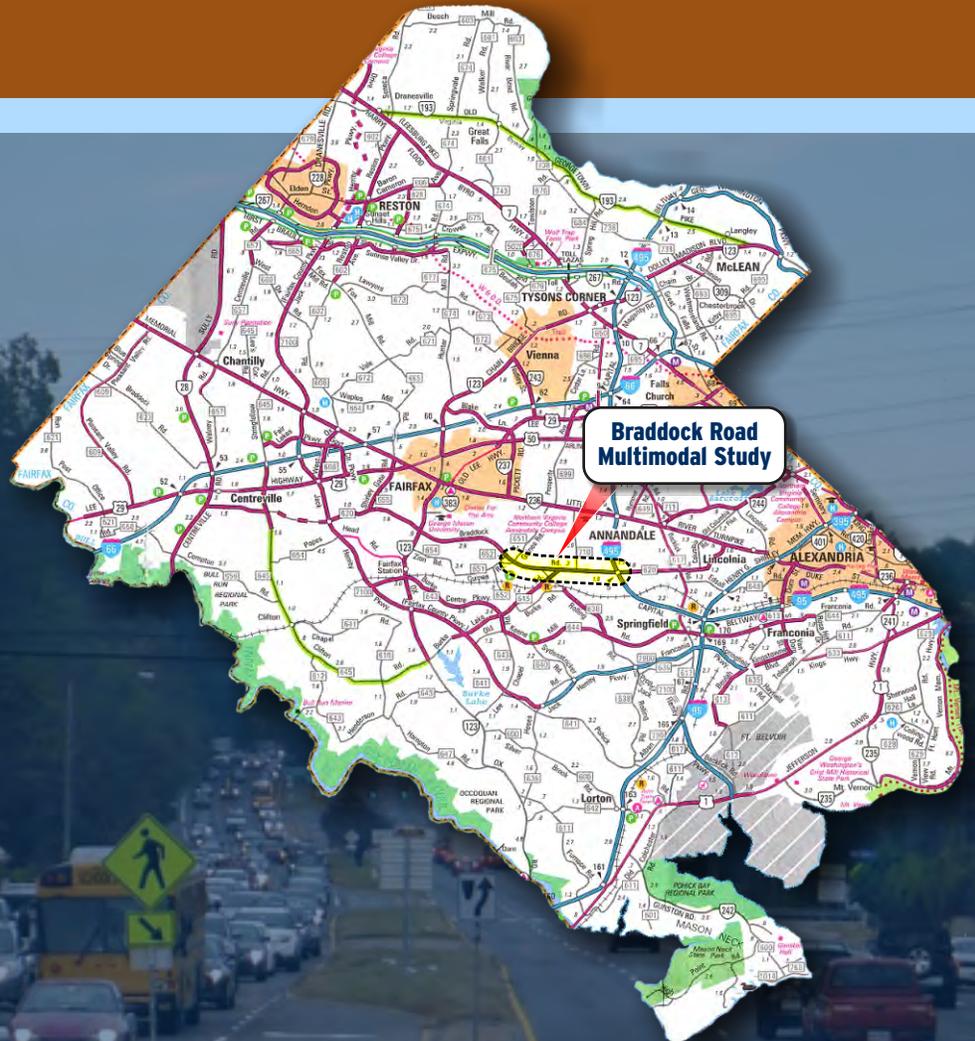




Braddock Road Multimodal Study

County of Fairfax, Virginia

Task Force Meeting Materials



Date: April 1, 2015



April 1, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia

Task Force Meeting

- I. Introduction Kevin Morse, Chairman
- II. Progress Since Last Task Force Meeting (15 minutes)..... Tad Borkowski/Michael Guarino
 - a. Commuter Attitude Survey John McDowell
 - b. Origin-Destination Study Results Stuart Samberg
 - c. Status of Travel Demand Modeling John McDowell
- III. Discussion Items (60 minutes) Tad Borkowski/John McDowell
 - a. Transit Center Sites John McDowell
 - b. Measures of Effectiveness Discussion Tad Borkowski/John McDowell
 - i. Review of Examples
 - ii. Roadway
 - iii. Transit Center
- IV. Following Month's Activities (15 minutes) Tad Borkowski/John McDowell
 - a. Continue Travel Demand Modeling effort
 - b. Transit Center Layouts
 - c. Begin Microsimulation Effort
 - d. Community Meeting Preparations
 - e. Future Meeting Durations
- V. Adjourn Meeting Kevin Morse, Chairman



March 4, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia

Task Force Meeting Minutes

Action Items

Task Force Members

- Review MOEs, provide comments and be prepared to discuss further at the April 1, 2015 task force meeting.
- Assist in sending the Commuter Attitude Survey within their neighborhoods

FCDOT

- Provide the Task Force with a few example studies with MOE weighting.
- Consult environmental staff for potential additional MOE's.

RK&K

- Update Commuter Attitude Survey for final draft distribution.
- Begin distribution of survey.

