US Bicycle Route 1
Summary Report: Selection of Preferred Route

Background

US Bicycle Route 1 (USBR 1) in Virginia was designated by the American Association of State Highway and Transportation Officials (AASHTO) in 1982. The route, when complete, will run from Maine to Florida with approximately 274 miles in Virginia. Due to changes in the overall transportation system in Northern Virginia, including bridge and road closures, new construction, and limited public access to Fort Belvoir, the routing for the USBR 1 requires reevaluation. This study recognizes the changes in transportation, land use, and military access along USBR 1 and seeks to provide recommendations for realignment. The project's study area follows USBR 1 through the Virginia Department of Transportation's (VDOT) Northern Virginia District, extending from the 14th Street Bridge in Arlington County to the southern boundary of Prince William County.

This summary report also documents the methodology used to evaluate alternatives for USBR 1 and includes recommendations for route realignment. In areas where alternate routes were not found, USBR 1 will remain on its current alignment. After sharing recommendations with project stakeholders, the study team will prepare a detailed signing plan for USBR1 and develop cost estimates for future implementation.

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Methodology and Evaluation

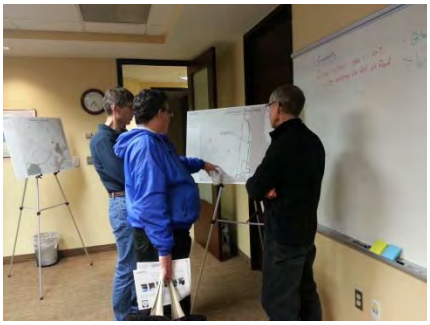
The study team relied on various criteria in the development of route recommendations. The criteria, discussed below, include field surveys, stakeholder outreach, and a bicycle level of service (BLOS) analysis. In addition, the study team reviewed criteria used by AASHTO and Adventure Cycling Association, a national bicycle-travel organization that publishes route maps and assists AASHTO in improving the USBR system.

Field Analysis

After identifying the existing route and potential alternatives, the study team conducted a field analysis on bicycle, during which the team photographed existing conditions, highlighted deficiencies, and located current USBR1 signage. The team, traveling with panniers and other bicycle touring gear, provided a cyclist's perspective on potential routing alternatives.

Stakeholder Outreach

Stakeholder input was integral in evaluating the routes and in the development of recommendations. In addition to several individual stakeholder meetings, the study team hosted an open-house style event where attendees had the opportunity to provide comments. A virtual meeting with maps and comment boxes was also hosted online, enabling users to submit feedback electronically. The stakeholder input was summarized and used



Stakeholders review route alternatives at an open-house style event

in the route evaluation. The following key stakeholders, representing jurisdictions, agencies, and bicycling organizations were contacted, however, any citizen could submit comments either by email or through the virtual meeting website:

- Alexandria Bicycle and Pedestrian Advisory Committee
- City of Alexandria
- East Coast Greenway Alliance
- Fairfax Advocates for Better Cycling
- Fairfax County
- National Parks Service
- Old Town Civic Association Board
- Prince William County
- Prince William Trails and Blueways Council
- Town of Occoquan
- Virginia Bicycling Federation

A second stakeholder meeting to present the route recommendations will be held in March of 2014.

Bicycle Level of Service

BLOS is a nationally used tool for quantifying the "bike friendliness" of a roadway. While the study team used BLOS to approximate the relative quality of service that a "typical" cyclist could expect along different stretches of the corridor, it should also be recognized that cyclists vary greatly in terms of competency and level of comfort when riding in traffic.

The study's BLOS analysis replicates the formula (Version 2.0) developed by Sprinkle Consulting, Inc. This same formula has been used to calculate BLOS on local plans, such as the *Alexandria Pedestrian and Bicycle Mobility Plan*, as well as in extensive statewide planning efforts (e.g. Florida). The formula's calculations are based on various roadway characteristics and conditions, including:

- Average daily traffic (ADT)
- Number of lanes of traffic
- Posted speed limit
- Pavement width
- Rightmost lane width
- Additional width (e.g. shoulder, bike lane)
- Percent of heavy vehicles (trucks)
- Pavement condition

The BLOS scale (below) is based on six letter grades, A through F (from best to worst), to describe the quality of a roadway segment for bicycle travel.

FIGURE 1: BICYCLE LEVEL OF SERVICE SCALE

The USBR 1 study team used VDOT's Statewide Planning System (SPS) data to calculate BLOS throughout the study area. In some cases, the study team used field notes and VDOT comments to update the SPS data for specific locations. The results, shown in Figure 2 below, were mapped using Geographic Information Systems (GIS) software. The heavier lines indicate existing USBR 1 or alternatives that were considered during this analysis.

