3.2 AIR QUALITY AND GREENHOUSE GASES

This section examines the air quality impacts of the Wilburton Commercial Area Land Use and Transportation Project. Specifically, it confirms that this project does not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. It illustrates increases in greenhouse gases in comparison to local or regional goals or targets for greenhouse gas reductions and identifies mitigation that, if implemented and tracked, could reduce impacts to a less than significant level. The section is broken out into two sub-sections: *Air Quality* (3.2.1) and *Greenhouse Gases and Climate Change* (3.2.2).

Section 3.2.1 begins with a discussion of the current regulatory environment and air quality, including discussion about individual criteria pollutants of concern. Next, short-term and long-term impacts for the No Action Alternative, Alternative 1 and Alternative 2 are discussed. After characterizing the impacts, mitigation measures are discussed for both short-term and long-term impacts. Section 3.2.1 concludes by showing that there are not any significant adverse impacts to air quality after mitigation.

Section 3.2.2 begins with a discussion of greenhouse gas emissions and the current regulatory environment for greenhouse gases and climate change. It then goes on to discuss short-term and long-term greenhouse gas impacts from the project, addressing the No Action Alternative, Alternative 1, and Alternative 2. Next, mitigation measures are discussed. The goal of this section is to show possible ways to achieve a significant reduction in uncontrolled greenhouse gas emissions from Alternative 1 and Alternative 2. Finally, the section concludes with an explanation of any significant adverse impacts after mitigation associated with this project.

3.2.1 AIR QUALITY

Criteria air pollutants are carbon monoxide (CO), particulate matter, ozone, and the ozone precursors; volatile organic compounds (VOCs); sulfur dioxide (SO2), oxides of nitrogen (NO_X), and lead. Both federal and state standards regulate these pollutants.

Additionally, mobile source air toxic (MSAT) air pollutants in vehicle exhaust, particularly from diesel-fueled vehicles, have been addressed in both local and national studies. Toxic air pollutants are known or suspected to cause cancer or other serious health impacts.

AFFECTED ENVIRONMENT

Regulatory Environment

Washington is subject to air quality regulations issued by the Environmental Protection Agency (EPA), Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). EPA's National Ambient Air Quality Standards (NAAQS) set limits on concentration levels of the criteria pollutants in the air. Concentration levels of the criteria pollutants must not exceed the NAAQS over specified time periods. Ecology and PSCAA monitor air quality in the Puget Sound Region by measuring the levels of criteria pollutants found in the atmosphere and comparing them with the NAAQS.

The NAAQS consist of two sets of standards: the primary standards are intended to protect public health and the secondary standards are intended to protect the natural environment. In addition to these standards, Ecology and PSCAA have adopted state and local ambient air quality standards. Exhibit 3.2–1 lists all of the national, state, and local air quality standards in effect for the criteria pollutants in the state of Washington.

The Puget Sound region is currently in attainment or unclassified for all criteria pollutants. CO was designated as maintenance until recently. However, EPA has acknowledged the maintenance

Exhibit 3.2–1 National, State, and Local Ambient Air Quality Standards

POLLUTANT	NATIONAL (NAAQS) Primary	NATIONAL (NAAQS) Secondary	WASHINGTON STATE	PUGET SOUND REGION
Nitrogen Dioxide				
Annual Average (ppm)	0.053	0.053	0.05	0.05
1-Hour Average (ppm)	0.100	0.100	NS	NS
Carbon Monoxide				
8-Hour Average (ppm)	9	NS	9	9
1-Hour Average (ppm)	35	NS	35	35
Ozone				
8-Hour Average (ppm)	0.070	0.070	NS	NS
Lead				
Maximum Arithmetic Mean (μg/m³) (averaged over rolling 3 months)	0.15	0.15	NS	1.5
Sulfur Dioxide				
Annual Arithmetic Average (ppm)	NS	NS	0.02	0.02
24-Hour Average (ppm)	NS	NS	0.10	0.10
3-Hour Average (ppm)	NS	0.5	NS	NS
1-Hour Average (ppm)	0.075	NS	0.40	0.40
Particulate Matter (PM_{10})				
24-Hour Average (μg/m³)	150	150	150	150
Particulate Matter ($PM_{2.5}$)				
Annual Arithmetic Average (μg/m³)	12	15	NS	NS
24-Hour Average (μg/m³)	35	35	NS	NS

μg/m³ Micrograms per cubic meter
NAAQS National Ambient Air Quality Standards
NS No standard established
$PM_{2.5}$ Particulate matter smaller than 2.5 microns in diameter
PM_{10} Particulate matter smaller than 10 microns in diameter
ppm Parts per million
Source: http://www.epa.gov/air/criteria.html (last accessed August 2017)

period has expired and the region is now considered in attainment. Appendix B contains documentation from EPA that the maintenance period has expired and a conformity analysis for CO is no longer required.

Air Quality in Puget Sound

The Puget Sound region has a relatively mild, marine climate with cool summers and mild, wet, and cloudy winters. Regionally, weather conditions such as temperature, fog, rain, and snowfall can vary within short distances, influenced by such factors as the distance from Puget Sound, the rolling terrain, and air from the ocean moving inland; within the Study Area the major influence in weather is topography.

Although the Puget Sound region is some of the most densely populated and industrialized area in Washington, there is sufficient wind most of the year to disperse air pollutants released into the atmosphere. Air pollution is usually most noticeable in the late fall and winter, under conditions of clear skies, light wind, and a sharp temperature inversion. Temperature inversions occur when cold air is trapped under warm air, preventing vertical mixing in the atmosphere. Inversions can last several days and can prevent pollutants from being dispersed by the wind. Inversions are most likely to occur during the months of January, February, October, November, and December. If poor dispersion persists for more than 24 hours, the PSCAA can declare an "air pollution episode" or local "impaired air quality."

Both Ecology and PSCAA operate ambient air quality monitoring stations to assess the levels of regulated pollutants and to verify continued compliance with the NAAQS. The monitoring stations used for this analysis are the nearest to the Study Area.

