Tri-County Parkway Location Study

AIR QUALITY TECHNICAL REPORT

Prepared for:

The Virginia Department of Transportation

Prepared by:

Parsons Brinckerhoff Quade and Douglas, Inc.

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S.0 EXECUTIVE SUMMARY

Project History and Overview

The Tri-County Parkway Location Study evaluates a new north/south transportation link in northern Virginia that will connect the City of Manassas with Interstate 66 (I-66) and the Dulles corridor. The corridor begins in the north at the intersection of US 50 and Route 606 (Old Ox Road) and extends to the south at the interchange of VA 28/VA 234 Bypass. It is approximately 15 miles long and traverses portions of the counties of Prince William, Fairfax, and Loudoun along with the cities of Manassas and Manassas Park. The three counties that the Tri-County Parkway will traverse are among the top ten fastest growing counties in the Commonwealth of Virginia. The City of Manassas and the City of Manassas Park have also experienced substantial population growth over the last ten years. Much of the growth in Northern Virginia can be attributed to the emergence of high-tech industries near the Washington Dulles International Airport. A second rapid growth corridor within the region is the I-66 corridor. The primary problem the Tri-County Parkway is intended to address is the lack of adequate north-south transportation facilities linking the I-66 corridor with the Dulles area and VA 267. East of US 15 and west of the I-495 (Capital Beltway), only three principal urban arterials link the spokes together - VA 28 (Sully Road), Route 7100 (Fairfax County Parkway), and VA 123. These north-south facilities are heavily congested and will deteriorate further by the year 2025.

Purpose and Need

The study area presently lacks adequate north-south transportation facilities linking the I-66 corridor with the Dulles area and VA 267. The purpose and need for the Tri-County Parkway is comprised of four key elements, namely:

1. Improve transportation mobility and capacity and, by doing so, improve access and reduce congestion.
2. Enhance the linkage of communities and the transportation system that serves those communities.
3. Accommodate social demands, environmental goals, and economic development needs.
4. Improve safety and, by doing so, reduce the average crash, injury, and accident rates on the roadway network.

Each of the elements has equal value and importance in the overall transportation, environmental, economic, and quality of life objectives for the communities being served under the proposed action.

Alternatives

In accordance with NEPA requirements, alternatives initially considered for the Tri-County Location Study included the No-Build, Mass Transit, Transportation System Management (TSM), and Candidate Build Alternatives (CBAs). Each alternative was evaluated with respect to its potential impacts and its ability to address the project's purpose and need.

Alternatives Eliminated from Detailed Study

Assessments conducted as part of the Tri-County Parkway Location Study determined that the nature of the study area makes the identification of a mass transit alternative that can address the corridor's purpose and need problematic. No transit authority exists whose service area covers or would cover the entire study area, nor are there plans to establish such an authority. In addition, the development patterns and traffic patterns and volumes within the study corridor do not favor north-south through movement along the corridor. The majority of trips and greatest volumes are to points outside the study area or along only a portion of the corridor (i.e., from the Manassas and Centerville areas to I-66 and points east, from the South Riding area to the Dulles corridor). The through volumes are by far the weakest in the study area and would not attract sufficient transit riders to make such service viable; therefore, the mass transit alternative was eliminated from further consideration.

There are no practicable Transportation System Management (TSM) measures beyond those already proposed in the CLRP and VDOT Six Year Plan which could reasonably be implemented to satisfy the

purpose and need for the Tri-County Parkway. TSM-type improvements programmed into the aforementioned plans do not satisfy the project's purpose and need when considered as a stand-alone alternative; therefore, the TSM Alternative was eliminated from further consideration.

The No-Build Alternative

The No-Build Alternative includes currently programmed committed and funded roadway and transit projects in the Virginia Department of Transportation (VDOT) Six Year Plan and the CLRP developed by the MWCOG. The No-Build Alternative, while having no direct construction costs, would result in other economic, environmental, and quality of life impacts that can be expected from the continuation of roadway system deficiencies. While the No-Build alternative does not meet the project needs for traffic, safety, and roadway infrastructure improvements, it provides a baseline condition with which to compare the improvements and consequences associated with the Candidate Build Alternatives.

Candidate Build Alternatives (CBAs)

Three Candidate Build Alternatives (CBAs) have been identified for further evaluation in a Draft Environmental Impact Statement (EIS). These CBAs are referred to hereinafter as: (1) the "Comprehensive Plan" CBA, (2) the "West Two" CBA, and (3) the "West Four" CBA. Each of the CBAs is expected to be comprised of two or more facility types according to localized needs and goals. To assess environmental effects associated with a particular facility type along each CBA, three general design segments were developed. These general design segments and their relationship to each alternative assessed are described in the body of this Technical Report.

The Comprehensive Plan CBA

The Comprehensive Plan CBA would be located east of the Manassas National Battlefield. The Comprehensive Plan CBA would provide a new urban principal arterial roadway from the northern terminus at the intersection of US 50 and Route 606 (Old Ox Road) and the southern terminus at the Route 28 and Route 234 Bypass Interchange, and would consist of Segments F', F, and E. Segment F' between Route 50 and Route 620 would be comprised of improvements along an existing four-lane divided facility within an existing right-of-way on an existing alignment. Segment F' south of Route 620 would be a new four-lane divided facility within a new right-of-way on a new alignment. Three separate sections characterize segment E. The portion of Segment E between I-66 and the Fairfax/Prince William county line would be a new six-lane divided facility within a new right-of-way on a new alignment. The portion of segment E from the Fairfax/Prince William county line south to VA 234 would be a new six-lane divided facility within an existing right-of-way on an existing alignment. The portion of Segment E from VA 234 to the VA 234 Bypass would be comprised of improvements along an existing four-lane divided facility called Godwin Drive and would be widened to a six-lane divided facility within the existing right-of-way and on an existing alignment.

The West Two CBA

The West Two CBA is located west of the Manassas National Battlefield. The West Two CBA would provide a new urban principal arterial roadway from the northern terminus near the intersection of US 50 and Route 877 (Racefield Lane) and the southern terminus at the I-66 and Route 234 Interchange. The West Two CBA would be a new four-lane divided facility within a new right-of-way and on a new alignment, and would consist of Segments D and C.

The West Four CBA

The West Four CBA is also located west of the Manassas National Battlefield. The West Four CBA would provide a new urban principal arterial roadway from the northern terminus at the intersection of US 50 and Route 606 (Old Ox Road) and the southern terminus at the I-66 and Route 234 Interchange. The West Four CBA would consist of Segments F', G, and C. Segment F' between Route 50 and Route 620 (Braddock Road) would be comprised of improvements along an existing four-lane divided facility within

an existing right-of-way on an existing alignment. Segment F' south of Route 620 would be comprised of a new four-lane divided facility within a new right-of-way on a new alignment.

Affected Environment

In accordance with the Clean Air Act of 1970 (42 USC 7609, as amended in 1997 and 1990) the US Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for the protection of public health and welfare. The NAAQS addresses the following six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur oxides (SO_x). Of these six pollutants, the FHWA requires a detailed evaluation of CO on a project by project basis.

Fairfax County, Loudon County, Prince William County and the City of Manassas are in attainment for all pollutants except for the 1-hour ozone standard, the 8-hour ozone standard, and possibly the $PM_{2.5}$ standard. The area is in attainment for the CO standard, but a project-level analysis is being performed per FHWA's *Technical Advisory T6640.8A*. The Tri-County Parkway is currently included in the constrained Long-Range Plan for the region for construction, and the plan has been found to conform with the State Implementation Plan for the 1-hour ozone standard by FHWA and FTA. No phases of the project are currently included in the region's Transportation Improvement Program with the exception of the environmental study.

Environmental Consequences

A microscale air quality analysis was conducted to determine the potential effects of the Candidate Build Alternatives on local air quality. The "worst-case" project level carbon monoxide (CO) concentrations were determined for the existing (2005), interim (2011), and design (2030) years. These CO concentrations were then compared to the National Ambient Air Quality Standards (NAAQS). The maximum one-hour and eight-hour CO levels predicted were below NAAQS maximum levels. Thus, the proposed Tri-County Parkway would not cause a violation of the NAAQS. The project conforms to the State Implementation Plan (SIP) and the goals set forth in the Clean Air Act Amendments (CAAA) and the Final Conformity Rule.