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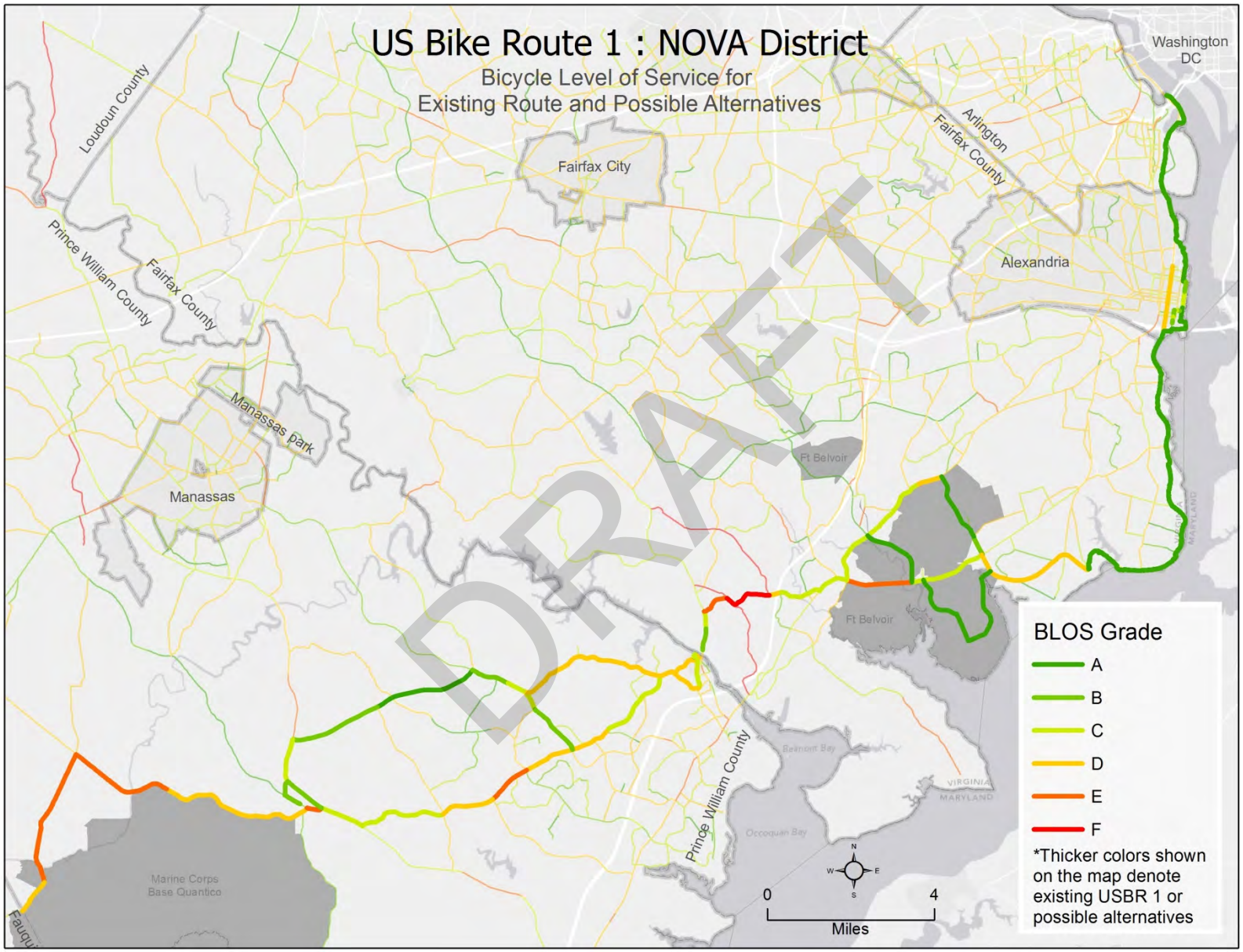
FIGURE 2: STUDY AREA BICYCLE LEVEL OF SERVICE – USBR 1 AND CONSIDERED ALTERNATIVES



Other Evaluation Criteria

While BLOS served as the primary tool for evaluating alternatives (as it considers a range of conditions), the study team also referred to AASHTO's *Corridor and Route Criteria for the U.S. Bike Route System* and Adventure Cycling Association's route selection criteria. The additional criteria included provisions, such as: the presence of amenities and accommodations, multimodal access, directness, and whether the routes overlap with an established and/or planned route. The study team further expanded the criteria by including the percent grade (slope) and determining whether or not the routes pass through a military installation (since access can be prohibited during heightened security alerts).

Results and Recommendations

Next, the study team formulated recommendations. In Alexandria, the study team recommended a primary (main) route, as well as a secondary (bypass) route. The dual route designation (main and bypass) is permitted along AASHTO bike routes and is intended to give a cyclist the flexibility to choose a route based on their needs (e.g. directness, amenities, or scenic value).

The map below (Figure 3) summarizes the recommendations for the entire study area. The advantages and disadvantages associated with each alternative are highlighted on their respective map. Note: The recommendations described below are provided from a southbound perspective, traveling from the 14th Street Bridge in Arlington County to the southwestern edge of Prince William County. The BLOS values identified in the sub-area maps (Figure 4 to Figure 7) reflect a weighted average based on the BLOS score and the length of all component segments.