Ambient air concentrations of the monitored pollutants for years 2013 through 2015 are summarized in Exhibit 3.2–4. However, Ecology and PSCAA no longer collect particulate matter smaller than 10 microns in diameter (PM_{10}) data in the Puget Sound Region. Data collection ceased in 2006. Therefore, the values listed in Exhibit 3.2–4 for PM_{10} are from years 2004 through 2006.

According to the Puget Sound Clean Air Agency 2014 report on Highly Impacted Communities (Puget Sound Clean Air Agency, 2014), Wilburton falls within the top 20 percent of air quality impacted communities in west King County, as demonstrated in Exhibit 3.2–2. More recent publications indicate that the demographic-weighted impact for NO_x emissions may be even higher, in the top 5–10 percent, as demonstrated in Exhibit 3.2–3.

Emission projections and ongoing monitoring throughout the Puget Sound region over the past decade indicate that the ambient air pollution concentrations for CO have been decreasing. Measured ozone concentrations, in contrast, have remained fairly static. The decline of CO is due primarily to improvements made to emission controls on motor vehicles and the retirement of older, higher-polluting vehicles. Exhibit 3.2–5 shows national data on reductions in motor vehicle emissions compared to changes in demographics over the past 40+ years.

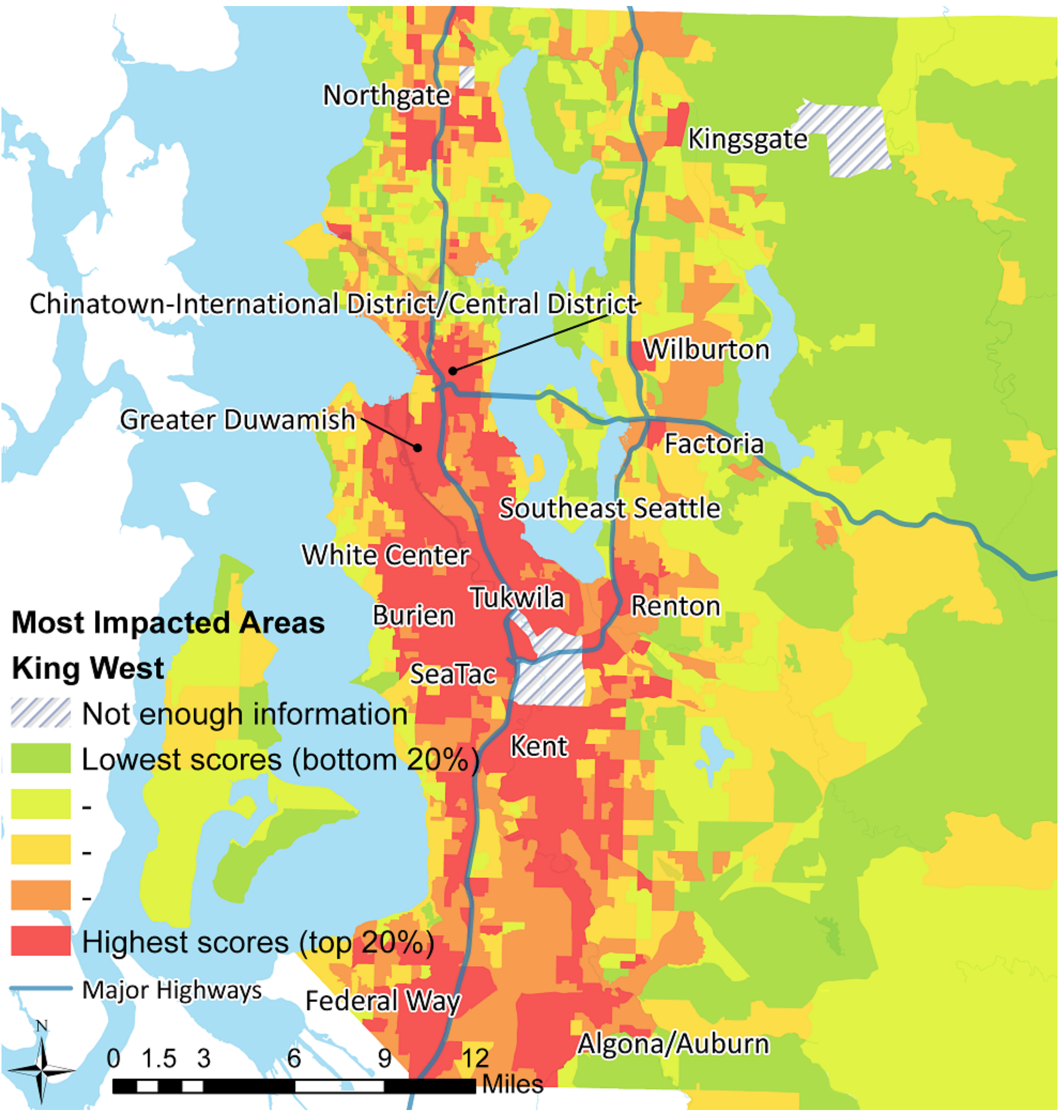

Exhibit 3.2–2 Air Quality Impacted Communities in West King County

Source: http://www.pscleanair.org/documentcenter/view/2323

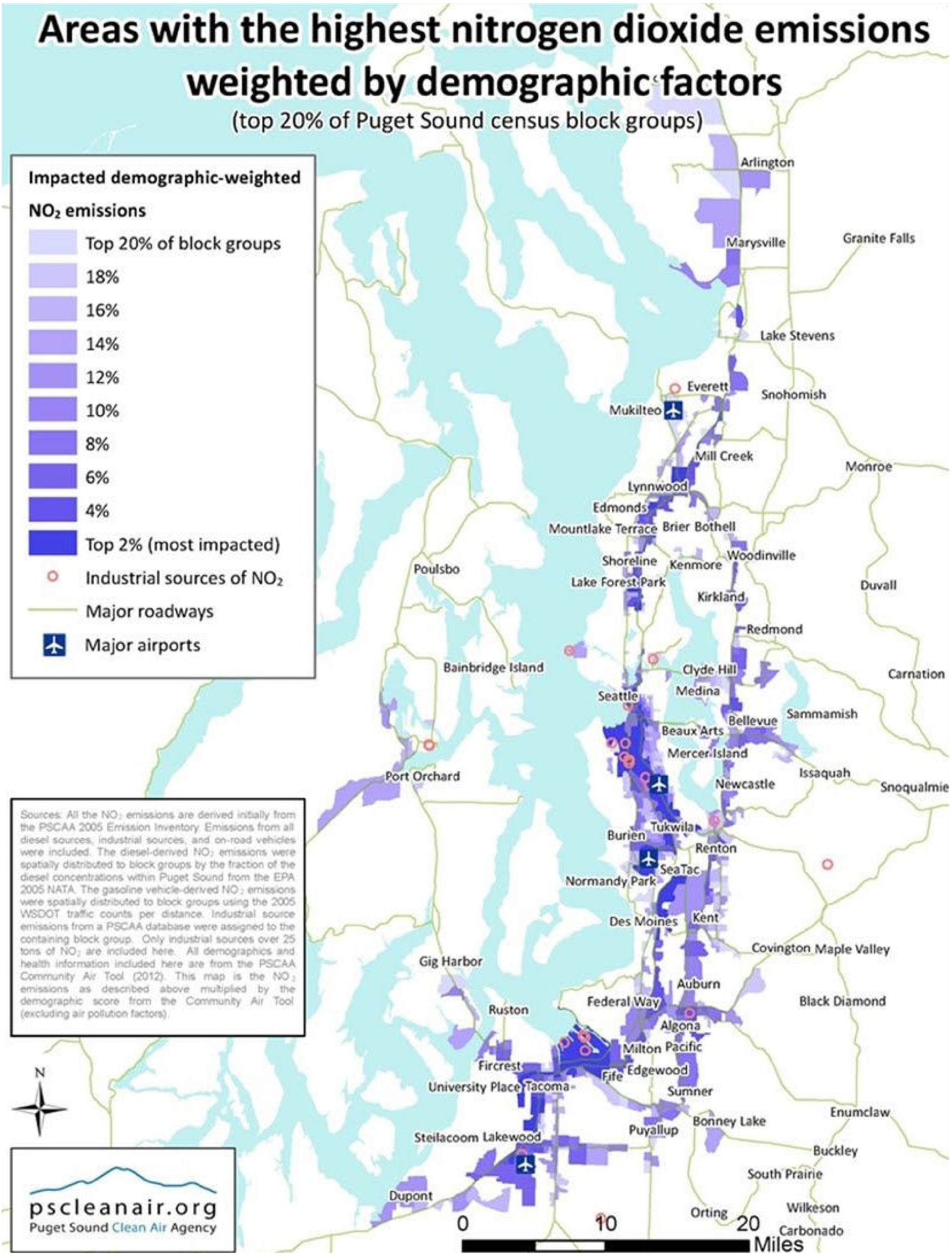

Exhibit 3.2–3 NO$_2$ Emissions Impacted Communities