Discussion

- Tad Borkowski (FCDOT) provided an overview of activities since the last Task Force Meeting:
 - Bluetooth data collection for the O-D study has been ongoing; work has been completed and the devices have been removed.
 - Traffic count information was posted to the Braddock website.
 - The County and RK&K drafted the MOEs for discussion at the meeting.
 - Sent the final compiled scope of work to Kiel for posting on the Braddock website.
 - Reported back to the task force that the inquiry regarding the Campus Drive bypass determined that it would be completed in April 2015.
 - Noted that at the last meeting the informal parking survey was presented and no comments have been received on it. It was noted that after seeing field conditions, that the additional Danbury Forest locations do not need to be added to the map.
 - He noted that the Commuter Attitude Survey will be discussed later in the meeting, but the survey will be placed on the Fairfax County website through the counties Survey Monkey and will be available in multiple languages.
 - Mentioned that an internal bi-weekly meeting has started to discuss project status.
- Stuart Samberg (RK&K) presented the status of the Origin-Destination Study
 - Noted that the data was 4-5 days late due to snow. The data collector kept the equipment in the field longer than expected to account for snow days and changes in pattern as a result, so the boxes were in the field for almost two weeks.
 - He noted that snow days will not be considered in the conclusions of the data.
- Stuart presented the Synchro analysis results
 - Noted that the Highway Capacity Manual methodologies are harsh to stop controlled movements as it assumes the need for a certain gap size. He noted that long delays can

- be indicative of safety concerns as vehicles begin to accept less than desirable gaps in traffic to make their movement.
- Mentioned that this analysis is simply a numbers exercise based on formulae and the simulation analysis will provide a better overall picture of the traffic operations along the corridor.
 - He instructed the task force on the level of service definitions and mentioned that the threshold for the county is LOS D or better.
 - A question was asked about what the number represents. The response was given that it is representative of the average time a vehicle waits at the intersection to complete their movement.
 - It was offered as a suggestion that all terms be defined in the future and acronyms not be used.
 - It was asked why Danbury Forest, a stop-controlled movement, was omitted. It was responded that it was not producing a number given the proximity to Wakefield Forest Drive.
 - John McDowell (RK&K) presented the status of the travel demand modeling
 - He noted that the subconsultant developed a refined zone structure to better represent the study area, a refined highway network, and associated land use data for existing conditions.
 - Prepared a memo on HOV/HOT modeling to evaluate the HOV/HOT alternatives
 - Worked on validation of the model for existing conditions.
 - John presented the revised Commuter Attitude Survey
 - He noted a 2-page fact sheet is now included.
 - A question was asked about defining SOV. Response: Single Occupant Vehicle – definitions requested in future
 - It was asked why the map included Olley and Twinbrook. John noted that the reason was to show the complete study area but that the highlighting along the non-Braddock areas could be removed. Michael Guarino (FCDOT) commented, however, that the study area does not define the outreach area.
 - A question was asked regarding how people will find out about the survey.
 - Tad noted the email distribution list for the Braddock District will be utilized, and that we will ask the Springfield District to distribute via their email distribution list.
 - It was asked whether the Civic Associations were to be included or not.
 - It was noted that the package sent out to the community will include the survey in PDF format.
 - Some on the task force noted concern that the survey was not focused enough on Braddock Road.
 - Concern was raised regarding the response rate for the survey.
 - It was noted that the survey could be included in the community newsletters but since they do not go out every month that the overall response rate may be reduced as a result.
 - A question was asked about why the 9 digit zip code was not being requested. Michael responded that the location question was included to address this concern.
 - It was asked when the expected release date for the survey was. John noted in the next few weeks.

- A question was raised regarding what the survey would be used for. Michael noted that it was a way to gain public input and ideas.
- It was noted that the term “attitude survey” was not defined.
- It was asked whether the survey should define a reasonable toll. It was noted that not enough information is available yet to determine what that would be for Braddock Road.
- A question was asked noting that the task force was under the impression that public funds were available for this project and therefore were not sure of the need for toll lanes.
- For question 3, it was asked why the wording is “previous” and not “typical”.
- For question 21, it was asked whether “self-employed” was trying to be a proxy for “work from home”.
- Tad mentioned that for anyone who needs copies of the survey that they should contact him. (tad.borkowski@fairfaxcounty.gov or 703-877-5757)
- The task force requested that the team establish a target date for the return of the survey.
- John presented the roadway and transit center MOEs for discussion.
 - A question was asked regarding who would decide the weighting for these factors. The County responded by offering to provide a similar study for the task force’s review.
 - Residents asked if the County could come back with recommended weighting and allow the community to then adjust.
 - It was asked how the Aesthetic Opportunities would be captured. It was noted that it would be based on community input.
 - It was noted that some of the questions were not balanced, i.e. Ease of Access.
 - It was noted that aside from simply noting crashes that severity was also important.
 - It was noted that Fuel Consumption, CO2, NOx all seem to cover the same item and why these were not captured under an environmental item questioned. It was noted that those factors are VISSIM model outputs. Michael said he would get the county environmental group involved to weigh in on a more qualitative assessment.

Should any revisions to these meeting minutes be required, please advise Tad Borkowski at tad.borkowski@fairfaxcounty.gov or John McDowell, PE at jmcdowell@rkk.com.



March 23, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia
Fact Sheet

FINAL

Fairfax County is working with Braddock District Supervisor Cook's office and members of the community to develop and evaluate a number of improvements for the Braddock Road corridor, between Guinea Road and I-495. Potential improvements may include additional travel lanes, HOV (high occupancy vehicle) lanes, HOT (high occupancy tolled) lanes, transit improvements, pedestrian and bicycle improvements, or intersection improvements. In November 2014, Fairfax County engaged the services of Rummel, Klepper & Kahl, LLP (RK&K), an engineering consultant, to assist in conducting a study of the project corridor. The purpose of this study is to analyze and recommend a plan for increasing the capacity of Braddock Road from Guinea Road to I-495, including evaluation of managed lanes from Burke Lake Road to I-495. The study will also analyze a potential transit center in the vicinity of the Kings Park Shopping Center. As a result, the study will address three projects that have been part of the Comprehensive Plan for several years:

