise or storm-surge-related flooding during the 2050–2080 planning horizon. Vulnerability was assessed using the Hampton Roads Regional Sea Level Rise Policy and the Volpe Resilience and Disaster Recovery Tool Suite, which evaluates flooding exposure under multiple hazard conditions.

2050 LRTP Flooding Scenarios based of Hampton Roads Regional Sea Level Rise Policy:

2050 LRTP Flooding Scenarios	
Baseline	3-ft SLR
Urban	3-ft SLR + 10-year storm surge
Suburban	3-ft SLR + 100-year storm surge
Inland	4.5-ft SLR + 100-year storm surge

GIS overlay analysis was used to determine the percentage of the project footprint within inundated areas, accounting for elevated structures. Scoring options:

- Vulnerable – Project area intersects forecasted inundation zones under one or more hazard scenarios.
- Not Vulnerable – Project area remains outside forecasted inundation zones under all hazard scenarios.

If vulnerable, stakeholders were asked to identify whether adaptation strategies or design features have been developed to address future sea level rise, storm surge, or recurrent flooding (responses: Improvements/strategies developed, No, or N/A if not vulnerable).

(g) Level of access provided by the candidate project to critical facilities or areas (e.g., hospitals, Fire-EMS, emergency shelters, dense employment area, and single entry/exit point for flood prone areas or neighborhoods)

Critical areas and facilities were identified in GIS. The level of access provided by each candidate project was determined through a spatial overlay analysis using GIS, evaluating proximity and connectivity to these facilities.

Access Proximity for Critical Facilities/Areas	
Hospitals	4 miles
Emergency Shelters	1 mile
Fire/EMS	1 mile
Single Entry/Exit Areas	2 miles

Scoring thresholds:

Level of Access to Critical Facilities/Areas	
High	> 14 Critical Facilities
Medium	6 – 14 Critical Facilities
Low	1 – 5 Critical Facilities
No	0 Critical Facilities

(h) Maintains Access to Critical Areas/Facilities During Disruptive Events

Assesses whether the project is likely to maintain access to essential facilities (such as hospitals, emergency services, shelters, or single entry/exit communities) during disruptive events. Scoring considers both the facility's surface condition and its vulnerability to flooding.

Project Surface	Not Vulnerable to Flooding	Vulnerable to Flooding
Paved	High	Medium
Not Paved	Low	No

Safety

(a) Crash History

Average Number of Bike/Ped Crashes involving motor vehicles with bicyclists or pedestrians per Year (2019-2023).

(b) Level of Separation/Network Quality

Responses: Physically Separated, Visually Separated – Additional Separation Not Needed, Visually Separated – Additional Separation Needed, No Separation – Separation Needed. Provided by stakeholders.

(c) Associated with Safe Routes to School

Yes/No. Provided by stakeholders.

Modal Enhancements

(a) Enhances Other Modes

0 to 3+ Enhancements. Provided by stakeholders.

(b) Project Enhances First Mile/Last Mile Connections

Yes/No. Provided by stakeholders.

(c) Provides Improved Access to Multimodal Choices

0 to 3+ Multimodal Choices. Provided by stakeholders.

Economic Vitality – Roadways

Travel Time and Delay Impacts

(a) Total Reduction in Regional Travel Time

Total reduction in regional travel time is obtained from the regional travel demand model and is based on the total regional travel time savings (in vehicle hours) between build and no build conditions for congested links across all scenarios (scenario results averaged).

The thresholds for total reduction in regional travel time are as follows:

Reduction in Regional Travel Time (in vehicle hours)	
Very High	> 27,000
High	18,000 – 26,999
Medium	12,000 – 17,999
Low	6,000 – 11,999
Very Low	0 – 5,999
None	Increase in Regional Travel Time

(b) Improved Regional Delay

Improved regional delay is obtained from the regional travel demand model and is based on the difference between congested and free flow travel times between build and no build conditions for each scenario. Scenario results in Improved Regional Delay were averaged.

The thresholds for total reduction in regional delay are as follows:

Reduction in Regional Delay (in vehicle hours)	
Very High	> 7,600
High	6,000 – 7,599
Medium	4,000 – 5,999
Low	2,000 – 3,999
Very Low	0 – 1,999
None	<0

Labor Market Access

Increases Access for High Density Employment Areas

Based on forecasted future employment, the HRTPO Board approved 2050 employment projections for the Baseline and the three Greater Growth employment assumptions. Densities were calculated per square mile for each scenario.