Source: http://www.pscleanair.org/266/Who-is-Impacted-by-NO2-Pollution

Exhibit 3.2-4 Ambient Criteria Pollutant Concentration Levels Measured from 2013 to 2015

MONITORING LOCATION	PARAMETER	MAXIMUM CONCENTRATION 2013	2014	2015	NAAQS
Particulate Matter (PM_{10})					
4401 E Marginal Way S Seattle, WA	24-Hour Average (µg/m³)	57[a]	76[a]	79[a]	**150**
Particulate Matter ($PM_{2.5}$)					
Beacon Hill 15th S/Clarkstown Seattle, WA	Annual Arithmetic Mean (µg/m³)	6.6	5.9	6.8	**12**
	24-Hour Average (µg/m³)	18	15	21	**35**
Carbon Monoxide					
Beacon Hill 15th S/Clarkstown Seattle, WA	8-Hour Average (ppm)	1.3	0.8	0.8	**9**
	1-Hour Average (ppm)	1.5	1.0	1.0	**35**
Ozone					
20050 SE 56th Issaquah, WA	Max 8-Hour Average (ppm) 4th Highest Daily 8-Hour (ppm)	0.045	0.044	0.048	**0.070**
Nitrogen Dioxide					
Beacon Hill 15th S/Clarkstown Seattle, WA	Annual Arithmetic Aver-age (ppm)	0.013	0.012	0.011	**0.053**
	1-Hour Average (ppm)	0.041	0.47	0.044	**0.100**
Sulfur Dioxide					
Beacon Hill 15th S/Clarkstown Seattle, WA	Annual Arithmetic Average (ppm)	0.00081	0.0003	0.00083	**0.02**
	24-Hour Average (ppm)	0.0026	0.0008	0.0025	**0.10**
	3-Hour Average (ppm)	0.009	0.003	0.008	**0.40**
	1-Hour Average (ppm)	0.009	0.003	0.008	**0.075**

a Values presented for PM_{10} represent years 2004, 2005, and 2006.
µg/m³ Micrograms per cubic meter
NAAQS National Ambient Air Quality Standards
NS No standard established
$PM_{2.5}$ Particulate matter smaller than 2.5 microns in diameter
PM_{10} Particulate matter smaller than 10 microns in diameter
ppm Parts per million
Source: www.epa.gov/aqs (last accessed August 2017)