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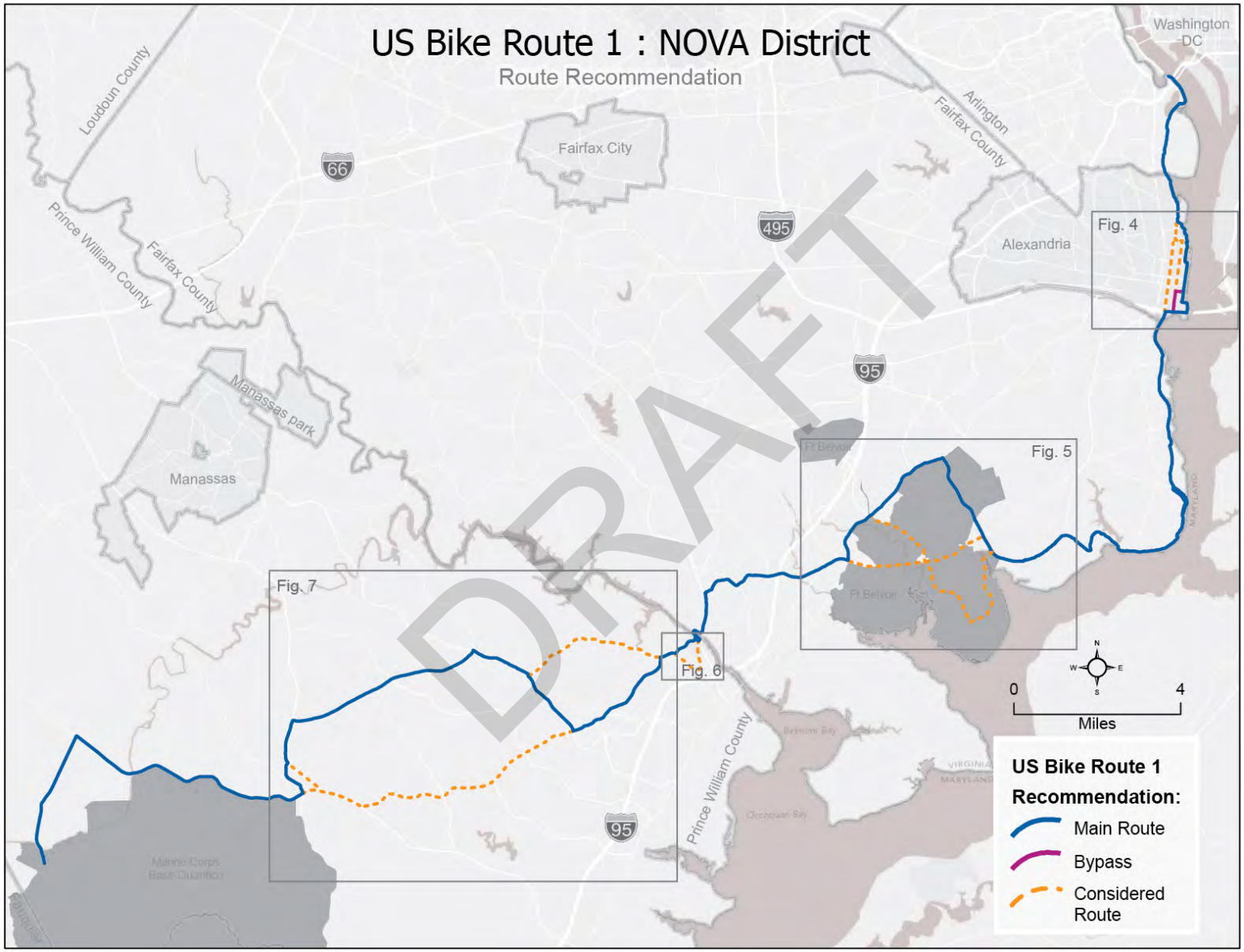
Cyclists enjoying a morning ride on USBR 1/Mount Vernon Trail

FIGURE 3: USBR 1 RECOMMENDATIONS – STUDY AREA



City of Alexandria

Main Route: Mount Vernon Trail - Union Street - Jones Point Park (Average BLOS= A)

After evaluating the existing USBR 1 along Washington Street and several potential routes in the City of Alexandria, the study team recommends that the main route follow the Mount Vernon Trail's river route. This recommended alignment is well known by cyclists and offers a shared use path through the northern portion of Old Town Alexandria (terminating at Pendleton Street). From Pendleton Street, the bicycle route follows Union Street through the southern section of Old Town before ultimately connecting to Jones Point Park. This alternative has the highest BLOS (A) of all of the Alexandria alternatives and provides access to shops, restaurants, and parks. In addition, the City of Alexandria has installed several bike shop wayfinding signs along this route. Stakeholders supported the route for its scenic value, but also identified several deficiencies, including the poor lighting in Jones Point Park and sight distance limitations near the intersection of Union Street and Franklin Street. With respect to the latter, stakeholders cited visibility issues associated with vehicles emerging from underground parking garages.

