Evaluating Road Diets: Recent Research and Case Studies

Peter Ohlms, Virginia DOT
Lance Dougald, Virginia DOT
John Bolecek, Virginia DOT
Nicole Wynands, Fairfax County DOT
Christine Mayeur, City of Alexandria
July 7, 2020
Meet the Panelists

Peter Ohlms
Virginia DOT

Lance Dougald
Virginia DOT

John Bolecek
Virginia DOT

Nicole Wynands
Fairfax County DOT

Christine Mayeur
City of Alexandria
Housekeeping

- Submit your questions
- Webinar archive: www.pedbikeinfo.org/webinars
- Certificates and professional development hours
- Follow-up email later today
- Upcoming Webinar: MPO and DOT Partnership for Complete Streets Projects (July 29, 2020)
Safe Transportation for Every Pedestrian (STEP)
The Spectacular Seven

STEP
Safe Transportation for Every Pedestrian
For More Information:

Becky Crowe  
FHWA Office of Safety  
Rebecca.Crowe@dot.gov

Peter Eun  
FHWA Resource Center  
peter.eun@dot.gov

https://safety fhwa dot gov/ped_bike/step/resources/
How’s That Diet Working?
Performance of Virginia Road Diets

Peter Ohlms, AICP, Research Scientist
Lance Dougald, Senior Research Scientist

Safe Transportation for Every Pedestrian Webinar, July 7, 2020
Road(diet)map

• Overview and definitions
• What the research says
• Virginia inventory
• Analysis example
How We Got Here

• Midcentury boom in auto traffic
• Many 2-lane roads were expanded to 4 lanes
A Golden Opportunity
Related: Lane Diets
VDOT’s Experience

• VDOT handles public roads in Virginia except in cities, larger towns, and two counties
  – Fairfax County: Adding dozens of miles of bike lanes every year, many through road diets
  – Some examples of road diets in small towns

• Localities had also conducted road diets
  – Extent was unknown
Study Goals

• Improve understanding of past road diets
  – How are road diets working?
  – How are road diets analyzed and success measured?

• Compile an inventory of Virginia road diets

• Analyze some Fairfax County road diets
What the Research Says

- Not so safe
- Safer
What the Research Says

• FHWA’s 2014 RDIG
  – Sites with average daily traffic from 2,000 to 26,000 veh/day
  – Crash reductions of 19% to 47%
  – Speed reductions: 3 to 5 mph
  – Improved speed harmony
What the Research Says

• FHWA’s 2014 RDIG
  – LOS declines at 1,750+ veh/hr
  – Safety benefits may diminish as volumes increase
  – Transit stops may affect operations
What the Research Says: In Brief

• Public opinion affects implementation and whether a project is deemed a success

• Many ways to measure (quantify) success:
  – Volumes, travel times, speeds, crashes, diversions
  – Bicycle and pedestrian volumes, crashes, injuries
  – Retail sales, employment, property values, investment

• Outcomes are generally positive
What the Research Says: In Detail

• Studies before 2014 not included in the *RDIG*

• 2014-2019
  – Before-after road diet studies and other B-A studies
  – Road diet case studies
  – Road diet models and simulations
  – Related guidance and performance measures
  – Studies on related topics, magazine articles, etc.
### Citations and Case Analyses

**FHWA (2015a): Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks**

- **Focus; Region; Data Year; Methods:** Case studies of various projects including two road diets and Chicago’s Complete Streets Arterial Resurfacing Program; New Orleans, Chicago, and Urbana, IL; 2010-2014; bicycle and pedestrian volumes and qualitative descriptions

- **Findings:** New Orleans: Estimated 226% increase in bicycling and 132% increase in walking. Chicago chose corridors based on pedestrian crashes and bicycle and pedestrian plans. Bike lanes in Urbana’s road diet connected to eight other existing/proposed bike facilities.

- **Limitations; Recommendations:** Shifting an agency’s focus from spot or corridor improvements to a systemwide perspective is challenging, as is measuring and evaluating nonmotorized network connectivity. Road diets are one tool for increasing nonmotorized network connectivity.

**Perk et al. (2015): Capturing the Benefits of Complete Streets**

- **Focus; Region; Data Year; Methods:** Economic activity associated with complete streets projects; one case study is a 2009-2011 road diet in Gainesville, FL; changes in parcel values, property taxes, and jobs

- **Findings:** Traffic volumes and speeds decreased somewhat. Bicycle and pedestrian volumes increased, and crashes declined sharply. Economic activity in the immediate area appeared to have increased.

