4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

The following sections discuss the direct, indirect (or secondary), and cumulative effects of the project alternatives, which include a No-Action Alternative and 5 Candidate Build Alternatives. Direct effects occur at the same time and place as project implementation. Direct effects include displacements of features or resources within the construction "footprint" of the proposed project (e.g., displacements of homes, businesses, and wetlands) off-site effects resulting from the project (e.g., changes in noise levels, air quality, visual intrusions, and water quality).

Indirect effects do not occur at the same time and place as project implementation, but remain reasonably foreseeable. Indirect effects include induced growth and changes in land use patterns, population density, or growth rates, and related effects on air and water and other natural systems, including ecosystems. Quantifying indirect effects is often difficult due to the inability to foresee relationships between the project and future development, as well as the interplay of factors besides transportation (e.g., overall economic conditions, availability of other infrastructure such as water and sewer systems, growth policies and plans of local governments, and inclinations of individual landowners).

Cumulative effects are incremental consequences of a proposed action that, when added to the consequences of past and reasonably foreseeable actions, affect the same resources. Other actions in the project area include other highway projects and residential, commercial, and institutional development.

As discussed in Chapter 2 (Alternatives), the No-Action Alternative includes all projects that are considered to be reasonably foreseeable. Because the northern extension of the VA Route 234 Bypass and Tri-County Parkway are included in the region's Constrained Long Range Plan, those projects were included in the No-Action scenario and used in the travel demand modeling and traffic simulation processes. However, because locations for these projects have not yet been finalized, the physical impacts directly related to these other projects have not been included in the quantitative analyses in this chapter for the No-Action Alternative. The No-Action alternative does include analyses of impacts that would occur from the continuation of commuter traffic through the Manassas National Battlefield Park.

All of the Candidate Build Alternatives were developed to utilize portions of the 234 Bypass extension and Tri-County Parkway alignments in coordination with local planning efforts and VDOT. Impacts along locations of any Candidate Build Alternatives that are co-located with either the Route 234 Bypass extension and Tri-County Parkway are included in the analyses for each Candidate Build Alternative. The full impacts of the Route 234 Bypass extension are included in the analyses of Candidate Build Alternatives B, D, and G. Partial impacts of the Route 234 Bypass extension are included in Candidate Build Alternatives A and C, since those alternatives would use only a portion of the Route 234 extension. Analyses of Candidate Build Alternatives A, B, C, and D include impacts along areas west of the Park and north of the existing Route 29 where portions of those alignments could be co-located with portions of a Tri-County Parkway Alignment. Analysis of Candidate Build Alternative G includes impacts where portions of those alignments could be co-located with portions of a Tri-County Parkway Alignment located west of the Park and south of the existing Route 29.

4.2 TRAFFIC AND TRANSPORTATION

The traffic and transportation analysis prepared as part of the existing conditions assessment include in Chapter 3 of this DEIS documents the congestion that occurs daily within the Park along Route 29 and Route 234. The analysis shows congested traffic conditions in both the AM and PM peak periods, high volumes of commuter traffic within the Park, highly variable travel speeds due to the congestion, and documents a higher than average percentage of heavy trucks using Routes 234 and 29. The primary purpose of this Draft EIS is to develop alternative means for this traffic now traveling through the Park. In this sense, the analysis is based on an existing problem that occurs daily within the Park.

This section focuses on defining traffic and transportation effects of the various Candidate Build Alternatives that would provide an alternative means of transportation for those commuters now using Routes 29 and 234. All of the analysis is prepared for the future design year of 2025. As will be discussed relative to the No-Action Alternative, there are several transportation improvements that are included in State, local, and regional plans that might aid in accommodating the relocated demand that would result from closing Routes 29 and 234. The following sections provide a comparative analysis of the alternatives.

4.2.1 Travel Demand and Capacity

Forecasting and Assumptions. Travel demand forecasts for the Candidate Build Alternatives, surrounding roadways, and cross-streets were developed using a refined version of the Metropolitan Washington Council of Governments' (COG) regionally approved travel demand model, based on Round 6.2 Cooperative Forecasts of population and employment for the year 2025. As part of the development of the travel demand model all of the Cooperative Forecasts were reviewed in conjunction with local planning officials to ensure that any new developments or changes in land use were included in the population and employment projections. In addition, the model was expanded to include a larger study area that included Fauquier County since some of the early concepts were proposed in that jurisdiction. The refinements were accepted by the Virginia Department of Transportation as part of their Western Transportation Corridor study, which is no longer on-going.

The forecast daily volumes were then assigned to the roadway network using a more detailed sub-area model to produce 2025 daily and peak hour forecasts of mainline, ramp, cross-street, and intersection-turning movement volumes. The assumed roadway network includes all existing roads and all applicable roadway improvements contained in the Constrained Long-Range Plan (CLRP) for the year 2025. **Table 4-1** shows key road improvements listed in the CLRP that were included in the transportation demand model network.

TABLE 4-1: CONSTRAINED LONG-RANGE PLAN IMPROVEMENTS MADE TO MWCOG NETWORK FOR 2025

Interstate 66 Improvements	Including HOV lanes to Route 15 and Gainesville Interchange
Tri-County Parkway	Construct 4 lanes
VA 28	Widen to 6 or 8 lanes, Improve Interchanges
VA 234 Bypass	Widen / Upgrade to Six Lanes (south of I-66)
VA 234 Bypass (North)	Construct 4 Lanes (to Loudoun County)

Since these improvements are all planned prior to 2025 and being pursued independently of the closure of Routes 29 and 234, they are all included in the No-Action Alternative for this analysis and have been included

as coded in the regional transportation demand network without alteration. For the Tri-County Parkway, the location coded in the network is to the east of the Park on what is referred to as the Fairfax County Comprehensive Plan location. For the VA Route 234 North Bypass the location is coded to connect to the proposed relocated Route 659 in Loudoun County.

Travel Demand Volumes

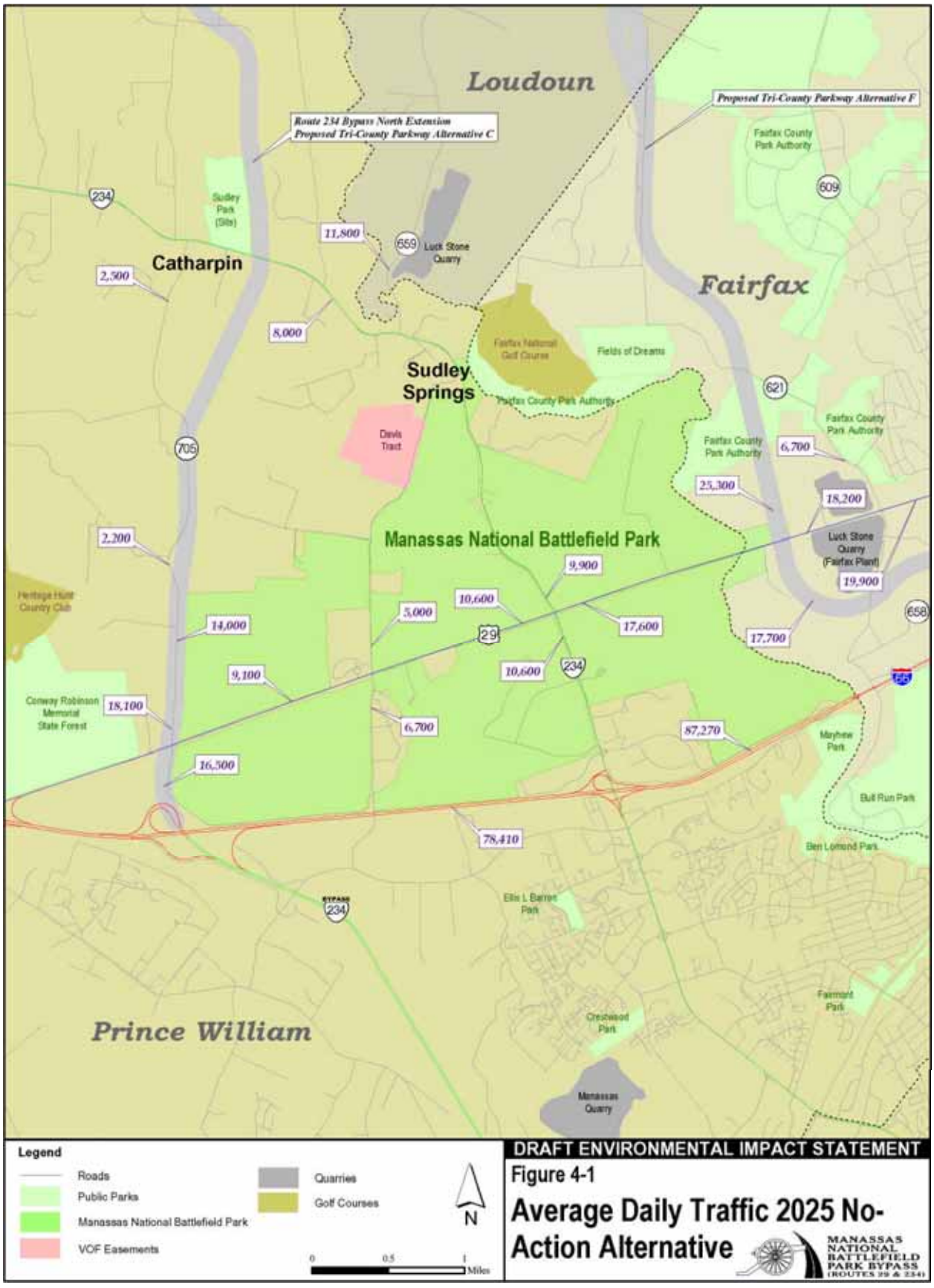
Figures 4-1 through 4-6 show the forecast daily volumes for the No-Action Alternative and the Build Alternatives and transportation network in the vicinity of the Park. As discussed in Chapter 2, all of the Build Alternatives are proposed as limited access, four-lane facilities and are coded as such in the network. As shown in the figures, there is potential for several of the alternatives to overlap segments of the Tri-County Parkway and the Route 234 North Bypass that are included in the No-Action Alternative, and the volumes reflect this over-lapping.

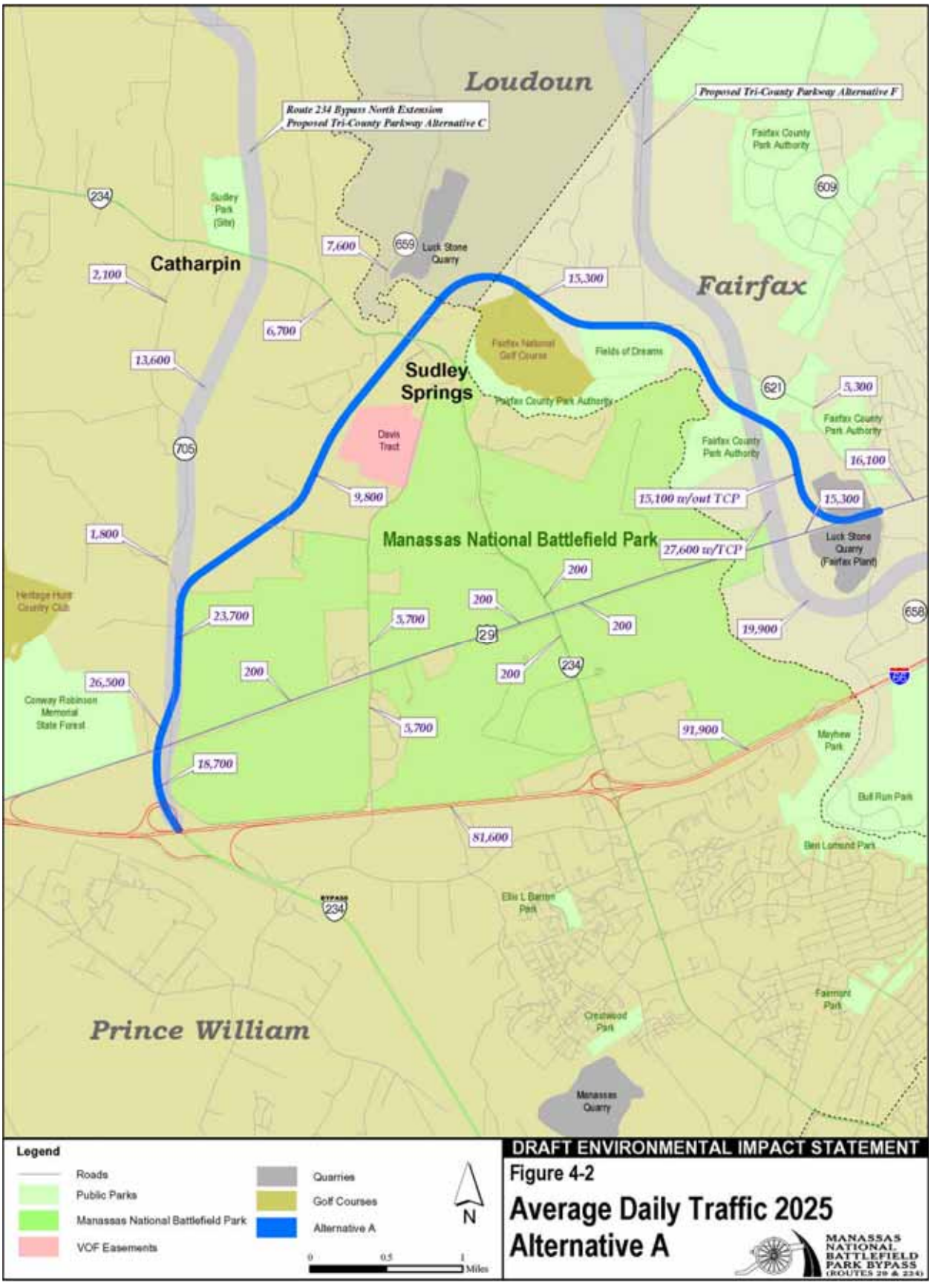
No-Action Alternative. In the No-Action alternative, Routes 29 and 234 would remain open within the Park in their current configuration. The forecasting model assumes that other improvements included in the CLRP and approved by the Transportation Planning Board (TPB) will have been implemented by 2025. As shown in Figure 4-1, there would be approximately 28,000 vehicles per day that used Routes 29 and 234 within the Park. These volumes are similar to existing volumes since these routes are already at their maximum capacity. However, all other two-lane minor collector roads that provide north-south travel such as Route 622 (Featherbed Lane and Groveton Road), Route 659 (Gum Springs Road) and Route 621 (Bull Run Post Office Road) are expected to experience tremendous volume increases over existing conditions. In some cases these increases, such as on Featherbed Lane, are over ten-fold greater than the counts taken in 2002 for this study.

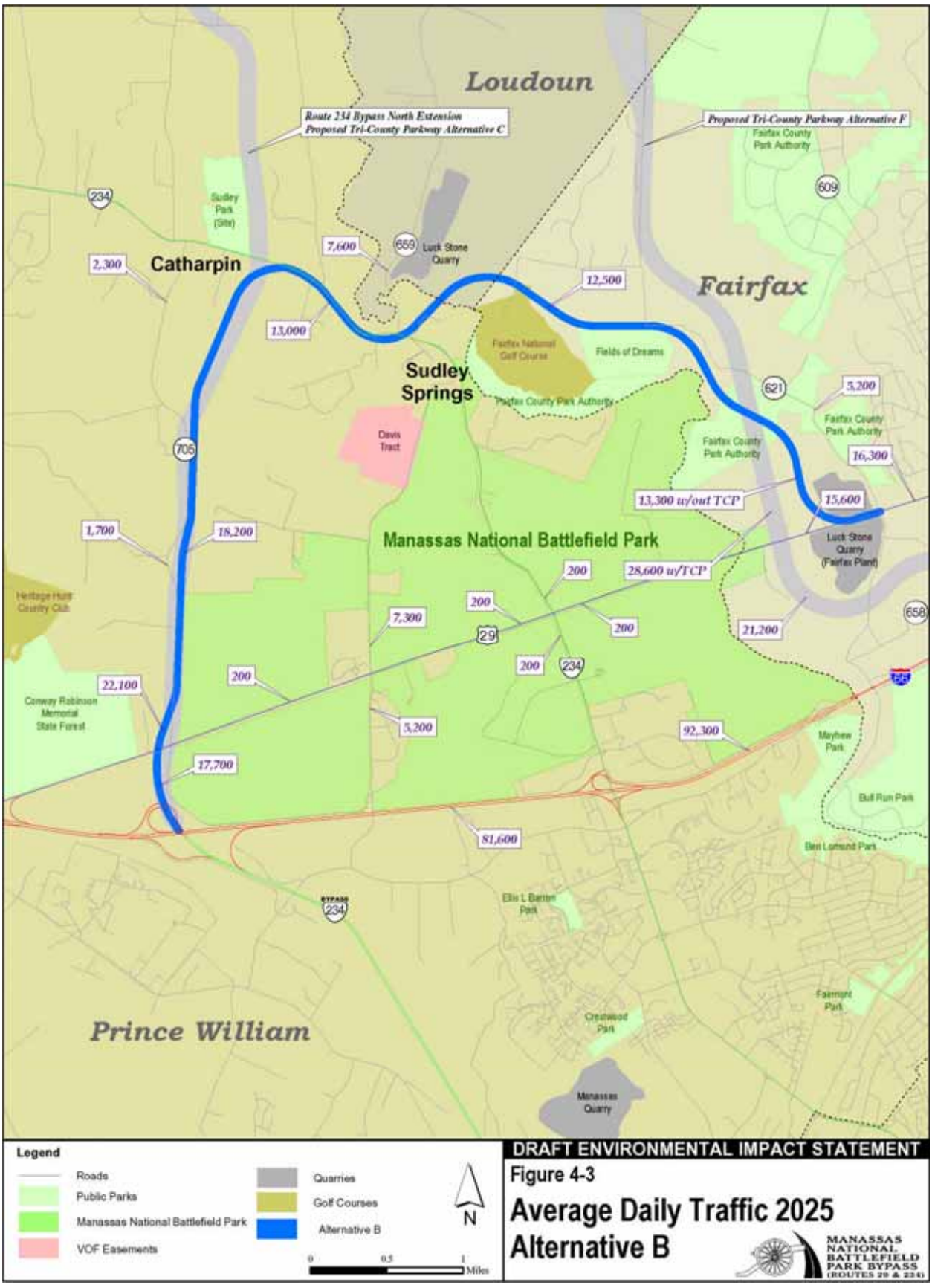
A select link analysis was conducted using the travel demand model to determine the origins and destinations of the traffic on Routes 29 and 234 within the Park. The greatest usage was for trips between Prince William County and Loudoun County. Of the approximately 28,000 trips using both routes, 16% had an origin in Prince William and a destination in Loudoun and 16% had on origin in Loudoun with a destination in Prince William. Of all of the trips using the routes, 32% had origins in Prince William County, 24% in Loudoun County, and 19% in Fairfax County. Longer distance trips with an origin from Fauquier County accounted for 9% of the volumes.

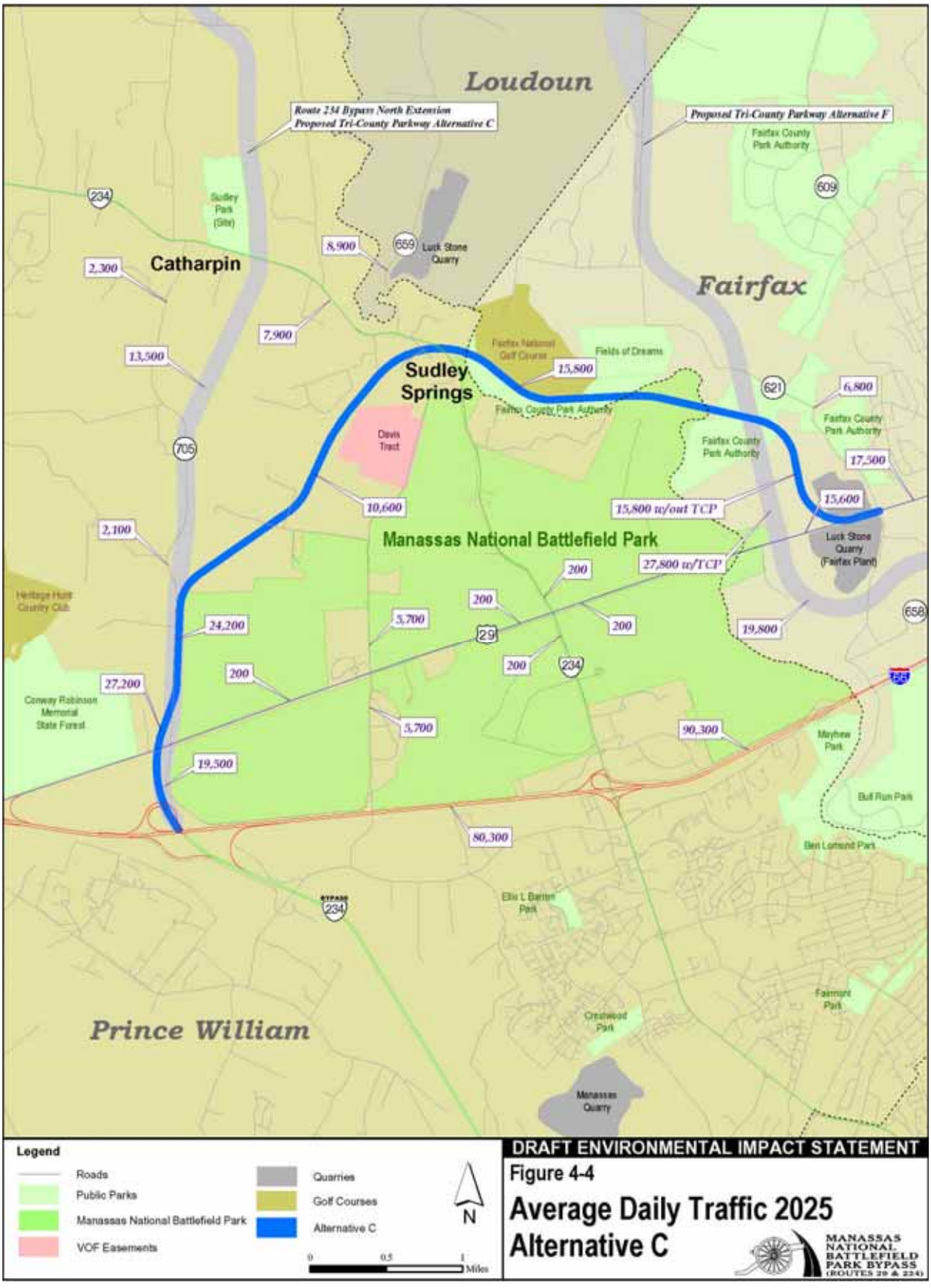
The destinations show a similar pattern with 31% passing through the Park and ending in Prince William, 26% ending in Loudoun, and 21% ending in Fairfax. The other origins and destinations are spread evenly throughout the entire region, including the core area of DC, Arlington, and Alexandria, as well as Maryland. The origin and destination analysis indicated that Routes 29 and 234 serve a variety of local commuting trips for commuters in the three counties that surround the Park.

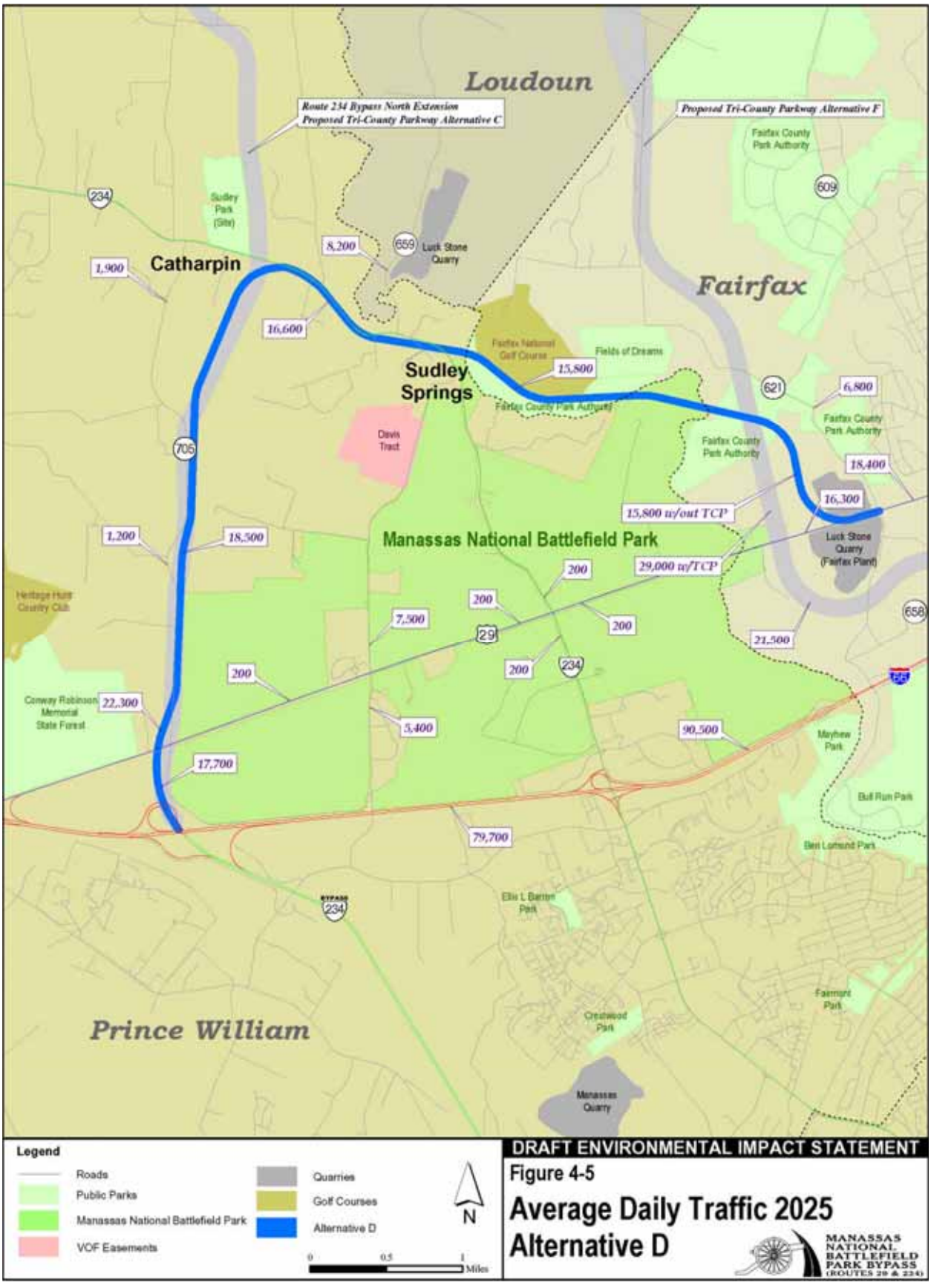
Alternative A. The daily traffic volumes on the mainline of Alternative A vary from 27,600 on a co-located segment of Tri-County Parkway east of the Park to 9,800 along Stony Ridge. The volumes along the sections that do not co-locate are similar to the volumes currently passing through the Park on Routes 29 and 234. Traffic volumes are reduced on Bull Run Post Office Road, Pageland Lane, Business 234 north of the Park and on Gum Springs Road in comparison to the No-Action Alternative. Traffic increases by 3,000 – 4,000 ADT on I-66 in this alternative, as well as on the co-located segments of Tri-County Parkway and Route 234 Bypass North extension.

