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Air Quality Impact Analysis

Project Title

**Cottonwood and East Planz Roads
Commercial Development
GPA/ZC No. 18-0366**

Project Location

**NW corner of Cottonwood and East Planz Roads
Bakersfield, Kern County, California
APN: 170-200-15**

January 11, 2019

Submitted to:

**Gilmar Construction, Inc.
608 Davies Court
Bakersfield, CA 93309**

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1.0 INTRODUCTION

This Air Quality Impact Analysis (AQIA) identifies the potential impacts on air quality resulting from the proposed commercial development, consisting of a convenience store with automotive fueling services. The proposed project occupies 0.66 gross acres.

The project site is located in the City of Bakersfield (City) in central Kern County. The project site is located within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is under the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD).

This document was prepared using methodology described in the San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD's) *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), March 15, 2015 Revision.

2.0 PROJECT DESCRIPTION

The Project site occupies 0.66 gross acres (APN 170-200-15) and is currently vacant. There are single family residences on to the north, single family residences and the Cottonwood Market to the west, undeveloped property to the east and south. The Project site is located at the northwest corner of the intersection of Cottonwood Road and East Planz Road in the City of Bakersfield, Kern County, California. The Project site is accessible from Cottonwood Road to the east, Oliver Street to the west and East Planz Road to the south side of the project site. The current City of Bakersfield zoning for the east half of the location is C-2 (General Commercial) and is R-2 (Limited Multi-family) for the west half.

Table 2-1: Assessor's Parcel Numbers and Area for Project Site

Assessor's Parcel Number	Acreage
170-200-15	0.66
Total Acreage	**0.66**

3.0 AIR QUALITY STANDARDS

There are three categories of air pollutants that are regulated by federal, State, and/or regional governmental agencies: criteria pollutants; hazardous air pollutants (HAPs), and greenhouse gases (GHGs). These air pollutants, which are emitted as a result of everyday activities, can pose significant health and environmental risks. The following provides a discussion of each air pollutant category.

3.1 Criteria Pollutants

The Federal Clean Air Act (FCAA) of 1970, and the subsequent Federal Clean Air Act Amendments (FCAAA) of 1977 and 1990, required the establishment of National Ambient Air Quality Standards (NAAQS) for widespread pollutants considered harmful to public health and the environment. These pollutants are commonly referred to as criteria pollutants. The NAAQS establish acceptable pollutant concentrations which may be equaled continuously or exceeded only once per year. The California Ambient Air Quality Standards (CAAQS) are limits set by the California Air Resources Board (CARB) that cannot be equaled or exceeded. An air pollution control district must prepare an Air Quality Attainment Plan if the standards are not met. The NAAQS and CAAQS are shown in Table 3-1.

The following is a summary of the characteristics of the criteria pollutants and their potential physical and health effects.

Ozone Emissions - Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. The ground level, or "bad" ozone layer, is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. The troposphere extends to a level about 10 miles up where it meets the second layer, the stratosphere. The stratospheric, or "good" ozone layer, extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays.

Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind. Ozone, the primary constituent of smog, is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on other air pollutants (called precursors), specifically nitrogen oxide (NO_x) and reactive organic gases (VOC). Sources of precursor gases to the photochemical reaction that form ozone number in the thousands. Common sources include consumer products, gasoline vapors, chemical solvents, and combustion products of various fuels. Originating from gas stations, motor vehicles, large industrial facilities, and small businesses such as bakeries and dry cleaners, the ozone-forming chemical reactions often take place in another location, catalyzed by sunlight and heat. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins.

In 1994, approximately 50 million people lived in counties with air quality levels above the EPA's health-based national air quality standard. The highest levels of ozone were recorded in Los Angeles, closely followed by the San Joaquin Valley. High levels also persist in other heavily populated areas, including the Texas Gulf Coast and much of the northeastern United States.

While the ozone in the upper atmosphere absorbs harmful ultraviolet light, ground-level ozone is damaging to the tissues of plants, animals, and humans, as well as to a wide variety of inanimate materials such as plastics, metals, fabrics, rubber, and paints. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

Table 3-1: Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 μg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m^3)		0.070 ppm (137 μg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 μg/m^3	Gravimetric or Beta Attenuation	150 μg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 μg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 μg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 μg/m^3	Gravimetric or Beta Attenuation	12.0 μg/m^3	15 μg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 μg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 μg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)		0.053 ppm (100 μg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 μg/m^3)	Ultraviolet Fluorescence	75 ppb (196 μg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 μg/m^3)	
	24 Hour	0.04 ppm (105 μg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 μg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 μg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 μg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 μg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 μg/m^3)	Gas Chromatography			

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (5/4/16)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (5/4/16)**

Health Effects

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems, such as: forests and foothill communities; agricultural crops; and some man-made materials, such as rubber, paint, and plastic. High levels of ozone may negatively affect immune systems, making people more susceptible to respiratory illnesses, including bronchitis and pneumonia. Ozone accelerates aging and exacerbates pre-existing asthma and bronchitis and, in cases with high concentrations, can lead to the development of asthma in active children. Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.

People who work or play outdoors are at a greater risk for harmful health effects from ozone. Children and adolescents are also at greater risk because they are more likely than adults to spend time engaged in vigorous activities. Research indicates that children under 12 years of age spend nearly twice as much time outdoors daily than adults. Teenagers spend at least twice as much time as adults in active sports and outdoor activities. In addition, children inhale more air per pound of body weight than adults and they breathe more rapidly than adults. Children are less likely than adults to notice their own symptoms and avoid harmful exposures.

Ozone is a powerful oxidant; it can be compared to household bleach, which can kill living cells (such as germs or human skin cells) upon contact. Ozone can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthmatic symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of ozone above the current ambient air quality standard could lead to lung inflammation and lung tissue damage and a reduction in the amount of air inhaled into the lungs.

Particulate Matter (PM10 and PM2.5) - Particulate Matter: Also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. In the western United States, there are sources of PM in both urban and rural areas. Because particles originate from a variety of sources, their chemical and physical compositions vary widely. The composition of PM can also vary greatly with time, location, the sources of the material and meteorological conditions. Dust, sand, salt spray, metallic and mineral particles, pollen, smoke, mist, and acid fumes are the main components of PM. EPA groups particle pollution into three categories based on their size and where they are deposited:

> "Inhalable coarse particles ($PM_{2.5\text{-}10}$)," such as those found near roadways, and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5\text{-}10}$ is deposited in the thoracic region of the lungs.
>
> "Fine particles ($PM_{2.5}$)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.

"Ultrafine particles (UFP)," are very, very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, their high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

$PM_{2.5\text{-}10}$, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM 10 sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust in the Valley.

Health Effects

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children.

Carbon Monoxide (CO) - Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive. CO is a byproduct of motor vehicle exhaust that contributes more than two-thirds of all CO emissions nationwide. In urban areas, automobile exhaust can cause as much as 95 percent of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

Health Effects

CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood and thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. At high concentrations, CO can cause heart difficulties in people with chronic diseases and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and in prolonged, enclosed exposure, death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to the concentration of carboxyhemoglobin (COHb) in the blood. Health effects observed may include: an early onset of cardiovascular disease; behavioral impairment; decreased exercise performance of young, healthy men; reduced birth weight; sudden infant death syndrome (SIDS); and increased daily mortality rate.

Most of the studies evaluating adverse health effects of CO on the central nervous system examine high-level poisoning. Such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death.

Nitrogen Oxides (NO_x) - Nitrogen oxides (NO_x) is a family of highly reactive gases that are primary precursors to the formation of ground-level ozone and react in the atmosphere to form acid rain. NO_x is emitted from combustion processes in which fuel is burned at high temperatures, principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A brownish gas, NO_x is a strong oxidizing agent that reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates.

Health Effects

NO_x is an ozone precursor that combines with VOC to form ozone. Refer to the discussion of ozone above regarding the health effects of ozone.

Direct inhalation of NO_x can also cause a wide range of health effects. NO_x can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of nitrogen dioxide (NO_2) may lead to changes in airway responsiveness and lung function in individuals with preexisting respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure. Other health effects associated with NO_x are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NO_x can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NO_x can also impair visibility.

NO_x is a major component of acid deposition in California. NO_x may affect both terrestrial and aquatic ecosystems. NO_x in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

NO_2 is toxic to various animals as well as to humans. Its toxicity relates to its ability to combine with water to form nitric acid in the eye, lung, mucus membranes, and skin. Studies of the health impacts of NO_2 include experimental studies on animals, controlled laboratory studies on humans, and observational studies. In animals, long-term exposure to NO_x increases susceptibility to respiratory infections, lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2, can suffer lung irritation and, potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes as well as hospital admissions for respiratory conditions.

NO_x contributes to a wide range of environmental effects both directly and when combined with other precursors in acid rain and ozone. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems such as those found in estuarine and coastal waters can lead to eutrophication as discussed above. Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum, which is toxic to plants. Acidification of surface waters creates conditions of low pH and levels of aluminum that are toxic to fish and other aquatic organisms.

Sulfur Dioxide (SO_2) - The major source of sulfur dioxide (SO_2) is the combustion of high-sulfur fuels for electricity generation, petroleum refining, and shipping.

<u>Health Effects</u>

High concentrations of SO_2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO_2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of SO_2, in conjunction with high levels of particulate matter, include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO_2 also is a major precursor to $PM_{2.5}$, which is a significant health concern and a main contributor to poor visibility. In humid atmospheres, sulfur oxides can react with vapor to produce sulfuric acid, a component of acid rain.

Lead (Pb) - Lead, a naturally occurring metal, can be a constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in automobile fuel. Since the 1980s, lead has been phased out in gasoline, reduced in drinking water, reduced in industrial air pollution, and banned or limited in consumer products. Since this has occurred, the ambient concentrations of lead have dropped dramatically.

<u>Health Effects</u>

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children. Effects on the nervous systems of children are one of the primary health risk concerns from lead. In high concentrations, children can even suffer irreversible brain damage and death. Children 6 years old and under are most at risk, because their bodies are growing quickly.

Visibility-Reducing Particles - This standard is a measure of visibility. The entire State of California has been labeled unclassified for visibility. CARB has not established a method for measuring visibility with the necessary accuracy or precision needed to designate areas in the State as attainment or nonattainment.

Sulfates - Sulfates are particulate products from combustion of sulfur-containing fossil fuels. When sulfur dioxide (SO_2) is exposed to oxygen, it oxidizes into sulfates (SO_3 or SO_4). Through a variety of chemical and photochemical reactions in the atmosphere, the sulfates can combine with ammonia to form ammonium sulfate particulate. Data collected in the SJVAB has demonstrated that levels of sulfates are significantly less than the applicable health standards. However, sulfates are still one of the wintertime particulate concerns due to secondary formation of ammonium sulfate.

Sulfates (SO_4) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or Hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California, due to regional meteorological features.

Health Effects

The health effects associated with SO_2 and sulfates more commonly known as sulfur oxides (SO_x) include respiratory illnesses, decreased pulmonary disease resistance, and aggravation of cardiovascular diseases. When acidic pollutants and particulates are also present, sulfur dioxide tends to have an even more toxic effect.

Increased particulate matter derived from sulfur dioxide emissions also contributes to impaired visibility. In addition to particulates, SO_3 and SO_4 are also precursors to acid rain. In the SJVAB, SO_x and NO_x are the leading precursors to acid rain. Acid rain can lead to corrosion of man-made structures and cause acidification of water bodies.

The State standard for SO_2 is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility and, because they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide - Hydrogen sulfide (H_2S) emissions are often associated with geothermal activity, oil, and gas production, refining, sewage treatment plants, and confined animal feeding operations. H_2S in the atmosphere will likely oxidize into SO_2 that can lead to acid rain.

Health Effects

Exposure to low concentrations of H_2S may cause irritation to the eyes, nose, or throat. It may also cause difficulty in breathing for some asthmatics. Exposure to higher concentrations (above 100 ppm) can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of H_2S (greater than 500 ppm) can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of H_2S (0.00011 ppm to 0.00033 ppm). Deaths due to breathing large amounts of H_2S have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools. Occupational Safety and Health Administrations (OSHA) has the primary responsibility for regulating workplace exposure to H_2S. The entire SJVAB is unclassified for H_2S.

Vinyl Chloride - Vinyl chloride monomer is a sweet-smelling, colorless gas at ambient temperature. Landfills, publicly-owned treatment works, and polyvinyl chloride (PVC) production are the major identified sources of vinyl chloride emissions in California. PVC can be fabricated into several products, such as PVC pipes, pipe fittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers. There are currently no adopted ambient air standards for vinyl chloride.

Health Effects

Short-term exposure to vinyl chloride has been linked with the following acute health effects (Agency for Toxic Substances and Disease Registry 2004; U.S. Department of Health and Human Services 1993):

- Acute exposure of humans to high levels of vinyl chloride via inhalation in humans has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness.
- Vinyl chloride is reported to be slightly irritating to the eyes and respiratory tract in humans. Acute exposure to extremely high levels of vinyl chloride has caused loss of consciousness, lung and kidney irritation, and inhibition of blood clotting in humans and cardiac arrhythmias in animals.
- Tests involving acute exposure of mice have shown vinyl chloride to have high acute toxicity from inhalation exposure.

Long-term exposure to vinyl chloride concentrations has been linked with the following chronic health effects (Agency for Toxic Substances and Disease Registry 2004; U.S. Department of Health and Human Services, Registry of Toxic Effects of Chemical Substances [RTECS, online database] 1993; U.S. Department of Health and Human Services 1993; U.S. Environmental Protection Agency 2000):

- Liver damage may result in humans from chronic exposure to vinyl chloride, through both inhalation and oral exposure.

A small percentage of individuals occupationally exposed to high levels of vinyl chloride in air have developed a set of symptoms termed “vinyl chloride disease,” which is characterized by Raynaud’s phenomenon (fingers blanched and numbness and discomfort are experienced upon exposure to the cold), changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema).