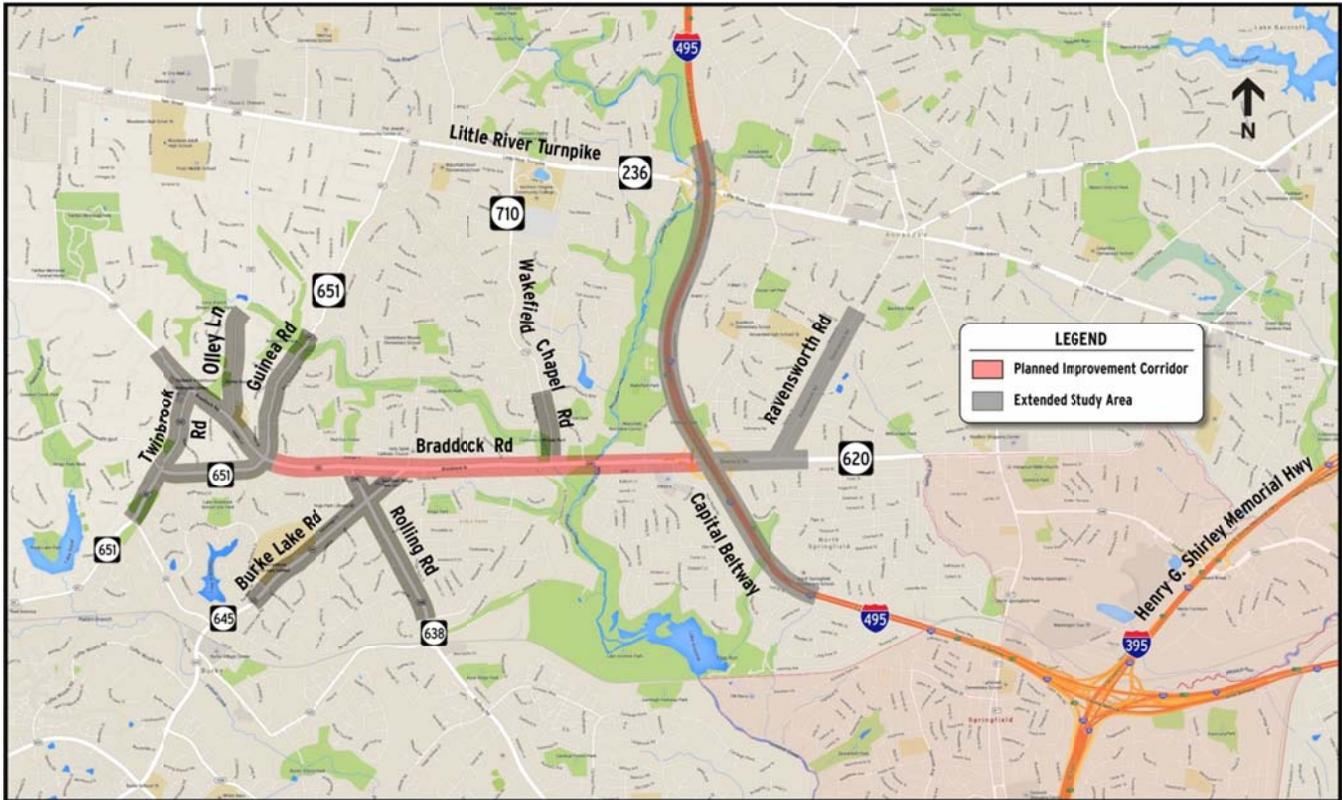
- **Construct/add one HOV lane in each direction from Burke Lake Road to I-495.**
- **Construct/add one general purpose lane in each direction from Guinea Road to Burke Lake Road.**
- **Construct a transit center along Braddock Road located in the vicinity of the Kings Park Shopping Center.**

A plan for HOV widening on Braddock Road was adopted by the Fairfax County Board of Supervisors in 1990. The Northern Virginia 2010 Transportation Plan recommended HOV widening on Braddock Road from Burke Lake Road to I-495 and conventional widening from Guinea to Burke Lake Road. The section of Braddock Road to be studied currently handles approximately 70,000 vehicle trips a day, and is one of the more congested corridors in the county. This project will analyze the feasibility of providing managed lanes along this congested corridor that connects with I-495. The Beltway offers vehicular and transit connections to the entire Washington DC metropolitan region.

Want to learn more about the project?

- Visit the Braddock Road Task Force webpage at <http://www.fairfaxcounty.gov/braddock/braddockroad.htm>.
- Following are definitions of some terms you will hear during the study:
 - **Peak Hours** - the single morning and afternoon hours of the working day carrying the heaviest traffic. This is typically used for the evaluation of traffic congestion along a roadway.
 - **Managed lanes** –a set of road lanes where operational strategies are proactively implemented and managed in response to changing conditions.
 - **General purpose lanes** –may be used by all road users regardless of the number of vehicle occupants or vehicle types.
 - **SOV** – Single occupant vehicle
 - **HOV Lanes** – “High Occupancy Vehicle” are restricted to vehicles carrying more than one passenger. “HOV-2” means a minimum of two passengers; “HOV-3” is a minimum of three passengers.

- **HOT Lanes** – “High Occupancy Toll” lanes are either free for HOV or tolled for vehicles carrying fewer than the required number of passengers for free passage.
- A map of the study corridor can be found below.



In accordance with Title VI and ADA requirements, please contact the Fairfax County Department of Transportation at 703-877-5600, TTY 711 to request reasonable Title VI or ADA accommodations, including printed material in an alternate format or translated and interpreter services for public events. Requests for assistance at public events must be received at least 7 days in advance of the scheduled event.

Take the Survey Today!

We are requesting your input in order to understand how you utilize the Braddock Road corridor and what you view are the priorities in making improvements.