Thresholds were determined using categorical breaks.

Employment Density (TAZ Forecasted Employment/Square Mile)	
High	> 20,000
Medium High	9,500 – 19,999
Medium	5,500 – 9,499
Medium Low	2,000 – 5,499
Low	< 2,000

Access to High Density Employment TAZs is determined using a spatial overlay analysis, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Addresses the Needs of Basic Sector Industries

(a) Improves Access to Major Military Bases

"Major" based on DOD report ("Base Structure Report," DOD, 2014). Nine (9) facilities have much higher employment than the rest.

Major Military Facilities:

1. Dam Neck
2. Fort Eustis (joint expeditionary base)
3. Fort Story (joint expeditionary base)
4. Langley AFB (joint expeditionary base)
5. Little Creek Naval Amphibious Base (joint expeditionary base)

6. Naval Medical Center Portsmouth
7. Norfolk Naval Shipyard
8. Norfolk Naval Base
9. Oceana Naval Air Station

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 5 miles
Low	> 5 miles

Points assigned based on the following matrix:

Access:	Non-Military Road	PPP Secondary or Road Serving the Military	PPP Primary, STRAHNET, STRAHNET Connector
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(b) Military/STRAHNET/Power Projection Platform Route
Based on whether the roadway is a Power Projection Platform (PPP) Route, is part of the Strategic Highway Network (STRAHNET), or is a roadway serving the military. Roadways serving the military were determined in the HRTPO Military Transportation Needs Study.

(c) Improves Access to Major Tourist Areas
Major Tourist Areas: Oceanfront, Historic Triangle (Williamsburg, Jamestown, Yorktown), Busch Gardens, and the Outer Banks.

Access determined via a spatial overlay analysis using GIS, applying the buffers below. Staff also identified regional tourist gateways.

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 5 miles
Low	> 5 miles

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(d) Increases Access to Port Facilities

This measure reflects truck access based on the total amount of truck hours of delay per mile.

Points are assigned based on the following thresholds:

Port Access (Truck Hours of Delay per Mile)	
Very High	> 3.00 hours per mile
High	2.50 – 2.99 hours per mile
Medium-High	2.00 – 2.49 hours per mile
Medium	1.50 – 1.99 hours per mile
Low	1.00 – 1.49 hours per mile
Very Low	< 1.00 hours per mile

(e) Improved Access to Truck Zones

Truck zones are a feature in the regional travel demand model and are defined as zones that contain a concentration of industrial or warehousing land uses or a specific truck generating activity, such as a truck stop, an intermodal transfer facility, or a trucking firm office. Truck Zones are anticipated to have a rate of truck trip ends per employee higher than other zones. Truck Zones have been identified through a review of satellite photos or local knowledge, coordinated with staff from the Virginia Port Authority and members of the Freight Transportation Advisory Committee (FTAC).

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 5 miles
Low	> 5 miles

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

Increased Opportunity

(a) Provides New or Increased Access Opportunities

Based on change in capacity or reliability:

- New alignment: New Opportunity
- Widening: Increased Opportunity
- Removal of Obstacle (e.g., rail crossing): Increased Opportunity
- Improvements without additional capacity (e.g., bridge replacement or road reconstruction): No Additional Opportunity

(b) Supports Plans for Future Growth

Yes/No response. Provided by stakeholders.

(c) Provides Access to Institutions of Higher Education or Work Force Development Sites

Institutions of Higher Education and Work Force Development Sites were identified in GIS. Data was obtained from HRGEO and includes colleges, universities, professional, technical, and trade schools. HRTPO staff also included Virginia Career Works workforce development sites.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(d) Provides Access to Urban Development Areas/Governor's Opportunity Zones/Industrial Economic Development Areas

Urban Development Areas (UDA), Governor's Opportunity Zones (GOZ), and Industrial Economic Development Areas (IEDA) were identified in GIS. Data was obtained from the Virginia Economic Development Partnership for UDAs and GOZs, and from the Virginia Office of Intermodal and Planning Investment (OIPI) for IEDAs.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

Economic Distress Factors

(a) Provides Access to Low-Income Areas

Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of households below the poverty level across the region. Those with concentrations above the regional average were classified as Low-Income Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(b) Provides Access to Areas with High Unemployment

Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of High Unemployment Areas across the region. Those with concentrations above the regional average were classified as High Unemployment Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(c) Maintains Access to Transportation-Vulnerable Communities During Disruptive Events

Evaluates a project's ability to preserve access to transportation-vulnerable communities, areas with higher concentrations of low-income or high-unemployment populations, during disruptive events such as flooding or storm surge. This measure supports equitable mobility and recovery by identifying projects that help sustain access for communities most vulnerable to transportation disruption during hazard conditions. The analysis was conducted using the Volpe Resilience and Disaster Recovery TAZ Metrics Tool, which calculates the percentage of trips retained to and from vulnerable areas under multiple hazard scenarios (see flooding scenarios). Baseline results were used to determine the overall level of access maintained (future analysis will average the overall level of access maintained across all scenarios). Scoring measure: Yes (High/Medium), No (Low/No).

Maintaining Access to Transportation-Vulnerable Communities	
High	≥ 75% of distressed TAZs retain ≥ 90% of trips
Medium	≥ 50-74% of distressed TAZs retain ≥ 90% of trips
Low	≥ 25-49% of distressed TAZs retain ≥ 90% of trips
No Points	< 25% of distressed TAZs retain ≥ 90% of trips

Economic Vitality – Intermodal/Freight

Travel Time and Delay Impacts

(a) Total Reduction in Regional Travel Time

Total reduction in regional travel time is obtained from the regional travel demand model and is based on the total regional travel time savings (in vehicle hours) between build and no build conditions for congested links across all scenarios (scenario results averaged).

The thresholds for total reduction in regional travel time are as follows:

Reduction in Regional Travel Time (in vehicle hours)	
Very High	> 27,000
High	18,000 – 26,999
Medium	12,000 – 17,999
Low	6,000 – 11,999
Very Low	0 – 5,999
None	Increase in Regional Travel Time

(b) Improved Regional Delay

Improved regional delay is obtained from the regional travel demand model and is based on the difference between congested and free flow travel times between build and no build conditions for each scenario.

The thresholds for total reduction in regional travel time are as follows:

Reduction in Regional Delay (in vehicle hours)	
Very High	> 7,600
High	6,000 – 7,599
Medium	4,000 – 5,999
Low	2,000 – 3,999
Very Low	0 – 1,999
None	<0

Labor Market Access

(a) Impact on Truck Movements

This measure reflects truck access based on the total amount of truck hours of delay per mile.

Points are assigned based on the following thresholds:

Port Access (Truck Hours of Delay per Mile)	
Very High	> 3.00 hours per mile
High	2.50 – 2.99 hours per mile
Medium-High	2.00 – 2.49 hours per mile
Medium	1.50 – 1.99 hours per mile
Low	1.00 – 1.49 hours per mile
Very Low	< 1.00 hours per mile

(b) Increases Access for High Density Employment Areas

Based on forecasted future employment, the HRTPO Board approved 2050 employment projections for the Baseline and the three Greater Growth employment assumptions. Densities were calculated per square mile for each scenario.

Thresholds were determined using categorical breaks.

Employment Density (TAZ Forecasted Employment/Square Mile)	
High	> 20,000
Medium High	9,500 – 19,999
Medium	5,500 – 9,499
Medium Low	2,000 – 5,499
Low	< 2,000

Access to High Density Employment TAZs is determined using a spatial overlay analysis, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Improves Interaction Between Modes of Travel for Basic Sector Industries

(a) Increases Access to the Port

Using GIS, port facilities were identified and analyzed through a spatial overlay to evaluate whether each candidate project would enhance direct access. Staff knowledge was applied to confirm and refine the assessment. Yes/No response.

(b) Improved Access to Truck Zones

Truck zones are a feature in the regional travel demand model and are defined as zones that contain a concentration of industrial or warehousing land uses or a specific truck generating activity, such as a truck stop, an intermodal transfer facility, or a trucking firm office. Truck Zones are anticipated to have a rate of truck trip ends per employee higher than other zones. Truck Zones have been identified through a review of satellite photos or local knowledge, coordinated with staff from the Virginia Port Authority and members of FTAC.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 5 miles
Low	> 5 miles

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

(c) Improves Flow of Rail

Based on whether facility will improve mobility of rail. Mobility improvement of rail determined using project description and spatial overlay analysis. A 250-foot tolerance was used to establish a buffer around existing rail. Yes/No response.

