
Chapter 7. Recommended Alternative

7.1 Summary of Analysis

Throughout the study process, multiple considerations were taken into account when developing alternatives. The alternative development process began with a universe of alternatives incorporating multiple combinations of traffic operations, transit, roadway, and environmental considerations. Through screening, modeling, and input from citizens and stakeholders, a final alternative was developed. The final alternative combines the traffic and operational needs of the forecast volumes and minimizes impacts to properties and environmental resources. The following section summarizes the considerations and the major decisions made based on conducted analysis and input from citizens and stakeholders.

7.1.1 Operational Considerations

During the initial volume forecasting, initial analysis indicated that the southern portion of US Route 1 in the study area (Russell Road to Telegraph Road) may require eight lanes in order to handle the expected volumes. Final simulation, using VISSIM determined that six lanes, throughout the study area would be sufficient in 2040. This recommendation is consistent with local and regional plans.

Based on analysis and screening of these considerations, described in more detail in previous chapters, the final alternative was developed and tested in detailed microsimulation analysis using VISSIM.

Figure 7-1 shows the refined recommended laneage for US Route 1 and the surrounding facilities.

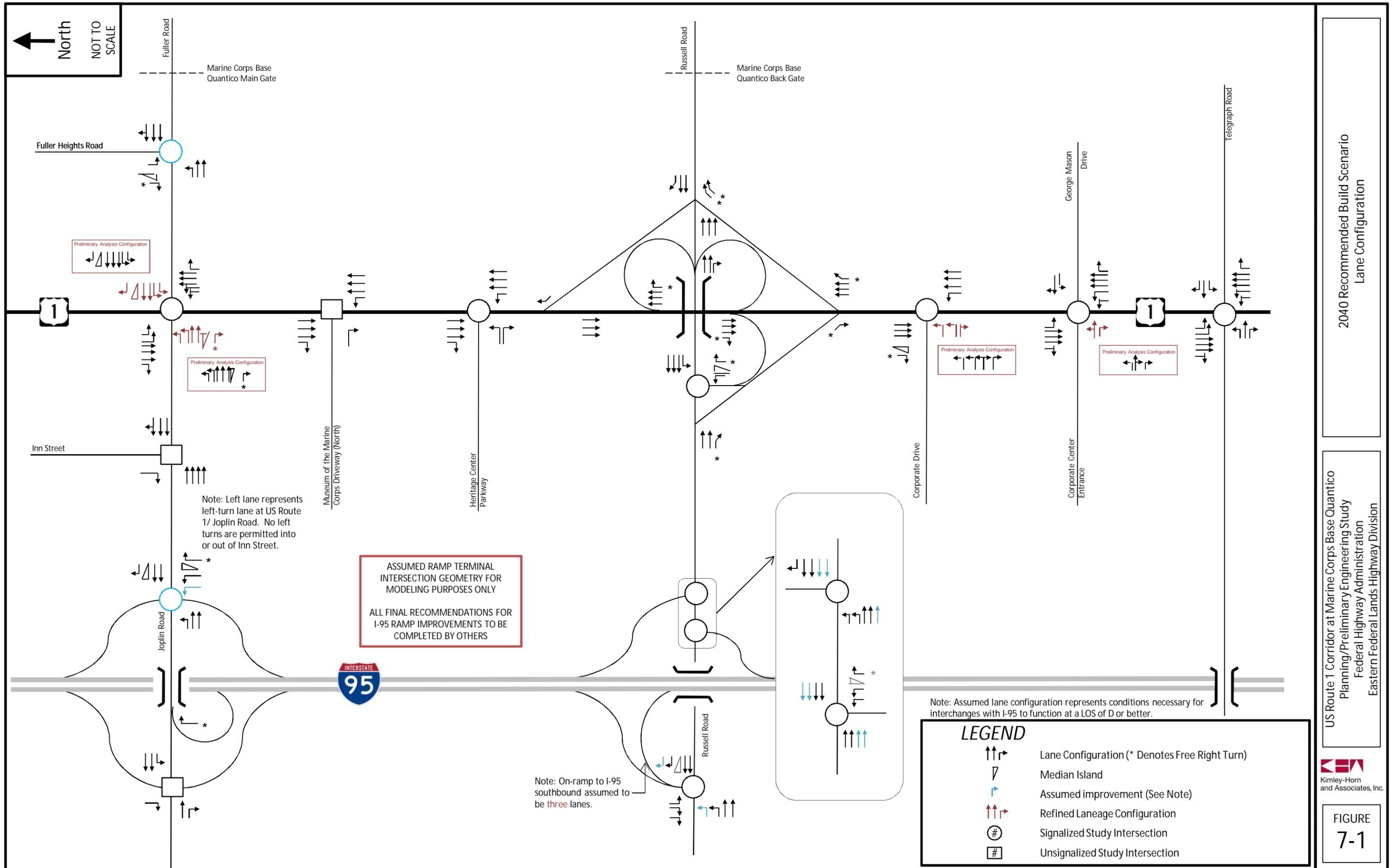
In the initial universe of alternatives, alternatives involving a lane dedicated to transit or high-occupancy vehicles (HOV) only. However, early in the process, it was determined that the anticipated transit share would not be high enough and the impacts to the general purpose lanes would be too severe to warrant a dedicated lane. As a result, this component was eliminated from considerations. Alternative transit and TDM accommodations are discussed later in this chapter.

7.1.2 Property and Environmental Considerations

Throughout the US Route 1 Corridor in the study area, there are many properties and environmental resources adjacent or in close proximity to the roadway. When determining the configuration and alignment for the roadway, efforts were made to balance and mitigate potential impacts to these properties and resources. Some major considerations included:

- Locust Shade Park
- Military housing developments
- Marine Corps Base Quantico (MCB Quantico) Protected Area
- Local residences and businesses adjacent to US Route 1
- Quantico Corporate Center
- Chopawamsic Creek
- Archeological and architectural resources
- Wetlands and floodplains

North of Russell Road, it was proposed that US Route 1 be widened along the existing centerline to minimize potential impacts to Locust Shade Park while limiting impacts to military housing.



At the Russell Road interchange, a hybrid concept was developed based on the preferred two concepts from the initial five concepts. Due to the fact that the interchange needs to be reconfigured due to operational and safety issues, impacts are inevitable. However, the configuration of the final alternative minimizes potential impacts to the park and limits wetland disturbance.

South of Russell Road, three US Route 1 alternatives were evaluated:

- The proposed centerline was centered on the existing right-of-way, impacting the properties on both sides of the road somewhat equally
- Limiting potential impact to not extend past the easternmost right-of-way line, impacting only the properties on the west side of the road
- Limiting potential impact to not extend past the westernmost right-of-way line, impacting only the properties on the east side of the road

These three mainline alignments were presented to stakeholders and the public at a citizen information meeting. Based on the input received at these meetings, it was decided to use the centerline centered within the existing right-of-way lines (first option), as the preferred alignment. This alignment balances potential impacts to local residences and businesses as well as natural resources. Future design of US Route 1 would include refinement of the alignment to further limit the impacts. One particular location where it may be possible to adjust the alignment in future stages of design and environmental documentation is described below.

7.1.2.1 Potential Alternative Alignments of US Route 1 at Boswell's Corner

In the area of the US Route 1/Telegraph Road intersection (commonly known as Boswell's Corner) many businesses and residences are located immediately adjacent to US Route 1 and any modification to the roadway would require property acquisition.

The study team examined two potential realignments of Route 1 in the vicinity of this intersection which would relocate US Route 1 to one side, avoiding potential property impacts on the other.

