AIR QUALITY ASSESSMENT

CENTERVILLE TURNPIKE PHASE III
CITY OF VIRGINIA BEACH

CIP 2-419, UPC 109381

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LIST OF ACRONYMS

ADT	Average Daily Traffic
CAA	Clean Air Act
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
FHWA	Federal Highway Administration
EIS	Environmental Impact Statement
GHG	Greenhouse Gas
HRTPO	Hampton Roads Transportation Planning Organization
IAC	Interagency Consultation
IACC	Inter-Agency Consultation for Conformity
LOS	Level of Service
LRTP	Long-Range Transportation Plan
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NCHRP	National Cooperative Highway Research Program
NO_X	Nitrogen Oxides
NO_2	Nitrogen Dioxide
O_3	Ozone
PA	Programmatic Assessment
Pb	Lead
PM	particulate matter
PPM	Parts-per-million
R/W	Right-of-Way
SO_2	Sulfur Dioxide
TIP	Transportation Improvement Program
TTAC	Transportation Technical Advisory Committee
USEPA	U.S. Environmental Protection Agency
VDOT	the Virginia Department of Transportation
VDEQ	Virginia Department of Environmental Quality
VMT	Vehicle-Miles-Traveled
VOC	Volatile Organic Compounds

VPD	Vehicles per Day
VPHPL	Vehicles per Hour per Lane

EXECUTIVE SUMMARY

The City of Virginia Beach, Department of Public Works, in coordination with the Virginia Department of Transportation (VDOT) and Federal Highway Administration (FHWA) is preparing a Categorical Exclusion (CE) for the Centerville Turnpike Phase III Project. Improvements are proposed for an approximate 1.2-mile section of Centerville Turnpike. The CE is being prepared in accordance with the National Environmental Policy Act (NEPA), FHWA regulations at 23 Code of Federal Regulations (CFR) 771 and Technical Advisory T 6640.8, and Council on Environmental Quality (CEQ) guidance at 40 CFR 1500 – 1508.

The Build Alternative calls for four lanes with a median from Kempsville Road to Lynnhaven Parkway where the roadway will begin to taper to two lanes tying into existing facilities south of the Parkway to about the City line. A bicycle lane on either side, an 8-foot asphalt sidewalk on the west side, and a 5-foot concrete sidewalk on the east side are proposed. Utilities are to be relocated within right-of-way (R/W) where feasible. The project includes modifying certain accesses to meet state access management standards. The project has the potential for noise barriers and limited new R/W. The drainage system along the study corridor directs stormwater to a major drain just south of the Virginia Beach/Chesapeake City Line that crosses under Centerville Turnpike and heads east to Stumpy Lake. The project would convey drainage to this facility and improve it to accommodate new drainage volumes, in turn requiring regrading a short section of ditch and establishing a construction access area on the east side of Centerville Turnpike in the City of Chesapeake near the City line.

The proposed improvements were assessed for potential air quality impacts and conformity consistent with all applicable air quality regulations and requirements. All methods and assumptions applied in the analyses were made consistent with those provided or specified in the VDOT Resource Document[1]. The assessment indicates that the project would meet all applicable air quality requirements of the NEPA and, as applicable, federal and state transportation conformity regulations. As such, the project will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (USEPA). Additional detail on the analyses conducted for this project is provided below.

Regional Air Quality Status: At the time of preparation of this report, the USEPA Green Book[2] shows the Cities of Virginia Beach and Chesapeake to be designated as attainment areas for all of the NAAQS. Notwithstanding that listing in the USEPA Green Book, federal conformity requirements, including specifically 40 CFR 93.114[3] and 40 CFR 93.115,[4] apply for the project as the area in which it is located is one affected by a recent court decision[5] that reinstates conformity requirements nationwide associated

[1] In 2016, in order to facilitate and streamline the preparation of project-level air quality analyses, and maintain high quality standards for modeling and documentation, the Department created a new resource for modeling. Titled the "Resource Document", it includes a general reference document as well as an associated online data repository (DR) for all modeling inputs needed for project-level air quality analyses in Virginia. The VDOT Resource Document and DR address in a comprehensive fashion the models, methods and assumptions (including data and data sources as well as protocols) needed for the preparation of air quality analyses for transportation projects by or on behalf of the Department. The VDOT Resource Document and DR are available on or via the Department website (http://www.virginiadot.org/projects/environmental_air_section.asp).

[2] See: USEPA Green Book: https://www3.epa.gov/airquality/greenbook/faq.html

[3] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-114.xml

[4] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-115.xml

[5] See: https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/$file/15-1115-1718293.pdf. The court decision addresses the 2015 revocation by EPA of the 1997 ozone NAAQS for which this region was previously in maintenance. EPA has filed a petition for rehearing, but a decision has not yet been issued. Therefore, pending

with the 1997 ozone NAAQS that had previously been eliminated with the revocation by USEPA of that NAAQS in 2015. Accordingly, unless there are further changes in conformity requirements in the timeframe of this project, there must be a currently conforming transportation plan and program at the time of project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CFR 93.109(b)).[6]

Transportation Plan and Program Status: The project is listed in the Hampton Roads Transportation Planning Organization (HRTPO) Fiscal Year 2018-2021 Transportation Improvement Program (TIP) as UPC # 109381 and in the 2040 Long-Range Transportation Plan (LRTP) as ID # 2040-152. The most recent conformity analysis[7] was completed in August 2018, with FHWA and FTA issuing a conformity finding on October 29, 2018 for the TIP and Constrained LRTP covered by that analysis.

Carbon Monoxide (CO): As the project is located in a region that is in attainment of the NAAQS for CO, only NEPA applies, and USEPA project-level ("hot-spot") transportation conformity requirements do not apply. For purposes of NEPA, the potential for CO impacts from the project in terms of potential violations of the NAAQS was assessed and no potential impacts were identified.

Mobile Source Air Toxics (MSAT): As this project involves a CE, and therefore, under FHWA guidance, may be categorized as a Tier 1 project for which no meaningful MSAT effects would be expected, neither a qualitative nor a quantitative analysis is needed. In addition, this project has been determined to generate minimal air quality impacts for Clean Air Act (CAA) criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause a meaningful increase in MSAT impacts of the project from that of the No-Build alternative.

Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. As noted in the referenced FHWA MSAT guidance, based on regulations now in effect, an analysis of national trends with USEPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 45 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

Climate Change and Greenhouse Gases: A Climate Change and greenhouse gas (GHG) analysis is not required for this project, as a CE and not an Environmental Impact Statement (EIS) is being prepared, consistent with the *VDOT Resource Document* (Section 4.7).

Indirect Effects and Cumulative Impacts: A qualitative assessment of the potential for indirect effects and cumulative impacts attributable to this project was conducted. It concluded that the potential effects or impacts are not expected to be significant given available information from pollutant-specific analyses (CO and MSATs).

More specifically, the assessment conducted for project-specific CO and MSAT impacts can be considered indirect effects analyses because they look at air quality impacts attributable to the project that occur in

any further legal changes, the immediate effect of the February court decision is to reinstate conformity requirements that had been eliminated with the revocation by EPA of that NAAQS.

[6] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-109.xml

[7] See: https://www.hrtpo.org/library/view/359/hampton-roads,-virginia-eight_hour-ozone-maintenance-area-regional-conformity-analysis-2040-long-range-transportation-plan-and-fy-18_21-transportation-improvement-program/

the future. These analyses demonstrate that, in the future: 1) air quality impacts from CO will not cause or contribute to violations of the CO NAAQS and 2) MSAT emissions will be significantly lower than they are today.

Regarding the potential for cumulative impacts, the annual regional conformity analysis conducted by VDOT represents a cumulative impact assessment for purposes of regional air quality. The conformity analysis quantifies the amount of mobile source emissions for which the area is designated nonattainment that will result from the implementation of all reasonably foreseeable regionally significant transportation projects in the region (i.e. those proposed for construction funding over the life of the region's transportation plan). The most recent conformity analysis was completed in August 2018, with FHWA and FTA issuing a conformity finding on October 29, 2018 for the TIP and Constrained LRTP covered by that analysis. The analysis demonstrated that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the State Implementation (Air Quality) Plan (SIP) and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by USEPA.

Mitigation: Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*[8].

The Virginia Department of Environmental Quality (VDEQ) provides general comments for projects by jurisdiction. Their comments in part address mitigation[9]: For the City of Virginia Beach and the City of Chesapeake, VDEQ comments relating to mitigation are "*…all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions*[10]*; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions*[11]*; and 9 VAC 5-50, Article 1, Fugitive Dust precautions*[12]."

[8] See http://www.virginiadot.org/business/const/spec-default.asp

[9] Spreadsheet entitled: "DEQ SERP Comments rev8b", March 2017

[10] See: http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130

[11] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-45-760

[12] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60

1. PROJECT BACKGROUND

1.1 INTRODUCTION

The City of Virginia Beach, Department of Public Works, in cooperation with the Virginia Department of Transportation (VDOT) and Federal Highway Administration (FHWA) is preparing a Categorical Exclusion (CE) for the Centerville Turnpike Phase III Project. Improvements are proposed for an approximate 1.2-mile section of Centerville Turnpike and near the Chesapeake City Line (**Figure 1-1**). The CE is being prepared in accordance with the National Environmental Policy Act (NEPA), FHWA regulations at 23 Code of Federal Regulations (CFR) 771 and Technical Advisory T 6640.8, and Council on Environmental Quality (CEQ) guidance at 40 CFR 1500 – 1508.

1.2 PURPOSE AND NEED

The project purpose and need is to accommodate existing/forecasted travel demand, reconstruct the roadway to meet current design standards in order to improve safety and turning movements, modify accesses to improve flow/safety, and improve multimodal travel options.