Central nervous system effects (including dizziness, drowsiness, fatigue, headache, visual and/or hearing disturbances, memory loss, and sleep disturbances) as well as peripheral nervous system symptoms (peripheral neuropathy, tingling, numbness, weakness, and pain in fingers) have also been reported in workers exposed to vinyl chloride.

Reactive Organic Gases (VOC) - Reactive Organic Gases (VOC) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

Organic chemicals are widely used as ingredients in household products. Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.

Health Effects

The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect. As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics. At present, not much is known about what health effects occur from the levels of organics usually found in homes. Many organic compounds are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans.

3.2 Toxic Air Contaminants

Toxic pollutants in California are identified as toxic air contaminates (TACs) and are listed in the Air Toxic "Hot Spots" and Assessment Act's "Emissions Inventory Criteria and Guideline Regulation"(AB2588). A subset of these pollutants has been listed by the Office of Environmental Health Hazard Assessment (OEHHA) as having acute, chronic, and/or carcinogenic effects, as defined by California Health and Safety Code (CH&SC) §39655.

Governor Deukmejian signed AB2588 into law in 1987. The purpose of the Act is to inventory the emissions of air toxics, determine if these emissions are high enough to expose individuals or groups to significant health risk, and to inform the public where there is a significant health risk. The SJVUAPCD has established the following levels of risk determined to be significant for purposes of AB2588:

1. A cancer risk exceeding 10 in 1 million, or
2. A ratio of the chronic or acute exposure to the reference exposure level ("hazard index") exceeding 1.0.

The requirements of AB2588 apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of AB 2588 must prepare and submit toxic emission inventory plans and reports and periodically update those reports.

3.3 Greenhouse Gas Emissions

For the purposes of the following discussion, greenhouse gases are considered as the cause of global climate change. Climate change is a shift in the "average weather" that a given region experiences. Regional "average weather" is measured by changes in temperature, wind patterns, precipitation, and storms. Global climate is the change in the climate of the earth as a whole.

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent GHG contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate.

Anthropogenic (caused or produced by humans) emissions of these GHG in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or global climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Transportation is responsible for 41 percent of the State's GHG emissions, followed by electricity generation. Emissions of CO_2 and nitrogen oxide (NO_x) are byproducts of fossil fuel combustion. Emissions of CH_4 result from off-gassing associated with agricultural practices and landfills. Sinks of CO_2 include uptake by vegetation and dissolution into the ocean.

An individual project cannot generate enough GHG emissions to effect a discernible change in the global climate. However, a proposed project may participate in this potential impact by its incremental contribution combined with the cumulative contribution combined with the cumulative increase of all other sources of GHGs which, when taken together, may influence global climate change.

The following provides a description of each of the GHGs and their global warming potential:

Water Vapor (H_2O) - Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved in is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (i.e., rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there are also dynamics that put the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

Carbon Dioxide (CO_2) - The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). However, the Intergovernmental Panel on Climate Change (IPCC), established by the United Nations in 1988, indicates that concentrations were 379 ppm in 2005, an increase of more than 30 percent. The IPCC projects that, left unchecked, the concentration of CO_2 in the atmosphere would increase to a minimum of 540 ppm by the year 2100 as a direct result of anthropogenic sources. This could result in an average global temperature rise of at least two degrees Celsius.

Methane (CH_4) - CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO_2. Its lifetime in the atmosphere is brief (10 to 12 years) compared to some other GHGs such as CO_2, N_2O, and Chlorofluorocarbons (CFCs). CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric (man-made) sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide (N_2O) - Concentrations of N_2O began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant (i.e., in whipped cream bottles), in potato chip bags, in rocket engines, and in racecars.

Chlorofluorocarbons (CFCs) - CFCs are gases formed synthetically by replacing all Hydrogen atoms in CH_4 or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs have no natural source, but were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken. This effort was extremely successful and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons (HFCs) - HFCs are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, hydrofluorocarbons are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons (PFCs) - Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). Concentrations of CF_4 in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

Sulfur Hexafluoride (SF_6) - SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest global warming potential of any gas evaluated; 23,900 times that of CO_2. Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Aerosols - Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel with sulfur within it is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil fuels. Although particulate matter regulation has been lowering aerosol concentrations in the United States, global concentrations are likely increasing.

Global Warming Potential
GHGs have varying global warming potentials (GWPs) and are one type of simplified index, based upon radiative properties that can be used to estimate the potential future impacts of emissions of different gases on the climate in a relative sense. GWP is based on a number of factors, including radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2.

The EPA defies GWP as "the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas," the reference gas in this case being CO_2. One ton of CO_2 equivalent (or CO_2e) is essentially the emissions of the gas multiplied by the GWP. The CO_2 equivalent is a good way to assess emissions because it gives weight to the GWP of the gas. A summary of the atmospheric lifetime and the GWP of selected gases are summarized in Table 3-2. As shown in Table 3-2, the GWP of GHGs ranges from 1 to 23,900.

Data compiled by the United Nations Framework Convention on Climate Change (UNFCCC) indicates that, in 2006, total worldwide GHG emissions were 22,170 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), emissions in the U.S. were 7054.2 $MMTCO_2e$, and emissions in California were 483.9 $MMTCO_2e$ (source: United Nations Framework Convention on Climate Change 2009 and California Air Resources Board 2009).

Table 3-2: Global Warming Potentials and Atmospheric Lifetimes

Gas	Atmospheric Lifetime	Global Warming Potential (100-Year Horizon)
Carbon Dioxide (CO_2)		1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1	124
PFC: Tetrafluoromethane	50,000	7,390
PFC: Hexafluoroethane	10,000	12,200
Sulfur Hexafluoride	3,200	22,800

Source: California Air Resources Board based on the Intergovernmental Panel on Climate Change fourth assessment report (AR4). June 22, 2018.
HFC = Hydrofluorocarbons
PFC = Perfluorocarbons

4.0 ENVIRONMENTAL SETTING AND CLIMATE

4.1 Project Location and Setting

The project site is located in the City of Bakersfield (City) in central Kern County. The project site is located within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is under the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD).

This AQIA identifies the potential impacts on air quality resulting from the proposed commercial development consisting of a convenience store and vehicle fuel pumps. The proposed project occupies 0.66 gross acres.

The project site is located in Kern County in the southwest region of Bakersfield. The proposed project is located in the western portion of the City. The elevation is approximately 365 feet above sea level. (Exhibit F)

4.2 Climate

According to US Climate Data, average temperatures in Bakersfield range from 69 degrees Fahrenheit (F) to 97 degrees F in July to 39 degrees F to 56 degrees F in January. The wet season is generally from December to March, with an annual average of 6.45 inches of rainfall.

4.3 San Joaquin Valley Air Basin

The California Air Resources Board (CARB) has divided California into 15 regional air basins according to topographic features. The project site is located within the south-western portion of the San Joaquin Valley Air Basin (SJVAB). The SJVAB is the southern half of California's Central Valley and is approximately 250 miles long and averages 35 miles wide. The SJV is bordered by the Sierra Nevada Mountains in the east (8,000 to 14,491 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi mountains in the south (6,000 to 7,981 feet in elevation). The SJVAB is under the jurisdictional authority of San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD).

Table 4-1 contains the ambient air quality classifications for the SJVUAPCD. The CCAA requires that all reasonable stationary and mobile source control measures be implemented in nonattainment areas to help achieve a mandated five-percent per year reduction in ozone precursors and to reduce population exposures.

Table 4-1: Ambient Air Quality Classifications

Pollutant	Designation/Classification	
	Federal Standards	State Standards
Ozone - One hour	Revoked in 2005	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme	Nonattainment
PM 10	Attainment	Nonattainment
PM 2.5	Nonattainment	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment

Pollutant	Designation/Classification	
	Federal Standards	State Standards
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Notes:

National Designation Categories

Nonattainment Area: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Unclassified/Attainment Area: Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant or meets the national primary or secondary ambient air quality standard for the pollutant.

State Designation Categories

Unclassified: A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment: A pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a three-year period.

Nonattainment: A pollutant is designated nonattainment if there was at least one violation of a State standard for that pollutant in the area.

Nonattainment/Transitional: A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for the pollutant.

4.4 Existing Air Quality

CARB has established and maintains, in conjunction with the local air districts, a network of sampling stations (called the State and Local Air Monitoring Stations Network [SLAMS]), which monitor ambient pollutant levels. The SLAMS network has 38 stations within the SJVAB monitor various pollutant concentrations. (Exhibit E)

The closest active monitoring station is located at 410 E. Planz Road (Site# 15258 – Bakersfield Municipal Airport) in Bakersfield, approximately 0.7 miles west of the site. Due to the close proximity to the site, this station provides the most applicable air quality monitoring data available for NOx and PM2.5. For the PM10 monitoring data, the monitoring station located at 5558 California Avenue (Site #15255) in Bakersfield, which is about 5 miles to the northwest of the site, provides the most applicable data.

Table 4-2 provides a summary of the maximum pollutant levels detected at this monitoring stations during 2015 through 2017. Exhibit G contains copies of reports for each monitoring station.

Table 4-2: Maximum Pollutant Levels

Pollutant	Averaging Time	Units	Maximums			Standards	
			2015	2016	2017	State	National
Nitrogen Dioxide (NO_2)	1 hour	ppm	0.1762	0.1422	0.175	0.18	100 ppb
	Annual Average	ppm	0.0710	0.0502	0.059	0.030	0.053
Particulates (PM10)	24 hour	μg/m^3	103.6 (CA) 104.7 (Fed)	92.2 (CA) 90.9 (Fed)	143.6 (CA) 138.0 (Fed)	50	150
	Annual Average	μg/m^3	44.1 (CA) 44.5 (Fed)	40.9 (CA) 41.2 (Fed)	42.6 (CA) 42.6 (Fed)	20	—
Particulates (PM2.5)	24 hour	μg/m^3	83.2 (CA) 83.2 (Fed)	51.4 (CA) 51.4 (Fed)	80.1 (CA) 80.1 (Fed)	—	35
	Annual Average	μg/m^3	17.9 (CA) 17.8 (Fed)	— (CA) 15.8 (Fed)	— (CA) 18.2 (Fed)	12	12

Source: CARB Website, (01/11/2019)
Notes: ppm = parts per million
μg/m^3 = micrograms per cubic meter
— = not reported

4.5 Sensitive Receptors

Some groups of people are more affected by air pollution than others. CARB has identified the following people who are likely to be affected by air pollution: children under 14; the elderly over 65; athletes; and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The proposed project may contain sensitive receptors.

The majority of the potential ambient air quality emissions from this proposed project are related to increases in traffic. The proposed project is not expected to result in localized impacts, such as CO “Hot Spots”, and therefore, is not expected to impact nearby sensitive receptors. Therefore, the impact to sensitive receptors is considered less than significant.

5.0 REGULATORY SETTING

5.1 Air Quality Regulations

Air quality within southern Kern County is addressed through the efforts of various federal, State, and regional and local government agencies. These agencies work together, as well as individually, to improve air quality through legislation, regulations, planning, and policy-making aimed at regulating air pollutants of concern as defined under the Federal Clean Air Act (FCAA) and the California Clean Air Act (CCAA). The agencies and legislation responsible for improving air quality within the SJVAB are discussed below.

Federal

The FCAA governs air quality in the United States and is administered by the U.S. Environmental Protection Agency (EPA). In addition to administering the FCAA, the EPA is also responsible for setting and enforcing the NAAQS for atmospheric pollutants as discussed above. As a part of its enforcement responsibilities, the EPA requires each state with non-attainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution. These measures need to incorporate performance standards and market-based programs that can be met within the timeframe identified in the SIP.

State

CARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs in California. In this capacity, the CARB conducts research, sets CAAQS, compiles emission inventories, develops suggested control measures, and prepares the SIP. For example, the CARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hair spray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. In addition, CARB oversees the functions of the local air pollution control districts and the air quality management districts, which in turn administer air quality at the regional and county level.

Regional

The SJVUAPCD is the primary agency responsible for comprehensive air pollution control in the SJVAB. The SJVUAPCD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines. In addition, the SJVUAPCD is tasked with addressing the State's requirements established under the CCAA (e.g., bringing the SJVAB into attainment).

Local

Local jurisdictions, including Kern County and the Kern Council of Governments (KernCOG), have the authority and responsibility to reduce air pollution through its policies and decision-making authority. Specifically, Kern County is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. As a result, the currently adopted Kern County General Plan and other planning documents identify goals, policies, and implementation measures that help Kern County contribute to efforts to improve regional air quality.

It should be noted that the City has developed a General Plan dated December 2007 containing a Conservation Element which includes applicable goals, objectives, or policies that directly address air quality in the City. The Conservation Element contains objectives that promote the conservation of natural and energy resources as well as energy efficiency and the use of renewable energy resources which would have beneficial effects on the City's air quality.

5.2 Greenhouse Gas Emissions

The regulatory setting related to GHG emissions and global climate change includes international, federal, state, regional, and local governmental agencies and organizations and their respective regulations as discussed below.

International

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change agreement with the goal of controlling GHG emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG in the United States. The plan consists of more than 50 voluntary programs.

Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere, consisting of CFCs, halons, carbon tetrachloride, and methyl chloroform, were to be phased out, with the first three by the year 2000 and methyl chloroform by the year 2005.

Federal

The EPA is responsible for implementing federal policy to address global climate change. The federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the United States. These programs focus on energy efficiency, renewable energy, CH_4, and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions. The EPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In February 2002, the federal government announced a strategy to reduce the GHG intensity of the American economy by 18 percent over the 10-year period from 2002 to 2012. GHG intensity measures the ratio of GHG emissions to economic output. Meeting this commitment will prevent the release of more than 100 million metric tons of carbon-equivalent emissions to the atmosphere (annually) by 2012 and more than 500 million metric tons (cumulatively) between 2002 and 2012. This strategy has three basic objectives: slowing the growth of emissions; strengthening science, technology, and institutions; and enhancing international cooperation.