US Route 1 West Relocation Option

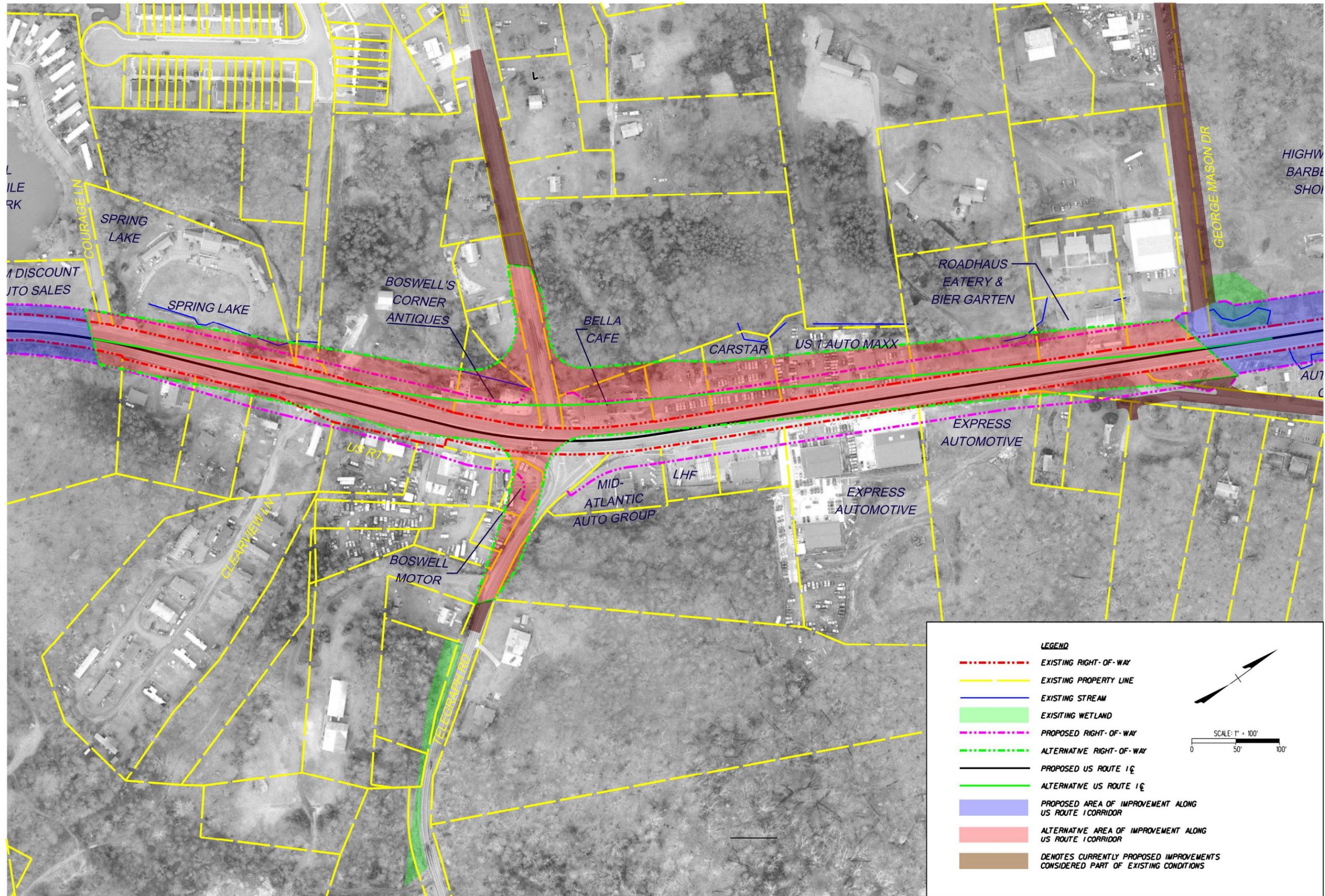
This potential realignment is shown in **Figure 7-2**. This realignment would:

- Avoid impacts to the properties along the eastern side of US Route 1
- Likely require complete acquisition of several properties along the western side of US Route 1
- Improve the alignment of Telegraph Road
- Meet current Virginia Department of Transportation (VDOT) standards for horizontal curves
- Provide increased intersection sight distances
- Maintain the existing property limits on the northeastern quadrant of the intersection
- Increase the total impact (linear feet) of stream delineation along the US Route 1 Corridor (see **Chapter 8**)

US Route 1 East Relocation Option

This potential realignment is shown in **Figure 7-3**. This realignment would:

- Avoid impacts to the properties along the western side of US Route 1
- Likely require complete acquisition of several properties along the eastern side of US Route 1
- Improve the alignment of Telegraph Road
- Meet current VDOT standards for horizontal curves

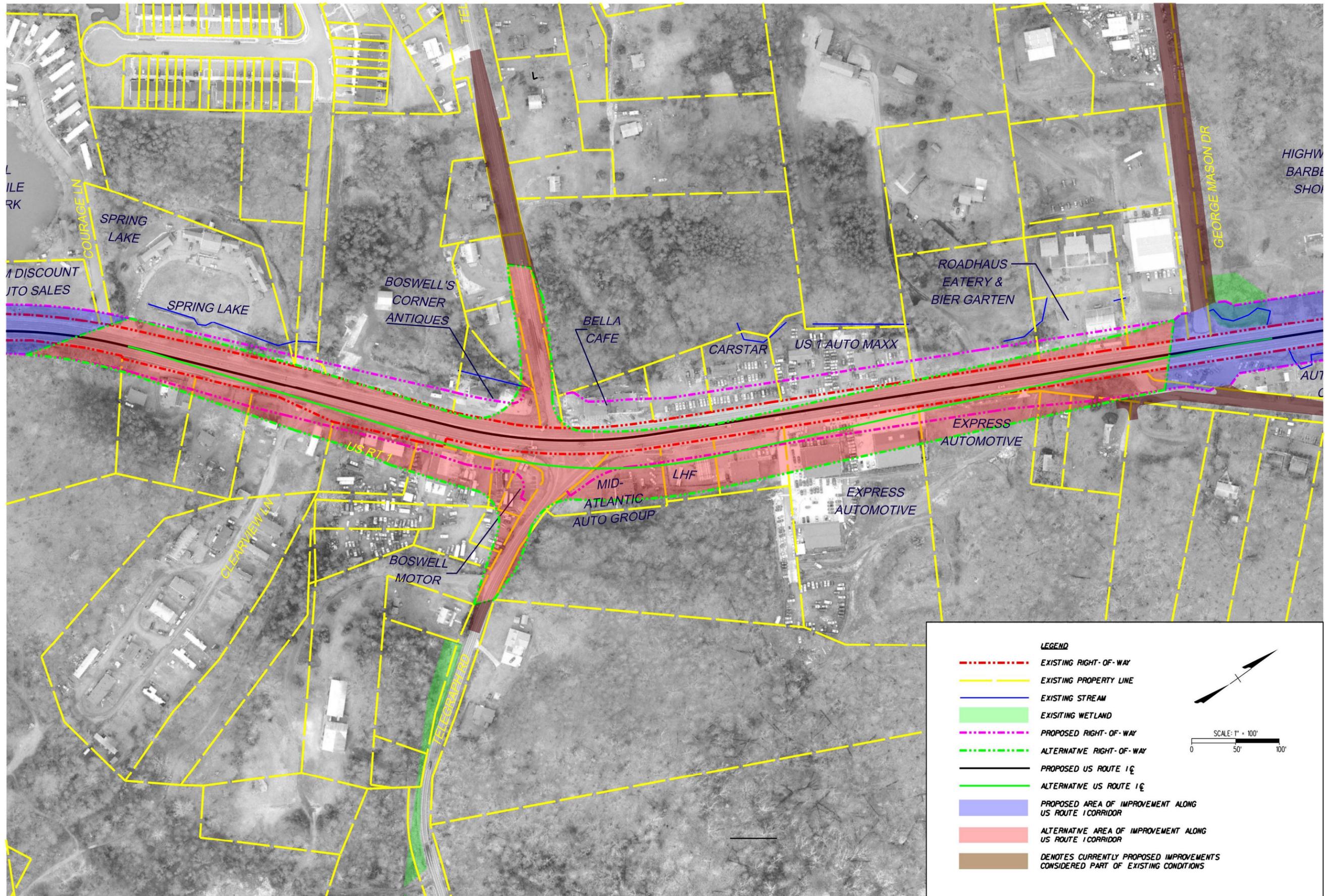


US Route 1 Alternative Alignment at
Boswell's Corner Option 1 (West)

US Route 1 Corridor at Marine Corps Base Quantico
Planning/Preliminary Engineering Study
Federal Highway Administration
Eastern Federal Lands Highway Division



FIGURE
7-2



US Route 1 Alternative Alignment 2 (East)
Boswell's Corner Option 2 (East)

US Route 1 Corridor at Marine Corps Base Quantico
Planning/Preliminary Engineering Study
Federal Highway Administration
Eastern Federal Lands Highway Division



FIGURE
7-3

As discussed above, the final recommendations of this study are to widen along the existing centerline in this area. These alternative alignments represent possible configurations to analyze further once detailed survey information is available and mitigation strategies are being investigated. Of the two alternatives, the US Route 1 West Relocation avoids the most property impact and provides a better geometric configuration.