- **Limitations; Recommendations:** Road diet was part of a major reconstruction project, not a simple resurfacing. An exact causal relationship between the project and economic activity cannot be determined.
<table>
<thead>
<tr>
<th>Citation: Title</th>
<th>Focus; Region; Data Year; Methods</th>
<th>Findings</th>
<th>Limitations; Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dowling et al. (2016): Applying Performance Based Practical Design Methods to Complete Streets - A Primer on Employing Performance-Based Practical Design and Transportation Systems Management and Operations to Enhance the Design of Complete Streets</td>
<td>How the application of performance-based practical design (PBPD) combined with operations strategies can promote the consideration and application of complete streets; Orlando, Pasadena, and Des Moines; years are in source studies; case study summaries</td>
<td>PBPD is one type of analysis that can evaluate the suitability of a road diet. Metrics included traffic volumes on the treatment and parallel streets, on-street parking utilization, pedestrian and bicycle volumes, bicycle and auto level of service, traffic speeds, and crashes.</td>
<td>Success in road diet projects also depends on institutional and policy factors outside the design process.</td>
</tr>
<tr>
<td>Moore et al. (2017): Implementing Context Sensitive Design On Multimodal Corridors: A Practitioner's Handbook</td>
<td>Guidance for practitioners developing multimodal thoroughfare designs in suburban areas, urban edges, and small towns; Cincinnati, OH and Dallas, TX; 2006-2010 and 2013-2017; case studies</td>
<td>Removing or narrowing lanes can allow for inclusion of multimodal elements. Case study streets added green space, sidewalk width, and/or parking by removing and/or narrowing lanes while lowering speeds; one had data showing stable traffic volumes and fewer crashes.</td>
<td>Comparing peak hour volumes to capacity per lane can be a quick approach for determining initial viability of a road diet when tube counts are not possible. Travel lanes on walkable streets should be 10 to 11 ft wide and no more than 12 ft.</td>
</tr>
<tr>
<td>Schlossberg et al. (2019): Rethinking Streets for Bikes: An Evidence-Based Guide to 25 Bike-Focused Street Transformations</td>
<td>Practitioner-focused guide to seven types of bicycle infrastructure; 25 illustrated examples, mostly in the U.S. and mostly road diets; years vary</td>
<td>Places across the U.S. have reallocated street cross-sections to create two-way cycle tracks, one-way protected bike lanes, raised bike lanes, advisory bike lanes, and off-street paths.</td>
<td>Limited quantitative information. No recommendations, but each case study includes key interventions, evidence of change, and additional context/lessons learned.</td>
</tr>
</tbody>
</table>
Virginia Road Diets Inventory

• 2018 survey aimed to:
  – Identify locations of and reasons for road diets
  – Document before/after layouts
  – Document study results and professional and public opinions of effectiveness
  – Record lessons learned

• Survey went to cities, counties, towns, Districts
Road Diets Across Virginia
Survey of Localities and Districts

- 105 responses (43% response rate)
- 10% had road diets since 2010
  - Six had one
  - One each had 4, 3, and 2
  - Two had 5 or more
Reasons for Road Diets

- Improving Safety: 15
- Accommodating Pedestrians: 9
- Accommodating Bicycle Travel: 18
- On-street Parking: 4
- Traffic Calming: 6
Did Road Diets Meet Goals?

- TBD: 1
- Met Goals: 3
- Mixed Results: 3
- Unknown: 1

Total: 18
How Do We Measure Success?

• Depends on the goal(s)
  – Encouraging bicycling: volumes, comfort
  – Neighborhood effects: volumes on parallel streets
  – Safety: crashes, speeders
  – Traffic flow: volumes, speeds
Metrics and Data: Fairfax Co. Diets

• Auto traffic volumes and speeds before and after road diets
  – Six sites on four roads in Fairfax County
• Bicycle and pedestrian counts and positioning
  – Two sites on one of the same roads
Colts Neck Rd: User Positioning

Before
- Pedestrians in street: 495
- Bicyclists on sidewalk: 169
- Bicyclists in street, with traffic: 110
- Bicyclists on sidewalk, against traffic: 31
- Bicyclists on sidewalk against traffic: 12

After
- Pedestrians in street: 1011
- Bicyclists on sidewalk: 236
- Bicyclists in street, with traffic: 62
- Bicyclists in street, against traffic: 4
- Bicyclists on sidewalk against traffic: 18
- Bicyclists on sidewalk against traffic: 10
Conclusions

• Road diets take many different forms
• Many methods and performance measures
• Road diets are part of many other concepts
• Road diets still work
• Virginia survey respondents had generally positive views about their road diet projects
Conclusions

• Fairfax County road diet cases studied
  – No practically significant speed changes
  – May reduce unsafe walking and biking behavior
• Working inventory: approx. 39 miles, 66 projects
• Additional research would be beneficial
• Planning for road diets routinely could improve safety and multimodal connectivity
How’s That Diet Working? Performance of Virginia Road Diets

Peter Ohlms, AICP, Research Scientist
Lance Dougald, Senior Research Scientist

Safe Transportation for Every Pedestrian Webinar, July 7, 2020
Unused slides
Volumes and Speeds: 2018 Sites
Dieting Can Be Scary

The Virginian-Pilot
Norfolk drops plan to take traffic lanes off Hampton Boulevard after resident outcry

By RYAN MURPHY
STAFF WRITER  |  FEB 07, 2019  |  3:44 PM

GREATER WASHINGTON

These “road diets” would make streets safer and barely affect traffic. Why do people oppose them?