1.3 ALTERNATIVES

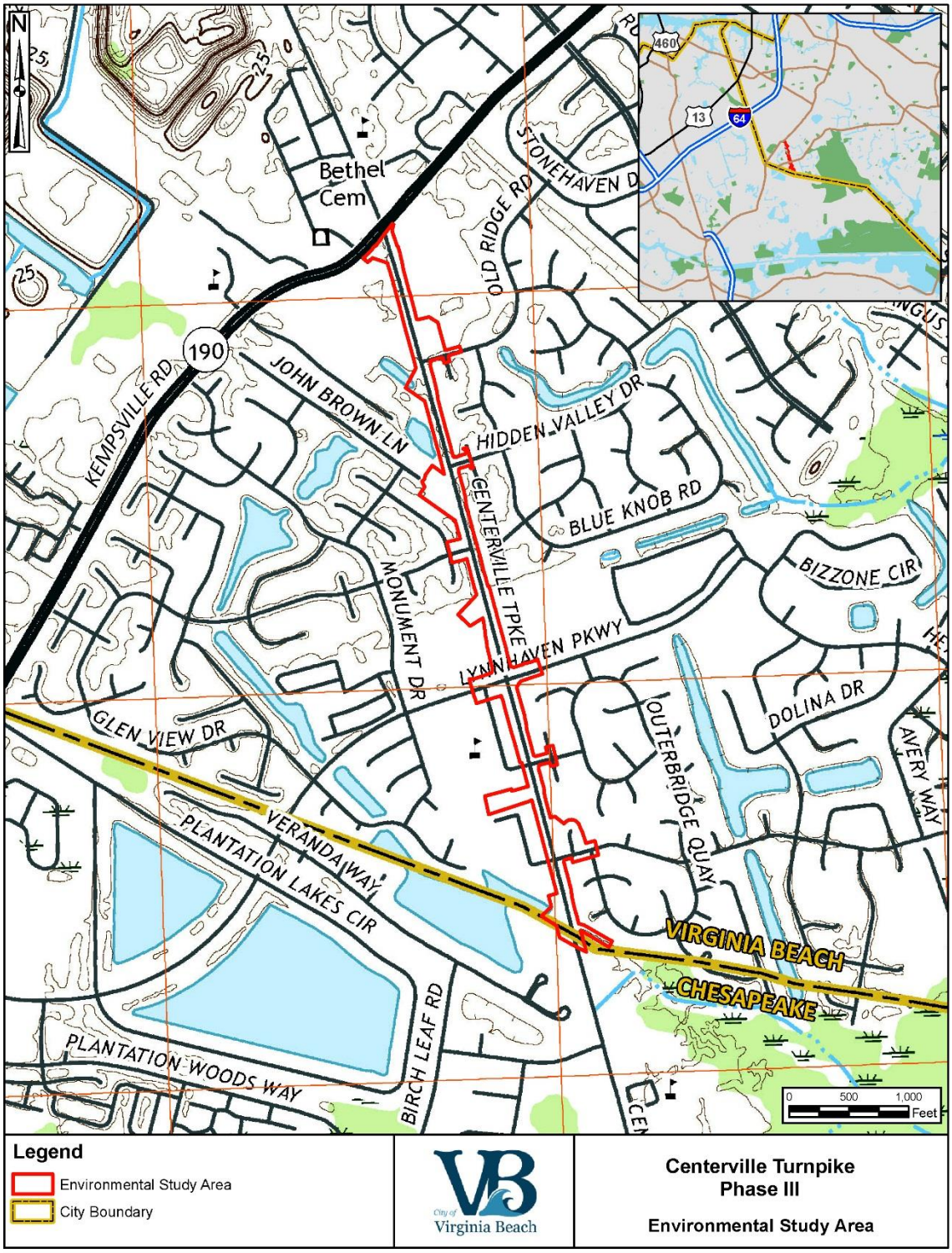
1.3.1 No-Build Alternative

The No-Build Alternative includes continued road maintenance and repairs of existing transportation infrastructure within the Study Area. The No-Build Alternative serves as the baseline against which the potential environmental effects of the Build Alternative are compared.

1.3.2 Build Alternative

The Build Alternative calls for four lanes with a median from Kempsville Road to Lynnhaven Parkway where the roadway will begin to taper to two lanes at the Virginia Beach City Line. A bicycle lane on either side, an 8-foot asphalt sidewalk on the west side, and a 5-foot concrete sidewalk on the east side are proposed. Utilities are to be relocated within R/W where feasible. The project includes modifying certain accesses to meet state access management standards.

Figure 1-1: Environmental Study Area



1.4 SUMMARY OF TRAFFIC DATA AND FORECASTS

Figure 1-2 presents a summary of Existing- (2017), Opening- (2025), and Design-Year (2045) average daily traffic (ADT) forecasts for Centerville Turnpike and the four-signalized cross-streets. **Table 1-1** details the peak-hour volumes and ADT for both the Build and No-Build Alternatives. As shown in **Figure 1-2** and **Table 1-1**, the peak ADT forecast for the Build Design-Year along Centerville Turnpike is 29,835 vehicles per day (vpd); the corresponding No-Build forecast is 27,615 vpd, which is eight percent less. Trucks comprise two percent of total traffic (**Table 1-2**).

Table 1-1: Average Daily Traffic of Centerville Turnpike and Signalized Cross-Streets

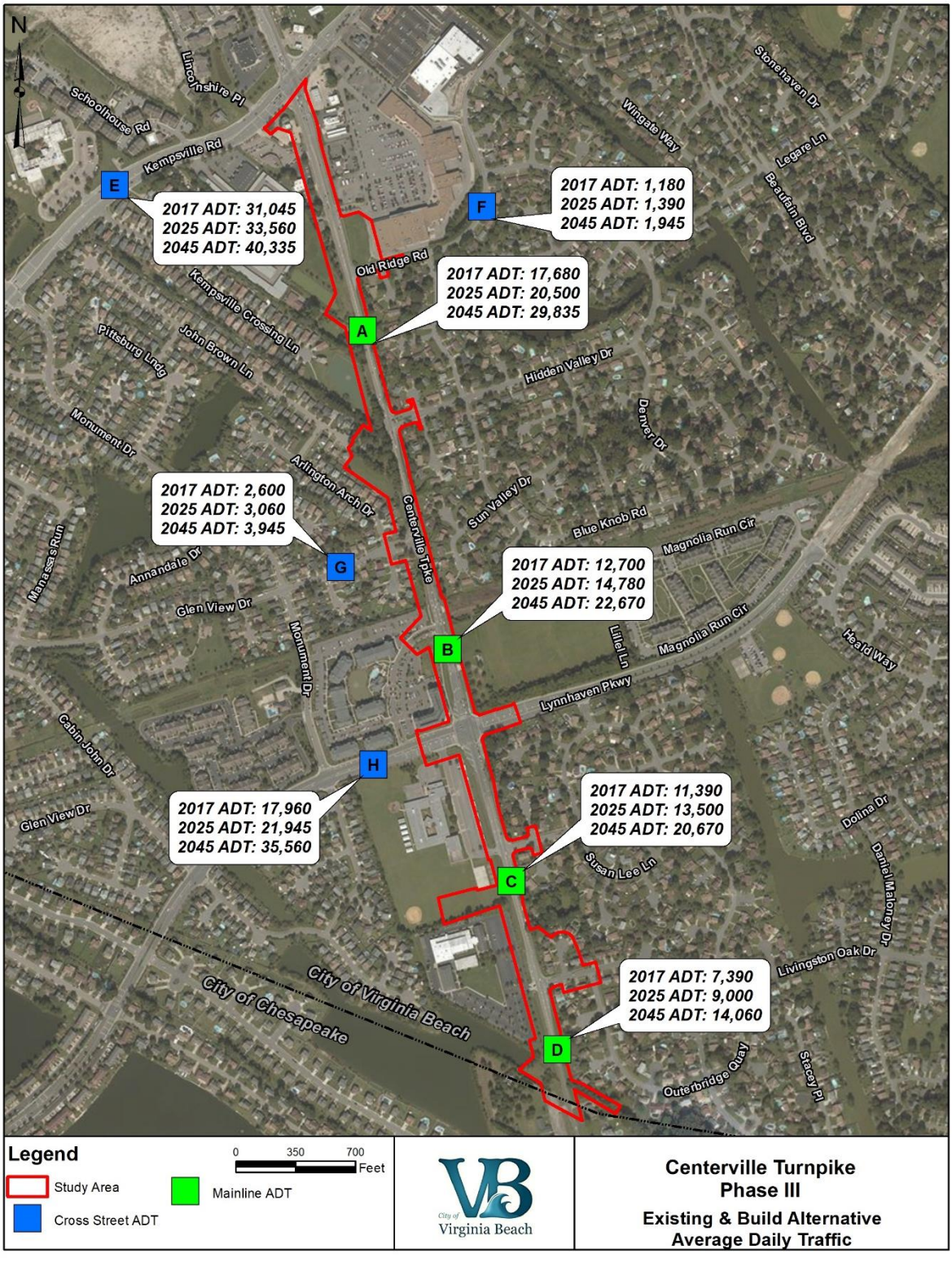
Map ID	Location	Peak Hour					ADT				
		2017 Existing	2025 No-Build	2025 Build	2045 No-Build	2045 Build	2017 Existing	2025 No-Build	2025 Build	2045 No-Build	2045 Build
	Centerville Turnpike @	**vph[1]**	**vph**	**vph**	**vph**	**vph**	**vpd[2]**	**vpd**	**vpd**	**vpd**	**vpd**
A	Glen View Dr to Kempsville Rd	1,591	1,790	1,845	2,485	2,685	17,680	19,890	20,500	27,615	29,835
B	Lynnhaven Pkwy to Glen View Dr	1,143	1,310	1,330	1,870	2,040	12,700	14,560	14,780	20,780	22,670
C	Livingston Oak Dr to Lynnhaven Pkwy	1,025	1,170	1,215	1,675	1,860	11,390	13,000	13,500	18,615	20,670
D	City Line to Livingston Oak Dr	665	775	810	1,075	1,265	7,390	8,615	9,000	11,945	14,060
Cross-Street Location											
E	Kempsville Rd	2,794	3,030	3,020	3,670	3,630	31,045	33,670	33,560	40,780	40,335
F	Old Ridge Rd	106	130	125	150	175	1,180	1,445	1,390	1,670	1,945
G	Glen View Dr	234	275	275	335	355	2,600	3,060	3,060	3,725	3,945
H	Lynnhaven Pkwy	1,616	1,950	1,975	3,140	3,200	17,960	21,670	21,945	34,890	35,560

[1]vph- vehicles per hour [2]vpd- vehicles per day

Table 1-2: Truck Percentages for Centerville Turnpike

	Truck Percentages	
	Class 4-7	**Class 8-13**
Daily	1.87%	0.15%
AM	3.98%	0.26%
PM	0.64%	0.08%

Figure 1-2: ADT of Centerville Turnpike and Signalized Cross-Streets



2. REGULATORY REQUIREMENTS AND GUIDANCE

2.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Federal requirements for air quality analyses for transportation projects derive from NEPA and, where applicable, the federal transportation conformity rule (40 CFR Parts 51 and 93). NEPA guidance for air quality analyses for transportation projects may be found on or via the FHWA website for planning and the environment[13].