- **Electronically:** visit <https://www.surveymonkey.com/s/XBCFQPC> to take the survey online now.
- **Download:** survey may be [downloaded](http://www.fairfaxcounty.gov/fcdot/braddockroadmmstudy/braddock_road_commuter_attitude_survey_2015.pdf) and completed by filling in the form.
- **Pick-up:** you may pick up survey at Braddock Supervisor’s Office, 9002 Burke Lake Road, Burke, Virginia 22015
- Return via US Postal Service mail to Fairfax County Department of Transportation, RE: Braddock Road Survey, 4050 Legato Road, Fairfax, Virginia 22033.

Please use the form at <http://www.fairfaxcounty.gov/fcdot/braddockroadmmstudy/> to submit any general comments or questions.



March 13, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia



Braddock Road Commuter Attitude Survey

FINAL

1. Please indicate the closest intersection to your home

- Braddock Road at Ravensworth Road
- Braddock Road at Queensbury Avenue
- Braddock Road at Wakefield Chapel Road/
Danbury Forest Drive
- Braddock Road at Southampton Drive
- Braddock Road at Burke Lake Road
- Braddock Road at Rolling Road
- Braddock Road at Guinea Road
- Outside of Study Area - indicate direction:
North South East West

2. How many vehicles are kept at your home?

- No vehicles 1 vehicle
- 2 vehicles 3 or more vehicles

3. What best describes your commute mode on the previous workday? (Check all that apply)

- Single Occupant Vehicle
- Carpooling vehicle
- Bike
- Walk
- Fairfax Connector
- Metrobus
- No commute

4. Which best describes the destination of your commute on the previous workday?

- Pentagon/Crystal City
- Alexandria
- Arlington
- Tysons Corner
- District of Columbia
- George Mason University
- Other (Please specify: _____)

5. What time(s) did you drive along Braddock Road on the previous workday? (check all that apply)

- AM peak hour (6:00 AM to 9:00 AM)
- Mid-day (9:00 AM to 3:00 PM)
- PM peak hour (3:00 PM to 7:00 PM)
- Evening (7:00 PM to 11:00 PM)
- Night (11:00 PM to 6:00 AM)

6. How do you view your travel time along the Braddock Road corridor?

- Acceptable
- Marginally acceptable
- Not acceptable

7. What improvements do you feel are needed along the corridor?

- No improvements are needed
- Spot improvements at congestion points
- One additional traffic lane per direction

8. If you selected an additional traffic lane, how should this additional lane operate?

- General use lanes
- HOV lane
- HOT lane

9. Would you be more likely to carpool if HOV/HOT lanes were installed on Braddock Road?

- Very likely (number of times per week: ____)
- Likely (number of times per week: ____)
- No change
- Less likely

10. Would you be willing to pay a reasonable toll if HOT lanes were installed on Braddock Road and if your travel time were reduced?

- Very likely (number of times per week: ____)
- Likely (number of times per week: ____)
- No change
- Less likely

11. How would you rate your experiences with public transit in the area? (both from Metrobus and Fairfax Connector)?

- Have no experience with public transit
- Very good
- Good
- Fair
- Poor

12. What factors might encourage you to use public transit more often? (check one or more)

- More frequent service on current routes
- More route options

Continued on next page

- Faster service, such as dedicated bus lanes
- Safer/more convenient pedestrian access

13. Would you be more likely to use public transit if additional facilities (i.e. park-and-ride lots) were provided along Braddock Road? (please check one)

- Very likely (number of times per week: ___)
- Likely (number of times per week: ___)
- No change
- Less likely

14. What additional facilities would make transit ridership more appealing to you? (Check all that apply)

- More Sidewalks
- More Transit shelters
- More Pedestrian crossing signals
- Median refuge islands (for crossing Braddock Road)
- None

15. Do you bicycle in this area? (check all that apply)

- For pleasure
- To commute
- For shopping
- I do not bicycle

16. What would create conditions favorable for you to bicycle in this area?

- Separated bike paths along Braddock Road
- More neighborhood bicycle connections
- More convenient access to work, shops, schools, etc.

17. Do you walk in this area?

- For pleasure
- To commute
- For shopping
- I do not walk in the area

18. What would create conditions more favorable for you to walk in this area?

- Safe walking paths along Braddock Road
- Neighborhood walking connections
- Convenient access to work, shops, schools, etc.