By Canaan Merchant (Elections Committee)  |  June 24, 2019  |  58

Some local road projects designed to calm traffic and increase safety for all users have been met with a surprising amount of resistance. Worse, regional officials seem to be prioritizing voices of opposition over actual studies, and it’s keeping our communities unsafe.

Recently, two traffic calming proposals have came up on roads that are known to be dangerous, one in Alexandria and the other in Montgomery County. Both were nixed after an outcry from drivers who worried the updates would lead to delays, despite evidence to the contrary. What can these incidents tell us?

Alexandria defies the evidence on Seminary Road

Alexandria has plans to update Seminary Road, an important arterial which runs through the central part of the city. The city has passed a Complete Streets ordinance,
Tasks

1. Literature review
   – Performance measure criteria / methods
   – Document quantitative / qualitative results

2. Conduct Virginia inventory
   – Survey of VDOT districts and localities
   – Projects since 2010 / planned projects
   – Document geometrics, costs, study results
   – Compile results: opinions on effectiveness, lessons learned
Tasks

3. Collect before/after data on select road diets in Fairfax
   – Colts Neck Rd (2017): speed, volume, video for bicycle/pedestrian counts
   – Post Forest Dr (2018): speed, volume

4. Analyze operational impacts

5. Develop conclusions/write report
So Have Virginia’s Road Diets Worked?

• It depends how you ask the question.

• Did throughput/speeds drop?
  – No! So yes, the diets worked.

• Did they address speeding? / Did more people walk or bike?
  – Not necessarily
The Future of Dieting in Virginia

- Development of Crash Modification Factors
- Statewide assessment of candidate streets
- VDOT Road Diet Guidelines
Background

- A recommendation from the Pedestrian Safety Action Plan (page 24) was to: “Develop Road Diet or lane width reduction guidelines”
- Over 66 Road Diets already constructed in Virginia
- Great examples of these happening annually, i.e. Fairfax County
- No place to communicate where, why or how these happened
- No instructions on how localities can request from VDOT
Road Diet
Informational Guide

FHWA Safety Program

Virginia Department of Transportation
Roadway Reconfiguration Brochure

Roadway Reconfiguration Guidance

Improving safety is a top priority for the Virginia Department of Transportation (VDOT). One of the strategies for achieving this goal is by implementing roadway reconfigurations. This safety strategy can be by implemented by modifying pavement markings during repaving projects or through new construction projects. Implementing striping and marking changes with the repaving program allows improvements in safety by addressing speeding, reducing crossing distances for pedestrians, and adding bike lanes in a very cost-effective manner.

VDOT’s ROADWAY RECONFIGURATIONS ACROSS THE STATE

REDUCE VEHICULAR SPEEDS
ENCOURAGE ECONOMIC GROWTH
IMPROVE ROADWAY SAFETY
CREATE SPACE FOR BICYCLISTS AND WALKERS

What is a Roadway Reconfiguration?

Roadway reconfigurations change the utilization of the pavement space, typically by restriping, to either remove one or more lanes or narrow them thereby adding bike lanes, turn lanes and/or parking. Roadway Reconfigurations that remove a travel lane are sometimes referred to as Road Diets.

The typical roadway reconfiguration converts a 4-lane, undivided roadway to a 3-lane roadway with a two-way left turn lane and bike lanes. The pavement space on Bluemont Way shown below was reconfigured in this manner.
Biking and Walking in Virginia

Roadway Reconfigurations

Improving safety is a top priority for the Virginia Department of Transportation (VDOT).

Roadway reconfigurations are a tool to address safety issues and are designated as a proven safety countermeasure by the Federal Highway Administration (FHWA).

Roadway reconfiguration is a broad term that can be defined as any striping change that alters a roadway's layout.

A Road Diet is a specific type of roadway reconfiguration generally described as removing one or more travel lanes from a roadway and utilizing the space for other uses or travel modes.

VDOT works with localities across the commonwealth interested in implementing roadway reconfigurations either as independent projects or as repainting during repaving projects.

Implementing striping and marking changes with the repaving program is a cost-effective approach for adding bike lanes and improving safety by reducing crashes, speed, and crossing conflicts for pedestrians.