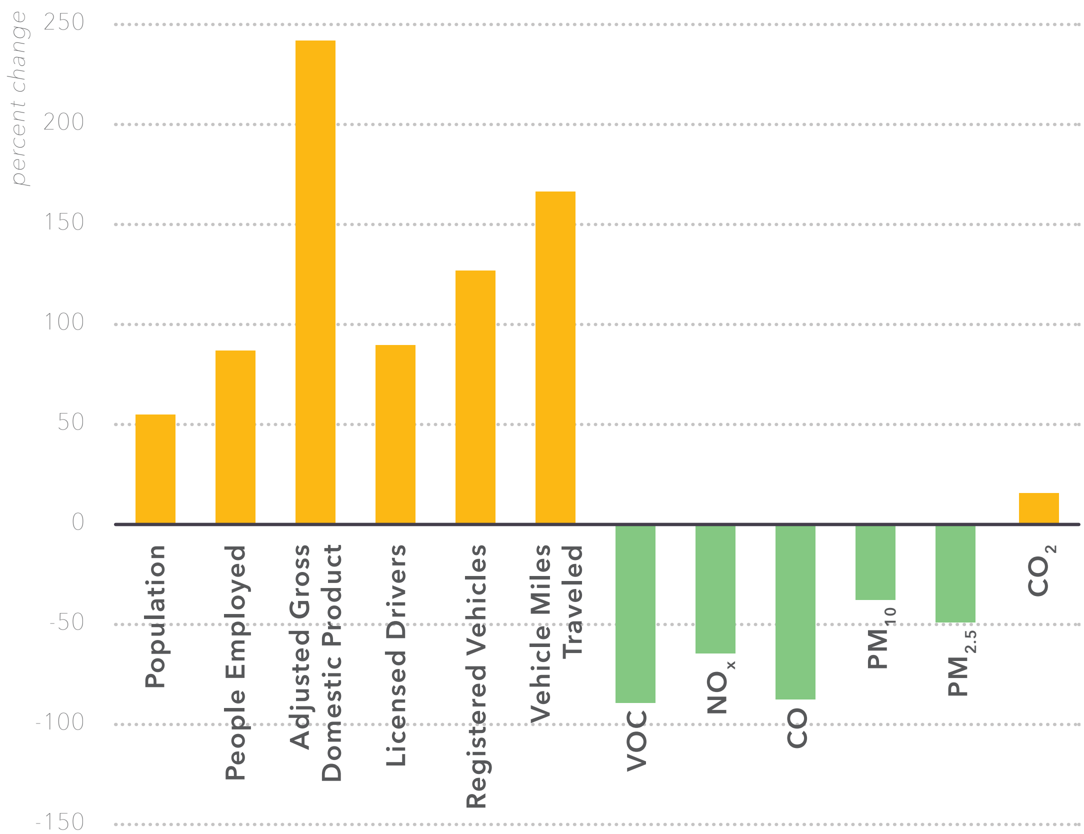

Exhibit 3.2-5 Change in Vehicle Emissions Compared to Demographics and Transportation, 1970–2013

Source: FHWA Fact Book, 2016 (https://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/factbook2016.pdf)

IMPACTS

Impacts on air quality from each alternative were determined by reviewing construction and post-construction activities. Construction is considered a temporary activity; therefore, a qualitative analysis of construction impacts common to all alternatives is presented below.

For long-term impacts, the proposed alternatives would increase population in the Study Area in the horizon year (2035) compared to the baseline year (2016). The projected citywide increases in vehicle miles traveled (VMT) for the p.m. peak periods (PMPK) were used as a basis for comparison of the alternatives to the base year. Although the change in VMT between the alternatives is significant, the VMT under all alternatives is a relatively small percentage of the citywide VMT. See Appendix B for citywide and Study Area VMT. Idling vehicles would also contribute to a potential increase in emissions as a result of the proposed project, however, VMT increases could be used as a method to correlate to increases in idling emissions as well.

Short-term Impacts Common to All Alternatives

During construction, soil-disturbing activities, operations of heavy-duty equipment, commuting workers, and the laying of asphalt may generate emissions which would temporarily affect air quality. The total emissions and the timing of the emissions from these sources would vary depending on the phasing of the project and options chosen for the project.

Typical sources of emissions during construction projects include:

- Fugitive dust generated during excavation, grading, and loading and unloading activities.
- Dust generated during demolition of structures and pavement.
- Engine exhaust emissions from construction vehicles, worker vehicles, and diesel fuel-fired construction equipment.
- Increased motor vehicle emissions associated with increased traffic congestion during construction.
- VOC and odorous compounds emitted during asphalt paving and painting.

The regulated pollutants of concern for the first two source types (dust) are particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$) and PM_{10}. Engine and motor vehicle exhaust would result in emissions of VOCs, NO_X, $PM_{2.5}$, PM_{10}, air toxics, and greenhouse gases (assessed in Section 3.2.2 below).

Long-term Impacts

No Action Alternative

The No Action Alternative could result in limited growth in the Study Area in 2035 compared to the baseline year of 2016. The citywide estimated VMT for the baseline year and No Action are presented in table Exhibit 3.2–6 (see also Appendix B). Under the No Action Alternative, citywide VMT could increase by roughly 50,300 VMT compared to the baseline year. The associated fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT (see Exhibit 3.2–5). Therefore, the No Action Alternative would result in a less than significant impact to air quality.

Exhibit 3.2–6 VMT Comparison for Alternatives

		CITYWIDE			STUDY AREA	
	YEAR	PMPK VMT	Change from Base Year	Change from No Action Alt.	VMT	Change from No Action Alt.
Base Year	2016	379,400	–	–	7,800	–
No Action Alternative	2035	429,700	50,300	–	10,600	–
Alternative 1	2035	437,800	58,400	8,100	11,700	1,100
Alternative 2	2035	440,400	61,000	10,700	12,100	1,500

Source: City of Bellevue, CH2M, 2017

Alternative 1

Alternative 1 could result in moderate growth in the Study Area in 2035 compared to the base year of 2016. Bellevue citywide estimated VMT for the baseline year and Alternative 1 are presented in Exhibit 3.2–6 (see also Appendix B). Under Alternative 1, citywide VMT could increase by roughly 58,400 compared to the baseline year. The associated fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT (see Exhibit 3.2–5). Therefore, Alternative 1 could result in a less than significant impact to air quality.