As discussed above, the EPA is responsible for setting and enforcing the NAAQS for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the EPA have authority to regulate GHG emissions, but the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO_2 and other GHGs as pollutants under the Section 202(a) of the federal Clean Air Act (CAA). The U.S. Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more environmental, renewable energy, and other organizations.

On April 17, 2009, the EPA Administrator signed a proposed endangerment finding that GHGs contribute to air pollution that may endanger public health or welfare. The EPA held a 60-day public comment period during the review of the proposed finding that ended June 23, 2009. During the public comment period, over 380,000 comments were received in the form of written comments and through testimony provided at two public hearings. The EPA reviewed, considered, and incorporated the public comments into the final findings that were issued January 14, 2010.

The EPA's proposed endangerment finding stated that, "In both magnitude and probability, climate change is an enormous problem. The greenhouse gases that are responsible for it endanger both the health and public welfare within the meaning of the Clean Air Act." These findings were based on careful consideration of the full weight of scientific evidence and the public comments that were received.

The specific GHG regulations that have been adopted by the EPA are:

- 40 CFR Part 98. Mandatory Reporting of Greenhouse Gases Rule. This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2e emissions per year. In addition, the reporting of emissions is required of owners of SF6 and PFC-insulated equipment when the total nameplate capacity of these insulating gases is above 17,280 pounds.
- 40 CFR Part 52. Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. This rule was mandated to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose CO_2e emissions exceed 75,000 tons per year.

These rules are not applicable to the proposed project.

State

<u>Assembly Bill 1493</u>

Assembly Bill (AB) 1493 is the successor bill to AB 1058 and was enacted on July 22, 2002 by Governor Gray Davis. AB 1493 mandates that CARB develop and implement GHG limits for vehicles beginning in model Year 2009. Subsequently, as directed by AB 1493, on September 24, 2004, CARB approved regulations limiting the amount of GHG that may be released from new passenger cars, sport utility vehicles, and pickup trucks sold in California in model Year 2009. The automobile industry subsequently sued and claimed AB 1493 was a measure designed to impose gas mileage standards on automobiles. A federal district court ruled on December 12, 2007 that the State and federal laws could co-exist. However, on December 19, 2007, the EPA denied California's request for the necessary waiver to implement its law, claiming that local emissions had little effect on global climate change and that the conditions in California were not "compelling and extraordinary" as required by law. California intends to sue the EPA to force reconsideration, given the precedent of Massachusetts v. EPA[1], which as discussed above, ruled that CO_2 was an air pollutant that the EPA had authority to regulate. Arizona, Colorado, Connecticut, Florida, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Utah, Vermont, and Washington are also interested in adopting California's automobile emissions standards.

[1] Massachusetts v. Environmental Protection Agency, 549 U.S.; 127 S. Ct. 1438 (2007).

Executive Order S-20-04

In December 2004, Governor Schwarzenegger signed Executive Order S-20-04 (The California Green Building Initiative) establishing the State's priority for energy and resource-efficient high performance buildings. The Executive Order sets a goal of reducing energy use in State-owned and private commercial buildings by 20 percent in 2015 using non-residential Title 20 and 24 standards adopted in 2003 as the baseline. The California Green Building Initiative also encourages private commercial buildings to be retrofitted, constructed, and operated in compliance with the State's Green Building Action Plan.

Executive Order S-3-05

In June 2005, Governor Schwarzenegger issued Executive Order S-3-05 that established California's GHG emissions reduction targets. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050. In addition, to meet these reduction targets, the Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate with the Secretary of the Business, Transportation and Housing Agency, the Secretary of the Department of Food and Agriculture, the Secretary of the Natural Resources Agency, the Chairperson of CARB, the Chairperson of the Energy Commission, and the President of the Public Utilities Commission. The Secretary of CalEPA leads this Climate Action Team (CAT) made up of representatives from these agencies as well as numerous other Boards and Departments. The CAT members work to coordinate statewide efforts to implement global warming emission reduction programs and the State's Climate Reduction Strategy. The CAT is also responsible for reporting on the progress made toward meeting the statewide GHG targets that were established in the Executive Order and further defined under the Global Warming Solutions Act of 2006 (Assembly Bill 32).

The first Climate Action Team (CAT) Assessment Report to the Governor and the Legislature was released in March 2006 and will be updated and issued every two years. The 2006 CAT Assessment Report has been followed by the release of the 2008 CAT Assessment Report. The 2008 CAT Assessment Report expands on the policy oriented 2006 CAT Assessment Report and provides new information and scientific findings. A discussion of the GHG emission reduction strategies provided in the 2006 CAT Assessment Report is provided further below.

Assembly Bill 32

The Legislature enacted AB 32, the California Global Warming Solutions Act of 2006 (Nunez, 2006), which Governor Schwarzenegger signed on September 27, 2006 to further the goals of Executive Order S-3-05. AB 32 represents the first enforceable statewide program to limit greenhouse gas emissions from all major industries with penalties for noncompliance. CARB has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. The foremost objective of CARB is to adopt regulations that require the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. The first GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020 (a reduction of approximately 25 percent from forecast emission levels). CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost effective GHG emission reductions. AB 32 allows CARB to adopt market based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market based compliance mechanism adopted. In order to advise CARB, it must convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee. CARB has approved a 2020 emissions limit of 427 metric tons of CO_2 equivalent.

Executive Order S-1-07

On January 18, 2007, California further solidified its dedication to reducing GHGs by setting a new Low Carbon Fuel Standard for transportation fuels sold within the State. Executive Order S-1-07 sets a declining standard for GHG emissions measured CO_2 in equivalent gram per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The Low Carbon Fuel Standard applies to refiners, blenders, producers, and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the “fuel cycle” using the most economically feasible methods. The Executive Order requires the Secretary of the California Environmental Protection Agency to coordinate with actions of the California Energy Commission, CARB, the University of California and other agencies to develop a protocol to measure the “life cycle carbon intensity” of transportation fuels. In response to this Executive Order, CARB identified the Low Carbon Fuel Standard as an early action item with a regulation to be adopted and implemented by 2010.

California Air Pollution Control Officers Association “White Paper”

In January 2008, the California Air Pollution Control Officers Association (CAPCOA) issued a “white paper” (CEQA and Climate Change) on evaluating GHG emissions under CEQA. The CAPCOA “white paper” strategies serve as guidelines and have not been adopted by any regulatory agency. The “white paper” serves as a resource to assist lead agencies in evaluating GHG emissions in environmental information documents. The methodologies used in this GHG emissions analysis are consistent with the CAPOCA guidelines.

The CAPCOA “white paper” specifically includes a disclaimer on the first page that states:

> This paper is intended to serve as a resource, not a guidance document. It is not intended and should not be interpreted, to dictate the manner in which an air district or Lead agency chooses to address GHG emissions in the context of its review of projects under CEQA. This paper has been prepared at a time when California law has been recently amended by the Global Warming Solutions Act of 2006 (AB 32) and the full programmatic implications of this new law are not yet fully understood.

In addition, page 33 of the CAPCOA “white paper” provides the following statement:

> This threshold approach would require a project to meet a percent reduction target based on the average reductions needed from business-as-usual emissions for all GHG sources. Using the 2020 target, this approach would require all discretionary projects to achieve a 33 percent reduction from the projected business-as-usual emission from all GHG sources in order to be considered less than significant.

While significance was not determined based on a hypothetical “business as usual” standards, any mitigation measures identified in a project-specific CEQA analyses will utilize the 29 percent GHG standards identified in AB 32 which establishes a target reduction of GHG emissions to 1990 levels by the year 2020. State and federal regulations are constantly changing as more and more information is made available regarding GHG emissions and their impact on global climate change. Additionally, SB 375 which requires the development of a GHG emission reduction target for specific metropolitan areas have not been identified.

Senate Bill 97

Senate Bill (SB) 97 enacted in 2007 required the California Office of Planning and Research (OPR) to develop amendments to the California Environmental Quality Act (CEQA) Guidelines to address the effects of GHG emissions. OPR was required to prepare and transmit the recommended amendments to the Natural Resources Agency by July 1, 2009. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing GHG emissions as required by SB 97. The recommended amendments were developed to provide guidance to public agencies regarding the analysis of the effects of GHG emissions and mitigation provided in draft CEQA documents.

On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code Section 21083.05. Following a 55-day public review period, including two public hearings and responses to comments, the Natural Resources Agency proposed revisions to the text of the proposed amendments to the CEQA Guidelines.

On December 31, 2009, the Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law. The Office of Administrative Law approved the amendments on February 16, 2010 and filed them with the Secretary of State for inclusion into the California Code of Regulations. The amendments became effective on March 18, 2010.

Assembly Bill 1358

In October 2008, Governor Schwarzenegger signed Assembly Bill 1358 (AB 1358 or the California Complete Streets Act of 2008). AB 1358 requires a city or county's general plan to identify how they will accommodate the circulation of all users of the roadway, including motorists, pedestrians, bicyclists, children, seniors, individuals with disabilities, and users of public transportation. The new general plan provisions would be required when the local government revises their circulation element. The accommodations under AB 1358 may include, but not be limited to, sidewalks, bike lanes, crosswalks, wide shoulders, medians, bus pullouts, and audible pedestrian signals.

Senate Bill 375

Senate Bill 375 (SB 375) enacted in August 2008 requires metropolitan planning organizations (MPOs) to include strategies for sustainable communities in their regional transportation plans. The purpose of SB 375 is to: reduce GHG emission reduction targets from automobiles and light trucks; require CARB to provide GHG emission reduction targets from the automobile and light truck sector for 2020 and 2035 by January 1, 2010; and update the regional targets until 2050. SB 375 requires certain transportation planning and programming activities to be consistent with the sustainable communities strategies contained in the regional transportation plan (RTP). In addition, the SB 375 requires affected regional agencies to prepare an alternative planning strategy to the sustainable communities' strategies if the sustainable communities' strategies are unable to achieve the GHG emission reduction targets.

The timeline for the implementation of SB 375 is as follows:

- January 1, 2009 - CARB adopts AB 32 Scoping Plan that includes the total reduction of carbon in million metric tons from regional transportation planning.
- January 31, 2009 - CARB appoints a Regional Targets Advisory Committee (RTAC) to recommend factors to be considered and methodologies to be used for setting reduction targets.
- September 30, 2009 - The RTAC must report its recommendations to the CARB.
- June 30, 2010 - CARB must provide draft targets for each region to review.
- September 30, 2010 - CARB must provide each affected region with a GHG emissions reduction target.
- October 1, 2010 - Beginning this date, MPOs updating their RTP will begin an eight-year planning cycle that includes the Sustainable Community Strategy (SCS).

Local

Kern Council of Governments

The Kern Council of Governments (KernCOG) is the Metropolitan Planning Organization (MPO) for Kern County. In addition, KernCOG is the Regional Transportation Planning Agency (RTPA) and the agency responsible for the Regional Housing Needs Allocation Plan (RHNA). In these roles, KernCOG is responsible for providing Kern County with the guidance documents identified in SB 375. The guidance documents are being developed in conjunction with and input from all cities within Kern County and the Kern County government. Future land use approvals will be the responsibility of the local governments and, therefore, those agencies would be responsible for ensuring conformance with the Sustainable Community Strategy (SCS) as it relates to the requirements of SB 375 and AB 32.

As discussed above, SB 375 was introduced as a result of AB 32, the climate change legislation signed into California law in 2006. SB 375 builds on the existing regional transportation planning process to connect the reduction of GHG emissions from cars and light trucks to land use and transportation policy. SB 375 requires all MPOs to update their Regional Transportation Plans (RTPs) so that resulting development patterns and supporting transportation networks can reduce GHG emissions by the target amounts set by CARB. Related to this, an additional component of KernCOG's responsibility under SB 375 is the development of a Sustainable Community Strategy (SCS) for Kern County.

KernCOG is working within the timeline and milestones established by the State legislation in SB 375 as discussed above. KernCOG has already initiated the regional planning, housing and transportation planning process into a strategy to meet the requirements of SB 375.

6.0 IMPACTS OF THE PROPOSED PROJECT

This document was prepared using methodology described in the San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD's) *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), March 19, 2015 Revision.

6.1 Thresholds of Significance

Criteria Pollutants

The SJVUAPCD has established the following significance thresholds for criteria pollutants. A proposed project does not have a significant air quality impact unless emissions of criteria pollutants exceed the following thresholds (Table 6-1).

Table 6-1: Significance Thresholds Criteria Pollutants

Pollutant / Precursor	Construction Emissions	Operational Emissions	
		Permitted Equipment and Activities	Non-Permitted Equipment and Activities
	Emissions (tons/year)	Emissions (tons/year)	Emissions (tons/year)
CO	100	100	100
NOx	10	10	10
VOC	10	10	10
SOx	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15

Odors

The proposed project is not a source of odors; however, facilities that are located near the project may be a source of odors. The project is located within the City of Bakersfield, which has varying sized commercial strip malls. Odors from these operations may be apparent on occasion.

CEQA Thresholds of Significance for GHG Emissions and Global Climate Change

There are no thresholds of significance that have been established by the SJVUAPCD for GHG emissions and global climate change. Based on the March 2010 amendments to the *Guidelines for the Implementation of the California Environmental Quality Act* (State CEQA Guidelines), the proposed project could potentially have a significant impact related to GHG and global climate change if it would:

- Generate GHGs, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emission of GHGs.