Road Diet Basic Design

A classic Road Diet typically involves converting an existing four-lane, undivided roadway to a three-lane roadway consisting of two through lanes and a center, two-way left-turn lane and bike lanes or paved shoulders.

At least 27 such “4-3” conversions have been implemented in Virginia.

The resulting benefits of the 4-3 conversion include an average crash reduction of 19 to 47 percent, reduced vehicle speed differential, improved mobility and access by all road users, and integration of the roadway into surrounding land uses that results in an enhanced quality of life.
Concept level striping plan

VDOT Road Diet Guidepost

Market Street (Road Diet Option)

PRESERVE PARKING

11 ft.
Ranges from 6-14 ft.
Ranges from 3-8 ft.

BEGIN LANE SHIFT TAPER

PROPOSED BUFFERED BIKE LANE

BEGIN LANE DROP TAPER

PROPOSED TWO-WAY LEFT TURN

CONCEPTUAL DESIGN ONLY NOT FOR CONSTRUCTION

Market Street Road Diet Concept
Hill Street Transition
Accomack County, Virginia

Figure 1
Example of operational analysis

Figure 1: Total Average Weekday/Weekend Traffic Profile

Table 2 - Existing (2019) AM/PM HCM 6th Edition Results

<table>
<thead>
<tr>
<th>Approach</th>
<th>Movement</th>
<th>Existing Storage (ft)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
<th>V/C</th>
<th>Delay (s) [LOS]</th>
<th>% Queue (ft)</th>
<th>% Queue (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>EBD</td>
<td>165</td>
<td>0.85</td>
<td>60.0 [E]</td>
<td>250</td>
<td>0.92</td>
<td>70.2 [E]</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>ERT</td>
<td>0.78</td>
<td>28.7 [E]</td>
<td>150</td>
<td>0.56</td>
<td>41.1 [E]</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDR</td>
<td>220</td>
<td>0.71</td>
<td>28.1 [E]</td>
<td>100</td>
<td>0.43</td>
<td>19.4 [E]</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Approach</td>
<td>-</td>
<td>38.2 [D]</td>
<td>-</td>
<td>-</td>
<td>89.7 [D]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WBL</td>
<td>WBL</td>
<td>215</td>
<td>0.72</td>
<td>61.5 [E]</td>
<td>75</td>
<td>0.64</td>
<td>68.7 [E]</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>WRT</td>
<td>0.42</td>
<td>55.3 [E]</td>
<td>150</td>
<td>0.52</td>
<td>45.8 [E]</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WBR</td>
<td>130</td>
<td>0.07</td>
<td>0.0 [A]</td>
<td>0</td>
<td>0.00</td>
<td>0.0 [A]</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Approach</td>
<td>-</td>
<td>39.7 [D]</td>
<td>-</td>
<td>-</td>
<td>48.0 [D]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NB</td>
<td>NB</td>
<td>130</td>
<td>0.72</td>
<td>65.2 [E]</td>
<td>150</td>
<td>0.56</td>
<td>60.1 [E]</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>NBT</td>
<td>-</td>
<td>0.47</td>
<td>43.0 [E]</td>
<td>125</td>
<td>0.79</td>
<td>46.7 [E]</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>NBR</td>
<td>130</td>
<td>0.12</td>
<td>8.6 [D]</td>
<td>0</td>
<td>0.28</td>
<td>8.6 [D]</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Approach</td>
<td>-</td>
<td>44.1 [D]</td>
<td>-</td>
<td>-</td>
<td>42.0 [D]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SB</td>
<td>SRL</td>
<td>235</td>
<td>0.07</td>
<td>27.6 [E]</td>
<td>25</td>
<td>0.01</td>
<td>86.3 [E]</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>SBT</td>
<td>-</td>
<td>0.47</td>
<td>32.5 [E]</td>
<td>225</td>
<td>0.55</td>
<td>30.7 [E]</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>SDR</td>
<td>-</td>
<td>0.72</td>
<td>30.3 [E]</td>
<td>125</td>
<td>0.55</td>
<td>25.7 [E]</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Approach</td>
<td>-</td>
<td>31.5 [K]</td>
<td>-</td>
<td>-</td>
<td>31.5 [K]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overall Intersec</td>
<td></td>
<td>-</td>
<td>36.6 [D]</td>
<td>-</td>
<td>-</td>
<td>39.2 [D]</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1 ADT calculated as 7-day average rounded to nearest 100 vehicles.
2 Peak hour calculated as 7-day average rounded up to nearest 10 vehicles.
3 Capacities for LOS C and D calculated using the VDOT Operational Level of Service Tables (Table 1 for daily two-way volumes; Table 4 for peak hour two-way volumes).
4 LOS compared to ADT and peak hour to respective LOS C and D calculated capacities.
Pros and cons of implementation via resurfacing