Alternative 2

Alternative 2 could result in more robust growth in the Study Area in 2035 compared to the baseline year of 2016. Bellevue citywide estimated VMT for the baseline year and Alternative 2 are presented in Exhibit 3.2–6 (see also Appendix B). Under Alternative 2, citywide VMT could increase by roughly 61,000 compared to the baseline year. The associated fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT (see Exhibit 3.2–5). Therefore, Alternative 2 could result in a less than significant impact to air quality.

MITIGATION MEASURES

Short-term/Construction Mitigation Measures

For temporary impacts during construction, construction site owners and/or operators are required to take reasonable precautions to prevent fugitive dust from becoming airborne (Washington State Department of Transportation, 2017b). Fugitive dust may become airborne during demolition, material transport, grading, driving of vehicles and machinery on and off the site, and wind events. Controlling fugitive dust emissions may require some of the following actions:

- Spray exposed soil with water or other suppressant to reduce emissions of PM10 and deposition of particulate matter.
- Use phased development to keep disturbed areas to a minimum.
- Use wind fencing to reduce disturbance to soils.
- Minimize dust emissions during transport of fill material or soil by wetting down the load, covering the load, or by ensuring adequate freeboard (space from the top of the material to the top of the truck bed) on trucks.
- Promptly clean up spills of transported material on public roads.
- Schedule work tasks to minimize disruption of the existing vehicle traffic on streets.
- Restrict traffic onsite to reduce soil upheaval and the transport of material to roadways.
- Locate construction equipment and truck staging areas away from sensitive receptors as practical and in consideration of potential impacts on other resources.
- Provide wheel washers to remove particulate matter that would otherwise be carried offsite by vehicles to decrease deposition of particulate matter on area roadways.
- Cover dirt, gravel, and debris piles as needed to reduce dust and wind-blown debris.
- Minimize odors onsite by covering loads of hot asphalt.

Emissions of $PM_{2.5}$, PM_{10}, VOCs, NO_X, SO_X, and CO would be minimized whenever reasonable and possible. Since these emissions primarily result from construction equipment, machinery engines would be kept in good mechanical condition to minimize exhaust emissions. Additionally, contractors would be encouraged to reduce idling time of equipment and vehicles and to use newer construction equipment or equipment with add-on emission controls.

Long-term Mitigation Measures

Although there would be an increase in criteria pollutant emissions due to each alternative after construction, the increase would have a less than significant impact on air quality since the area is in attainment or unclassified for all pollutants. Additionally, long-term trends in vehicle emission standards should reduce tailpipe emissions of criteria air pollutants as the fleet-mix become more modernized to meet the standards. Also, the local air agency continues to monitor air quality in the region for comparison to the NAAQS and State AAQS. Therefore, mitigation beyond using current international building, energy codes, and good best management practices would not be warranted. Good best management practices in the context of the Wilburton Commercial Area Comprehensive Plan and Land Use Code amendments could include:

- Reviewing City landscape standards applicable to public infrastructure investments and private development to promote vegetative walls and tree canopies or other landscape methods in proximity to I-405 and other high traffic areas.
- Considering locations for schools, daycares, and residential uses that incorporate a buffer from high-volume roadways or other measures to reduce exposure to criteria pollutant emissions. Design parks in proximity to high-volume roadways to incorporate landscaping that helps reduce exposure to criteria pollutant emissions. Consider best practices in the US Environmental Protection Agency's publication "Best Practices for Reducing Near-Road Air Pollution Exposure at Schools" (U.S. Environmental Protection Agency, 2015).
- Adding a freeway wall combined with vegetation to buffer air pollution. Helps to distribute air pollution higher into the air.
- Obtaining additional/enhanced air quality information for Bellevue, including $PM_{2.5}$ to monitor changes.
- Adding a denser tree canopy near the freeway or other high traffic areas.

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The proposed alternatives would not result in a significant unavoidable adverse impact to air quality.

3.2.2 GREENHOUSE GASES AND CLIMATE CHANGE

AFFECTED ENVIRONMENT

Regulatory Environment

There is no standard significance threshold for GHG emissions in the Washington SEPA rules (Washington Administrative Code [WAC] 197-11-330).

Chapter 173-441 WAC—Reporting of Emissions of Greenhouse Gas, as adopted by the Department of Ecology, requires mandatory greenhouse gas reporting for facilities that emit at least 10,000 $MTCO_2e$ per year. A facility is defined as follows:

> “*WAC 173-441-020 (1)(f) “Facility” unless otherwise specified in any subpart of 40 C.F.R. Part 98 as adopted by September 1, 2016, means any physical property, plant, building, structure, source, or stationary equipment located on one or more contiguous or adjacent properties in actual physical contact or separated solely by a public roadway or other public right of way and under common ownership or common control, that emits or may emit any greenhouse gas. … All source categories in WAC 173-441-120 are considered facilities even if the source category name includes the word “supplier.”*”

King County Cities Climate Change Collaboration

The City of Bellevue is a member of the King County-Cities Climate Collaboration. This Collaboration is working toward GHG reduction goals of 25 percent by 2020 (compared to 2007), 50 percent by 2030 (compared to 2007) and 80 percent by 2050 (compared to 2007). Bellevue has yet to update their GHG rules to incorporate the Collaboration’s goals. As the City’s rules read now, the Mayor’s Climate Protection Agreement target (Resolution 7517) is to reduce GHG emissions by 7 percent below 1990 levels by 2012.

Greenhouse Gas Background

The accumulation of greenhouse gases (GHGs) has been identified as a driving force in global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community. In general, however, climate change can be described as the changing of earth's climate caused by natural fluctuations and anthropogenic activities (i.e., activities relating to, or resulting from the influence of human beings) that alter the composition of the global atmosphere.