(d) Increases Access to Regional Airports

Regional airports were identified in GIS, and a spatial overlay analysis was conducted applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 5 miles
Low	> 5 miles

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

Increased Opportunity

(a) Provides New or Increased Access Opportunities

Based on change in capacity or reliability:

- New alignment: New Access
- Widening: Expanded Capability
- Removal of Obstacle (e.g., rail crossing): Expanded Capability

(b) Supports Plans for Future Growth

Yes/No response. Provided by stakeholders.

(c) Provides Access to Urban Development Areas/Governor's Opportunity Zones/Industrial Economic Development Areas
Urban Development Areas (UDA), Governor's Opportunity Zones (GOZ), and Industrial Economic Development Areas (IEDA) were identified in GIS. Data was obtained from the Virginia Economic Development Partnership for UDAs and GOZs, and from the Virginia Office of Intermodal and Planning Investment (OIPI) for IEDAs.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer:

Access	Buffer
Direct	<= 0.25 miles
Near	0.25 – 1 mile
Low	> 1 mile

Points assigned based on the following matrix:

Access:	Local	Principal	Interstate
Direct	Medium	High	High
Near	Low	Medium	Medium
Low	Low	Low	Low

Economic Vitality – Transit

Labor Market Access

(a) Increases Access for Major Employment Centers

TAZs within ½ mile of transit alignment identified. HRTPO Board approved 2050 forecasted total employment for the Baseline and three Greater Growth scenarios were summed for these TAZs.

Points awarded on a sliding scale 0-20 points:

20 Points (max): Total Employment >= 120,000
0 Points: Total Employment <=10,000

(b) Increases Frequency of Service

New LRT, Fixed Guideway, and Ferry projects automatically increase frequency of transit service; bus transfer stations do not.

Addresses the Needs of Basic Sector Industries

(a) Improves Access to Major Military Bases

"Major" based on DOD report ("Base Structure Report," DOD, 2014). Nine (9) facilities have much higher employment than the rest.

Major Military Facilities:

1. Dam Neck
2. Fort Eustis (joint expeditionary base)
3. Fort Story (joint expeditionary base)
4. Langley AFB (joint expeditionary base)
5. Little Creek Naval Amphibious Base (joint expeditionary base)
6. Naval Medical Center Portsmouth
7. Norfolk Naval Shipyard
8. Norfolk Naval Base
9. Oceana Naval Air Station

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer and point allocation:

Access	Buffer	Points
Direct	<= 0.25 miles	10 points
Near	0.25 – 5 miles	5 points
Low	> 5 miles	0 points

(b) Improves Access to Major Tourist Areas

Major Tourist Areas: Oceanfront, Historic Triangle (Williamsburg, Jamestown, Yorktown), Busch Gardens, and the Outer Banks.

Access determined via a spatial overlay analysis using GIS, applying the buffers and point allocation listed below. Staff also identified key tourist gateways.

Access	Buffer	Points
Direct	<= 0.25 miles	10 points
Near	0.25 – 5 miles	5 points
Low	> 5 miles	0 points

Increased Opportunity

(a) Provides New Access to the Network

New LRT, Fixed Guideway, and Ferry projects provide new access; transfer stations do not.

(b) Supported by Plans for Increased Density and Economic Activity

Stakeholder input: Designated Strategic Growth Area, Planning Supports Increased Density

(c) Provides Access to Institutions of Higher Education or Work Force Development Sites

Institutions of Higher Education and Work Force Development Sites were identified in GIS. Data was obtained from HRGEO and includes colleges, universities, professional, technical, and trade schools. HRTPO staff also included Virginia Career Works workforce development sites.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(d) Provides Access to Urban Development Areas/Governor's Opportunity Zones/Industrial Economic Development Areas
Urban Development Areas (UDA), Governor's Opportunity Zones (GOZ), and Industrial Economic Development Areas (IEDA) were identified in GIS. Data was obtained from the Virginia Economic Development Partnership for UDAs and GOZs, and from the Virginia Office of Intermodal and Planning Investment (OIPI) for IEDAs.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

Economic Distress Factors

(a) Provides Access to Low-Income Areas
Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of households below the poverty level across the region. Those with concentrations above the regional average were classified as Low-Income Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(b) Provides Access to Areas with High Unemployment
Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of High Unemployment Areas across the region. Those with concentrations above the regional average were classified as High Unemployment Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(c) Maintains Access to Transportation-Vulnerable Communities During Disruptive Events
This measure evaluates the degree to which a project preserves access to transportation-vulnerable communities (areas with high concentrations of low-income or high-unemployment populations) during disruptive events. Scoring is based on proximity to these communities, project vulnerability to flooding, and project type.