ArcGIS VDOT Pavement Condition Map

Legend
VDOT Pavement Conditions 2018

- Excellent
- Good
- Fair
- Poor
- Very Poor
- Not Rated
Before / after map with 24 examples

**31 Turner Rd - 2016 (Before)**

**Locality:** Chesterfield County

**Roadway:** 2 mi, 45 MPH, 11,000AADT
After

Virginia Department of Transportation
GIS tools

These sheets display potential segments with relevant data:

- Existing bike/ped facilities
- Pavement condition
- ACS walk, bike, transit data
- Traffic volume, K-factor
- Crash rate
- V/C Ratio
- Median type
Next Steps

- Publish more robust guidelines
- Assist with planning
- Continue to assist districts by funding:
  - Requests for striping plans
  - Traffic counts
  - Full studies
Road Diets in Fairfax County: A VDOT & County Collaboration
Programmatic Implementation

• 20+ road diets since 2009
• Over 100 miles of bike lanes added through VDOT’s repaving program (road diets and lane diets)
• 0 failed or removed road diets (though some are temporary)
• Public support for road diets is growing
Policy Guidance

Evaluate road dieting and/or lane dieting concepts where roadway volume to capacity ratios allow in order to establish on-road bike lanes.

- Fairfax County Comprehensive Plan
Process Overview & Timeline

1. VDOT: Distribution of Preliminary Paving Plans (August-October Y1)
2. County: Prescoping (October-November Y1)
3. VDOT: Review & Approval (December Y1)
4. County: Political Stakeholder Review & Approval (January Y2)
5. County: Public Outreach (February-April Y2)
6. VDOT: Design & Final Approval (April-May Y2)
7. VDOT: Implementation (May – December Y2)
Lessons Learned

1. Start with low hanging fruit to show positive effects of road diets
2. Be mindful of stadium arrival, including weekends
3. Coordinate with impacted schools
4. Coordinate with transit, move bus stops if needed
5. Don’t forget pedestrians – new crosswalks, ped refuges, signage
6. Communicate new traffic pattern ahead of time (alerts, signage)
7. Drivers need time to adjust (2-3 months)
Thank you!

Contact Information:

Nicole Wynands
Transportation Planner III
Active Transportation Program
Fairfax County Department of Transportation
Nicole.Wynands@fairfaxcounty.gov
Alexandria, Virginia

Road Reconfigurations on Higher Volume Roads
Intro to Alexandria

- Street Ownership
- Street Types
Intro to Alexandria
Alexandria Process for Consideration

- Resurfacing schedule
- Planned multimodal facilities
- VDOT or otherwise collected volume data
- FHWA guidance
- Crash Data/ Crash Risk
- Other capital projects in planning
Why consider a Road Diet?

• Federal guidance gives criteria for whether road diets are possible in certain circumstances, recognizing where they are and are not possible:

<table>
<thead>
<tr>
<th>Average Daily Traffic (ADT)</th>
<th>&lt; 10,000</th>
<th>10,000-15,000 ADT</th>
<th>15,000-20,000 ADT</th>
<th>&gt;20,000 ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great candidate for Road Diets in most instances. Capacity will most likely not be affected.</td>
<td>Good candidate for Road Diets in many instances. Agencies should conduct intersection analysis and consider signal retiming to determine any effect on capacity.</td>
<td>Good candidate for Road Diets in some instances. Agencies should conduct a corridor analysis. Capacity may be affected at this volume depending on the “before” condition.</td>
<td>Agencies should complete a feasibility study to determine whether this is a good location for a Road Diet. There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume.</td>
<td></td>
</tr>
</tbody>
</table>
Recent Road Reconfiguration Projects

N Van Dorn
(Menokin Drive to West Braddock Road)
2015–2016

King Street
(Janneys Lane to Kenwood Avenue)
2015–2017

Seminary Road
(North Quaker Lane to North Howard Street)
2018–2020
King Street Complete Streets Project
Background

- Board action at TPB Public Hearing in June 2016 recommended:
  - **Removal of EB travel lane** between Chinquapin & Janney’s and **WB travel lane** between Kenwood & Janney’s
  - Installation of “**No Right Turn on Red**” signs at SB Kenwood at King
  - Reduction in the speed limit from **35mph to 25mph** on King, between Chinquapin & Melrose

- Project implemented between July – October 2016

- Board approved the staff recommendation
  - Requested **staff perform evaluation**
    - If the project failed to meet the staff defined expectations in the project proposal presented to the Board, **take remedial actions** to correct.
  - To comply with the motion:
    - Staff enlisted an **external traffic engineering firm to perform an analysis** along the corridor of
      - Intersection level-of-service
      - Travel time delays
Project Limits: Radford Street to Janney’s Lane
Project Goals