2.1.1 FHWA Guidance for Implementing NEPA for Air Quality

For purposes of NEPA, general guidance for project-level air quality analyses is provided in the FHWA 1987 Technical Advisory 6640.8A, "*Guidance for Preparing and Processing Environmental and Section 4(f) Documents"*[14]. That guidance focuses on carbon monoxide. FHWA provides separate guidance for mobile source air toxics (MSATs)[15,16].

2.1.2 Programmatic Agreements

In order to streamline the preparation of project-level air quality analyses conducted for purposes of NEPA, VDOT has implemented several programmatic agreements with FHWA. Copies of current agreements are available on the VDOT website[17].

Project-Level Air Quality Analyses for Carbon Monoxide

In 2016, FHWA and VDOT executed the *"Programmatic Agreement for Project-Level Air Quality Analyses for Carbon Monoxide"* (2016 FHWA-VDOT PA, or 2016 PA), updating the prior (2009) PA. It specifies technical criteria for determining whether project-specific modeling for carbon monoxide will be needed, and was developed based on templates originally created in the 2015 National Cooperative Highway Research Program (NCHRP) study "Programmatic Agreements for Project-Level Air Quality Analyses"[18]. As the NCHRP template did not include skewed intersections, the 2016 FHWA-VDOT PA incorporates by reference the thresholds that were established for skewed intersections in the 2009 FHWA-VDOT PA. It is noteworthy that the 2015 NCHRP study report specifically acknowledged that its national-level templates were modeled on the 2009 FHWA-VDOT PA (which includes both a main agreement as well as a Technical Support Document).

The 2009 FHWA-VDOT "*Project-Level Carbon Monoxide Air Quality Studies Agreement*"[19] (2009 PA) was based on the results of extensive modeling of worst-case analyses, which are presented in a separate Technical Support Document[20]. The 2009 PA incorporated new technical criteria and thresholds (based on

[13] See: http://www.fhwa.dot.gov/environment/index.cfm

[14] See: https://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

[15] FHWA, "INFORMATION: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents", October 18, 2016. See: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/

[16] See: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/

[17] See: http://www.virginiadot.org/projects/environmental_air_section.asp

[18] ICF International, Zamurs and Associates LLC, and Volpe Transportation Systems Center, "Programmatic Agreements for Project-Level Air Quality Analyses", NCHRP 25-25 (78), 2015. http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3311

[19] "Project-Level Carbon Monoxide Air Quality Studies Agreement", FHWA-VDOT letter agreement executed February 27, 2009.

[20] "FHWA-VDOT Agreement On Project-Level Carbon Monoxide Air Quality Studies - Technical Support Document", February 2009

the worst-case modeling results) and represented a major update to prior agreements executed in 2004[21] and 2000[22].

No-Build Analysis Agreement for Air and Noise Studies

On May 22, 2009, FHWA and VDOT executed a "*No-Build Analysis Agreement for Air and Noise Studies*" (2009 No-Build Agreement) [23]. With regard to air quality, the 2009 No-Build Agreement only addresses CO. It requires:

> *…for transportation projects within the Commonwealth of Virginia that require a carbon monoxide (CO) air study under the current Project-Level CO Air Quality Studies Agreement in effect between VDOT and FHWA, the following will govern the need for analysis of the interim and design-year no-build alternatives in CO air studies:*
>
> *A. Any project that qualifies for a Categorical Exclusion (CE) will be exempt from analysis of the no-build alternatives, although VDOT may choose to analyze the no-build alternatives if they determine it appropriate;*
>
> *B. Any project that qualifies for an Environmental Assessment (EA) will generally be exempt from analysis of the no-build alternatives, although VDOT may choose to analyze the no-build alternatives if they determine it appropriate;*
>
> *C. Any project that qualifies for an Environmental Impact Statement (EIS) will require analysis of the no-build alternative; …*

2.2 TRANSPORTATION CONFORMITY

The USEPA issued the federal transportation conformity rule (40 CFR Parts 51 and 93) pursuant to requirements in the CAA as amended[24,25]. Copies of the USEPA conformity regulation and associated guidance are available on the USEPA website[26]. In general, the rule requires conformity determinations for transportation plans, programs and projects in "*non-attainment or maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan*" (40 CFR 93.102(b))[27].

[21] FHWA-VDOT, "Project Level Air Quality Studies Agreement", letter dated August 4, 2004 from FHWA to VDOT.

[22] FHWA-VDOT, "VDOT request to raise the ADT threshold at which quantitative project-level carbon monoxide analyses are conducted", letter dated August 7, 2000

[23] FHWA-VDOT, "No-Build Analysis Agreement for Air and Noise Studies", letter agreement dated May 22, 2009.

[24] See: http://www.epa.gov/air/caa/.

[25] While corresponding state regulations for transportation conformity also apply, they generally focus on consultation requirements (rather than technical) and are therefore not addressed here. See: http://law.lis.virginia.gov/admincode/title9/agency5/chapter151/

[26] See: http://www.epa.gov/otaq/stateresources/transconf/index.htm

[27] See Sections 3.1-3.2 for more information on nonattainment and maintenance areas and the attainment status of the project area.

3. AMBIENT AIR QUALITY

3.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

Table 3-1 presents the NAAQS established by the USEPA for criteria air pollutants, namely: carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), and lead (Pb). There are two types of NAAQS—primary and secondary: "*Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings*."[28]

Areas that have never been designated by USEPA as nonattainment for one or more of the NAAQS are classified as attainment areas, while areas that do not meet one or more of the NAAQS may be designated by USEPA as nonattainment areas for that or those criteria pollutants. Areas that have failed to meet the NAAQS in the past but have since re-attained them may be re-designated as attainment (maintenance) areas, which are commonly referred to as maintenance areas.

Table 3-1: National Ambient Air Quality Standards (USEPA Tabulation)

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum 8-hour concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years

[28] From the EPA preamble to the NAAQS table: https://www.epa.gov/criteria-air-pollutants/naaqs-table

Pollutant	Primary/Secondary	Averaging Time	Level	Form
Sulfur Dioxide (SO_2)	primary	1 hour	75 ppb (4)	98th percentile of 1-hour daily maximum 8-hour concentrations, averaged over 3 years
	secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clear comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Source: Excerpted from: https://www.epa.gov/criteria-air-pollutants/naaqs-table, accessed 10/26/2017.

3.2 AIR QUALITY ATTAINMENT STATUS OF PROJECT AREA

At the time of preparation of this report, the USEPA Green Book shows the Cities of Virginia Beach and Chesapeake to be designated as attainment areas for all of the NAAQS. Notwithstanding that listing in the USEPA Green Book, federal conformity requirements, including specifically 40 CFR 93.114[29] and 40 CFR 93.115,[30] apply for the project as the area in which it is located is one affected by a recent court decision[31] that reinstates conformity requirements nationwide associated with the 1997 ozone NAAQS that had previously been eliminated with the revocation by USEPA of that NAAQS in 2015. Accordingly, unless there are further changes in conformity requirements in the timeframe of this project, there must be a currently conforming transportation plan and program at the time of project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CFR 93.109(b)).[32]

The project is listed in the Hampton Roads Transportation Planning Organization (HRTPO) Fiscal Year 2018-2021 Transportation Improvement Program (TIP) as UPC # 109381 and in the 2040 Long-Range Transportation Plan (LRTP) as ID # 2040-152. The most recent conformity analysis[33] was completed in

[29] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-114.xml

[30] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-115.xml

[31] See:https://www.cadc.uscourts.gov/internet/opinions.nsf/217B6778AE3EC89C8525823600532AE0/$file/15-1115-1718293.pdf. The court decision addresses the 2015 revocation by EPA of the 1997 ozone NAAQS for which this region was previously in maintenance. EPA has filed a petition for rehearing, but a decision has not yet been issued. Therefore, pending any further legal changes, the immediate effect of the February court decision is to reinstate conformity requirements that had been eliminated with the revocation by EPA of that NAAQS.

[32] See: https://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol20/xml/CFR-2014-title40-vol20-sec93-109.xml

[33] See: https://www.hrtpo.org/library/view/359/hampton-roads,-virginia-eight_hour-ozone-maintenance-area-regional-conformity-analysis-2040-long-range-transportation-plan-and-fy-18_21-transportation-improvement-program/

August 2018, with FHWA and FTA issuing a conformity finding on October 29, 2018 for the TIP and Constrained LRTP covered by that analysis.