Inputs and rationale:

- Proximity to Low-Income (LI): Direct = 2, Near = 1, Low = 0
- Proximity to High-Unemployment (HU): Direct = 2, Near = 1, Low = 0
- Flooding Vulnerability: Not Vulnerable = 1, Vulnerable = 0
- Project Type: Fixed Guideway/Rail = 1; Ferry/Other = 0

Total Score = LI + HU + Flood + Project Type (range 0–6).

Maintained Access to Transportation-Vulnerable Communities	Buffer
High	5 - 6
Medium	3 - 4
Low	1 - 2
No Points	0

Economic Vitality – Active Transportation

Labor Market Access

Increases Access for Major Employment Centers
TAZs within ½ mile of project alignment identified. HRTPO Board approved 2050 forecasted total employment for the Baseline and three Greater Growth scenarios were summed for these TAZs.

Points awarded on a sliding scale 0-20 points:

20 Points (max): Total Employment > 75,000
0 Points: Total Employment < 1,000

Addresses the Needs of Basic Sector Industries

(a) Improves Access to Major Military Bases
"Major" based on DOD report ("Base Structure Report," DOD, 2014). Nine (9) facilities have much higher employment than the rest.

Major Military Facilities:

1. Dam Neck
2. Fort Eustis (joint expeditionary base)
3. Fort Story (joint expeditionary base)
4. Langley AFB (joint expeditionary base)
5. Little Creek Naval Amphibious Base (joint expeditionary base)
6. Naval Medical Center Portsmouth
7. Norfolk Naval Shipyard
8. Norfolk Naval Base
9. Oceana Naval Air Station

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer and point allocation:

Access	Buffer	Points
Direct	<= 0.25 miles	10 points
Near	0.25 – 5 miles	5 points
Low	> 5 miles	0 points

(b) Improves Access to Major Tourist Areas

Major Tourist Areas: Oceanfront, Historic Triangle (Williamsburg, Jamestown, Yorktown), Busch Gardens, and the Outer Banks.

Access determined via a spatial overlay analysis using GIS, applying the buffers and point allocation listed below. Staff also identified key tourist gateways.

Access	Buffer	Points
Direct	<= 0.25 miles	10 points
Near	0.25 – 5 miles	5 points
Low	> 5 miles	0 points

Increased Opportunity

(a) Provides New Access to the Network

New facilities indicated as providing new access to the network.

(b) Supports Plans for Future Growth

Yes/No response. Provided by stakeholders.

(c) Provides Access to Institutions of Higher Education or Work Force Development Sites

Institutions of Higher Education and Work Force Development Sites were identified in GIS. Data was obtained from HRGEO and includes colleges, universities, professional, technical, and trade schools. HRTPO staff also included Virginia Career Works workforce development sites.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(d) Provides Access to Urban Development Areas/Governor's Opportunity Zones/Industrial Economic Development Areas

Urban Development Areas (UDA), Governor's Opportunity Zones (GOZ), and Industrial Economic Development Areas (IEDA) were identified in GIS. Data was obtained from the Virginia Economic Development Partnership for UDAs and GOZs, and from the Virginia Office of Intermodal and Planning Investment (OIPI) for IEDAs.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

Economic Distress Factors

(a) Provides Access to Low-Income Areas

Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of households below the poverty level across the region. Those with concentrations above the regional average were classified as Low-Income Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(b) Provides Access to Areas with High Unemployment

Using 2017–2021 American Community Survey (ACS) data, Census Block Groups were analyzed to assess the distribution of High Unemployment Areas across the region. Those with concentrations above the regional average were classified as High Unemployment Areas.

Access improvement determined via a spatial overlay analysis using GIS, applying the following buffer, and scoring response:

Access	Buffer	Yes/No
Direct	<= 0.25 miles	Yes
Near	0.25 – 1 mile	Yes
Low	> 1 mile	No

(c) Maintains Access to Transportation-Vulnerable Communities During Disruptive Events

Evaluates the degree to which a project maintains access to transportation-vulnerable communities (areas with high concentrations of low-income or high-unemployment populations) during disruptive events. Scoring is based on proximity to these communities, flooding vulnerability, and surface condition.