• Improve the **safety** and convenience of all street users

• Provide **facilities** for people who walk, bike, ride transit or drive cars

• Implement City Council adopted **plans and policies**
What we heard from the community:

**What We Heard – main themes**

- Difficult to cross King Street
- Pedestrian safety concerns near school
- Vehicle speeds along King Street are high
- Street crossings are long
- Not enough time to cross at lights
- Maintain travel times
- Unsafe for people who bike
- Difficult to access bus stops
- Improvements needed at intersections
- Need to change character of the roadway

*Over 250 comments regarding this project submitted*
Conditions Before

- Average 85th percentile speeds:
  - 35mph=42  25mph=33
- AM Peak ~750vph
- PM Peak ~650vph
- ADT: 13,000 (VDOT)
- Traffic Study

*No bicycle or pedestrian crashes reported*
## Data Collection

<table>
<thead>
<tr>
<th>Location</th>
<th>85th percentile speed (MPH)</th>
<th>AM peak hour volume (VPH)</th>
<th>PM peak hour volume (VPH)</th>
<th>Total vehicles per day (VPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>King St. eastbound at Quincy St.</td>
<td>40.4</td>
<td>597</td>
<td>574</td>
<td>6,730</td>
</tr>
<tr>
<td>King St. westbound at Quincy St.</td>
<td>41.3</td>
<td>663</td>
<td>553</td>
<td>6,931</td>
</tr>
<tr>
<td>King St. eastbound at Albany</td>
<td>43.7</td>
<td>657</td>
<td>679</td>
<td>7,457</td>
</tr>
<tr>
<td>King St. westbound at Albany</td>
<td>42.9</td>
<td>999</td>
<td>735</td>
<td>8,008</td>
</tr>
<tr>
<td>King St. eastbound at Kenwood Ave.*</td>
<td>33.8</td>
<td>768</td>
<td>640</td>
<td>5,924</td>
</tr>
<tr>
<td>King St. westbound at Kenwood Ave.*</td>
<td>32.8</td>
<td>832</td>
<td>649</td>
<td>3,367</td>
</tr>
<tr>
<td><strong>CORRIDOR AVERAGE 35 MPH</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CORRIDOR AVERAGE 25 MPH</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*25 mph speed limit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Why consider a Road Diet?

- Federal guidance gives criteria for whether road diets are possible in certain circumstances, recognizing where they are and are not possible:

<table>
<thead>
<tr>
<th>&lt; 10,000 Average Daily Traffic (ADT)</th>
<th>10,000-15,000 ADT</th>
<th>15,000-20,000 ADT</th>
<th>&gt;20,000 ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great candidate for Road Diets in most instances. Capacity will most likely not be affected.</td>
<td>Good candidate for Road Diets in many instances. Agencies should conduct intersection analysis and consider signal retiming to determine any effect on capacity.</td>
<td>Good candidate for Road Diets in some instances. Agencies should conduct a corridor analysis. Capacity may be affected at this volume depending on the “before” condition.</td>
<td>Agencies should complete a feasibility study to determine whether this is a good location for a Road Diet. There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume.</td>
</tr>
</tbody>
</table>
Option 1
Complete Street Maintenance

Option 2
Pedestrian & Accessibility Intersection Enhancements

Option 3
Complete Street Corridor Improvements
Complete Street Design Corridor Concept

Existing

Complete Street Option
Evaluation – Key Findings

1. Zero reported traffic crashes in the first year.
   • Annual average of 7 crashes during the 10 years prior to this project

2. Average vehicle speeds on the corridor have reduced.
   • -18% between Albany Ave. and Hermitage Ct.
   • -4% near T.C. Williams High School

3. Traffic delay at King & Chinquapin has increased slightly more in the AM peak hour than anticipated.
   • Other intersections along the corridor have seen minimal or no additional changes to delay.

4. Traffic diversion onto Scroggins Road has not appeared to increase due to this project.
   • Concern from several residents.
Average Vehicle Speeds Have Been Reduced

<table>
<thead>
<tr>
<th>Segment of King St.</th>
<th>Before</th>
<th>After</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Speed Limit (mph)</td>
<td>Avg. 85th % Speed (mph)</td>
<td>Speed Limit (mph)</td>
</tr>
<tr>
<td>Albany Ave. to Hermitage Ct.</td>
<td>35</td>
<td>43.3</td>
<td>25</td>
</tr>
<tr>
<td>Radford St. to Chinquapin Dr.</td>
<td>25</td>
<td>33.8</td>
<td>25</td>
</tr>
</tbody>
</table>

After data collected in May 2017
AM Peak Delays at King & Chinquapin

- Traffic delay in the AM peak slightly higher at King & Chinquapin than anticipated
  - Expected: 22 seconds of additional delays
  - Observed: 32 seconds of additional delays

- Overall intersections operate at a reasonable level-of-service and delay after implementation

- Traffic volumes are up slightly on King St. during this time.