7.2 2040 Build Conditions

This section describes the characteristics of the recommended alternative for US Route 1 including the general cross section, study area intersection configurations, and the relationship to connecting facilities. Roadway concept design plans for the recommended alternative are included in Appendix A. These consist of:

- Existing Typical Sections
- Proposed Typical Sections
- Existing Conditions including planned and programmed improvements
- Proposed US Route 1 six-lane divided highway concept design plans (includes proposed concept design of US Route 1/Russell Road interchange)
- Proposed US Route 1 six-lane divided highway vertical profiles

It should be noted that these concept design plans were prepared using aerial imagery and Geographic Information System (GIS) data and do not represent complete design.

7.2.1 General Cross-Section

The recommended cross section for US Route 1 consists of:

- Three 12-foot travel lanes in each direction (inside lanes contain an additional one-foot “shy distance”)
- Raised, seeded median
- Mountable curb and gutter on both sides of US Route 1
- A 10-foot multi-use path on the west side of US Route 1
- A six-foot sidewalk on the east side of US Route 1

7.2.1.1 Telegraph Road to George Mason Drive

From Telegraph Road to George Mason Drive, the recommended median is 28 feet, accommodating dual left-turn lanes. This provides for a total right-of-way of 131 feet and 2 inches. This cross section is shown in **Figure 7-4**.

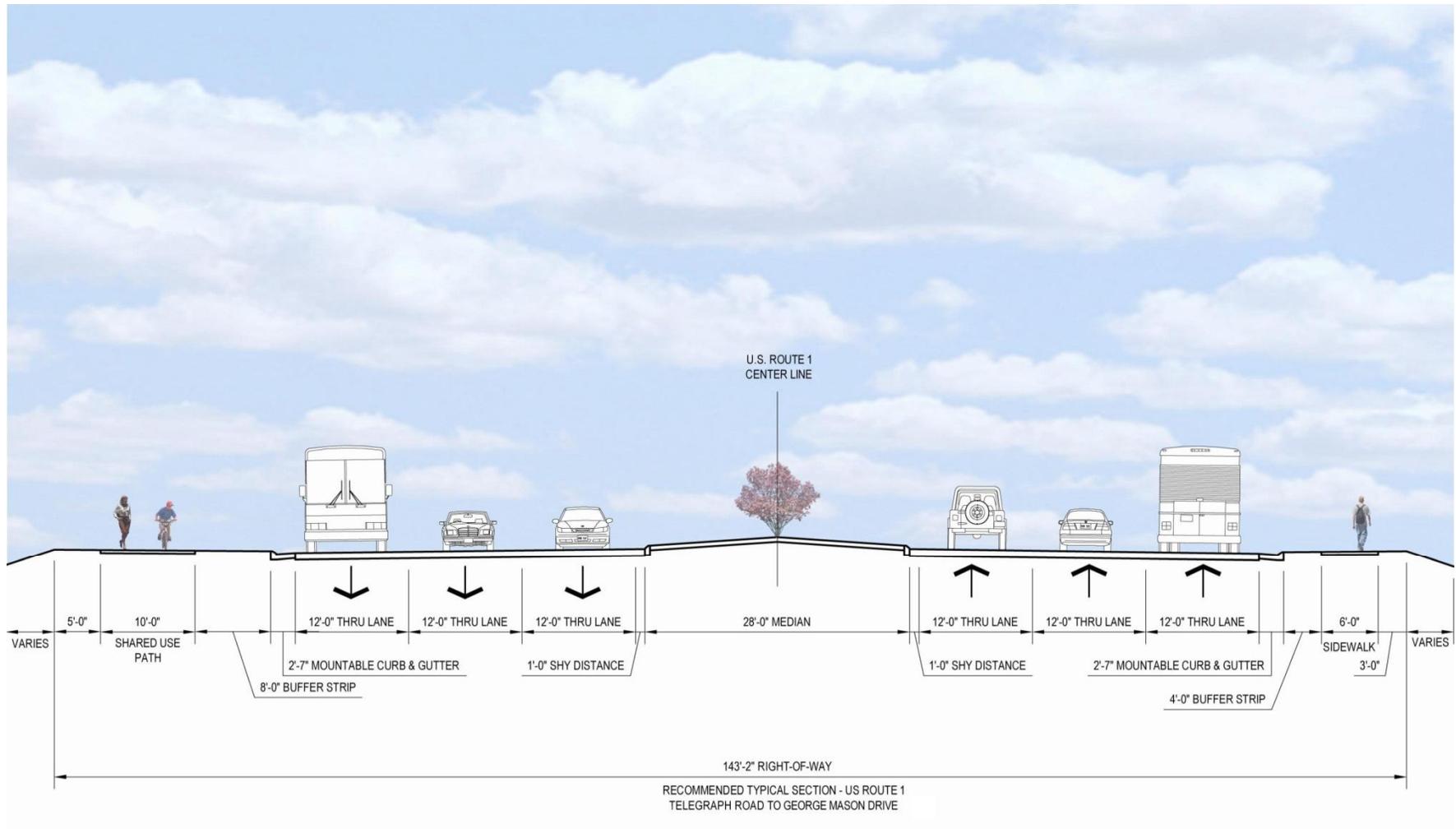
7.2.1.2 George Mason Drive to Joplin Road/Fuller Road

From Telegraph Road to George Mason Drive, the recommended median is 16 feet, accommodating single left-turn lanes. This provides for a total right-of-way of 142 feet and 2 inches. This cross section is shown in **Figure 7-5**.

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US Route 1 Corridor at Marine Corps Base Quantico Planning/Preliminary Engineering Study

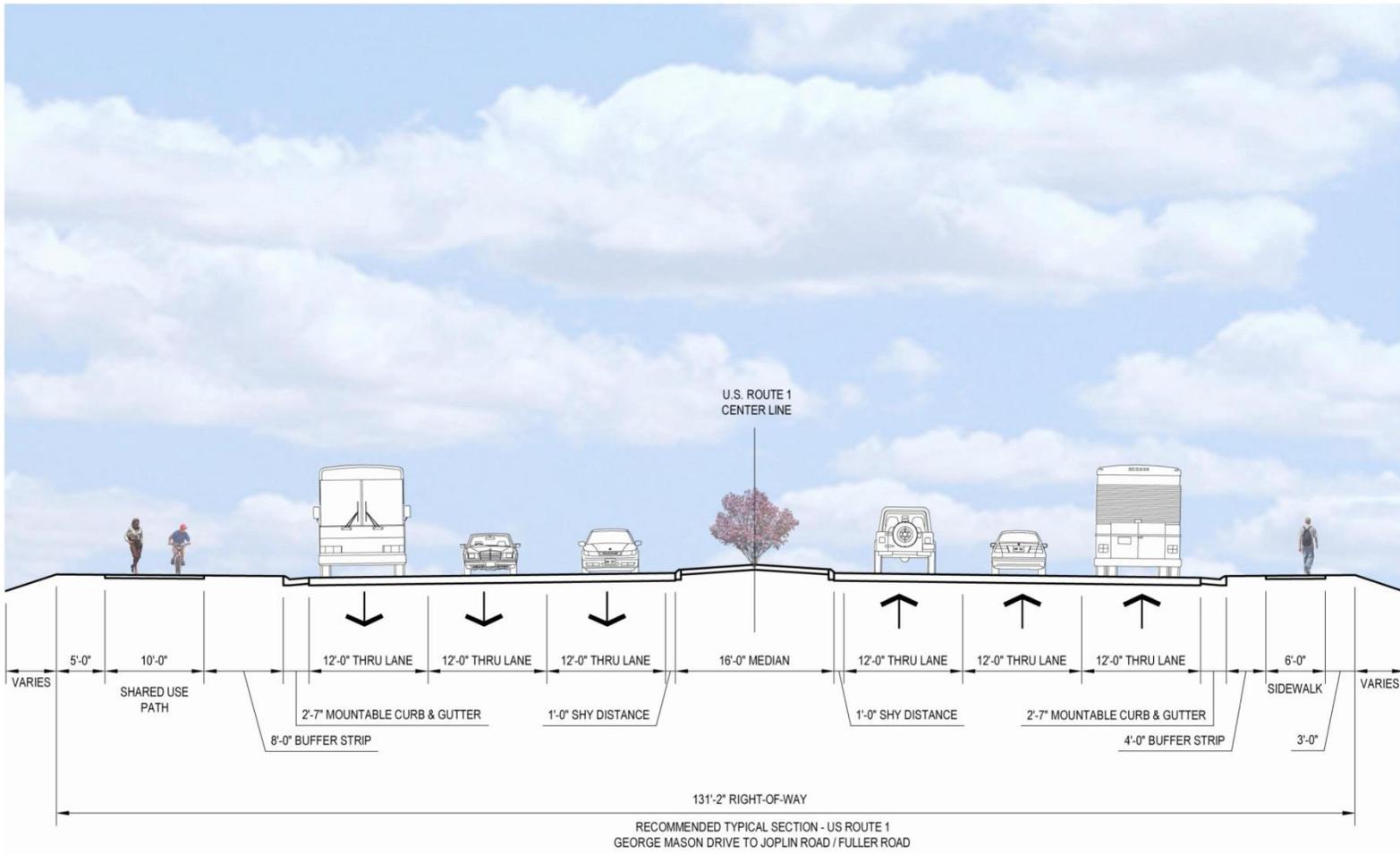
Figure 7-4: Proposed Recommended US Route 1 Cross Section – Telegraph Road to George Mason Drive