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND HISTORY

The Tri-County Parkway Location Study evaluates a new north/south transportation link in northern Virginia that will connect the City of Manassas with Interstate 66 (I-66) and the Dulles corridor. The corridor begins in the north at the intersection of US 50 and Route 606 (Old Ox Road) and extends to the south at the interchange of VA 28/VA 234 Bypass. It is approximately 15 miles long and traverses portions of the counties of Prince William, Fairfax, and Loudoun along with the cities of Manassas and Manassas Park.

The Tri-County Parkway was first identified during the development of the transportation element of the comprehensive plans for Prince William, Fairfax, and Loudoun counties. The Tri-County Parkway has been the subject of many local studies and plans and has been known by many names throughout the years. In Prince William County, it has been referred to as the "Route 28 Bypass" and, in Loudoun County, the Tri-County Parkway has been known as the "Loudoun County Parkway". Several conceptual alignments were considered through Fairfax County even before it was first proposed in their comprehensive plan. The Tri-County Parkway has been incorporated in the three counties' comprehensive plans for over ten years. The Tri-County Parkway was adopted by the Metropolitan Washington Council of Governments (MWCOG) and included in their Constrained Long-Range Plan (CLRP) and Transportation Improvement Program (TIP) in the early to mid 1990s. Figure 1.1-1 illustrates the Tri-County Parkway project from a regional perspective, while Figure 1.1-2 depicts the study area within which Tri-County Parkway alternatives will be evaluated.

The three counties that the Tri-County Parkway will traverse are among the top ten fastest growing counties in the Commonwealth of Virginia. According to the 2000 Census, Loudoun County's population grew by 97 percent from 1990 to 2000. Prince William County's and Fairfax County's population grew by 30 percent and 19 percent, respectively, during those same years. The City of Manassas and the City of Manassas Park are also located within the Tri-County Parkway study area. Both of these cities have experienced substantial population growth over the last ten years. The City of Manassas had a population growth of 26 percent and the City of Manassas Park grew by 53 percent.

Much of the growth in Northern Virginia can be attributed to the emergence of high-tech industries near the Washington Dulles International Airport. By the year 2025, employment in the Dulles/Tysons corridor is expected to reach 280,000 jobs - 71 percent more than current conditions. The Dulles/Tysons corridor will become the second largest employer in the Washington Metropolitan region, second only to downtown Washington D.C. Prince William County and the City of Manassas have also experienced significant high-tech industry growth. The Dulles area consists of the Dulles Greenway, VA 7, VA 28, and US Route 50.

A second rapid growth corridor within the region is the I-66 corridor. Transportation improvements for the I-66 corridor from Interstate 495 (I-495) to the Gainesville area were evaluated in January 1999 as part of a comprehensive study entitled "The I-66 Corridor Major Investment Study (I-66 MIS)." Information from that study revealed that population in the I-66 corridor located within Fairfax, Prince William, and Loudoun counties is projected to increase from 269,000 persons in 1999 to 466,000 persons in 2020. This represents a 73 percent increase in population over the 22-year time frame. Employment is estimated to increase 83 percent in this same time period (from 162,000 jobs in 1999 to 296,000 jobs in 2020).

The primary problem the Tri-County Parkway is intended to address is the lack of adequate north-south transportation facilities linking the I-66 corridor with the Dulles area and VA 267. East of US 15 and west of the I-495 (Capital Beltway), only three principal urban arterials link the spokes together - VA 28 (Sully Road), Route 7100 (Fairfax County Parkway), and VA 123. These north-south facilities are heavily congested and will deteriorate further by the year 2025.

Level of service on VA 28 is currently deficient in the a.m. and p.m. peak periods. By 2025, most segments of VA Route 28 northbound in the a.m. and southbound in the p.m. are expected to operate at LOS F or G (a severely congested state). Traveling south in the p.m. between the Fairfax County line

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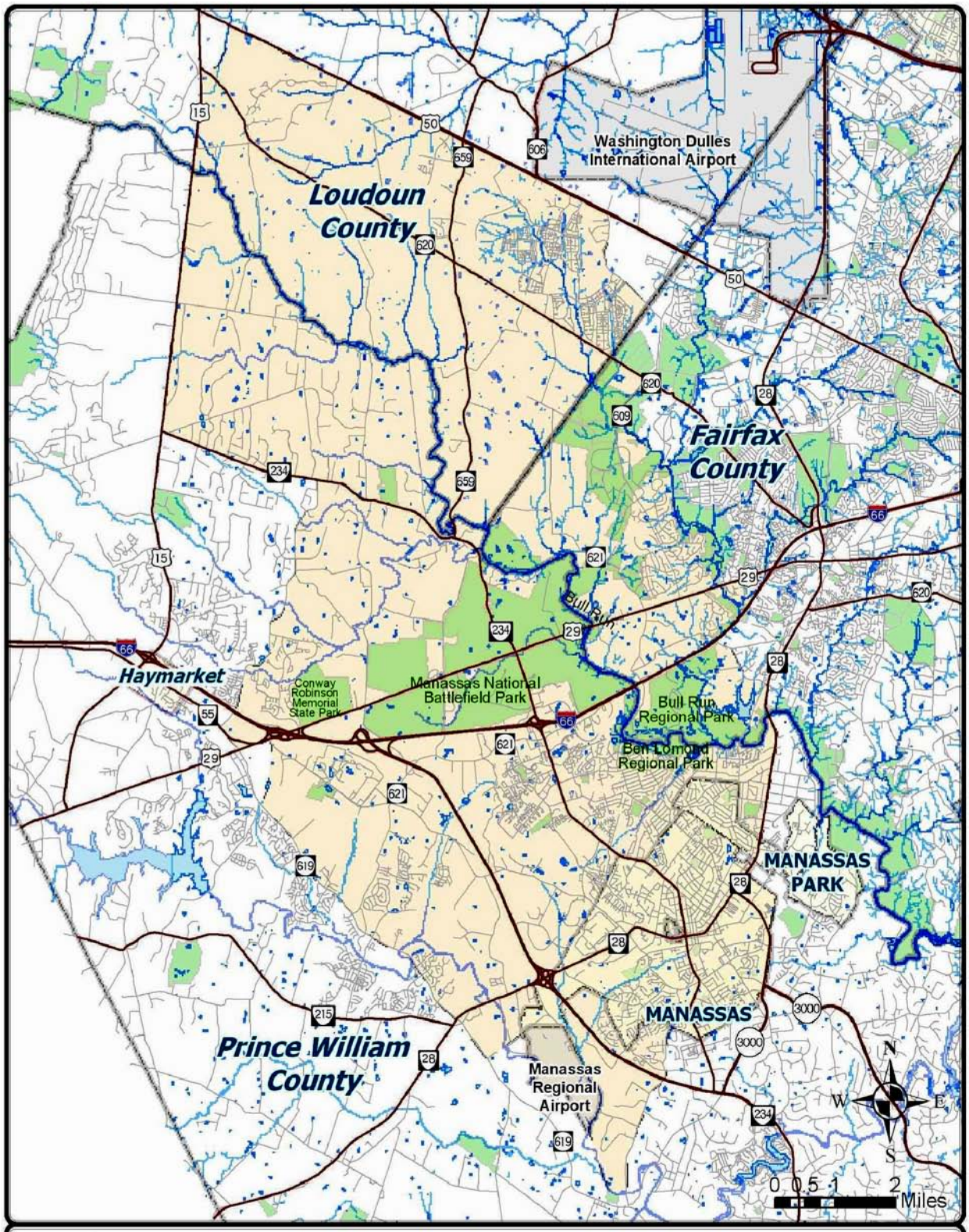
FIGURE 1.1-1
REGIONAL LOCATION MAP



Tri-County PARKWAY Location Study

FIGURE 1.1.2
STUDY AREA

and I-66, speeds are estimated to drop along VA 28 from an already slow 18 miles per hour (mph) to 13 mph between 2000 and 2025. The posted speed limit in this area is 45 mph. By 2025 the peak periods for a.m. and p.m. traffic on VA 28 could extend for over three hours each; however, improvements to VA 28 have been proposed under the Virginia Public-Private Transportation Act (VPPTA) of 1995 to convert the 14-mile stretch of VA 28 between I-66 and Route 7 to a limited access freeway. That project would involve widening VA 28 to an eight-lane section, as well as replacing up to ten signalized intersections with grade-separated interchanges. If the VA 28 improvements project is completed as planned, the added capacity should increase speeds and reduce congestion along VA 28 - in effect improving operating speeds in the a.m. and p.m. peak periods.