- Remedial actions taken to reduce excessive travel time delays:
  - Signal timing modifications at the intersections of Chinquapin & Kenwood (Fall 2016)
  - Protected left turn for WB King at Kenwood for vehicles entering TC Williams (Aug. 2017)

Post implementation traffic data collected in May 2017
No Increase in Traffic Diversion on Scroggins

### Vehicle Speeds

<table>
<thead>
<tr>
<th>Segment of Scroggins Rd.</th>
<th>Before</th>
<th>After</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg. 85th % Speed (mph)</td>
<td>Avg. 85th % Speed (mph)</td>
<td>Avg. 85th % Speed (mph)</td>
</tr>
<tr>
<td>Quincy St. to Cleveland St.</td>
<td>30.2</td>
<td>30.6</td>
<td>0.4</td>
</tr>
</tbody>
</table>

### Traffic Volumes

<table>
<thead>
<tr>
<th>Segment of Scroggins Rd.</th>
<th>Before</th>
<th>After</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vehicles per Day</td>
<td>Vehicles per Day</td>
<td>Vehicles per Day</td>
</tr>
<tr>
<td>Quincy St. to Cleveland St.</td>
<td>2,233</td>
<td>2,174</td>
<td>-59</td>
</tr>
</tbody>
</table>

Recent King Street volume counts show steady 13,000 ADT
Seminary Road
Complete Streets Project
Study Area

Alternatives Consideration

Additional area considered for short-term and mid-term improvements (no lane changes)
Project Objectives

- Reduce crashes on the corridor
- Improve mobility, safety, and access for all roadway users
- Provide continuous, safe, and comfortable places for people to walk
- Provide more frequent and safer crossing opportunities along the corridor
- Minimize delay at intersections, and encourage speed limit compliance
- Where excess roadway capacity exists, explore opportunities to reconfigure the corridor to better serve all modes
Traffic Volumes Map – 2018 Average Daily Traffic

Typical Maximum Capacity of a Similar Roadway is >30,000 Vehicles per day

<table>
<thead>
<tr>
<th>Peak Period</th>
<th>Vehicles traveling WB</th>
<th>Vehicles traveling EB</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM 7:30-8:30am</td>
<td>Quaker to Ft. Williams: 947</td>
<td>N Howard to St. Stephens: 599</td>
</tr>
<tr>
<td></td>
<td>Ft. Williams to St. Stephens: 1019</td>
<td>St. Stephens to Ft. Williams: 523</td>
</tr>
<tr>
<td></td>
<td>St. Stephens to N Howard: 1104</td>
<td>Ft. Williams to Quaker: 517</td>
</tr>
<tr>
<td>PM 4:15-6:00pm</td>
<td>Quaker to Ft. Williams: 699</td>
<td>N Howard to St. Stephens: 776</td>
</tr>
<tr>
<td></td>
<td>Ft. Williams to St. Stephens: 630</td>
<td>St. Stephens to Ft. Williams: 746</td>
</tr>
<tr>
<td></td>
<td>St. Stephens to N Howard: 684</td>
<td>Ft. Williams to Quaker: 684</td>
</tr>
</tbody>
</table>
Why consider a Road Diet?

- Federal guidance gives criteria for whether road diets are possible in certain circumstances, recognizing where they are and are not possible:

<table>
<thead>
<tr>
<th>Traffic (ADT)</th>
<th>10,000-15,000 ADT</th>
<th>15,000-20,000 ADT</th>
<th>&gt;20,000 ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10,000</td>
<td>Good candidate for Road Diets in many instances. Agencies should conduct intersection analysis and consider signal retiming to determine any effect on capacity.</td>
<td>Good candidate for Road Diets in some instances. Agencies should conduct a corridor analysis. Capacity may be affected at this volume depending on the “before” condition.</td>
<td>Agencies should complete a feasibility study to determine whether this is a good location for a Road Diet. There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume.</td>
</tr>
</tbody>
</table>
Crash History- Kenmore to Quaker

POLICE REPORTED CRASHES

- Total Crashes
- Injury Crashes
- KSI Crashes

Key Events:
- BRAC opened
- HOV exits open
- Speed limit reduced

Yearly Crashes from 2010 to 2017:
- 2010: Total crashes
- 2011: Total crashes
- 2012: Total crashes
- 2013: Total crashes
- 2014: Total crashes
- 2015: Total crashes
- 2016: Total crashes
- 2017: Total crashes
Speed Data