3.3 AIR QUALITY DATA AND TRENDS

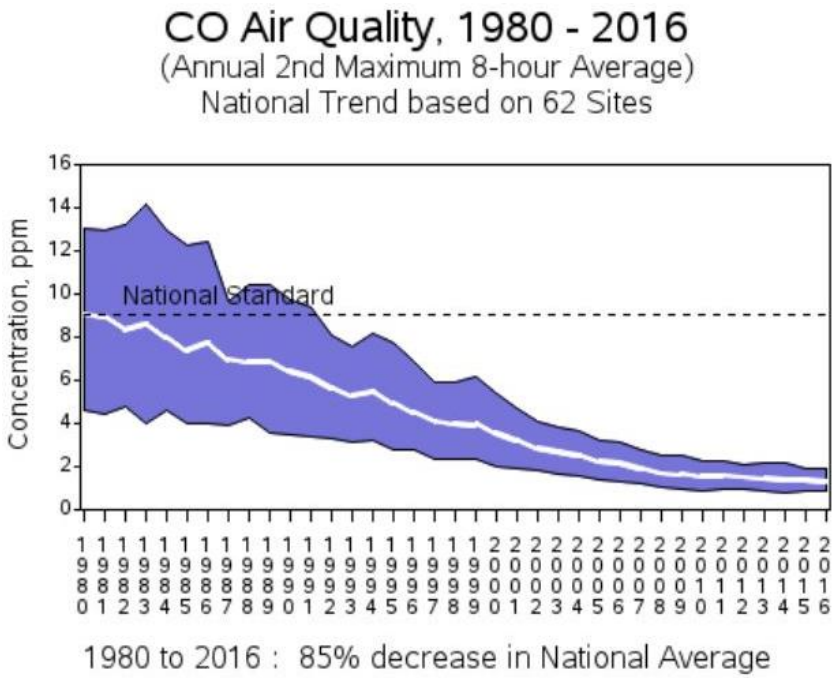
3.3.1 Carbon Monoxide (CO)

As shown in **Figure 3-1**, and due primarily to the implementation of more stringent vehicle emission and fuel quality standards, the national trend in ambient concentrations of CO is and has been downward for decades. The national trend is reflected in the relatively very low ambient CO concentrations observed in Virginia, as summarized in **Figure 3-2** and **Figure 3-3**. Currently, all values in Virginia are well under the one- and eight-hour NAAQS for CO.

3.3.2 Other Criteria Pollutants

As presented in **Figure 3-3** through **Figure 3-6**, VDEQ's ten-year monitoring data indicates that criteria pollutants concentrations have been decreasing. The reduction in SO_2, NOx, and ozone emissions is due to a variety of control measures that have been implemented over the last two decades, including motor vehicle engine controls and reductions in evaporative emissions from gasoline stations and consumer products, as well as reductions from power plants, businesses, and residential combustion sources.

Figure 3-1: Nationwide Long-Term Trend in Ambient CO Concentrations



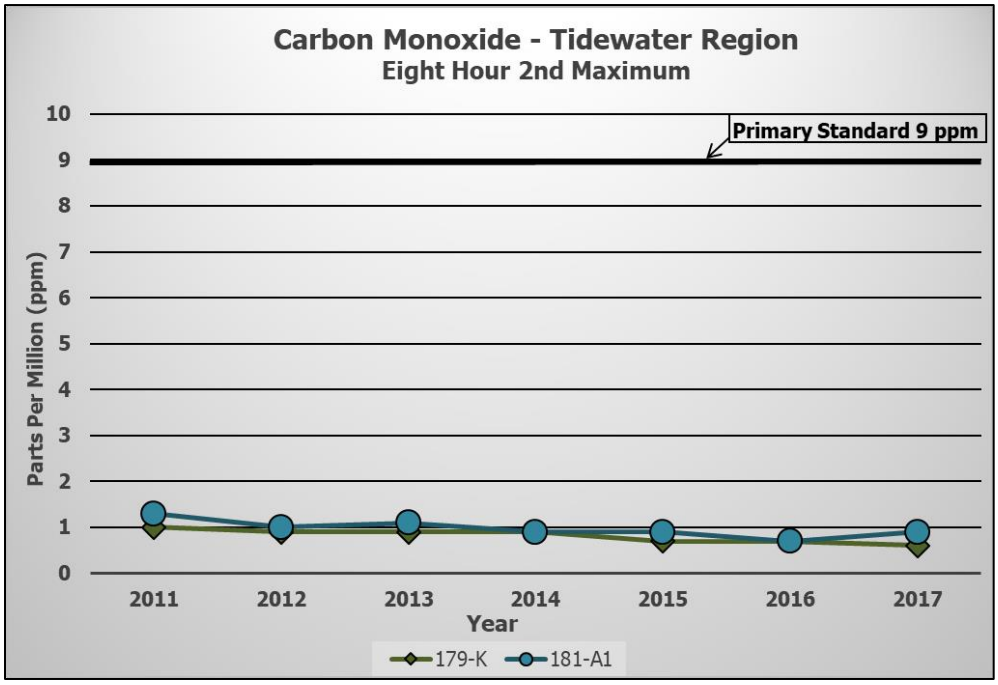
Source: https://www.epa.gov/air-trends/carbon-monoxide-trends, accessed October 26, 2017.

Figure 3-2: Ambient Concentrations of CO in Virginia in 2016

Site	2017			
	1-Hour Avg. (ppm)		8-Hour Avg. (ppm)	
	1st Max.	2nd Max.	1st Max.	2nd Max.
(19-A6) **Roanoke Co.**	1.2	1.0	.8	.7
(72-M) **Henrico Co.**	1.2	1.1	.9	.8
(158-X) **Richmond**	1.7	1.5	1.3	1.1
(179-K) **Hampton**	.9	.8	.6	.6
(181-A1) **Norfolk**	1.7	1.7	1.3	.9
(46-C2) **Fairfax Co.**	1.5	1.5	1.1	1.1
(47-T) **Arlington Co.**	2.1	2.0	1.6	1.2

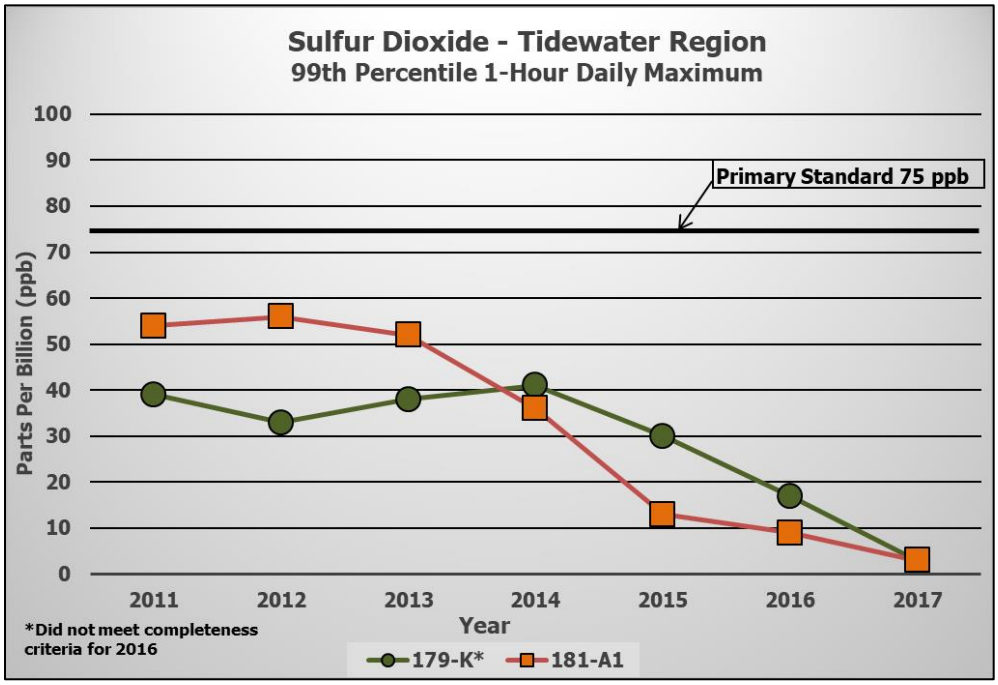
ppm- parts-per-million
Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2017 Data Report", November 2017.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

Figure 3-3: VDEQ 10-Year Trend for 8-hour CO (PPM) – Hampton Roads Region



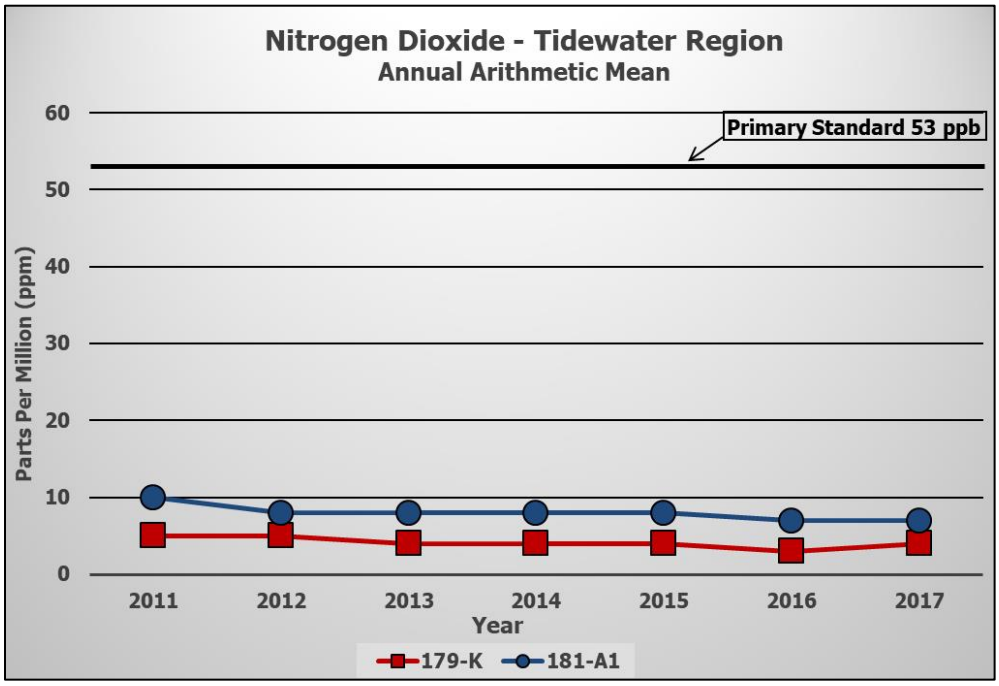
Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2017 Data Report", November 2017.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