1.2 PURPOSE AND NEED

The study area presently lacks adequate north-south transportation facilities linking the I-66 corridor with the Dulles area and VA 267. The purpose and need for the Tri-County Parkway is comprised of four key elements. Each of the elements is a critical and salient factor to be addressed by the transportation alternatives. There is no attempt to weight one element over the others. Each of the elements has equal value and importance in the overall transportation, environmental, economic, and quality of life objectives for the communities being served under the proposed action. The four elements are listed below and are further elaborated in Sections 1.3 through 1.7 of the associated document titled Purpose and Need Statement (VDOT, 2003):

1. Improve transportation mobility and capacity and, by doing so, improve access and reduce congestion.
2. Enhance the linkage of communities and the transportation system that serves those communities.
3. Accommodate social demands, environmental goals, and economic development needs.
4. Improve safety and, by doing so, reduce the average crash, injury, and accident rates on the roadway network.

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2.0 ALTERNATIVES CONSIDERED

2.1 INTRODUCTION

In accordance with NEPA requirements, alternatives initially considered for the Tri-County Location Study included the No-Build, Mass Transit, Transportation System Management (TSM), and Candidate Build Alternatives (CBAs). Each alternative was evaluated with respect to its potential impacts and its ability to address the project's purpose and need.

2.2 ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Assessments conducted as part of the Tri-County Parkway Location Study determined that the nature of the study area makes the identification of a mass transit alternative that can address the corridor's purpose and need problematic. No transit authority exists whose service area covers or would cover the entire study area, nor are there plans to establish such an authority. In addition, the development patterns and traffic patterns and volumes within the study corridor do not favor north-south through movement along the corridor. The majority of trips and greatest volumes are to points outside the study area or along only a portion of the corridor (i.e., from the Manassas and Centerville areas to I-66 and points east, from the South Riding area to the Dulles corridor). The through volumes are by far the weakest in the study area and would not attract sufficient transit riders to make such service viable; therefore, the mass transit alternative was eliminated from further consideration.

There are no practicable Transportation System Management (TSM) measures beyond those already proposed in the CLRP and VDOT Six Year Plan which could reasonably be implemented to satisfy the purpose and need for the Tri-County Parkway. TSM-type improvements programmed into the aforementioned plans do not satisfy the project's purpose and need when considered as a stand-alone alternative; therefore, the TSM Alternative was eliminated from further consideration.

2.3 THE NO-BUILD ALTERNATIVE

Consistent with the requirements of the NEPA and related FHWA guidelines, full consideration is given to the environmental consequences of taking no action to meet future travel demand (hereinafter referred to as the "No-Build Alternative"). The No-Build Alternative includes currently programmed committed and funded roadway and transit projects in the Virginia Department of Transportation (VDOT) Six Year Plan and the CLRP developed by the MWCOG. The No-Build Alternative, while having no direct construction costs, would result in other economic, environmental, and quality of life impacts that can be expected from the continuation of roadway system deficiencies. While the No-Build alternative does not meet the project needs for traffic, safety, and roadway infrastructure improvements, it provides a baseline condition with which to compare the improvements and consequences associated with the Candidate Build Alternatives. The following is a list of major projects identified in the CLRP which influence the Tri-County Parkway study area:

- Dulles/VA 7 Corridor
- VA 28 Corridor
- Prince William Parkway (VA 3000) Corridor
- Fairfax County Parkway (VA 7100) Corridor
- I-66/US 29/US 50 Corridor
- I-495 (Beltway) Corridor
- Manassas National Battlefield Park Bypass
- Western Transportation Corridor

2.4 CANDIDATE BUILD ALTERNATIVES

Three Candidate Build Alternatives (CBAs) have been identified for further evaluation in a Draft Environmental Impact Statement (EIS). These CBAs are referred to hereinafter as: (1) the "Comprehensive Plan" CBA, (2) the "West Two" CBA, and (3) the "West Four" CBA. The process leading

to the identification of these three CBAs is discussed in greater detail in the associated document tilted Alternatives Identification, Development, and Screening Technical Report (VDOT, 2004). The northern and southern termini for these CBAs have been selected in accordance with FHWA Technical Guidelines for termini development and are discussed in greater detail in the associated document titled Logical Termini Technical Memorandum (VDOT, 2003).

Each of the CBAs is expected to be comprised of two or more facility types according to localized needs and goals. To assess environmental effects associated with a particular facility type along each CBA, three general design concepts have been developed:

- General Design Segment 1 (hereinafter referred to as "Segment 1").
- General Design Segment 2 (hereinafter referred to as "Segment 2").
- General Design Segment 3 (hereinafter referred to as "Segment 3").

The process leading to the development of these general design segments is presented in the associated document tilted Study Location Report (VDOT, 2004). The three general design segments developed for purposes of this assessment are depicted in Figure 2.4-1 and are described as follows:

- *Segment 1*. *Segment 1* will provide a controlled access facility with four 12-foot lanes divided with a 42-foot graded grass median and 10-foot multi-use trail. The 42-foot wide median will allow for expanding to six lanes in the future. Segment 1 could either include (1) paved shoulders in areas where right-of-way is needed or (2) curb and gutter in areas where portions of the facility have been partially constructed and right-of-way exists. These design options are represented as Option 1 and Option 2, respectively. The median width will be transitioned to include additional width at all intersection approaches to allow for construction of dual left turn lanes, as necessary.

- *Segment 2*. *Segment 2* will provide a limited access facility with four 12-foot lanes divided with a 42-foot graded grass median, paved shoulders, and 10-foot multi-use trail. The median width will be transitioned to include additional width at all intersection approaches to allow for construction of dual left turn lanes, as necessary.

- *Segment 3*. *Segment 3* will provide a limited access facility with six lanes (four 12-foot outside lanes and two 13-foot inside lanes) divided with a 42-foot graded median, paved shoulders, and a 10-foot multi-use trail. The 13-foot inside lanes are adjacent to curbed median only.

2.4.1 The Comprehensive Plan CBA

The Comprehensive Plan CBA is so named because it incorporates certain alignments recognized in local Comprehensive Plans. The Comprehensive Plan CBA would be located east of the Manassas National Battlefield. The Comprehensive Plan CBA would provide a new urban principal arterial roadway from the northern terminus at the intersection of US 50 and Route 606 (Old Ox Road) and the southern terminus at the Route 28 and Route 234 Bypass Interchange, and would consist of Segments F', F, and E (see Figure 2.4-2). Segment F' between Route 50 and Route 620 would be comprised of improvements along an existing four-lane divided facility within an existing right-of-way on an existing alignment. Segment F' south of Route 620 would be a new four-lane divided facility within a new right-of-way on a new alignment. Three separate sections characterize segment E. The portion of Segment E between I-66 and the Fairfax/Prince William county line would be a new six-lane divided facility within a new right-of-way on a new alignment. The portion of segment E from the Fairfax/Prince William county line south to VA 234 would be a new six-lane divided facility within an existing right-of-way on an existing alignment. The portion of Segment E from VA 234 to the VA 234 Bypass would be comprised of improvements along an existing four-lane divided facility called Godwin Drive and would be widened to a six-lane divided facility within the existing right-of-way and on an existing alignment. The Comprehensive Plan CBA would consist of three of the aforementioned general design segments in the following areas:

- *Segment 1 (Options 1 and 2)* will extend from the intersection of US 50 and Route 606 (Old Ox Road) in Loudoun County to the Fairfax County Line.

- *Segment 2* will extend from the Fairfax County Line to I-66 (east of the Manassas National Battlefield).

- *Segment 3* will extend from I-66 in Fairfax County to Route 234 in Prince William County.

2.4.2 The West Two CBA

The West Two CBA is located west of the Manassas National Battlefield. The West Two CBA would provide a new urban principal arterial roadway from the northern terminus near the intersection of US 50 and Route 877 (Racefield Lane) and the southern terminus at the I-66 and Route 234 Interchange. The West Two CBA would be a new four-lane divided facility within a new right-of-way and on a new alignment, and would consist of Segments D and C (see Figure 2.4-2). The West Two CBA would consist of two of the aforementioned general design segments in the following areas:

- *Segment 1 (Option 1)* will extend from the intersection of US 50 and 877(Racefield Road) in Loudoun County to the Prince William County Line.
- *Segment 2* will extend from the Prince William County Line to the interchange of I-66 and Route 234 (west of the Manassas National Battlefield).