The principal GHGs of concern are Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs). Electric utilities use SF_6 in electric distribution equipment. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat-trapping ability of each of these gases varies significantly. CH_4 is 25 times as potent as CO_2 at trapping heat, while SF_6 is 23,900 times more potent than CO_2. Conventionally, GHGs have been reported as CO_2 equivalents (CO_2e). CO_2e takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity.

The primary human-made processes that release GHGs include combustion of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH_4, such as livestock production and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gases such as SF_6, PFCs, and HFCs. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the earth's capacity to remove CO_2 from the air and altering the earth's albedo (surface reflectance) thus allowing more solar radiation to be absorbed.

Global mean temperatures in the United States (U.S.) have warmed during the 20th century and continue to warm into the 21st century. According to data compiled by the National Oceanic and Atmospheric Administration, the rate of warming for the entire period of record (1901–2008) is 0.14°F per decade across the contiguous 48 States (U.S. Environmental Protection Agency, 2017a).

IMPACTS

Short-term Impacts Common to All Alternatives

GHGs would be emitted during construction activities from demolition and construction equipment, much of it diesel-powered. Other emissions during construction would result from trucks used to haul construction materials to and from sites, and from vehicle emissions generated during worker travel to and from construction sites. Construction-related GHG emissions from any given development project that may occur by 2035 would be temporary and would not represent an on-going burden to the City's inventory.

Long-term Impacts

Changes in operational GHG emissions were considered from electricity use and transportation for each of the alternatives. In the paragraphs below, the methods used to estimate emissions from each of the categories are described.

Electricity Use

GHG emissions from electricity use in the Study Area are quantified using the Washington Department of Ecology's calculation tool for SEPA analyses. Information about the projected construction projects, including number of residential units and hotel rooms and square footage of other types of construction are input into the Ecology calculation tool. The tool uses assumptions about electricity usage per unit or per square foot and the carbon density of power to estimate the GHG impact from these sources.[1] Potential GHG emissions attributable to electricity usage from the alternatives are shown in Exhibit 3.2–7.

1 *In other Seattle-area rezoning analyses, electricity emissions are assumed to be zero because Seattle City Light is carbon neutral. Because Seattle City Light is not the electricity provider in Bellevue, the assumption is not appropriate for this analysis.*

Exhibit 3.2–7 Baseline and Potential 2035 GHG Emissions from Electricity Use in the Study Area

	GHG EMISSIONS IN $MTCO_2E$			
TYPE OF USAGE	2016 Existing	2035 No Action Alt.	2035 Alt. 1	2035 Alt. 2
Residential	706	979	12,065	16,056
Office Space: Non-Medical	6,977	9,613	33,294	42,574
Retail	5,620	6,362	8,761	9,869
Hotel	1,732	2,061	6,330	7,479
Office Space: Medical	7,553	7,553	12,942	14,841
Industrial	0	0	0	0
Total	**22,588**	**26,569**	**73,392**	**90,819**
Difference from Existing	–	3,981	50,804	68,231
Difference from No Action	–	–	46,823	64,251

Source: CH2M, 2017

Transportation

GHG emissions from transportation are quantified using Ecology's calculation tool for SEPA analyses. Information about the p.m. peak vehicle miles traveled (PMPK VMT) traveled in each of the scenarios is input into the Ecology tool. This tool has built-in assumptions about fuel economy and the higher heating value of gasoline and calculates GHG emissions based on these values. With higher-density zoning, there will be more people in the Study Area and, consequently, more GHG emissions associated with transportation. GHG emissions attributable to changes in transportation from the proposed development anticipated under each alternative are shown in Exhibit 3.2–8.

Exhibit 3.2–8 Baseline and Potential 2035 Citywide GHG Emissions from Transportation

	GHG EMISSIONS IN $MTCO_2E$			
TYPE OF VEHICLE	2016 Existing	2035 No Action Alt.	2035 Alt. 1	2035 Alt. 2
Vehicle Emissions	147.88	167.48	170.64	171.65
Difference from Existing	–	19.61	22.76	23.78
Difference from No Action	–	–	3.16	4.17

Source: CH2M, 2017

Grand Connection Options

All Grand Connection Options would require energy to construct them, and contribute to GHG construction emissions. Operationally, Grand Connection would promote non-motorized travel and could help moderate (reduce) VMT results.

Public Space Options

To the extent that the Public Space Options provide greenspace, the trees and shrubs can provide shade and lower temperatures in urban areas, and can assist with GHG reductions. (City of Bellevue, 2013) (National Arbor Day Foundation, 2017)

Performance Measures Evaluation

Wilburton Commercial Area Performance Measures

For the purposes of this EIS, performance measures have been developed to test the performance of alternatives in relation to Council principles, as identified in Section 2.3. The relevant performance measure for this section is per capita greenhouse gas emissions.

Exhibit 3.2-9 Evaluation Framework: Comparison of Alternatives—Greenhouse Gases and Climate Change

PERFORMANCE MEASURE	NO ACTION ALTERNATIVE	ALTERNATIVE 1	ALTERNATIVE 2
Per capita greenhouse gas emissions	▼	●	▲

▲ *Strong Emphasis* ● *Moderate Emphasis* ▼ *Weak Emphasis*

The No Action Alternative would not realize the same increases in density in the Study Area as Alternatives 1 and 2, and as a result the overall GHG would be lower, but per capita GHG would be higher. Alternative 2 has the greatest increases in densities for both residential and employment, and, while the total amount of GHG emissions would increase because there would be more people living and working in the area, per capita emissions would be lower than the No Action Alternative, and slightly lower than Alternative 1. See Exhibit 3.2–10.

Exhibit 3.2–10 Net Increase in GHG Emissions in $MTCO_2e$, Per Capita from Electricity Sources

	2035 NO ACTION ALT.	2035 ALT. 1	2035 ALT. 2
GHG Emissions from Electricity Use in the Study Area	26,569	73,392	90,819
GHG Emissions from Transportation Citywide[1]	167.48	170.64	171.65
Increase in GHG Emissions ($MTCO_2e$/yr)	4,000	50,826	68,255
Net Population	160	6,641	8,975
GHG Emissions Per Capita	25.04	7.65	7.61

1 This analysis uses citywide VMT numbers for two reasons: First, transportation emissions are a small part of the estimates (the vast majority of emissions come from electricity generation). Second, it is conservative for this planning level review.