The Mount Vernon Trail splits north of Alexandria; the trail on the left follows the recommended River Route

Bypass Route: Mount Vernon Trail - Union Street - Wilkes Street - Royal Street (Average BLOS= B)

The study team also recommends a business bypass route that includes short segments on Wilkes Street (through a bicycle/pedestrian tunnel) and Royal Street. This route operates at a lower BLOS (B) than the main route and received strong stakeholder support (roughly equivalent to the support for the main route). The bypass is likely a safer option for nighttime cyclists as it avoids the dimly lit Jones Point Park. In addition, the route offers access to a Safeway Grocery Store, located at the intersection of Wilkes and Royal. The proposed bypass will potentially reduce bicycle volume on the main route, which will help address some of the stakeholder concerns mentioned above.

Other Considered Routes (Average BLOS=B and D)

The existing USBR 1 along Washington Street was abandoned due to poor BLOS (D), resulting from high traffic volumes and limited shoulders. The Royal Street alternative, through the entirety of Old Town Alexandria, was not selected. While the BLOS was acceptable, the route has fewer scenic amenities than the Mount Vernon Trail-Union Street-Jones Point Park alternative, which is already in existence,

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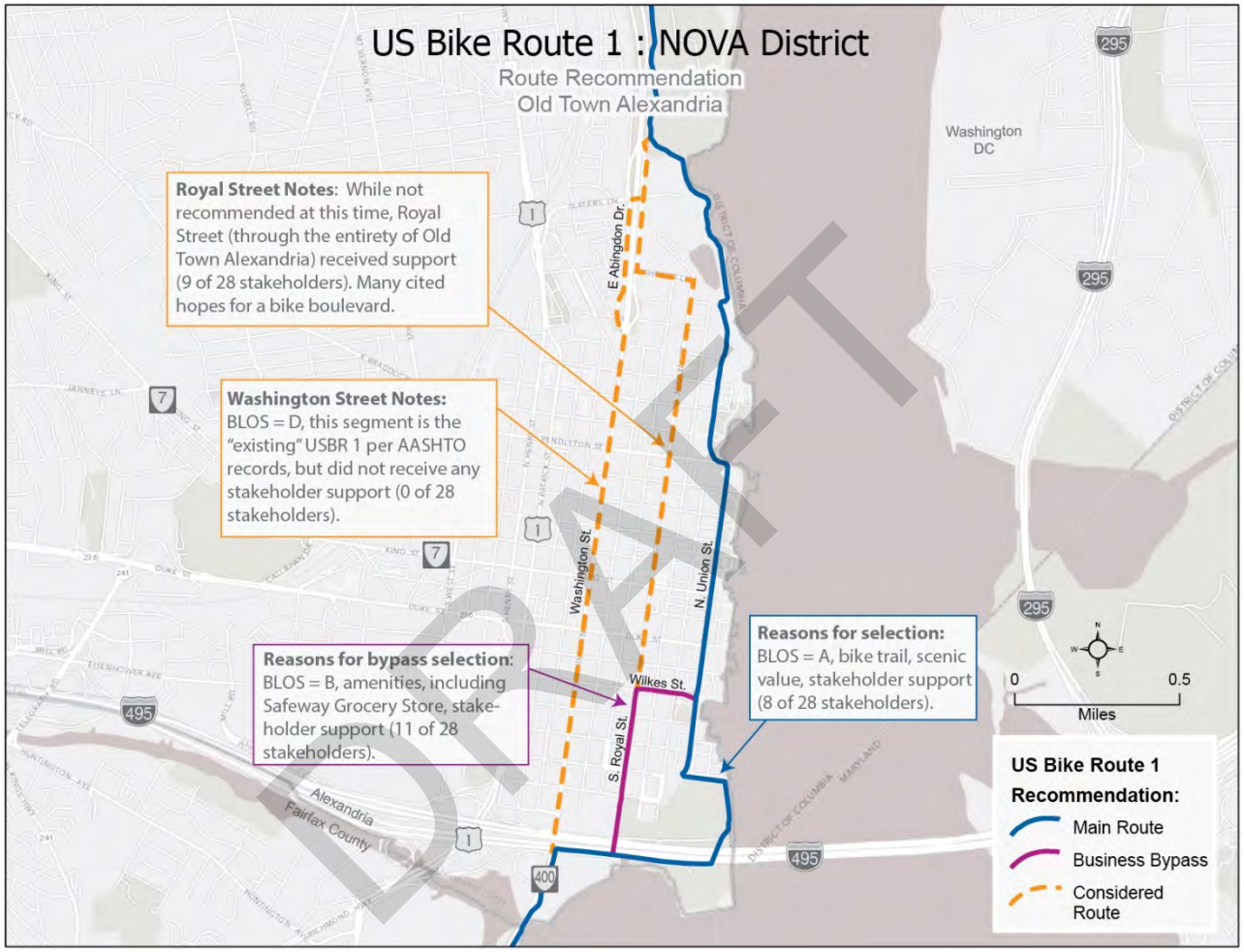
has signage, and is supported by stakeholders. This does not preclude the concept of Royal Street from becoming a bicycle boulevard which was mentioned during the evaluation process. In fact, the presence of a bicycle boulevard along Royal could provide multiple routes through the City of Alexandria in the future. This routing evaluation is based on existing conditions so Royal Street is not recommended at this time.