2.4.3 The West Four CBA

The West Four CBA is also located west of the Manassas National Battlefield. The West Four CBA would provide a new urban principal arterial roadway from the northern terminus at the intersection of US 50 and Route 606 (Old Ox Road) and the southern terminus at the I-66 and Route 234 Interchange. The West Four CBA would consist of Segments F', G, and C (Figure 2.4-2). Segment F' between Route 50 and Route 620 (Braddock Road) would be comprised of improvements along an existing four-lane divided facility within an existing right-of-way on an existing alignment. Segment F' south of Route 620 would be comprised of a new four-lane divided facility within a new right-of-way on a new alignment. The West Four CBA would consist of two of the aforementioned general design segments in the following areas:

- *Segment 1 (Option 1)* will extend from the intersection of US 50 and Route 606 (Old Ox Road) in Loudoun County to the Prince William County Line.
- *Segment 2* will extend from the Prince William County Line to the interchange of I-66 and Route 234 (west of the Manassas National Battlefield).

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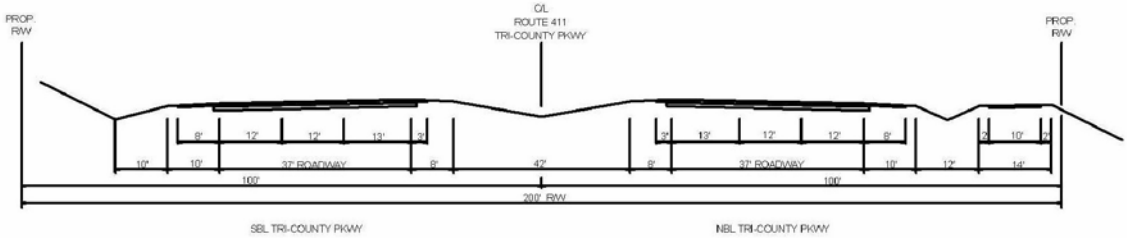
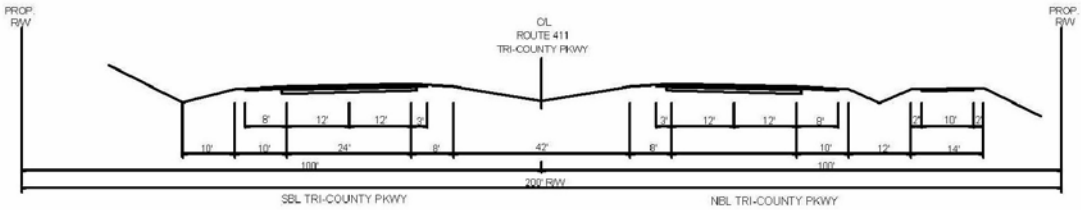
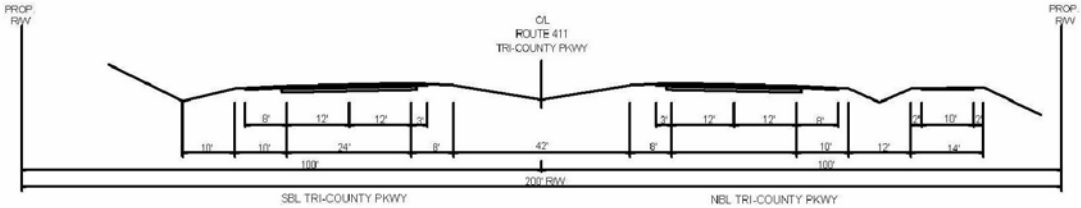


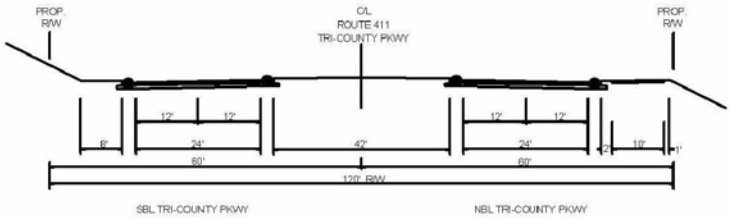
GENERAL DESIGN SEGMENT 3



GENERAL DESIGN SEGMENT 2



GENERAL DESIGN SEGMENT 1, OPTION 1



GENERAL DESIGN SEGMENT 1, OPTION 2

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FIGURE 2.4-1
GENERAL DESIGN SEGMENTS
TYPICAL SECTIONS

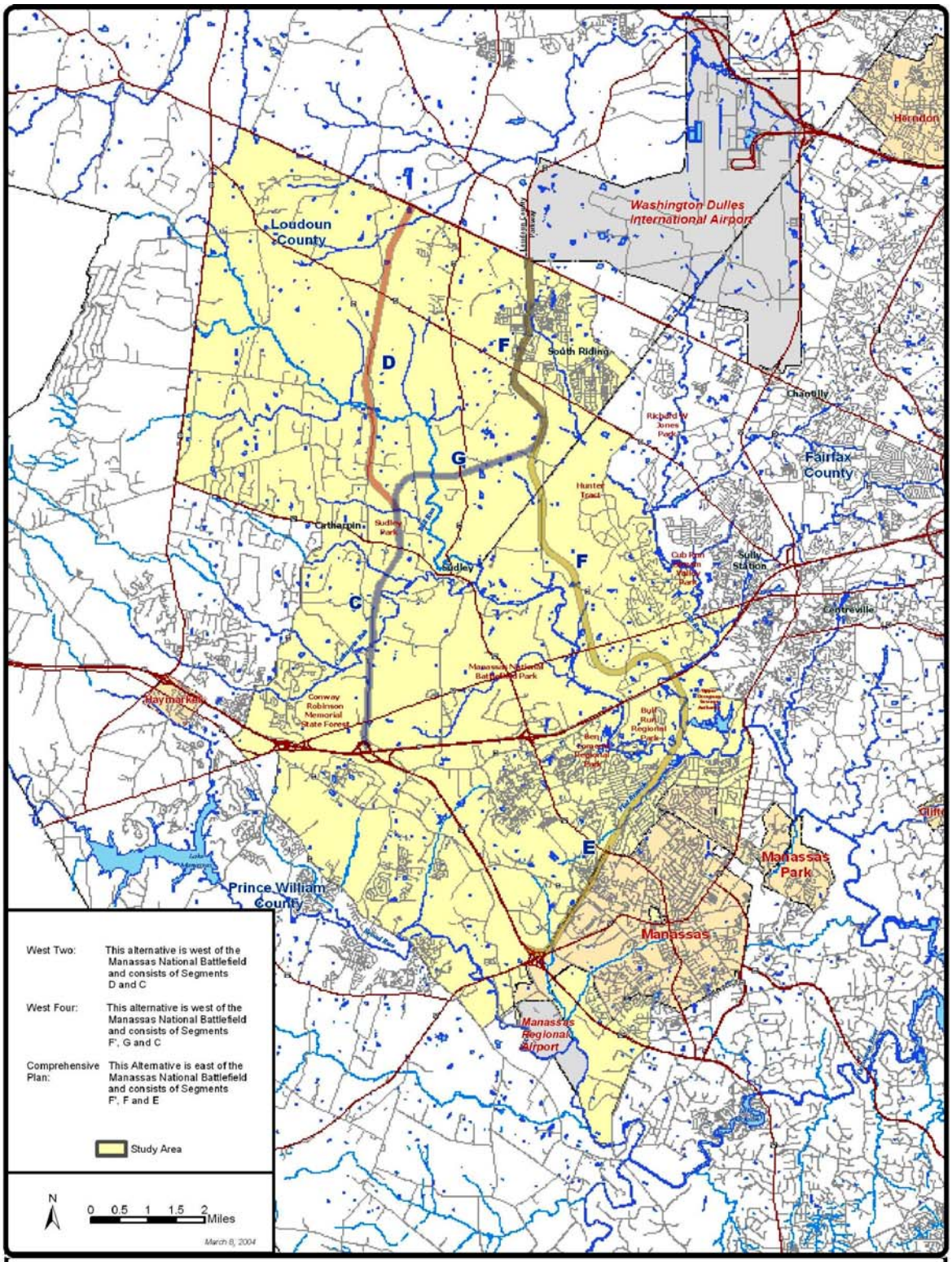

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FIGURE 2.4-2
CANDIDATE BUILD ALTERNATIVES

3.0 AFFECTED ENVIRONMENT

3.1 AIR QUALITY

This section presents applicable federal air quality standards and discusses whether the Tri-County Parkway Location Study attains those standards. Air quality is a general term used to describe the pollutant levels in the atmosphere. The air quality analysis will identify the potential air quality effects associated with traffic conditions resulting from the construction of the proposed Tri-County Parkway alternatives.