85TH PERCENTILE SPEEDS

- Eastbound
- Westbound
- Posted Speed Limit

May 2017 count:
- (85th percentile): EB- 34.9 mph, WB- 34.55 mph
- (95th Percentile): EB- 38.9 mph, WB- 38.3 mph

Average excessive speeding (going over 40 mph):
- EB- 130 drivers per day
- WB- 155 drivers per day

HOV exits open
Speed limit reduced
Alternatives Studied

Alternative 1

Alternative 2

Alternative 3 (Council-adopted)

Staff Recommendation
Scoring

-2  More Impacts over Existing Conditions
-1  Minor Impacts over Existing Conditions
0   Existing Conditions
+1  Minor Improvement over Existing Conditions
+2  More Improvement over Existing Conditions
# DESIGN ALTERNATIVES

<table>
<thead>
<tr>
<th>PERFORMANCE INDICATORS</th>
<th>ALTERNATIVE 1 (4 lanes with minor changes)</th>
<th>ALTERNATIVE 2 (1 eastbound, 2 westbound lanes)</th>
<th>ALTERNATIVE 3 (1 eastbound, 1 westbound, 1 turn lane)</th>
<th>STAFF RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian Safety/Comfort</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Filling The Sidewalk Gap</td>
<td>0</td>
<td>+1</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>Controlling Speed</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>0</td>
</tr>
<tr>
<td>Preventing Crashes</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>Minimizing Vehicle Delay</td>
<td>+2</td>
<td>+1</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>Accommodating Vehicle Volumes</td>
<td>+2</td>
<td>0</td>
<td>0</td>
<td>+2</td>
</tr>
<tr>
<td>Adjacent Resident Livability</td>
<td>0</td>
<td>+1</td>
<td>+1</td>
<td>+1</td>
</tr>
<tr>
<td>Bicyclist Safety/Comfort</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
<td>0</td>
</tr>
<tr>
<td>Totals (max score +16, min score -16)</td>
<td>+4</td>
<td>+7</td>
<td>+11</td>
<td>+9</td>
</tr>
</tbody>
</table>
Constructed Road Reconfiguration

**Before**

**After**
Constructed Alternative 3
Emergency Access

Why were two different medians constructed?

- Mountable medians were installed in conjunction with the temporary side path so vehicles would not have to pull into the sidewalk space to let an emergency vehicle (EV) pass, and the EV could go directly over the median.
- Standard crossing medians were installed where vehicles can pull out of the travel lane and into the bike lane to allow EV to pass.
- Medians were designed cooperatively between T&ES and AFD.
- **Appropriate measures have been put in place for emergency responders to safely travel before, during and after an emergency call.**
Evaluation

- Volumes
- Speeds
- Crashes
- Travel Times

AFTER Data Collection (Spring 2021)
Evaluation Report (June 2021)
Preliminary Travel & Traffic Summary

- **Across the day**, average travel times have generally stayed the same:
  - Increased by an average of 4% (6 seconds) in the westbound direction and have decreased by an average of 6% (about 12 seconds) in the eastbound direction
  - In the eastbound directions, travel times are better or relatively the same as they were during the before period except for the 5pm hour (7% increase or about 6 seconds)
- During the **worst 15-minute period** of the day (in the westbound direction from 8:15am – 8:30am) travel times have increased by 30% (about 1 minute).  
  - Across the entire morning peak period (7am-9am), there has been an 8% increase in travel times from 3 minutes to 3.2 minutes (about 12 seconds)
- During the **evening peak**, the greatest increase was between 5:45pm and 6:00pm when there was a 14% increase, from 3.4 minutes to 3.9 minutes (about 30 seconds)

For most of the day, the City’s Bluetooth travel time monitoring system shows the road is functioning similarly to before implementation. A tradeoff for the peak half hour increases (30 sec – 1 minute) is a street with safer conditions for people who drive, walk, bike and use transit.
DASH AT2 On-TIME PERFORMANCE

(August 2018 - Present)

Seminary Road Construction (Oct-Nov)
More Information:

www.alexandriava.gov/CompleteStreets
Discussion

⇒ Send us your questions

⇒ Follow up with us:
  ⇒ Peter Ohlms peter.ohlms@vdot.virginia.gov
  ⇒ Lance Dougald lance.dougald@vdot.virginia.gov
  ⇒ John Bolecek john.bolecek@vdot.virginia.gov
  ⇒ Nicole Wynands nicole.wynands@fairfaxcounty.gov
  ⇒ Christine Mayeur christine.mayeur@alexandriava.gov
  ⇒ General Inquiries pbic@pedbikeinfo.org

⇒ Archive at www.pedbikeinfo.org/webinars