FIGURE 4: USBR 1 RECOMMENDATIONS – CITY OF ALEXANDRIA



Fort Belvoir

Main Route: Mulligan Road - Telegraph Road (Average BLOS= B)

The study team recommends that the main route follow Mulligan Road (opening in June 2014) to Telegraph Road. While this route is less direct than the Richmond Highway (US 1) alternative, it will likely have a higher BLOS (B versus C) and will offer bicycle facilities. With respect to the latter, Mulligan Road will include a 10-foot shared use path and Telegraph Road currently has 4-foot bike lanes. In addition, the route will operate outside of the Fort Belvoir security perimeter, an advantage when the base closes to the public.

Telegraph Road offers 4-foot bike lanes

Other Considered Routes:

1. **Fort Belvoir Loop - Backlick Road - Fairfax County Parkway - Telegraph Road (Average BLOS= A)**

While a loop through Fort Belvoir offers an excellent BLOS (A), follows an existing Adventure Cycling route, and is generally very scenic, vehicles and cyclists are prohibited from entering the Walker Gate on Route 235 due to security concerns. Given that the Department of Defense cannot concur with allowing an official route through the base, the study team no longer considers this a viable alternative.

2. **Richmond Highway (BLOS= C)**

The study team also evaluated a more direct route along Richmond Highway (US 1), but does not recommend this alternative due to a poor BLOS (C), resulting from high traffic volume (nearly 50,000 vehicles per day). In addition, US 1 (from Route 235 to Telegraph Road) will be under construction until 2016. When complete, the segment will provide six lanes of traffic (there are currently four lanes) and will include bicycle facilities and a shared use path. VDOT may consider USBR 1 realignment when construction is finished.

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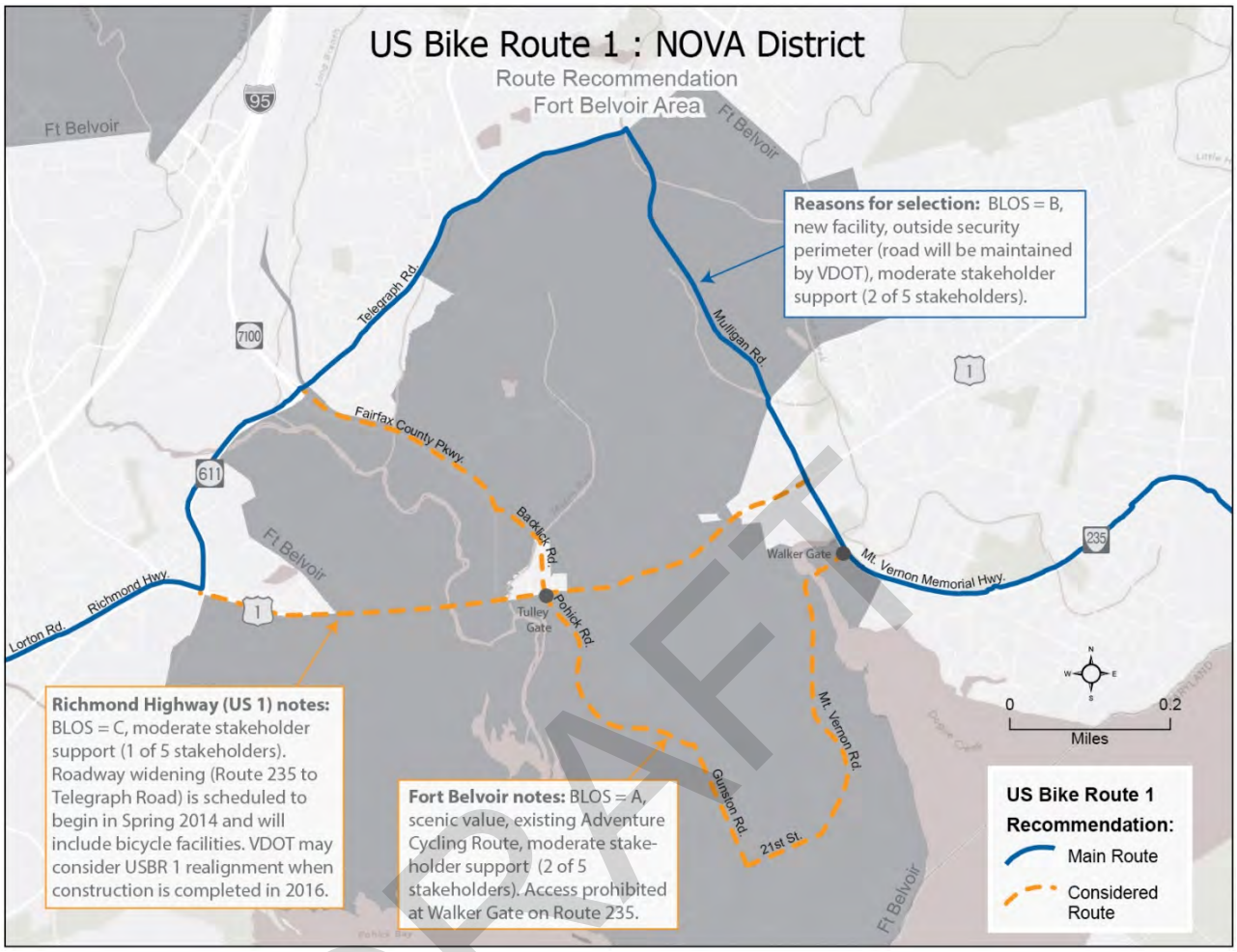
FIGURE 5: USBR 1 RECOMMENDATIONS – FORT BELVOIR AREA