3.1.1 Regulatory Context

In accordance with the Clean Air Act of 1970 (42 USC 7609, as amended in 1997 and 1990) the US Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six major pollutants. These include: carbon monoxide (CO), lead (Pb), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur oxides (SO_x). These standards, presented in Table 3.1-1, are also the official ambient air quality standards for the State of Virginia. The "primary" standards have been established to protect the public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Of these six pollutants, the FHWA requires a detailed evaluation of CO on a project by project basis.

Table 3.1-1
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	35 PPM (40 µg/m^3)	1-hour	None
	9 PPM (10 µg/m^3)	8-hour	None
Lead	1.5 µg/m^3	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 PPM (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM10)	50 µg/m^3	Annual (Arithmetic Mean)	Same as Primary
	150 µg/m^3	24-hour	Same as Primary
Particulate Matter (PM2.5)	15 µg/m^3	Annual (Arithmetic Mean)	Same as Primary
	65 µg/m^3	24-hour	Same as Primary
Ozone	0.12 ppm (235 µg/m^3)^A	1-hour	Same as Primary
	0.08 PPM (157 µg/m^3)^A	8-hour	Same as Primary
Sulfur Oxides	80 µg/m^3 (0.3 ppm)	Annual (Arithmetic Mean)	- -
	365 µg/m^3 (0.14 ppm)	24-hour	- -
	- -	3-hour	1300 µg/m^3 (0.5 ppm)

Source: USEPA, "National Primary and Secondary Ambient Air Quality Standards." (49 CFR 50).
Notes:
A Areas not attaining the 1-hour standard by the end of 1997 must attain that standard before demonstrating attainment with the 8-hour standard.
B 3-year average of the 4th highest 8-hour concentration may not exceed 0.08 ppm.
C Not to be exceeded more than once a year.
D Based on a 3-year average of annual averages.
E Based on a 3-year average of annual 98th percentile values.
Abbreviations: ppm - parts per million µg/m^3 - micrograms per cubic meter mg/m^3 - milligrams per cubic meter

3.1.2 Carbon Monoxide

Carbon Monoxide is a colorless, odorless, poisonous gas formed from the incomplete combustion of fossil fuels. It is the primary pollutant emitted from motor vehicles. Automobiles contribute about 60 percent of all CO emissions nationwide and represent the major source of CO in the study area.

The state and federal ambient air quality standards for carbon monoxide are as follows:

- 1-hour - 35 parts per million (ppm) or 40 milligrams per cubic meter (mg/m^3); not to be exceeded more than once per year;
- 8-hour - 9 ppm or 10 mg/m^3; not to be exceeded more than once per year.

Any 1-hour concentration above 35 ppm or 8-hour concentration above 9 ppm is considered a violation of the standards.

In order to determine potential CO concentrations at receptors near a highway, two concentration components must be used: local and background. The local component takes into account CO emitted by cars operating on highways near receptors (i.e., within 300 feet). The background component takes into account CO emitted by cars operating on streets further from receptor locations. The background CO concentration for the project area is conservatively estimated to be 6.0 parts per million (ppm) for the one-hour period and 3.0 ppm for the eight-hour period. Consultation with the Air, Noise and Energy Section, Environmental Division, Virginia Department of Transportation, indicated that an ambient CO concentration of 3.0 ppm is applied to most rural areas.

3.1.3 Other Emissions

Automobiles and other mobile sources are also sources of hydrocarbons and nitrogen oxides. Hydrocarbons and nitrogen oxides emitted from automobiles and other mobile sources in an urban area may mix together in the atmosphere and react with sunlight to form ozone under certain conditions. The photochemical reactions that form ozone don't occur immediately when emissions are emitted from mobile sources. Instead, ozone will form under certain atmospheric conditions over a large area and several hours removed from the traffic conditions that produced the initial emissions that provide the precursors for ozone.

Because of the number of variables that are involved in the formation of ozone and because the process by which ozone is formed is not well defined, ozone can't be accurately predicted or measured. Instead, the precursors of ozone such as hydrocarbons and nitrogen are predicted using models and serve as indicators of the potential for ozone formation.

Ozone is a regional pollutant and analyzing it on an individual project cannot be done with any degree of accuracy. Instead, it must be analyzed in the aggregate with all other projects included in an areas long range plans and transportation improvement programs. This is accomplished during the transportation planning process on a system wide basis and is addressed in greater detail in Section 3.9.2.

Automobiles are not significant sources of particulate matter (PM_{10}) and sulfur dioxide. Nationwide, highway sources account for less than seven percent of particulate matter emissions and less than two percent of sulfur dioxide emissions. Particulate matter and sulfur dioxide emissions are predominantly the result of non-highway sources (e.g., industrial, commercial, and agricultural activities). Because emissions of particulate matter and sulfur dioxide from cars are very low, there is no reason to suspect that traffic within the study area would cause air quality standards for particulate matter and sulfur dioxide to be exceeded. The addition of PM2.5 as a criteria pollutant is addressed in Section 3.9.2.

Automobiles emit lead as a result of burning gasoline containing tetraethyl lead, which is added by refineries to increase the octane rating of the fuel. In 1973, the EPA called for a reduction in the lead content of leaded gasoline. The average lead content of gasoline in 1973 was 2-3 grams per gallon or about 200,000 tons of lead a year. In 1975, passenger cars and light trucks were manufactured with more elaborate emission control system which included catalytic converters that required unleaded gasoline and emit no lead. By 1989, the composite average of lead in gasoline had dropped to 0.01 grams per gallon. In 1995, leaded fuel accounted for only 0.6 percent of total gasoline sales or less than

2,000 tons per year. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles. Because of these reasons, the traffic within the study area would not cause the NAAQS for lead to be exceeded.

3.1.4 Existing Air Quality

Section 107 of the 1997 Clean Air Act Amendments requires the EPA to publish a list of all geographic areas in compliance with the NAAQS, as well as those not in attainment of the NAAQS. Areas not in compliance with the NAAQS are termed nonattainment areas; the designation subjects the effected areas to a regulatory burden that must be followed to clean up the air. Failure to do so can result in a variety of restrictions including restrictions on the area to advance certain transportation projects. The designation of an area is made on a pollutant-by-pollutant basis. A network of sampling stations monitors air pollutant levels throughout Virginia. The stations are operated under the supervision of the Virginia Department of Environmental Quality (DEQ). Table 3.1-2 gives the data from the stations within the study area (Fairfax County, Loudon County, Prince William County and the City of Manassas) for 2002. The counties comprising the area are in attainment for all pollutants except for the 1-hour ozone standard, the 8-hour ozone standard, and possibly the $PM_{2.5}$ standard. The area is in attainment for the CO standard, but a project-level analysis is being performed per FHWA's *Technical Advisory T6640.8A*.

In July of 1997, EPA added $PM_{2.5}$ as a criterion pollutant to the NAAQS. For $PM_{2.5}$, EPA is currently coordinating with the states to determine which areas will be designated nonattainment. Although all of Virginia's monitors are in compliance with the $PM_{2.5}$ standard, EPA has informed the Governor of their intention to designate the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park as well as the Counties of Arlington, Fairfax, Loudoun, and Prince William as nonattainment under the $PM_{2.5}$ standard. The rationale for this decision is based on the fact that these jurisdictions are part of a metropolitan statistical area which includes jurisdictions in Maryland that are not in compliance with the $PM_{2.5}$ standard. The VDEQ is working with the EPA regarding their recommendation. EPA plans to finalize the $PM_{2.5}$ designations in November of 2004. If the counties comprising the study area are designated nonattainment for $PM_{2.5}$, then they will likely have at least one year from the designation to demonstrate conformity to the standard in accordance with the Clean Air Act.