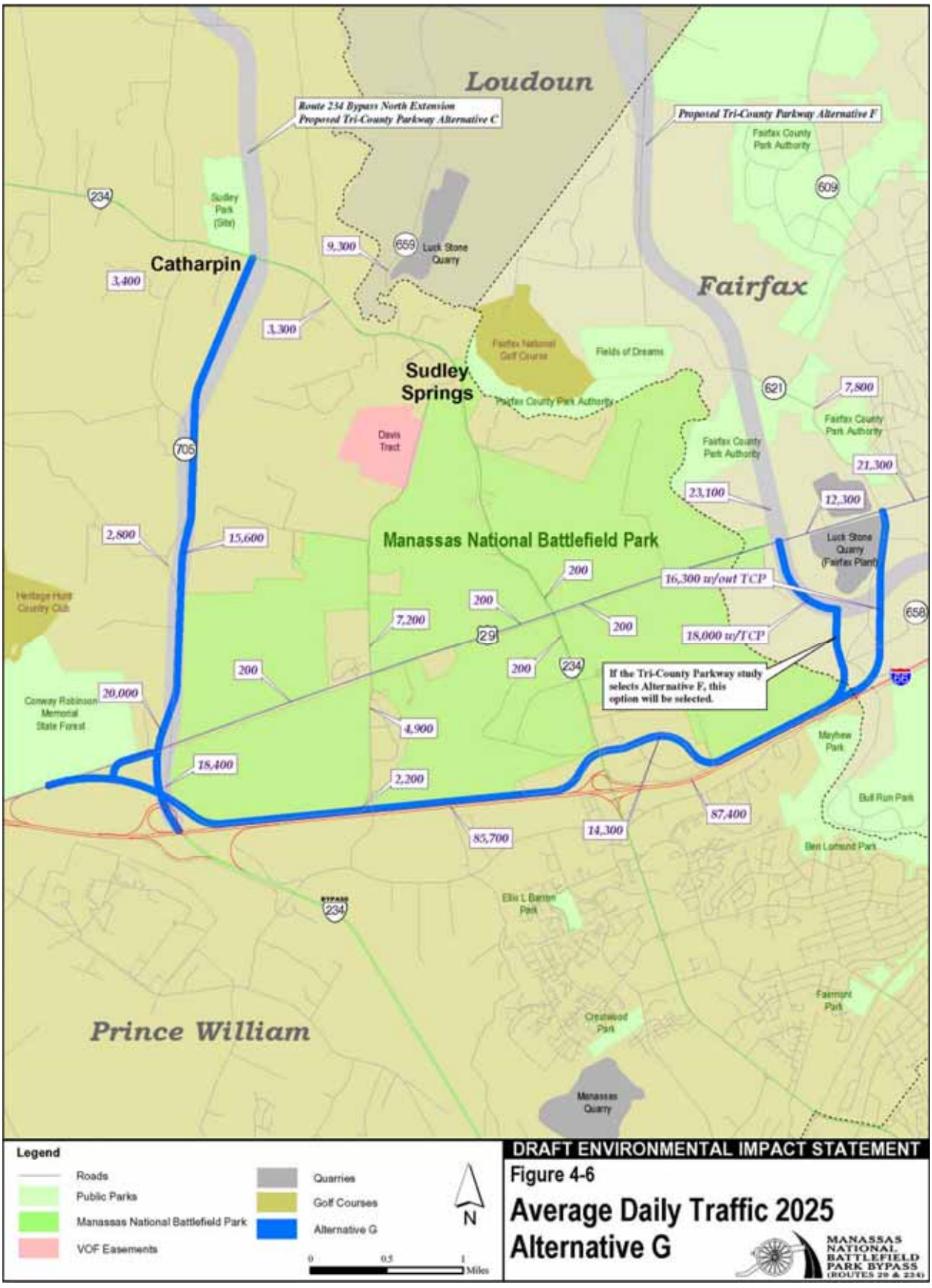

Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Fairfax County Park Authority
609
234
Sudley Park (Site)
11,800
659
Luck Stone Quarry
Catharpin
2,500
8,000
Fairfax
Fairfax National Golf Course
Fields of Dreams
Sudley Springs
Fairfax County Park Authority
621
Davis Tract
705
Fairfax County Park Authority
6,700
25,300
18,200
Fairfax County Park Authority
2,200
Manassas National Battlefield Park
Luck Stone Quarry (Fairfax Plant)
9,900
19,900
Heritage Hunt Country Club
10,600
5,000
658
14,000
29
17,600
17,700
10,600
234
9,100
Conway Robinson Memorial State Forest
18,100
6,700
87,270
Mayhew Park
16,500
Bull Run Park
78,410
Ben Lomond Park
BYPASS
234
Ellis L Barrett Park
Fairmont Park
Crestwood Park
Prince William
Manassas Quarry
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-1
Average Daily Traffic 2025 No-Action Alternative
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Catharpin
Sudley Springs
Fairfax
Manassas National Battlefield Park
Prince William
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Davis Tract
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Luck Stone Quarry (Fairfax Plant)
Mayhew Park
Bull Run Park
Bert Lomond Park
Ellis L Barton Park
Fairmont Park
Crestwood Park
Manassas Quarry
7,600
2,100
6,700
13,600
9,800
1,800
23,700
26,500
18,700
5,700
200
15,300
5,300
16,100
15,100 w/out TCP
27,600 w/TCP
19,900
91,900
81,600
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
Alternative A
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-2
Average Daily Traffic 2025
Alternative A
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Fairfax County Park Authority
609
234
Sudley Park (Site)
659
Luck Stone Quarry
7,600
2,300
Catharpin
12,500
Fairfax
13,000
Fairfax National Golf Course
Fields of Dreams
Sudley Springs
Fairfax County Park Authority
621
5,200
Fairfax County Park Authority
Davis Tract
706
Fairfax County Park Authority
16,300
13,300 w/out TCP
15,600
1,700
18,200
Manassas National Battlefield Park
Luck Stone Quarry (Fairfax Plant)
200
28,600 w/TCP
Heritage Hunt Country Club
200
7,300
200
658
29
21,200
200
234
22,100
200
Conway Robinson Memorial State Forest
5,200
92,300
Mayhew Park
17,700
Bull Run Park
81,600
Bell Lomond Park
BYPASS
234
Ellis L Barton Park
Fairmont Park
Prince William
Crestwood Park
Manassas Quarry
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
Alternative B
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-3
Average Daily Traffic 2025
Alternative B
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Fairfax County Park Authority
609
234
Sudley Park (Site)
8,900
659
Luck Stone Quarry
2,300
Catharpin
Fairfax
7,900
13,500
Fairfax National Golf Course
Fields of Dreams
15,800
Sudley Springs
621
6,800
Fairfax County Park Authority
Davis Tract
705
Fairfax County Park Authority
17,500
15,600
10,600
15,800 w/out TCP
2,100
Manassas National Battlefield Park
27,800 w/TCP
Luck Stone Quarry (Fairfax Plant)
200
200
200
Heritage Hunt Country Club
24,200
5,700
29
19,800
658
200
200
234
27,200
Conway Robinson Memorial State Forest
5,700
90,300
Mayhew Park
19,500
Bull Run Park
80,300
Bert Lomond Park
Ellis L Barton Park
BYPASS
234
Fairmont Park
Crestwood Park
Prince William
Manassas Quarry
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
Alternative C
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-4
Average Daily Traffic 2025
Alternative C
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Fairfax County Park Authority
609
234
Sudley Park (Site)
8,200
659
Luck Stone Quarry
1,900
Catharpin
Fairfax
16,600
Fairfax National Golf Course
Fields of Dreams
15,800
Sudley Springs
621
6,800
Fairfax County Park Authority
Davis Tract
705
Fairfax County Park Authority
18,400
16,300
15,800 w/out TCP
1,200
18,500
Manassas National Battlefield Park
29,000 w/TCP
Luck Stone Quarry (Fairfax Plant)
200
200
200
Heritage Hunt Country Club
7,500
29
658
21,500
200
200
234
Conway Robinson Memorial State Forest
22,300
5,400
90,500
Mayhew Park
17,700
Bull Run Park
Bell Lomond Park
79,700
Ellis L Barton Park
234
Fairmont Park
Prince William
Crestwood Park
Manassas Quarry
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
Alternative D
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-5
Average Daily Traffic 2025
Alternative D
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Route 234 Bypass North Extension
Proposed Tri-County Parkway Alternative C
Proposed Tri-County Parkway Alternative F
Fairfax County Park Authority
609
234
Sudley Park (Site)
9,300
659
Luck Stone Quarry
Catharpin
3,400
3,300
Fairfax
Fairfax National Golf Course
Fields of Dreams
Sudley Springs
Fairfax County Park Authority
621
7,800
Fairfax County Park Authority
Davis Tract
705
Fairfax County Park Authority
21,300
23,100
12,300
2,800
15,600
Manassas National Battlefield Park
Luck Stone Quarry (Fairfax Plant)
200
16,300 w/out TCP
Heritage Hunt Country Club
200
7,200
29
200
18,000 w/TCP
658
200
200
234
If the Tri-County Parkway study selects Alternative F, this option will be selected.
20,000
Conway Robinson Memorial State Forest
4,900
Mayhew Park
18,400
2,200
87,400
85,700
14,300
Bull Run Park
Ben Lomond Park
Ellis L Barton Park
234
Fairmont Park
Crestwood Park
Prince William
Manassas Quarry
Legend
Roads
Public Parks
Manassas National Battlefield Park
VOF Easements
Quarries
Golf Courses
Alternative G
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-6
Average Daily Traffic 2025
Alternative G
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

Alternative B. The projected traffic for Alternative B are similar to those of Alternative A, although those volumes on the non co-located segment are slightly lower (12,500 compared to 15,300). Also, the improved segment of existing Business Route 234 in between Sudley Springs and Catharpin would have higher traffic volumes as part of the Alternative under consideration.

Alternative C. In general, this Alternative has the highest daily traffic volumes along the mainline facility, ranging from a high of 27,800 to a low of 10,600 vehicles and is the shortest in distance. This alternative does not reduce volumes on Bull Run Post Office Road and does not divert as much traffic from Pageland Lane as Alternatives A and B. This Alternative also shifts a lower volume of traffic onto I-66 relative to the previous alternatives.

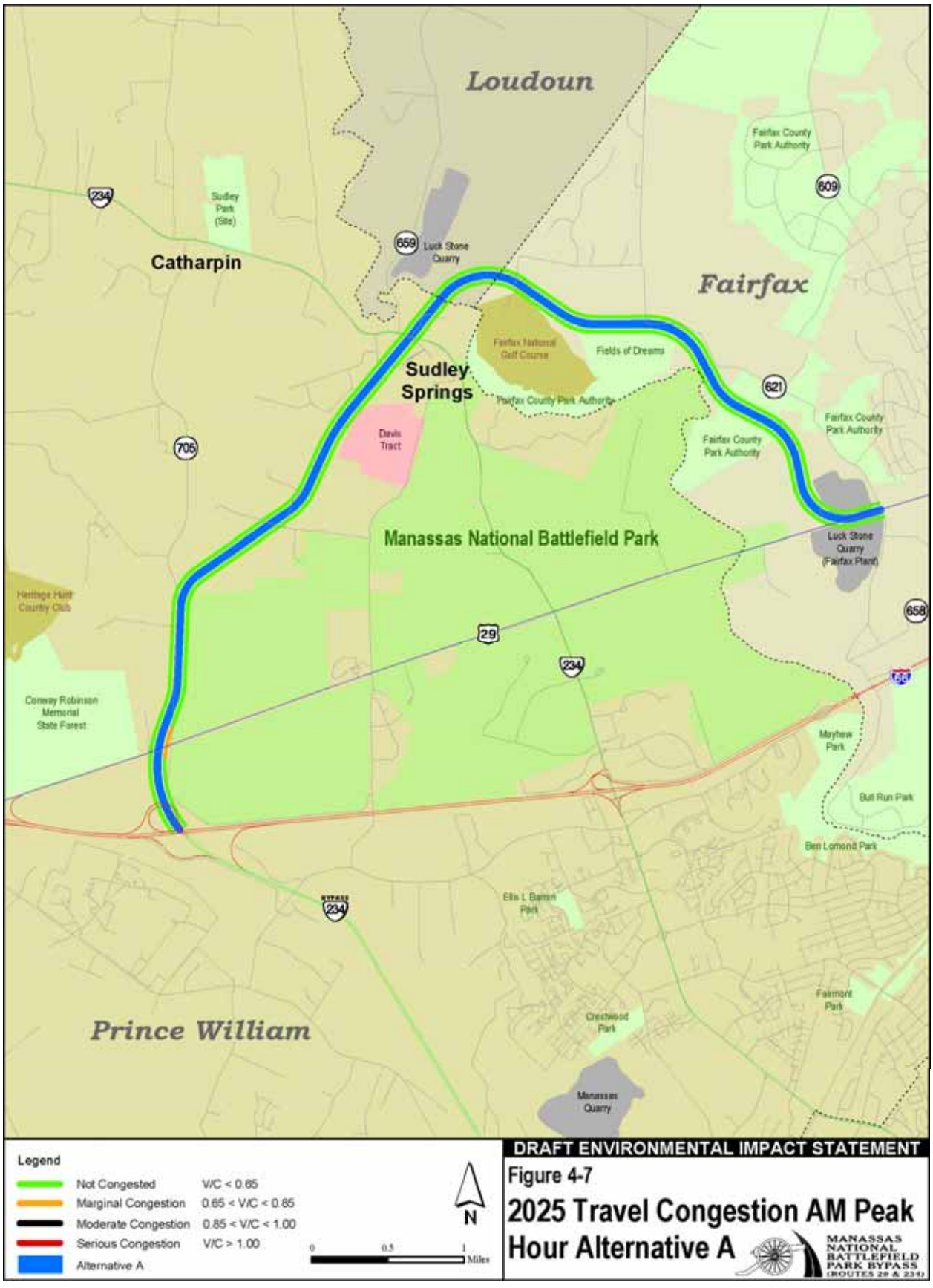
Alternative D. This alternative has similar traffic volumes as Alternative A, although it attracts slightly more trips on the segment from Route 29 east of the Park to Catharpin. This Alternative diverts the most traffic from Pageland Lane, although it increases volumes on Featherbed Lane in comparison to the No-Action Alternative. This Alternative also shifts lower volumes of traffic to I-66 than the other alternatives.

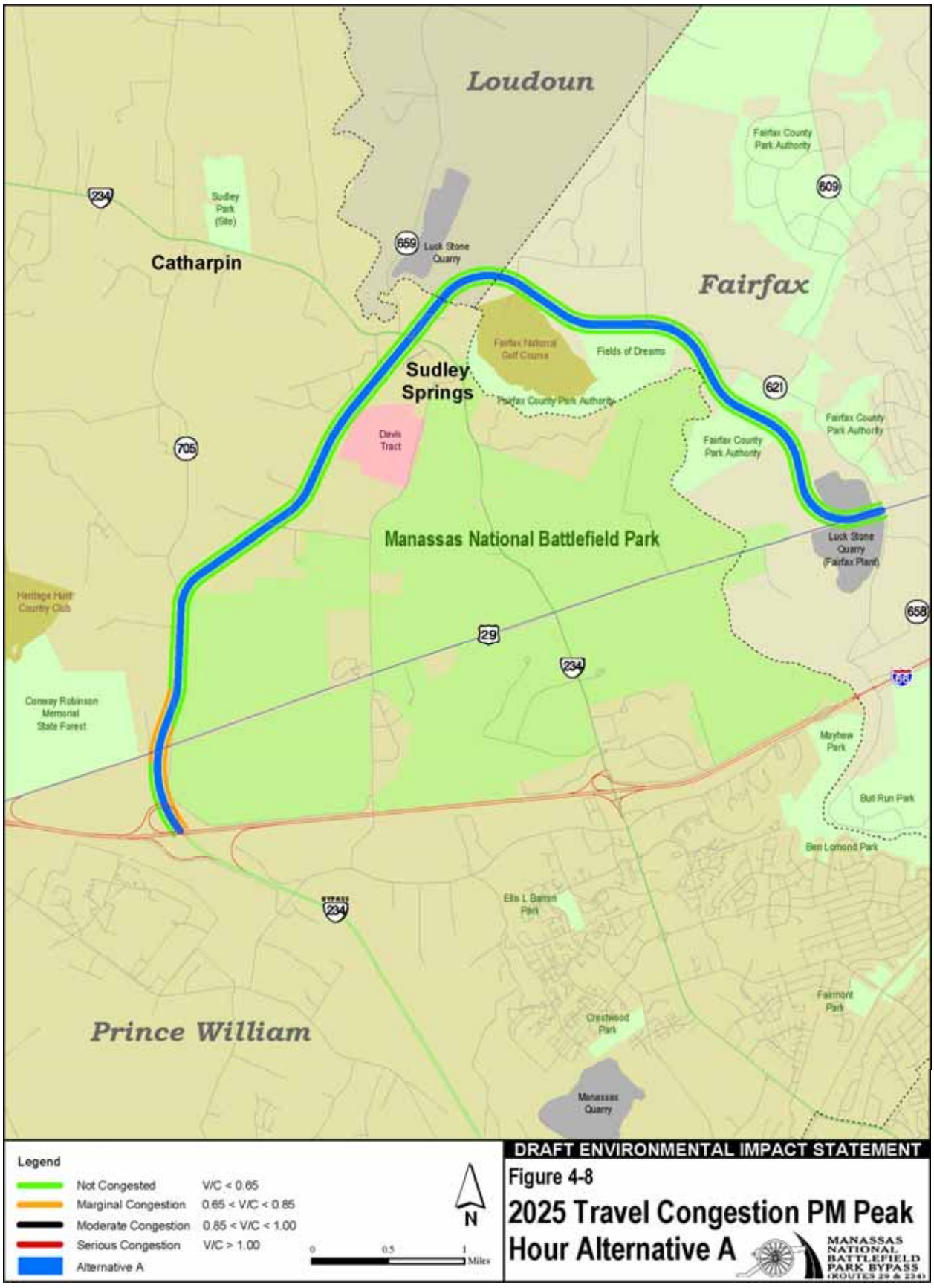
Alternative G. Alternative G has different traffic operations than the northern alternatives under consideration. The volumes and turning movement calculations presented in the following section indicate that Alternative G operates as more of a bypass for congested portions of I-66, particularly in the PM peak period. Thus, the volumes on the section of Alternative from Route 29 east of the Park to Business Route 234 are substantially higher than volumes (14,300 – 16,300) on Alternative G west of the Business Route 234 (2,200). Most of the volume reduction is due to traffic diverting onto I-66 at the intersection with Business Route 234. Since Alternative G also does not provide access to the north of the Park, several of the local north-south routes are projected to experience a traffic increase over the No-Action Alternative, including Pageland Lane, Featherbed Lane, and Bull Run Post Office Road.

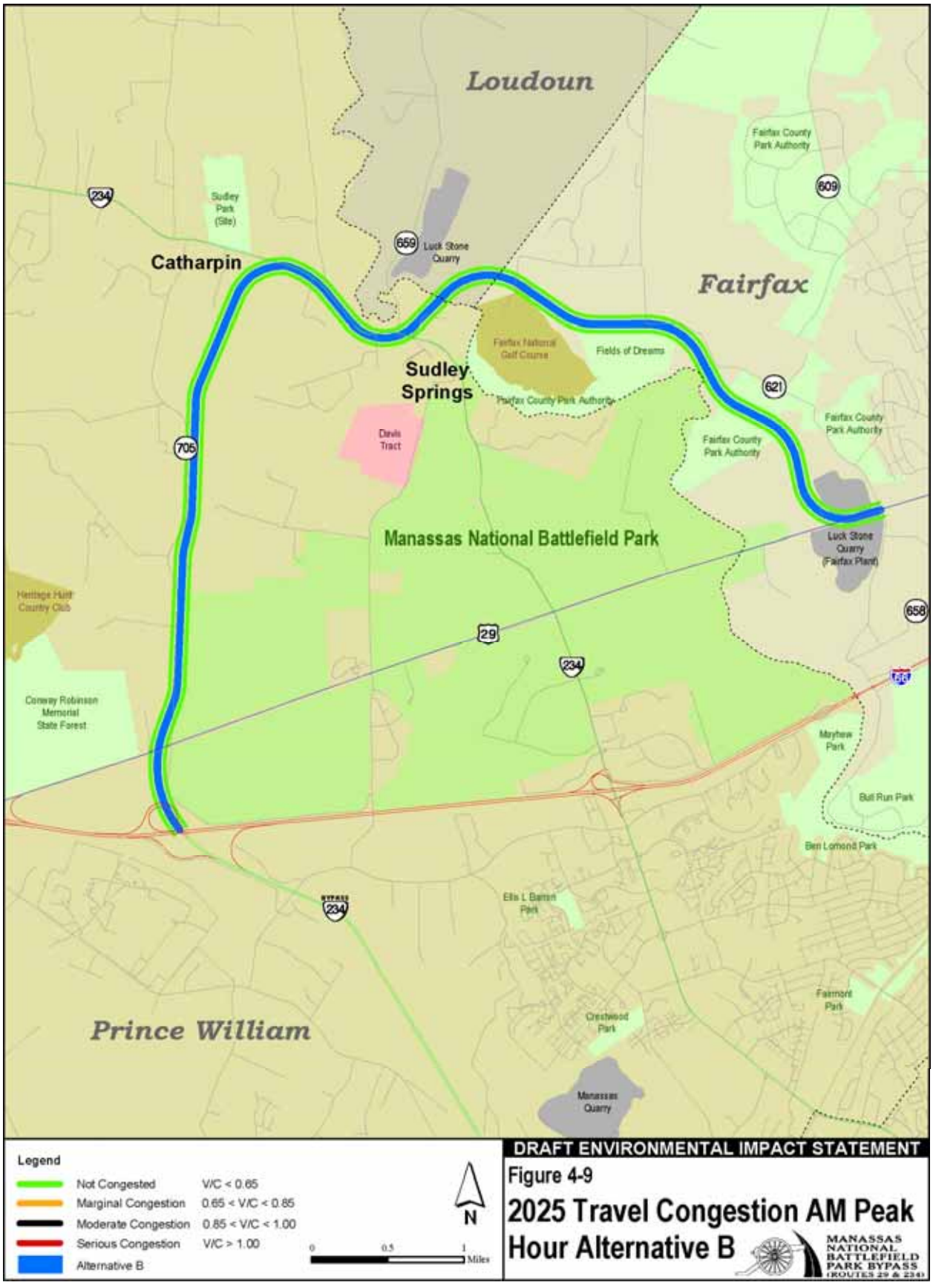
4.2.2 Operational Analysis

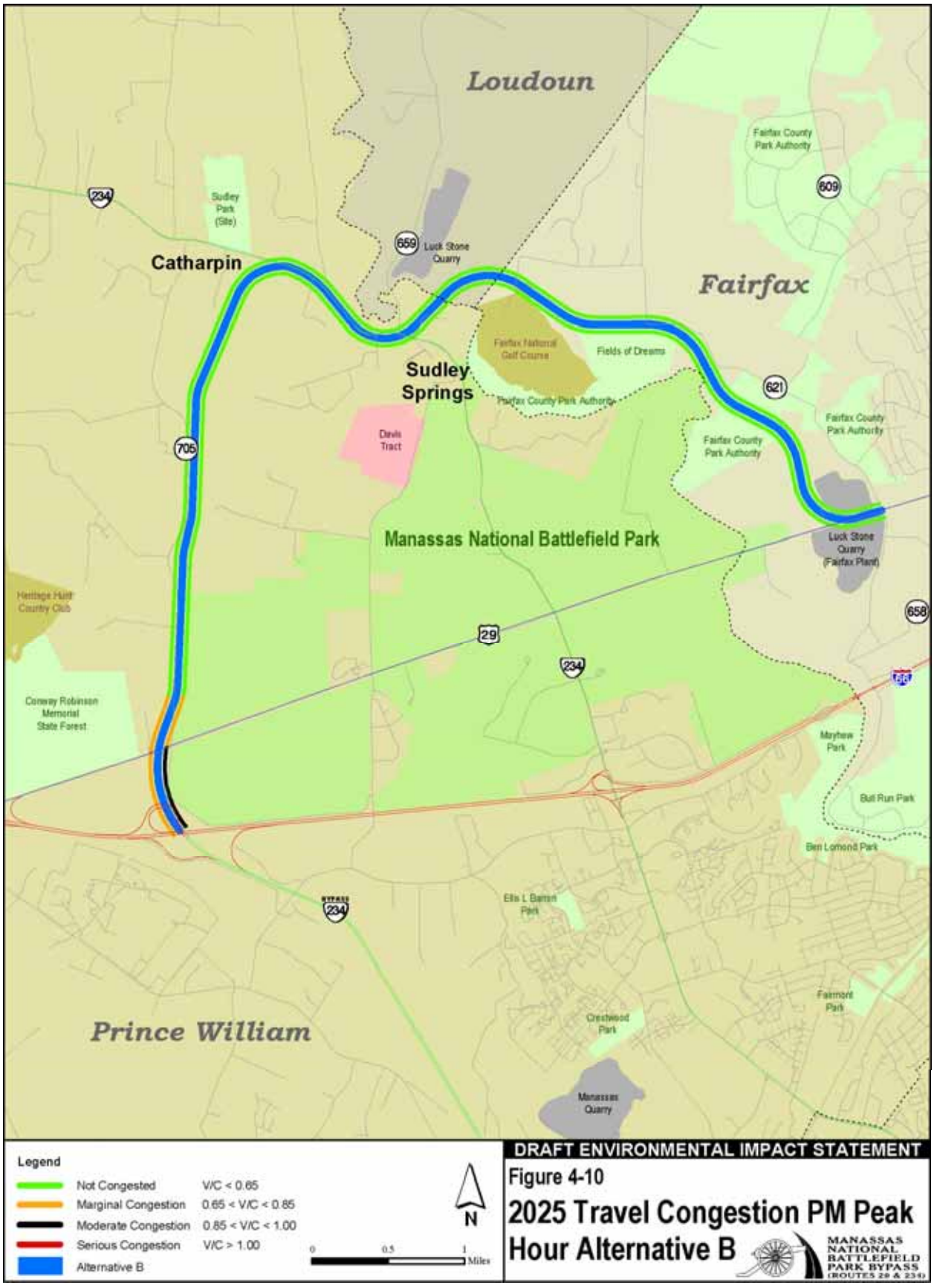
All traffic capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: *Highway Capacity Manual (HCM), 1997*. These procedures include evaluating traffic conditions based on the concept of levels of service (LOS). Levels of service range from A (best) to F (worst). For the mainline segments a volume to capacity (V/C) ratio has been developed to assess the operational performance. The V/C ratio can be generally equated to LOS standards for the various roadways in the study area. **Figures 4-7 through 4- 16** show the mainline V/C ratios and their corresponding operational performance in LOS terms. The V/C ratios have been determined using the travel demand model and compare the volumes projected in the AM and PM peak periods to the capacity provided by each of the alternatives.

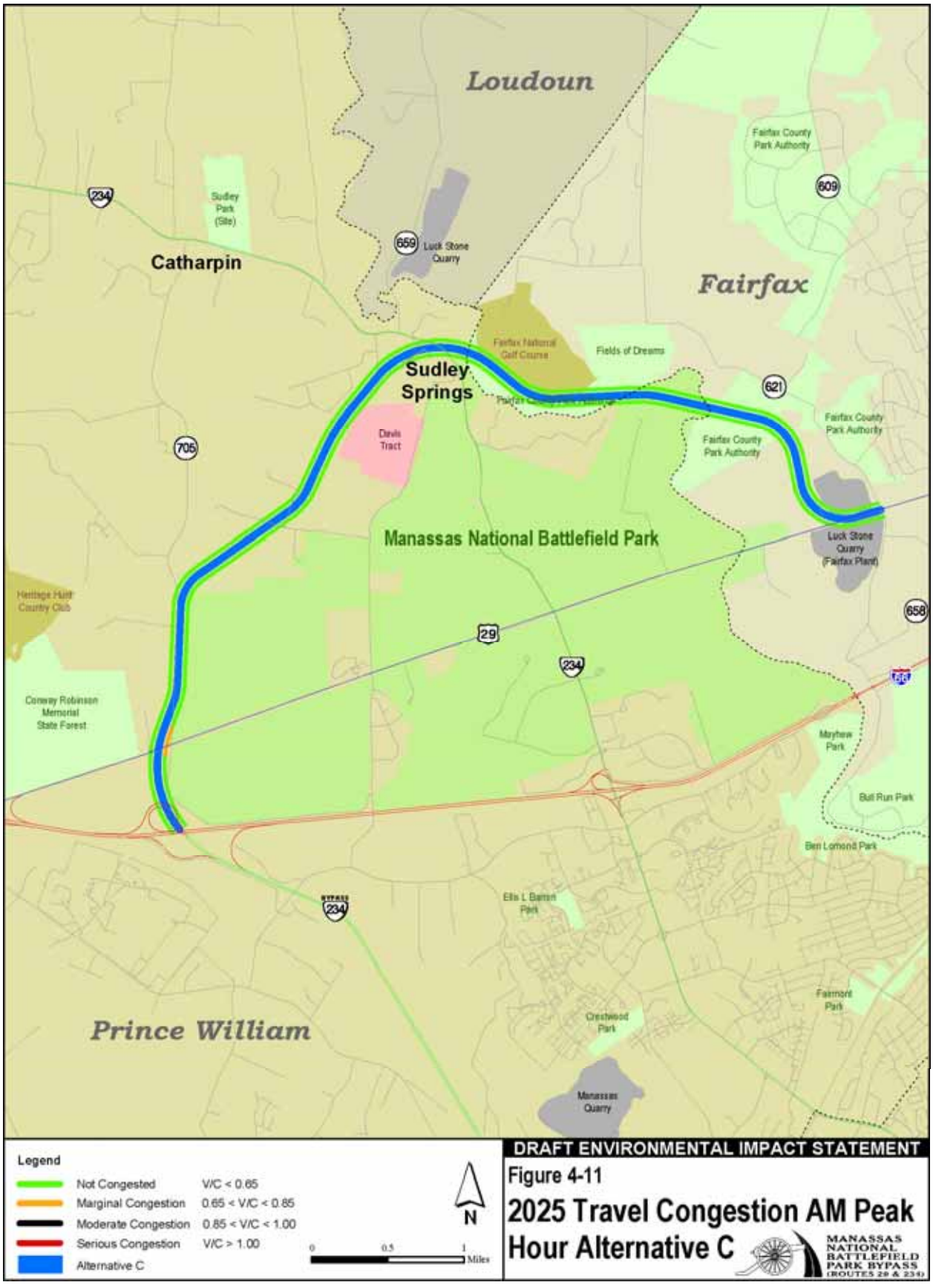
In general, most of the Candidate Build Alternatives experience little mainline congestion in the AM and PM peak periods. Alternative A is projected to operate with little to no congestion in both the AM and PM peak periods. Alternatives B and D have a short segment from I-66 to Route 29 in the northbound direction that is projected to operate at moderate congestion only in the PM peak period. Alternative C is projected to have moderate congestion on the same segment as above, but congestion in both directions in the PM peak period is projected. In all instances, this segment would be part of a co-location with the Route 234 North Bypass and could be easily mitigated by providing additional turning capacity at Route 29. Alternative G is projected to experience moderate congestion in the AM peak period and serious congestion in the PM peak period. As discussed above, since Alternative G is located in such close proximity to I-66 it is operating as a bypass to that

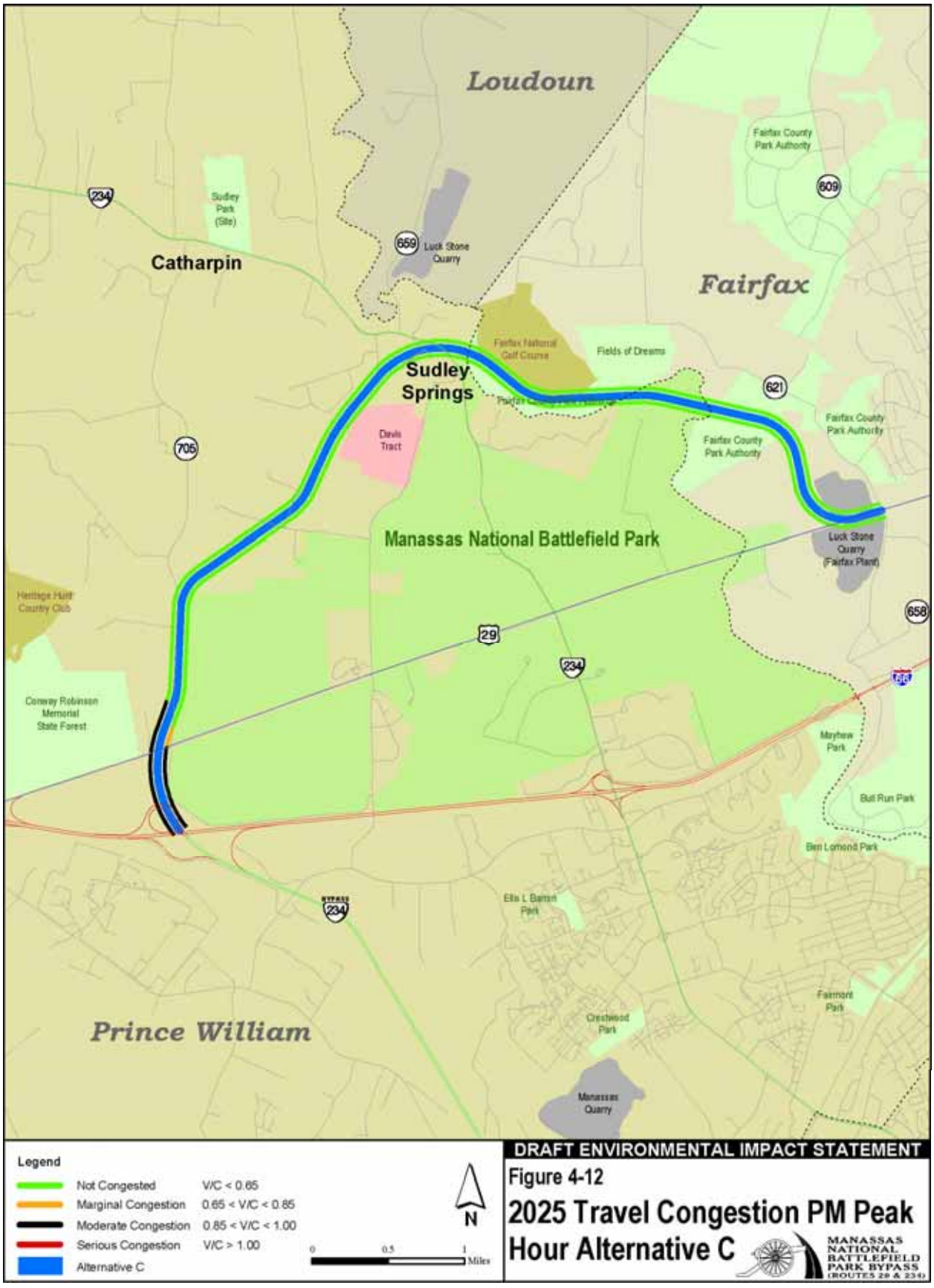

Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
609
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative A
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-7
2025 Travel Congestion AM Peak Hour Alternative A
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