Figure 3-4: VDEQ 10-Year Trend for 1-hour Sulfur Dioxide (PPM) – Hampton Roads Region



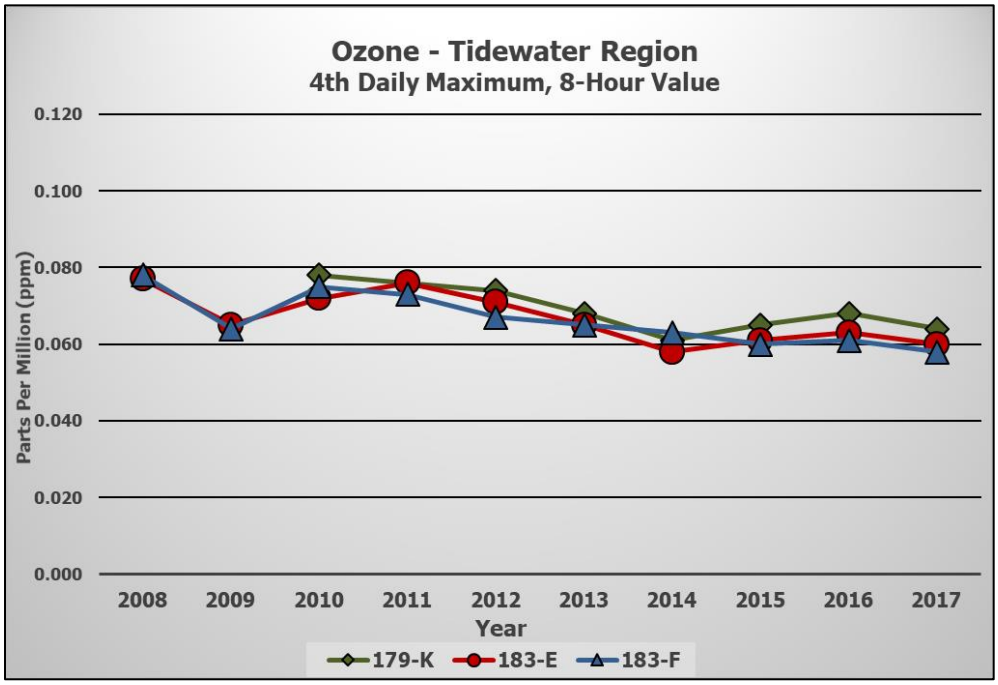
Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2017 Data Report", November 2017.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

Figure 3-5: VDEQ 10-Year Trend Annual Nitrogen Dioxide (PPM) – Hampton Roads Region



Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2017 Data Report", November 2017.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

Figure 3-6: VDEQ 10-Year Trend for 8-hour Ozone (PPM) – Hampton Roads Region



Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2017 Data Report", November 2017.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

4. PROJECT ASSESSMENT

4.1 APPLICATION OF VDOT RESOURCE DOCUMENT

In 2016, VDOT created the "VDOT Resource Document" and associated online data repository to facilitate and streamline the preparation of project-level air quality analyses for purposes of NEPA and conformity. Inter-agency consultation was conducted with FHWA Division and Headquarters and other agencies (including USEPA) before the Resource Document was finalized.

With regard to this project, the methods/protocols and assumptions as specified or referenced in the VDOT Resource Document were applied without change or without substantive change as defined in that document.

4.2 CARBON MONOXIDE ASSESSMENT

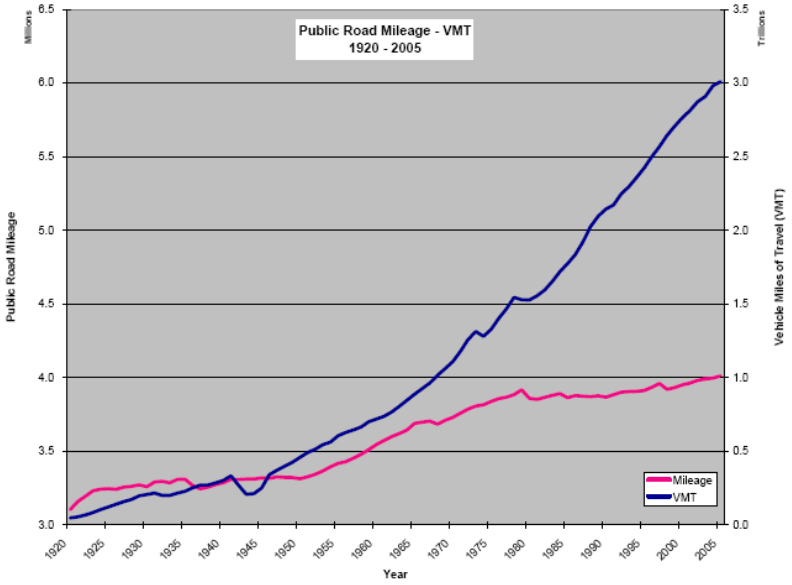
4.2.1 Background

Figure 4-1 and **Figure 4-2** present, respectively, trends in vehicle-miles-traveled (VMT) at both the national (public road) and local levels. VMT has increased significantly over the past several decades, with local trends generally reflecting the national. As (non-idling) emissions are calculated as the product of VMT and per-mile emission factors, they increase with VMT absent concurrent reductions in emission factors due to improved emission control technology implemented to meet increasingly more stringent emission standards.

Figure 4-3 presents the increasingly more stringent new vehicle emission standards for CO as introduced by the USEPA over the past few decades. With continued fleet turnover to new vehicles constructed to the more stringent emission standards, fleet average vehicle emission rates have declined to the extent

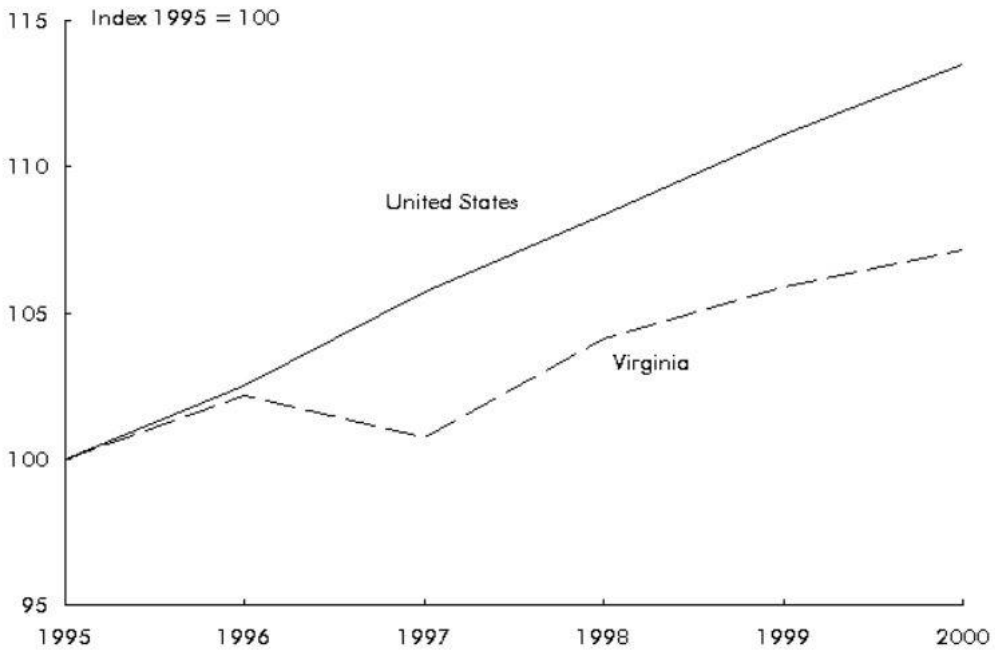
that emissions and therefore ambient concentrations of CO have not only not increased with the increasing VMT, they have substantially decreased.

Figure 4-1: Long-Term Trend in Public Road Mileage and Vehicle Miles Traveled



Source: FHWA Office of Highway Policy Information (OHPI) Web site, updated 5/20/08 (accessed 8/1/2016). See: http://www.fhwa.dot.gov/policyinformation/charts/05.cfm

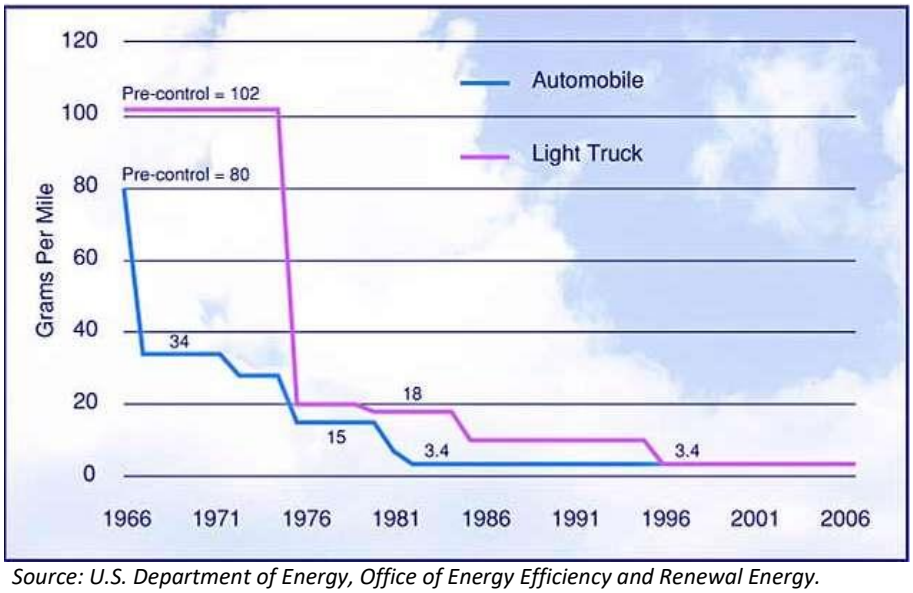
Figure 4-2: Highway VMT – US and Virginia



SOURCE FOR DATA ON THIS PAGE: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, annual editions, available at http://www.fhwa.dot.gov/ohim/ohimstat.htm as of Dec. 6, 2001.