The counties comprising the study area are part of an area currently designated as a severe nonattainment area under the 1-hour ozone standard (0.12 ppm). In July of 1997, EPA evaluated the latest scientific data and developed a standard more protective of public health after discovering that adverse health effects resulting from ozone exposure occur at lower concentrations spread out over longer periods of time. As a result, EPA adopted an 8-hour standard for ozone (0.08 ppm) but before they could apply it, it was tied up in litigation. Finally, in spring of 2004, EPA designated areas in nonattainment with the 8-hour standard; the localities comprising the study area are all included in the area designated nonattainment under the 8-hour standard, effective June 15, 2004. Areas designated nonattainment under the 8-hour ozone standard have one year to demonstrate conformity in accordance with the procedures established by EPA at which time the 1-hour ozone standard will be revoked. The Tri-County Parkway is currently included in the constrained Long-Range Plan for the region for construction, and the plan has been found to conform with the State Implementation Plan for the 1-hour ozone standard by FHWA and FTA. No phases of the project are currently included in the region's Transportation Improvement Program with the exception of the environmental study.

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TABLE 3.1-2
STUDY AREA AIR QUALITY SUMMARY
DEQ MONITORING SITES
HIGHEST RECORDED LEVELS DURING 2002

Polluant	Fairfax County	Fairfax County	Loudon County	Prince William County	Prince William County
	Mclean Governmental Center	Chantilly, Upper Cub Run Treatment Plant	Ashburn, Broad Run High School	Long Park	Manassas Health Department
Station Number	**L-46-A8**	**L-46-F**	**38-I**	**45-L**	**45-A**
Carbon Monoxide (CO)					
Maximum 1-hour	3.3 ppm	2.2 ppm	NM	NM	NM
Concentrations > 35 ppm	0	0	NM	NM	NM
Maximum 8-hour	2.3 ppm	1.2 ppm	NM	NM	NM
Concentrations > 9 ppm	0	0	NM	NM	NM
Nitrogen Dioxide (NO_2)					
No. of 1-hour Observations	6076	8401	8506	8464	NM
1-Hour Maximum	0.071 ppm	0.050 ppm	0.052 ppm	0.047 ppm	NM
Annual Arithmetic Mean	0.019 ppm	0.009 ppm	0.014 ppm	0.011 ppm	NM
Annual Mean > 0.05 ppm	0	0	0	0	NM
Particulate Matter < 10 Micrometers (PM_{10})					
No. Of 24-Hour Observations	NM	54	NM	NM	57
24-Hour	NM	57 $\mu g/m^3$	NM	NM	51 $\mu g/m^3$
Concentrations > 150 g/m^3	NM	0	NM	NM	0
Annual Arithmetic Mean	NM	18 $\mu g/m^3$	NM	NM	18 $\mu g/m^3$
Mean > 50 g/m^3	NM	1	NM	NM	1
Ozone (O_3)					
No. Of 1-Hour Observations	6696	7250	5070	4918	NM
1-Hour Maximum	0.131 ppm	0.149 ppm	0.132 ppm	0.129 ppm	NM
Concentrations > 0.12 ppm	1	1	1	1	NM
No. Of 8-Hour Observations	6696	7262	5127	4969	NM
8-Hour Maximum	0.104 ppm	0.099 ppm	0.119 ppm	0.108 ppm	NM
Concentrations > 0.08 ppm	7	12	23	7	NM
Sulfur Dioxide (SO_2)					
No. of 24-Hour Observations	363	364	NM	NM	NM
24-Hour Maximum	0.021 ppm	0.014 ppm	NM	NM	NM
Concentrations > 0.14 ppm	0	0	NM	NM	NM
Annual Arithmetic Mean	0.007	0.004	NM	NM	NM
Lead (Pb)					
Quarterly Average	NM	NM	NM	NM	NM

Source: Virginia Ambient Air Monitoring 2002 Data Report, DEQ, 2002.
Note: NM = Not Monitored

4.0 ENVIRONMENTAL CONSEQUENCES

A microscale air quality analysis was conducted to determine the potential effects of the CBA's on local air quality. The "worst-case" project level carbon monoxide (CO) concentrations were determined for the existing (2005), interim (2011), and design (2030) years. These CO concentrations were then compared to the National Ambient Air Quality Standards (NAAQS). The maximum one-hour and eight-hour CO levels predicted were below NAAQS maximum levels. Thus, the proposed Tri-County Parkway would not cause a violation of the NAAQS. The project conforms to the State Implementation Plan (SIP) and the goals set forth in the Clean Air Act Amendments (CAAA) and the Final Conformity Rule.

4.1 METHODOLOGY

Microscale air quality modeling was performed using VDOT's VACALN6A program. Emission factors within VACALN6A are based on the EPA mobile source emission factor model (MOBILE 6.2). Dispersion parameters within the program are based on EPA's CALINE3 air quality dispersion model. Following the guidelines set forth in VDOT's *Project Air Quality Analysis Consultants Guide, Revision 11*, CO levels in the study area were estimated along each segment for each CBA. Sites were selected on the basis of existing and estimated future traffic conditions and their location relative to the alignment where the highest CO concentrations could be expected and where the general public would have access during the analysis periods (i.e. sidewalks and bike lanes).

Maximum one-hour and eight-hour CO levels were estimated at each site for the existing year (2005), interim or completion year (2011 Build and No-Build scenarios) and the design year (2030 Build and No-Build scenarios).

Microscale modeling is used to predict CO concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the location at which predictions are being made. A CO "background level" must be added to this value to account for CO entering the area from environmental and other non-mobile sources upwind of the receptors. Based upon VDOT recommendations, a one-hour background and eight-hour background concentrations of 6 ppm and 3 ppm, respectively, were applied to all analysis sites.

Emission factors within the VACALN6A program are based on EPA's MOBILE6.2 mobile source emission factor model and accounts for the inspection maintenance program implemented by the State of Virginia for the Northern Virginia region. Traffic data used for the air quality analysis was developed as part of an overall traffic analysis for this study and is shown in Appendix A. The microscale CO analysis was performed for the peak one-hour and eight-hour traffic periods. These are the periods when the greatest air quality effects of the proposed project are expected. The average number of vehicles per hour during the peak eight-hour period was calculated as 0.7 percent of the average daily traffic. This persistence factor was recommended by VDOT based on FHWA's *Manual for Air Quality Considerations in Environmental Documents*.

4.2 IMPACTS

Maximum one-hour and eight-hour CO levels predicted for each segment are shown in Table 4.2-1 through Table 4.2-4 respectively as well as Appendix B. These tables also include the predicted CO levels expected to occur for the No-Build Alternatives. All predicted concentrations are below the applicable Federal Standards.

Table 4.2-1
INTERIM YEAR (2011)
ONE HOUR PREDICTED CO CONCENTRATIONS (PPM)

Segment	Receptor Distance		Existing	Alternatives			
	Existing Roadway	Proposed Roadway		No-Build	Comp Plan	West 4	West 2
C	60	77	6.9	6.6	N/A	7.0	6.8
D	15	77	6.1	6.2	N/A	N/A	6.8
E	60	90	7.1	6.8	9.5	N/A	N/A
F	20	77	7.5	7.2	6.8	N/A	N/A
F’	20	50	6.9	7.5	7.1	7.1	N/A
G	20	77	7.0	6.9	N/A	6.8	N/A

Table 4.2-2
DESIGN YEAR (2030)
ONE-HOUR PREDICTED CO CONCENTRATIONS (PPM)

Segment	Receptor Distance		Existing	Alternatives			
	Existing Roadway	Proposed Roadway		No-Build	Comp Plan	West 4	West 2
C	60	77	6.9	6.6	N/A	6.9	6.9
D	15	77	6.1	6.7	N/A	N/A	6.7
E	60	90	7.1	6.3	8.6	N/A	N/A
F	20	77	7.5	7.1	6.7	N/A	N/A
F’	20	50	6.9	7.6	7.2	7.1	N/A
G	20	77	7.0	6.4	N/A	6.8	N/A

Table 4.2-3
INTERIM YEAR (2011)
EIGHT HOUR PREDICTED CO CONCENTRATIONS (PPM)

Segment	Receptor Distance		Existing	Alternatives			
	Existing Roadway	Proposed Roadway		No-Build	Comp Plan	West 4	West 2
C	60	77	3.6	3.4	N/A	3.6	3.6
D	15	77	3.1	3.5	N/A	N/A	3.5
E	60	90	3.8	3.2	4.2	N/A	N/A
F	20	77	4.1	3.8	3.5	N/A	N/A
F’	20	50	3.6	4.1	3.8	3.8	N/A
G	20	77	3.7	3.3	N/A	3.6	N/A

Table 4.2-4
DESIGN YEAR (2030)
EIGHT HOUR PREDICTED CO CONCENTRATIONS (PPM)

Segment	Receptor Distance		Existing	Alternatives			
	Existing Roadway	Proposed Roadway		No-Build	Comp Plan	West 4	West 2
C	60	77	3.6	3.4	N/A	3.7	3.6
D	15	77	3.1	3.1	N/A	N/A	3.6
E	60	90	3.8	3.6	5.5	N/A	N/A
F	20	77	4.1	3.8	3.6	N/A	N/A
F’	20	50	3.6	4.1	3.8	3.8	N/A
G	20	77	3.7	3.6	N/A	3.6	N/A

The highest predicted one and eight-hour CO concentrations occurred along Segment E for the Comprehensive Alternative. The receptor for this site is relatively close to the roadway; 14 feet from the edge of the roadway and 90 feet from the roadway's centerline. This location also has the highest hourly volume of vehicles (over 9,000 in all future scenarios) of all sites analyzed.