Source: CH2M, 2017

Grand Connection Performance Measures

The No Action Alternative is not applicable since the Grand Connection is not constructed.

Regarding Alternatives 1 and 2, depending on timing of construction there would be a cumulative effect on GHG emissions from construction activities. Promoting non-motorized travel could contribute to a moderation of VMT in the area.

Considering studies of other lids evaluated for SR 520 in several locations (e.g. Montlake), lids would not create adverse air quality impacts for lid users and associated landscaping can help contribute to air quality. (Washington State Department of Transportation/ Federal Highway Administration, 2016) (Puget Sound Clean Air Agency and Public Health—Seattle & King County, 2008)

Impacts of the No Action Alternative

Potential operational GHG emissions from the No Action Alternative are presented in Exhibit 3.2–11. Annual GHG emissions under the No Action Alternative could increase by 4,000 $MTCO_2e$ as compared to 2016, which would be below the 10,000 $MTCO_2e$ mandatory reporting threshold for the State of Washington for facilities. Consequently, the No Action Alternative would result in an increase in GHG emissions that would be considered a less than significant impact for SEPA.

Exhibit 3.2–11 Potential GHG Impacts Under the No Action Alternative

SOURCE	GHG EMISSIONS IN $MTCO_2E$
Electricity Usage	26,569
Transportation	167
Total	**26,736**
Difference from Existing	4,000

Source: CH2M, 2017

While the No Action Alternative could result in the smallest net increase in GHG emissions when compared to the other alternatives, it could contribute the least towards supporting growth and development near existing and planned high capacity transit. Growth that might otherwise be accommodated in the Study Area would occur in peripheral areas of the city or region where there are fewer jobs, services and mobility options in close proximity. This suggests that there could be less progress towards reducing overall GHG emissions related to VMT on a region-wide basis.

Impacts of Alternative 1

Potential operational GHG emissions from Alternative 1 are presented in Exhibit 3.2–12. The results reflect the land use differences of moderately increased density of residential and commercial development in the Study Area. Alternative 1 could increase GHG emissions by 50,826 $MTCO_2e$ per year over existing conditions. Compared to the No Action Alternative, Alternative 1 would result in a net increase in GHG emissions of 46,826 $MTCO_2e$ per year, which is above the 10,000 $MTCO_2e$ mandatory reporting threshold for the State of Washington. Consequently, Alternative 1

Exhibit 3.2-12 Potential GHG Impacts Under Alternative 1

SOURCE	GHG EMISSIONS IN $MTCO_2E$
Electricity Usage	73,392
Transportation	171
Total	**73,562**
Difference from Existing	50,826
Difference from No Action	46,826

Source: CH2M, 2017

could result in an increase in GHG emissions could be considered potentially significant and mitigation measures would be warranted.

Alternative 1 could support more efficient growth patterns, consistent with regional planning, and consequently lower per-capita GHG emissions on a region-wide basis, both in terms of electricity usage and transportation. Although this analysis shows substantial increases in GHG emissions from these sources (when comparing Alternative 1 to the No Action Alternative), Alternative 1 could accommodate significantly more people than the No Action Alternative. This increase in population comes with inevitable emissions increases and those increases can be minimized on a per capita basis through higher-density zoning.

If the increase in population lives in lower-density development away from services and employment centers of Bellevue, rather than in higher density developments closer to services and employment centers, VMT per person will be greater because people will have to travel further to go to work and meet their basic needs. Alternative 1 could lead to more walking, bicycling, and transit use; a lower percentage of residents could be driving cars, and those who do drive could drive less as compared to both existing conditions and the No Action Alternative.

Another consequence of this population growth being further from services and employment centers in Bellevue (under the No Action Alternative) is that the total non-vehicular GHG emissions could be higher than it would be in a scenario with higher density of residents and jobs (under Alternative 1 and Alternative 2). There is a substantial increase in non-vehicular emissions associated with an increase in population (as reflected in this analysis). However, newer, multi-family buildings common to high-density development have lower natural gas demand than that of single-family housing and many older multi-family buildings. Consequently, per capita GHG emissions could be reduced with this increased intensity of development under Alternative 1.

In order to contribute to the King County-Cities Climate Collaboration GHG reduction targets, Bellevue could require all development to be as efficient as possible to offset the projected growth in the area. Alternative 1 could accommodate this growth in a manner consistent with the goals of the Collaboration.

Impacts of Alternative 2

Potential operational GHG emissions from Alternative 2 are presented in Exhibit 3.2–13. These GHG emissions reflect the land use change to the highest density of residential and commercial development proposed. Alternative 2 could increase GHG emissions by 68,255 $MTCO_2e$ per year. Alternative 2 could also result in a net increase in GHG emissions of 64,255 $MTCO_2e$ per year compared to the No Action Alternative, which is above the 10,000 $MTCO_2e$ mandatory reporting threshold for the State of Washington. Consequently, Alternative 2 could result in an increase in GHG emissions that could be considered potentially significant and mitigation measures would be warranted.

Exhibit 3.2–13 Potential GHG Impacts Under Alternative 2

SOURCE	GHG EMISSIONS IN $MTCO_2E$
Electricity Usage	90,819
Transportation	172
Total	**90,991**
Difference from Existing	68,255
Difference from No Action	64,255

Source: CH2M, 2017

Alternative 2 could provide different types of redevelopment incentives that could encourage the greatest concentration of growth focused within the Study Area. Alternative 2 could support more efficient growth patterns, consistent with regional planning, and consequently less total increase in GHG emissions on a region-wide basis, both in terms of electricity usage and transportation.

