



### 3.12 Need Category: Capacity Preservation

**Measure:** VDOT Arterial Preservation Network, or the state-maintained portion of the National Highway System in Virginia and including some additional highways that facilitate connectivity.

**What it means:** This VTrans Need Category focuses on the need for proactive measures to strike a balance between access and mobility.

**Applicable VTrans Travel Market:** CoSS, RN

#### Identification of Needs

- Data Sources:
  - VDOT Transportation Mobility Planning Division, Geospatial database of VDOT's Arterial Preservation Network
- Year of analysis: 2019
- Period of analysis: n/a
- Calculations:
  1. Identify roadway segments included in VDOT's Arterial Preservation Network.
  2. **Threshold for Need for Capacity Preservation:** Roadway segments within RNs or along the CoSS, and included in VDOT's Arterial Preservation Network, are identified as those with a VTrans Mid-term Need for Capacity Preservation.





### 4.2.11 Prioritization within Capacity Preservation Need Category

**Applicable VTrans Travel Market:** CoSS, RN

**Utilized for:** Establishing Statewide and Construction District Priority Locations

#### Severity of VTrans Mid-term Need for Capacity Preservation

- Source data:
  - RTIS, Hourly average 2018 Travel Time Index (TTI) for each TMC for weekdays and weekends
- Calculations
  - Calculate TTILT13, which is the cumulative total of all TTI less than 1.3 from 6 AM to 8 PM using the following equation:
    - $TTILT13 = 5/7 \times (\text{sum of weekday } TTI < 1.3) + 2/7 \times (\text{sum of weekend } TTI < 1.3)$
    - Set outliers with an equation value greater than the 15, (90th percentile) to 15.
    - For CoSS Need for Capacity Preservation, sort TTILT in descending order for the entire state and assign the following scores (referred to as CoSS Capacity):
      - Score 7: Top 5% of the total mileage
      - Score 6: 5.001%–10%
      - Score 5: 10.001%–15%
      - Score 4: 15.001%–20%
      - Score 3: 20.001%–25%
      - Score 2: 25.001%–50%
      - Score 1: Bottom 50.001%–100%
    - For RN Need for Capacity Preservation, sort TTILT in descending order for each VDOT Construction District and assign the following scores (referred to as RN Capacity):
      - Score 7: Top 5% of the total mileage
      - Score 6: 5.001%–10%
      - Score 5: 10.001%–15%
      - Score 4: 15.001%–20%
      - Score 3: 20.001%–25%
      - Score 2: 25.001%–50%
      - Score 1: Bottom 50.001%–100%

## Magnitude of VTrans Mid-term Need for Capacity Preservation

- Source data:
  - VDOT Traffic Engineering Division, Average Annual Daily Traffic (AADT) data.
- Calculations:
  - If AADT for a segment is null or 0, populate AADT with default values based on the roadway segment's functional classification (see Appendix E)

## Consideration of Severity and Magnitude Criteria

- Utilize established priorities within Need for Roadway Safety along CoSS (referred to below as *Safety Statewide Priority*) and established priorities within Need for Roadway Safety within RN (referred to below as *Safety District Priority*)
- For CoSS Need for Capacity Preservation, derive a scoring metric using the following equation, which relies on the Capacity Preservation Severity, Safety Statewide Priority, and AADT.  
$$\text{CoSS Capacity Score} = \text{AVG}(\text{CoSS Capacity}, \text{Safety Statewide Priority}) \times \text{AADT}$$
- For RN Need for Capacity Preservation, derive a scoring metric using the following equation, which relies on RN Capacity Preservation Severity, Safety District Priority, and AADT.  
$$\text{RN Capacity Score} = \text{AVG}(\text{RN Capacity}, \text{Safety District Priority}) \times \text{AADT}$$

## Prioritizing within CoSS and RN Capacity Preservation Need Category

Prioritization within this VTrans Mid-term Needs Category occurs in the following manner:

- For the establishment of Statewide Capacity Preservation Priorities, sort the CoSS Capacity Scores in descending order and assign the following scores based on mileage<sup>1</sup> to develop statewide *Very High*, *High*, *Medium*, and *Low* categorizations for VTrans Mid-term Need for Capacity Preservation.
  - *Very High* (Score 7): Top 5% of the total mileage
  - *High* (Score 6): 5.001%–10%
  - *High* (Score 5): 10.001%–15%
  - *Medium* (Score 4): 15.001%–20%
  - *Medium* (Score 3): 20.001%–25%
  - *Low* (Score 2): 25.001%–50%
  - *Low* (Score 1): Bottom 50.001%–100%
- For the establishment of Construction District Capacity Preservation Priorities, sort the CoSS and RN Capacity Scores in descending order and assign the following scores based on mileage<sup>1</sup> to develop VDOT Construction District-specific *Very High*, *High*, *Medium*, and *Low* categorizations for VTrans Mid-term Need for Capacity Preservation.
  - *Very High* (Score 7): Top 5% of the total mileage
  - *High* (Score 6): 5.001%–10%
  - *High* (Score 5): 10.001%–15%
  - *Medium* (Score 4): 15.001%–20%
  - *Medium* (Score 3): 20.001%–25%
  - *Low* (Score 2): 25.001%–50%
  - *Low* (Score 1): Bottom 50.001%–100%

<sup>1</sup> Where prioritization values do not break exactly at the percentile categories, assign all values to the higher category until there is a new prioritization value. For example, if the top 7% of roadway miles all have the same score, then 7% of miles would be classified as *Very High*.