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Town of Occoquan

Main Route: Union Street/Tanyard Hill Road (Average BLOS= D)

From the one-way street pair (Commerce Street and Mill Street) in the Town of Occoquan, the study team recommends that the main route follow existing USBR 1 along Union Street/Tanyard Hill Road to Old Bridge Road. The route is more direct (0.7 miles shorter) than the Washington Street alternative, has significantly lower average daily traffic, and offers a marginally higher bicycle level of service. While both alternatives have a BLOS equivalent to "D", the results indicate that Tanyard Hill Road is on the margin of "C", while the Washington Street alternative's average BLOS is closer to "E" (due to Old Bridge Road). Tanyard Hill Road does not have shoulders and is steep, with an average grade of 7 percent. Tanyard Hill Road's steep grade and winding nature may help calm traffic by reducing vehicle volumes and travel speeds. Tanyard Hill Road may be particularly preferable in the northbound direction since the downhill slope will enable cyclists to travel at the same speed as motorists. Stakeholders provided moderate support for each alternative, citing the advantages and disadvantages mentioned above.

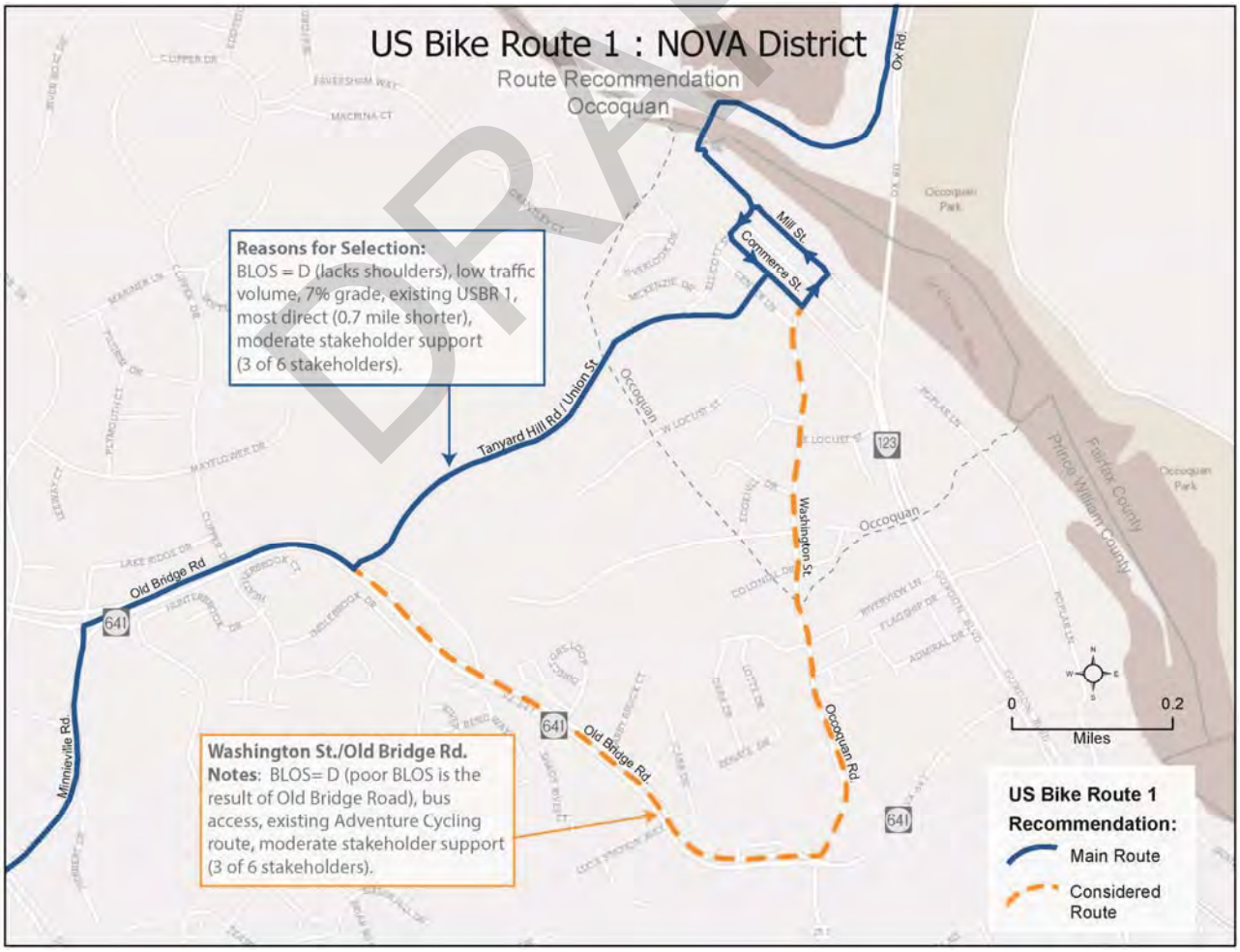
Commerce Street in the Town of Occoquan

Daily Traffic on Old Bridge Road

Other Considered Routes (Average BLOS= D)

The study team also considered an alternative along Washington Street/Occoquan Road and Old Bridge Road. As mentioned above, this alternative is longer than the main route and would place cyclists on a busy segment of Old Bridge Road that lacks shoulders and has narrow sidewalks. The route is not recommended at this time.

FIGURE 6: USBR 1 RECOMMENDATIONS – TOWN OF OCCOQUAN



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Prince William County

Main Route: Minnieville Road - Prince William Parkway - Hoadly Road (Average BLOS= B)

From Old Bridge Road (west of Occoquan), the study team recommends that USBR 1 follow segments of Minnieville Road, Prince William Parkway, Hoadly Road, Dumfries Road (Route 234), Independent Hill Drive, and Bristow Road before ultimately connecting to Aden Road. The recommended route has the highest average BLOS (B) of all considered alternatives and follows parts of other established routes (Adventure Cycling, and East Coast Greenway). The recommended route represents a compromise for those who prefer Minnieville Road and those who prefer Hoadly Road, as the route operates on portions of both facilities.