To the extent that Alternative 2 attracts growth that could otherwise occur outside of Bellevue, it could result in the greatest decrease in growth of total VMT within the city. On a region-wide basis, Alternative 2 could create the greatest potential reduction in overall VMT growth, and the greatest potential increase in use of public transit and non-motorized forms of transportation compared to similar growth accommodation in a more peripheral location.

With respect to non-vehicular GHG emissions, Alternative 2 has advantages over the No Action Alternative. High-rise residential structures use less electricity per person or dwelling unit than midrise structures and significantly less than single-family homes. Consequently, Alternative 2 presents the lowest per capita GHG emissions growth associated with electricity usage.

MITIGATION MEASURES

Alternative 1 and Alternative 2 could support efficient planning goals, but all alternatives—in particular Alternative 1 and Alternative 2—contribute to increased GHG emissions through future growth and development in the Study Area. These two rezoning scenarios result in GHG emissions above the 10,000 MTCO_2e mandatory reporting threshold and, consequently, GHG emissions from future projects need to be mitigated so that future projects do not result in a significant environmental impact. A list of potential mitigation measures is given below; some measures would need to be integrated into Wilburton Commercial Area policies or codes as requirements and incentives to apply to future development. Because indirect emissions from electricity generation are the source of the majority of emissions, special emphasis will be given to the measures that reduce GHG emissions from electricity generation.

Incorporated Plan Features

Alternatives 1 and 2 could change development regulations applicable to the Study Area to allow building height increases to achieve affordable housing goals and possibly other benefits, while adding design and development standards. Increasing density in an urbanized area with access to multiple mobility options could lead to more use of public transportation, biking, and walking, and less use of cars. These policies and actions recognize the value of planning for the type and density of future housing and jobs as a way to reduce the need for future residents and workers to travel by automobile, thereby reducing transportation-related GHG emissions per capita in the region.

Regulations and Commitments

- Washington State Energy Code: Development in the Study Area would be subject to the requirements of the Washington State Energy Code, which regulates the energy-use features of new and remodeled buildings.
- The City's 2013–2018 Environmental Stewardship Initiative Strategic Plan includes strategies and actions to develop information, targets, and resiliency planning. The strategic plan is an inter-departmental document signed by City department heads showing coordination on the strategies and actions. It has not been formally adopted by Bellevue City Council.

Other Proposed Mitigation Measures

- Large Project Review: The City could evaluate GHG emissions of new large-scale developments and require reasonable mitigation measures to minimize GHG emissions as part of the SEPA review.
- Waste Diversion: To minimize GHG from solid waste, multifamily residential development within the study area could include centralized recycling, composting, and waste separation collection areas.
- Green Building Standards: To lower the GHG contribution from electricity use, new construction projects in the study area could be required to achieve one of the following green building standards: Built Green, LEED, the Living Building Challenge, or the Evergreen Sustainable Development Criteria. These programs are similar to those included in the recent Downtown Livability code amendments that addressed an updated amenity system.
- Building Demolition Waste Reduction: When existing buildings are demolished, there are often opportunities to reduce the amount of waste being sent to landfill with sustainable waste management strategies. In the Seattle area, standard practice for building construction and demolition results in fairly high

recycling rates of over 50 to 60 percent. The City of Bellevue could consider programs to require or encourage best practices to achieve higher recycling rates for buildings demolished in the Wilburton study area.

- Puget Sound Energy (PSE) Carbon Neutrality Statement: Bellevue is served by PSE, which is not carbon neutral but has an option for rate payers to pay an extra $8 per month to receive carbon neutral power. The City of Bellevue could promote or incentivize renewable energy in Wilburton, possibly through PSE expanding their renewable energy generation.
- Electric Vehicles: The City could adopt regulations for Wilburton that support the placement of equipment for charging of electric vehicles in applicable new developments. Placing the electric vehicles parking spaces closer to entrances of destinations would further encourage use of such vehicles. In addition, flex car spaces could be added to encourage the use of electric vehicles.
- Trees: The City could adopt regulations/incentives for the Wilburton Commercial Area that preserve and/or replace on-site trees, and encourage planting of more trees. Trees and shrubs can provide shade and lower temperatures in urban areas, and can assist with GHG reductions. (City of Bellevue, 2013; National Arbor Day Foundation, 2017). The City has a 40 percent tree canopy goal and the Study Area has the potential to significantly increase its canopy from its current state, while also buffering high traffic areas such as I-405.
- The City could adopt or incorporate sustainable neighborhood development strategies such as district energy and microgrids, sustainable sites, salmon-safe certification, and EcoDistrict models. These could be implemented through incentives or requirements.
- Higher performing building and energy codes could be used, including green building incentives to maximize energy efficiency of new construction.

Exhibit 3.2–14 lists the possible mitigation measures and the reduction in emissions attributable to each.

Exhibit 3.2–14 Potential Mitigation Measures and GHG Reductions

MITIGATION MEASURE	REDUCTION IN GHG EMISSIONS
Carbon Neutral Power	At least 9% of emissions from electricity
Solar Panels and/or Wind Turbines	Variable, depending on units installed
High Efficiency Appliances	2–4% of emissions from electricity in residential units
High Efficiency Public Street Lighting	16–40% of emissions from electricity for public lighting
LED Traffic Lights	90% of emissions from electricity for traffic lights

Source: CH2M, 2017

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Potentially significant impacts could be expected for Alternative 1 and Alternative 2, since they could both have the potential for increased GHG emissions above the 10,000 $MTCO_2e$ mandatory reporting threshold. However, if mitigation measures are implemented and tracked, the alternatives may result in a decrease of the growth in GHG emissions such that the impacts from future development allowed by the changes in plans and zoning could be considered less than significant for SEPA.

Significant GHG emission increases are inevitable with population growth and the proposed alternatives (with proper mitigation) handle this growth while keeping per capita GHG contributions as low as possible.

While each alternative would create a net increase in GHG emissions generated from growth and development in the Study Area, the region-wide benefit of capturing development that might otherwise occur in peripheral areas of the city or region would serve to offset these impacts.

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