Recognizing that the predicted concentrations of CO include background concentrations of 3 and 6 ppm for the eight and one-hour levels, respectively, the proposed project will have little effect on existing levels of localized pollution. At a couple of sites, CO concentrations will decrease in the design year compared to the existing conditions. At those sites where the project will increase existing CO concentrations, the increase is less than 1 ppm with the exception of one site. Regardless, CO concentrations will still be well below the NAAQS for CO at all sites.

4.3 CONSTRUCTION IMPACTS

The temporary air quality impacts from construction are not expected to be significant. Construction activities are to be performed in accordance with VDOT's *Road and Bridge Specifications*. The Specifications are approved as conforming with the SIP and require compliance with all applicable local, state, and federal regulations.

4.4 PROJECT-LEVEL CONFORMITY

The purpose and need of the study focuses on meeting the current and future regional transportation needs of the area. The Tri-County Parkway is currently included in the constrained Long-Range Plan for the region for construction, and the plan has been found to conform with the State Implementation Plan under the 1-hour ozone standard by FHWA and FTA. No phases of the project are currently included in the region's Transportation Improvement Program with the exception of the environmental study.

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5.0 REFERENCES

Virginia Department of Environmental Quality, Virginia Ambient Air Monitoring 2002 Data Report. June 2003.

U.S. Department of Transportation, Federal Highway Administration Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents. October 30, 1987.

U.S. Department of Transportation, Federal Highway Administration Southern Resource Center, Manual for Air Quality Considerations in Environmental Documents

Virginia Department of Transportation, Environmental Division, Air, Noise, and Energy Section. Project Air Quality Analysis Consultants Guide, Revision 11. September 2002.

Clean Air Act Amendments (CAAA). 40 CFR Part 50-87.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards (OAQPS). National Primary and Secondary Ambient Air Quality Standards (49 CFR 50)

Virginia Department of Transportation, Road and Bridge Specifications, Section 107.14(b) 2 Air, 2002.

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APPENDIX A

Tri-County Parkway Location Study

TRAFFIC DATA USED IN AIR QUALITY ANALYSIS

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2005 EXISTING
WORST CASE TRAFFIC VOLUMES

Facility	Limits	Volume	Average Speed
Godwin Drive	VA 28 to Wellington Drive	1576	49
Godwin Drive	Wellington Drive to VA 234 Business	1618	49
Loudoun County Parkway (existing)	Braddock Road to US 50	660	46
Wellington Road	east of existing Godwin Drive	333	45
Wellington Road	west of Tri-County Parkway (existing Godwin Drive)	971	45
VA 234 Business	north of Godwin Drive	1872	44
VA 234 Business	south of Godwin Drive	1912	44
VA 234	east of Tri-County Parkway west location	727	49
VA 234	west of Tri-County Parkway west location	503	50
Lomond Drive	east of Tri-County Parkway location	871	38
Lomond Drive	west of Tri-County Parkway location	2010	11
Interstate 66 Eastbound	at Tri-County Parkway east location	5169	21
Interstate 66 Westbound	at Tri-County Parkway east location	7360	17
Interstate 66 Eastbound	east of Tri-County Parkway west location	4093	19
Interstate 66 Eastbound	west of Tri-County Parkway west location	4642	17
Interstate 66 Westbound	east of Tri-County Parkway west location	5005	16
Interstate 66 Westbound	west of Tri-County Parkway west location	5709	14
US 29	at Tri-County Parkway east location	1150	47
US 29	At Tri-County Parkway west location	1326	44
Braddock Road	East of Loudoun County Parkway	565	33
Braddock Road	West of Loudoun County Parkway	293	33
Braddock Road	At Tri-County Parkway west location	92	33
US 50	East of Loudoun County Parkway	2413	51
US 50	West of Loudoun County Parkway	1624	55
US 50	At Tri-County Parkway west location	2010	54

2011 (INTERIM) NO-BUILD
WORST CASE TRAFFIC VOLUMES

Facility	Limits	Volume	Average Speed
Godwin Drive	VA 28 to Wellington Drive	1766	48
Godwin Drive	Wellington Drive to VA 234 Business	1535	49
Loudoun County Parkway (existing)	Braddock Road to US 50	1765	45
Wellington Road	east of existing Godwin Drive	691	45
Wellington Road	west of TCP (existing Godwin Drive)	1228	45
VA 234 Business	north of Godwin Drive	2764	43
VA 234 Business	south of Godwin Drive	2150	42
VA 234	At Tri-County Parkway west location	971	47
Lomond Drive	east of Tri-County Parkway location	882	38
Lomond Drive	west of Tri-County Parkway location	1323	22
Interstate 66 Eastbound	at Tri-County Parkway east location	6105	19
Interstate 66 Westbound	at Tri-County Parkway east location	8456	15
Interstate 66 Eastbound	east of Tri-County Parkway west location	5233	41
Interstate 66 Eastbound	west of Tri-County Parkway west location	6040	31
Interstate 66 Westbound	east of Tri-County Parkway west location	6487	26
Interstate 66 Westbound	west of Tri-County Parkway west location	7078	21
US 29	at Tri-County Parkway east location	1415	43
US 29	At Tri-County Parkway west location	1338	44
Braddock Road	East of Loudoun County Parkway	1372	29
Braddock Road	West of Loudoun County Parkway	552	33
Braddock Road	At Tri-County Parkway west location	250	33
US 50	East of Loudoun County Parkway	2833	48
US 50	West of Loudoun County Parkway	1399	55
US 50	East of Tri-County Parkway west location	1992	54
US 50	West of Tri-County Parkway west location	2907	47

2030-NO-BUILD
WORST CASE TRAFFIC VOLUMES

Facility	Limits	Volume	Average Speed
Godwin Drive	VA 28 to Wellington Drive	853	51
Godwin Drive	Wellington Drive to VA 234 Business	867	51
Loudoun County Parkway (existing)	Braddock Road to US 50	2369	43
Wellington Road	east of existing Godwin Drive	221	45
Wellington Road	west of Tri-County Parkway (existing Godwin Drive)	564	45
VA 234 Business	north of Godwin Drive	2073	44
VA 234 Business	south of Godwin Drive	1724	44
VA 234	east of Tri-County Parkway west location	648	49
VA 234	west of Tri-County Parkway west location	615	50
Lomond Drive	east of Tri-County Parkway location	1210	37
Lomond Drive	west of Tri-County Parkway location	2007	11
Interstate 66 Eastbound	at Tri-County Parkway east location	6737	23
Interstate 66 Westbound	at Tri-County Parkway east location	9541	13
Interstate 66 Eastbound	east of Tri-County Parkway west location	7644	20
Interstate 66 Eastbound	west of Tri-County Parkway west location	6588	25
Interstate 66 Westbound	east of Tri-County Parkway west location	8462	16
Interstate 66 Westbound	west of Tri-County Parkway west location	9489	13
US 29	at Tri-County Parkway east location	1826	35
US 29	At Tri-County Parkway west location	1703	37
Braddock Road	East of Loudoun County Parkway	2325	15
Braddock Road	West of Loudoun County Parkway	1505	27
Braddock Road	At Tri-County Parkway west location	927	32
US 50	East of Loudoun County Parkway	3618	39
US 50	West of Loudoun County Parkway	2905	47
US 50	East of Tri-County Parkway west location	2796	48
US 50	West of Tri-County Parkway west location	3767	37