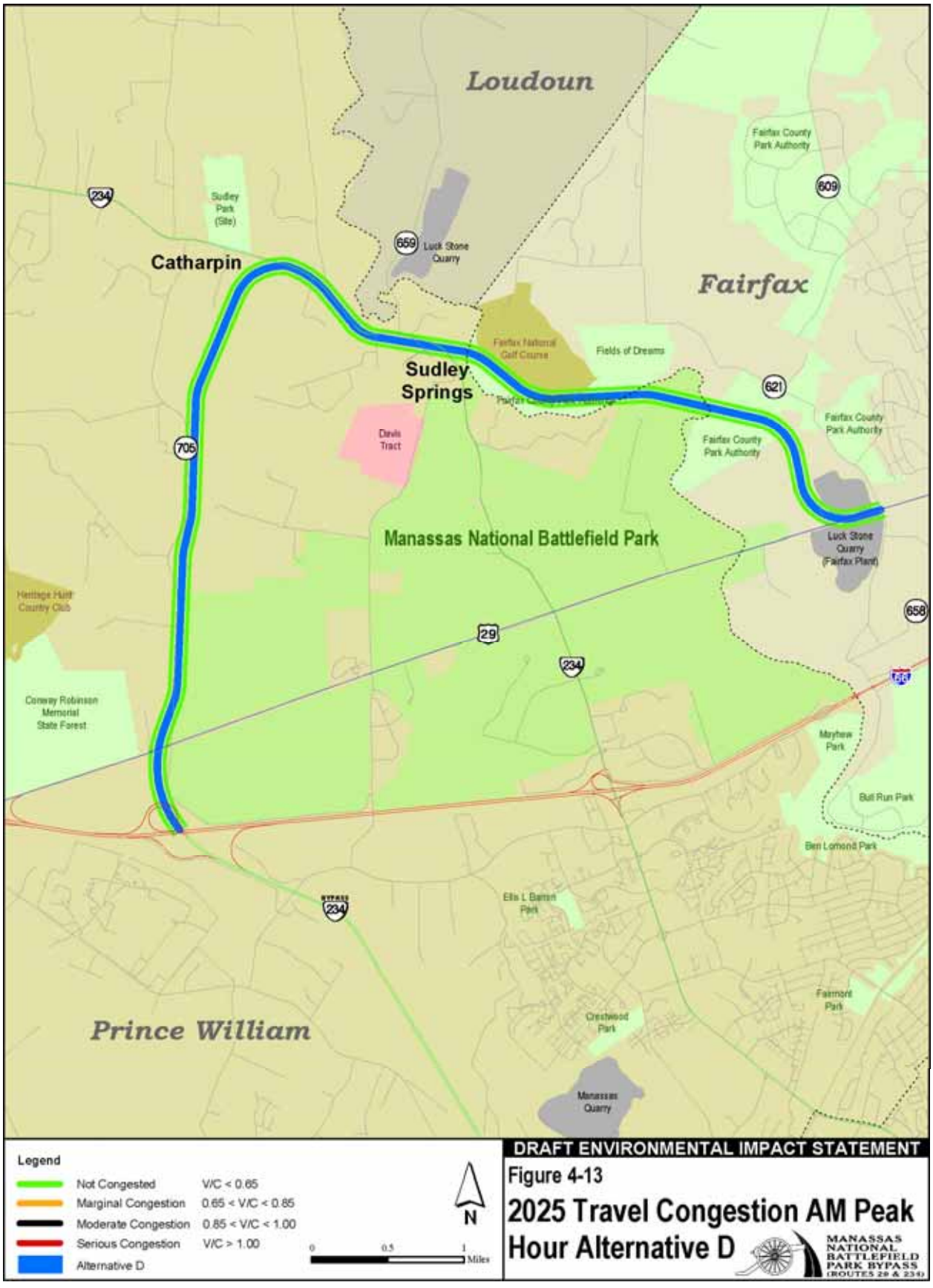

Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
609
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative A
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-8
2025 Travel Congestion PM Peak Hour Alternative A
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

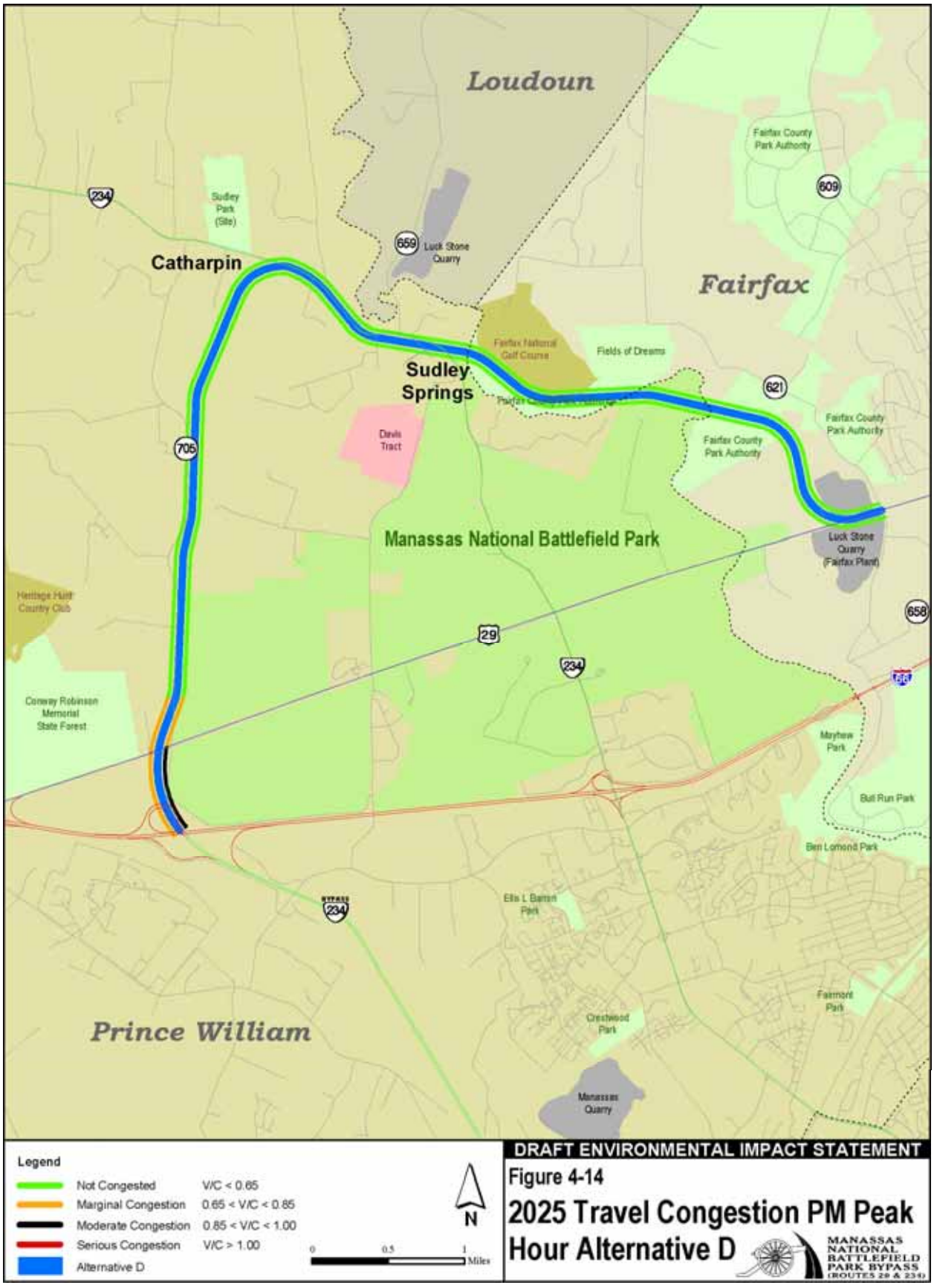

Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
659
609
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative B
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-9
2025 Travel Congestion AM Peak Hour Alternative B
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
609
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative B
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-10
2025 Travel Congestion PM Peak Hour Alternative B
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Davis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barton Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
609
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative C
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-11
2025 Travel Congestion AM Peak Hour Alternative C
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barton Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
659
609
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative C
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-12
2025 Travel Congestion PM Peak Hour Alternative C
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
609
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative D
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-13
2025 Travel Congestion AM Peak Hour Alternative D
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Devis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barton Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
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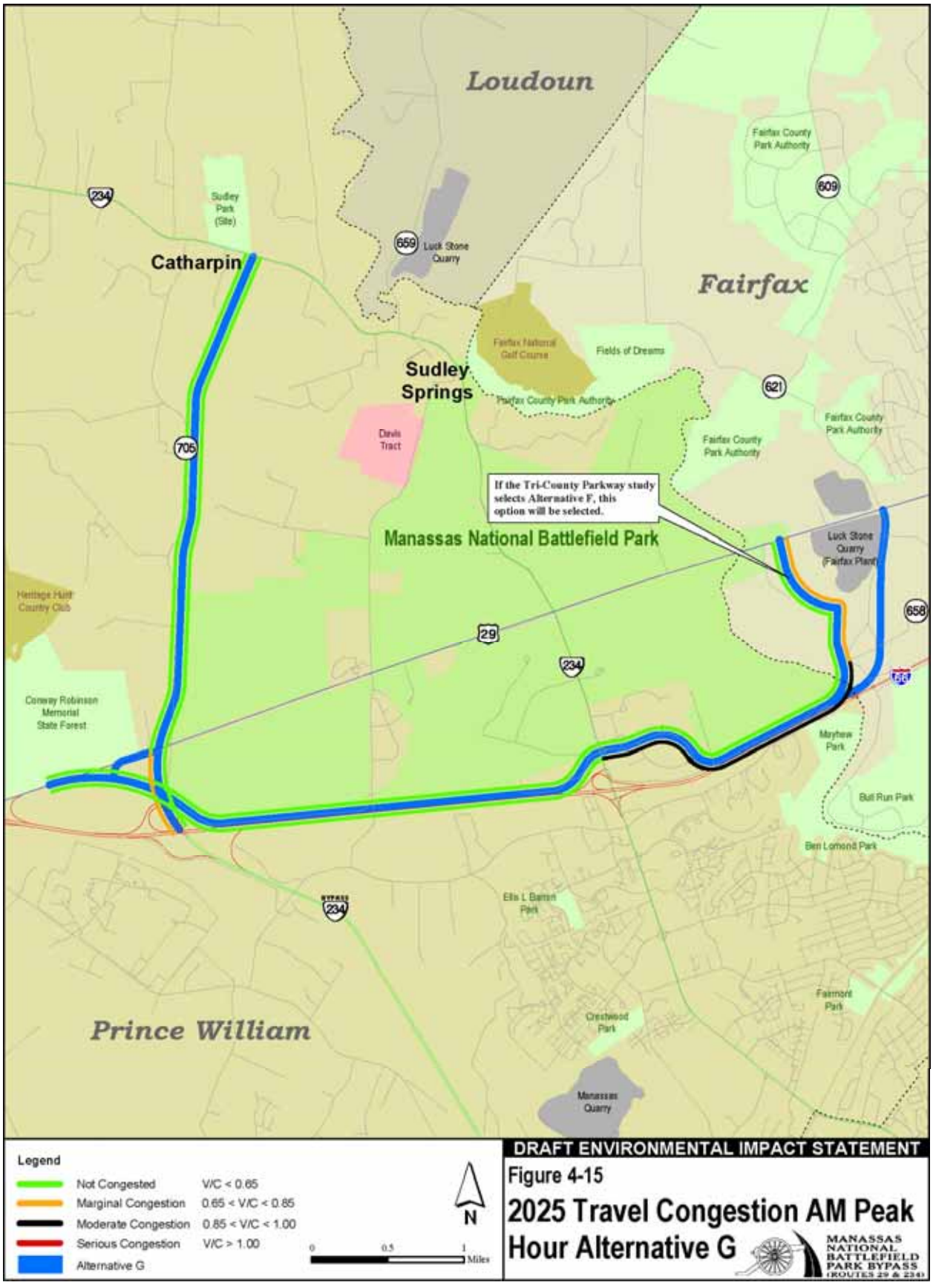
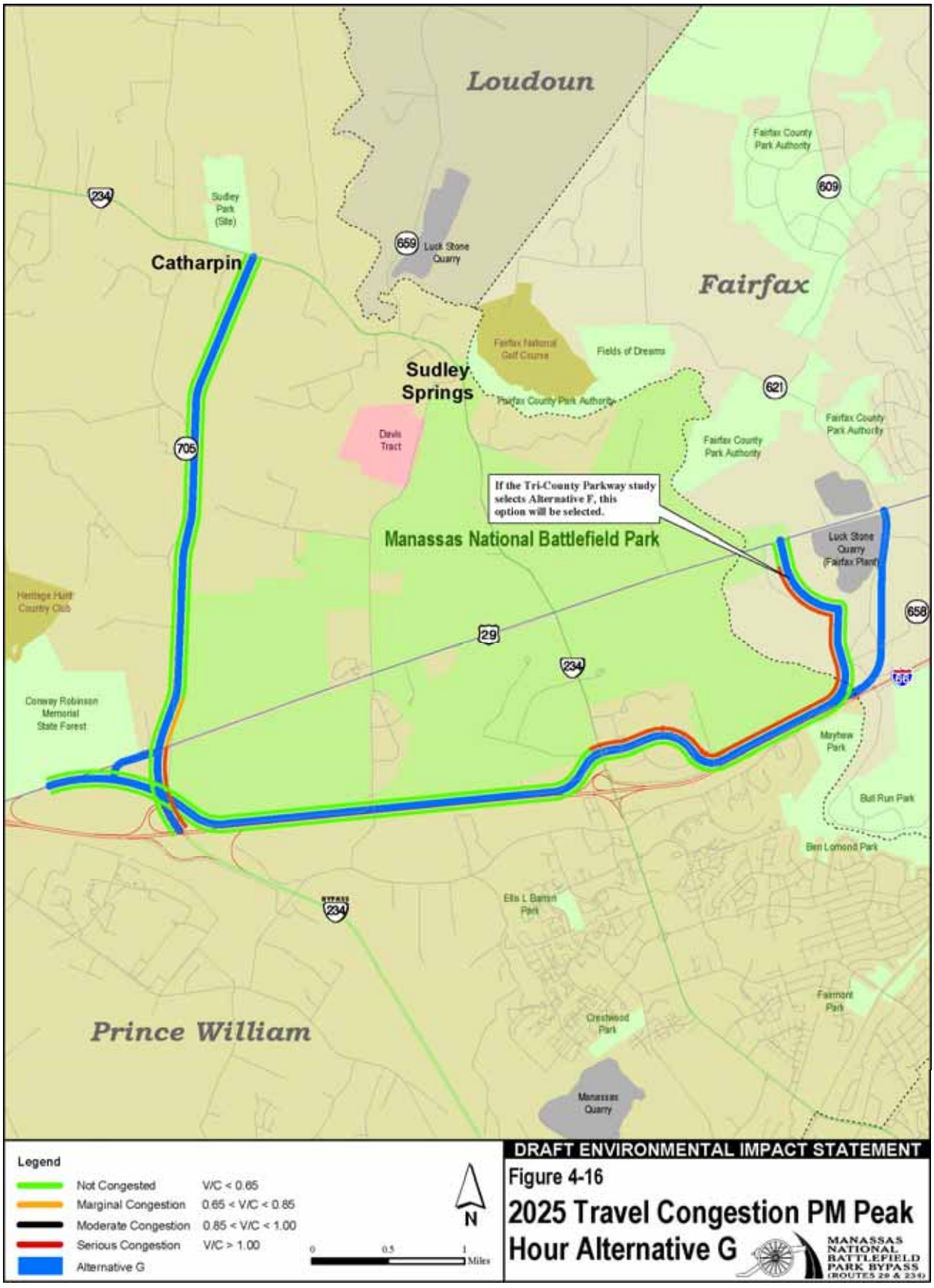
659
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative D
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-14
2025 Travel Congestion PM Peak Hour Alternative D
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
If the Tri-County Parkway study selects Alternative F, this option will be selected.
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Davis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barton Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
659
609
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative G
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-15
2025 Travel Congestion AM Peak Hour Alternative G
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
If the Tri-County Parkway study selects Alternative F, this option will be selected.
Sudley Park (Site)
Luck Stone Quarry
Fairfax National Golf Course
Fields of Dreams
Fairfax County Park Authority
Davis Tract
Luck Stone Quarry (Fairfax Plant)
Heritage Hunt Country Club
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L Barnes Park
Fairmont Park
Crestwood Park
Manassas Quarry
234
659
609
621
705
29
658
66
Legend
Not Congested V/C < 0.65
Marginal Congestion 0.65 < V/C < 0.85
Moderate Congestion 0.85 < V/C < 1.00
Serious Congestion V/C > 1.00
Alternative G
0 0.5 1 Miles
N
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-16
2025 Travel Congestion PM Peak Hour Alternative G
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

facility and thus, is attracting more traffic than the four-lane facility and intersection at Business Route 234 can handle.

An analysis of travel times was also conducted for each of the alternatives. As discussed in Chapter 3 of this DEIS, travel times are negatively affected by the congestion that occurs within the Park. For example, in the observed travel time runs conducted in 2002, there was an average delay of over 12 minutes in the AM peak period on Route 29 heading towards DC. An analysis was conducted using the travel demand model to test projected travel times comparing projected times with uncongested or free-flow travel times. **Table 4-2** shows the results of the analysis.

TABLE 4-2: TRAVEL TIME ESTIMATES

	Travel Time AM (min)		Travel Time PM (min)		Travel Time AM (min)		Travel Time PM (min)	
	Gainesville to Rte 621		Rte 621 to Gainesville		Catharpin to I-66		I-66 to Catharpin	
Alternative	**AM Peak**	**Free Flow**	**PM Peak**	**Free Flow**	**AM Peak**	**Free Flow**	**PM Peak**	**Free Flow**
No Build	15.13	7.35	16.46	7.35	9.53	8.33	10.53	8.47
A	15.87	11.60	15.39	11.60	9.32	8.33	10.53	8.47
B	18.07	13.68	17.78	13.68	9.31	8.33	10.40	8.47
C	15.78	11.11	16.46	11.11	9.29	8.33	10.54	8.47
D	17.95	12.88	19.75	12.88	9.14	8.33	10.09	8.47
G	14.67	9.67	19.35	9.67	9.75	8.33	11.10	8.47

In reviewing the data in Table 4-2 it is important to note that the results are derived from a model analysis of future conditions in the study area and some of the movements are in fact, less than existing levels of delay calculated in 2002. As such, they should be considered conservative estimates, since the traffic analyses indicates that the level of congestion within the Park should not decrease in future years. The analysis indicates that travel times would be similar to what would be experienced if the roads remained open within the Park even though all of the alternatives are longer in distance than the routes through the Park. This is due to the delay projected as a result of the continuing congestion within the Park.

For the Gainesville to Bull Run Post Office Road analysis (basically eastbound on US 29) Alternative G would be projected to reduce travel times. Alternative B would increase travel times by almost three minutes as one of the more circuitous routes. In the westbound direction Alternatives A and C would either have the exact travel time or reduce it slightly. Alternative D would increase travel time the most, followed by Alternative G. In the AM peak period travel time on Route 234 would be decreased on all of the northern alternatives in comparison to the No-Action Alternative. Only Alternative G would increase travel time, but not significantly. All have similar PM peak period travel times, although Alternative D would be the fastest.

Operational analyses were also prepared for intersection within the study area. A brief description of each level of service for signalized and unsignalized intersections is provided below:

Level of Service at Signalized Intersections: Level of service (LOS) at signalized intersections is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection, and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- LOS A describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- LOS B describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of delay.
- LOS C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures (where all waiting vehicles do not clear the intersection during a single green time) may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- LOS D describes operation with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures are noticeable. This is generally considered the lower end of the range of acceptable levels of service in urban areas.
- LOS E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions (at capacity).
- LOS F describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

Level of Service at Unsignalized Intersections: At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left-turning traffic depends on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting (i.e.: against traffic) turn. The level of service grade that is provided for each conflicting movement at an unsignalized intersection is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the result from this analysis usually indicates worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- LOS A describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.

- LOS B describes operations with average total delay in the range of 10.1 to15.0 seconds per vehicle.
- LOS C describes operations with average total delay in the range of 15.1 to 25.0 seconds per vehicle.
- LOS D describes operations with average total delay in the range of 25.1 to35.0 seconds per vehicle.
- LOS E describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- LOS F describes operations with average total delay of 50 seconds or more per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a vehicle on a side street to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

Signalized Intersections

Table 4-3 summarizes the existing baseline traffic operations at the signalized intersections within the study area during the critical AM and PM peak hours. All analyses were prepared using Synchro Version 5 software, which is based on methods compatible with the Highway Capacity Manual guidelines mentioned earlier. The traffic signal timings used in the analysis for the following intersections were obtained either from VDOT files or from field observations during peak hour periods.

TABLE 4-3: SIGNALIZED LEVELS OF SERVICE, PEAK HOUR LOS (AVG DELAY / VEHICLE, SECONDS)

Intersection	No-Action		Alternative A		Alternative B		Alternative C		Alternative D		Alternative G	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Rte 29 & TCP	E (72.6)	E (73.6)	C (33.0)	C (27.4)	C (25.8)	C (33.1)	E (58.0)	D (46.5)	D (38.8)	E (71.4)	B (17.4)	D (46.8)
Rte 234 Bus & Rte 234 Bypass	C (27.8)	D (36.1)	C (20.8)	E (57.3)	C (32.6)	E (71.4)	C (20.3)	E (58.1)	D (46.5)	F (119.5)	B (16.6)	B (19.6)
Rte 29 & Rte 234 Bypass	D (38.7)	D (45.6)	C (24.6)	B (17.4)	C (21.0)	B (15.1)	C (21.4)	D (40.7)	C (20.7)	C (30.2)	C (21.8)	C (31.6)
Battleview & Rte 234 Bus	A (9.3)	B (17.0)	A (5.5)	A (9.4)	A (5.6)	A (9.5)	A (4.8)	B (10.1)	A (4.8)	B (10.1)	B (13.0)	F (111.1)
Rte 29 & I-66 EB Ramp	F (191.4)	C (20.2)	E (66.2)	A (1.3)	E (65.3)	A (1.5)	E (66.1)	A (1.4)	D (53.3)	A (2.7)	D (48.6)	A (1.4)
Alternative & TCP	N/A	N/A	B (15.1)	E (55.1)	B (19.3)	E (70.5)	C (20.0)	D (46.5)	C (33.4)	F (93.0)	N/A	N/A
Alt B/D & Rte 234 Bus	N/A	N/A	N/A	N/A	B (10.1)	A (6.0)	N/A	N/A	B (12.6)	D (49.2)	N/A	N/A
Alt A/C & Rte 234 N Bypass	N/A	N/A	B (10.9)	C (26.6)	N/A	N/A	C (33.8)	C (33.8)	N/A	N/A	N/A	N/A
Alt A/C & Rte 234 Bus EB Ramp	N/A	N/A	D (43.4)	A (7.5)	N/A	N/A	D (37.4)	A (8.3)	N/A	N/A	N/A	N/A

TABLE 4-3: SIGNALIZED LEVELS OF SERVICE, PEAK HOUR LOS (AVG DELAY / VEHICLE, SECONDS)

Intersection	No-Action		Alternative A		Alternative B		Alternative C		Alternative D		Alternative G	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Alt A/C & Rte 234 Bus WB Ramp	N/A	N/A	A (3.2)	A (4.9)	N/A	N/A	A (2.7)	A (5.5)	N/A	N/A	N/A	N/A
Alt G & Route 29 (East of Park)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	A (9.3)	A (9.6)

As Table 4-3 shows, a number of the intersections operate at acceptable levels of service (LOS D or better) during both AM and PM peak traffic hours. However, three of the signalized intersections analyzed will not operate at acceptable levels of service without capacity enhancements. The Route 29 and Tri-County Parkway intersection (assuming the alternative for Tri-County is located to the east of the Park as included in the No-Action Alternative) is projected to operate at LOS E in the No-Action and in the peak periods for Alternatives C and D, although the average delay is improved under both Alternatives C and D. An additional turning lane would accommodate the projected capacity and would be assessed in the design phase, depending on the outcome of the TCP DEIS process. All of the northern alternatives would experience congested conditions at the intersection of the proposed Route 234 Bypass North extension and the existing Route 234 Business intersection. This capacity could be accommodated by additional turning lanes or the consideration of grade separation at this location, but would need to be addressed once a definite location decision has been made for the Route 234 Bypass North. Alternatives A, B and D also would experience congestion at their connection with the Tri-County Parkway eats of the Park. An additional turning lane would be enough to mitigate this congestion. Finally, the intersection of Alternative G and Battleview Parkway would operate at LOS F in the PM peak period, due to the demand for left-turns at this location. The only method to mitigate this congestion would be to restrict movements at this location or design grade-separated facilities that would result in additional impacts including displacements and the potential re-design of the I-66 interchange as well.

Unsignalized Intersections

The unsignalized intersections in the Park were also analyzed to identify any locations with capacity deficiencies. The results are presented in **Table 4-4**.

TABLE 4-4: UNSIGNALIZED LEVELS OF SERVICE

Intersection	No-Action		Alternative A		Alternative B		Alternative C		Alternative D		Alternative G	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Rte 29 and Rte 621	F	F	F	F	F	F	F	F	F	F	F	F
Rte 29 and Rte 622	D	C	B	B	B	B	B	B	B	B	B	B
Rte 29 and Rte 705	C	E	B	E	B	F	B	F	B	D	B	F
Rte 234 Bus and Rte 659	F	F	F	F	C	E	F	F	C	E	F	D

In all cases, including the No-Action Alternative the intersection of Route 29 and Route 621 (Bull Run Post Office Road) is projected to fail, indicating that a signal is warranted at this location. All of the alternatives improve operations at Route 29 and Route 622 (Featherbed Lane) since traffic is restricted from Route 29 within the Park. All of the alternatives except Alternative D also fail at Route 29 and Route 705 (Pageland Lane). Finally, Alternatives B, D, and G have some improvement in operations at the intersection of Route 234 Business and Route 659 (Gum Springs Road), although they all still are projected to have failing level of service in the future, primarily due to the demand created between Route 659 and the extension of Route 234 Bypass North, which is part of the No-Action Alternative. As part of the proposed Route 234 North Bypass study, Route 659 could be relocated, which could address these operational deficiencies.

Interchange Analysis

Capacity analysis was also performed at three primary interchanges affected by the study. Analyses were completed at ramp merge, diverge, and weave locations at interchanges along I-66 from Route 29 to Route 234 Bypass. As expected in this region, the analysis results reveal a number of ramp merge, diverge, and weave locations that operate at LOS E or LOS F during the peak hours due to extremely high volumes of commuting traffic.

In Centreville the I-66 and Route 29 interchange is generally improved by all alternatives due to a reduction in volumes along Route 29. The only movements affected are the AM merge area from Route 29 (includes northbound and southbound) onto I-66 eastbound which is projected to decrease from LOS D to LOS F for Alternatives B, C, D and G and an un-signalized left turning movement from the I-66 eastbound off-ramp to Route 29 which fails in comparison to the No-Action Alternative.

All of the movements are improved at the interchange of Route 234 Business and I-66 due to the closure of Route 234 within the Park. The only failing movement is associated with Alternative G. The left turning movement from Route 234 Business onto I-66 westbound fails in the PM peak period due to volumes generated in this area by Alternative G.

The interchange of Route 234 Bypass and I-66 is projected to experience congestion on several movements in all of the alternatives, including the No-Action Alternative. The only movement made worse by the alternatives would be from I-66 westbound to Route 234 Bypass northbound in the PM peak period which would decrease from a LOS B in the No-Action Alternative to LOS F for all of the Build alternatives. As discussed with VDOT, should the Route 234 Bypass North project proceed as planned, additional capacity would be needed for this movement.

4.2.3 Safety and Roadway Design

Construction of any of the build alternatives would substantially improve safety within the Park and in the study area. Without improvements, the number of crashes on Routes 29 and 234 will continue to rise as congestion increases, and the safety performance of these routes would deteriorate substantially. The No-Action Alternative does not solve any of the current safety issues, exacerbating the existing problem. All of the Build alternatives, on the other hand, would allow for closure of the roads within the Park and eliminate existing substandard design issues.

The removal of roads from within the Park would increase the safety of Park operations and enhance the pedestrian environment. Potential pedestrian-vehicular conflicts are reduced not only by removing the congestion within the center of the Park, but also by the removal of higher-speeding commuter traffic and the

heavy volumes of truck traffic within the Park. In addition, all of the Build Alternatives are designed with four-lane sections which will provide better mobility and a higher level of design for commuting traffic. In addition, closure would reduce the conflict of turning movements at the intersection of Routes 29 and 234 and reduce driver stress that results from the queues that develop in both the AM and PM peak periods.

The travel time analysis indicates that emergency service provisions will not be hindered by the road closures. For residents living within the Park in private in-holdings or in neighborhoods surrounded by Park land, travel times will be similar to leaving the roads open, and in some cases will be slightly faster. As part of the General Management Plan being adopted by the NPS, a pass system or SmartCard technology would also be implemented to provide access to all residents and that could be easily by-passed by emergency service personnel.

4.3 LAND USE

4.3.1 Introduction

Land use impacts were analyzed to determine the potential effect of each of the alternatives on current development trends and any local or state plans and policies on land use and growth in the affected area. Specifically, each alternative was assessed for consistency with locally adopted comprehensive plans and any other plans for the affected area. Direct land use conversions were also calculated. Impacts to neighborhoods, community facilities, and parklands are discussed separately in later sections. Secondary social, economic, and environmental impacts of any substantial, foreseeable, induced development are discussed separately in Section 4.22.

4.3.2 Impacts

Each of the Candidate Build Alternatives is consistent with local comprehensive plans in the affected environment. Technical staff from the Prince William County and Fairfax County Departments of Transportation have been instrumental in assisting the Study Team develop and refine the Candidate Build Alternatives to ensure consistency with county plans and policies. The alternatives are also consistent with the *Long Range Transportation Plan for the National Capital Region*. This regional plan incorporates all the transportation projects that VDOT and local jurisdictions plan to complete by the year 2020.

Unplanned growth or development can result in incompatible land uses. Planned land use allows necessary room for growth without conflict. Appropriately planned land use will provide sufficient employment within a short commute of major portions of the population. Local Comprehensive Plans for the study area jurisdictions have anticipated development growth by providing for it in the future land use and zoning plans. The relationship between roadway improvements and induced development or "sprawl" and unplanned growth is discussed in Section 4.22.

The direct land use impacts that would be necessary for highway rights-of-way for each of the proposed alternatives presented are **Table 4-5.** The direct land use impacts are generally proportional to the length of the alternative. The total impacts would range from a low of 178.4 acres (Alternative C) to a high of 204.2 acres (Alternative G). Undeveloped or agricultural land use types would be impacted most under all of the alternatives. Residential land use impacts would range from a low of 13.5 acres (Alternative D) to a high of 34.2 acres (Alternative A). Alternative G is the only alternative that would impact commercial land use (21.2 acres), primarily due to its interaction with the Battleview Business Park. Industrial land use impacts would be

similar for Alternatives A, B, C, and D (11.4 to 11.9 acres). Alternative G would have a much smaller impact on industrial land (0.3 acres). Federal or State land impacted, which includes Manassas NBP land, would range from a high of 32.1 acres (Alternative G) to a low of 11 acres (Alternatives A and B).

TABLE 4-5: DIRECT LAND USE IMPACTS BY ALTERNATIVE

	No-Action	A	B	C	D	G
Undeveloped or Agricultural (acres)	0	128.3	154.4	124.0	145.1	136.1
Residential (acres)	0	34.2	19.6	23.3	13.5	14.4
Commercial (acres)	0	0.0	0.0	0.0	0.0	21.2
Industrial (acres)	0	11.9	11.9	11.4	11.4	0.3
Federal/State Land (acres)	0	11.0	11.0	19.6	20.5	32.1
Total (acres)	0	185.4	196.9	178.4	190.4	204.2

A detailed description of the land use impacts for each alternative follows. **Figure 4-17** illustrates existing land cover impacts, while **Figure 4-18** illustrates impacts to planned land use. Specific impacts to neighborhoods are discussed in more detail in section 4.5 and impacts to parks and community facilities are discussed in more detail in section 4.7.