19. What best describes your age range?

- 18-25 25-35 35-50
- 50-65 65+

20. How many people live in your household? _____

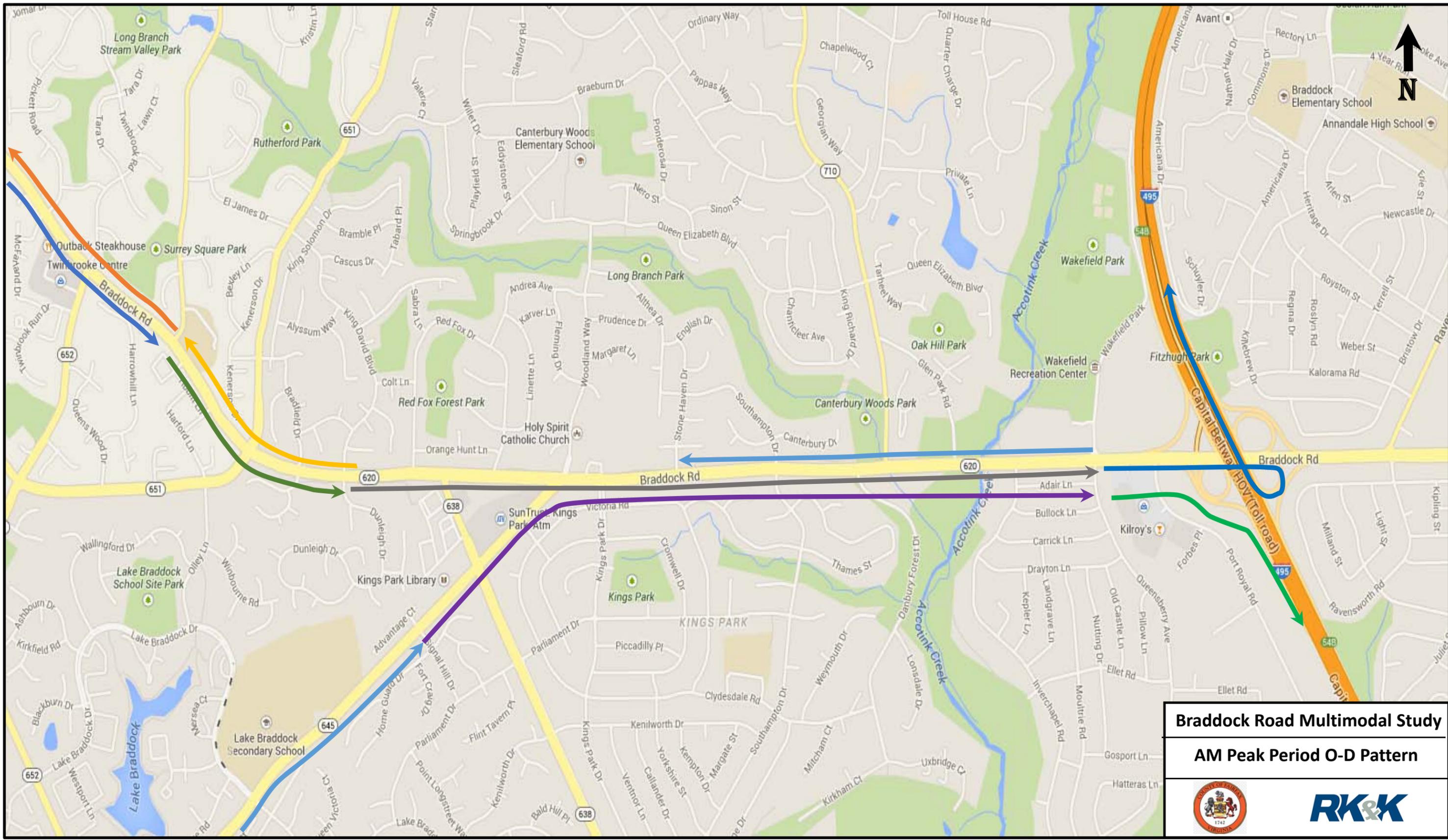
21. What best describes your employment status?

- Work full time Work part time
- Self-employed Student
- Not in job market
(retired/homemaker/unemployed)

What are your concerns about the proposed project?

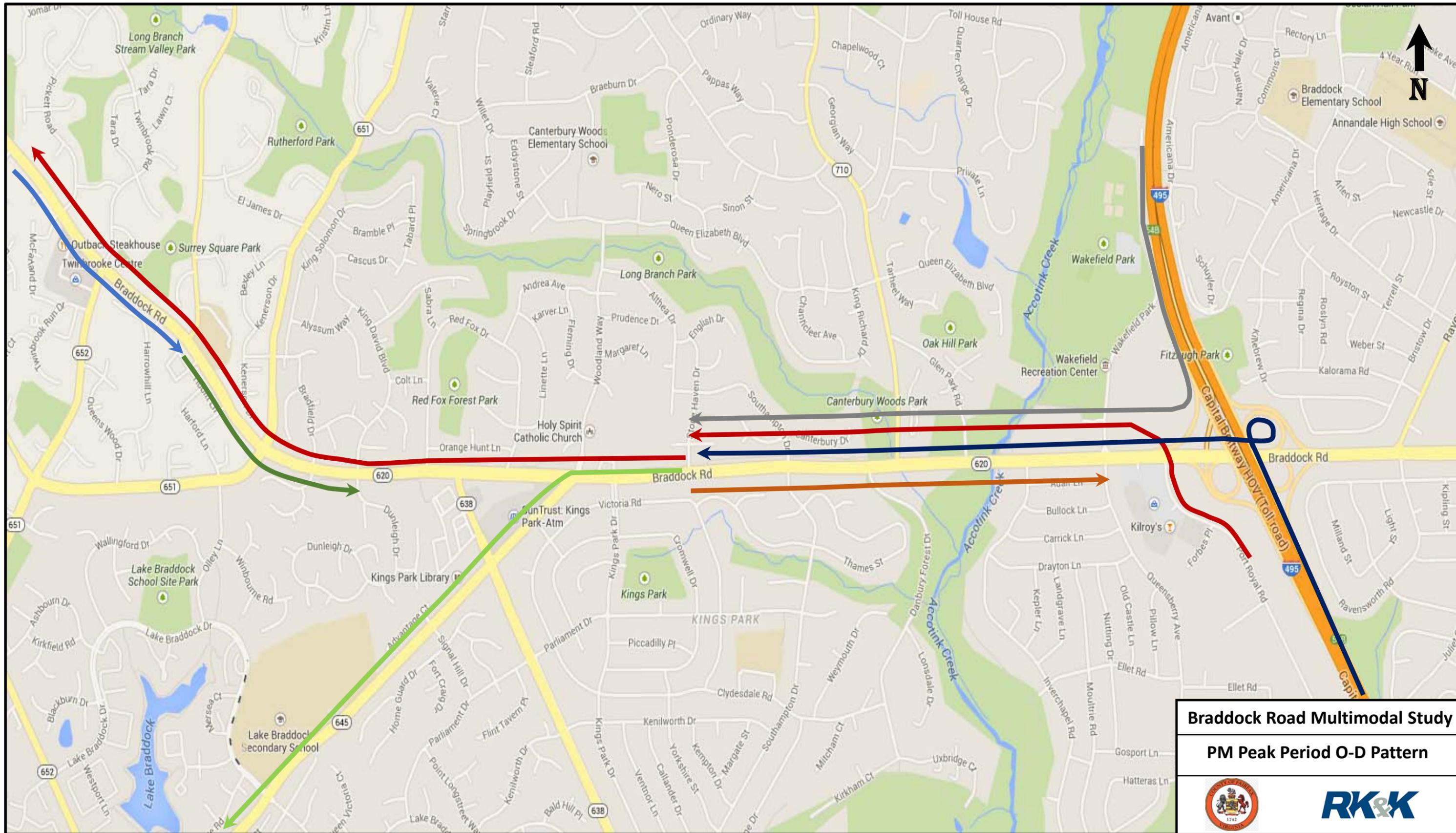
What improvements would you like to see in this corridor?