In order to determine whether or not a proposed project would cause an incremental contribution resulting in a significant effect on global climate change, the incremental contribution of the proposed project must be determined quantitatively and qualitatively by examining the types and levels of GHG emissions that would be generated directly and indirectly and address whether the proposed project would comply with the provisions of an adopted greenhouse reduction plan or strategy. If no such plan or strategy is applicable or has been adopted, the analysis must determine if the proposed project would significantly hinder or delay California's ability to meet the reduction targets contained in Assembly Bill 32 (AB 32). AB 32 sets target emissions and requires that GHG emitted in California be reduced to 1990 levels by the year 2020, which is 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). The year 2020 reduction target equates to a decrease of approximately 29 percent in GHG emissions below year 2020 "business as usual" (BAU) emissions (or approximately 15 percent below the current GHG emissions). "Business as usual" (BAU) conditions are defined based on the year 2005 building energy efficiency, average vehicle emissions, and electricity energy conditions. The BAU conditions assume no improvements in energy efficiency, fuel efficiency, or renewable energy generation beyond that existing today.

6.2 Model Assumptions

Short-term construction emissions and long-term operational emissions were determined utilizing the latest version of the CalEEMod model based on the assumptions summarized below.

<u>Short-term Construction Assumptions</u>

- Construction of the commercial site would take place over one year (from January 2019 to October 2019), consisting of a convenience store with gas pumps.
- The number and type of construction equipment was determined by the CalEEMod defaults based on the size of the proposed project.

<u>Long-term Operational Assumptions</u>

- Operation of the proposed project would begin in 2019.
- Operational emissions were determined for vehicle traffic in and out of a commercial strip mall in each year 2019 through 2035. Maximum operational emissions will occur in 2019 and are equivalent to the emissions calculated using CalEEMod for vehicle traffic in and out of a convenience market with pumps for 2019.

6.3 Short-Term Construction Air Emissions

The implementation of the proposed project would generate short-term increases in air emissions from construction activities that would occur as a result of the proposed project. These construction activities have the potential to result in air emissions that could exceed the SJVUAPCD's thresholds of significance.

The major construction activities that would occur are the following:

- Excavation, earthmoving, and grading for construction of utilities, on-site roads and offsite road improvements, building foundations, building construction, and landscaping.

The construction activities would generate emissions that primarily consist of: fugitive dust (PM10 and PM2.5) from soil disturbance; exhaust emissions (including NOx, SOx, CO, VOC, PM10, and PM2.5) from construction equipment and motor vehicle operation; and the release of VOC emissions during the finishing phase including paving and the application of architectural coatings.

The construction activities that would occur off-site could include: delivery of building materials and supplies to the sites; and the transport of construction employees to and from the sites. The off-site activities would generate emissions that primary consist of VOC, NOx, PM10, PM2.5, and CO from motor vehicle exhaust. The construction emissions would vary substantially from day to day, depending on the level of activity, the specific type of operation, and the climatic conditions.

Table 6-2 provides the annual short-term construction emissions generated by the construction activities. The construction equipment used in the CalEEMod model and the CalEEMod model outputs are included in Exhibit H. As seen in Table 6-2, the annual emissions from the construction activities would not exceed the SJVUAPCD thresholds of significance in any construction year. Therefore, the short-term impacts to regional air quality as a result of the construction will be *less than significant*. Sections 8.1 and 8.2 below provide mitigation set forth in the GAMAQI guidance document and SJVUAPCD's Rules that would further reduce the construction equipment exhaust and PM10 and PM2.5 emission levels.

Table 6-2: Annual Short-term Construction Emissions (2019) After Mitigation

Source	Pollutant (tons/year)						
	VOC	**NO_x**	**CO**	**PM10**	**PM2.5**	**SO_x**	**CO_{2e}**
Construction Emissions	0.09	0.60	0.47	0.04	0.04	0.0008	72.93
Total 2019	**0.09**	**0.60**	**0.47**	**0.04**	**0.04**	**0.0008**	**72.93**
SJVUAPCD Threshold	10	10	100	15	15	27	NA
Is Threshold Exceeded After Mitigation?	**No**	**No**	**No**	**No**	**No**	**No**	**NA**

Notes: VOC = Reactive Organic Gases
CO = Carbon Monoxide
NO_x = Nitrogen Oxides
PM_{10} = Particulate Matter < 10 microns
$PM_{2.5}$ = Particulate Matter < 2.5 microns
SO_x = Sulfur Oxides
Refer to Exhibits for a printout of the computer model used in this analysis.

6.4 Long-Term Operational Air Emissions

The implementation of the proposed project would generate long-term emissions caused by mobile sources (vehicle emissions), from energy consumption (related to heating, cooling, and emergency generator), landscape maintenance, and consumer products. The following provides a discussion of the long-term operational emissions of the proposed project.

The predicted emissions associated with vehicular traffic (mobile sources) are not subject to the SJVUAPCD's permit requirements. However, the SJVUAPCD is responsible for overseeing efforts to improve air quality within the SJVAB. The SJVUAPCD reviews land use changes to evaluate the potential impact on air quality. The SJVUAPCD has established a CEQA significance level for criteria pollutants as shown in Table 6-1.

Operational emissions have been estimated using the CalEEMod computer model. CalEEMod predicts operational emissions of CO, VOC, NO_x, SO_x, PM10, PM2.5 and CO2e associated with new or modified land uses. CalEEMod modeling results are contained in Exhibit H and summarized in Table 6-3 below.

Table 6-3: Annual Long-term Operational Emissions

Source	Pollutant (tons/year)						
	VOC	NO_x	CO	PM10	PM2.5	SO_x	CO_{2e}
2019	1.00	8.96	6.15	0.74	0.22	0.02	1,864.80
SJVUAPCD Threshold	10	10	100	15	15	27	NA
Is Threshold Exceeded After Mitigation?	No	No	No	No	No	No	NA

As seen in Table 6-3, the annual total long-term emissions from the operation of the proposed project will not exceed the SJVUAPCD thresholds of significance. The highest operational emissions occur in 2019, the first year after the development's construction has been completed. Therefore, the long-term impacts to regional air quality from operation of the proposed project will be *less than significant.*

Mobile Source - Carbon Monoxide Local Emissions

CO emissions are a function of vehicle idling time and, thus, under normal meteorological conditions, depend on traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthful levels affecting sensitive receptors (residents, school children, hospital patients, the elderly, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable Level of Service (LOS). CO "Hot Spot" modeling is required if a traffic study reveals that the proposed project will reduce the LOS on one or more streets to E or F; or, if the proposed project will worsen an existing LOS F.

A traffic study was prepared and submitted by Ruettgers & Schuler Civil Engineers that indicates that, with the recommended mitigation measures, the proposed project would not reduce the composite LOS to E or F at any of the three impacted intersections.

- The LOS of the Cottonwood Rd & Watts Dr intersection would improve from a LOS of D to B.
- The LOS of the Cottonwood Rd & E. Planz Rd intersection would not change from a C.
- The LOS of the Cottonwood Rd & E. White Ln intersection would improve from a LOS of D to C.

CO concentrations along this road segment were modeled using Synchro 9 software from Trafficware. Calculated concentrations of CO do not exceed the 1 hour threshold of 20 ppm or the 8 hour threshold of 9.0 ppm.

Therefore, the long-term impacts to local air quality due to CO concentrations will be *less than significant*.

6.5 Potential Effect on Sensitive Receptors

The air quality impact of the proposed project is not likely to affect sensitive receptors. Sensitive receptors are areas where young children, chronically ill individuals, or other individuals more sensitive than the general population are located. Examples of sensitive receptors are schools, day care centers, and hospitals. Some residents in nearby residential areas may also be considered sensitive.

The majority of the potential ambient air quality emissions from this proposed project are related to increases in traffic. As discussed above, the proposed project is not expected to result in localized impacts such as CO "Hot Spots" and, therefore, is not expected to impact nearby sensitive receptors. Therefore, the potential impacts to sensitive receptors will be *less than significant.*

6.6 Odors

The generation of odors is associated with certain types of small commercial sources such as gas stations. The project site is located within the City of Bakersfield, which has a long history of association with the oil and gas industry. Since service stations are regulated by the SJVUAPCD, the incidence of odors from this facility is expected to be less than significant.

6.7 Hazardous Air Pollutants

The proposed project is not a significant source of hazardous air pollutants (HAPS). This facility has the potential to emit HAPs from the operation of gasoline dispensing pumps. The SJVUAPCD has established rules that limit the emissions of HAPs from stationary sources such that the excess cancer risk to the nearest receptor is less than 10 in one million, and the non-carcinogenic Hazard Index is less than 1, therefore the risk to the nearest receptor is expected to be *less than significant*.

6.8 Greenhouse Gas Emissions

In order to determine whether or not a proposed project would cause an incremental contribution resulting in a significant effect on global climate change, the incremental contribution of the proposed project must be determined quantitatively and qualitatively by examining the types and levels of GHG emissions that would be generated directly and indirectly and addressing whether the proposed project would comply with the provisions of an adopted greenhouse reduction plan or strategy. If no such plan or strategy is applicable or has been adopted, the analysis must determine if the proposed project would significantly hinder or delay California's ability to meet the reduction targets contained in AB 32. As discussed above, AB 32 sets target emissions and requires that GHG emitted in California be reduced to 1990 levels by the year 2020, which is 427 million metric tons of carbon dioxide equivalent emissions ($MMTCO_2e$).[2] The year 2020 reduction target equates to a decrease of approximately 29 percent in GHG emissions below year 2020 "business as usual" (BAU) emissions (or approximately 15 percent below the current GHG emissions).

"Business as usual" (BAU) conditions are defined based on the year 2005 building energy efficiency, average vehicle emissions, and electricity energy conditions. The BAU conditions assume no improvements in energy efficiency, fuel efficiency, or renewable energy generation beyond that existing today. Specifically, BAU conditions do not include future General Plan goals, policies, or implementation measures that address GHG emissions, GHG reduction strategies included in the 2006 CAT assessment Report, CARB's expanded list of Early Action Measures to Reduce GHG Emissions in California, or mitigation provided by the California Attorney General's Office.

[2] GHG emissions other than CO_2 are commonly converted into CO_2 equivalents that take into account the differing GWP of different gases.

Short-Term Construction GHG Emissions

The implementation of the proposed project would generate short-term increases in air emissions from construction activities that would occur as a result of the proposed development. These construction activities have the potential to generate GHG Emissions of CO_2, CH_4, and N_2O primarily from vehicle and construction equipment. The other GHG emissions defined under AB 32, which include HFCs, PFCs, and SF_6, would only consist of trace emissions, if any, during construction associated with the proposed project.

The major construction activities that would occur are the following:

- Land clearing and grading
- Excavation, earthmoving, and grading for construction of utilities, on-site and off-site roads, parking areas, building foundations, and landscape
- Building construction
- Asphalt paving of on-site roadways
- Application of architectural coatings

The construction activities would generate: dust emissions primarily from soil disturbance; exhaust emissions from construction equipment and motor vehicle operation; and the release of emissions during the finishing phase including paving and the application of architectural coatings.

The construction activities that would occur off-site could include: delivery of building materials and supplies to the sites; and the transport of construction employees to and from the sites. The construction emissions would vary substantially from day to day, depending on the level of activity, the specific type of operation, and the climatic conditions.

It is anticipated that future construction activities associated with the proposed project would have the potential to result in short-term increases in air emissions during construction activities that would generate GHG emissions that could contribute to global climate change.

The CalEEMod model was used to estimate the GHG emissions due to construction activities as a result of the proposed project with “business as usual” conditions. The CalEEMod outputs are included in Exhibit H for reference and summarized in Table 6-2 above. The construction activities for the proposed project would generate a maximum of 73 metric tons per year of CO_2e of GHG emissions. This represents 0.00002 percent of the 2016 GHG emissions in the State of California (which is 429,400,000 metric tons of CO_2e). Therefore, the GHG emissions as a result of the proposed project will be *less than significant.*

Long-Term Operational GHG Emissions

It is anticipated that the operation of the proposed project would have the potential to result in long-term increases in air emissions that would generate GHGs that could contribute to global climate change. The majority of the long-term GHG emissions would be generated by motor vehicles traveling to and from the project site. Area source emissions would result from fuel combustion, landscape maintenance equipment, and consumer products. The daily operational activities as a result of the proposed project would have the potential to generate GHG emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Since there is an international ban on CFCs, it is not anticipated that this GHG would occur. SF_6 is primarily used in electronics manufacturing and as an insulation medium in large electrical transformers. It is not anticipated that there will be SF_6 emissions from the proposed project.

The CalEEMod model was used to estimate the GHG emissions due to mobile source emissions and area source emissions as a result of the proposed project with "business as usual" conditions. The outputs are included in Exhibit H and summarized in Table 6-3 above. It can be seen that the operation of the proposed project based on "business as usual" conditions" would result in 1,778 metric tons per year of CO_2e of GHG emissions. This represents 0.0004 percent of the CO_2e of 2016 GHG emissions in the State of California (which is 429,400,000 metric tons of CO_2e).[3] Therefore, the GHG emissions as a result of the proposed project will be *less than significant*.

Mitigation from the California Attorney General's Office

The Office of the California Attorney General maintains a list of "CEQA Mitigations for Global Warming Impacts" on their website. This list, which is not intended to be exhaustive, includes examples of types of mitigation measures and policies that local agencies may consider offsetting or reducing impacts related to global climate change. The Attorney General's Office acknowledges that the measures cited may not be appropriate for every project and that the lead agency undertaking a CEQA analysis should use its own informed judgment in deciding which measures it would analyze and which measure it would require for a given project. These include measures that are "Generally Applicable" in the areas of energy efficiency, renewable energy, water conservation and efficiency, solid waste measures, land use measures, transportation and motor vehicles, and carbon offsets.

The proposed project would incorporate the applicable measures and policies provided by the Attorney General's Office. This includes energy efficiency, water conservation and efficiency, solid waste recycling, and access to transit. Therefore, the proposed project would comply with the applicable mitigation provided by the Attorney General's Office and impacts are considered to be *less than significant*.