Source: Highway Vehicle-Miles Traveled, United States and Virginia, from US Department of Transportation, Bureau of Transportation Statistics, "Virginia Transportation Profile", 2007.

Figure 4-3: Federal Emissions Standards for CO for New Automobiles and Light Trucks



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewal Energy. Transportation Energy Data Book: Edition 24, ORNL-6973. December 2004.

4.2.2 Level of Analysis Determination

Screening for Quantitative or Qualitative Analysis

The CO analysis included a review of eight intersections in the study area using the 2016 PA. The 2016 PA establishes the type of projects and conditions that would not require project-specific modeling or a quantitative air quality analysis for compliance with the NAAQS.

For background, the 2016 PA was based on the recent NCHRP 25-25 Task 78 study templates. Virginia-specific background concentrations and persistence factor were applied as specified in the *VDOT Project-Level Air Quality Resource Document* (2016). The ADT thresholds, project type, and project conditions detailed or incorporated by reference in the PA were developed and approved based on modeling using "worst-case" traffic and meteorological assumptions. Study corridor intersections that meet these criteria do not require project-specific modeling for CO. Therefore, the Build Alternative's Design-Year forecast volume, roadway grades, and intersection skew angles were compared to the thresholds specified in the current 2016 PA.

As the 2016 PA does not include skewed intersections, it incorporates, by reference, the criteria specified in the previously existing 2009 PA for skewed intersections. Under the terms of the 2009 Agreement, project-level air quality (hot-spot) analyses are typically only conducted for CO projects that exceed specified ADT and Level of Service (LOS) thresholds or for any project for which an EIS is being prepared. The thresholds in the 2009 PA were originally established based on worst-case modeling for typical arterial intersections, with different thresholds applying for different intersection skew angles.

The 2016 PA, and by reference, the criteria for skewed intersections from the 2009 PA, were then applied to screen the intersections for the Build Alternative, including skewed and non-skewed intersections. The results of the screening-methodology are discussed further in the following sections.

Application of Other Programmatic Agreements

The 2009 FHWA-VDOT No-Build Agreement (**Section 2.1.3.3**) may be applied for this project, therefore project-specific modeling of the No-Build alternative is not required. The criteria specified in the No-Build Agreement are met for this project given that:

- the project location is not within a maintenance area for CO, and
- an EIS is not planned.

4.2.3 Traffic Data and Forecasts for the CO Analysis

Table 4-1, **Table 4-2**, and **Table 4-3** summarize the traffic estimates developed by the project team for the eight (8) intersections in the study area (**Figure 4-4**). These intersections were ranked based on the worst-case LOS and highest peak hour traffic volume for the Opening- (2025) and Design- (2045) Year. All intersection and traffic data are provided in **Appendix A**. The top three intersections for each were then compared against the 2016 PA criteria. The data and information used to screen the top three intersections out are provided in **Table 4-4** to **Table 4-7**.

Based on the use of the aforementioned methodology and the data presented in **Table 4-4** to **Table 4-7**, the top ranked intersections for LOS and volume met the criteria specified in the 2016 PA (and by reference the 2009 PA) and were therefore able to be screened out from further analysis.

While the skewed intersection of Centreville Parkway and Kempsville Road (Map ID 1-Figure 4-4) will operate at LOS F in the forecast Design-Year, this intersection still meets the criteria based on a reasonable proxy of the Level of Service. This intersection has a vehicle per hour per lane (vphpl) value of 347 vehicles

per day (vpd), which is well below the FHWA-default worst case value of 1,037 vphpl that was applied in the 2009 PA for skewed intersections. In addition, the 2009 PA used emission factors in the worst-case modeling for an Opening-Year of 2009. Based on this project's Opening-Year of 2025, the emission factors would be much lower for CO given the continued fleet turnover to new vehicles which are designed to meet more stringent emission standards set by the USEPA.

Table 4-1: Peak Hour Volumes, Delay, and Level-of-Service at Intersections

Map ID	Intersections	Existing-Year (2017)			Opening-Year (2025) Build			Design-Year (2045) Build		
		Vol.[1]	LOS[2]	Delay	Vol.	LOS	Delay	Vol.	LOS	Delay
1	Kempsville Road	4,329	F	144.3	4,805	E	72.4	6,250	F	138.0
2	Old Ridge Road	1,340	A	2.8	1,575	C	22.4	2,375	B	12.1
3	Hidden Valley Drive	1,341	A	3.5	1,575	A	1.1	2,390	A	7.6
4	Glen View Drive	1,320	B	10.8	1,540	A	7.2	2,325	B	11.0
5	Amberbrooke Way	1,176	A	4.1	1,425	A	0.6	2,180	A	0.7
6	Lynnhaven Parkway	2,637	E	57.8	3,205	C	32.4	5,080	D	54.1
7	Woodhill Road	1,098	A	5.2	1,315	A	4.2	1,985	E	48.2
8	Livingston Oak Drive	935	A	5.3	1,125	A	4.8	1,685	C	19.2

[1]Vol- Volume[2]LOS- Level of Service

Table 4-2: Comparison of Project Forecasts for Peak Hour Traffic Volumes and VDOT Resource Document Worst-Case Volumes

Map ID	Signalized Intersection	Peak Hour Forecasted Traffic Volumes			Values Used in CO Screening			
					Volume[1]	% Difference[2]		
	Centerville Turnpike @	Existing	Opening	Design		Existing	Opening	Design
1	Kempsville Road	4,329	4,805	6,250	22,140	134.6	128.7	111.9
2	Old Ridge Road	1,340	1,575	2,375	9,840	152.1	144.8	122.2
4	Glen View Drive	1,320	1,540	2,325	9,840	152.7	145.9	123.6
6	Lynnhaven Parkway	1,637	3,205	5,080	22,140	172.5	149.4	125.3

1.) Worst-case volume calculated by multiplying the proposed number of lanes by 1,230 vphpl, in accordance with the VDOT Resource Document.

2.) Percent difference defined as the absolute value of the change in value, divided by the average of the two numbers, multiplied by 100.

Table 4-3: Average Daily Traffic for Each Leg of Intersection – Existing, Opening, and Design-Year

Map ID	Intersection	Intersection Leg	2017 ADT	2025 Build ADT	2045 Build ADT
1	Kempsville Road	North	19,480	22,835	33,780
		South	17,680	20,500	29,835
		East	28,000	29,890	34,945
		West	31,045	33,560	40,335
2	Old Ridge Road	North	14,360	16,890	25,445
		South	14,245	16,725	25,390
		East	1,180	1,390	1,945
3	Hidden Valley Drive	North	14,245	16,725	25,390
		South	14,035	16,390	25,060
		East	1,525	1,890	2,670
4	Glen View Drive	North	14,035	16,390	25,060
		South	12,700	14,780	22,670
		West	2,600	3,060	3,945
5	Amberbrooke Way / Infinity Lane	North	12,700	14,780	22,670
		South	12,045	14,500	22,445
		East	835	1,390	1,890
		West	560	1,000	1,445
6	Lynnhaven Parkway	North	12,045	14,500	22,445
		South	11,390	13,500	20,670
		East	17,890	21,945	35,500
		West	17,960	21,945	35,560
7	Woodhill Road	North	11,390	13,500	20,670
		South	9,990	11,945	17,945
		East	760	1,060	1,500
		West	2,290	2,780	4,115
8	Livingston Oak Drive	North	9,990	11,945	17,945
		South	7,390	9,000	14,060
		East	4,645	5,560	7,945
		West	160	280	560