Inputs and rationale:

- Proximity to Low-Income (LI): Direct = 2, Near = 1, Low = 0
- Proximity to High-Unemployment (HU): Direct = 2, Near = 1, Low = 0
- Flooding Vulnerability: Not Vulnerable = 1, Vulnerable = 0
- Project Surface (paved surfaces more traversable during adverse conditions): Paved = 1; Not Paved = 0

Total Score = LI + HU + Flood + Project Surface (range 0–6).

Maintained Access to Transportation-Vulnerable Communities	Buffer
High	5 - 6
Medium	3 - 4
Low	1 - 2
No Points	0

Project Viability – All Project Categories

Project Readiness

(a) Percent of Committed Funding
0-100%. Provided by stakeholders.

(b) Prior Commitment
Prior commitment for Roadway Projects is inclusion in currently adopted LRTP.
Prior commitment for Transit Projects is inclusion in currently adopted LRTP or Transit Vision Plan.
Prior commitment for Active Transportation Projects is inclusion in currently adopted LRTP or local Comprehensive Plan.
Yes/No. Provided by stakeholders.

(c) Project Alignment Status
Final/Preliminary/None. Provided by stakeholders.

(d) Percentage of Project Design Complete
0-100%. Provided by stakeholders.

(e) Environmental Documents Status
Full (NEPA has been completed), Partial (NEPA has been initiated), None. Provided by stakeholders.

(f) Environmental Decisions Obtained
Yes/No. Provided by stakeholders.

(g) ROW Obtained/Utilities Coordinated
Full (both ROW and Utilities have been coordinated), Partial (either ROW or Utilities have been coordinated), None. Provided by stakeholders.

Land Use/Future Development Compatibility

Compatible and Officially Documented (by an elected body), Compatible but Not Officially Documented, Not Compatible. Provided by stakeholders.

Environmental Considerations

(a) Environmental Measures of Effectiveness (MOE)

Evaluates the potential of a project to address the reduction of pollutant emissions and energy consumption. More information on how environmental MOEs are calculated can be found in the SMART SCALE Technical Guide. Responses include 0 to 3+ MOEs.

(b) Acres of Natural and Cultural Resources

Evaluates potential of project to minimize the impact on natural and cultural resources. More information on how impacts to natural and cultural resources are calculated can be found in the SMART SCALE Technical Guide. Responses include High, Medium, Low, or No Impact.

Measure for Active Transportation projects evaluates potential of project to provide access to natural and cultural resources. Responses include High, Medium, Low, or No Access.

Data Category	Data Type	Source
Conservation Lands	Conservation Lands	Virginia Department of Conservation and Recreation
	6F Properties	
	Protected Easements	
	Natural Heritage Screening Sites	
	Agriculture/Forest Districts	Virginia Department of Forestry
Species/Habitat	Threatened and Endangered Species	Virginia Department of Wildlife Resources
	Bats and Roost Trees	
Cultural Resources	Historic Resources Architecture	Virginia Department of Historic Resources
	Historic Resources Archeology	
	American Battlefield Protection Program	National Park Service
Wetlands	National Wetlands Inventory	US Fish and Wildlife Service

Highway/Interchange/Bridge-Tunnel Only

Air Quality: Percentage of truck traffic (for congested bottlenecks with high truck traffic)

Percent of truck traffic was calculated for congested intersections, interchanges, or other bottlenecks that have a high percentage of truck traffic (defined as 8%, based on the threshold used in the SMART SCALE prioritization process.)

Highway/Interchange/Bridge-Tunnel/Intermodal Only

Air Quality: Project Reduces traffic delay at a congested bottleneck with a high percentage of truck traffic and/or includes improvements to freight/rail/intermodal facilities

Yes/No, based on the travel time and LOS analysis used in the Project Utility section.

Transit Only

Air Quality/Emissions Reduction

The difference between total carbon dioxide, methane, and nitrous oxide emissions (in tons per commuter) of single-occupant passenger cars and transit was calculated. Then, this difference was multiplied by the number of estimated annual trips for each project.