7.0 CUMULATIVE IMPACTS

The GAMAQI, under CEQA, defines cumulative impacts as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The document also states that *"if a project is significant based on the thresholds of significance for criteria pollutants, then it is also cumulatively significant. If the combined impacts of such projects cause or worsen an exceedance of the concentration standards, the project would have a cumulatively significant impact under CEQA."*

Regionally, the SJUAPCD has annual VOC emissions of 302,200 tons and annual NO_x emissions of 223,800 tons from all sources. The proposed project represents approximately 0.003% of the VOC and 0.004% of the NO_x emissions in the SJVUAPCD. These amounts are not individually considerable because emissions within the SJVAB will be essentially the same regardless of whether or not the proposed project is built.

As stated in page 22 of the SJVUAPCD CEQA Guidelines, "a project's potential contribution to cumulative impacts shall be assessed utilizing the same significance criteria as those for project specific impacts." Since the proposed project would not have a significant long-term air

[3] California Air Resources Board, 2016 GHG Inventory, *California Greenhouse Gas Inventory (millions of metric tonnes of CO2 equivalent) — By IPCC Category,* Updated July 11, 2018

quality impact, the proposed project would not have a significant cumulative impact to regional air quality. Therefore, the cumulative impacts to the regional air quality with implementation of the proposed project would be *less than significant.*

Hazardous Air Pollutants (HAPs)

The GAMAQI also states that when evaluating potential impacts related to HAPs, *"impacts of local pollutants (CO, HAPs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards."* The proposed project does not have significant sources of HAPs. Therefore, the cumulative impact as a result of HAPs would be *less than significant*.

Carbon Monoxide (CO) from Mobile Sources

Elevated CO concentrations are often localized due to heavy traffic volumes and congestion. This localized impact can result in elevated levels of CO or "Hot Spots" even though concentrations at the closest air quality monitoring station may be below state and federal standards. The GAMAQI has established that preliminary screening can be used to determine, with fair or reasonable certainty, that the effect a proposed project has on any specific intersection would not cause a potential CO Hot Spot. The GAMAQI has, therefore, established two criteria by which this pre-screening can be conducted.

As noted in section 6.4, the proposed project will not have a significant impact on the LOS at any intersection or road segment. Therefore, the cumulative impact as a result of CO emissions is *less than significant*.

8.0 EMISSION REDUCTION MEASURES

The proposed project generates air pollutant emissions associated with the construction and operation of the proposed project. Based on the analysis provided above, the potential impacts of the proposed project would be less than significant. However, to further reduce the emissions associated with the construction of the proposed project, the project will implement the following reduction measures.

8.1 Reduction Measures for Construction Equipment Exhaust

The construction activities for the proposed project shall incorporate the following measures stated in the GAMAQI guidance document as approved mitigation to reduce exhaust emissions from construction equipment:

- Properly and routinely maintain all construction equipment, as recommended by manufacturer manuals, to control exhaust emissions.
- Shut down equipment when not in use for extended periods of time to reduce emissions associated with idling engines.
- Encourage ride sharing and use of transit transportation for construction employee commuting to the project sites.
- Use electric equipment for construction whenever possible in lieu of fossil fuel-fired equipment.

8.2 Reduction Measures for Fugitive Dust Emissions

The construction activities for the proposed project shall incorporate the following measures set forth by the SJVUAPCD Fugitive Dust rules to reduce fugitive dust emissions during grading and construction:

- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover, or vegetative ground cover.
- All onsite unpaved roads and offsite-unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- When materials are transported offsite, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.

9.0 REFERENCES

California Air Resources Board (CARB), website for background information, http://www.arb.ca.gov/

California Department of Transportation (Caltrans), *Transportation Project-Level Carbon Monoxide Protocol,* December 1997.

Caltrans, *Caltrans Interim Guidance: Project-Level* PM_{10} *Hot-Spot Analysis,* February 2000.

County of Kern, Planning Department, *County of Kern Housing Element 2002-2007*, Adopted September 10, 2002.

Kern Council of Governments (KernCOG), *Final Conformity Analysis for the 2006 Federal Transportation Improvement Program (TIP) and 2004 Regional Transportation Plan (RTP),* July 20, 2006

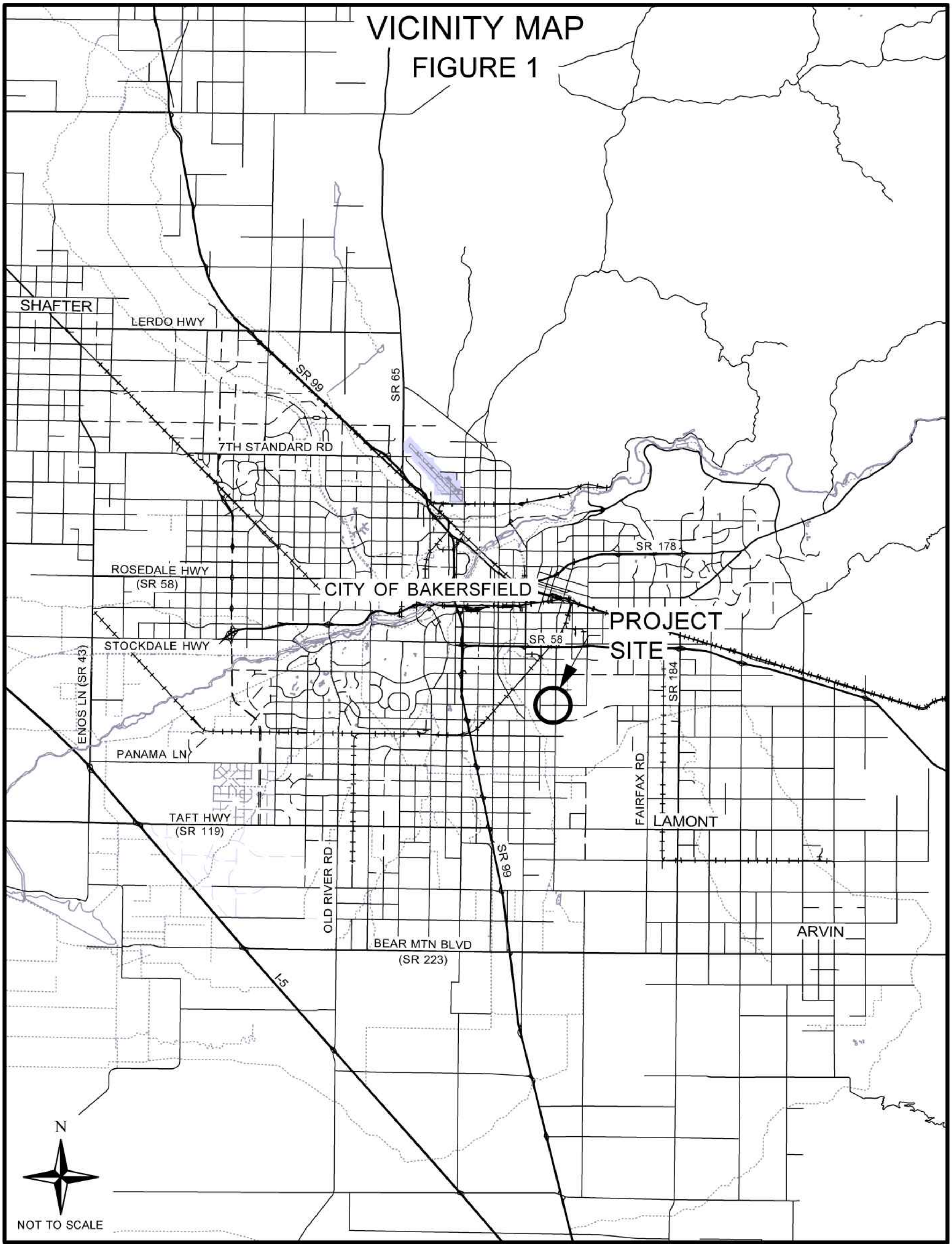
KernCOG, *2000 Regional Housing Allocation Plan*, Adopted May 17, 2001

San Joaquin Valley Unified APCD, *Guidelines for Implementation of the California Environmental Quality Act (CEQA) of 1970*, as amended, July 1, 1999

SJVUAPCD, *Guide for Assessing and Mitigating Air Quality Impacts,* March 19, 2015.

EXHIBIT A

LOCATION MAP



RUETTGERS & SCHULER CIVIL ENGINEERS

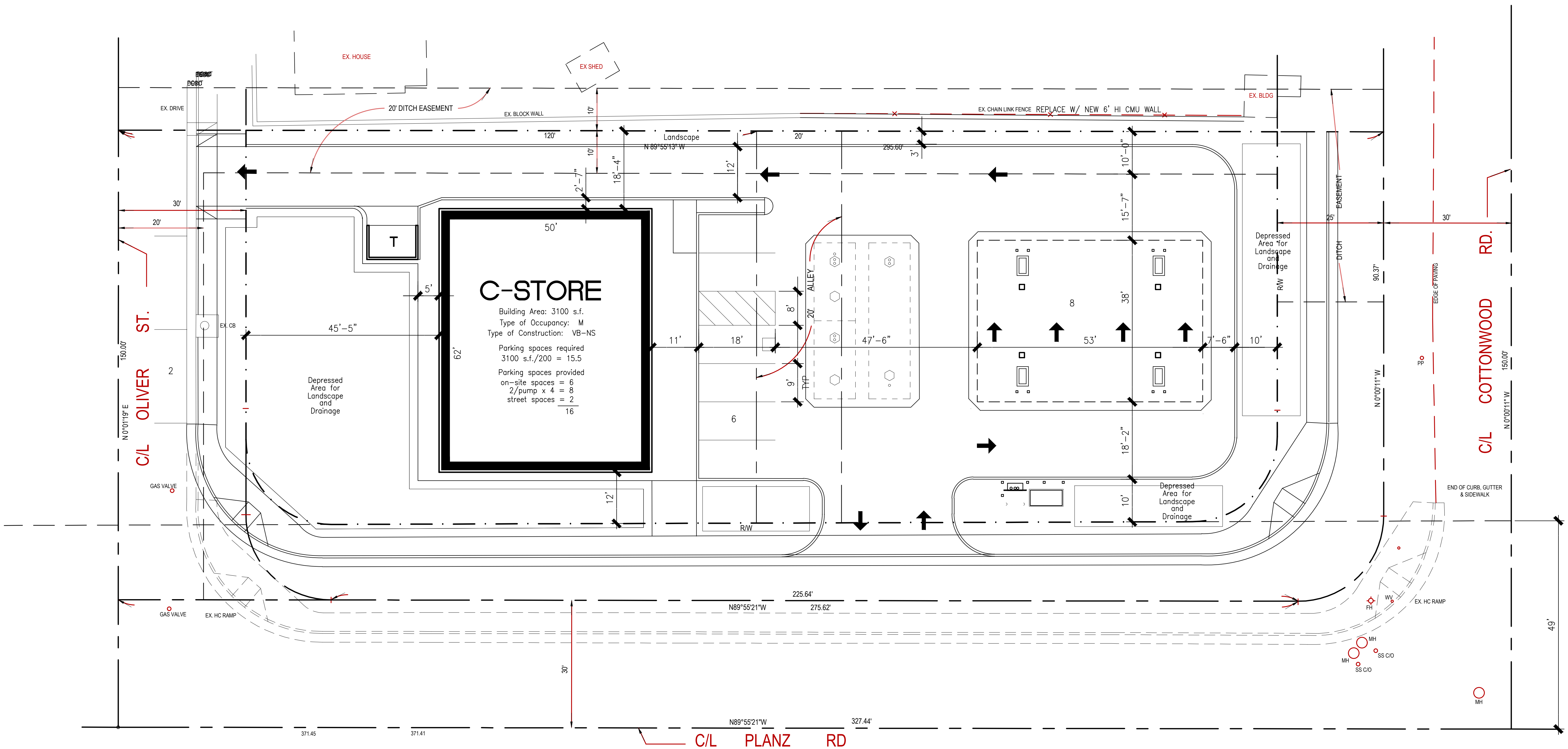
EXHIBIT B

PROJECT LOCATION MAP


LOCATION MAP
FIGURE 2
Watts Dr
Madison Ave
Cottonwood Rd
Project Site
Planz Rd
Oliver St
White Ln
N
NOT TO SCALE
LEGEND
EXISTING ROAD
FUTURE ROAD

EXHIBIT C

PROJECT SITE PLAN



SITE PLAN

GILMAR Construction Inc
Design–Construction Services

Gilbert M. Wong
Architect
C 12967

LICENSED ARCHITECT GILBERT M. WONG C-12967 8-31-2019 RENEWAL DATE STATE OF CALIFORNIA

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BAKERSFIELD, CA
93309–1416
(661) 631 2254
Fax (661) 631 2254
gmwarchitect@yahoo.com

10' 20' 40'

N

1" = 20'-0"