Figure 4-4: Study Intersections Considered for CO Modeling

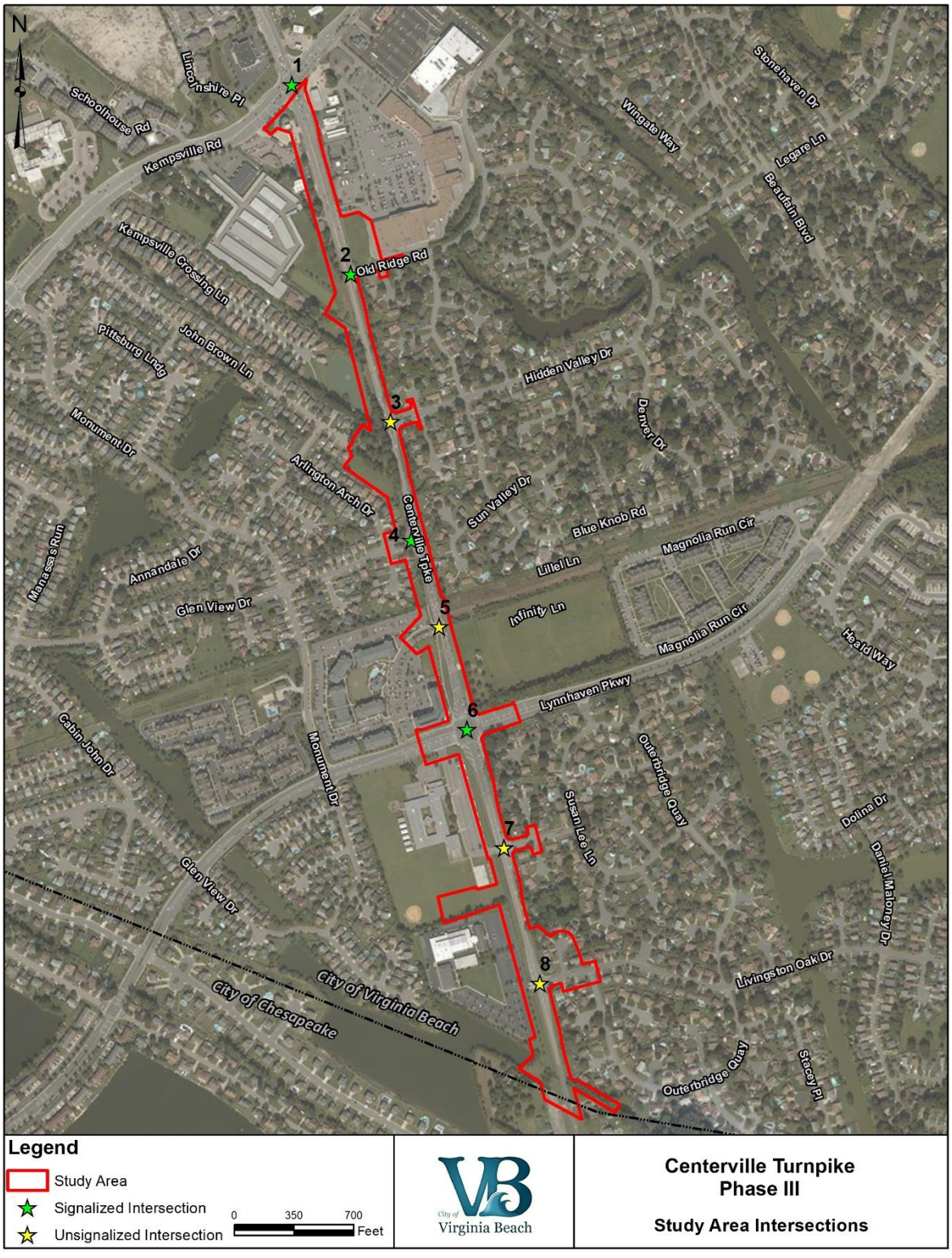


Table 4-4: Top Three Ranked Intersections for Volume in the Opening-Year (2025) – CO Screening

			Intersection Data						2025 Build				
Map ID	**Major Street**	**Cross Street**	**Skew Angle**	**Approach Lanes**	**Departure Lanes**	**Largest Mainline Grade**	**Largest Cross Street Grade**	**Lowest Posted Speed Limit**	**Vehicle Per Hour Per Lane**	**Peak Hour Volume[1]**	**Average Daily Traffic**	**Level of Service**	**Delay (s)**
1	**Centerville Turnpike**	**Kempsville Road**	65	5	2	1.6%	0.6%	45	431	3,020	33,560	E	72.4
6	**Centerville Turnpike**	**Lynnhaven Parkway**	90	5	2	0.4%	0.2%	35	282	1,975	21,945	C	32.4
3	Centerville Turnpike	Hidden Valley Drive	85	3	2	0.4%	0.8%	25	301	1,505	16,725	A	1.1

			2016 Programmatic Agreement (PA)[2,3]					2009 Programmatic Agreement[2]		
Map ID	**Major Street**	**Cross Street**	**Skewed Intersection (Yes/No))**	**Grade <2%**	**Approach Speed Greater than 15 mph[3] (Yes/No)**	**Maximum Lanes at the Intersection < 6 (Yes/No)**	**Screen Out with 2016 PA?**	**Vehicles per Hour per Lane < 1,037?**	**ADT Less than 59,000 (Skew Angle > 60 degrees)?**	**Screen Out with 2009 PA?**
1	**Centerville Turnpike**	**Kempsville Road**	Yes	N/A[4]	N/A	N/A	N/A	Yes	Yes	**Yes**
6	**Centerville Turnpike**	**Lynnhaven Parkway**	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A
3	Centerville Turnpike	Hidden Valley Drive	Yes	N/A	N/A	N/A	N/A	Yes	Yes	**Yes**

1.) Worst of either AM or PM peak volumes was chosen.
2.) 2016 VDOT Programmatic Agreement with FHWA which references screening criteria (primarily Design-Year average daily traffic and intersection skew angle) that were previously established in the 2009 PA based on worst-case modeling of 1,037 vphpl.
3.) The 2016 PA also contains Intersection screening criteria of for 90 degree intersections, 6 approach lanes, 4 lanes on each departure, and a roadway grade of 2 percent and vehicle speeds greater than 15 mph.
4.) N/A denotes PA not applicable.

Table 4-5: Top Three Ranked Intersections for LOS in the Opening-Year (2025) – CO Screening

			Intersection Data						2025 Build				
Map ID	**Major Street**	**Cross Street**	**Skew Angle**	**Approach Lanes**	**Departure Lanes**	**Largest Mainline Grade**	**Largest Cross Street Grade**	**Lowest Posted Speed Limit**	**Vehicle Per Hour Per Lane**	**Peak Hour Volume[1]**	**Average Daily Traffic**	**Level of Service**	**Delay (s)**
1	**Centerville Turnpike**	**Kempsville Road**	65	5	2	1.6%	0.6%	45	431	3,020	33,560	E	72.4
6	**Centerville Turnpike**	**Lynnhaven Parkway**	90	5	2	0.4%	0.2%	35	282	1,975	21,945	C	32.4
2	**Centerville Turnpike**	**Old Ridge Road**	90	3	2	0.4%	0.2%	25	304	1,520	16,890	C	22.4

			2016 Programmatic Agreement (PA)[2,3]					2009 Programmatic Agreement[2]		
Map ID	**Major Street**	**Cross Street**	**Skewed Intersection (Yes/No))**	**Grade -< 2%**	**Approach Speed Greater than 15 mph (Yes/No)**	**Maximum Lanes at the Intersection < 6 (Yes/No)**	**Screen Out with 2016 PA?**	**Vehicles per Hour per Lane < 1,037?**	**ADT Less than 59,000 (Skew Angle > 60 degrees)?**	**Screen Out with 2009 PA?**
1	**Centerville Turnpike**	**Kempsville Road**	Yes	N/A[4]	N/A	N/A	N/A	Yes	Yes	**Yes**
6	**Centerville Turnpike**	**Lynnhaven Parkway**	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A
2	**Centerville Turnpike**	**Old Ridge Road**	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A

1.) Worst of either AM or PM peak volumes was chosen.
2.) 2016 VDOT Programmatic Agreement with FHWA which references screening criteria (primarily Design-Year average daily traffic and intersection skew angle) that were previously established in the 2009 PA based on worst-case modeling of 1,037 vphpl.
3.) The 2016 PA also contains Intersection screening criteria (Table2) for 90 degree intersections, 6 approach lanes, 4 lanes on each departure, and a roadway grade of 2 percent, and vehicle speeds greater than 15 mph.
4.) N/A denotes PA not applicable.

Table 4-6: Top Three Ranked Intersections for Volume in the Design-Year (2045) – CO Screening

			Intersection Data						2045 Build				
Map ID	**Major Street**	**Cross Street**	**Skew Angle**	**Approach Lanes**	**Departure Lanes**	**Largest Mainline Grade**	**Largest Cross Street Grade**	**Lowest Posted Speed Limit**	**Vehicle Per Hour Per Lane**	**Peak Hour Volume[1]**	**Average Daily Traffic**	**Level of Service**	**Delay (s)**
1	**Centerville Turnpike**	**Kempsville Road**	65	5	2	1.6%	0.6%	45	519	3,630	40,335	F	138.0
6	**Centerville Turnpike**	**Lynnhaven Parkway**	90	5	2	0.4%	0.2%	35	457	3,200	35,560	D	54.1
3	Centerville Turnpike	Hidden Valley Drive	85	3	2	0.4%	0.8%	25	457	2,285	25,390	A	7.6

			2016 Programmatic Agreement[2,3]					2009 Programmatic Agreement[2]		
Map ID	**Major Street**	**Cross Street**	**Skewed Intersection (Yes/No))**	**Grade - <2%**	**Approach Speed Greater than 15 mph (Yes/No)**	**Maximum Lanes at the Intersection < 6 (Yes/No)**	**Screen Out with 2016 PA?**	**Vehicles per Hour per Lane < 1,037?**	**ADT Less than 59,000 (Skew Angle > 60 degrees)?**	**Screen Out with 2009 PA?**
1	**Centerville Turnpike**	**Kempsville Road**	Yes	N/A[4]	N/A	N/A	N/A	Yes	Yes	**Yes**
6	**Centerville Turnpike**	**Lynnhaven Parkway**	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A
3	Centerville Turnpike	Hidden Valley Drive	Yes	N/A	N/A	N/A	N/A	Yes	Yes	**Yes**

1.) Worst of either AM or PM peak volumes was chosen.
2.) 2016 VDOT Programmatic Agreement with FHWA which references screening criteria (primarily Design-Year average daily traffic and intersection skew angle) that were previously established in the 2009 PA based on worst-case modeling of 1,037 vphpl.
3.) The 2016 PA also contains Intersection screening criteria (Table 2) for 90 degree intersections, 6 approach lanes, 4 lanes on each departure, and a roadway grade of 2 percent), and vehicle speeds greater than 15 mph.
4.) N/A denotes PA not applicable.