Travel Mode	CO2, CH4, and N2O Emissions (tons per passenger-mile)
Cars	4.707×10^{-4}
Transit	1.863×10^{-4}

Active Transportation Only

Air Quality/Emissions Reduction

Eliminated vehicle trips and estimated reductions in VMT are calculated to analyze estimated impact of the project on VOC and NOx reductions.

System Importance

(a) Project Regret Score

This measure reflects the potential for "regret" if a project is not implemented under future hazard conditions. The Regret Score represents how critical a project becomes when comparing performance across different flooding and storm surge scenarios, helping to identify projects that perform well across a range of uncertain futures. A lower score indicates greater importance for maintaining system function and reducing long-term risk (lower scores represent prioritized regret).

Roadway Projects

The Regret Score for roadway projects was calculated using the Volpe Resilience and Disaster Recovery Tool Suite, which applies a Robust Decision Making (RDM) framework to evaluate project performance under multiple hazard scenarios (3-ft sea level rise, 3-ft sea level rise with 10-year storm surge, 3-ft sea level rise with 100-year storm surge, and 4.5-ft sea level rise with 100-year storm surge). Results were averaged across scenarios and classified using quartile thresholds derived from all candidate project scores.

Roadway Regret Scoring Thresholds	
High	Top 25% of scores (lowest regret values)
Medium	Middle 50% of scores
Low	Bottom 25% of scores
No Points	0

Transit Projects

Regret of not implementing a project given forecasted ridership and project type operability, where Fixed Guideway and Rail modes generally provide greater reliability under adverse conditions (0-20 scale).

Demand Bands: No = 0; Low = 1–6; Medium = 7–13; High = 14–20

Project Type	High Demand (14-20)	Medium Demand (7-13)	Low Demand (1-6)
Fixed Guideway/Rail	High	Medium	Low
Ferry/Other	Medium	Low	No

Active Transportation Projects

Regret of not implementing a project based on forecasted user demand and the surface condition of the facility. Forecasted demand reflects anticipated use. Surface condition (paved or unpaved) represents the facility's ability to maintain usability and reliability during disruptive events.

Demand Bands: No = 0; Low = 1–6; Medium = 7–13; High = 14–20

Surface Type	High Demand (14-20)	Medium Demand (7-13)	Low Demand (1-6)
Paved	High	Medium	Low
Not Paved	Medium	Low	No

(b) Infrastructure Criticality

This measure identifies how essential a project is to maintaining critical regional functions under both normal operating conditions and disruptive events. It is a composite index derived from multiple prioritization metrics, such as travel demand, reliability, and accessibility key to regional assets, that collectively indicate the project's functional importance to the regional transportation network.

By integrating multiple indicators of system performance and accessibility, the Infrastructure Criticality measure highlights those key facilities where investment would provide the greatest benefit to system resilience, mobility, and economic continuity.

Roadway Criticality

Reflects the functional and strategic importance of roadway segments in supporting regional mobility, economic activity, and emergency management. Measure aggregates results from several prioritization metrics, weighted by their contribution to network-level reliability and access to key regional assets.

Input factors include:

Measure	High (2 points)	Medium (1 point)	Low (0 points)
Future Usage (volumes) – double weight	Top 25% (4 points)	25% to 75% (2 points)	Bottom 25%
Travel Time Reliability	Very High, High	Medium High, Medium, Medium Low	Low
Degree of Regional Impact	Regional	Multi-jurisdictional	Local
Incident Management/Evacuation Route	Yes	N/A	No
Labor Market Access	Direct	Near	Low
Military Access	High	Medium	Low
STRAHNET/PPP/Military Roads	STRAHNET, PPP Primary	PPP Secondary, Military Roads	No
Port/Freight Access (Truck Zones)	High	Medium	Low
Impact to Freight Movement	Very High, High	Medium High, Medium	Low, Very Low
Tourism Access	High	Medium	Low
Access to High Unemployment/Low-Income Areas	Both High	High + Medium	Both Low
Functional Class	Limited Access, Principal Arterial	Minor Arterial, Major Collector (Secondary)	Minor Collector, Local

Scoring thresholds:

Roadway Criticality Scoring Thresholds	
High	18 – 26 points
Medium	9 – 17 points
Low	0 – 8 points

Intermodal/Freight Criticality

Measures the importance of intermodal connections and freight facilities in supporting goods movement and regional economic functions. Reflects how these facilities contribute to freight efficiency, port access, and multi-jurisdictional connectivity.