Although less direct than the other alternatives, the recommended alternative (via Minnieville Road, Prince William Parkway, and Hoadly Road) offers a higher average BLOS (B), primarily the result of lower ADT and wider shoulders. The route segment along Minnieville Road and Prince William Parkway has high ADT (up to 45,000 vehicles per day), but also provides shared use paths or wide shoulders for much of the duration. Meanwhile, Hoadly Road has approximately 13,000 to 23,000 vehicles per day and provides 8-foot shoulders along many segments. It should be noted that Prince William County is also constructing a shared use path on a 0.4-mile segment of Hoadly Road, extending from Dale Boulevard to Spriggs Road.

Following a left turn on Dumfries Road, the study team recommends that USBR 1 connect to Aden Road via Independent Hill Road and Bristow Road. This short spur, cutting off a corner of Dumfries Road, is 0.6 miles shorter than the other alternative and operates at a better BLOS (B versus C).

Other Considered Routes (Average BLOS= C and D)

The study team does not recommend keeping the portion of existing USBR 1 along Minnieville Road after crossing the Prince William Parkway (see map below) due to the route's poor average BLOS (D). The segment of Minnieville from Prince William Parkway to Spriggs Road operates at a particularly poor BLOS, which can be attributed to high ADT (up to 50,000 vehicles per day) and limited shoulders. The segment west of Spriggs Road has much lower volumes (approximately 15,000 vehicles per day), but is narrow and lacks shoulders. It is worth noting that the County plans to widen Minnieville Road from Spriggs Road to Dumfries Road (Route 234). When complete (construction estimated for 2015), the segment will offer a 10-foot shared use path and will be a much safer facility.

While the Old Bridge to Prince William Parkway alternative is roughly one-mile shorter than the recommended route, it operates at a lower BLOS (C), carrying approximately 25,000 to 43,000 vehicles per day. Please see the next section for additional notes on Old Bridge Road.