PLANNING / PRELIMINARY ENGINEERING REPORT

US Route 1 Corridor at Marine Corps Base Quantico Planning/Preliminary Engineering Study

Figure 7-5: Proposed Recommended US Route 1 Cross Section – George Mason Drive to Joplin Road/Fuller Road



7.2.2 Major Study Area Intersections

Major signalized intersections will have dual left-turn lanes and dedicated right-turn lanes on most approaches. At the US Route 1 and Russell Road interchange, the recommended configuration is the final Alternative G described in **Chapters 4 and 5**. A detailed description of each recommended intersection layout is included below.

Conceptual Traffic Signal and Pedestrian/Bicycle Facility Layout

As part of this study, a conceptual traffic signal layout for each of the major study area intersections and the Russell Road interchange was developed. This conceptual design included approximate locations for signal heads and pedestrian facilities such as crosswalks and refuge islands. Once more detailed survey information is available and detailed design occurs, these designs will likely be adjusted. Additional improvements that could be added for increased pedestrian and driver safety include:

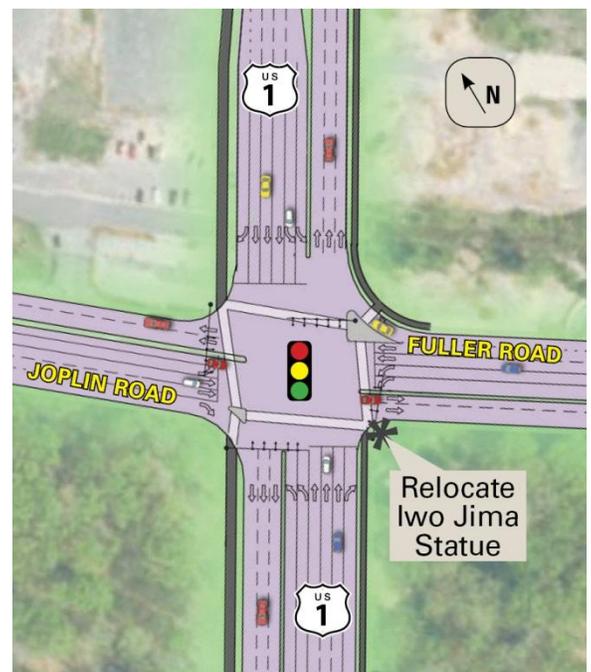
- High-visibility crosswalks
- Pedestrian refuges
- Americans with Disabilities Act (ADA) compliant curb ramps
- ADA compliant pedestrian call buttons
- Count-down pedestrian signal heads
- Pedestrian warning signs

A detailed description of each recommended intersection layout and a rendering of the conceptual design is included below.

US Route 1 at Joplin Road/Fuller Road

As shown in **Figure 7-6**, the recommended layout for this intersection is an ultimate build-out condition that includes two through lanes, dual left-turn lanes, and dedicated right-turn lanes on all four approaches. This capacity is needed to accommodate the projected growth in design year 2040 peak hour traffic volume primarily related to the MCB Quantico Main Gate. The preliminary analysis configuration consisted of three east/west through lanes. Through micro-simulation, it was determined that two lanes were adequate to handle this anticipated traffic volume and movements at this intersection. Relocation of the Iwo Jima memorial statue would likely be necessary (see **Chapter 8**).

Figure 7-6: US Route 1 at Joplin Road/Fuller Road



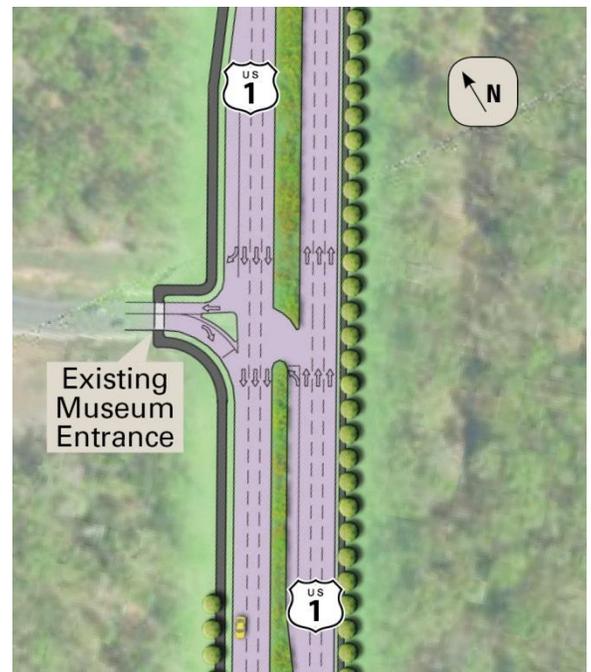
Fuller Road at Fuller Heights Road

The analysis of the build alternative assumed that the planned improvement project for the Fuller Road at Fuller Heights Road intersection would be completed. The assumed lane configuration was a four-lane cross section of Fuller Road, with a dedicated left-turn lane on the eastbound approach. The southbound approach of Fuller Heights Road was assumed to have one left-turn lane and one right-turn lane. The right-turn lane would turn unimpeded into a third westbound lane on Fuller Road that would terminate as a right-turn-only lane at US Route 1. To accommodate the left turns in and out of Fuller Heights Road, the intersection was assumed to be signalized and coordinated with the signal at US Route 1.

US Route 1 at Museum of the Marine Corps Entrance

US Route 1 at this location would be widened to a six-lane cross section. A dedicated left-turn lane on the northbound and a dedicated right-turn lane on the southbound approach would be provided. However, as part of the planned expansion of the Heritage Museum site, it is recommended that the traffic signal at this location be relocated to the new entrance planned further south. Left turns onto northbound US Route 1 would be prohibited and traffic would be rerouted to the new signalized entrance. This configuration was the recommended concept in the 2011 traffic impact analysis for the National Museum of the Marine Corps Expansion⁶. **Figure 7-7** shows the recommended intersection configuration.