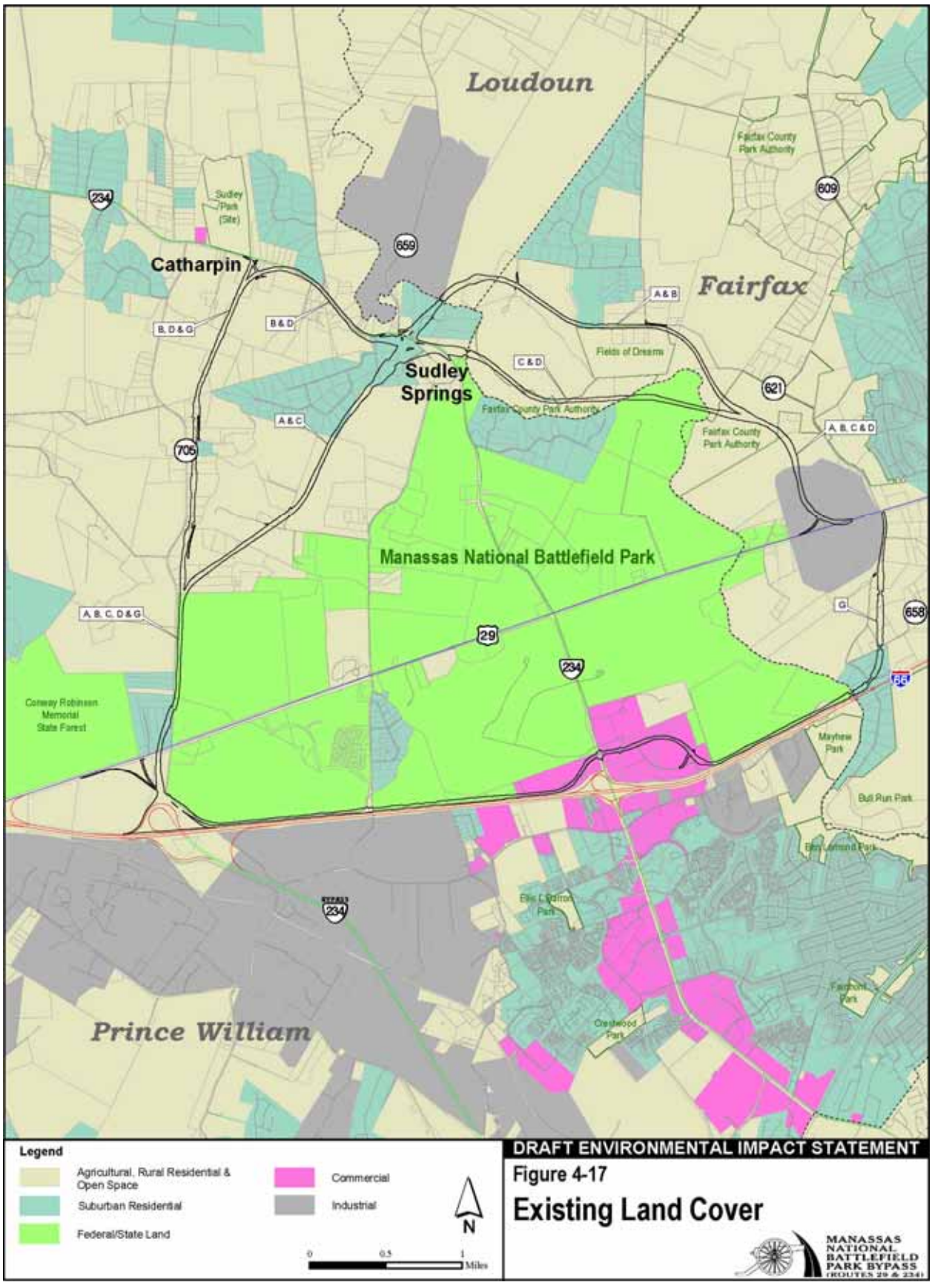
No-Action

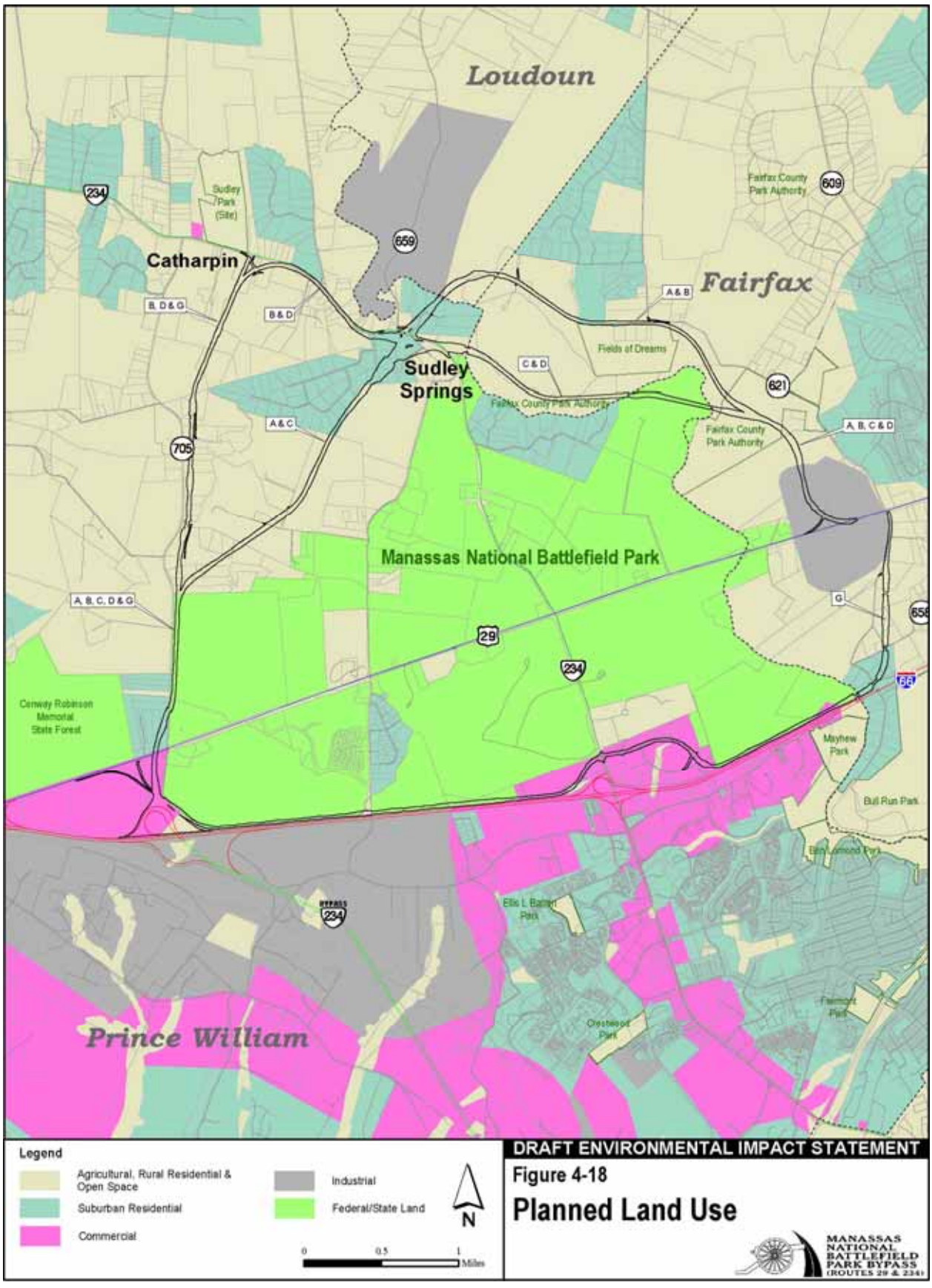
The No-Action alternative would be inconsistent with the National Park Service's intended plans to close existing portions of US 29 and VA 234 within the Manassas National Battlefield Park. The No-Action alternative would not directly affect other land uses in the study area. The extension of the VA 234 Bypass is included in Prince William County's Comprehensive Plan and is on the Constrained Long Range Plan for the Region.

Alternative A

Beginning from the east, Alternative A would convert industrial uses including a cement plant located east of the Luck Stone Quarry and turn northward. Moving north, existing wooded lands (including some land recently purchased by the Fairfax County Park Authority), a portion of a horse pasture, and agricultural areas would be converted to highway use. The alternative would then turn westward and run along the edge of the Fields of Dreams complex and some residential areas currently under construction. The alternative would continue westward through wooded lands and cross the existing driving range of the Fairfax National Golf Course. After reaching its' furthest point north, the alternative would turn south in a wooded area and cut through residential area of Bull Run Overlook Ct. and in-between residential areas of Sudley Mountain and Sudley Springs.

Moving southward, Alternative A would impact mostly undeveloped, wooded, and rural land before connecting with the planned extension of the VA 234 Bypass. At this point the alignment would be located within the western edge of the Manassas NBP before crossing some undeveloped and agricultural land areas to connect with the existing US 29.


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Conway Robinson Memorial State Forest
Fairfax County Park Authority
Fields of Dreams
Mayhew Park
Bull Run Park
Ellis Lomond Park
Fairmont Park
Crestwood Park
Sudley Park (Site)
234
659
609
621
705
29
658
66
A&B
B&D
B,D&G
C&D
A&C
A,B,C&D
A,B,C,D&G
G
Legend
Agricultural, Rural Residential & Open Space
Suburban Residential
Federal/State Land
Commercial
Industrial
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-17
Existing Land Cover
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Fairfax County Park Authority
Fields of Dreams
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ellis L. Bartlett Park
Crestwood Park
Fairmont Park
234
659
609
621
705
29
66
B, D&G
B&D
A&B
C&D
A&C
A, B, C&D
A, B, C, D&G
G
Legend
Agricultural, Rural Residential & Open Space
Suburban Residential
Commercial
Industrial
Federal/State Land
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-18
Planned Land Use
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

Alternative A would make use of a portion of the planned extension of the VA 234 Bypass, which is included in Prince William County's Comprehensive Plan, and might also be co-located with a portion of the Tri-County Parkway, which is included in Fairfax County's Comprehensive Plan.

Alternative B

Beginning from the east, Alternative B would convert industrial uses including a cement plant located east of the Luck Stone Quarry and turn northward. Moving north, existing wooded lands (including some land recently purchased by the Fairfax County Park Authority), a portion of a horse pasture, and agricultural areas would be converted to highway use. The alternative would then turn westward and run along the edge of the Fields of Dreams complex and some residential areas currently under construction. The alternative would continue westward through wooded lands and cross the existing driving range of the Fairfax National Golf Course.

After reaching its' furthest point north, the alternative would turn south in a wooded area and cut through residential area of Bull Run Overlook Ct. and connect to the existing VA 234 located just north of the Manassas NBP. The alternative would then follow the existing VA 234 northwest to the planned intersection with the VA 234 Bypass Extension converting residential, institutional, and agricultural land uses along VA 234 to accommodate the expanded right-of-way.

Alternative B would make use of the planned extension of the VA 234 Bypass, which is included in Prince William County's Comprehensive Plan, and might also be co-located with a portion of the Tri-County Parkway, which is included in Fairfax County's Comprehensive Plan.

Alternative C

Beginning from the east, Alternative C would convert industrial uses including a cement plant located east of the Luck Stone Quarry and turn northward. Moving north, existing wooded lands (including some land recently purchased by the Fairfax County Park Authority), a portion of a horse pasture, and agricultural areas would be converted to highway use. The alternative would then cross Bull Run and cut across the northeast corner of the Manassas NBP before crossing Bull Run Again. Here, the alternative would move in a northeasterly direction in-between the Park and the Fairfax National Golf Course on undeveloped wooded land that was recently acquired by the Fairfax County Park Authority. The alternative would cross Bull Run again before turning south in the Sudley Springs area and along the southwestern boundary of the Sudley Mountain neighborhood.

Moving further southward, Alternative C would impact mostly undeveloped/agricultural land uses before connecting with the planned extension of the VA 234 Bypass. At this point the alignment would be located within the western edge of the Manassas NBP before crossing some undeveloped and agricultural land areas to connect with the existing US 29.

Alternative D

Beginning from the east, Alternative D would convert industrial uses including a cement plant located east of the Luck Stone Quarry and turn northward. Moving north, existing wooded lands (including some land recently purchased by the Fairfax County Park Authority), a portion of a horse pasture, and agricultural areas would be converted to highway use. The alternative would then cross Bull Run and cut across the northeast corner of the Manassas NBP before crossing Bull Run Again. Here, the alternative would move in a

northeasterly direction in-between the Park and the Fairfax National Golf Course on undeveloped wooded land that was recently acquired by the Fairfax County Park Authority. The alternative would then cross Bull Run again and connect to the existing VA 234 in the Sudley Springs area located just north of the Manassas NBP. The alternative would then follow the existing VA 234 northwest to the planned intersection with the VA 234 Bypass Extension converting residential, institutional, and agricultural land uses along VA 234 to accommodate the expanded right-of-way.

Alternative D would make use the planned extension of the VA 234 Bypass, which is included in Prince William County's Comprehensive Plan, and might also be co-located with a portion of the Tri-County Parkway, which is included in Fairfax County's Comprehensive Plan.

Alternative G

Alternative G is the only alternative that would relocate existing US 29 traffic south of the Park. Beginning from the east and moving south, agricultural/conservation land and low-density residential land, including land within the Bull Run Estates neighborhood would be converted to highway use. After crossing Bull Run, the alternative would parallel an existing transportation corridor (I-66) along the southern boundary of the Park. The alternative would move westward and make use of existing roadways within the Battlefield Business Park and shopping center area, although they would be redesigned to handle higher traffic volumes. The alternative would then continue between I-66 and the Park until reconnecting with US 29 west of the Park and converting wooded land northwest of the I-66/VA 234 Bypass intersection. This alternative would result in the most direct land use impacts to the Park compared to any other alternative, requiring approximately 31 acres of federal lands to be converted for highway use.

Alternative G would make use the planned extension of the VA 234 Bypass, which is included in Prince William County's Comprehensive Plan, and might also be co-located with the portion of the Tri-County Parkway located south of the existing Route 29, which is included in Fairfax County's Comprehensive Plan.

4.4 DISPLACEMENTS AND RELOCATIONS

The number of displacements of residences, businesses, and non-profit organizations that would result from each of the alternatives are presented in **Table 4-6**. These displacements include those structures that are directly within the right-of-way limits estimated for the project or that are made inaccessible due to construction of the proposed facility. Upon completion of more in-depth design for the project, a detailed relocation plan will be developed to ensure that orderly relocation of all displacees can be accomplished in a satisfactory manner. The acquisition of right-of-way and the relocation of displacees will be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation assistance will be available to all residential, business, and nonprofit displacees without discrimination.

The demographics for the study area indicate that the potential residential displacements will not have an effect on protected minority or low-income populations. The average household size in the study area is 3.16 persons according to the 2000 U.S. Census. Based on ongoing construction of new homes in the area and real estate advertisements, replacement housing is readily available in the area. All families and individuals displaced by the project will be relocated to suitable replacement housing. All replacement housing will be fair housing available to all persons without regard to race, color, religion, sex, or national origin and will be within the

financial means of the displacees. Each person will be given sufficient time to negotiate for and obtain possession of replacement housing. No residential occupants will be required to move from property needed for the project until comparable decent, safe, and sanitary replacement dwelling shall be made available to them.

TABLE 4-6: DISPLACEMENTS BY ALTERNATIVE

	No-Action	A	B	C	D	G
Residences	0	6	13	5	13	11
Businesses	0	1	1	1	1	2
Schools Displaced	0	0	0	0	0	0
Churches	0	0	0	0	0	0
Other Community Facilities	0	0	0	0	0	1
Totals	0	7	14	6	14	15

Total displacements would range from 7 (Alternative C) to 15 (Alternative G). Alternatives B, D, and G would cause the highest residential displacements, many of which would occur along the portion of the alignment that would be collocated with the Route 234 bypass extension. The business displacement caused by Alternatives A, B, C, & D is an industrial business, located along US 29 east of the Manassas NBP. Alternative G would displace two restaurants in the Battleview Business Park. None of these businesses displacements would pose any special relocation problems. The current vacancy rate for commercial space in the area is adequate to absorb these businesses.

The only potential displacement of a non-profit/community facility would occur under Alternative G. Alternative G would displace the rest stop located on I-66. Relocation of this rest stop has previously been considered by VDOT as part of the I-66 Multimodal Transportation and Environmental Study.

A detailed description of the potential displacements resulting from each alternative follows.

No-Action

The No-Action alternative would not cause displacements to residences, business, or community facilities. Displacements resulting from other projects, such as the Route 234 North Bypass Extension and the Tri-County Parkway, which could occur are addressed in Section 4.22 (Secondary and Cumulative Effects).

Alternative A

Alternative A would displace 6 residences including one home in the Bull Run Overlook neighborhood, 1 home in Sudley Springs, 1 home in Sudley Mountain Estates, and 2 homes and 4 outbuildings along Pageland Lane. Alternative A would displace 1 business located on US 29. The alternative would cut-through the driving range and displace a pavilion structure associated with the Fairfax National Golf Course. The alternative would not displace any non-profit or community facilities.

Alternative B

Alternative B would displace 13 residences including 1 home in the Bull Run Overlook neighborhood, 5 homes and 7 outbuildings along VA Route 234 north of the Park, and 7 homes and 8 outbuildings along

Pageland Lane. Alternative B would displace 1 business located on US 29. The alternative would cut-through the driving range and displace a pavilion structure associated with the Fairfax National Golf Course. The alternative would not displace any non-profit or community facilities.

Alternative C

Alternative C would displace 5 residences: including 1 home with an outbuilding along VA 234 (north of the Park), 1 home in Sudley Mountain Estates, and 3 homes with 4 outbuildings along Pageland Lane. Alternative C would displace 1 business on US 29. The alternative would not displace any non-profit or community facilities.

Alternative D

Alternative D would displace 13 residences including, six homes with 7 outbuildings along VA Route 234 (north of the Park), and 7 homes and 8 outbuildings along Pageland Lane. Alternative D would displace one business located on US 29.

Alternative G

Alternative G would displace 11 residences including 4 residences and 5 outbuildings in the Bull Run Post Office Road and Bull Run Estates area, and 7 residences and 8 outbuildings along Pageland Lane. Alternative G would also displace the rest stop located on I-66 and 2 businesses in the Battleview Business Park.

4.5 NEIGHBORHOODS AND RESIDENTIAL AREAS

4.5.1 Introduction

Neighborhood impacts were evaluated for each alternative based on changes (both positive and negative) in neighborhoods or community groups as a result of the proposed action; changes in travel patterns and accessibility, including bicycle and pedestrian modes; and impacts on school districts, recreation areas, churches, businesses, police and fire protection, etc. Effects on community cohesion can include the taking of land and homes, physical or psychological barriers dividing a community, or disruption of access within a community. General social groups especially benefited or harmed by the project, including minority and ethnic groups are discussed in Section 4.8 (Environmental Justice).

4.5.2 Impacts

Impacts to neighborhoods and residential areas are highlighted in **Table 4-7**. Alternatives A, C, and D would result in impacts to community cohesion. Alternatives A and B would impact community cohesion in the Bull Run Overlook Ct. neighborhood, while Alternative G would impact the Bull Run Estates neighborhood. Alternatives A and B would change access to several homes in the Bull Run Overlook Court. Alternatives B, D, and G would affect changes in access to several residences along Pageland lane. Access would be maintained to all affected residences to avoid any isolation effects. Noise impacts from the candidate build alternatives would range from 12 to 20 dwelling units impacted. The No-Action alternative would impact between 1 and 2 residences. Noise and visual impacts are discussed in more detail in Section 4.14 (Noise) and Section 4.12 (Aesthetic and Scenic Resources).

Figure 4-19 illustrates the location of neighborhoods in relation to the Candidate Build Alternatives. A description of the impacts to neighborhood and residential areas for each specific alternative follows.

TABLE 4-7: SUMMARY OF IMPACTS TO NEIGHBORHOOD AND RESIDENTIAL AREAS

	No-Action	A	B	C	D	G
Community Cohesion Impacts	No effect	Bull Run Overlook Ct.	No effect	Bull Run Overlook Ct.	No effect	Bull Run Estates
Isolation Effects	No effect	No effect	No effect	No effect	No effect	No effect
Access Changes	No effect	Bull Run Overlook Ct.	Bull Run Overlook Ct, Pageland Lane	Sudley Springs	Pageland Lane	Pageland Lane, Bull Run Estates
Residential Displacements	No effect	0	6	13	5	13
Noise (impacted dwelling units)	1-2	18	20	12	17	13

No-Action

The No-Action alternative would not impact any neighborhoods or community facilities.

Alternative A

Alternative A would bisect the Bull Run Overlook Court neighborhood impacting the existing community cohesion and character, as well as resulting in visual and noise impacts to some residences. Impacts to Bull Run Overlook Court neighborhood are illustrated in **Figure 4-20**. A new access road would be constructed off of Gum Springs Road that would require partial acquisition of several residential properties. One home within the neighborhood would be displaced.

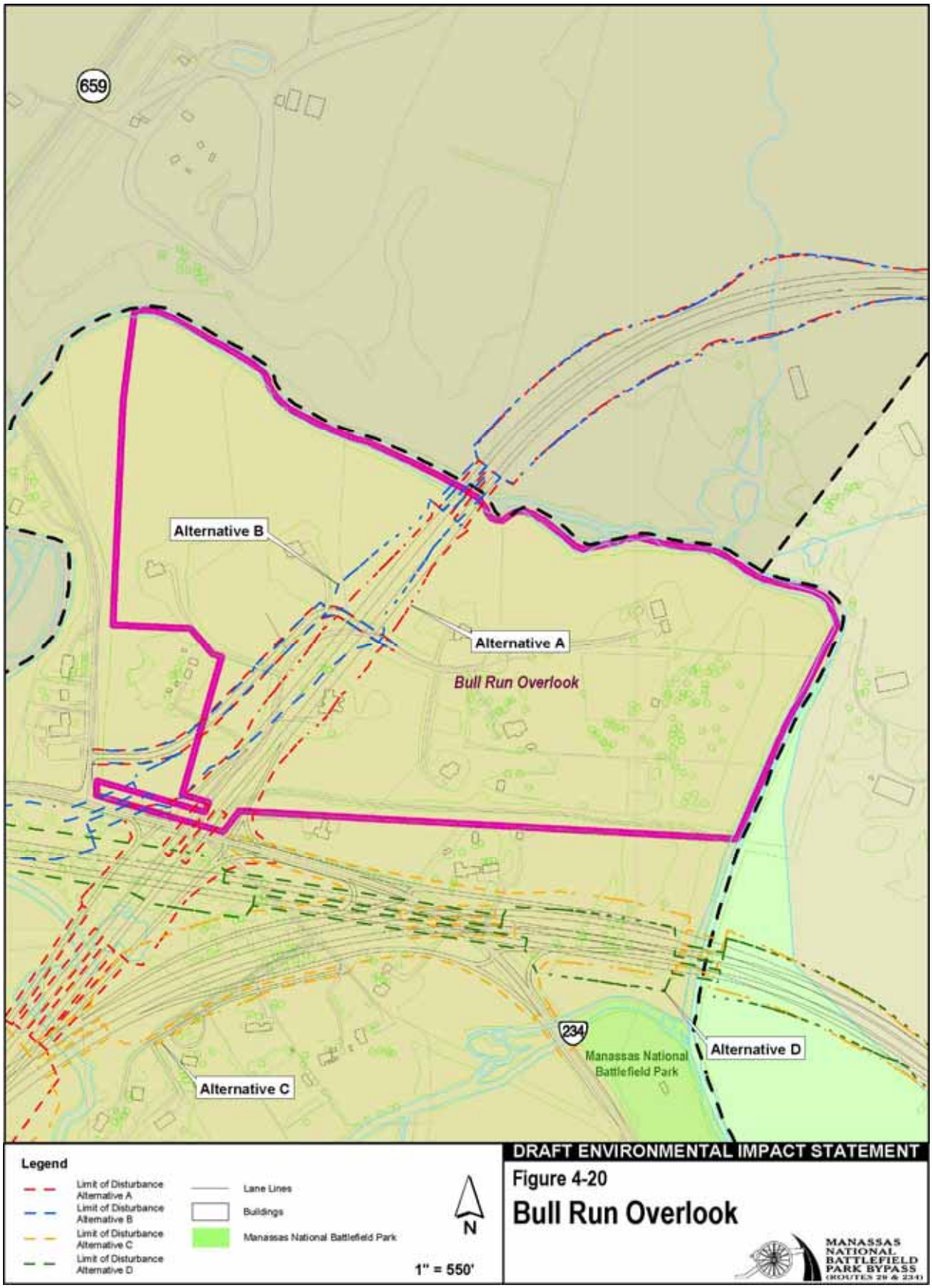
The alternative would cross the northern area of the Sudley Springs neighborhood, but would not displace any homes within the neighborhood or impact community cohesion. Alternative A's alignment would be located along the eastern edge of the Sudley Mountain Neighborhood and would displace 1 existing residence. Two residences would be displaced along Pageland Lane. Alternative A would reduce cut-through traffic along Pageland Lane and improve safety conditions on the road.

Alternative B

Alternative B would bisect the Bull Run Overlook Court neighborhood impacting the existing community cohesion and character, as well as resulting in visual and noise impacts to some residences. Impacts to Bull Run Overlook Court neighborhood are illustrated in Figure 4-20. This could result in a potential decrease in property values within the neighborhood. A new access road would be constructed off of Gum Springs Road that would require partial acquisition of several residential properties. One home within the neighborhood would be displaced.

Alternative B would also displace 4 residences along Sudley Road (northwest of the Park) and 7 residences along Pageland Lane. Some residences along Pageland Lane would experience noise impacts. All of the residences located west of the alignment in the Pageland Lane area would continue to have direct access to Pageland Lane. Reconfigured access roads would be constructed at two locations, each of which would travel


Loudoun
Fairfax
Prince William
Richland Estates
Sudley Road
Bull Run Overlook
Fairfax National Estates
Sudley Mountain Estates
Sudley Springs
Sunrise Hill Farm
Pageland Lane
Manassas National Battlefield Park
Zouave Hills
Bull Run Estates
Conway Robinson Memorial State Forest
Fields of Dreams
Fairfax County Park Authority
Sudley Park (Site)
MOUNT CALVARY CHURCH
NOVA COMMUNITY COLLEGE
LIVING FAITH MINISTRIES
STRAYER UNIVERSITY
Mayhew Park
Bull Run Park
MANASSAS MOSQUE
HOLY LIGHT UNITED BAPTIST
DEAN DIVERS BAPTIST
Ellis L Barron Park
GEORGE MASON UNIVERSITY
SINCLAIR SCHOOL
JACKSON HIGH SCHOOL
GEORGE F MULLEN ELEMENTARY
WEST GATE SCHOOL
Fairmont Park
MANASSAS PRESBYTERIAN
Crestwood Park
MOUNT CALVARY BAPTIST
FAIRMONT CHURCH PREPARATORY
TABERNACLE BAPTIST
ANTIOCH CHURCH OF CHRIST
VIRGINIA RUN ELEMENTARY
Legend
Schools
Churches
Cemeteries
Manassas National Battlefield Park
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-19
Neighborhoods and Community Facilities
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


659
Alternative B
Alternative A
Bull Run Overlook
234
Manassas National Battlefield Park
Alternative D
Alternative C
Legend
Limit of Disturbance Alternative A
Limit of Disturbance Alternative B
Limit of Disturbance Alternative C
Limit of Disturbance Alternative D
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 550'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-20
Bull Run Overlook
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

under the alternative at bridged locations, to maintain access to Pageland Lane. Alternative B would reduce cut-through traffic along Pageland Lane and improve safety conditions on the road.

Alternative C

Alternative C would displace one residence located along Sudley Road (north of the Park). The alternative would run along the north edge of the Sudley Springs neighborhood, but would not displace any homes within the neighborhood. Access to the Sudley Springs neighborhood would be maintained through a new access road that would connect to a reconfigured interchange of the relocated portion of US 29 and the existing VA 234. Alternative C's alignment would be located along the eastern edge of the Sudley Mountain Neighborhood and would displace one existing residence. Alternative C would displace 2 residences along Pageland Lane. Alternative C would reduce cut-through traffic along Pageland Lane and improve safety conditions on the road.

Alternative D

Alternative D would widen the alignment of the existing Route 234 (Sudley Road) located northwest of the Park, which includes several residential frontages. The alternative would displace 4 residences along Sudley Road. Alternative B would displace 7 residences along Pageland Lane. Some residences along Pageland Lane would experience noise impacts. All of the residences located west of the alignment in the Pageland Lane area would continue to have direct access to Pageland Lane. Reconfigured access roads would be constructed at two locations, each of which would travel under the alternative at bridged locations, to maintain access to Pageland Lane. Alternative D would reduce cut-through traffic along Pageland Lane and improve safety conditions on the road.

Alternative G

Alternative G would cut-through the Bull Run Estates neighborhood negatively impacting community cohesion, creating noise impacts to some residences, and displacing 3 residences within the community. Impacts to the Bull Run Estates neighborhood are illustrated in **Figure 4-21**. Alternative G would also displace 2 residences along Bull Run Post Office Road and 7 residences along Pageland Lane. Several residences along Pageland Lane would experience noise impacts. All of the residences located west of the alignment in the Pageland Lane area would continue to have direct access to Pageland Lane. Reconfigured access roads would be constructed at two locations, each of which would travel under the alternative at bridged locations, to maintain access to Pageland Lane. Alternative G would result in increased cut-through traffic on Pageland Lane.

A design option has also been developed east of the Park that would be co-located with the Tri-County Parkway, which would avoid direct impacts to the Bull Run Estates neighborhood. This alternative also includes a corridor along the proposed Route 234 North Bypass Extension to provide Route 234 movements.

4.5.3 Mitigation

Mitigation strategies would focus on reducing noise, visual, and construction impacts on neighborhoods and residential areas. These strategies will be developed in more detail after an alternative is selected and during preliminary engineering. Some potential mitigation strategies that would be available are discussed in more detail in Section 4.14 (Noise), Section 4.12 (Aesthetic and Scenic Resources), and Section 4-23 (Construction Impacts).


Alternative G
66
Manassas National Battlefield Park
Bull Run Estates
Bull Run Park
Mayhew Park
Sources Fairfax County & Prince William County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 800'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-21
Bull Run Estates
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

4.6 ECONOMICS

The acquisition of private residential and commercial properties to provide right-of-way would result in loss of property tax revenue for Fairfax, Prince William Counties, and Loudoun Counties. The current real estate tax rate is $1.13 per $100 of assessed value in Fairfax County, $1.07 per $100 of assessed value in Prince William County, and $1.1075 per $100 of assessed value in Loudoun County.

Annual tax revenue losses from real estate acquisitions are presented in **Table 4-8** and would range from a low of approximately $117,675 (Candidate Build Alternative B) to $170,394 (Candidate Build Alternative G). These losses would be offset to some degree by the economic benefits of reductions in congestion and travel time and by increases in sales tax receipts.

TABLE 4-8: ANNUAL TAX REVENUE LOSSES FROM REAL ESTATE ACQUISITIONS

	No-Action	A	B	C	D	G
Fairfax County	$0	$20,006	$20,024	$17,608	$17,716	$29,541
Prince William County	$0	$144,386	$117,675	$136,860	$124,918	$170,394
Loudoun County	$0	$7,319	$7,402	$0	$0	$0
Total	$0	$171,711	$145,102	$154,468	$142,634	$199,935

Note: The estimated annual tax revenue losses from real estate acquisitions is based on preliminary design information that likely will change as more detailed design work is conducted following the selection of an alternative. Costs are represented in current (2004) dollars and current (2004) tax rates for each county.

The project would provide a positive economic impact to the project area through the increase in employment and purchases of building materials during construction of a build alternative. Based on an FHWA procedure for estimating construction-related employment, each one million dollars of construction expenses would create an average of 9.75 temporary, on-site construction jobs and 12.7 temporary, off-site jobs. Off-site employment would include support services to construction services (e.g., construction supplies, and food and beverage service). This procedure assumes that local workers would provide the needed labor for the project. Based on the construction cost estimates, **Table 4-9** provides estimates of the temporary employment creation due to construction requirements.

TABLE 4-9: ESTIMATED CONSTRUCTION EMPLOYMENT

	No-Action	A	B	C	D	G
Total Cost (in millions)	0	$117.6	$126.1	$118.0	$127.7	$153.4
On-site Jobs	0	1,146	1,229	1,150	1,245	1,495
Off-site Jobs	0	1,493	1,601	1,498	1,621	1,948
Total Jobs	0	2,640	2,830	2,649	2,866	3,443

Note: The estimated construction cost is based on preliminary design information that likely will change as more detailed design work is conducted following the selection of an alternative.