EXHIBIT D

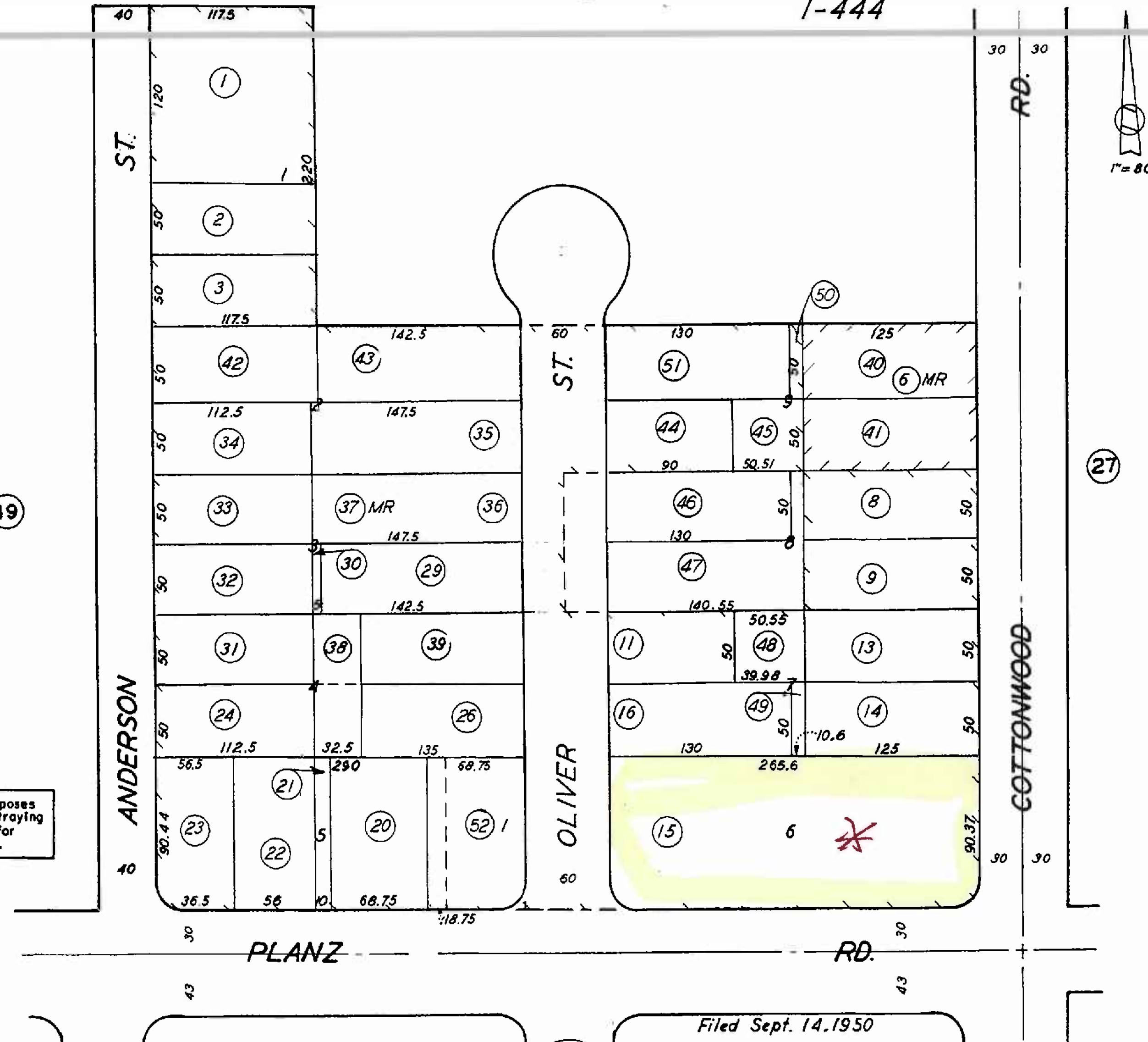
ASSESSOR’S PARCEL MAP

170-20

TRACT 1574
PTN. OF SE 1/4 OF SE 1/4 OF SE 1/4 OF SEC. 8 T. 30 S. R. 28 E.

SCHOOL DIST.
1-440
1-442
1-444

170-20

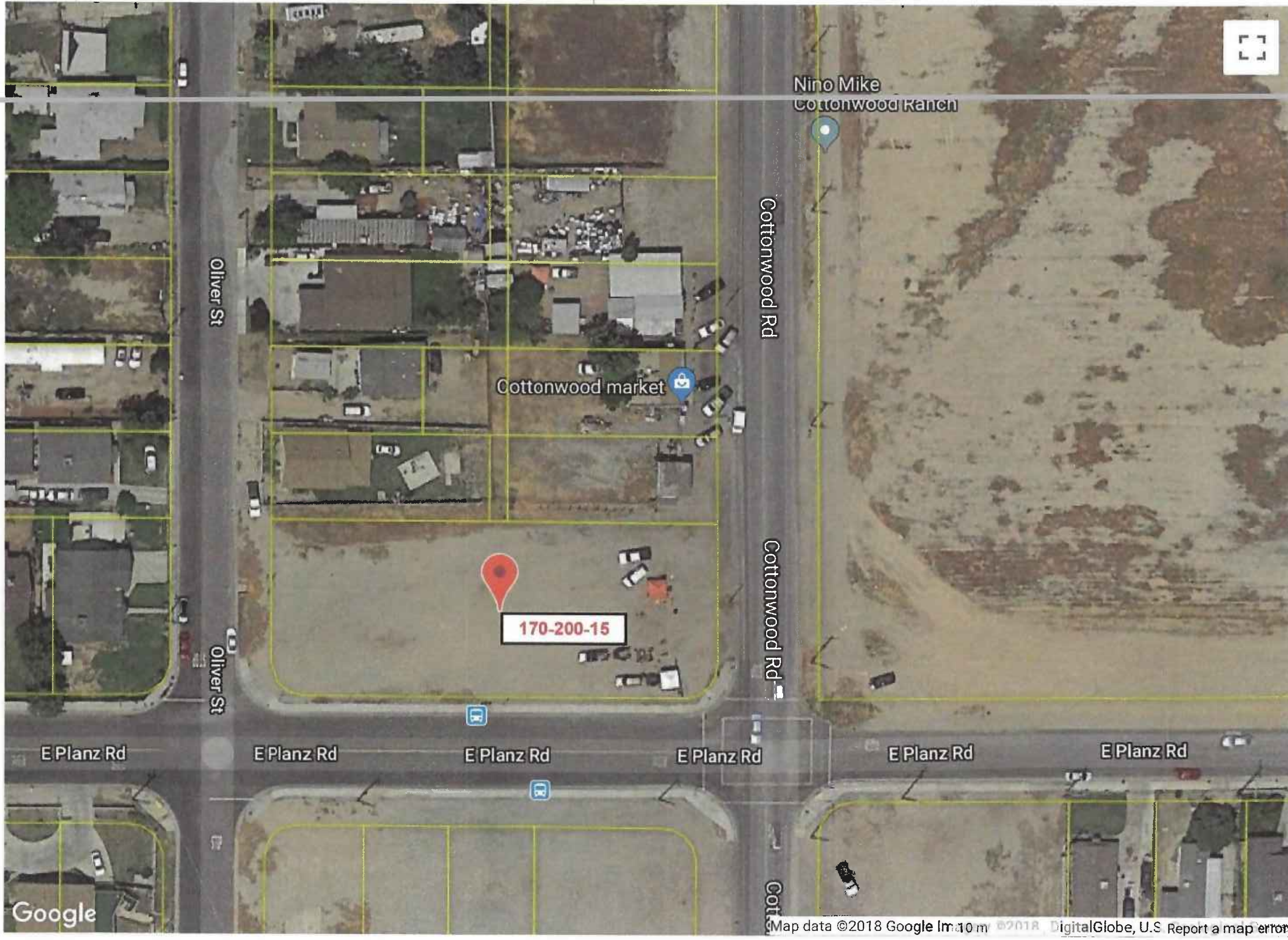


Revised: Feb 16, 2006

Note: This map is for assessment purposes only. It is not to be construed as portraying legal ownership or divisions of land for purposes of zoning or subdivision law.

ASSESSORS MAP NO. 170-20
COUNTY OF KERN

Search: Search Box



Search: Search Box

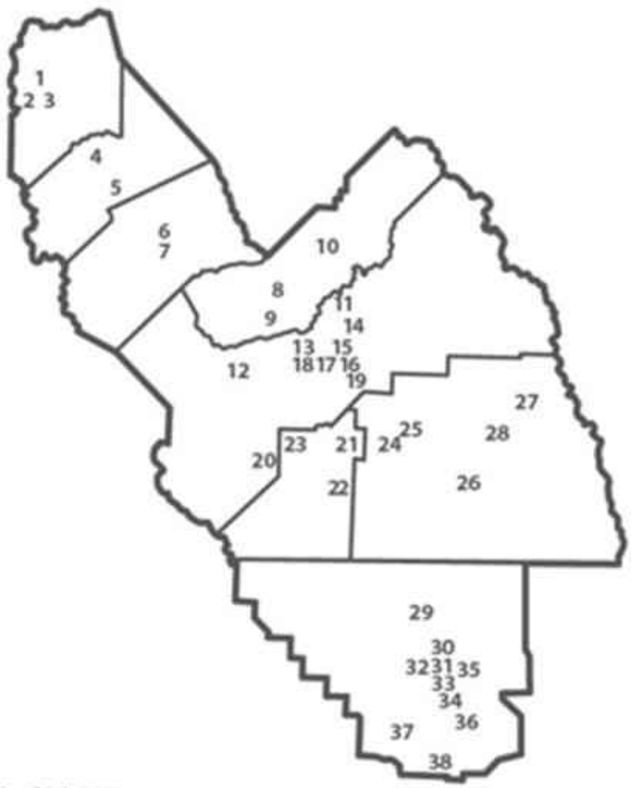
Select Maps
Map Layers
Map
Imagery 2014
Imagery 2013
Imagery 2010
Imagery 2008
R-S
R-2
C-2
R-2-MH
CITY OF BAKERSFIELD
E PLANZ RD


Select Maps
Map Layers
Map
Imagery 2014
Imagery 2013
Imagery 2010
Imagery 2008
SR
CITY OF BAKERSFIELD
LMR
GC
E PLANZ RD
COTTONWOOD RD
ANDERSON ST
OLIVER ST
HORN ST
HALE ST

EXHIBIT E

AIR BASIN MONITORING STATIONS

Air Monitoring Sites in Operation



As of July 2018

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

SAN JOAQUIN COUNTY
- ■ 1 Stockton-Hazelton: G, M, P, F, T
- ★ 2 Tracy-Airport: G, M, P, F
- ★ 3 Manteca: P, F, M

STANISLAUS COUNTY
- ■ 4 Modesto-14th St: G, M, P, F
- ★ 5 Turlock: G, M, P, F

MERCED COUNTY
- ★ 6 Merced-M St: P, F
- ★ 7 Merced-Coffee: G, F, M

MADERA COUNTY
- ★ 8 Madera City: G, P, F, M
- ★ 9 Madera-Pump Yard: G, M

Other[1]:
Chukchansi Indians
- ▲ 10 Picayune Rancheria: G, F, P, M

FRESNO COUNTY

Other[1]:
Monache Tribe/Foothill Yokut Indians
- ▲ 11 Table Mountain AMS*: G, F, P, M
- ★ 12 Tranquillity: G, F, M
- ★ 13 Fresno-Sky Park: G, M
- ★ 14 Clovis: G, M, P, F
- ■ 15 Fresno-Garland: G, M, P, F, T, N, L
- ★ 16 Fresno-Pacific: F
- ★ 17 Fresno-Drummond: G, P, M
- ★ 18 Fresno-Foundry Park Ave: G, M
- ★ 19 Parlier: G, M
- ★ 20 Huron: F, M

KINGS COUNTY
- ★ 21 Hanford: G, F, M, P
- ★ 22 Corcoran: F, M, P

Other[1]:
Tachi Yokut Tribe
- ▲ 23 Santa Rosa Rancheria: G, M, P

TULARE COUNTY
- ★ 24 Visalia Airport: M
- ■ 25 Visalia-Church St: G, F, M, P
- ★ 26 Porterville: G, F, M

Other[2]:
- ▲ 27 Lower Kaweah: A, G, M
- ▲ 28 Ash Mountain: A, G, M, F

KERN COUNTY
- ● 29 Shafter: G, M
- ■ 30 Oildale: G, M, P
- ★ 31 Bakersfield-Golden/M St: F, P
- ■ 32 Bakersfield-Calif Ave: A, G, M, P, F, T
- ★ 33 Bakersfield-Muni: G, M
- ■ 34 Bakersfield-Airport (Planz): F
- ■ 35 Edison: G, M
- ■ 36 Arvin-Di-Giorgio: G, M
- ★ 37 Maricopa: G, M
- ★ 38 Lebec: F, M

MONITORING DESIGNATIONS

A	Acid Deposition	P	Particulate (PM10)
F	Fine Particulate (PM2.5)	N	National Core
G	Gaseous	T	Toxins
M	Meteorological	L	Lead

MONITORING OPERATION
- ★ Sites operated by the District
- ● Sites operated by the District & CARB
- ■ Sites operated by CARB
- ▲ Sites operated by other agencies
  - Other[1] Tribal
  - Other[2] National Park Service
- * Air Monitoring Station (AMS)

Source: http://www.valleyair.org/aqinfo/MonitoringSites.htm, 07/2018

EXHIBIT F

TOPOGRAPHIC MAP


BM USED: CITY OF BAKERSFIELD
TOP MON;T IN WELL AT
INTERSECTION OF PLANZ RD.
AND COY ST. EL= 372.68
EX. HOUSE
EX SHED
EX. BLDG
EX. DRIVE
20' DITCH EASEMENT
EX. BLOCK WALL
EX. CHAIN LINK FENCE
EASEMENT
DITCH
ALLEY
R/W
EDGE OF PAVING
EX. CB
GAS VALVE
EX. HC RAMP
EX. CURB, GUTTER
& SIDEWALK
END OF CURB, GUTTER
& SIDEWALK
N 89°55'13" W
295.60'
N89°55'21"W
275.62'
225.64'
N89°55'21"W
327.44'
N 0°01'19" E
150.00'
N 0°00'11" W
150.00'
90.37'
Δ = 89°56'40"
R = 20.00'
T = 19.98'
L = 31.40'
Δ = 90°04'50"
R = 20.00'
T = 20.03'
L = 31.44'
C/L OLIVER ST.
C/L COTTONWOOD RD.
C/L PLANZ RD
FD CONC. MON IN WELL
370.12
FD CONC. MON. IN WELL
369.89