End of Survey – Thank you



Braddock Road Multimodal Study
AM Peak Period O-D Pattern



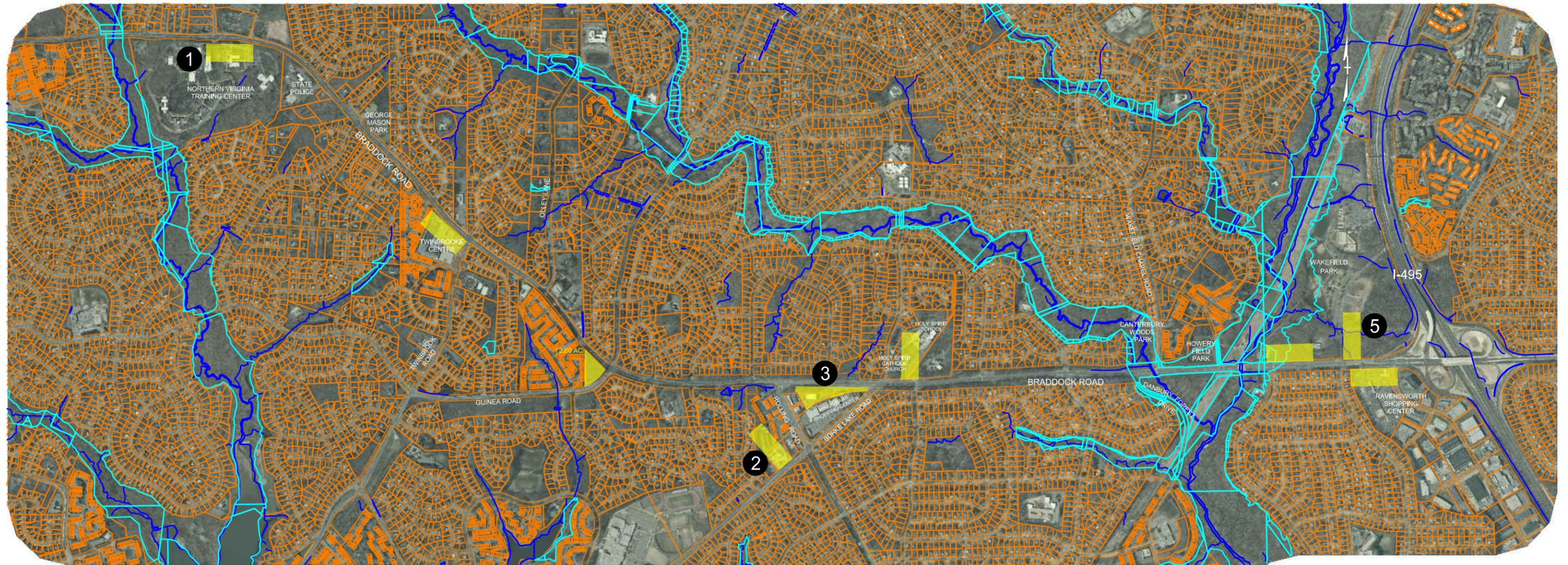


Braddock Road Multimodal Study

PM Peak Period O-D Pattern



MAP OF CANDIDATE TRANSIT CENTER SITES ALONG BRADDOCK ROAD CORRIDOR

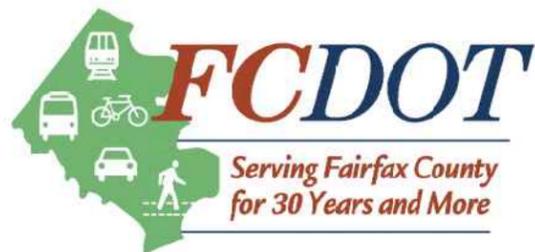


LEGEND

	DENOTES CANDIDATE TRANSIT CENTER SITES TO BE STUDIED
	SHORT LISTED SITE

APRIL 1, 2015

IMAGE FROM USGS



April 1, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia

Transit Center Site Alternatives

Ten sites were identified as candidates for review. Of these, several have been eliminated due to various considerations, including size, access concerns, incompatible land use. Following are descriptions of the selection of the five sites that have been shortlisted for further study:

Site #1: Northern Virginia Training Center

- Sufficient residual area in multiple parts of the site for consideration
- Direct access for buses from Braddock Road, either from existing signalized intersection or adjacent access point
- Would best serve commuters coming from the west of the study corridor
- Does not facilitate bicycle/pedestrian access within study area

Site #2: Kings Park Library

- Opportunity to redevelop site into multi-use
- Easy access along Burke Lake Road
- No real estate cost – already owned by County
- Good neighborhood access

Site #3: Kings Park Shopping Center

- Most centrally located site
- Best option to facilitate bicycle/pedestrian access
- Multiple options for site access
- Site geometry challenges the ability for an efficient design