Alternative G would cut through the Battleview Business Park and Parkridge Shopping Center. Impacts to these facilities are illustrated in **Figure 4-22**. Alternative G would displace two businesses.


Manassas National Battlefield Park
Battleview Business Park
Parkridge Center Shopping Center
66
Alternative G
Source: Prince William County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 1200'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-22
Battleview Business Park & Shopping Center
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

4.7 PARKS AND COMMUNITY FACILITIES

4.7.1 Introduction

Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended (49 USC 303(c)), stipulates that federally funded or approved transportation projects may not use land from a publicly owned public park, recreation area, wildlife or waterfowl refuge, or from a significant historic site, unless there is no feasible or prudent alternative to the use. Significant historic sites are those that are listed in, or eligible for listing in, the National Register of Historic Places. Such use requires documentation that the proposed action includes all possible planning to minimize harm to protected properties. In addition, Section 6(f) of the Land and Water Conservation Fund Act of 1965, as amended (16 USC 4601-8 (f)), requires land conversion approval by the U.S. Department of Interior where funds provided to a state under the statute were used to purchase or develop parklands or recreational facilities that would be used by a proposed action. There are no Section 6(f) properties within the impacted area. Section 4(f) impacts are described in detail in Chapter 8.

The study area for parklands and recreation areas included all publicly and privately-owned or leased parks and recreation lands (parks) that are located within the proposed limit of disturbance for the various alternatives or immediately adjacent to these areas. After the noise, vibration, and air quality effects were carefully analyzed, this study area was reviewed to ensure it adequately covered all of the parklands and recreational areas potentially affected.

Parklands and recreation areas in the study area were identified in coordination with the Northern Virginia Regional Park Authority, NPS, Fairfax County Park Authority, and the Prince William County Park Authority.

4.7.2 Impacts

All impacts to public parks are summarized in **Table 4-10** and discussed in more detail in Chapter 8. Public parks impacted would include the Manassas NBP and Fairfax County Park Authority owned land. Alternative G would impact 42.3 acres of the Manassas NBP, more than twice as much as any other alternative. Alternatives C and D would impact approximately 38 acres of the Manassas NBP. Alternatives A and B would impact 11.2 acres of the Manassas NBP, the least impact of any alternative other than the No-Action.

Land owned by the Fairfax County Park Authority would also be impacted by 4 of the Candidate Buld Alternatives. Alternatives C and D would impact 20.5 acres and Alternatives A and B would impact approximately 8.5 acres of Fairfax County Park Authority land. The No-Action alternative and Alternative G would not impact Fairfax County Park Authority land.

TABLE 4-10: PARK IMPACTS

Park/Facility	No-Action	A	B	C	D	G
# of Public Parks Impacted	0	2	2	2	2	1
Fairfax County Park Authority (acres)	0	8.5	8.6	20.5	20.5	0.0
MNBP Legislative Boundary (acres)	0	15.5	15.2	38.0	38.1	42.9
MNBP Park-Owned (acres)	0	11.2	11.2	19.2	20.6	42.3

None of the Candidate Build Alternatives would displace any churches, schools, or emergency services. All of the Candidate Build Alternatives would reduce noise impacts to the Sudley United Methodist Church and at several sites within the Manassas NBP. Privately owned community facilities that may be impacted include the Union Ridge Equestrian Center, the Fairfax National Golf Course, and a Strayer University facility. A description of the impacts for each alternative follows.

No-Action

The No-Action alternative would not impact any parks or community facilities, but would result in continuing degradation of the Manassas National Battlefield Park and the Sudley United Methodist Church would continue to experience noise impacts.

Alternative A

Alternative A would impact the Union Ridge Equestrian Center, Fairfax County Park Authority Land, the Fields of Dreams site, the Fairfax National Golf Course, and the Manassas NBP.

Alternative A would impact 7.2 acres of the Union Ridge Equestrian Center. The alternative would bisect the property and create both noise and visual impacts. Impacts to the Union Ridge Equestrian Center are illustrated in **Figure 4-23.**

Alternative A would impact 8.5 acres of land currently owned by the Fairfax County Park Authority. Impacts would occur at one location, which is currently undeveloped and sometimes referred to as the "Huntor-Hacor" assemblage.

Alternative A would impact 3.8 acres of the Fields of Dreams site along the northern edge resulting in noise and visual impacts. The impacts would not affect use of any of the facilities planned for the site. Direct access to the Fields of Dreams site would be provided from the roadway. Impacts to the Fields of Dreams site are illustrated in **Figure 4-24.**

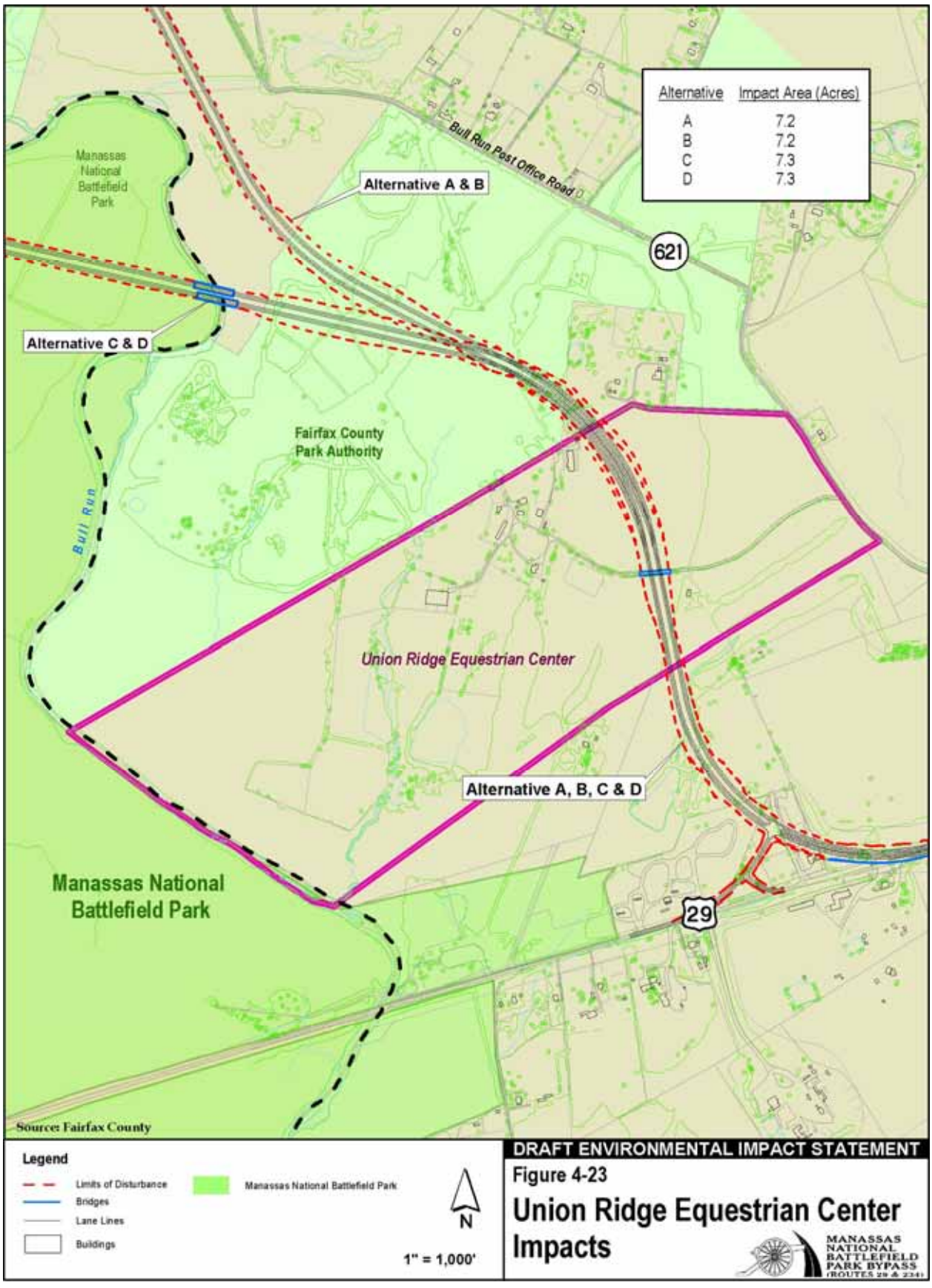
Alternative A would cross the driving range at the Fairfax National Golf Course, impacting 1.7 acres and resulting in noise and visual impacts. The golf course would not be affected, but the driving range would not be able to function in its current location with the presence of the highway. Access to the golf course would be reconfigured to provide direct access from the relocated portion of Route 29, which would improve access particularly from western locations. The existing access road would be gated to avoid cut-through traffic through the Fairfax National Estates neighborhood. Impacts to the Fairfax National Golf Course are illustrated in **Figure 4-25**.

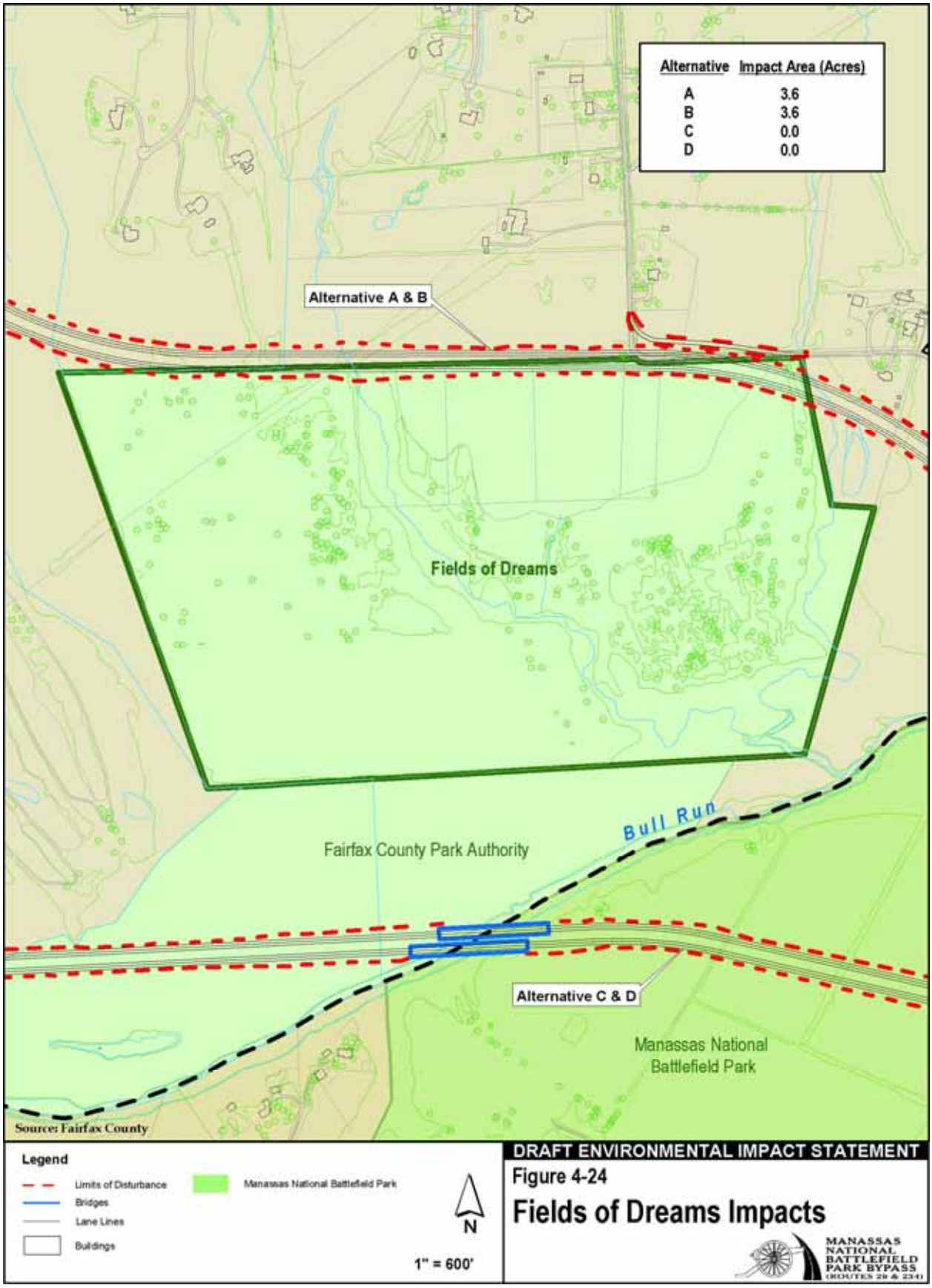
Alternative A would impact a small portion of land owned by the Sudley United Methodist Church, but would not result in any impacts to the Church itself. Impacts to Sudley United Methodist Church are illustrated in **Figure 4-26.**

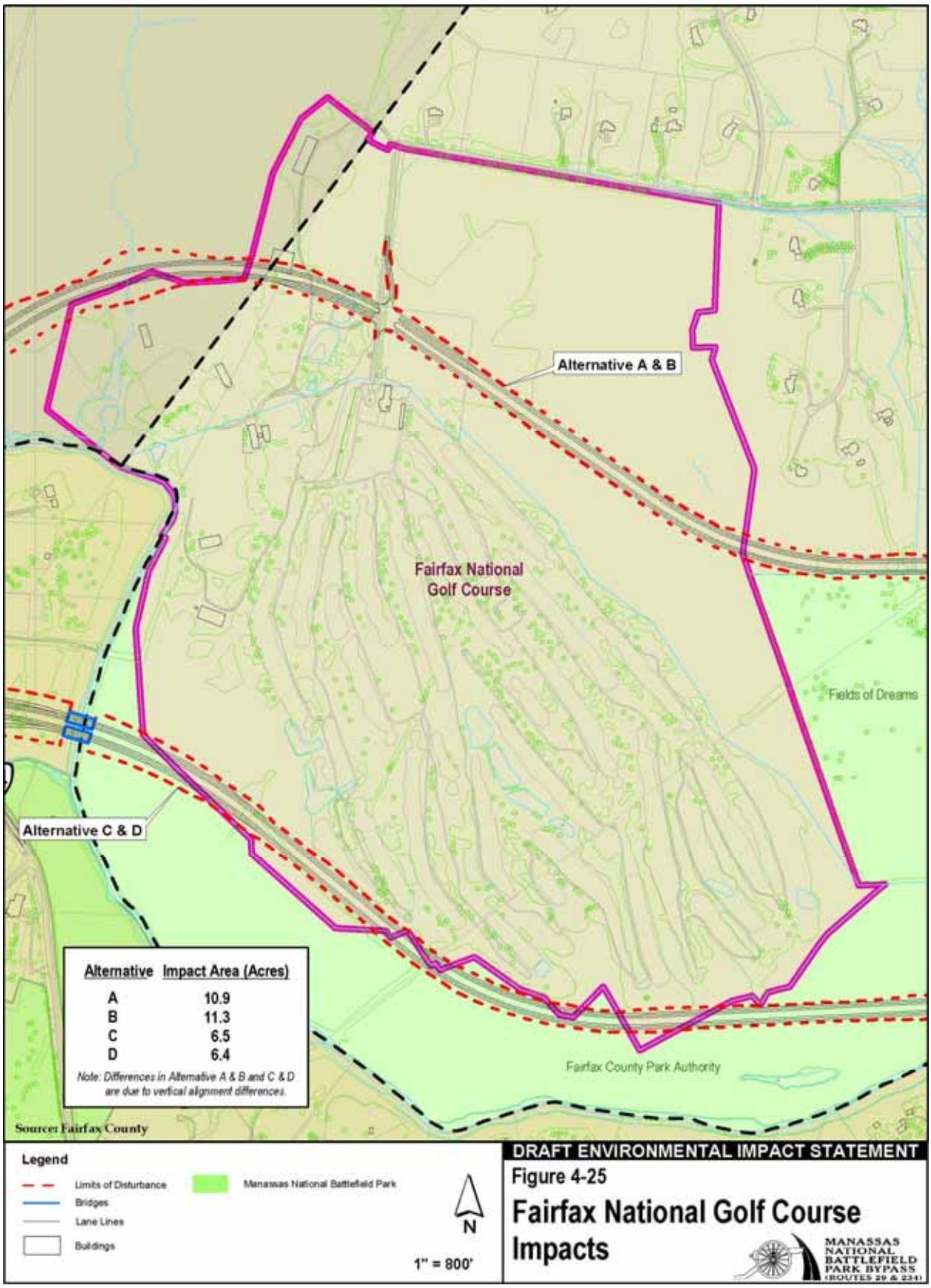
Alternative A would impact 11.2 acres of the Manassas NBP. Impacts would occur on the western edge of the Park near the powerline.

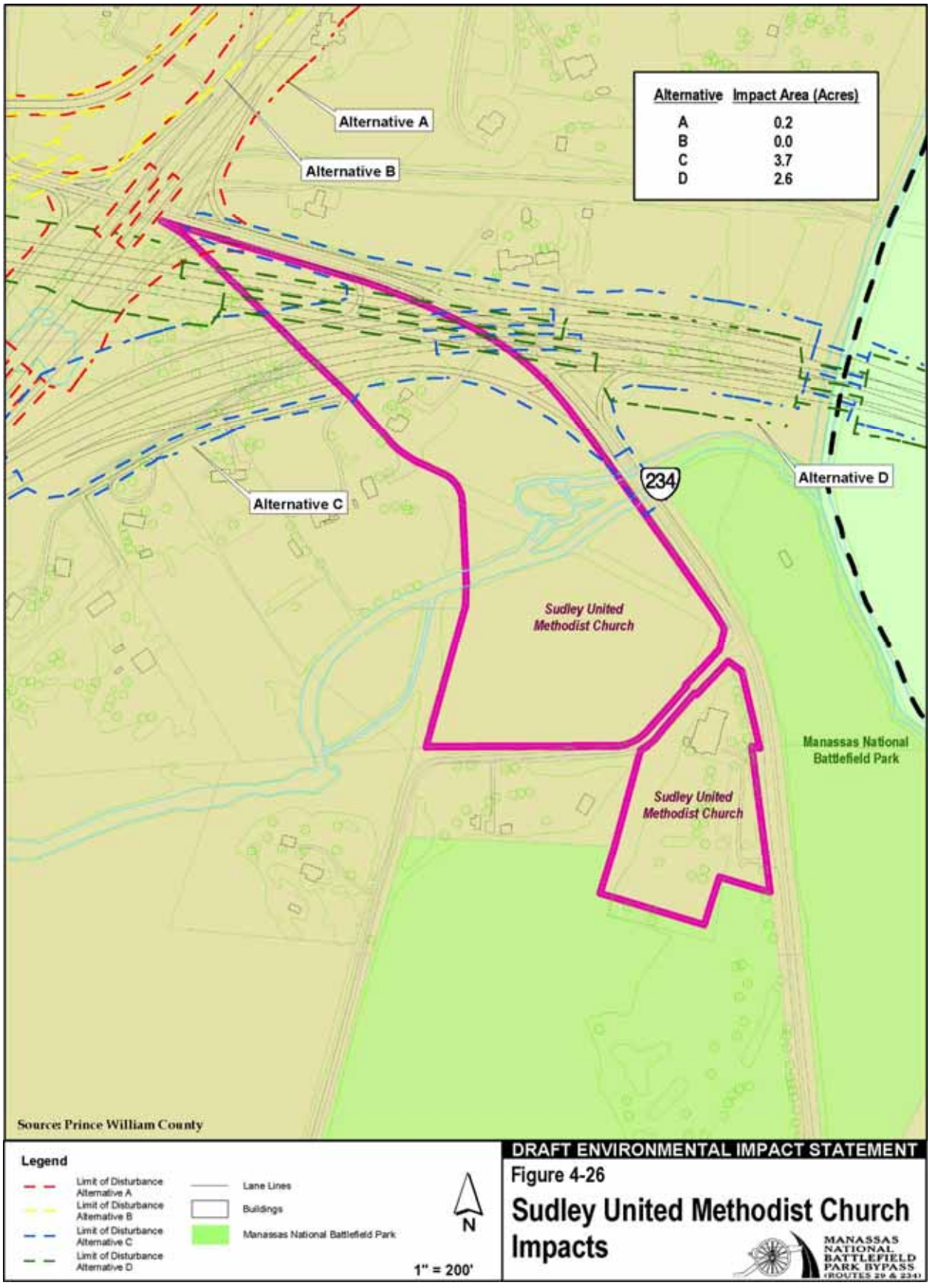
Alternative B

Alternative B would directly impact the Fairfax National Golf Course, Fairfax County Park Authority land, the Fields of Dreams, Union Ridge Equestrian Center, and the Manassas NBP. Alternative B would impact 7.2


Alternative | Impact Area (Acres)
A 7.2
B 7.2
C 7.3
D 7.3
Manassas National Battlefield Park
Alternative A & B
Bull Run Post Office Road
621
Alternative C & D
Fairfax County Park Authority
Bull Run
Union Ridge Equestrian Center
Alternative A, B, C & D
Manassas National Battlefield Park
29
Source: Fairfax County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 1,000'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-23
Union Ridge Equestrian Center Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Alternative | Impact Area (Acres)
A 3.6
B 3.6
C 0.0
D 0.0
Alternative A & B
Fields of Dreams
Fairfax County Park Authority
Bull Run
Alternative C & D
Manassas National Battlefield Park
Source: Fairfax County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 600'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-24
Fields of Dreams Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)


Alternative A & B
Fairfax National Golf Course
Fields of Dreams
Alternative C & D
Fairfax County Park Authority
Alternative | Impact Area (Acres)
A 10.9
B 11.3
C 6.5
D 6.4
Note: Differences in Alternative A & B and C & D are due to vertical alignment differences.
Source: Fairfax County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 800'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-25
Fairfax National Golf Course Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Alternative A
Alternative B
Alternative C
Alternative D
Alternative | Impact Area (Acres)
A 0.2
B 0.0
C 3.7
D 2.6
234
Sudley United Methodist Church
Sudley United Methodist Church
Manassas National Battlefield Park
Source: Prince William County
Legend
Limit of Disturbance Alternative A
Limit of Disturbance Alternative B
Limit of Disturbance Alternative C
Limit of Disturbance Alternative D
Lane Lines
Buildings
Manassas National Battlefield Park
N
1" = 200'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-26
Sudley United Methodist Church Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

acres of the Union Ridge Equestrian Center resulting in noise and visual impacts. The alternative would bisect the property and create both noise and visual impacts. Impacts to the Union Ridge Equestrian Center are illustrated in Figure 4-23.

Alternative B would impact 8.6 acres of land currently owned by the Fairfax County Park Authority. Impacts would occur at one location, which is currently undeveloped and sometimes referred to as the "Huntor-Hacor" assemblage.

Alternative B would impact 3.8 acres of the Fields of Dreams site along the northern edge resulting in noise and visual impacts. The impacts would not affect use of any of the facilities planned for the site. Direct access to the Fields of Dreams site would be provided from the roadway. Impacts to the Fields of Dreams site are illustrated in Figure 4-24.

Alternative B would cross the driving range at the Fairfax National Golf Course, impacting 1.7 acres and causing noise and visual impacts. The golf course would not be affected, but the driving range would not be able to function in its current location with the presence of the highway. Access to the golf course would be reconfigured to provide direct access from the relocated portion of Route 29, which would improve access particularly from western locations. The existing access road would be gated to avoid cut-through traffic through the Fairfax National Estates neighborhood. Impacts to the Fairfax National Golf Course are illustrated in Figure 4-25.

Alternative B would impact a small portion of land owned by the Sudley United Methodist Church, but would not result in any impacts to the Church itself. Impacts to Sudley United Methodist Church are illustrated in Figure 4-26. Expansion of the VA 234 the right-of-way would potentially impact the Mount Calvary Church property along the existing roadway, but would not displace the church or any facilities. Impacts to the Mount Cavalry Baptist Church are illustrated in **Figure 4-27**.

Alternative B would impact 11.2 acres of the Manassas NBP. Impacts would occur on the western edge of the Park near the powerline.

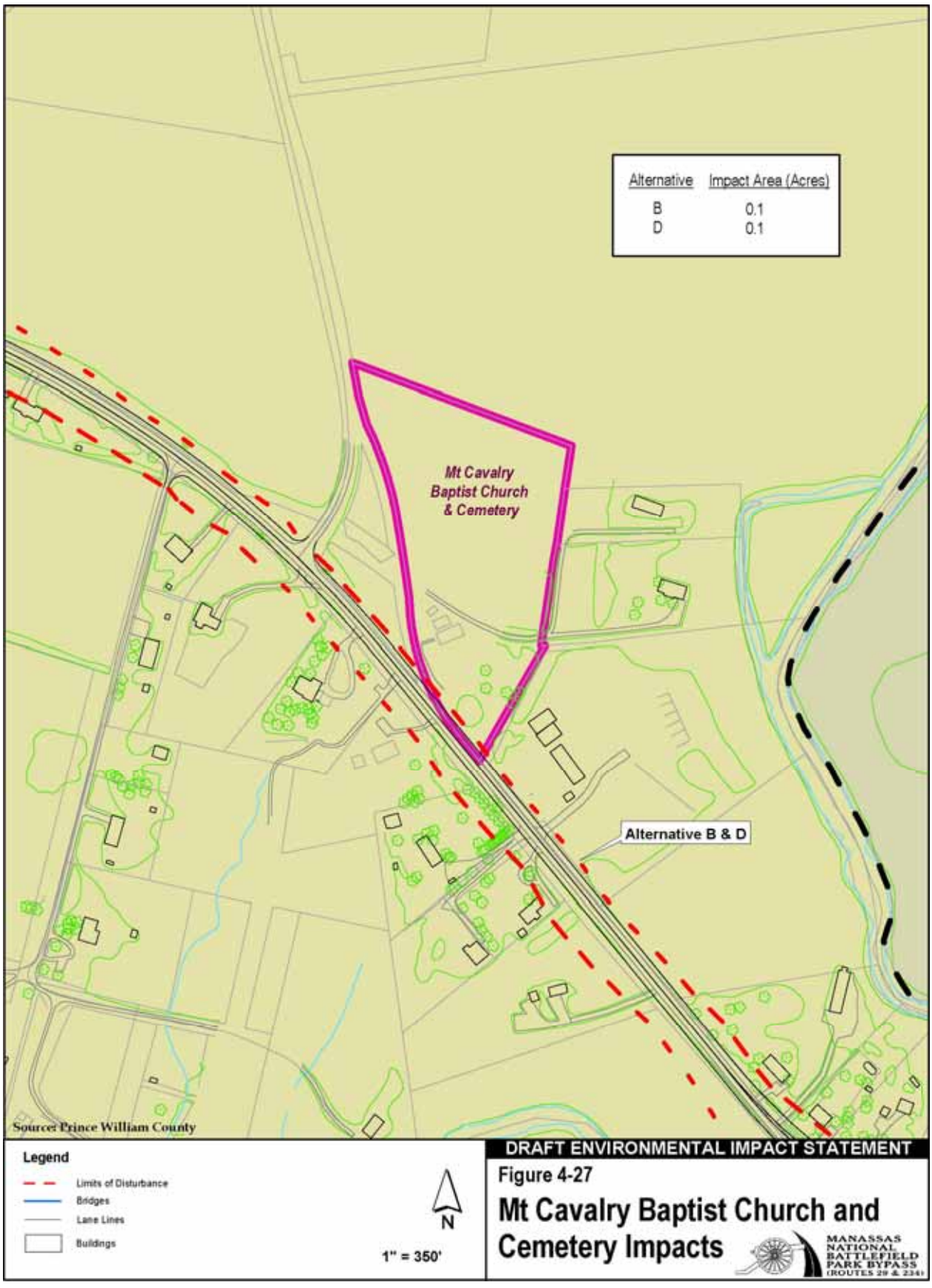
Alternative C

Alternative C would impact the Union Ridge Equestrian Center, Fairfax County Park Authority Land, the Fairfax National Golf Course, and the Manassas NBP.

Alternative C would impact 7.3 acres of the Union Ridge Equestrian Center and create noise and visual impacts. The alternative would bisect the property and create both noise and visual impacts. Impacts to the Union Ridge Equestrian Center are illustrated in Figure 4-23.

Alternative C would impact 20.5 acres of land owned by the Fairfax County Park Authority. Impacts would occur at two locations. Both locations are undeveloped. One location is located west of Bull Run PO Road, which sometimes referred to as the "Huntor-Hacor" assemblage. The other location is between the Park's northern boundary and the Fairfax National Golf Course, which is also within the Park's legislative boundary.

Alternative C would impact 1.7 acres of land along the southern boundary of the Fairfax National Golf Course and create noise and visual impacts, but would not affect use of the facility. Impacts to the Fairfax National Golf Course are illustrated in Figure 4-25. Alternative C would impact land owned by the Sudley United


Alternative | Impact Area (Acres)
B 0.1
D 0.1
Mt Cavalry Baptist Church & Cemetery
Alternative B & D
Source: Prince William County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
N
1" = 350'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-27
Mt Cavalry Baptist Church and Cemetery Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Methodist Church, but would not result in any impacts to the Church itself. Impacts to Sudley United Methodist Church are illustrated in Figure 4-26.

Alternative C would impact 19.2 acres of the Manassas NBP. Alternative C would impact the Park in two locations. Alternative C would be located within the northeast corner of the Park and along the western edge of the Park near the power line.

Alternative D

Alternative D would impact the Union Ridge Equestrian Center, Fairfax County Park Authority land, the Fairfax National Golf Course, the Mt. Cavalry Church, and the Manassas NBP.

Alternative D would impact 7.3 acres of the Union Ridge Equestrian Center and create noise and visual impacts. The alternative would bisect the property and create both noise and visual impacts. Impacts to the Union Ridge Equestrian Center are illustrated in Figure 4-23.

Alternative D would impact 20.5 acres of land owned by the Fairfax County Park Authority. Impacts would occur at two locations. Both locations are undeveloped. One location is located west of Bull Run PO Road, which sometimes referred to as the "Huntor-Hacor" assemblage. The other location is between the Park's northern boundary and the Fairfax National Golf Course, which is also within the Park's legislative boundary.

Alternative D would impact 1.7 acres of land along the southern boundary of the Fairfax National Golf Course and create noise and visual impacts, but would not affect use of the facility. Impacts to the Fairfax National Golf Course are illustrated in Figure 4-25. Alternative D would impact a small portion of land owned by the Sudley United Methodist Church, but would not result in any impacts to the Church itself. Impacts to Sudley United Methodist Church are illustrated in Figure 4-26. Expansion of the VA 234 the right-of-way would potentially impact the Mount Calvary Church property along the existing roadway, but would not displace the church or any facilities. Impacts to the Mount Cavalry Baptist Church are illustrated in Figure 4-27.