EXHIBIT G

AIR MONITORING STATION DATA

Air Monitoring Stations:

AQS Number	ARB Number	Site Start Date	Reporting Agency and Agency Code*
060290016	15258	02-18-2000	California Air Resources Board (001)

Site Address	County	Air Basin	Latitude (N)	Longitude (W)	Elevation (m)
410 E. Planz Rd., Bakersfield CA 93307	Kern	San Joaquin Valley	35.32464	-118.99763	115

AQS Number	ARB Number	Site Start Date	Reporting Agency and Agency Code*
060290014	15255	03-01-1994	California Air Resources Board (001)

Site Address	County	Air Basin	Latitude (N)	Longitude (W)	Elevation (m)
5558 California Ave, Bakersfield CA 93309	Kern	San Joaquin Valley	35.35662	-119.06261	119

NOx Emissions Data (2015-2017)

Kern County
Annual Oxides of Nitrogen Summary Data
2016
Parts Per Million (ppm)

Basin	County	Monitoring Site	Annual Maximum	
			1-Hr Maximum	1-Day Average
SJV	Kern	Bakersfield-5558 California Avenue	0.1675	0.0744
SJV	Kern	Bakersfield-Municipal Airport	0.1422	0.0502
SJV	Kern	Edison	0.0631	0.0243
SJV	Kern	Shafter-Walker Street	0.1184	0.0422

Get Additional Information on Sites

Kern County
Annual Oxides of Nitrogen Summary Data
2015
Parts Per Million (ppm)

Basin	County	Monitoring Site	Annual Maximum	
			1-Hr Maximum	1-Day Average
SJV	Kern	Bakersfield-5558 California Avenue	0.2051	0.0971
SJV	Kern	Bakersfield-Municipal Airport	0.1762	0.0710
SJV	Kern	Edison	0.1347	0.0226
SJV	Kern	Shafter-Walker Street	0.1209	0.0481

Get Additional Information on Sites

Kern County
Annual Oxides of Nitrogen Summary Data
2017
Parts Per Million (ppm)

Basin	County	Monitoring Site	Annual Maximum	
			1-Hr Maximum	1-Day Average
SJV	Kern	Bakersfield-5558 California Avenue	0.215	0.098
SJV	Kern	Bakersfield-Municipal Airport	0.175	0.059
SJV	Kern	Edison	0.111	0.016
SJV	Kern	Shafter-Walker Street	0.098	0.040

Get Additional Information on Sites

Source: California Air Resources Board (CARB), website for air quality monitoring information, http://www.arb.ca.gov/aqmis2.

Top 4 Summary: Highest 4 Daily 24-Hour PM10 Averages

at Bakersfield-5558 California Avenue

	2015		2016		2017	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Sep 9	104.7	Feb 12	90.9	Dec 15	138.0
Second High:	Jan 6	97.7	Sep 9	79.9	Dec 9	106.7
Third High:	Oct 9	82.3	Nov 8	79.5	Dec 27	94.9
Fourth High:	Nov 14	78.1	Oct 22	71.4	Oct 17	90.9
California:						
First High:	Jan 6	103.6	Feb 12	92.2	Dec 15	143.6
Second High:	Sep 9	99.6	Nov 8	80.6	Dec 9	112.1
Third High:	Oct 9	80.1	Sep 9	78.1	Dec 27	99.5
Fourth High:	Nov 14	79.1	Dec 20	72.2	Oct 17	90.9
National:						
Estimated # Days > 24-Hour Std:		0.0		0.0		0.0
Measured # Days > 24-Hour Std:		0		0		0
3-Yr Avg Est # Days > 24-Hr Std:		*		*		0.0
Annual Average:		*44.5*		*41.2*		*42.6*
3-Year Average:		*50*		*46*		*43*
California:						
Estimated # Days > 24-Hour Std:		121.4		121.4		98.7
Measured # Days > 24-Hour Std:		20		21		16
Annual Average:		44.1		40.9		42.6
3-Year Maximum Annual Average:		44		44		44
Year Coverage:		99		97		98

Notes:

Daily PM10 averages and related statistics are available at Bakersfield-5558 California Avenue between 1994 and 2017. Some years in this range may not be represented.

All averages expressed in micrograms per cubic meter.

The national annual average PM10 standard was revoked in December 2006 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .

An exceedance of a standard is not necessarily related to a violation of the standard.

All values listed above represent midnight-to-midnight 24-hour averages and may be related to an exceptional event.

State and national statistics may differ for the following reasons:

- State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
- State statistics for 1998 and later are based on local conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on local conditions). National statistics are based on standard conditions.
- State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.

3-Year statistics represent the listed year and the 2 years before the listed year.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Top 4 Summary: Highest 4 Daily 24-Hour PM2.5 Averages

at Bakersfield-410 E Planz Road

	2015		2016		2017	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Jan 9	83.2	Dec 29	51.4	Dec 30	80.1
Second High:	Jan 6	64.3	Jan 1	50.7	Dec 15	73.6
Third High:	Nov 14	56.5	Dec 20	47.7	Dec 12	69.7
Fourth High:	Jan 18	52.9	Nov 8	44.5	Dec 24	69.7
California:						
First High:	Jan 9	83.2	Dec 29	51.4	Dec 30	80.1
Second High:	Jan 6	64.3	Jan 1	50.7	Dec 15	73.6
Third High:	Nov 14	56.5	Dec 20	47.7	Dec 12	69.7
Fourth High:	Jan 18	52.9	Nov 8	44.5	Dec 24	69.7
National:						
Estimated # Days > 24-Hour Std:		38.0		*		32.2
Measured # Days > 24-Hour Std:		13		7		10
24-Hour Standard Design Value:		77		61		59
24-Hour Standard 98th Percentile:		56.5		50.7		69.7
2006 Annual Std Design Value:		20.8		18.4		17.3
2013 Annual Std Design Value:		20.8		18.4		17.3
Annual Average:		17.8		15.8		18.2
California:						
Annual Std Designation Value:		18		18		18
Annual Average:		17.9		*		*
Year Coverage:		94		86		86

Notes:

Daily PM2.5 averages and related statistics are available at Bakersfield-410 E Planz Road between 2000 and 2017. Some years in this range may not be represented.

All averages expressed in micrograms per cubic meter.

An exceedance of a standard is not necessarily related to a violation of the standard.

State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

EXHIBIT H

CALEEMOD EMISSION MODELING

GIL100 - Operational 2019

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	24.52	1000sqft	0.56	24,521.00	0
Convenience Market (24 Hour)	2.78	1000sqft	0.06	2,784.00	0
Convenience Market With Gas Pumps	8.00	Pump	0.03	1,129.40	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Demo not required. Expected construction time frame.

Mobile Land Use Mitigation -

Area Mitigation -

Water Mitigation -

Vehicle Trips - Based on Traffic Study-vehicle trip ADT 322.5 for 'Convenience Market and Pumps', which uses a factor of 29.09 (IDT Table 1: Trip Generation for Land Use Code 853). The 'Convience Market' factor is 21.49, so the ADT for the 'Convenience Market' is 238.24. The Sat/Sun Trip Rate was not determined, so the WkDy Trip Rate was used to be conservative.

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblVehicleTrips	ST_TR	863.10	238.24
tblVehicleTrips	ST_TR	204.47	322.50
tblVehicleTrips	SU_TR	758.45	238.24
tblVehicleTrips	SU_TR	166.88	322.50
tblVehicleTrips	WD_TR	737.99	238.24
tblVehicleTrips	WD_TR	542.60	322.50

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	5.6000e-004	4.7300e-003	4.0700e-003	1.0000e-005	4.0000e-005	3.1000e-004	3.5000e-004	1.0000e-005	3.0000e-004	3.1000e-004	0.0000	0.5686	0.5686	1.0000e-004	0.0000	0.5712
2019	0.0938	0.6027	0.4739	8.1000e-004	8.3300e-003	0.0351	0.0435	2.4200e-003	0.0325	0.0349	0.0000	72.4553	72.4553	0.0189	0.0000	72.9278
Maximum	**0.0938**	**0.6027**	**0.4739**	**8.1000e-004**	**8.3300e-003**	**0.0351**	**0.0435**	**2.4200e-003**	**0.0325**	**0.0349**	**0.0000**	**72.4553**	**72.4553**	**0.0189**	**0.0000**	**72.9278**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	5.6000e-004	4.7300e-003	4.0700e-003	1.0000e-005	4.0000e-005	3.1000e-004	3.5000e-004	1.0000e-005	3.0000e-004	3.1000e-004	0.0000	0.5686	0.5686	1.0000e-004	0.0000	0.5712
2019	0.0938	0.6027	0.4739	8.1000e-004	8.3300e-003	0.0351	0.0435	2.4200e-003	0.0325	0.0349	0.0000	72.4552	72.4552	0.0189	0.0000	72.9277
Maximum	**0.0938**	**0.6027**	**0.4739**	**8.1000e-004**	**8.3300e-003**	**0.0351**	**0.0435**	**2.4200e-003**	**0.0325**	**0.0349**	**0.0000**	**72.4552**	**72.4552**	**0.0189**	**0.0000**	**72.9277**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**12-31-2018**	**3-30-2019**	0.3606	0.3606
2	**3-31-2019**	**6-29-2019**	0.3370	0.3370
		Highest	0.3606	0.3606

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0201	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004
Energy	2.3000e-004	2.0500e-003	1.7200e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	14.0096	14.0096	5.8000e-004	1.5000e-004	14.0690
Mobile	0.9837	8.9601	6.1507	0.0197	0.7207	0.0236	0.7443	0.1939	0.0224	0.2163	0.0000	1,838.1444	1,838.1444	0.2940	0.0000	1,845.4940
Waste						0.0000	0.0000		0.0000	0.0000	1.6950	0.0000	1.6950	0.1002	0.0000	4.1992
Water						0.0000	0.0000		0.0000	0.0000	0.0919	0.6366	0.7284	9.4600e-003	2.3000e-004	1.0332
Total	**1.0041**	**8.9621**	**6.1527**	**0.0197**	**0.7207**	**0.0238**	**0.7445**	**0.1939**	**0.0225**	**0.2165**	**1.7868**	**1,852.7912**	**1,854.5780**	**0.4042**	**3.8000e-004**	**1,864.7961**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0190	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004
Energy	2.3000e-004	2.0500e-003	1.7200e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	14.0096	14.0096	5.8000e-004	1.5000e-004	14.0690
Mobile	0.9728	8.8250	5.9454	0.0188	0.6575	0.0223	0.6798	0.1769	0.0211	0.1980	0.0000	1,751.1594	1,751.1594	0.2915	0.0000	1,758.4470
Waste						0.0000	0.0000		0.0000	0.0000	1.6950	0.0000	1.6950	0.1002	0.0000	4.1992
Water						0.0000	0.0000		0.0000	0.0000	0.0919	0.6255	0.7174	9.4600e-003	2.3000e-004	1.0221
Total	**0.9920**	**8.8270**	**5.9474**	**0.0188**	**0.6575**	**0.0224**	**0.6799**	**0.1769**	**0.0213**	**0.1982**	**1.7868**	**1,765.7951**	**1,767.5820**	**0.4017**	**3.8000e-004**	**1,777.7381**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.20**	**1.51**	**3.34**	**4.76**	**8.77**	**5.56**	**8.67**	**8.77**	**5.60**	**8.44**	**0.00**	**4.70**	**4.69**	**0.61**	**0.00**	**4.67**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/31/2018	1/11/2019	5	10	Demo not required
2	Site Preparation	Site Preparation	1/12/2019	1/14/2019	5	1	
3	Grading	Grading	1/15/2019	1/16/2019	5	2	
4	Building Construction	Building Construction	1/17/2019	6/5/2019	5	100	
5	Paving	Paving	6/6/2019	6/12/2019	5	5	
6	Architectural Coating	Architectural Coating	6/13/2019	6/19/2019	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.56

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 5,870; Non-Residential Outdoor: 1,957; Striped Parking Area: 1,471 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	12.00	5.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.3000e-004	4.7100e-003	3.8900e-003	1.0000e-005		3.1000e-004	3.1000e-004		3.0000e-004	3.0000e-004	0.0000	0.5304	0.5304	1.0000e-004	0.0000	0.5330
Total	**5.3000e-004**	**4.7100e-003**	**3.8900e-003**	**1.0000e-005**		**3.1000e-004**	**3.1000e-004**		**3.0000e-004**	**3.0000e-004**	**0.0000**	**0.5304**	**0.5304**	**1.0000e-004**	**0.0000**	**0.5330**

3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	1.9000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0382	0.0382	0.0000	0.0000	0.0382
Total	**3.0000e-005**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0382**	**0.0382**	**0.0000**	**0.0000**	**0.0382**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.3000e-004	4.7100e-003	3.8900e-003	1.0000e-005		3.1000e-004	3.1000e-004		3.0000e-004	3.0000e-004	0.0000	0.5304	0.5304	1.0000e-004	0.0000	0.5330
Total	**5.3000e-004**	**4.7100e-003**	**3.8900e-003**	**1.0000e-005**		**3.1000e-004**	**3.1000e-004**		**3.0000e-004**	**3.0000e-004**	**0.0000**	**0.5304**	**0.5304**	**1.0000e-004**	**0.0000**	**0.5330**

3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	1.9000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0382	0.0382	0.0000	0.0000	0.0382
Total	**3.0000e-005**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0382**	**0.0382**	**0.0000**	**0.0000**	**0.0382**