Site #4: Morrissette Drive

- Efficient site layout
- Far away from Braddock Road corridor
- Does not facilitate bicycle/pedestrian access within study area

Site #5:

- Close to I-495 and I-495 Express Lanes
- Efficient site layout
- Ample room for center development
- Potential wetlands and environmental concerns



State Street Conceptual Study Alternatives Evaluation Criteria Stakeholder Input Below



Criterion		Alt 1B	Alt 1C	Alt 3	Alt 3B	Alt 3C	Alt 4	Alt 4B	Alt 5	Alt 5B	Alt 5C	Alt 5D	Alt 6	Alt 6B
State Street Project Cost (Design/Construct) (\$ Mil)		\$9.2	\$11.5	\$9.3	\$11.6	\$7.0	\$10.0	\$4.8 ⁵	\$4.9	\$5.4	\$3.5	\$4.2 ⁵	\$6.7	\$5.1
Rte 7 Reconstruction Cost (Design/Construct) ¹ (\$ Mil)		\$3.4 ²	\$3.4 ²	\$3.4 ²	\$3.4 ²	\$7.5 ²	\$3.4 ²	\$6.1 ²	\$1.3 ³	\$1.3 ³	\$1.3 ³	\$1.6 ³	\$1.3 ³	\$1.3 ³
Metrorail Clearance		15.78'	15.78'	15.88'	15.88'	17.65'	16.35'	17.65'	17.14'	17.14'	17.14'	17.65'	17.14'	17.14'
Conformity to Broad Street (Yes/No)		Yes	Yes	Yes	Yes	Yes	Yes							
R/W Area Impacted (Acres)		3.05	3.26	3.00	3.27	3.24	3.80	3.26	3.40	3.90	2.90	3.48	5.25	4.70
R/W Area Impacted: Estimated Cost (\$ Mil)		\$26.6	\$28.4	\$26.1	\$28.5	\$28.2	\$33.1	\$28.4	\$29.6	\$34.0	\$25.3	\$30.3	\$45.7	\$41.0
Land Use														
Number of Structures Impacted		5	5	5	5	4	5	2	2	2	2	2	2	2
Office Space (SF displaced)		10,000	10,000	150,400	150,400	150,400	150,400	145,400	0	0	0	5,000	0	0
Retail Space (SF displaced)		118,000	118,000	44,900	44,900	0	234 Units (Hotel)	0	19,900	19,900	19,900	19,900	19,900	19,900
Structures Impacted: Estimated Cost (\$ Mil)		\$20.8	\$20.8	\$27.5	\$27.5	\$16.0	\$65.4	\$14.0	\$8.9	\$9.6	\$10.5	\$8.0	\$12.0	\$14.0
Number of parking spaces affected		160	190	859	878	960	863	945	265	345	230	240	405	405
Conformance to Tysons Urban Design Standards/Multimodal Standards		Yes	Yes/No ⁴	Yes/No ⁴	No	Yes/No ⁴	Yes/No ⁴	No						
State Street Total Project Cost (\$ Mil)		\$60.0	\$64.1	\$66.3	\$71.0	\$58.7	\$111.9	\$53.3	\$44.7	\$50.3	\$40.6	\$44.1	\$65.7	\$61.4
Conformance to Intent of "Grid of Streets" per CTIA study	Weight	Alt 1B	Alt 1C	Alt 3	Alt 3B	Alt 3C	Alt 4	Alt 4B	Alt 5	Alt 5B	Alt 5C	Alt 5D	Alt 6	Alt 6B
Connectivity - Full	3	3.2	2.8	3.6	3.3	3.3	1.9	3.4	3.9	2.5	3.8	4.1	2.0	2.3
Connectivity - Partial	3	3.0	2.6	2.7	2.3	2.3	2.1	3.3	4.5	3.8	4.4	4.5	3.0	3.0
Roadway Capacity	2	2.5	3.3	2.5	3.3	3.3	2.1	3.4	3.1	2.4	2.6	4.2	2.2	1.8
Intersection Spacing Rest of Tysons Grid	2	2.3	1.9	2.6	2.3	2.3	2.1	2.7	3.8	2.8	3.8	3.9	3.0	3.1
Compatibility with Planned/Approved Parks	2	3.1	2.7	3.3	2.9	2.9	2.8	3.0	2.8	2.6	2.6	2.7	2.4	2.5
Impacts to Existing Buildings	2.5	1.8	1.5	1.7	1.4	1.4	1.5	2.5	3.1	3.2	3.2	3.1	3.1	3.2
Approved Unbuilt CDP	2	2.3	1.9	2.2	2.0	2.0	1.8	2.3	3.7	3.5	3.5	3.6	3.9	4.0
Approved Unbuilt FDP	3	1.7	1.4	1.9	1.5	1.5	1.5	2.1	3.5	3.4	3.5	3.5	3.3	3.4
Planned Development – Submitted but not approved	1	2.6	2.3	2.5	2.2	2.2	3.0	2.8	4.3	4.1	4.2	4.3	4.0	4.1
Remnant Property "Usability"	3	2.5	2.0	2.4	1.9	1.9	2.1	2.9	2.9	2.8	2.8	2.9	2.7	2.8
Engineering Complexity	1	1.7	1.4	1.8	1.6	1.6	1.7	2.6	4.0	3.5	3.9	3.9	2.9	3.0
Timing of Improvements	3	1.7	1.4	2.2	1.8	1.8	1.7	2.4	3.6	3.4	3.5	3.6	3.1	3.2
Operations Along Route 7	3	1.7	2.0	2.2	2.5	2.5	1.5	2.5	3.4	3.3	3.3	4.0	3.3	3.4
Intersection Spacing on Route 7	2.5	2.0	1.6	2.5	2.1	2.1	2.8	2.6	3.9	3.8	3.8	3.9	3.8	3.9
Overall Ranking		75.7	67.4	80.8	73.3	73.3	65.7	90.9	118.3	105.0	114.8	122.6	99.2	101.6
Frequency Voted #1 Preferred Alternative		1	0	2	2	2	0	4	2	0	0	4	0	1
Frequency Voted #2 Preferred Alternative		0	0	0	1	1	0	1	1	0	3	4	0	0

Key: Least Desirable 1 – 5 Most Desirable

¹Cost includes utility adjustments.