Figure 7-7: US Route 1 at Museum of the Marine Corps Entrance

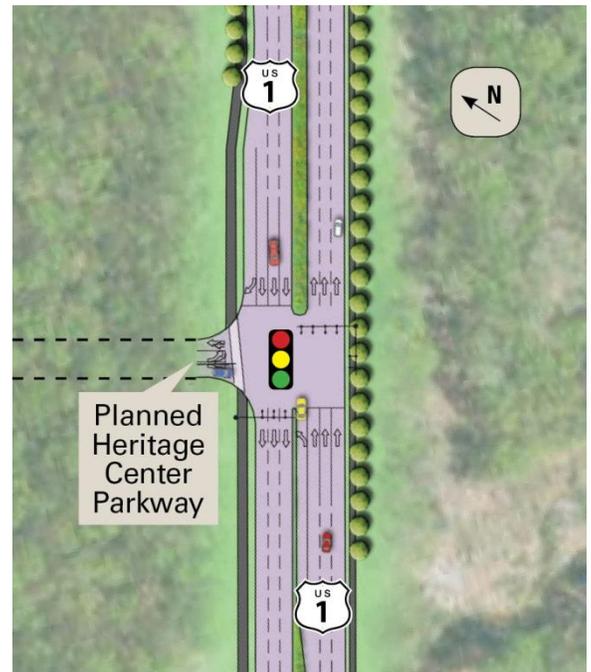


⁶ Traffic Impact Analysis: National Museum of the Marine Corps Expansion. Prince William County, Virginia. May 2011. Prepared by Timmons Group

US Route 1 at Heritage Center Parkway

As part of the planned expansion of the Heritage Museum site, this location would become the main entrance to the site. US Route 1 would be widened to six lanes (three in each direction) and a dedicated left-turn lane on the northbound approach and a right turn lane on the southbound approach would be provided. All traffic movements at this intersection would be accommodated with a traffic signal. **Figure 7-8** shows the recommended intersection configuration.

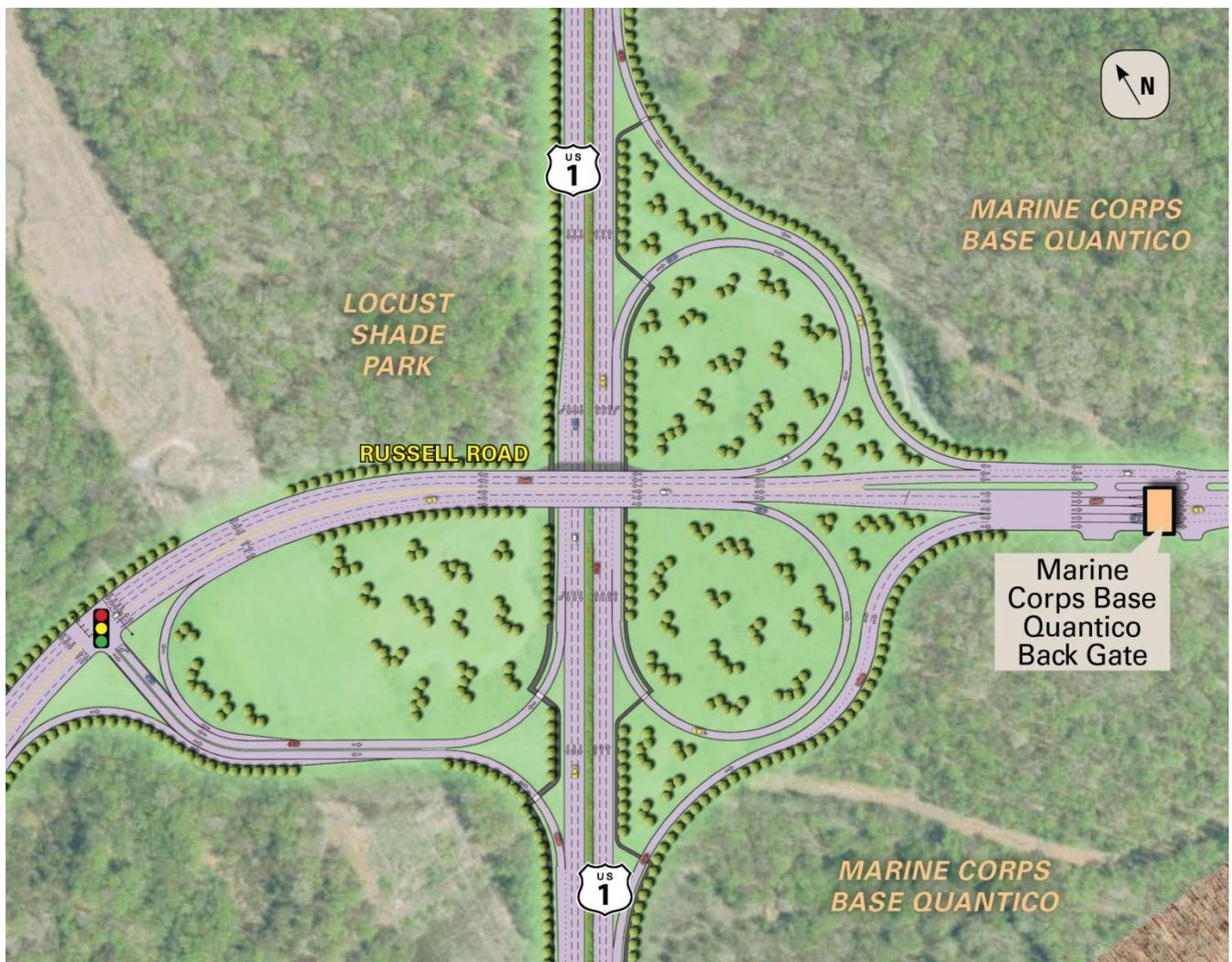
Figure 7-8: US Route 1 at Heritage Center Parkway



US Route 1 at Russell Road

The current interchange configuration cannot adequately serve current and future peak hour traffic. The recommended layout includes a traffic signal on Russell Road west of US Route 1 at the intersection with the ramps to and from southbound US Route 1 and a partial cloverleaf interchange on the east side of US Route 1 is recommended. A fourth southbound lane on US Route 1 is added south of the interchange so that the right turn movement from eastbound Russell Road to southbound US Route 1 turns unimpeded into a dedicated lane. This lane terminates as a right-turn-only lane at Corporate Center Drive. Detailed design of the Russell Road interchange must meet Anti-Terrorism/Force Protection standards, physical security standards, and UFC Guidelines for Entry Control Facilities, and are subject to final review by MCB Quantico. The new interchange would require a new bridge over Chopawamsic Creek on Route 1 and a new bridge over Route 1 on Russell Road. The interchange would potentially cause impacts to wetlands and archaeological resources (see **Chapter 8**). The proposed layout for the interchange is shown in **Figure 7-9**.

Figure 7-9: US Route 1 at Russell Road

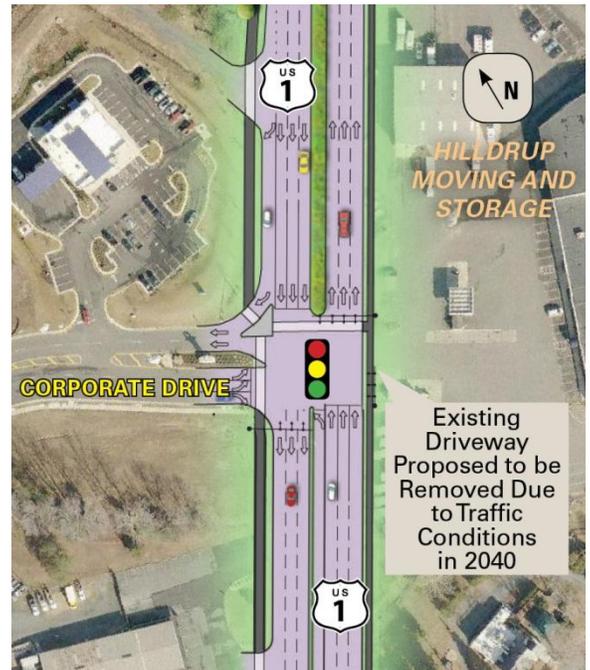


US Route 1 at Corporate Center Drive

The design year 2040 peak hour volumes reflect the planned full build out of the Quantico Corporate Center. The recommended intersection configuration accommodates the heavy traffic movements generated by the site. US Route 1 would be widened to a six-lane cross section, with a dedicated right-turn lane in the southbound direction and dual left-turn lanes on the northbound approach. The right-turn lane on the southbound approach extends upstream to the Russell Road interchange as described above. Exiting the Corporate Center site, it is recommended that the eastbound approach to the intersection have two left-turn lanes and one dedicated right-turn lane. This represents a reduction of one dedicated right-turn lane that was determined to be unnecessary by VISSIM microsimulation analysis. The existing east leg of the intersection would be closed to accommodate 2040 traffic and all traffic rerouted south to the George Mason intersection. Alternative configuration may necessitate further widening of Route 1 in this locations and addition of left- and right-turn lanes for driveway access.