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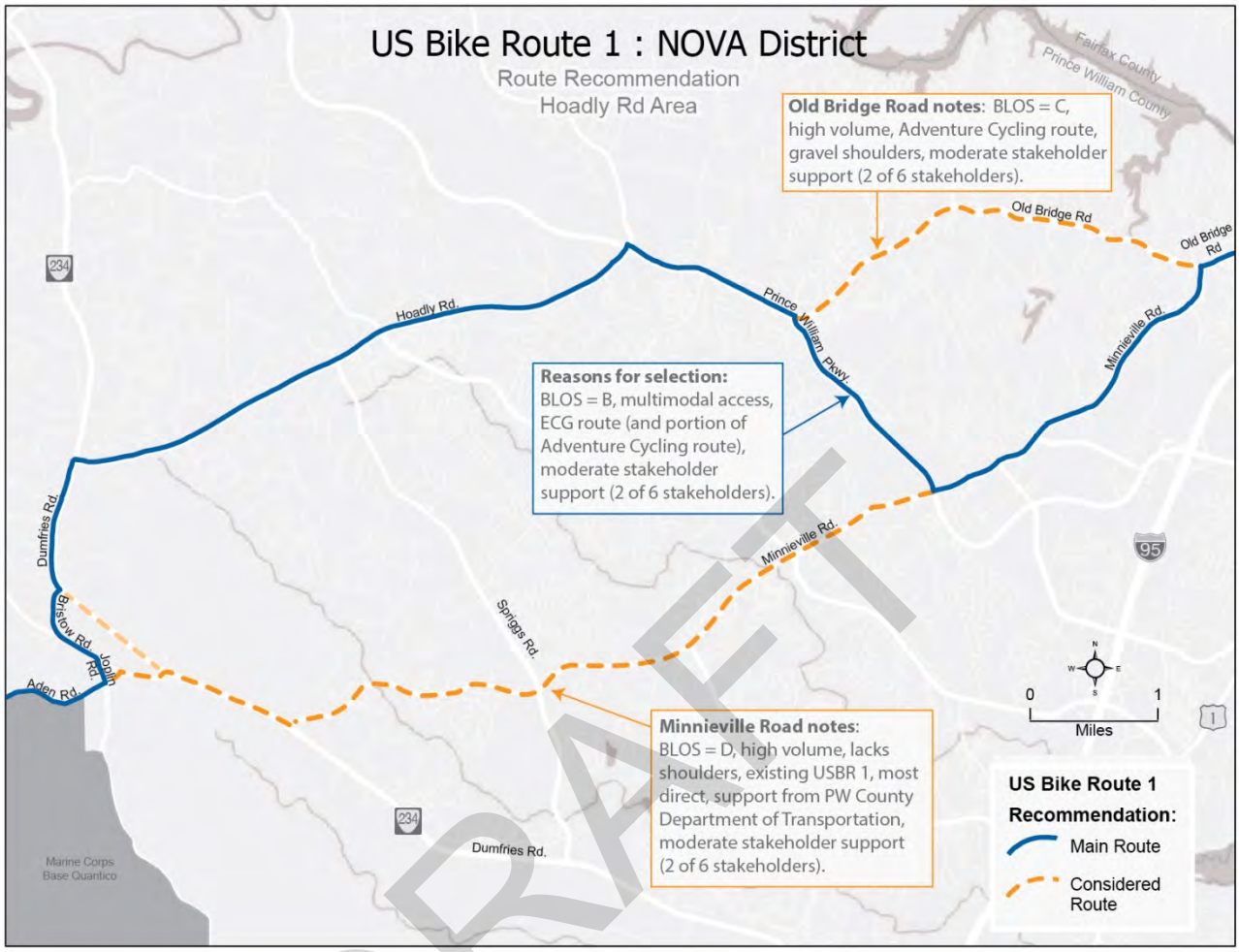
FIGURE 7: USBR 1 RECOMMENDATIONS – PRINCE WILLIAM COUNTY



Other Recommended Improvements

While route recommendations were only made in cases where two or more alternatives were considered, stakeholders and the data analysis highlight several other roadway segments that may warrant additional improvements. These roadway segments are discussed below.

- **Telegraph Road (Mulligan Road to Fairfax County Parkway):** stakeholders indicated that the four-foot shoulders on Telegraph Road are insufficient.

- **Lorton Road (Silverbrook Road to Ox Road):** Fairfax County plans to widen the existing two-lane roadway to a four-lane divided section to include medians, new bridges over Giles Run, the Greenway Trail, 10-foot wide shared use paths, on-road bike lanes, and low impact development storm water management. The study team agrees that these improvements will enhance safety and improve the quality of service along what is currently a poorly performing segment (BLOS = F) of USBR 1.

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- **Old Bridge Road (Occoquan Road to Prince William Parkway):** Old Bridge Road includes 4-6 lanes, has a 45 mile-per-hour (MPH) speed limit, and carries between 35,000 and 48,000 vehicles per day. The roadway's shoulders are intermittent, ranging from non-existent to gravel to paved shoulders. It is recommended that the gravel stretches (noted just northwest of Minnieville Road) be paved where feasible.

Gravel Shoulders along a busy stretch of Old Bridge Road: 3 p.m. on weekday

- **Aden Road and Fleetwood Road (Bristow Road to Prince William County line):** This two-lane stretch of USBR 1 in Prince William County has a 45 MPH speed limit, offers minimal shoulders (0-4 feet, depending on the segment), and operates at a poor level of service (ranging from D to E). Peak period traffic accounts for nearly 13.0% of the 5,000 vehicles per day on this stretch of USBR 1. Future maps and route descriptions, including those offered by independent organizations (e.g. Adventure Cycling), should note that Aden Road and Fleetwood Road are safest and most enjoyable when cycled in off-peak periods.

Next Steps

The study team is currently identifying locations where signs need to be installed, removed, or relocated. These sign adjustments are based on the recommended route alignment, as well as on other considerations such as the locations of existing signposts. The study team is also working with the NPS to identify suitable sign locations along the historic Mount Vernon Trail to minimize material costs and visual impacts.

Once the signage study is complete, the study team will prepare USBR 1 applications for AASHTO's review. The applications will explain the reasons for the realignment request, identify the route changes, and provide letters of support from bicycle groups, jurisdictions, and key government agencies.

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