Measuring Congestion Relief Options in Northern Virginia

EXECUTIVE SUMMARY

- *In a high-demand area, planners needed alternatives to roadway expansion.*
- *StreetLight scanned hundreds of congested segments to quickly identify those with the most short trips.*
- *Modeled bicycle, pedestrian, and transit options showed potential to remove 4+ million vehicle trips per year.*

Northern Virginia needed to prioritize projects with the most congestion relief per dollar. StreetLight's metrics drove critical modeling results.

Mission: Meet Demand Without Widening Highways

Northern Virginia consistently ranks as one of the most congested areas in the country, with limited resources for building new roads or expanding highways. Regional stakeholders wanted to find new ways to reduce vehicle travel demand.

Needing to scan hundreds of congestion road segments on a range of weekdays and times of day, engineers from the State Smart Transportation Initiative (SSTI), Michael Baker International, and local agencies turned to StreetLight InSight®. Planners aimed to identify segments suitable for transportation demand management (TDM) tactics such as bike lanes and transit.

> "This data helped us understand the likely effects of 24 projects that were under consideration. The Origin-Destination information was incredibly useful for understanding travel behavior in and between activity areas."
>
> KEITH JASPER
> Northern Virginia Transportation Authority

Analysis: Scan and Prioritize Hundreds of Roads

Instead of selecting a few locations to analyze, the project partners could pre-scan hundreds of locations for trip reduction potential, then prioritize from a subset of top 24 options for deep-dive assessments.

StreetLight's analysis ranked the most common O-D pairs in Northern Virginia and revealed which pairs had the shortest, most circuitous (least direct) trips, including trips internal to the zone. This highlighted regions with the most potential for road network or connectivity improvements to displace short trips with bike or pedestrian travel.

The project partners ranked the congested segments with the greatest volume of trips between the same O-D pairs to identify the ones that would benefit most from transit and shuttle options. Key O-D pair locations also indicated ideal transit stop locations.

Results: Shift More Than Four Million Trips

The project partners integrated StreetLight's metrics into existing models to estimate total flows of vehicles and evaluate project costs and benefits for three key areas.

The Tysons Corner zone had the most short trips: 29% of traffic (Peak PM) on Route 7 west-bound began in Tysons Corner, with 22% under five miles. This indicated that bicycle and pedestrian improvements, a bike share, and circulator shuttles could remove between 2.0 and 3.8 million vehicle trips per year from that zone.

Metrics for the George Mason University area showed that increasing pedestrian, biking, and transit connections while simultaneously introducing more competitive pricing at nearby parking lots could remove between 250,000 and 400,000 vehicle trips per year.

Several thousand highly circuitous vehicle trips under one mile originated in the neighborhood immediately adjacent to the Van Dorn Metro station. Adding limited-use crossings for bikes and pedestrians could remove between 100,000 to 152,000 vehicle trips year.

Link Description & Direction	Flow (000)	Top O-D Pair (%)	Trips < 5 mi (%)	Trips < 2 mi (%)	Trips < 1 mi (%)
Neabsco Mills Rd (US 1 - Optiz Blvd) SB	67.5	10.7	2.9	0.7	0.2
VA-28 (1-66 to Westfields Blvd) SB	60.3	1.4	3.4	1.1	0.3
1-66 (US-29 to VA-120) WB	55.7	2.0	0.0	0.0	0.0
US-50 (VA-286 to I-66) EB	51.3	1.4	3.3	1.4	0.4
VA-123 (George Wash. Pkwy to Chain Bridge)	47.8	10.6	0.5	0.1	0.0
US-50 (Stringfellow Rd to VA-286) EB	47.6	1.5	5.5	1.5	0.4
US-50 (VA-28 to Lees Corner Rd) EB	45.0	1.6	10.2	4.4	2.0
US-50 (Stringfellow Rd to VA-286) WB	43.2	1.4	3.8	1.4	0.3
I-66 (t-495 to VA-7) WB	41.0	0.9	0.4	0.1	0.0
US-50 (VA-609 to VA-28) WB	40.7	2.0	10.2	3.6	1.1
VA-7 (VA-123 to I-495) EB	37.5	2.9	15.3	11.1	4.4

Congested segments ranked to identify the links that would be impacted most by transit options. The orange shading indicates factors that make that link a good candidate for a multimodal project.