Figure 7-10 shows the recommended intersection configuration.

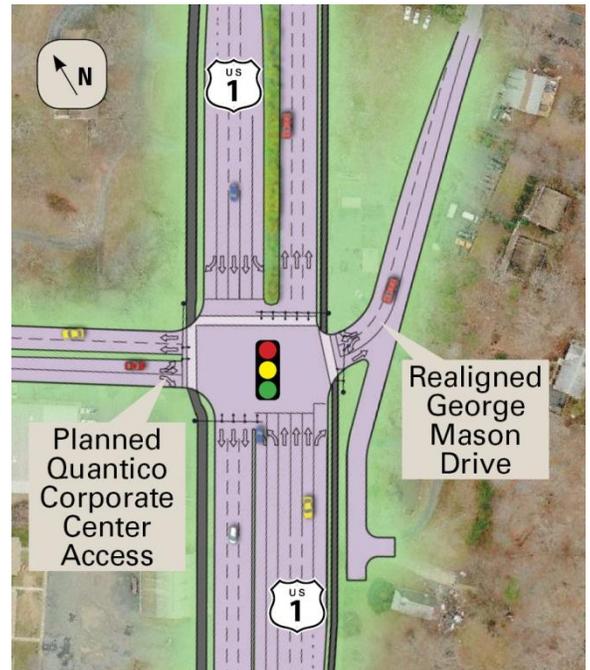
Figure 7-10: US Route 1 at Corporate Drive



US Route 1 at George Mason Drive

George Mason Drive east of US Route 1 would be realigned to intersect with US Route 1 approximately 200 feet further north to align with the planned new entrance/exit to Quantico Corporate Center. This realignment creates one combined signalized intersection to improve the efficiency of traffic flow. US Route 1 would be widened to a six-lane cross section, with a dedicated left- and right-turn lane on the southbound approach and dual-left turn lanes and a dedicated right-turn lane on the northbound approach. Both the eastbound and westbound approaches would have a shared left-turn and through lane and a dedicated right-turn lane. The eastbound approach represents a reduction in a dedicated right-turn lane that was determined to be unnecessary by VISSIM microsimulation analysis. **Figure 7-11** shows the recommended intersection configuration.

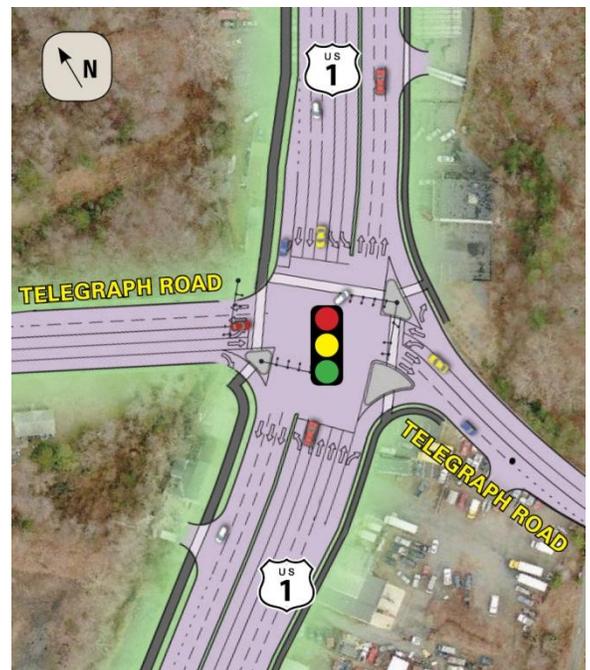
Figure 7-11: US Route 1 at George Mason Drive



US Route 1 at Telegraph Road

As with all study intersections, US Route 1 would be widened to six lanes at this location. Both the northbound and southbound approaches would have dual left-turn lanes and a dedicated right-turn lane. The eastbound and westbound approaches would both have a dedicated left-turn, through, and right-turn lane. This configuration incorporates the short-term improvements designed for Telegraph Road. **Figure 7-12** shows the recommended intersection configuration.

Figure 7-12: US Route 1 at Telegraph Road



7.2.3 Surrounding Intersections

Other adjacent intersections outside the study area were included in the VISSIM microsimulation analysis to better replicate traffic arrival patterns at the study intersections along US Route 1, specifically, the I-95 ramp intersections with Russell Road and with Joplin Road. VISSIM is a microscopic simulation model, which means that it models individual vehicles traveling through the network. If a bottleneck occurs in the network, than traffic will be prevented from reaching downstream intersections and the simulated volumes will be lower than intended. For this reason, assumptions were made at the I-95 ramp intersections in order to accommodate the project design year traffic and properly load the simulation network with traffic. These assumptions included:

Joplin Road at I-95 Southbound Ramps

- No change from existing configuration

Joplin Road at I-95 Northbound Ramps

- Dual left-turn lanes (northbound approach)
- Add traffic signal

Fuller Road at Fuller Heights Road (Relocated)

- Planned design complete
- Add traffic signal

Russell Road at I-95 Southbound Entrance Ramp (signalized)

- Dual left-turn lanes (eastbound approach)
- Dual right-turn lanes (westbound approach)
- Dual left-turn lanes (southbound approach)

Russell Road at I-95 Northbound Exit Ramp (signalized)

- Two eastbound through lanes
- Three westbound through lanes
- Dual left-turn lanes (northbound approach)
- Single free flow right-turn lane into a new third eastbound lane on Russell Road (northbound approach)

Russell Road at I-95 Northbound Entrance Ramp (signalized)

- Three eastbound and westbound through lanes
- Dual left-turn lanes (eastbound approach)
- Single free flow right-turn lane (westbound approach)

It should be noted that although design year traffic volumes were accommodated through the I-95 ramp intersections with the above assumptions, the current layout of the I-95 at Russell Road interchange is not conducive to future traffic patterns. As demand shifts to the south, the need for south-facing ramps will become increasingly more urgent. It is recommended that a more detailed Interchange Modification Report (IMR) be initiated to study this interchange in more detail. One design option that should be considered in this process is a Diverging Diamond Interchange (DDI). This type of interchange is extremely efficient in handling closely spaced ramp intersections with heavy turning

movements and relatively light through traffic demand on the arterial. Any design option would need to be approved by the Federal Highway Administration (FHWA), VDOT, and MCB Quantico.

7.2.4 Accommodations for Transit and Transportation Demand Management (TDM)

During the preliminary analysis phase of this study (described in **Chapter 5**) the potential for a transit- and high-occupancy vehicle (HOV)-only lane as part of the roadway configuration was examined. It was determined that the transit and carpool ridership in this area was not sufficient to warrant a dedicated lane. A dedicated lane would also cause the general purpose lanes to become more congested.

However, with growth expected in the corridor area, it is vital to make accommodations for transit users, both local and long-distance. Multiple transportation studies have recommended regional bus service in this corridor connecting with the future I-95 Express Lanes. Future design should incorporate roadway modifications that include bus stops with appropriate amenities for riders. The US Route 1 Multimodal Corridor Study⁷ recommended Fredericksburg Regional Transit (FRED) bus stops at the following locations in or near the study area:

- Quantico Corporate Center
- US Route 1 and Clearview Lane/Terrace Drive (south of study area)
- US Route 1 and Merryview Drive/Courage Lane (south of study area)

Transportation demand management (TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles). A demand management approach to transportation has the potential to deliver better environmental outcomes, improved public health, stronger communities, and more prosperous and livable places. In addition, the I-95 Express Lanes will strengthen the needs for commuter-oriented facilities in the US Route 1 corridor. The following TDM strategies could improve travel demand and help to reduce congestion on US Route 1 and surrounding facilities:

- New park-and-ride lots for commuters
- Supporting shuttle service within MCB Quantico and surrounding facilities
- Neighborhood circulators
- Promoting knowledge and use of TDM and regional commuter services
- Encouraging employer incentives for carpooling/teleworking/transit use

7.3 Traffic Operations Analysis (VISSIM)

The alternative carried forward for detailed microsimulation consists of a six-lane cross section for US Route 1 for the entire study area, from Joplin Road/Fuller Road to Telegraph Road. The preliminary analysis using Synchro/HCM methodology indicated some potential queuing issues at the signalized intersections at the southern end of the study area, but the results were not definitive enough to rule out the six-lane option.