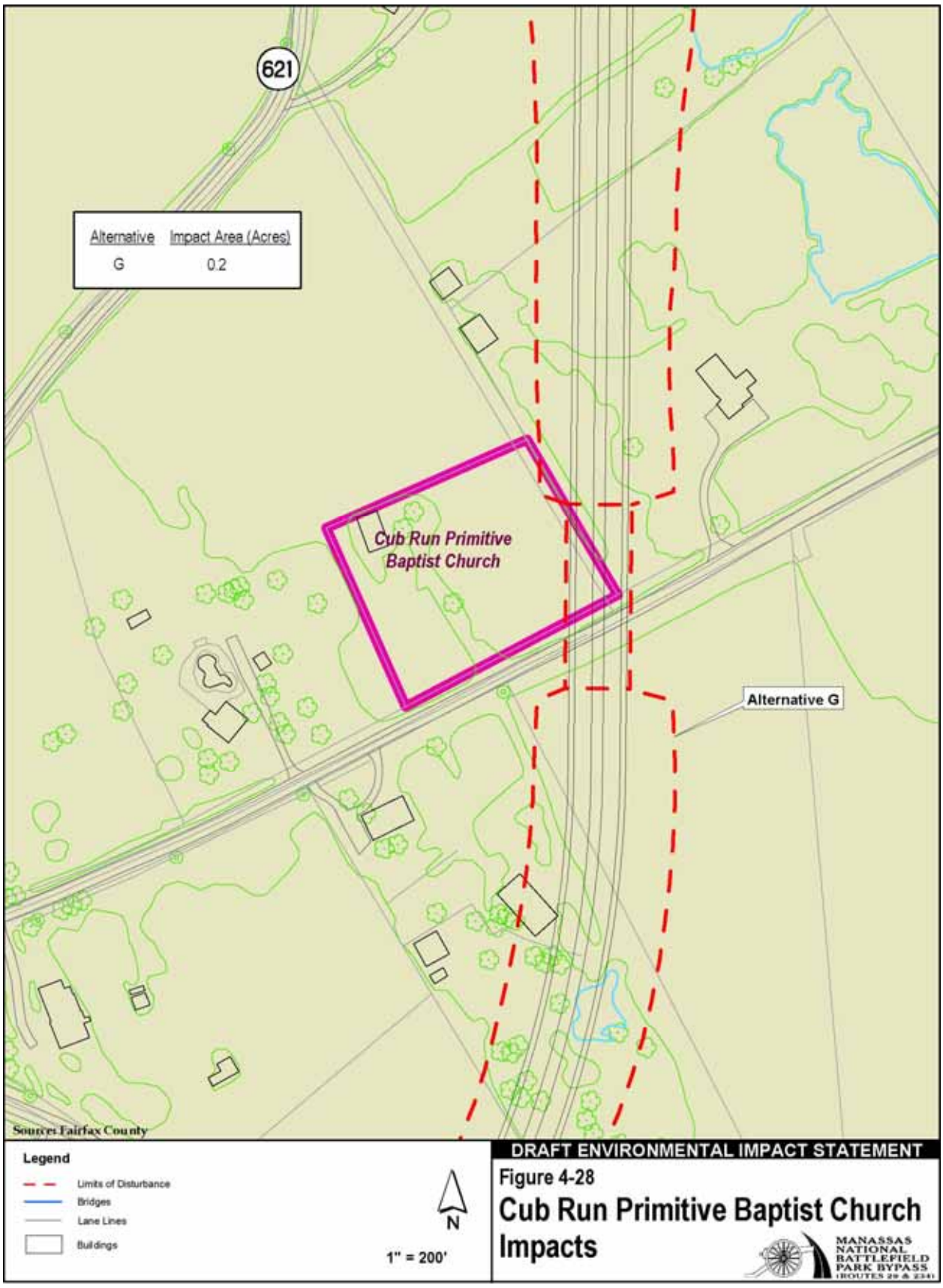
Alternative D would impact 20.6 acres of the Manassas NBP. Alternative D would impact the Park in two locations. Alternative D would be located within the northeast corner of the Park and along the western edge of the Park near the power line.

Alternative G

Alternative G would impact the Cub Run Primitive Baptist Church (**Figure 4-28**), a VDOT rest stop located on I-66, a Strayer University facility, and the Manassas NBP.

Alternative G would cross through the southwest corner of the Cub Run Primitive Baptist Church, but would not displace the church or any facilities. Alternative G would displace the existing rest stop area located on I-66. The rest stop could be relocated at another location on I-66. Alternative G would displace a building in the Battleview Business Park, which currently houses a Strayer University facility.

Alternative G would impact of 42.3 acres of the Manassas BNP. Impacts would occur at several locations along the Park's southern border and on the Park's western edge near the power line.


621
Alternative
Impact Area (Acres)
G
0.2
Cub Run Primitive Baptist Church
Alternative G
Sources Fairfax County
Legend
Limits of Disturbance
Bridges
Lane Lines
Buildings
N
1" = 200'
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-28
Cub Run Primitive Baptist Church Impacts
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

4.7.3 Mitigation

Mitigation strategies would focus on reducing noise, visual, and construction impacts on parks and community facilities. These strategies will be developed in more detail after an alternative is selected and during preliminary engineering. Some potential mitigation strategies that would be available are discussed in more detail in Section 4.14 (Noise), Section 4.12 (Scenic Resources), and Section 4-23 (Construction Impacts).

Physical impacts to the Manassas National Battlefield Park would be offset under each of the Candidate Build Alternatives by conversion of approximately 76.2 acres of roadway within the Manassas NBP to Park ownership.

4.8 ENVIRONMENTAL JUSTICE

4.8.1 Introduction

According to DOT Order 5680.1, a disproportionately high and adverse effect on minority and low-income populations is an adverse effect that, "(1) is predominately borne by a minority and/or a low-income population, or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population."

Minority and low-income groups are often located in areas already experiencing the effects of multiple development projects resulting in social and/or environmental degradation. These areas are likely to be adversely affected by existing industrial, commercial or transportation facilities, and populations in these areas are often not politically organized sufficiently to prevent further adverse development. Typically project impacts could affect areas that are vulnerable due to these factors and impacts that occur in these areas are likely to be considered more severe than the same impacts that would occur in areas not already subject to these conditions.

To adequately assess EJ impacts to minority and low-income populations in the study area, this analysis will determine whether impacts of alternatives (including a No-Build alternative) analyzed in other sections of the EA document would be disproportionate to these populations. Special consideration will be given to cultural diversity and barriers that are common in EJ populations. The following aspects of the study area environment are analyzed for disproportionate impacts:

- Land Use
- Displacements
- Community Facilities
- Community Cohesion
- Public Health and Safety/Hazardous Materials
- Noise
- Traffic and Transportation
- Air Quality
- Local Employment and Economy
- Aesthetics
- Water Quality

- Natural Resources
- Cultural Resources

The geographic extent of environmental impacts for the components listed above will be investigated, where possible, in areas with minority and low-income populations that meet the EJ thresholds. This analysis will use both a quantitative and qualitative approach to determine disproportionate impacts based on an examination of impact analysis performed for other sections of the EA, including the cumulative effects of exposure from many sources. An important aspect of the analysis of the relative impact of environmental effects on EJ populations will be an assessment of the severity of the impacts to EJ groups and the cultural and community significance of effected resources.

4.8.2 Impacts

Although each of the Build Alternatives would displace a number of homes, such displacements would not disproportionately affect any EJ populations in the project area. Similarly, there is no evidence that business displacements would be borne disproportionately by owners from EJ populations. Nor are any of the businesses that would be displaced known to provide unique or irreplaceable services to minority or low-income populations. Alternative G would be located partially within a block group identified as having potential EJ communities; the impacts would not be disproportionate (**Figure 4-29**). Alternative G would impact a corner of land owned by the Cub Run Primitive Baptist Church, but would not affect use of the church.

The project would not affect natural resources that EJ populations rely on for subsistence. The projected concentrations of carbon monoxide (CO) would not exceed National Ambient Air Quality Standards (NAAQS) at any of the receptor locations for any of the alternatives. Noise levels at many sites, not just those within EJ block groups, will exceed the FHWA criteria at which noise abatement measures must be considered. Where feasible and reasonable, noise abatement measures will be provided.

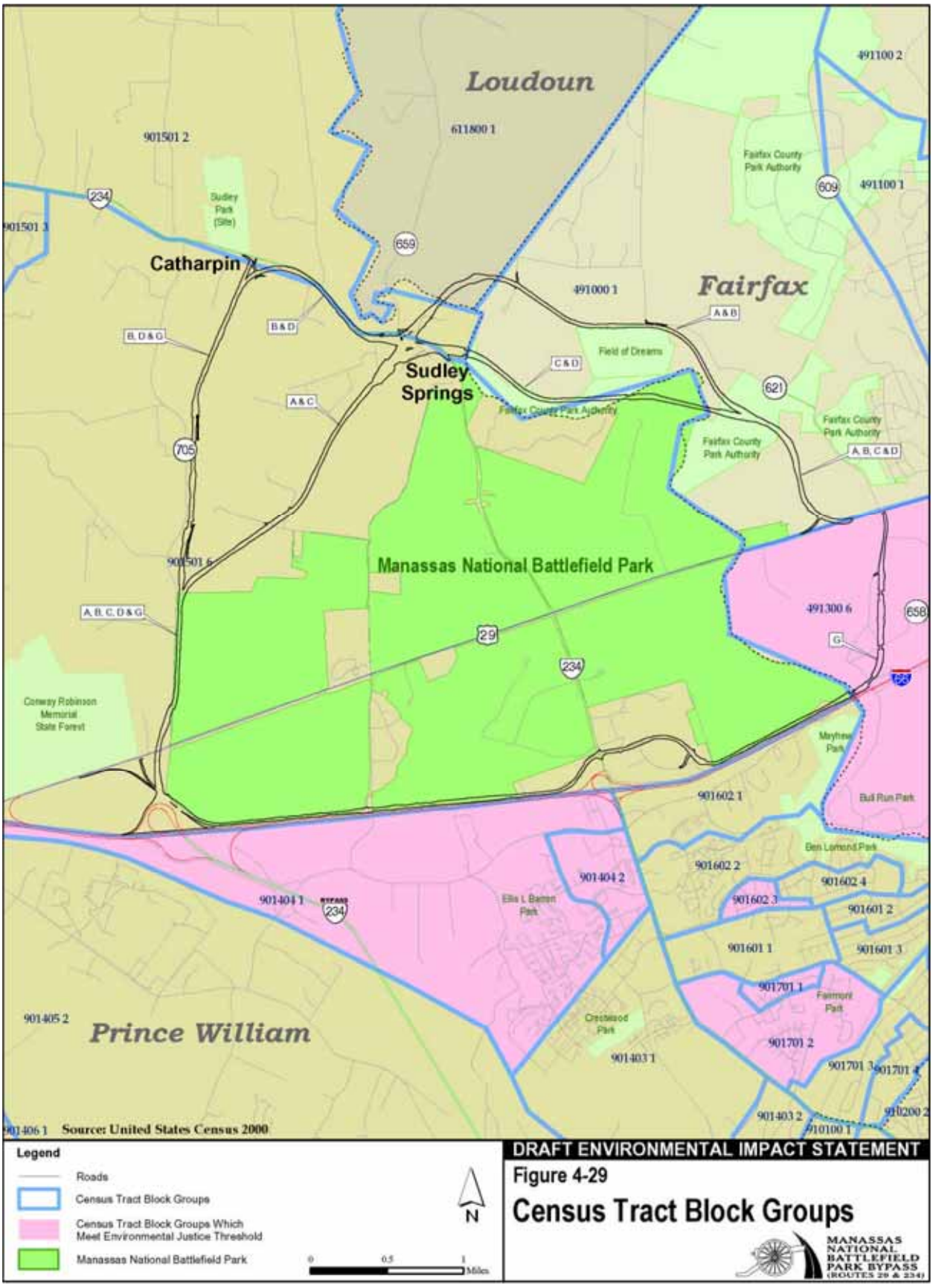
The public involvement program has provided numerous opportunities for participation by EJ populations in the study process. Outreach efforts included a project hotline (phone and e-mail); a website with detailed information about the study process, progress, and alternatives under consideration; and a mailing list that was used to distribute newsletters and meeting announcements

4.8.3 Mitigation

Consistent with NEPA and CEQ guidance, mitigation measures for this project will include steps to avoid, mitigate, minimize, rectify, reduce or eliminate impacts through consultation with the affected population. The magnitude of impact and the appropriateness of modifying the recommended mitigation measure to address disproportionate environmental impacts on minority and low-income populations will be considered.

CEQ guidelines state "mitigation measures identified in an EIS or developed as part of a FONSI should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable". Where disproportionate impacts are anticipated as the result of the proposed project a range of mitigation measures will be suggested. Mitigation measures for EJ impacts will be arrived at through consultation with affected populations and will be consistent with DOT, CEQ and EPA standards. EPA has suggested for example, that in addition to avoidance, minimization and compensation measures, the following mitigation measures should be considered for impacts to minority and low-income populations:

- Reducing pollutant loadings through changes in processes or technologies.


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
611800 1
491100 2
491100 1
491000 1
901501 2
901501 3
901501 6
491300 6
901602 1
901602 2
901602 3
901602 4
901601 1
901601 2
901601 3
901701 1
901701 2
901701 3
901701 4
901404 1
901404 2
901403 1
901403 2
901405 2
901406 1
910200 2
910100 1
Source: United States Census 2000
Legend
Roads
Census Tract Block Groups
Census Tract Block Groups Which Meet Environmental Justice Threshold
Manassas National Battlefield Park
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-29
Census Tract Block Groups
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 29 & 234)

- Reducing or eliminating other sources of pollutants or impacts to reduce cumulative effects.
- Planning for and addressing indirect impacts prior to project initiation (e.g., planning for alternative public transportation alternatives if the project may result in increased population growth).
- Providing assistance to an affected community to ensure that it receives at least its fair (i.e., proportional) share of the anticipated benefits of the proposed action (e.g., through job training, community infrastructure improvements).
- Relocating affected communities, upon request or with concurrence from the affected individuals.
- Establishment of a community oversight committee to monitor progress and identify potential community concerns.
- Changing the timing of impact-causing actions (e.g., noise and pollutant loadings) to reduce effects on minority communities or low-income communities.
- Conducting medical monitoring on affected communities and providing treatment or other responses if necessary.

The type of mitigation that is appropriate for identified impacts will be determined individually for each resource. Mitigation measures to avoid, minimize, or mitigate disproportionately effects and provide offsetting benefits and opportunities to enhance communities, neighborhoods, and individuals affected, will be proposed if feasible and practical. These measures will be based on a review of the analysis, public comments, and field visits.

4.9 CULTURAL RESOURCES

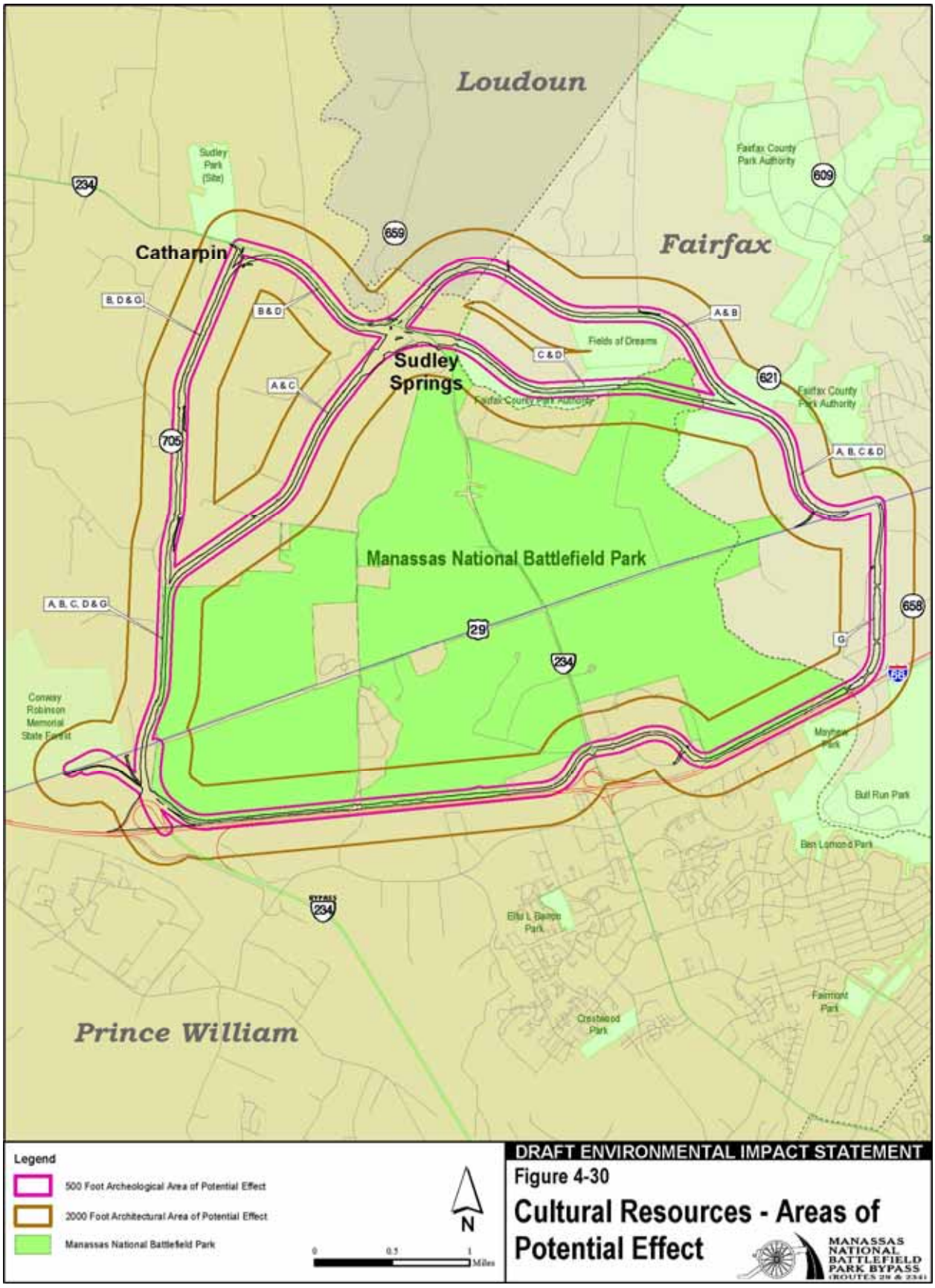
4.9.1 Methodology

An integral part of the identifying process is to determine the area within which archaeological resources would or would likely be affected (36 CFR 800.16(d)). The Area of Potential Effect (APE) for archaeological resources extends 250 feet on each side of the proposed centerline and represents a 500-foot wide corridor. This corridor is of sufficient width to include road construction and all future construction staging areas and local borrow pits. The APE for each alterantive is illustrated in **Figure 4-30**.

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register of Historic Places (NRHP). An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but not be limited to:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register of Historic Places;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities which make it potentially eligible for inclusion in the NRHP.


Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Fairfax County Park Authority
Fields of Dreams
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Park
Ben Lomond Park
Ellis L. Barnes Park
Fairmont Park
Crosswood Park
234
659
609
621
705
29
658
B, D & G
B & D
A & B
C & D
A & C
A, B, C & D
A, B, C, D & G
G
Legend
500 Foot Archeological Area of Potential Effect
2000 Foot Architectural Area of Potential Effect
Manassas National Battlefield Park
N
0
0.5
1
Miles
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-30
Cultural Resources - Areas of Potential Effect
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS
(ROUTES 28 & 234)

For the purposes of this document, a significant impact under the National Environmental Policy Act (NEPA) will be defined as an 'adverse effect' under Section 106 of the National Historic Preservation Act (NHPA).

Although archaeological resources are identified in NEPA, procedures for their identification, evaluation, and treatment are contained in a series of federal and state laws and regulations and agency guidelines. Archaeological resources are protected by a variety of laws and their implying regulations: the most important of these are the National Historic Preservation Act (NHPA) of 1966 as amended in 2000; the Archeological and Historic Preservation Act of 1974; and the Archaeological Resources Protection Act (ARPA) of 1979. Treatment of archaeological resources is further guided by the Advisory Council on Historic Preservation regulations, Protection of Historic Properties (36 CFR 800).

Identification of archaeological resources was conducted according to the requirements of 36 CFR 800 for Section 106 of the NHPA and initiation of the process was implemented with the Virginia Department of Historic Resources (VDHR). As stipulated in Section 800.8, Section 106 can be coordinated with the requirements of NEPA. Preparation of an Environmental Assessment or Environmental Impact Statement can be sufficient in fulfilling the required determination of effects for Section 106 compliance.

4.9.2 Impacts

Impacts to archaeological resources include physical disturbance through road construction, staging areas, and borrow pit excavations and vandalism from temporary increased access during construction. Construction-related ground disturbance consists of subsurface excavation for below grade segment of the road and excavation of borrow pits; surface disturbance related to road grading and use of heavy equipment at staging areas. Road construction creates easy access into adjacent areas; artifact collecting and vandalism of archaeological sites may occur. These types of physical disturbance will disturb or destroy the integrity of the archaeological sites and subsequently, its eligibility for the NRHP. Under Section 106 of the NHPA, these types of impacts are 'adverse effects.'

Known archaeological resources within the Area of Potential Effect (APE) are listed for each alternative in **Table 4-11** below.

TABLE 4-11: KNOWN ARCHAEOLOGICAL RESOURCES IN THE APE

Site Number	Site Type	NRHP Status	No-Action	A	B	C	D	G
44FX1358	Middle Archaic/Middle Woodland Prehistoric camp	Not evaluated				X	X	
44FX1359	Middle Archaic/Middle Woodland/Late Woodland Prehistoric camp	Not evaluated		X	X	X	X	
44FX2436	Prehistoric scatter	Not evaluated		X	X			
44FX2440	Prehistoric camp	Destroyed?		X	X			
44PW254	Late Woodland camp	Not evaluated				X	X	
44PW256	prehistoric	Not evaluated				X	X	

TABLE 4-11: KNOWN ARCHAEOLOGICAL RESOURCES IN THE APE

Site Number	Site Type	NRHP Status	No-Action	A	B	C	D	G
44PW354	Prehistoric scatter /20th century refuse scatter	Not evaluated		X	X	X	X	
44PW355	19th century historic refuse concentration	Not evaluated			X	X	X	
44PW356	19th century historic refuse concentration	Not evaluated				X	X	
44PW479	19th century Brownsville	Not evaluated						X
44PW595	19th century road	Not evaluated			X		X	X
No number	Historic refuse concentration	Not evaluated						X
No number	Mill pond and race remains	Not evaluated			X		X	X

No-Action

The No-Action Alternative does not include any improvements or relocation of the roads (i.e., physical disturbance) beyond periodic maintenance within existing disturbed rights-of-way. No archaeological resources will be adversely affected with the No-Action Alternative.

Alternative A

Four known archaeological sites occur within the APE for Alternative A: three prehistoric sites (44FX1359, 44FX2436, 44FX2440) and one 20th century site (44PW354) (Table 4-11). These sites will be disturbed or destroyed during construction activities.

Additional archaeological sites may occur within the APE for Alternative A and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these archaeological sites may be considered NRHP eligible and would also be disturbed or destroyed during construction activities.

Alternative B

Seven known archaeological sites occur within the APE for Alternative B: three prehistoric sites (44FX1359, 44FX2436, 44FX2440) and four historical sites (44PW354, 44PW355, 44PW595, and a mill pond with mill race remains) (Table 4-11). These sites will be disturbed or destroyed during construction activities.

Additional archaeological sites may occur within the APE for Alternative B and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these archaeological sites may be considered NRHP eligible and would also be disturbed or destroyed during construction activities.

Alternative C

Seven known archaeological sites occur within the APE for Alternative C: four prehistoric sites (44FX1358, 44FX1359, 44PW254, 44PW256) and three historical sites (44PW354, 44PW355, 44PW356) (Table 4-11). These sites will be disturbed or destroyed during construction activities.

Additional archaeological sites may occur within the APE for Alternative C and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these archaeological sites may be considered NRHP eligible and would also be disturbed or destroyed during construction activities.

Alternative D

Nine known archaeological sites occur within the APE for Alternative D: four prehistoric sites (44FX1358, 44FX1359, 44PW254, 44PW256) and five historical sites (44PW354, 44PW355, 44PW356, 44PW595 and a mill pond with mill race remains) (Table 4-11). These sites will be disturbed or destroyed during construction activities.

Additional archaeological sites may occur within the APE for Alternative D and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these archaeological sites may be considered NRHP eligible and would also be disturbed or destroyed during construction activities.

Alternative G

Four known historical archaeological sites occur within the APE for Alternative G: sites 44PW479, 44PW595, a refuse concentration and a mill pond with mill race remains (Table 4-11). These sites will be disturbed or destroyed during construction activities.

Additional archaeological sites may occur within the APE for Alternative G and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these archaeological sites may be considered NRHP eligible and would also be disturbed or destroyed during construction activities.

4.9.3 Mitigation

Mitigation measures reduce adverse effects on archaeological sites. The assumed (and preferred mitigation) is avoidance. Avoidance may be accomplished through redesign or re-routing of the proposed road, staging areas and borrow pit excavations. Avoidance preserves the integrity of archaeological sites and protects its research potential (i.e., NRHP eligibility). Avoidance also avoids costs and potential construction delays associated with data recovery.

Traditionally, data recovery of archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation and dissemination, has been the standard mitigation measure. However, data recovery is labor intensive (i.e., costly) but may be necessary if NRHP-eligible sites cannot be avoided. Data recovery of archaeological information is now considered, in and of itself, an adverse effect under the revised Section 106 regulations (36CFR800.5(a)(2)(i)).

Because intact prehistoric and historical archaeological resources that may contain sufficient information to be NRHP eligible may occur, a Phase I archaeological survey is recommended prior to construction. The Phase I survey would consist of a series of shovel probes and/or backhoe trenches, to identify archaeological sites and to determine their extent and integrity. If intact archaeological sites are identified, Phase II cultural resources studies should be designed in consultation with the NPS-MNBP and VDHR and implemented to determine the NRHP eligibility of the cultural resources. If NRHP-eligible resources occur and cannot be avoided through project redesign, Phase III data recovery investigations should be designed in consultation with NPS-MNBP and the VDHR and implemented prior to construction.

4.10 ARCHITECTURAL RESOURCES

4.10.1 Introduction

An integral part of the identifying process is to determine the area within which architectural resources would or would likely be affected (36 CFR 800.16(d)). The APE for architectural resources extends 1,000 feet on each side of the proposed centerline and represents a 2,000-foot wide corridor. This APE includes areas where important or potentially important architectural resources might be directly affected or subject to either visual or audible impacts.

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but not limited to:

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register of Historic Places;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; and
- transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any visual or audio intrusions to the setting or demolition or alteration of architectural traits, can affect the integrity of that an NRHP-eligible or potentially eligible architectural resource, resulting in alteration or destruction of those characteristics or qualities which make it potentially eligible for inclusion in the NRHP.

For the purposes of this document, a significant impact under NEPA will be defined as an 'adverse effect' under Section 106 of the NHPA.

Although architectural resources are identified in the National Environmental Policy Act (NEPA), procedures for their identification, evaluation, and treatment are contained in a series of federal and state laws and regulations and agency guidelines. Architectural resources are protected by a variety of laws and their implying regulations: the most important of these are the National Historic Preservation Act (NHPA) of 1966 as amended in 2000; the Archeological and Historic Preservation Act of 1974; and the Archaeological Resources Protection Act (ARPA) of 1979. Treatment of architectural resources is further guided by the Advisory Council on Historic Preservation regulations, Protection of Historic Properties (36 CFR 800).

Identification of architectural resources was conducted according to the requirements of 36 CFR 800 for Section 106 of the NHPA and initiation of the process was implemented with the Virginia Department of Historic Resources (VDHR). As stipulated in Section 800.8, Section 106 can be coordinated with the requirements of NEPA. Preparation of an Environmental Assessment or Environmental Impact Statement can be sufficient in fulfilling the required determination of effects for Section 106 compliance.

Although cemeteries may be considered historic resources (i.e., older than 50 years), they are not ordinarily considered NRHP-eligible (NPS 2002:25). However, some cemeteries may be considered as NRHP-eligible resources under special criteria consideration D (NPS 2002:25):

A cemetery is eligible if it derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events (NPS 2002:34).

Some cemeteries may be considered NRHP-eligible as a result of their unique grave stone or mausoleum architecture, or as contributing elements to a Civil War battlefield or other National Register District. Unless specified, most of the cemeteries identified during this project represent small local, slave or family cemeteries that are not likely to be considered NRHP-eligible.

Even though these cemeteries are not NRHP-eligible, they warrant identification and discussion in accordance with the Code of Virginia which dictates strict regulations for the acquisition (Title 33.1 Chapter 1, Article 8), care (Title 57, Chapter 3, Article 3.2), abandonment and removal (Title 57, Chapter 3, Article 4) and disturbance penalties (Title 18.2 Chapter 5). In addition, the Virginia Antiquities Act (Title 10 Chapter 23) requires a permit for the archaeological excavation and relocation of human remains.

4.10.2 Impacts

Impacts to architectural resources may include demolition, alteration of architectural traits, structural instability through vibration, audio intrusions from increased traffic and visual intrusions to historic settings and rural landscapes. Known architectural resources within the area of potential effect (APE) are listed in **Table 4-12** for both a 500-foot corridor and a 2,000-foot corridor for each alternative.

TABLE 4-12: KNOWN ARCHITECTURAL RESOURCES IN THE APE

Resource Number	Type	NRHP Status	Cemetery	500 foot corridor					2000 foot corridor				
				A	B	C	D	G	A	B	C	D	G
029-0259	Sudley	Not evaluated							X	X			
076-0062	1919 Sudley Church and cemetery	Not evaluated	X								X	X	
076-0166	1900 Simpson House/ 19th-20th century Pattie Cemetery	Not evaluated	X							X		X	X
076-0169	1850 Spring/Spring House	Not evaluated				X	X						
076-0170	1840 Sudley Springs Post Office	Not evaluated									X	X	
076-0207	1790 Wheeler House/ Willow Green	Not evaluated											X
076-0292	1850 Haislip cemetery and house site	Not evaluated	X							X		X	X
076-0297	1938 Conway Robinson Memorial State Forest and Monument	Not evaluated							X	X	X	X	X
076-0362	1850 Shed	Not							X	X	X	X	X

TABLE 4-12: KNOWN ARCHITECTURAL RESOURCES IN THE APE

Resource Number	Type	NRHP Status	Cemetery	500 foot corridor					2000 foot corridor				
				A	B	C	D	G	A	B	C	D	G
		evaluated											
076-0365	Thornburry House	Not evaluated									X	X	
076-0433	1880 Italianate House	Not evaluated						X	X	X	X	X	
076-0434	1900 house	Not evaluated							X	X	X	X	X
076-0435	1920 house	Not evaluated		X	X	X	X	X					
No number	Sudley Springs Ford on Catharpin Run	Not evaluated		X	X	X	X						
No number	Sudley Ford on Bull Run	Not evaluated		X	X	X	X						
076-0441	Swart Family cemetery	Not evaluated	X						X	X	X	X	X
44FX1281	1825-1876 cemetery	Not evaluated	X	X	X								
44FX1371	Cemetery	Not evaluated	X					X					
No number	Cemetery	Not evaluated	X					X					
No number	Slave cemetery (B)	Not evaluated	X							X		X	X
No number	Slave cemetery (G)	Not evaluated	X						X	X			
No number	Mount Calvary Baptist Church and cemetery	Not evaluated	X		X		X						
No number	Garden Club Commemoratives	Not evaluated							X	X	X	X	X

No-Action

The No-Action Alternative does not include any improvements or relocation of the roads (i.e., physical disturbance) beyond periodic maintenance within existing disturbed rights-of-way. No architectural resources will be adversely affected with the No-Action Alternative.

Alternative A

Twelve architectural resources (Table 4-12) are located within the APE for Alternative A. Four resources including two fords, a 1920s house and an 1825-1876 cemetery occur within the 500-foot corridor and will be disturbed or destroyed by construction activities.

Eight architectural resources are located within the 2,000-foot corridor. Four architectural resources contain standing structures; construction of the proposed road will be intrusive to the historic setting and create visual and noise effects. Four resources consisting of the Conway Robinson State Forest, two small cemeteries, and the Garden Club commemorative plaques, will not be affected.

Additional architectural resources sites may occur within the APE for Alternative A and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these architectural resources may be considered NRHP-eligible and would also be disturbed or destroyed during construction activities.

No rural historical landscapes have yet been identified in the project area; however, the two areas, along Pageland Lane and along Bull Run Post Office Road, may contain characteristics associated with rural historical landscapes. The construction of Alternative A could create visual and noise effects to potential rural landscapes.