²Includes lowering Route 7 to provide vertical clearance under Metrorail.

³Includes warping Route 7 to provide vertical clearance under Metrorail.

April 1, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia

Roadway Measures of Effectiveness

Qualitative Measures

- **Aesthetic Opportunities** – Availability for screening or landscaping enhancements
- **Ease of local access** – does the alternative facilitate community access to the road?
- **Community cohesion** – Will the alternative enhance or erode the quality of the community?
- **Non-motorized mobility** – Will the alternative provide better access and circulation for pedestrians and bicycles?
- **Crashes/Year** – this will be a qualitative assessment of whether the suggested improvements will likely lower or increase potential crashes.
- **Noise** – does the alternative have the potential to improve or degrade the noise levels felt by those adjacent to the corridor? (Note: this study will not do a quantitative analysis of these measures.)
- **Pedestrian Safety** – will the alternative improve safety to transit bus stops and school bus stops by providing improved pedestrian paths?

Quantitative Measures (for AM, or PM or peak hour or peak period or daily?)

- **Travel Time (minutes)** - Travel time along different segments of the corridor
- **Intersection delay (seconds/vehicle)** – This metric will evaluate the delay per vehicle for each intersection and movement along the Braddock Road corridor
- **Intersection Queue Length (feet)** – This metric will evaluate the queue length for each movement at each intersection along Braddock Road.
- **Person Trips Processed (each)** - This metric combines transit, HOV, SOV, bike, ped, etc., by computing the completed number of completed trips within the study area (e.g. a completed trip may be defined as traversing the entire Braddock Road corridor within the study area)
- **Total Distance Traveled in Vehicle Miles (VMT)** – This will be measured as the total distance traveled by vehicles within the network and broken into SOV, HOV, and Transit vehicles.
- **Fuel Consumption (kg)** – This will measure the approximate fuel usage of vehicles using the corridor and can be used as an indicator for congestion as greater usage is usually attributed to lower speeds and more congestion.
- **Latent Demand / Denied Entry (veh)** – This metric measures the number of vehicles which wish to utilize the corridor from a demand standpoint but are unable to as a result congestion.
- **Public Transit Waiting Time** - This is a VISSIM output and can be somewhat misleading at times, but filtered properly can be an indication of how much transit might run behind schedule as a result of congestion

- **CO2 Emissions (kg)** – This is one of two potential metrics which can serve as a proxy for Air Quality. This measure is a direct output from VISSIM and measures the estimated CO2 emissions of the vehicles in the model based on the emissions modules contained within VISSIM.
- **NOx Emissions (kg)** - This is one of two potential metrics which can serve as a proxy for Air Quality. This measure is a direct output from VISSIM and measures the estimated nitrous oxide emissions of the vehicles in the model based on the emissions modules contained within VISSIM.
- **Right-of-Way Impacted (acres)** – This will measure acres of impacted rights-of-way associated with roadway and transit expansion.
- **Environmental Impacts** – This metric will address the potential impact to wetlands, streams, wildlife habitat, noise and other environmental quality issues.
- **Construction Cost (dollars)** – Estimated construction cost of the various concepts.

DRAFT

April 1, 2015
Braddock Road Multimodal Study
Fairfax County, Virginia

Transit Center Measures of Effectiveness

Qualitative Measures

- **Proximity to local trip sources** – how well the candidate location serves the demand for passenger service arriving from adjacent neighborhoods, either by motorized or non-motorized travel. This metric will be assisted by the results from the transit survey and determination of which neighborhoods have a higher likelihood to utilize any additional transit facilities along this corridor.
- **Accessibility for non-local commuters** – how well does the candidate location provide access for vehicles accessing the site from areas outside of the study boundary
- **Compatibility with adjacent land uses** – is the land use adjacent to the candidate site compatible with the transit center? Does the existing zoning allow the development of the transit site as envisioned?
- **Transit system operating efficiency** – a measure of ease of ingress/egress to transit facility based on number of turning movements, traffic signal operations, etc.
- **Safety of accessing site** – the ability of a transit vehicle to access a site with fewest conflicts. This is a measure of conflicts with opposing movements, left-turn across oncoming traffic and other movements within the vicinity of the candidate transit center site.
- **Safety of pedestrian access to site** – the ability of pedestrians and bicycles to access the site utilizing sidewalks/paths and access to signalized intersections for crossing major roads.

Quantitative Measures

- Site area (acres)
- Number of bus bays provided
- Number of parking spaces provided
- Property Costs (land/right-of-way/utility relocations)
- Cost per parking space provided
- Off-site improvement costs (turn lanes, median modifications, signalization)
- Construction Cost
- Transit Travel time to/from I-495
- Average Patron Travel Time
 - Local trips via SOV
 - Local trips via walking/cycling
 - Commuter trips (originating outside of study area)
- Diverted trips from SOV
 - Local users
 - Commuter users

- Trip cost – sum of person-trip cost for all users, inclusive of cost of SOV operation, transit fares and unrecovered operating cost of transit system, tolls

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