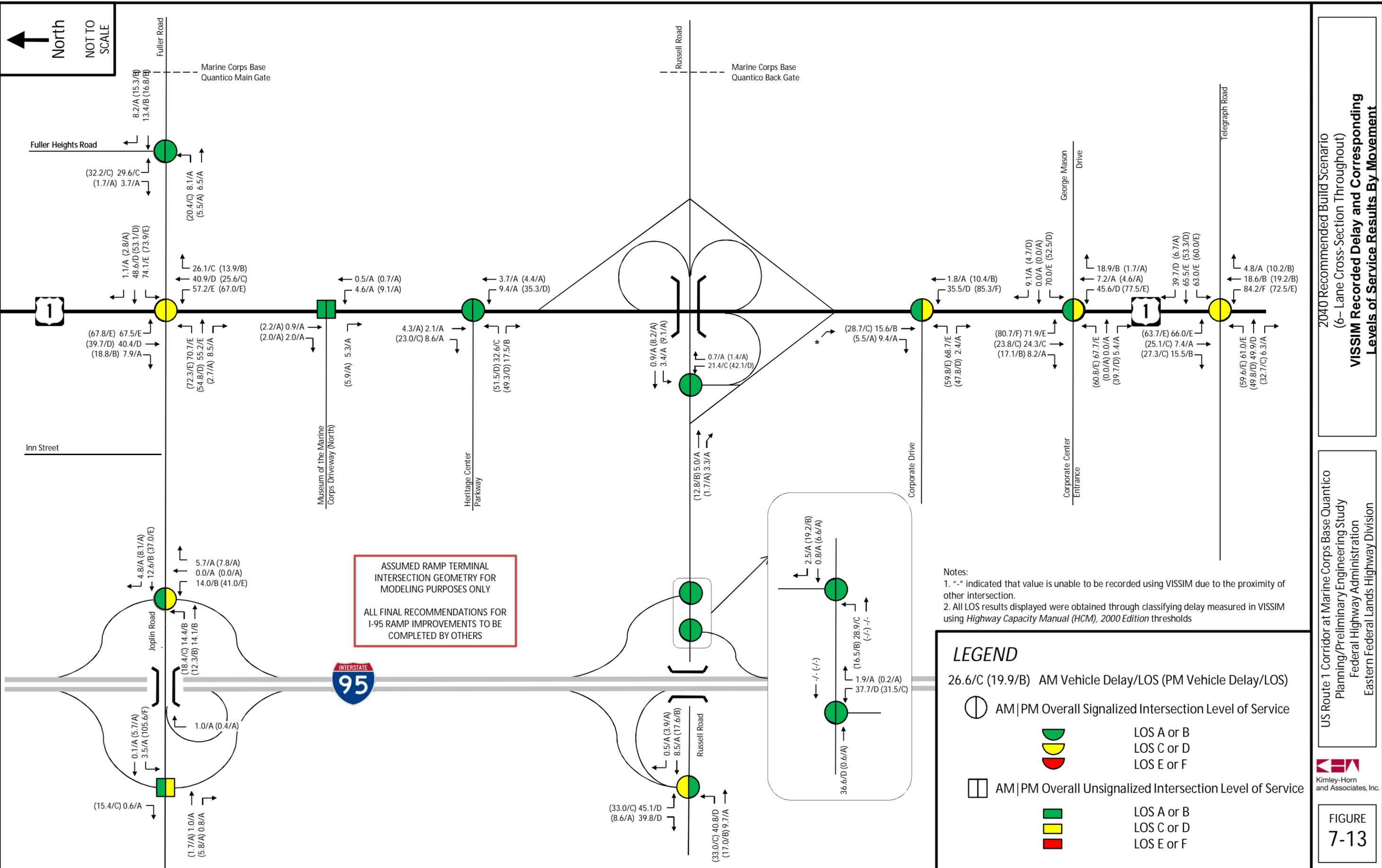
The existing conditions VISSIM model was modified to reflect peak hour 2040 traffic volumes and the recommended build alternative described above. This final analysis more accurately models network features such as actuated-coordinated signals, right-turn-on-red, and the cumulative effects of overcapacity intersections and queuing over the entire peak hour. In general, the average vehicle delay

⁷ Route 1 Multimodal Corridor Study. 2008. Vanasse Hangen Brustlin, Inc.

and level of service (LOS) results closely match the initial Synchro analysis documented in **Chapter 5**. AM and PM peak hour results are shown in **Table 7-1**. Individual movement and overall intersection LOS are shown in **Figure 7-13**. A complete report of all vehicle delays and LOS by movement is included in **Appendix F**. Some individual traffic movements at some intersections operate at LOS F, but overall intersection delays and levels of service are all at LOS D or better. Queuing results also match well with the Synchro results. Average and maximum AM and PM peak hour queuing results are shown in **Figure 7-14**. Along US Route 1, maximum queues within the peak hour are expected to nearly spill back to upstream intersections. However, the VISSIM simulation also revealed that this condition is short lived and does not exist for the entire peak hour. Queue lengths recover to more acceptable levels by the end of the hour and spillback does not significantly affect adjacent intersections. Average queues do not extend through upstream intersections.

Table 7-1: US Route 1 Signalized Intersection Capacity Results (VISSIM)

Signalized Intersections		2040 Build Scenario (VISSIM)	
		Level of Service	Delay, sec/veh
		AM (PM)	AM (PM)
US Route 1 Lanes (Joplin Road to Russell Road)		6 lanes	
1	US Route 1 and Joplin Road/Fuller Road	D (D)	44.2 (39.8)
2	US Route 1 and Heritage Center Parkway	A (A)	9.9 (6.9)
US Route 1 Lanes (Russell Road to Telegraph Road)		6 lanes	
3	US Route 1 and Corporate Drive	A (C)	9.0 (28.4)
4	US Route 1 and George Mason Drive/Corporate Center Entrance	B (C)	17.7 (22.8)
5	US Route 1 and Telegraph Road	C (C)	24.9 (28.6)