Alternative B

Sixteen architectural resources (Table 4-12) are located within the APE for Alternative B. Five resources including two fords, a 1920s house, an 1825-1876 cemetery, and the Mount Calvary Baptist Church and cemetery occur within the 500-foot corridor and will be disturbed or destroyed by construction activities.

Eleven architectural resources are located within the 2,000-foot corridor. Six architectural resources contain standing structures; construction of the proposed road will be intrusive to the historic setting and create visual and noise effects. Cemeteries associated with two of the standing structures will not be affected. Five resources consisting of the Conway Robinson State Forest, the Garden Club commemorative plaques, and three small cemeteries, will not be affected.

Additional architectural resources sites may occur within the APE for Alternative B and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these architectural resources may be considered NRHP-eligible and would also be disturbed or destroyed during construction activities.

No rural historical landscapes have yet been identified in the project area; however, the two areas, along Pageland Lane and along Bull Run Post Office Road, may contain characteristics associated with rural historical landscapes. The construction of Alternative B could create visual and noise effects to potential rural landscapes.

Alternative C

Thirteen architectural resources (Table 4-12) are located within the APE for Alternative C. Four resources including two fords, a 1920s house and an 1850 spring house occur within the 500 foot corridor and will be disturbed or destroyed by construction activities.

Nine architectural resources are located within the 2,000-foot corridor. Six architectural resources contain standing structures; construction of the proposed road will be intrusive to the historic setting and create visual and noise effects. The cemetery associated with the Sudley Church will not be affected. Three resources consisting of the Conway Robinson State Forest, one cemetery, and the Garden Club commemorative plaques, will not be affected.

Additional architectural resources sites may occur within the APE for Alternative C and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these architectural resources may be considered NRHP-eligible and would also be disturbed or destroyed during construction activities.

No rural historical landscapes have yet been identified in the project area; however, the two areas, along Pageland Lane and along Bull Run Post Office Road, may contain characteristics associated with rural historical landscapes. The construction of Alternative C could create visual and noise effects to potential rural landscapes.

Alternative D

Seventeen architectural resources (Table 4-12) are located within the APE for Alternative D. Five resources including two fords, a 1920s house, an 1850 spring house, and the Mount Calvary Baptist Church and cemetery occur within the 500-foot corridor and will be disturbed or destroyed by construction activities.

Twelve architectural resources are located within the 2,000-foot corridor. Nine architectural resources contain standing structures; construction of the proposed road will be intrusive to the historic setting and create visual and noise effects. Three cemeteries associated with standing structures will not be affected. Three resources, consisting of the two small cemeteries and the Garden Club commemorative plaques, will not be affected.

Additional architectural resources sites may occur within the APE for Alternative D and would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these architectural resources may be considered NRHP-eligible and would also be disturbed or destroyed during construction activities.

No rural historical landscapes have yet been identified in the project area; however, the two areas, along Pageland Lane and along Bull Run Post Office Road, may contain characteristics associated with rural historical landscapes. The construction of Alternative D could create visual and noise effects to potential rural landscapes.

Alternative G

Thirteen architectural resources (Table 4-12) are located within the APE for Alternative G. Four resources including an 1880 Italianate house, a 1920s house and two small cemeteries occur within the 500-foot corridor and will be disturbed or destroyed by construction activities.

Nine architectural resources are located within the 2,000-foot corridor. Five architectural resources contain standing structures; construction of the proposed road will be intrusive to the historic setting and create visual and noise effects. Two cemeteries associated with two of the standing structures will not be affected. Four resources consisting of the Conway Robinson State Forest, two cemeteries, and the Garden Club commemorative plaques, will not be affected.

Additional architectural resources sites may occur within the APE for Alternative G and would be identified during subsequent cultural resources investigations if this Alternative were selected. Some of these architectural resources may be considered NRHP-eligible and would also be disturbed or destroyed during construction activities.

No rural historical landscapes have yet been identified in the project area; however, one area along Pageland Lane may contain characteristics associated with a rural historical landscape. The construction of Alternative G could create visual and noise effects to a potential rural landscape.

4.10.3 Mitigation

Mitigation measures reduce adverse effects on architectural resources. For architectural resources within the 500-foot corridor, mitigation measures may include, but not be limited to, avoidance through project redesign, relocation of historic buildings, and documentation through the Historic American Building Survey (HABS) or the Historic American Engineering Record (HAER) programs administered by the National Park Service. The assumed (and preferred mitigation) is avoidance. Avoidance may be accomplished through redesign or re-routing of the proposed road, staging areas and borrow pit excavations. Avoidance preserves the integrity of architectural resources and protects its research potential (i.e., NRHP eligibility). Avoidance also avoids costs and potential construction delays associated with more labor intensive types of mitigations. Relocation of historic buildings may be an option; however, relocation is considered an adverse effect because aspects of integrity such as location, setting and association, are destroyed. Documentation of buildings and structures to the HABS/HAER standards preserve the contextual and architectural information of the resource even though the resource is demolished.

Mitigation measures for architectural resources and possible rural landscapes with visual and noise impacts include, but are not limited to, redesign of the proposed road using subgrade options, compatible vegetative screening, sound barriers, and road and bridge design with historically compatible materials and appropriate landscaping.

Because there is a possibility for encountering additional architectural resources that may contain sufficient information to be NRHP-eligible, an architectural survey and evaluation study is recommended. If NRHP-eligible resources occur and cannot be avoided through project redesign, mitigation measures should be identified in consultation with NPS-MNBP and the VDHR and implemented prior to construction.

Because there is a possibility that the two rural landscapes occur in the project area and may contain sufficient information to be NRHP-eligible, a rural landscape study is recommended. If NRHP-eligible rural landscapes occur, mitigation measures should be identified in consultation with NPS-MNBP and the VDHR and implemented prior to construction.

4.11 CIVIL WAR RESOURCES

4.11.1 Introduction

An integral part of the identifying process is to determine the area within which Civil War archaeological and architectural resources would or would likely be affected (36 CFR 800.16(d)). The APE for Civil War archaeological resources is the same as identified for archaeological resources in Section 4.9.1. The APE for Civil War architectural resources is the same as identified in Section 4.10.1.

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but not limited to:

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register of Historic Places;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; and
- transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities which make it potentially eligible for inclusion in the NRHP. While archaeological sites or historic buildings or structures can be destroyed during a single event, more often it is the cumulative effect of recurrent disturbing actions that diminish the integrity of the cultural resource and its important characteristics.

For the purposes of this document, a significant impact under NEPA will be defined as an 'adverse effect' under Section 106 of the NHPA.

Cultural Landscapes

Three broad landscapes and seventeen component cultural landscapes have been identified within the Manassas National Battlefield Park and reflect both the battlefield and agricultural contexts. Defining characteristics for the overall landscapes include spatial organization, natural environment, land use, views and vistas, and circulation patterns. Component landscapes are defined by a variety of contributing features including vegetation, structures, archaeological sites, and small-scale features.

Levels of impact were defined to assess effects to the Civil War cultural landscapes. These levels were defined based elements of the component landscapes, the location of the effects within the component landscape (periphery or core) and the types of effects to contributing landscape elements (alteration or loss and removal) (**Table 4-13**).

TABLE 4-13: LEVELS OF IMPACT FOR CULTURAL LANDSCAPES

Level of Impact	Component Landscape		Overall Landscape
	Periphery	Core	
Low	Alteration of elements		Alteration of peripheral elements
Moderate	Loss or removal of elements	Alteration of elements	Loss or removal of peripheral elements; Alteration of core elements
High		Loss or removal of elements	Loss or removal of core elements

Low- physical disturbance to contributing elements on the periphery of the defined component landscape such as changes in land use that alter vegetation related to period of significance (including fencelines, wood lots and field patterns), disturbance of contributing archaeological sites and alteration of boundary demarcations and small-scale features such as cemeteries, wells, and springs.

Moderate- physical destruction to contributing elements on the periphery of the component landscape such as loss of vegetation related to period of significance, loss or removal of contributing archaeological sites, loss of boundary demarcations and small-scale features, widening and reconstruction of historic roadways, construction of new buildings and structures and introduction of nonhistoric land uses; physical alteration to contributing elements within the core of the component landscape such as widening and reconstruction of historic roadways, alteration of vegetation related to period of significance, and introduction of nonhistoric land uses.

High-physical loss or removal to contributing elements within the core of the component landscape such as widening and reconstruction of historic roadways, loss of vegetation related to period of significance, construction of new buildings and structures and introduction of nonhistoric land uses; intrusive and non-compatible elements constructed within the component landscape core; these effects to the component landscape(s) culminate in effects to the overall landscape contributing elements (i.e., spatial organization, natural environment, land use, views and vistas, and circulation patterns).

Although archaeological and architectural resources are identified in the National Environmental Policy Act (NEPA), procedures for their identification, evaluation, and treatment are contained in a series of federal and state laws and regulations and agency guidelines. Archaeological and architectural resources are protected by a variety of laws and their implying regulations: the most important of these are the National Historic Preservation Act (NHPA) of 1966 as amended in 2000; the Archeological and Historic Preservation Act of 1974; and the Archaeological Resources Protection Act (ARPA) of 1979. Treatment of archaeological and architectural resources is further guided by the Advisory Council on Historic Preservation regulations, Protection of Historic Properties (36 CFR 800).

Identification of Civil War archaeological and architectural resources was conducted according to the requirements of 36 CFR 800 for Section 106 of the NHPA and initiation of the process was implemented with the Virginia Department of Historic Resources (VDHR). As stipulated in Section 800.8, Section 106 can be coordinated with the requirements of NEPA. Preparation of an Environmental Assessment or Environmental Impact Statement can be sufficient in fulfilling the required determination of effects for Section 106 compliance.

4.11.2 Impacts

Impacts to Civil War archaeological and architectural resources and cultural landscapes may include construction-related ground disturbance, vandalism from temporary increased access during construction; visual intrusions; audio intrusions from increased traffic, and demolition of architectural resources. Construction-related impacts include subsurface excavation of the road base, and surface disturbance related to construction staging areas and use of heavy equipment. **Table 4-14** lists the known Civil War resources that may be impacted by each alternative. **Table 4-15** lists the Civil War probability areas and effects. **Table 4-16** lists the Civil War cultural landscapes and effects. Following the tables, are explanations of the impacts for each alternative.

TABLE 4-14: KNOWN CIVIL WAR RESOURCES POTENTIALLY IMPACTED BY ALTERNATIVES

Resource Number	Type	NRHP Status	No-Action	A	B	C	D	G
44PW0299	Unfinished Railroad	Contributing		X	X	X	X	X
44PW455	Civil War campsite	Eligible						X
44PW579	Prehistoric/Civil War cemetery	Contributing		X	X	X	X	X
No number	Unfinished Railroad Quarry	Contributing		X	X	X	X	X
44PW623	Civil War cemetery	Eligible		X	X	X	X	X
029-0084 (44PW290)	Bull Run Stone Bridge	Contributing	X					
076-0028 (44PW298)	Stone House	Contributing	X					
44PW302	Lucinda Dogan House	Contributing	X					
029-0259	Sudley	Contributing	X					
No number	Groveton Cemetery	Contributing	X					
No number	Rock Features/Fortifications	Not evaluated						X

TABLE 4-15: CIVIL WAR PROBABILITY AREAS POTENTIALLY IMPACTED BY ALTERNATIVES

Probability Area	No-Action	A	B	C	D	G
Ball's Ford						X
Bull Run				X	X	
Lewis Lane/Young's Branch						X
Pageland Lane		X	X	X	X	X
Poplar Ford		X	X	X	X	
Portici						X
Stony Ridge		X		X		
South Bald Hill						X
Sudley Springs		X	X	X	X	
Warrenton Turnpike, East of Stone Bridge		X	X	X	X	X

TABLE 4-16: CIVIL WAR CULTURAL LANDSCAPES AND EFFECTS

Resource Number	Name	No-Action	A	B	C	D	G
600182	Brawner Farmstead		Low	Low	Low	Low	Low
600185	Groveton/Lucinda Dogan Farmstead	Moderate					
600184	John Dogan Farmstead	Moderate					
600185	Groveton Cemetery	Moderate					
600186	Unfinished Railroad	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
600188	Thornberry Site/Sudley	Moderate	Low	Low	Low	Low	
600190	Henry Farmstead	Moderate					
600191	Robinson Farmstead	Moderate					
600192	Portici Farmstead						Low
600193	Hazel Plain Estate	Moderate					
600194	Pittsylvania Estate	Moderate			Low	Low	
600195	Van Pelt Estate	Moderate	Low	Low	Low	Low	
600196	Matthew Farmstead	Moderate					
600197	Stone House	Moderate					
600198	Cundiff Farmstead	Moderate	Low	Low	Low	Low	Low
600283	New York Monuments	Moderate					
600199	Lewis Farmstead						Low
No number	Overall Landscape - Southern Half	Moderate	Low	Low	Low	Low	Low
No number	Overall Landscape-Northeast Quadrant	Moderate	Low	Low	Low	Low	Low
No number	Overall Landscape-Northwest Quadrant	Moderate	Low	Low	Low	Low	Low

No-Action

The No-Action Alternative does not include any improvements or relocation of the roads (i.e., physical disturbance) beyond periodic maintenance within existing disturbed rights-of-way. No known Civil War archaeological resources or probability areas along the Warrenton Turnpike or Sudley Road will be adversely affected with the No-Action Alternative.

With the No-Action Alternative, traffic along Routes 234 and Highway 29 will continue to increase with a resultant increase in noise intrusions to contributing elements of the NRHP Manassas National Battlefield Historic District. Traffic induced noise at the Stone Bridge, the Stone House, the Lucinda Dogan house, Sudley and the Groveton Cemetery was determined to exceed defined decibel levels in 1996 (Bowlby and Associates, Inc. and Staiano Engineering, Inc. 1996:31).

With the No-Action Alternative, traffic will increase resulting in increases in noise effects to those five resources which will continue to exceed defined decibel levels.

A vibration study near the Stone House was conducted in 1996 (Bowlby and Associates, Inc. and Staiano Engineering, Inc. 1996). Vibration levels from daily traffic, truck passbys and pedestrian footfalls were documented. The measured building response to traffic averages and individual vehicle passbys were within the defined limits indicating nondestructive vibration from these sources; however, measured ground vibration from unknown sources substantially exceeded the defined criteria. Due to the resulting low vibration levels of the Stone House because of its massive construction, this increased ground vibration was considered a small risk of creating structural damage. No adverse effects from traffic-induced vibration are expected.

Three broad landscapes and seventeen component cultural landscapes occur within the Manassas National Battlefield Park and reflect both the battlefield and agricultural contexts. Currently, fourteen of the seventeen component cultural landscapes and all three overall landscapes experience degradation of important views and vistas from traffic induced visual intrusions. Prior widening and resurfacing of the historic roadways, the Warrenton Turnpike (Route 29) and Sudley Road (Route 234), has already contributed to a slight loss of integrity of the associated landscapes. With the No-Action Alternative, future increases in traffic will result in increased degradation of important views and vistas within the core areas of fourteen component cultural landscapes and three overall landscapes. Impacts to these cultural landscapes would be moderate.

Alternative A

Four known Civil War archaeological sites occur within the APE for Alternative A: the unfinished railroad, the railroad quarry, and two Civil War cemeteries (Table 4-14). These sites will be disturbed or destroyed during construction activities.

Additional Civil War archaeological sites may occur within the APE for Alternative A as designated in five different archaeological probability areas (Table 4-15). These sites would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these Civil War archaeological sites may be considered contributing to the NRHP Historic District. These resources would also be disturbed or destroyed during construction activities.

Five component landscapes and three overall landscapes will be affected by Alternative A (Table 4-16). Fence lines on the western edge of the Brawner Farm may be disturbed resulting in a low impact. The railroad quarry site associated with southwestern end of the Unfinished Railroad landscape may be destroyed resulting in a moderate impact. Boundary lines may be disturbed on the northern edge of the Thornberry/Sudley landscape resulting in a low impact. Views and vistas to the east from the Van Pelt landscape may be affected resulting in a low impact. Western boundary and fence lines associated with the Cundiff landscape may be disturbed resulting in a low impact. Even though some contributing peripheral elements will be adversely affected for some component landscapes, these effects do not substantially impact the spatial organization, natural

environment, land use, views and vistas, and circulation patterns within each of the three overall landscapes; therefore the impacts to the overall landscapes are considered to be low.

Alternative B

Four known Civil War archaeological sites occur within the APE for Alternative B: the unfinished railroad, the railroad quarry, and two Civil War cemeteries (Table 4-14). These sites will be disturbed or destroyed during construction activities.

Additional Civil War archaeological sites may occur within the APE for Alternative B as designated in four different archaeological probability areas (Table 4-15). These sites would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these Civil War archaeological sites may be considered contributing to the NRHP Historic District. These resources would also be disturbed or destroyed during construction activities.

Five component landscapes and three overall landscapes will be affected by Alternative B (Table 4-16). Fence lines on the western edge of the Brawner Farm may be disturbed resulting in a low impact. The railroad quarry site associated with southwestern end of the Unfinished Railroad landscape may be destroyed resulting in a moderate impact. Boundary lines may be disturbed on the northern edge of the Thornberry/Sudley landscape resulting in a low impact. Views and vistas to the east from the Van Pelt landscape may be affected resulting in a low impact. Western boundary and fence lines associated with the Cundiff landscape may be disturbed resulting in a low impact. Even though some contributing peripheral elements will be adversely affected for some component landscapes, these effects do not substantially impact the spatial organization, natural environment, land use, views and vistas, and circulation patterns within each of the three overall landscapes; therefore the impacts to the overall landscapes are considered to be low.

Alternative C

Four known Civil War archaeological sites occur within the APE for Alternative C: the unfinished railroad, the railroad quarry, and two Civil War cemeteries (Table 4-14). These sites will be disturbed or destroyed during construction activities.

Additional Civil War archaeological sites may occur within the APE for Alternative C as designated in six different archaeological probability areas (Table 4-15). These sites would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these Civil War archaeological sites may be considered contributing to the NRHP Historic District. These resources would also be disturbed or destroyed during construction activities.

Six component landscapes and three overall landscapes will be affected by Alternative C (Table 4-16). Fence lines on the western edge of the Brawner Farm may be disturbed resulting in a low impact. The railroad quarry site associated with southwestern end of the Unfinished Railroad landscape may be destroyed resulting in a moderate impact. Boundary lines may be disturbed on the northern edge of the Thornberry/Sudley landscape resulting in a low impact. Boundary and fence lines may be disturbed on the northern edge of the Pittsylvania landscape resulting in a low impact. Views and vistas to the east from the Van Pelt landscape may be affected resulting in a low impact. Western boundary and fence lines associated with the Cundiff landscape may be disturbed resulting in a low impact. Even though some contributing peripheral elements will be adversely affected for some component landscapes, these effects do not substantially impact the spatial organization,

natural environment, land use, views and vistas, and circulation patterns within each of the three overall landscapes; therefore the impacts to the overall landscapes are considered to be low.

Alternative D

Four known Civil War archaeological sites occur within the APE for Alternative D: the unfinished railroad, the railroad quarry, and two Civil War cemeteries (Table 4-14). These sites will be disturbed or destroyed during construction activities.

Additional Civil War archaeological sites may occur within the APE for Alternative D as designated in five different archaeological probability areas (Table 4-15). These sites would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these Civil War archaeological sites may be considered contributing to the NRHP Historic District. These resources would also be disturbed or destroyed during construction activities.

Six component landscapes and three overall landscapes will be affected by Alternative D (Table 4-16). Fence lines on the western edge of the Brawner Farm may be disturbed resulting in a low impact. The railroad quarry site associated with southwestern end of the Unfinished Railroad landscape may be destroyed resulting in a moderate impact. Boundary lines may be disturbed on the northern edge of the Thornberry/Sudley landscape resulting in a low impact. Boundary and fence lines may be disturbed on the northern edge of the Pittsylvania landscape resulting in a low impact. Views and vistas to the east from the Van Pelt landscape may be affected resulting in a low impact. Western boundary and fence lines associated with the Cundiff landscape may be disturbed resulting in a low impact. Even though some contributing peripheral elements will be adversely affected for some component landscapes, these effects do not substantially impact the spatial organization, natural environment, land use, views and vistas, and circulation patterns within each of the three overall landscapes; therefore the impacts to the overall landscapes are considered to be low.

Alternative G

Six known Civil War archaeological sites occur within the APE for Alternative G: the unfinished railroad, the railroad quarry, a campsite, two Civil War cemeteries, and possible rock fortification features (Table 4-14). These sites will be disturbed or destroyed during construction activities.

Additional Civil War archaeological sites may occur within the APE for Alternative G as designated in six different archaeological probability areas (Table 4-15). These sites would be identified during subsequent cultural resources investigations if this Alternative is selected. Some of these Civil War archaeological sites may be considered contributing to the NRHP Historic District. These resources would also be disturbed or destroyed during construction activities.

Five component landscapes and three overall landscapes will be affected by Alternative G (Table 4-16). Fence lines on the western edge of the Brawner Farm may be disturbed resulting in a low impact. The railroad quarry site associated with southwestern end of the Unfinished Railroad landscape may be destroyed resulting in a moderate impact. Boundary and fence lines may be disturbed on the southern edge of the Portici landscape resulting in a low impact. Western boundary and fence lines associated with the Cundiff landscape may be disturbed resulting in a low impact. Southern boundary and fence lines associated with the Lewis landscape may be disturbed resulting in a low impact. Even though some contributing peripheral elements will be adversely affected for some component landscapes, these effects do not substantially impact the spatial

organization, natural environment, land use, views and vistas, and circulation patterns within each of the three overall landscapes; therefore the impacts to the overall landscapes are considered to be low.

4.11.3 Mitigation

Mitigation measures reduce adverse effects on Civil War resources and cultural landscapes. The assumed (and preferred mitigation) is avoidance. Avoidance may be accomplished through redesign or re-routing of the proposed road, staging areas and borrow pit excavations. Avoidance preserves the integrity of Civil War resources, and protects their research potential (i.e., NRHP eligibility). Avoidance also avoids costs and potential construction delays associated with data recovery.

Traditionally, data recovery of Civil War archaeological sites through professional techniques such as surface collection, mapping, photography, subsurface excavation, technical report preparation and dissemination, has been the standard mitigation measure. However, data recovery is labor intensive (i.e., costly) but may be necessary if NRHP-eligible sites cannot be avoided. Data recovery of archaeological information is now considered, in and of itself, an adverse effect under the revised Section 106 regulations (36CFR800.5(a)(2)(i)).

Because intact Civil War archaeological resources that may contain sufficient information to be NRHP eligible may occur, a Phase I archaeological survey is recommended prior to construction. The Phase I survey would consist of a series of shovel probes and/or backhoe trenches, to identify Civil War archaeological sites and to determine their extent and integrity. If intact Civil War archaeological sites are identified, Phase II cultural resources studies should be designed in consultation with the NPS-MNBP and VDHR and implemented to determine the NRHP eligibility of the cultural resources. If NRHP-eligible resources occur and cannot be avoided through project redesign, Phase III data recovery investigations should be designed in consultation with NPS-MNBP and the VDHR and implemented prior to construction.

Mitigation measures for Civil War cultural landscapes include, but are not limited to, detailed documentation of contributing landscape elements that will be disturbed or destroyed, redesign of the proposed road using subgrade options, compatible vegetative screening, sound barriers, and road and bridge design with historically compatible materials and appropriate landscaping.

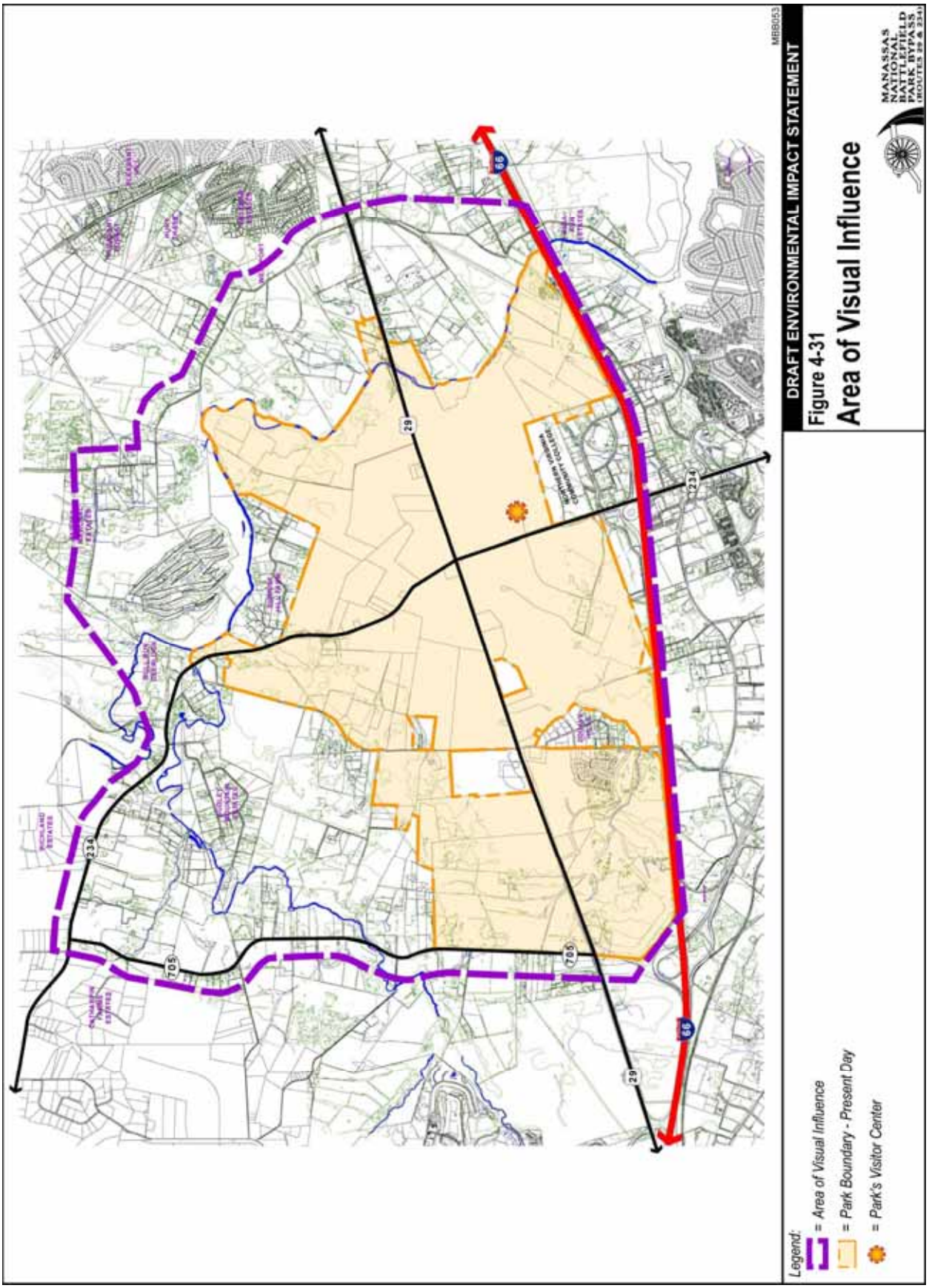
4.12 SCENIC RESOURCES AND AESTHETICS

4.12.1 Introduction

This section describes the visual and aesthetic consequences (impacts) of implementing the No-Action Alternative, and Alternatives A, B, C, D and G on the area of visual influence (**Figure 4-31**). Included at the end of this section are key views, identified in Chapter 3, selected for creating photo-simulations based on their locations, the areas that they represent and the impacts associated with the Alternatives.

The criteria used to assess impacts to the existing visual environment were based on the methodologies outlined in *Visual Assessment for Highway Projects* (USDOT, 1981). The criteria are intended to illustrate not only potential negative impacts, but also opportunities for enhancing the visual environment and traveling experience that would result from construction of a bypass. These criteria are outlined below:

Integration with the natural features of the area. The more compatible a new roadway is with the character of the existing landforms and land cover, the less it will impact the visual environment. Also, the less visually


DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-31
Area of Visual Influence
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)
Legend:
= Area of Visual Influence
= Park Boundary - Present Day
= Park's Visitor Center
66
29
234
705
M88053

apparent the roadway is to residents in the viewsheds, the less the visual environment has been impacted. A well-integrated roadway segment has the following attributes:

- parallels ridge/valley lines without altering the top of a ridgeline;
- graded slightly into the land, rather than filled on the top of the landform;
- has cut-and-fill slopes that are not excessively high; and
- does not require clearing/disturbance of woodlands and wetlands.

Impacts on community fabric. A roadway segment will have relatively less impact on a community if it has the following characteristics:

- maintains existing physical connections between communities;
- creates new connections between currently divided communities; and
- creates new community entry points.

Impacts on areas of high visual quality. It is assumed that changes to the visual environment in an area with lower visual quality are more acceptable than changes to an area with high visual quality since low quality areas are already less unified, vivid or distinctive. For this criterion, a roadway segment with positive attributes does the following:

- is routed through areas with low levels of visual quality;
- creates a low level of disturbance/impact as evaluated by criteria 1 and 2 above; and
- creates opportunities for aesthetic improvements to an area of low visual quality.

Impacts on areas of high viewer sensitivity. A roadway which has minimal impact on high viewer sensitivity is characterized as follows:

- avoids areas containing viewers with high sensitivity to changes in the visual setting; and
- is located in areas containing a minimal number of viewers or viewers with low sensitivity to change.

Impacts on the existing visual setting. A roadway which positively impacts the existing visual setting:

- results in the removal of dilapidated and/or unattractive structures; and
- includes consolidation of ramps and approaches to reduce the visible roadway area;
- contains buffering with berms and landscaping; and
- has adequate pedestrian walkways.

Creation of viewing opportunities from the roadway, i.e., potential aesthetic benefits for motorists and others. A roadway with positive impacts on viewing opportunities does the following:

- contributes new scenic views of high quality aesthetic settings;
- includes community “gateways” or high quality entrances; and
- removes visual impediments to potentially high quality views such as overhead ramps, barrier walls, and unattractive foreground or background structures.

Impacts on scenic thoroughfares**,** such as Pageland Lane, Route 234, Bull Run Post Office Road, and Lee Highway (Route 29). A roadway segment has minimal impact to scenic thoroughfares if it does the following:

- does not cross a scenic thoroughfare or cannot be viewed from a scenic thoroughfare;
- crosses a scenic thoroughfare in a location that does not modify the existing high quality views from the thoroughfare; and
- creates a new segment or a connection to or within an existing scenic thoroughfare.

4.12.2 Impacts

As part of the visual impact assessment, each alternative was evaluated based on the evaluation criteria outlined above. **Table 4-17** illustrates the overall distribution of visual impacts to each alternative as related to the criteria.

TABLE 4-17: **DEGREE OF CHANGE TO SCENIC QUALITY OF ENVIRONMENT**

Key	Key Views	No-Action	A	B	C	D	G
N1	Brawner Farm Area	High	Medium				
N2	Sudley Area / Thornberry House (Stop 4)	High	Low		High		
N3	Pittsylvania Area				HIgh		
N4	Portici Area						High
N5	Chinn Ridge Road	High					
N6	Brownsville Area						
1	Stone House (Stop 2)	High					
2	Pageland Lane - north of park						
3	Duncklin Monument						
4	Battery Heights (Stop 1)	High					
5	Groveton (Stop 7)	High					
6	Matthews Hill (Stop 3)	High					
7	Stone Bridge (Stop 11)	High					
8	Stuart's Hill		High		High		High
9	Henry Hill	High					
10	Stony Ridge		High		High		
11	Boxwood Farms		High		High		
12	Pageland Lane		High		High		
13	Sudley Mountain Estates		High	Low	High	Low	
14	Sudley Road			Medium		Medium	

TABLE 4-17: **DEGREE OF CHANGE TO SCENIC QUALITY OF ENVIRONMENT**

Key	Key Views	No-Action	A	B	C	D	G
15	Bull Run Overlook		High	High	Low	Low	
16	Cedar Crest Estates		Low	Low			
17	Fairfax National Golf Club		Medium	Medium	High	High	
18	Sun Rise Hill Farm				Medium	Medium	
19	Bull Run Post Office Road						
20	Lee Highway		Medium	Medium	Medium	Medium	
21	Bull Run Estates						High

Notes: The degree of change does not consider topography or vegetative cover at this time. The degree may vary as analysis progresses on the Key Views and topography and vegetative cover is taken into account.