Input factors include:

Measure	High (2 points)	Medium (1 point)	Low (0 points)
Future Usage (volumes) – double weight	Top 25% (4 points)	25% to 75% (2 points)	Bottom 25%
Travel Time Reliability	Very High, High	Medium High, Medium, Medium Low	Low
Degree of Regional Impact	Regional	Multi-jurisdictional	Local
Impact on Truck Movement	High	Medium	Low
Labor Market Access	Direct	Near	Low
Increased Access for Port Facilities	Yes	N/A	No
Port/Freight Access (Truck Zones)	High	Medium	Low

Scoring thresholds:

Intermodal/Freight Criticality Scoring Thresholds	
High	12 – 16 points
Medium	6 – 11 points
Low	0 – 5 points

Transit Criticality

Evaluates the importance of transit facilities in supporting regional accessibility, particularly for high-demand corridors and populations with limited transportation options. Integrates ridership data, connectivity to employment and activity centers, and access to priority user groups.

Input factors include:

Measure	High (2 points)	Medium (1 point)	Low (0 points)
Future Usage (ridership) – double weight	Top 25% (4 points)	25% to 75% (2 points)	Bottom 25%
Percent of Trips Removed from Roadways	High	Medium	Low
Degree of Regional Impact	Regional	Multi-jurisdictional	Local
Labor Market Access	High	Medium	Low
Military Access	High	Medium	Low
Tourism Access	High	Medium	Low
Access to High Unemployment/Low-Income Areas	Both High	High + Med	Both Low

Scoring thresholds:

Transit Criticality Scoring Thresholds	
High	12 – 16 points
Medium	6 – 11 points
Low	0 – 5 points

Active Transportation Criticality

Identifies facilities that provide essential multimodal connections to transit and key activity centers while improving access for vulnerable and active users. Measure highlights corridors and linkages most vital to maintaining non-motorized system connectivity and resilience.

Input factors include:

Measure	High (2 points)	Medium (1 point)	Low (0 points)
Future Usage (ridership) – double weight	Top 25% (4 points)	25% to 75% (2 points)	Bottom 25%
Transit Stop Access	Top 25%	25% to 75%	Bottom 25%
Access to Regional Activity Centers	3+	2	1
Degree of Regional Impact	Regional	Multi-jurisdictional	Local
Labor Market Access	High	Medium	Low
Military Access	High	Medium	Low
Tourism Access	High	Medium	Low
Access to High Unemployment/Low-Income Areas	Both High	High + Med	Both Low

Scoring thresholds:

Active Transportation Criticality Scoring Thresholds	
High	12 – 16 points
Medium	6 – 11 points
Low	0 – 5 points

Cost Effectiveness

(a) Benefit to Cost Comparison

An index created by dividing the combined benefits of a project by the estimated cost. Costs are expressed in millions and in current year dollars.

(b) Return on Resilience Investment Across Scenarios (includes delay and repair cost savings)

Evaluates the expected return on investment (ROI) for resilience improvements by comparing a project's total discounted benefits to its total discounted costs. Measure highlights projects that deliver the greatest return on resilience-related investments, ensuring that funding supports improvements offering the most cost-effective reduction in future disruption and damage.

Roadway Projects

Benefits factored in for ROI measure include reductions in travel delay, network disruption, and repair costs under various hazard conditions. Calculations were conducted using the Volpe Resilience and Disaster Recovery Tool Suite, which calculates the net present value (NPV) of benefits relative to costs, expressed as a ratio of NPV/Cost. Results from the flooding hazard scenarios were averaged to determine each project's overall ROI classification.

Roadway ROI Scoring Thresholds	
High	≥ 2.00
Medium	1.50 – 1.99
Low	1.00 – 1.49
No Points	< 1.00

Transit Projects

Uses Benefit Cost Index (BCI) and project type. Projects with higher BCI values and more resilient modes (Fixed Guideway/Rail) receive higher scores.

Project Type	High BCI (10-15)	Medium BCI (5-9)	Low BCI (0-4)
Fixed Guideway/Rail	High	Medium	Low
Ferry/Other	Medium	Low	Very Low

Active Transportation Projects

Uses BCI and project surface condition to reflect differences in long-term durability and reliability.

Project Surface	High BCI (10-15)	Medium BCI (5-9)	Low BCI (0-4)
Paved	High	Medium	Low
Not Paved	Medium	Low	Very Low