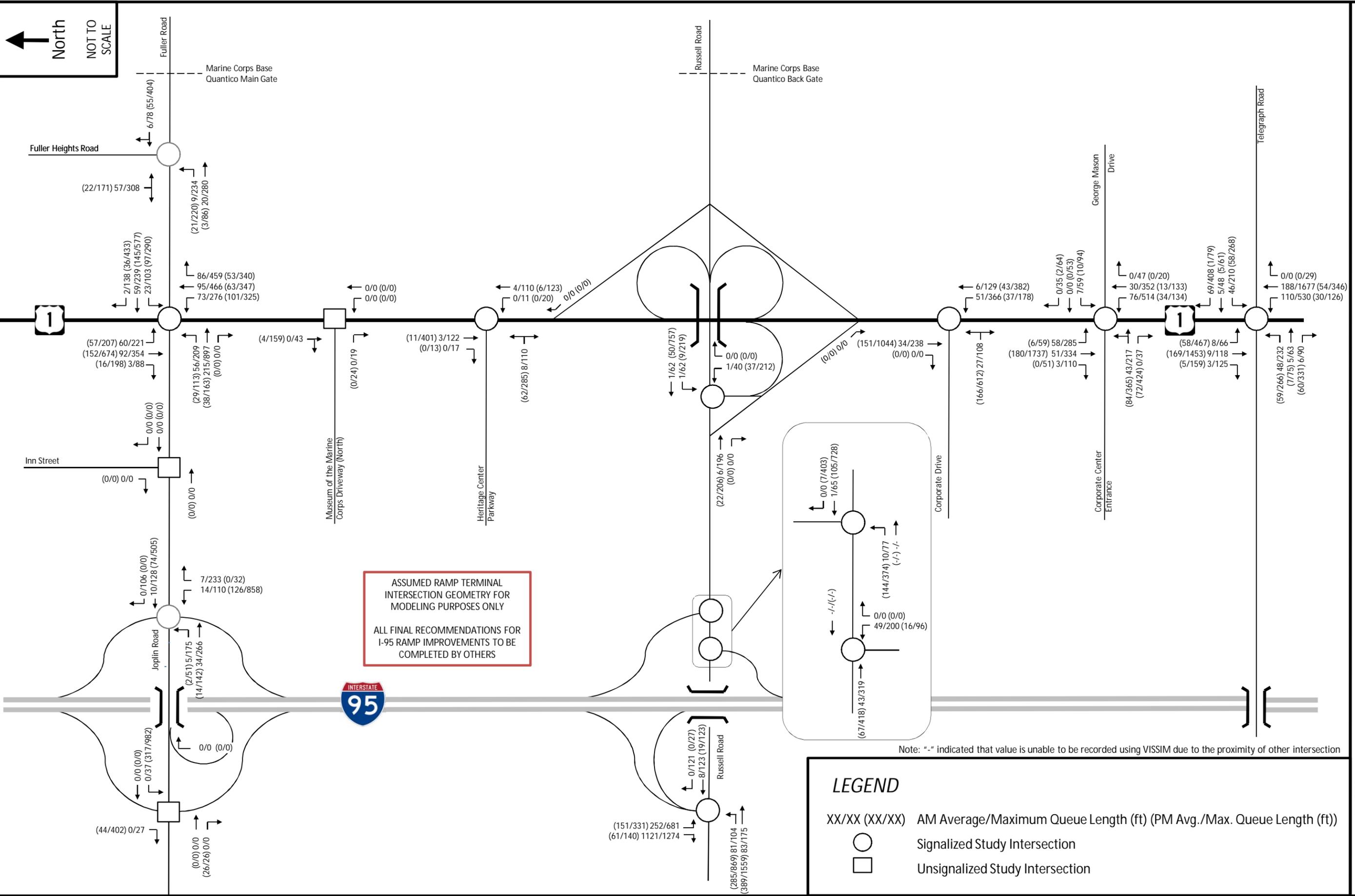
2040 Recommended Build Scenario
 (6-Lane Cross-Section Thoroughout)
VISSIM Recorded Delay and Corresponding Levels of Service Results By Movement

US Route 1 Corridor at Marine Corps Base Quantico
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FIGURE 7-13

North
NOT TO SCALE



LEGEND

- XX/XX (XX/XX) AM Average/Maximum Queue Length (ft) (PM Avg./Max. Queue Length (ft))
- Signalized Study Intersection
- Unsignalized Study Intersection

2040 Recommended Build Scenario
(6-Lane Cross-Section Throughout)
Queuing Results (VISSIM)

US Route 1 Corridor at Marine Corps Base Quantico
Planning/Preliminary Engineering Study
Federal Highway Administration
Eastern Federal Lands Highway Division



FIGURE
7-14

7.4 Moving Forward

The high-level planning recommendations of this corridor study provide a framework for the improvement of the US Route 1 corridor in Stafford and Prince William Counties. This report identifies the transportation and safety needs of the corridor. It addresses the potential transportation and potential environmental impacts that the suggested improvements would have to the corridor and surrounding areas.

Both counties have studied this area for roadway improvements and development opportunities in the past. Comprehensive and transportation plans for both Stafford County and Prince William County as well as the Fredericksburg Area Metropolitan Planning Organization (FAMPO) include the widening of US Route 1 in the study area from four to six lanes. The following section describes how this study fits with the previously approved recommendations of the two counties.

7.4.1 Stafford County

In May 2011, Stafford County approved a Redevelopment Plan for Boswell's Corner which envisioned the area surrounding US Route 1 roughly from Telegraph Road to Corporate Center Drive as a target area for commercial and residential growth. The county envisions a grid network of streets surrounding a tree-lined, six-lane US Route 1. Other goals are to have an open-space park along Chopawamsic Creek and for Telegraph Road to be a four-lane road with bicycle lanes and on-street parking.

The US Route 1 envisioned in this report serves as an interim step towards Stafford County's vision of US Route 1. Widening of the road from the existing four lanes to six lanes with pedestrian and bicycle facilities will begin the process of this ambitious yet achievable vision set by Stafford County.

7.4.2 Prince William County

In 2004, Prince William County approved a proposed cross section and alignment for US Route 1 that was developed as part of the VDOT Route 1 Location Study for Fairfax and Prince William Counties. This study area was divided into three sections and "Location A" was from the Stafford County/Prince William County line to the Occoquan River. This alignment and cross section are similar in nature but vary in some instances. **Table 7-2** compares the major components of each study for the portion of Route 1 from Russell Road to Joplin Road/Fuller Road.

Table 7-2: US Route 1 Study Comparison

	2004 VDOT Location Study (Location A)	2013 US Route 1 at MCB Quantico Feasibility Study
Study Extents	Stafford County/Prince William County Line to the Occoquan River	Telegraph Road to Joplin Road/Fuller Road
Pedestrian/Bicycle Accommodations	10-foot multiuse path on west side of US Route 1	10-foot multiuse path on west side of US Route 1 6-foot sidewalk on east side of US Route 1
Cross Section	six-lane divided with 16-foot raised median 134-foot total right-of-way	six-lane divided with 16-foot raised median 131-foot total right-of-way
Russell Road	Did not include improvements to Russell Road or interchange	Includes new concept design for Russell Road interchange
Marine Corps Heritage Center Expansion	Incorporates turn lanes to a four-way intersection with the proposed Heritage Center Parkway	Incorporates updated design of Heritage Center Parkway, proposed to intersect US Route 1 at a "T-intersection" from the west
Alignment	Widens US Route 1 to the east to avoid impacts to Locust Shade Park property	Widens US Route 1 along existing centerline due to concern over potential impacts to MCB Quantico housing on the east side of Route 1

In the case that the southern portion of US Route 1 (primarily in Stafford County) in this study area moves forward with construction before that of Prince William County, Prince William County has acknowledged the need to fund improvements in its small section of US Route 1 south of Russell Road. This would aid in meeting VDOT standards of logical termini for a construction project.

7.4.3 MCB Quantico

The Marine Corps Base has noted that any property acquisitions from MCB Quantico will require a real estate action/agreement with US Department of Navy and that improvements near security gates must meet appropriate military standards. MCB Quantico is also in the process of reconfiguring access at the Main Gate on Fuller Road which will likely improve operations at the US Route 1/Joplin Road/Fuller Road intersection.

7.5 Conclusions

The recommended build alternative for US Route 1 between Joplin Road/Fuller Road and Telegraph Road is a continuous six-lane cross section with dual left-turn lanes and a dedicated right-turn lane on most approaches.

Future design of US Route 1 will incorporate more detailed design of pedestrian facilities at intersections and specific transit accommodations.

Recommendations for lane configuration at each study intersection were initially developed using Synchro/Highway Capacity Manual (HCM) analysis and further refined using detailed VISSIM microsimulation. Based on these results, all study intersections are expected to operate at acceptable levels of service through the design year 2040. For this reason, the eight-lane alternative was eliminated from consideration. The traffic analysis did not justify the need for the extra capacity, and the additional impact to existing businesses along the corridor was not supported by the project stakeholders.

The recommended build alternative for the interchange of US Route 1 at Russell Road is the hybrid Alternative G, with a signalized intersection west of US Route 1 and a half cloverleaf interchange. This alternative would operate at an acceptable level of service with design year 2040 peak hour traffic based on the results of the Synchro/HCM analysis and the VISSIM microsimulation. It also minimizes the environmental concerns of taking property from Locust Shade Park and satisfies the security requirements of uninterrupted traffic flow in the vicinity of the MCB Quantico Back Gate.

As MCB Quantico continues to expand through Base Realignment and Closure (BRAC) and other programs, TDM initiatives for MCB Quantico personnel should be explored to further mitigate traffic growth in the study area. As the area redevelops, other large employment centers such as Quantico Corporate Center and the Boswell's Corner redevelopment should include TDM as part of their overall transportation strategies.

Continued cooperation will be needed between local jurisdictions, transportation agencies, military organizations, and local citizens in order to move toward implementation of this report's recommendations.