The ratings of high, medium, and low are based upon FHWA's Visual Impact Assessment for Highway Projects degree of vividness, intactnees and visual unity. "Vividness is a measure of the visual power or memorability of the landscape. Intactness is a measure of how integrity of the landscape and its freedom from intrusive elements. Visual unity is a measure of how coherent and harmonious a visual pattern exists in the landscape.

N1-N6 are key views identified by the National Park Service.

Visual and aesthetic impacts are discussed in more detail for each alterantive.

No-Action

The No-Action Alternative would not result in any negative visual or aesthetic impacts of the study area. Existing viewsheds would remain unchanged.

Alternative A

Park Sector. This alignment would have a high impact to the natural features and scenic thoroughfares in areas within the Park. These impacts would occur along Pageland Lane, where the Park parallels the road, and at the crossings of Lee Highway and Route 234. The alignment requires a bridge crossing over Pageland Lane therefore disrupting the natural features within this area by filling the area to meet the proposed bridge, which will eliminate scenic views along Pageland lane towards the Park. Lee Highway's historic two-lane road will be disrupted by the proposed intersection at the west end of the Park, which would include visual clutter from signage, utilities, and traffic signals. The high quality linear corridor views along Lee Highway, at the east end of the Park, will be eliminated as the roadway gets realigned to meet Alternative A at a new intersection. However, impacts to areas of high visual quality and to viewers of high sensitivity within the Park will be reduced as Alternative A redirects traffic from traveling through the Park.

Residential Sector. The alignment would have a high impact not only to the natural features and scenic thoroughfares but also to the community fabric and visual setting. The impacts would occur all along the alignment, including Pageland Lane, Sudley Mountain Estates and Bull Run Overlook. The bridge crossing over Pageland will reduce the scenic quality and visual setting of the rural agriculture land adjacent to Pageland Lane. The natural setting of a portion of Sudley Mountain Estates would be impacted, see Cross Section No. 7 (**Figure 4-33h**) and Photo Simulation No. 6 (**Figure 4-32f**), while Bull Run Overlook would become

divided, see Cross Section No. 6 (**Figure 4-33g**) and Photo Simulation No. 5 (**Figure 4-32e**). Other areas with high aesthetic quality and high viewer sensitivity that would be impacted include a series of horse farms and open rural homesteads between the eastern edge of the Park and Bull Run Post Office Road, see Cross Section No. 8(**Figure 4-33i**)**.** Community parks, such as Field of Dreams, would be impacted by the alignment dividing it from Bull Run Post Office Road, see Cross Section No. 2 (**Figure 4-33c**).

Alternative B

Park Sector. This alignment would have little to no impact to the Park even though it crosses the Park at its northern border. This area is in a heavily wooded area, away from areas of high visual quality and areas of high viewer sensitivity.

Residential Sector. The alignment would have a moderate to high impact to the natural features, scenic thoroughfares, community fabric and visual setting. The alignment follows a portion of Route 234 and improvements within this segment, including a bride and widening of the existing road, would impact the rural and aesthetic setting of the scenic thoroughfare. Bull Run Overlook would become divided, which would impact the community fabric and visual setting of the neighborhood, see Cross Section No. 6 (**Figure 4-33g**) and Photo Simulation No. 5 (Figure 4-32e). Fairfax National Golf Course would benefit from this alignment by the creation of a highly visible main entrance and potential scenic views would be created of the golf course with this alignment. Community parks, such as Field of Dreams, would be impacted by the alignment dividing it from Bull Run Post Office Road, see Cross Section No. 2 (**Figure 4-33c**).

Alternative C

Park Sector. This alignment would have a high impact to the natural features and scenic thoroughfares in areas within the Park. These impacts would occur along Pageland Lane, where the Park parallels the road, northeast of the historic Pittsylvania Area, and at the crossings of Lee Highway and Route 234. The alignment requires a bridge crossing over Pageland Lane therefore disrupting the natural features within this area by filling the area to meet the proposed bridge, which will eliminate scenic views along Pageland lane towards the Park. The alignment divides a northeast section of the Park, reducing the aesthetic quality of the area, see Cross Section No. 3 (**Figure 4-33d**). Lee Highway's historic two-lane road will be disrupted by the proposed intersection at the west end of the Park, which would include visual clutter from signage, utilities, and traffic signals. The high quality linear corridor views along Lee Highway, at the east end of the Park, will be eliminated as the roadway gets realigned to meet Alternative C at a new intersection.

Residential Sector. The alignment would have a high impact not only to the natural features and scenic thoroughfares but also to the community fabric and visual setting. The impacts would occur along the alignment, including Pageland Lane and Sudley Mountain Estates. The bridge crossing over Pageland will reduce the scenic quality and visual setting of the rural agriculture land adjacent to Pageland Lane. The natural setting of a portion of Sudley Mountain Estates would be impacted, see Cross Section No. 7 (**Figure 4-33h**) and Photo Simulation No. 6 (Figure 4-32g). Other areas with high aesthetic quality and high viewer sensitivity that would be impacted include a series of horse farms and open rural homesteads between the eastern edge of the Park and Bull Run Post Office Road, see Cross Section No. 1 (**Figure 4-33b**). However, Sunrise Hill Farm residential neighborhood would not be impacted due to the topography change and dense vegetation, see Cross Section No. 3 (**Figure 4-33d**).

Alternative D

Park Sector. This alignment would have a low to moderate impact to the Park. The impacts would occur at the three (3) crossings of Bull Run and in the northeast section of the Park. The three crossing of Bull Run would require the altering of the natural landscape and visual setting in these areas, reducing the aesthetic natural qualities. The alignment would divide a northeast section of the Park, reducing the aesthetic quality of the open fields and hedge rows, see Cross Section No. 3 (**Figure 4-33d).**

Residential Sector. The alignment would have a moderate to high impact to areas of high visual quality and viewer sensitivity and to the scenic thoroughfares and natural features. The alignment follows a portion of Route 234 and improvements within this segment, including a bridge and widening of the existing road, would impact the rural and aesthetic setting of the scenic thoroughfare. The high quality linear corridor views along Lee Highway, at the east end of the Park, would be eliminated as the roadway gets realigned to meet Alternative D at a new intersection. However, Sunrise Hill Farm residential neighborhood would not be impacted due to the topography change and dense vegetation, see Cross Section No. 3 (**Figure 4-33d).** Potential scenic views would be created of the Fairfax National Golf Course just north of the alignment.

Alternative G

Park Sector. This alignment would have a moderate to high impact to the Park. The impacts would occur along the Park's southern border, including the historic Portici Area. The open fields and hedge rows in the Portici Area would be impacted with the alignment, see Cross Section No. 12(**Figure 4-33n**) and Photo Simulation No. 1 (**Figure 4-32a**). However, the impact would be reduced due to the existing I-66 Corridor in this area, which already impacts the existing visual setting. The southwest section of the Park would not be impacted due to the dense vegetation in this area that buffers the Park from the I-66 Corridor. Lee Highway's aesthetic visual quality would be impacted by the widening and bridge crossing at the west end of the Park.

I-66 Corridor Sector. The alignment would have low to no impact to the transportation corridor. Opportunities for scenic views from the corridor towards the Park would be reduced by the additional barriers, traffic, signage and utility poles along the alignment between the Park and I-66.

Residential Sector. The alignment would have a low impact to the residential neighborhoods. However, there would be a high impact in the southeast section, adjacent to the Park, where existing wetlands would be impacted. The alignment would be raised in this area, which would allow for scenic viewing opportunities to overlook the wetlands.

Commercial Sector. Because Alternative G would follow the existing alignments of Battleview Parkway and Bulloch Drive the impacts to the commercial sector would be low. Opportunities for aesthetic entrances to offices and commercial stores would exist along the alignment.

4.12.3 Cross Sections and Photo Simulations

Eleven (11) key viewpoints were chosen as the locations for the photo-simulations. Each viewpoint is illustrated as an existing conditions photo and then as a photo simulation of the proposed conditions. The simulations illustrate the design alternative that would have the greatest impact on the existing visual resources and/or would have the greatest impact on sensitive viewer groups. The photo simulations illustrate the proposed alternatives and the associated improvements that are proposed to mitigate visual impacts and improve the general appearance of the design. The photo simulations are shown **Figure 4-32a** through **Figure 4-32i.**

Twelve (12) locations were chosen for the cross sections. Each section illustrates the existing grade and the proposed grade for the design alternatives. The section illustrates the impacts to the existing conditions and the associated improvements that are proposed to mitigate visual impacts and improve general appearance of the design. The cross sections are illustrated on **Figure 4-33a** through **Figure 4-33m**.

4.12.4 Mitigation

In order to maintain the existing visual quality and in order to reduce the amount of negative visual impact caused by the alternatives, the following design, construction and maintenance actions are recommended. With the implementation of the stated mitigation methods, the visual impacts of the alternatives would be reduced and would not result in substantial changes in overall visual quality. The mitigation measures include:

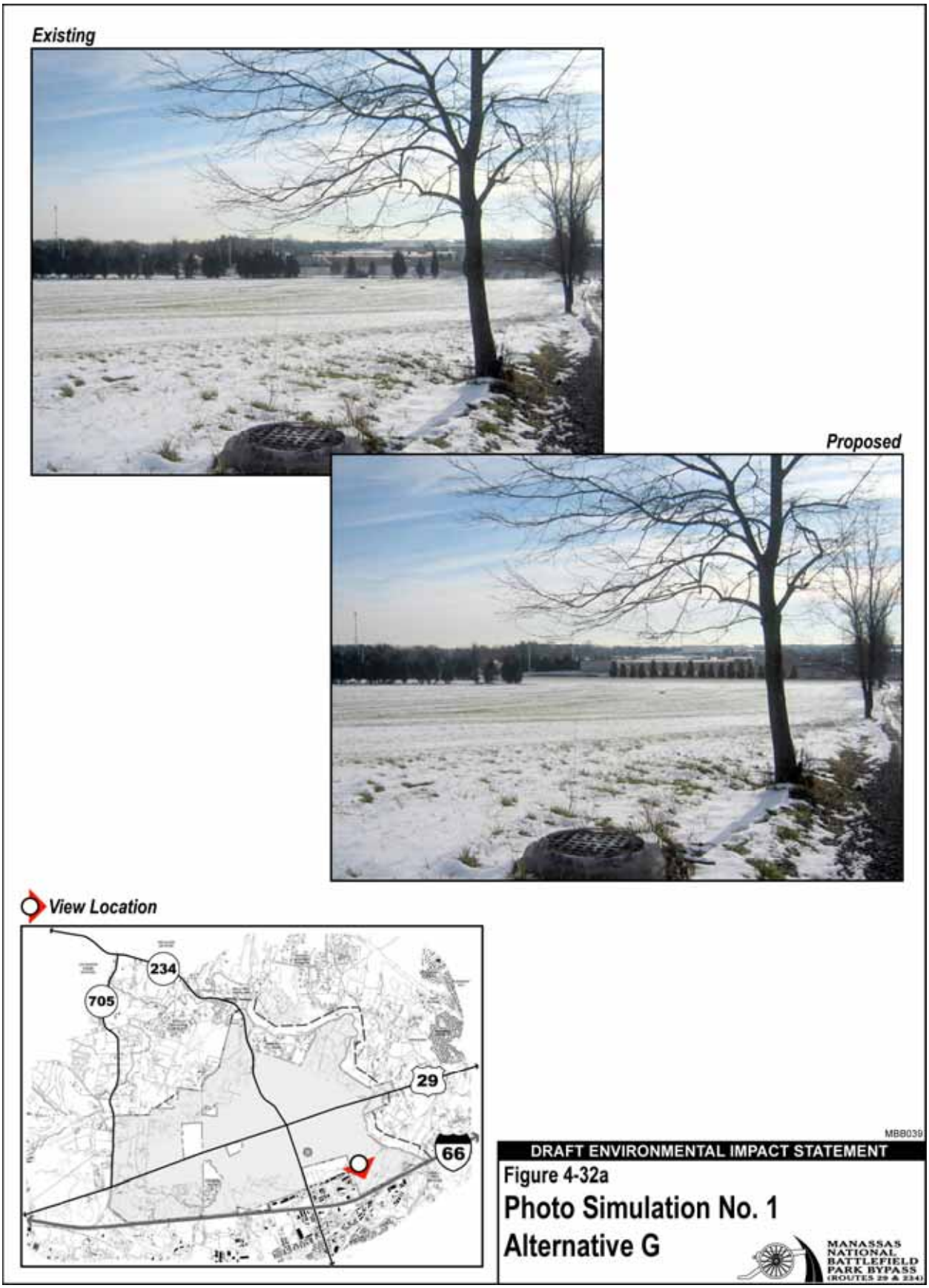
- New landscaping and revegetation to restore slopes and woodland edges, soften roadway appearance, frame views from the road and create community gateways at key interchanges.
- Shaping of the land at edges of the grading to smooth the transition to existing grades and to screen views of the roadway from adjacent land uses.
- Installation of attractive retaining walls and guardrails to reduce the aesthetic/visual impact to structure and/or natural features.
- Sensitive design of bridge structures to reflect the character of the area.
- Establishment of variable-width landscaped medians where possible to protect resources and to provide visual variety and high quality aesthetic character. This would emphasize the proposed roadway as a scenic parkway, despite the scale associated with major thoroughfares.
- Designation of the roadway or portions of the roadway (within the Park) as a State or National Scenic Byway to protect scenic qualities.
- Construct excavation slopes as steep as possible to minimize tree removal.
- Warp constructed slopes where possible to save existing trees.
- Replace all removed trees using a planting ratio and maintenance program which will ensure plant establishment and long-term success.
- Replant with native species in consultation with U.S. Forest Service plant resource specialists.
- Replace shrubs in specific areas where appropriate.
- Revegetate all fill slopes with trees.
- Undulate the perimeter of tree groupings and vary plant spacing to increase the natural appearance.

Save, stockpile and reapply duff and topsoil on disturbed slopes to reduce the newly constructed look and to promote natural re-vegetation.

4.13 AIR QUALITY

4.13.1 Introduction

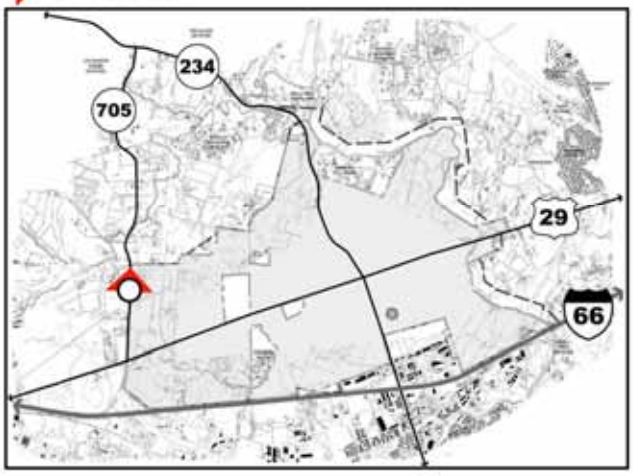
Under requirements of the *Clean Air Act*, the U.S. Environmental Protection Agency (EPA) designates as "nonattainment" metropolitan regions that are not yet meeting National Ambient Air Quality Standards (NAAQS). States are required to develop plans for bringing such regions into attainment. These so-called "State Implementation Plans" (SIPs) specify planning and control measures designed to reduce pollutant emissions and resulting atmospheric concentrations. Because transportation sources are large contributors to total pollutant emissions, many of the planning and control measures focus on transportation. Major


Existing
Proposed
View Location
234
705
29
66
MBB039
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-32a
Photo Simulation No. 1
Alternative G
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MB8042

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32b

Photo Simulation No. 2

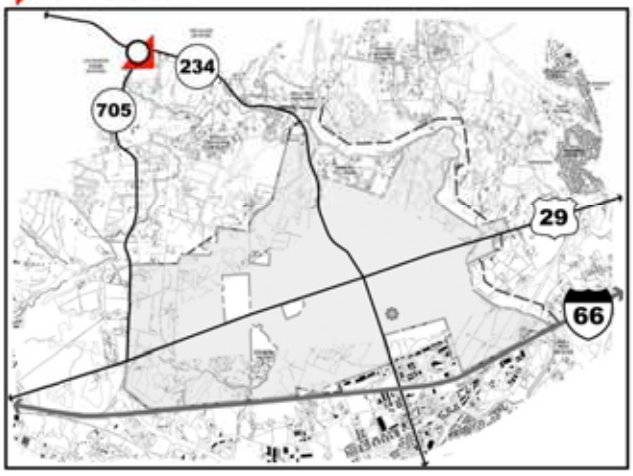
All Alternatives

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MBB043

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32c

Photo Simulation No. 3

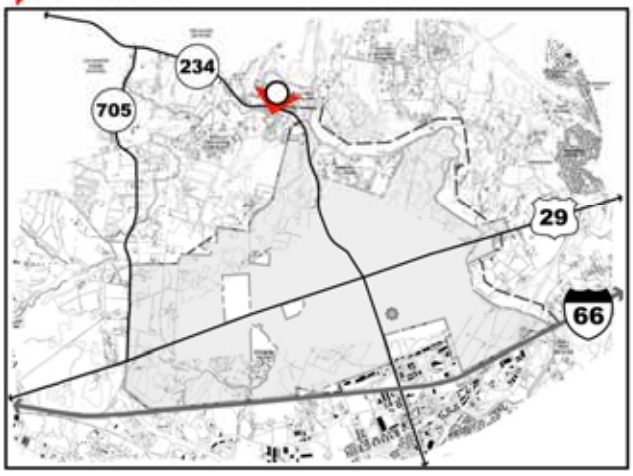
Alternatives B & D

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MBB044

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32d

Photo Simulation No. 4

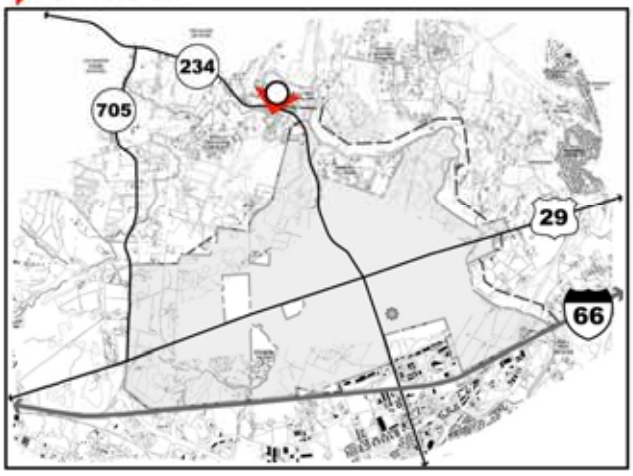
Alternatives C & D

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MBB045

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32e

Photo Simulation No. 5

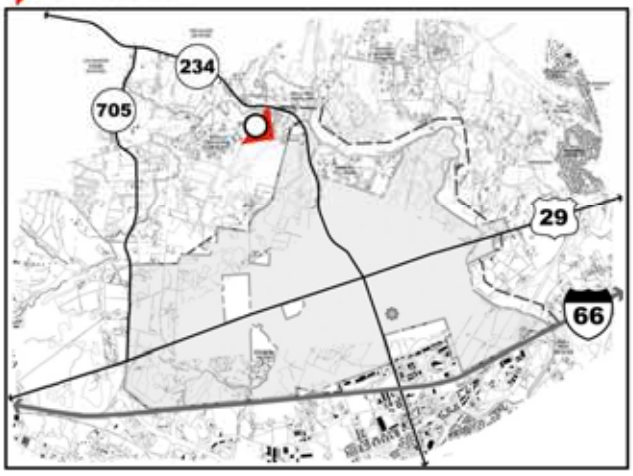
Alternatives A & B

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MBB046

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32f

Photo Simulation No. 6

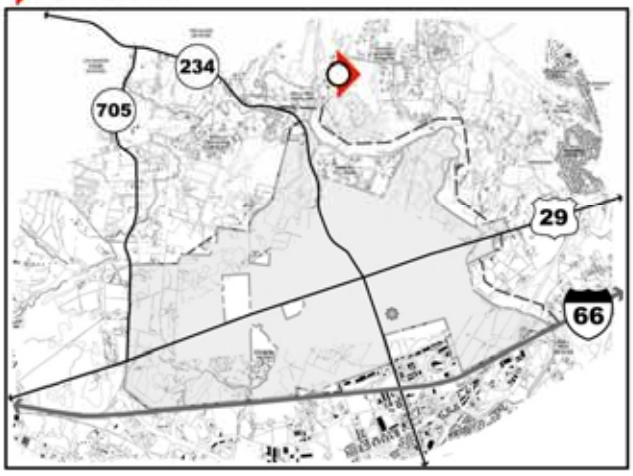
Alternatives A & C

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed

View Location



MBB047

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32g

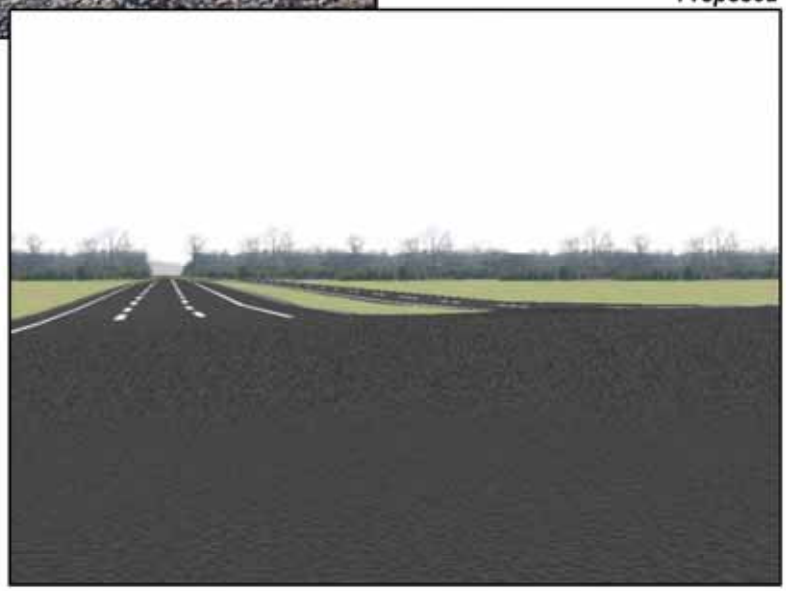
Photo Simulation No. 7

Alternatives A & B

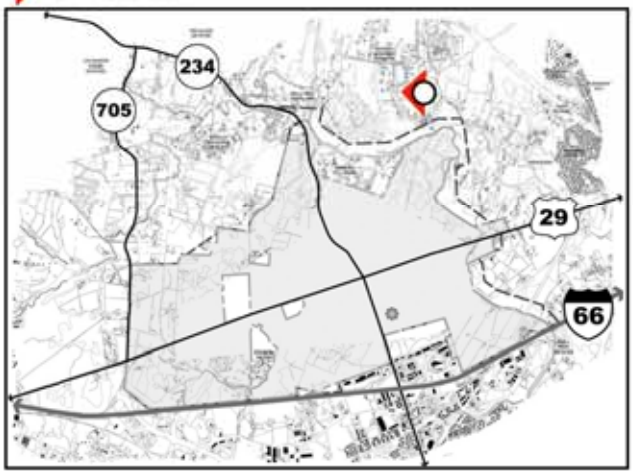
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

Existing

Proposed



View Location



MBB048

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Figure 4-32h

Photo Simulation No. 8

Alternatives A & B

MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)


Existing
Proposed
View Location
234
705
29
66
MBB049
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-32i
Photo Simulation No. 9
Alternatives C & D
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)

transportation projects in nonattainment areas must be found to "conform" to the SIP. To conform to the SIP, a proposed project must not result in any new violations of the NAAQS, must not exacerbate any existing violations, and must not delay timely attainment of the NAAQS. (42 USC 7506(c)). Because the proposed project is located in a severe ozone non-attainment area,[1] a determination of conformity to the SIP must be made.

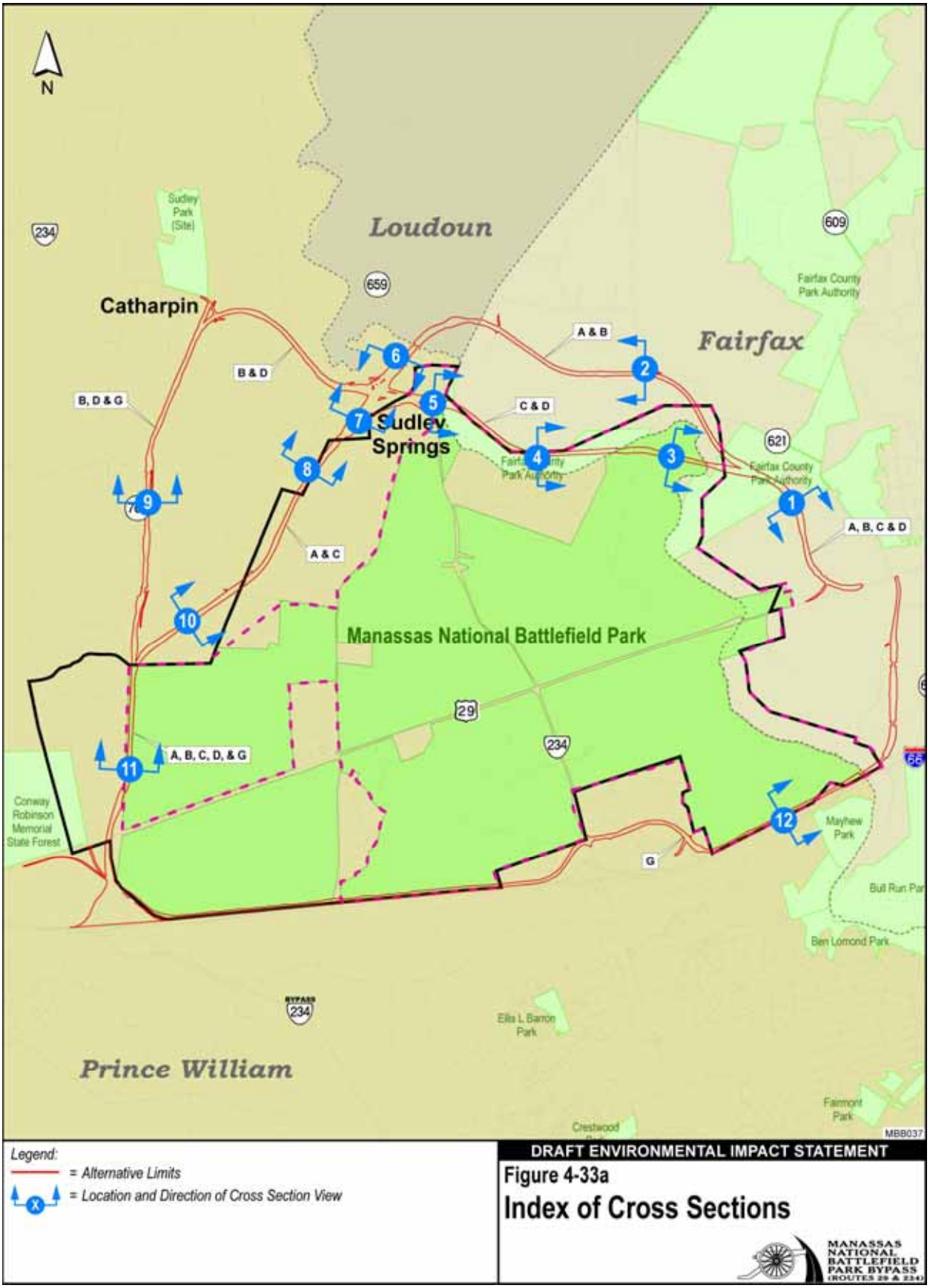
Under the Transportation Conformity Rule (40 CFR Part 93), if a project is included in the region's Transportation Plan or Transportation Improvement Program (TIP), and this plan or program has been approved by FHWA and EPA as conforming to the SIP, then the project is presumed to conform. The Transportation Plan for the region is the [financially] Constrained Long-Range Plan (CLRP) prepared by the Washington Council of Governments' Transportation Planning Board. The Manassas National Battlefield Park Bypass Project is not currently included in the CLRP. Therefore, before final NEPA approval can be given for the project, a conformity determination will have to be made.

Scoping. On January 28, 2002, a letter was sent to the local representative of the U.S. Environmental Protection Agency (EPA, the principal federal agency responsible for air quality issues) submitting handouts from the November 19, 2001 agency scoping meeting, a summary of that meeting, and handouts from the December 6, 2001 public scoping meeting. EPA was asked to submit any official scoping comments. On June 27, 2002, EPA was invited to another agency coordination meeting held on July 24, 2002. At none of these meetings, or in the letter submitted by EPA, were any air quality issues noted as concerns. At the public scoping meeting, only a few nonspecific comments about air quality were received. This low level of expressed concern for air quality suggests that potential air quality impacts associated with the project are not significant issues. The analysis reported below confirms that no significant air quality impacts are anticipated.

Microscale Modeling. The project-level effects of the alternatives on air quality were evaluated by analyzing carbon monoxide (CO) concentrations for a base year (2002), interim year (2015) build and no-build conditions, and design year (2025) build and no-build conditions. CO is the predominant pollutant emitted from gasoline-powered motor vehicles, and its concentrations attributable to highway sources can be accurately estimated with computerized dispersion models. VACALN6A, a simplified microcomputer procedure developed by VDOT and approved by FHWA, was used to estimate CO concentrations at selected sites along each alternative. VACALN6A calculates CO concentrations using traffic volumes and speeds and pre-computed emission factors derived from EPA's MOBILE 6.2 program. Traffic inputs were derived from data developed during the project studies based on counts of traffic at selected locations and projections for the design year. Worst-case assumptions and inputs were used in the analysis, including peak-hour volumes and speeds for one-hour CO concentrations (generally, the highest volume and lowest speed conditions yield the highest CO concentrations). In most instances, the peak-hour traffic data also were used to represent the highest eight-hour period. An ambient temperature of 30 degrees Fahrenheit was assumed, along with a wind speed of 1 meter/second, an atmospheric stability rating of "D," and wind directions nearly parallel to the roadway. Background concentrations built into the microcomputer procedure are 6 parts per million (ppm) and 3 ppm for the one-hour and eight-hour concentrations, respectively.[2]

[1] Federal Register: January 24, 2003 (Volume 68, Number 16, pp 3410-3425).

[2] The 6 ppm and 3 ppm assumptions are very conservative in view of recent monitoring data that show the highest 1-hour concentration to be 1.9 ppm and the highest 8-hour concentration to be 1.7 ppm at the closest CO monitoring station in the Northern Virginia region. See Sorensen, Crystal. 2004. *Virginia Ambient Air Monitoring 2003 Data Report*. Virginia Department of Environmental Quality, Office of Air Quality Planning and Monitoring. Published September 2004.


N
Loudoun
Fairfax
Prince William
Catharpin
Sudley Springs
Manassas National Battlefield Park
Sudley Park (Site)
Fairfax County Park Authority
Conway Robinson Memorial State Forest
Mayhew Park
Bull Run Par
Ben Lomond Park
Ellis L Barron Park
Fairmont Park
Crestwood
234
659
609
621
29
55
A & B
B & D
B, D & G
C & D
A & C
A, B, C & D
A, B, C, D, & G
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MBB037
Legend:
= Alternative Limits
= Location and Direction of Cross Section View
DRAFT ENVIRONMENTAL IMPACT STATEMENT
Figure 4-33a
Index of Cross Sections
MANASSAS NATIONAL BATTLEFIELD PARK BYPASS (ROUTES 29 & 234)