2011 (INTERIM) BUILD
WORST CASE TRAFFIC VOLUMES

Facility	Limits	Volume	Average Speed
Comprehensive Plan Alternative			
Segment E (existing Godwin Drive)	VA 28 to Wellington Drive	3093	34
Segment E (existing Godwin Drive)	Wellington Drive to VA 234 Business	3393	29
Segment E	VA 234 Business To Lomond Drive	8487	26
Segment E	Lomond Drive to I-66	9617	19
Segment F	I-66 to US 29	2374	59
Segment F	US 29 to Braddock Road	2058	44
Segment F	Braddock Road to US 50	1996	44
West 4 Alternative			
Segment C	I-66 to US 29	2202	60
Segment C	US 29 to Artemus Road	2682	57
Segment C	Artemus Road to VA 234	2259	60
Segment C	VA 234 to Segment G	2891	55
Segment G	Segment C to VA 659	2891	55
Segment G	VA 659 to Segment F	2030	44
Segment F	Segment G to Braddock Road	2072	44
Segment F	Braddock Road to US 50	2084	44
West 2 Alternative			
Segment C	I-66 to US 29	2224	60
Segment C	US 29 to Artemus Road	2303	59
Segment C	Artemus Road to VA 234	1866	61
Segment D	VA 234 to US 50	2206	60

2030 BUILD
WORST CASE TRAFFIC VOLUMES

Facility	Limits	Volume	Average Speed
Comprehensive Plan Alternative			
Segment E (existing Godwin Drive)	VA 28 to Wellington Drive	2888	37
Segment E (existing Godwin Drive)	Wellington Drive to VA 234 Business	3345	30
Segment E	VA 234 Business To Lomond Drive	8073	29
Segment E	Lomond Drive to I-66	9322	21
Segment F	I-66 to US 29	2159	60
Segment F	US 29 to Braddock Road	2980	39
Segment F	Braddock Road to US 50	2863	40
West 4 Alternative			
Segment C	I-66 to US 29	3621	46
Segment C	US 29 to Artemus Road	3212	51
Segment C	Artemus Road to VA 234	2791	56
Segment C	VA 234 to Segment G	3186	52
Segment G	Segment C to VA 659	3229	51
Segment G	VA 659 to Segment F	2167	44
Segment F	Segment G to Braddock Road	2293	43
Segment F	Braddock Road to US 50	2660	41
West 2 Alternative			
Segment C	I-66 to US 29	3631	46
Segment C	US 29 to Artemus Road	3300	50
Segment C	Artemus Road to VA 234	2826	55
Segment D	VA 234 to US 50	2779	56

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APPENDIX B

Tri-County Parkway Location Study

VACALN6A MODEL RESULTS

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VACALN6A VERSION 9

NON-ATTAINMENT
VIRGINIA DEPARTMENT OF TRANSPORTATION

MOBILE 6.2/CALINE 3 GRAPHIC CO SIMULATION
(MOBILE 6.2-ISSUE 2-03)
L.E.REMY- JAN. 20, 2004

* * * * * * * *****

ATTAINMENT

Enter I/M Y/N = N SITE # COMP - E

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	49	1618	0	60	4
INTERIM YR.....	2011	48	1766	0	60	4
DESIGN YR.....	2030	51	867	0	60	4
BUILD						
INTERIM YR.....	2011	19	9617	0	90	6
DESIGN YR.....	2030	21	9322	0	90	6

* * * * * * * *****

CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	7.1
2011	NO-BUILD.....	3.0	6.8
2011	BUILD.....	3.0	9.5
2030	NO-BUILD.....	3.0	6.3
2030	BUILD.....	3.0	8.6

VACALN6A VERSION 9

NON-ATTAINMENT
VIRGINIA DEPARTMENT OF TRANSPORTATION

MOBILE 6.2/CALINE 3 GRAPHIC CO SIMULATION
(MOBILE 6.2-ISSUE 2-03)
L.E.REMY- JAN. 20, 2004

* * * * * * * *****

ATTAINMENT

Enter I/M Y/N = N SITE # COMP - F

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	47	1150	0	20	2
INTERIM YR.....	2011	43	1415	0	20	2
DESIGN YR.....	2030	35	1826	0	20	2
BUILD						
INTERIM YR.....	2011	59	2374	0	77	4
DESIGN YR.....	2030	39	2980	0	77	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	7.5
2011	NO-BUILD.....	3.0	7.2
2011	BUILD.....	3.0	6.8
2030	NO-BUILD.....	3.0	7.1
2030	BUILD.....	3.0	6.7

VACALN6A VERSION 9

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VIRGINIA DEPARTMENT OF TRANSPORTATION

MOBILE 6.2/CALINE 3 GRAPHIC CO SIMULATION
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ATTAINMENT

Enter I/M Y/N = N SITE # COMP - F'

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	46	660	0	20	2
INTERIM YR.....	2011	45	1765	0	20	2
DESIGN YR.....	2030	43	2369	0	20	2
BUILD						
INTERIM YR.....	2011	44	1996	0	50	4
DESIGN YR.....	2030	40	2863	0	50	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	6.9
2011	NO-BUILD.....	3.0	7.5
2011	BUILD.....	3.0	7.1
2030	NO-BUILD.....	3.0	7.6
2030	BUILD.....	3.0	7.2

VACALN6A VERSION 9

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ATTAINMENT

Enter I/M Y/N = N SITE # West 2 - C

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	44	1326	0	60	4
INTERIM YR.....	2011	44	1338	0	60	4
DESIGN YR.....	2030	37	1703	0	60	4
BUILD						
INTERIM YR.....	2011	59	2303	0	77	4
DESIGN YR.....	2030	46	3631	0	77	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	6.9
2011	NO-BUILD.....	3.0	6.6
2011	BUILD.....	3.0	6.8
2030	NO-BUILD.....	3.0	6.6
2030	BUILD.....	3.0	6.9

VACALN6A VERSION 9

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ATTAINMENT

Enter I/M Y/N = N SITE # West 2 - D

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	33	92	0	15	2
INTERIM YR.....	2011	33	250	0	15	2
DESIGN YR.....	2030	32	927	0	15	2
BUILD						
INTERIM YR.....	2011	60	2206	0	77	4
DESIGN YR.....	2030	56	2779	0	77	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	6.1
2011	NO-BUILD.....	3.0	6.2
2011	BUILD.....	3.0	6.8
2030	NO-BUILD.....	3.0	6.7
2030	BUILD.....	3.0	6.7

VACALN6A VERSION 9

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ATTAINMENT

Enter I/M Y/N = N SITE # West 4 - C

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	47	1326	0	60	4
INTERIM YR.....	2011	44	1338	0	60	4
DESIGN YR.....	2030	37	1703	0	60	4
BUILD						
INTERIM YR.....	2011	55	2891	0	77	4
DESIGN YR.....	2030	46	3621	0	77	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	6.9
2011	NO-BUILD.....	3.0	6.6
2011	BUILD.....	3.0	7.0
2030	NO-BUILD.....	3.0	6.6
2030	BUILD.....	3.0	6.9

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ATTAINMENT

Enter I/M Y/N = N SITE # West 4 - F'

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	46	660	0	20	2
INTERIM YR.....	2011	45	1765	0	20	2
DESIGN YR.....	2030	43	2369	0	20	2
BUILD						
INTERIM YR.....	2011	44	2084	0	50	4
DESIGN YR.....	2030	41	2660	0	50	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	6.9
2011	NO-BUILD.....	3.0	7.5
2011	BUILD.....	3.0	7.1
2030	NO-BUILD.....	3.0	7.6
2030	BUILD.....	3.0	7.1

VACALN6A VERSION 9

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ATTAINMENT

Enter I/M Y/N = N SITE # West 4 - G

With ATP

NO-BUILD	YEAR	MPH	1 HR.VPH	8 HR.VPH	SITE DIST	NO. LANES
EXISTING YR.....	2005	49	727	0	20	2
INTERIM YR.....	2011	47	971	0	20	2
DESIGN YR.....	2030	49	648	0	20	2
BUILD						
INTERIM YR.....	2011	55	2891	0	77	4
DESIGN YR.....	2030	51	3229	0	77	4

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CO CONCENTRATION,PPM
(INCLUDING BACKGROUND)

		'8 HOUR	1 HOUR
2005	BASE.....	3.0	7.0
2011	NO-BUILD.....	3.0	6.9
2011	BUILD.....	3.0	7.0
2030	NO-BUILD.....	3.0	6.4
2030	BUILD.....	3.0	6.8