Table 4-7: Top Three Ranked Intersections for LOS in the Design-Year (2045) – CO Screening

			Intersection Data						2045 Build				
Map ID	**Major Street**	**Cross Street**	**Skew Angle**	**Approach Lanes**	**Departure Lanes**	**Largest Mainline Grade**	**Largest Cross Street Grade**	**Lowest Posted Speed Limit**	**Vehicle Per Hour Per Lane**	**Peak Hour Volume[1]**	**Average Daily Traffic**	**Level of Service**	**Delay (s)**
1	**Centerville Turnpike**	**Kempsville Road**	65	5	2	1.6%	0.6%	45	519	3,630	40,335	F	138.0
6	**Centerville Turnpike**	**Lynnhaven Parkway**	90	5	2	0.4%	0.2%	35	457	3,200	35,560	D	54.1
7	Centerville Turnpike	Woodhill Road	90	4	2	0.4%	0.5%	25	310	1,860	20,670	E	48.2

			2016 Programmatic Agreement[2,3]					2009 Programmatic Agreement[2]		
Map ID	**Major Street**	**Cross Street**	**Skewed Intersection (Yes/No))**	**Grade <2%**	**Approach Speed Greater than 15 mph (Yes/No)**	**Maximum Lanes at the Intersection < 6 (Yes/No)**	**Screen Out with 2016 PA?**	**Vehicles per Hour per Lane < 1,037?**	**ADT Less than 59,000 (Skew Angle > 60 degrees)?**	**Screen Out with 2009 PA?**
1	**Centerville Turnpike**	**Kempsville Road**	Yes	N/A[4]	N/A	N/A	N/A	Yes	Yes	**Yes**
6	**Centerville Turnpike**	**Lynnhaven Parkway**	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A
7	Centerville Turnpike	Woodhill Road	No	Yes	Yes	Yes	**Yes**	N/A	N/A	N/A

1.) Worst of either AM or PM peak volumes was chosen.
2.) 2016 VDOT Programmatic Agreement with FHWA which references screening criteria (primarily Design-Year average daily traffic and intersection skew angle) that were previously established in the 2009 PA based on worst-case modeling of 1,037 vphpl.
3.) The 2016 PA also contains Intersection screening criteria (Table 2) for 90 degree intersections, 6 approach lanes, 4 lanes on each departure, and a roadway grade of 2 percent, and vehicle speeds greater than 15 mph.
4.) N/A denotes PA not applicable.

4.2.4 CO Conclusions

As demonstrated above for those roadways intersecting at a 90 degree angle the criteria in Table 2 of the 2016 PA for intersection projects has been met. The table lists a 6-lane urban intersection for all approaches and an approach speed of 15 mph. The modeled CO concentrations for this type of project excluding the background concentrations is 6.5 ppm for the one-hour and using a persistence factor of 0.77, an eight-hour concentration of 5.0 ppm. When the background concentrations of 2.0 ppm and 1.1 ppm are included, the one-hour and eight-hour concentration increase to 8.5 ppm and 6.1 ppm, respectively. These predicted values are well below the NAAQS of 35 ppm for the one-hour and 9 ppm for the eight-hour. Additionally, it has been demonstrated that intersections identified above where the roadways intersect at a skewed angle meet the criteria established under the 2009 agreement as incorporated by reference in the 2016 PA. Therefore, the proposed project falls within the project types and conditions listed in the 2016 PA for streamlining the project level air quality analysis process for carbon monoxide. Modeling using "worst-case" parameters has been conducted for these project types and conditions. It has been determined that projects, such as this one, for which the conditions are not exceeded, would not significantly impact air quality and would not cause or contribute to a new violation, or delay timely attainment of the NAAQS for carbon monoxide.

4.3 MOBILE SOURCE AIR TOXIC (MSAT) ASSESSMENT

FHWA most recently updated its guidance for the assessment of MSATs in the NEPA process for highway projects in 2016[34]. The guidance identifies nine priority MSATs: "*1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.*" It also specifies three possible categories or tiers of analysis, namely, 1) projects with no meaningful potential MSAT effects or exempt projects (for which MSAT analyses are not required), 2) projects with low potential MSAT effects (requiring only qualitative analyses), and 3) projects with higher potential MSAT effects (requiring quantitative analyses).

4.3.1 Level of Analysis Determination

As this project involves a CE, and therefore under FHWA guidance may be categorized as a Tier 1 project for which no meaningful MSAT effects would be expected, neither a qualitative nor a quantitative analysis is needed. In addition, this project has been determined to generate minimal air quality impacts for CAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause a meaningful increase in MSAT impacts of the project from that of the No-Build Alternative.

Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. As noted in the referenced FHWA MSAT guidance, based on regulations now in effect, an analysis of national trends with USEPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 45 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

[34] FHWA, "*INFORMATION: Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*", October 18, 2016. See: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/

4.4 CLIMATE CHANGE AND GREENHOUSE GAS ASSESSMENT

The Department protocol (VDOT Resource Document, Section 4.7) for greenhouse gas (GHG) analyses was reviewed for applicability to this project. Based on the Department protocol that limits GHG analyses to projects involving an EIS, a Climate Change and GHG analysis is not warranted for this project as it involves a CE and not an EIS. Therefore, a GHG analysis was not conducted for this project.

4.5 INDIRECT EFFECTS AND CUMULATIVE IMPACTS (IECI) ASSESSMENT

Indirect effects are defined by the CEQ as "effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water or other natural systems, including ecosystems" (40 CFR 1508.8(b)). For transportation projects, induced growth is attributed to changes in accessibility caused by the project that influences the location and/or magnitude of future development.[35]

Cumulative impacts are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7). According to the FHWA *Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process*, cumulative impacts include the total of all impacts to a particular resource that have occurred, are occurring, and will likely occur as a result of any action or influence, including the direct and reasonably foreseeable indirect impacts of a proposed project. Cumulative impacts include indirect effects. The potential for indirect effects or cumulative impacts to air quality that may be attributable to this project is not expected to be significant for two reasons.

First, regarding the potential for indirect effects, the assessment conducted for project-specific CO impacts can be considered indirect effects analyses because it looked at air quality impacts attributable to the project that occur in the future. This analysis demonstrates that, in the future, air quality impacts from CO will not cause or contribute to violations of the CO NAAQS.

Second, regarding the potential for cumulative impacts, the annual conformity analysis conducted by the HRTPO represents a cumulative impact assessment for purposes of regional air quality. Federal conformity requirements, including specifically 40 CFR 93.114 and 40 CFR 93.115, apply as the area in which the project is located is designated as nonattainment for ozone. Accordingly, there must be a currently conforming transportation plan and program at the time of project approval, and the project must come from a conforming plan and program (or otherwise meet criteria specified in 40 CFR 93.109(b)).

- The existing air quality designations for the region are based, in part, on the accumulated mobile source emissions from past and present actions, and these pollutants serve as a baseline for the current conformity analysis.
- The conformity analysis quantifies the amount of mobile source emissions for which the area is designated nonattainment/maintenance that will result from the implementation of all reasonably foreseeable regionally significant transportation projects in the region (i.e. those proposed for construction funding over the life of the region's transportation plan).

[35] See: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_466.pdf

- The most recent conformity analysis was completed in August 2018, with FHWA and FTA issuing a conformity finding on October 29, 2018 for the TIP and LRTP covered by that analysis. This analysis demonstrated that the incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the SIP and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS established by USEPA.

Therefore, the indirect and cumulative effects of the project are not expected to be significant.

5. MITIGATION

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*[36].

The VDEQ provides general comments for projects by jurisdiction. Their comments in part address mitigation. For the Cities of Virginia Beach and Chesapeake, VDEQ comments relating to mitigation are[37] "*…all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions[38]; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions[39]; and 9 VAC 5-50, Article 1, Fugitive Dust precautions[40]*."

6. CONSULTATION

6.1 PUBLIC CONSULTATION

Public consultation is generally conducted and documented within the overall NEPA process, and not separately for any specialty area (including air quality). Please refer to the overall NEPA documentation for a summary of public consultation activities for this project.

6.2 INTER-AGENCY CONSULTATION

6.2.1 Models, Methods, Assumptions and Protocols Specified in the VDOT Resource Document

All models, methods, assumptions and protocols specified or referenced within the VDOT Resource Document[41] to be applied in project-level analyses for projects in Virginia were subjected to inter-agency consultation with FHWA, DEQ and other agencies as required by the federal transportation inter-agency consultation for conformity rule (IACC) and for purposes of NEPA inter-agency consultation (IAC) prior to it being finalized in 2016. IACC was required at that time as it was before project-level conformity requirements in Virginia were eliminated for CO (with the expiry of the CO maintenance plan on March

[36] See http://www.virginiadot.org/business/const/spec-default.asp

[37] Spreadsheet entitled: "DEQ SERP Comments rev8b", March 2017, downloaded from the online data repository for the VDOT Resource Document. See: http://www.virginiadot.org/projects/environmental_air_section.asp

[38] See: http://law.lis.virginia.gov/admincode/title9/agency5/chapter130/

[39] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-45-760

[40] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60

[41] See: http://www.virginiadot.org/projects/environmental_air_section.asp

16, 2016) and PM (with USEPA's revocation of the applicable NAAQS effective October 24, 2016). **Appendix A** of the Resource Document provides a summary of the consultation process and results. Currently, inter-agency consultation is limited to that needed for purposes of NEPA.

6.2.2 Virginia Department of Environmental Quality

VDEQ provides a tabulation of general comments organized by jurisdiction[42]. For the Cities of Virginia Beach and Chesapeake, they provided the following comments:

"This project is located within a volatile organic compounds (VOC) and nitrogen oxides (NOx) Emissions Control Area. As such, all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions[43]; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions[44]; and 9 VAC 5-50, Article 1, Fugitive Dust precautions[45]."

7. CONCLUSIONS

The proposed improvements were assessed for potential air quality impacts and compliance with applicable air quality regulations and requirements. All methods/protocols and assumptions applied in the analyses were made consistent with those provided or specified in the VDOT Resource Document. The assessment indicates that the project would meet all applicable air quality requirements of the National Environmental Policy Act (NEPA).

[42] Spreadsheet entitled: "DEQ SERP Comments rev8b", March 2017, downloaded from the online data repository for the VDOT Resource Document. See: http://www.virginiadot.org/projects/environmental_air_section.asp.

[43] See: http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130

[44] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-45-760

[45] See: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60

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APPENDIX A: INTERSECTION AND TRAFFIC DATA

(See PDF Attachment)