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.2900e-003	0.0387	0.0346	5.0000e-005		2.4200e-003	2.4200e-003		2.3100e-003	2.3100e-003	0.0000	4.7341	4.7341	9.0000e-004	0.0000	4.7567
Total	**4.2900e-003**	**0.0387**	**0.0346**	**5.0000e-005**		**2.4200e-003**	**2.4200e-003**		**2.3100e-003**	**2.3100e-003**	**0.0000**	**4.7341**	**4.7341**	**9.0000e-004**	**0.0000**	**4.7567**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3334	0.3334	1.0000e-005	0.0000	0.3337
Total	**2.1000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3334**	**0.3334**	**1.0000e-005**	**0.0000**	**0.3337**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.2900e-003	0.0387	0.0346	5.0000e-005		2.4200e-003	2.4200e-003		2.3100e-003	2.3100e-003	0.0000	4.7341	4.7341	9.0000e-004	0.0000	4.7567
Total	**4.2900e-003**	**0.0387**	**0.0346**	**5.0000e-005**		**2.4200e-003**	**2.4200e-003**		**2.3100e-003**	**2.3100e-003**	**0.0000**	**4.7341**	**4.7341**	**9.0000e-004**	**0.0000**	**4.7567**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3334	0.3334	1.0000e-005	0.0000	0.3337
Total	**2.1000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3334**	**0.3334**	**1.0000e-005**	**0.0000**	**0.3337**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-004	4.4600e-003	2.0700e-003	0.0000		1.8000e-004	1.8000e-004		1.7000e-004	1.7000e-004	0.0000	0.4378	0.4378	1.4000e-004	0.0000	0.4413
Total	**3.6000e-004**	**4.4600e-003**	**2.0700e-003**	**0.0000**	**2.7000e-004**	**1.8000e-004**	**4.5000e-004**	**3.0000e-005**	**1.7000e-004**	**2.0000e-004**	**0.0000**	**0.4378**	**0.4378**	**1.4000e-004**	**0.0000**	**0.4413**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0185	0.0185	0.0000	0.0000	0.0185
Total	**1.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0185**	**0.0185**	**0.0000**	**0.0000**	**0.0185**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-004	4.4600e-003	2.0700e-003	0.0000		1.8000e-004	1.8000e-004		1.7000e-004	1.7000e-004	0.0000	0.4378	0.4378	1.4000e-004	0.0000	0.4413
Total	**3.6000e-004**	**4.4600e-003**	**2.0700e-003**	**0.0000**	**2.7000e-004**	**1.8000e-004**	**4.5000e-004**	**3.0000e-005**	**1.7000e-004**	**2.0000e-004**	**0.0000**	**0.4378**	**0.4378**	**1.4000e-004**	**0.0000**	**0.4413**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0185	0.0185	0.0000	0.0000	0.0185
Total	**1.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0185**	**0.0185**	**0.0000**	**0.0000**	**0.0185**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.5000e-004	8.6000e-003	7.6900e-003	1.0000e-005		5.4000e-004	5.4000e-004		5.1000e-004	5.1000e-004	0.0000	1.0520	1.0520	2.0000e-004	0.0000	1.0570
Total	**9.5000e-004**	**8.6000e-003**	**7.6900e-003**	**1.0000e-005**	**7.5000e-004**	**5.4000e-004**	**1.2900e-003**	**4.1000e-004**	**5.1000e-004**	**9.2000e-004**	**0.0000**	**1.0520**	**1.0520**	**2.0000e-004**	**0.0000**	**1.0570**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	3.0000e-005	3.3000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0741	0.0741	0.0000	0.0000	0.0742
Total	**5.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0741**	**0.0741**	**0.0000**	**0.0000**	**0.0742**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.5000e-004	8.6000e-003	7.6900e-003	1.0000e-005		5.4000e-004	5.4000e-004		5.1000e-004	5.1000e-004	0.0000	1.0520	1.0520	2.0000e-004	0.0000	1.0570
Total	**9.5000e-004**	**8.6000e-003**	**7.6900e-003**	**1.0000e-005**	**7.5000e-004**	**5.4000e-004**	**1.2900e-003**	**4.1000e-004**	**5.1000e-004**	**9.2000e-004**	**0.0000**	**1.0520**	**1.0520**	**2.0000e-004**	**0.0000**	**1.0570**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	3.0000e-005	3.3000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0741	0.0741	0.0000	0.0000	0.0742
Total	**5.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0741**	**0.0741**	**0.0000**	**0.0000**	**0.0742**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0479	0.4910	0.3772	5.7000e-004		0.0303	0.0303		0.0279	0.0279	0.0000	51.1502	51.1502	0.0162	0.0000	51.5548
Total	**0.0479**	**0.4910**	**0.3772**	**5.7000e-004**		**0.0303**	**0.0303**		**0.0279**	**0.0279**	**0.0000**	**51.1502**	**51.1502**	**0.0162**	**0.0000**	**51.5548**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2200e-003	0.0333	6.7000e-003	7.0000e-005	1.6600e-003	2.5000e-004	1.9100e-003	4.8000e-004	2.4000e-004	7.2000e-004	0.0000	6.8081	6.8081	5.7000e-004	0.0000	6.8223
Worker	2.7900e-003	1.9600e-003	0.0197	5.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2700e-003	3.0000e-005	1.3100e-003	0.0000	4.4452	4.4452	1.4000e-004	0.0000	4.4487
Total	**4.0100e-003**	**0.0353**	**0.0264**	**1.2000e-004**	**6.4600e-003**	**2.9000e-004**	**6.7400e-003**	**1.7500e-003**	**2.7000e-004**	**2.0300e-003**	**0.0000**	**11.2533**	**11.2533**	**7.1000e-004**	**0.0000**	**11.2710**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0479	0.4910	0.3772	5.7000e-004		0.0303	0.0303		0.0279	0.0279	0.0000	51.1502	51.1502	0.0162	0.0000	51.5548
Total	**0.0479**	**0.4910**	**0.3772**	**5.7000e-004**		**0.0303**	**0.0303**		**0.0279**	**0.0279**	**0.0000**	**51.1502**	**51.1502**	**0.0162**	**0.0000**	**51.5548**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2200e-003	0.0333	6.7000e-003	7.0000e-005	1.6600e-003	2.5000e-004	1.9100e-003	4.8000e-004	2.4000e-004	7.2000e-004	0.0000	6.8081	6.8081	5.7000e-004	0.0000	6.8223
Worker	2.7900e-003	1.9600e-003	0.0197	5.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2700e-003	3.0000e-005	1.3100e-003	0.0000	4.4452	4.4452	1.4000e-004	0.0000	4.4487
Total	**4.0100e-003**	**0.0353**	**0.0264**	**1.2000e-004**	**6.4600e-003**	**2.9000e-004**	**6.7400e-003**	**1.7500e-003**	**2.7000e-004**	**2.0300e-003**	**0.0000**	**11.2533**	**11.2533**	**7.1000e-004**	**0.0000**	**11.2710**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.0700e-003	0.0196	0.0179	3.0000e-005		1.1100e-003	1.1100e-003		1.0300e-003	1.0300e-003	0.0000	2.3931	2.3931	6.8000e-004	0.0000	2.4102
Paving	7.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.8000e-003**	**0.0196**	**0.0179**	**3.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.0300e-003**	**1.0300e-003**	**0.0000**	**2.3931**	**2.3931**	**6.8000e-004**	**0.0000**	**2.4102**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3334	0.3334	1.0000e-005	0.0000	0.3337
Total	**2.1000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3334**	**0.3334**	**1.0000e-005**	**0.0000**	**0.3337**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.0700e-003	0.0196	0.0179	3.0000e-005		1.1100e-003	1.1100e-003		1.0300e-003	1.0300e-003	0.0000	2.3931	2.3931	6.8000e-004	0.0000	2.4102
Paving	7.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.8000e-003**	**0.0196**	**0.0179**	**3.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.0300e-003**	**1.0300e-003**	**0.0000**	**2.3931**	**2.3931**	**6.8000e-004**	**0.0000**	**2.4102**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3334	0.3334	1.0000e-005	0.0000	0.3337
Total	**2.1000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3334**	**0.3334**	**1.0000e-005**	**0.0000**	**0.3337**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0323					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397
Total	**0.0330**	**4.5900e-003**	**4.6000e-003**	**1.0000e-005**		**3.2000e-004**	**3.2000e-004**		**3.2000e-004**	**3.2000e-004**	**0.0000**	**0.6383**	**0.6383**	**5.0000e-005**	**0.0000**	**0.6397**

3.7 Architectural Coating - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0370	0.0370	0.0000	0.0000	0.0371
Total	**2.0000e-005**	**2.0000e-005**	**1.6000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0370**	**0.0370**	**0.0000**	**0.0000**	**0.0371**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0323					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397
Total	**0.0330**	**4.5900e-003**	**4.6000e-003**	**1.0000e-005**		**3.2000e-004**	**3.2000e-004**		**3.2000e-004**	**3.2000e-004**	**0.0000**	**0.6383**	**0.6383**	**5.0000e-005**	**0.0000**	**0.6397**

3.7 Architectural Coating - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0370	0.0370	0.0000	0.0000	0.0371
Total	**2.0000e-005**	**2.0000e-005**	**1.6000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0370**	**0.0370**	**0.0000**	**0.0000**	**0.0371**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9728	8.8250	5.9454	0.0188	0.6575	0.0223	0.6798	0.1769	0.0211	0.1980	0.0000	1,751.1594	1,751.1594	0.2915	0.0000	1,758.4470
Unmitigated	0.9837	8.9601	6.1507	0.0197	0.7207	0.0236	0.7443	0.1939	0.0224	0.2163	0.0000	1,838.1444	1,838.1444	0.2940	0.0000	1,845.4940

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market (24 Hour)	663.26	663.26	663.26	505,124	460,814
Convenience Market With Gas Pumps	2,580.00	2,580.00	2580.00	1,383,923	1,262,524
Parking Lot	0.00	0.00	0.00		
Total	3,243.26	3,243.26	3,243.26	1,889,047	1,723,338

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Convenience Market (24 Hour)	9.50	7.30	7.30	0.90	80.10	19.00	24	15	61
Convenience Market With Gas	9.50	7.30	7.30	0.80	80.20	19.00	14	21	65
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Convenience Market (24 Hour)	0.492402	0.034496	0.167383	0.136948	0.023406	0.006040	0.021602	0.106741	0.001802	0.001770	0.005495	0.001006	0.000911
Convenience Market With Gas Pumps	0.492402	0.034496	0.167383	0.136948	0.023406	0.006040	0.021602	0.106741	0.001802	0.001770	0.005495	0.001006	0.000911
Parking Lot	0.492402	0.034496	0.167383	0.136948	0.023406	0.006040	0.021602	0.106741	0.001802	0.001770	0.005495	0.001006	0.000911

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	11.7751	11.7751	5.3000e-004	1.1000e-004	11.8212
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	11.7751	11.7751	5.3000e-004	1.1000e-004	11.8212
NaturalGas Mitigated	2.3000e-004	2.0500e-003	1.7200e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2345	2.2345	4.0000e-005	4.0000e-005	2.2478
NaturalGas Unmitigated	2.3000e-004	2.0500e-003	1.7200e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2345	2.2345	4.0000e-005	4.0000e-005	2.2478

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market (24 Hour)	29788.8	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5896	1.5896	3.0000e-005	3.0000e-005	1.5991
Convenience Market With Gas Pumps	12084.6	7.0000e-005	5.9000e-004	5.0000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.6449	0.6449	1.0000e-005	1.0000e-005	0.6487
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**2.3000e-004**	**2.0500e-003**	**1.7300e-003**	**1.0000e-005**		**1.6000e-004**	**1.6000e-004**		**1.6000e-004**	**1.6000e-004**	**0.0000**	**2.2345**	**2.2345**	**4.0000e-005**	**4.0000e-005**	**2.2478**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market (24 Hour)	29788.8	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5896	1.5896	3.0000e-005	3.0000e-005	1.5991
Convenience Market With Gas Pumps	12084.6	7.0000e-005	5.9000e-004	5.0000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.6449	0.6449	1.0000e-005	1.0000e-005	0.6487
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**2.3000e-004**	**2.0500e-003**	**1.7300e-003**	**1.0000e-005**		**1.6000e-004**	**1.6000e-004**		**1.6000e-004**	**1.6000e-004**	**0.0000**	**2.2345**	**2.2345**	**4.0000e-005**	**4.0000e-005**	**2.2478**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market (24 Hour)	22689.6	6.6007	3.0000e-004	6.0000e-005	6.6265
Convenience Market With Gas Pumps	9204.61	2.6777	1.2000e-004	3.0000e-005	2.6882
Parking Lot	8582.35	2.4967	1.1000e-004	2.0000e-005	2.5065
Total		**11.7751**	**5.3000e-004**	**1.1000e-004**	**11.8212**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market (24 Hour)	22689.6	6.6007	3.0000e-004	6.0000e-005	6.6265
Convenience Market With Gas Pumps	9204.61	2.6777	1.2000e-004	3.0000e-005	2.6882
Parking Lot	8582.35	2.4967	1.1000e-004	2.0000e-005	2.5065
Total		**11.7751**	**5.3000e-004**	**1.1000e-004**	**11.8212**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0190	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004
Unmitigated	0.0201	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.2300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004
Total	**0.0201**	**0.0000**	**3.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.3000e-004**	**6.3000e-004**	**0.0000**	**0.0000**	**6.7000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.2300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0157					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	3.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.3000e-004	6.3000e-004	0.0000	0.0000	6.7000e-004
Total	**0.0190**	**0.0000**	**3.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.3000e-004**	**6.3000e-004**	**0.0000**	**0.0000**	**6.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.7174	9.4600e-003	2.3000e-004	1.0221
Unmitigated	0.7284	9.4600e-003	2.3000e-004	1.0332

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market (24 Hour)	0.205922 / 0.12621	0.5180	6.7300e-003	1.6000e-004	0.7347
Convenience Market With Gas Pumps	0.0836574 / 0.0512739	0.2104	2.7300e-003	7.0000e-005	0.2985
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.7284**	**9.4600e-003**	**2.3000e-004**	**1.0332**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market (24 Hour)	0.205922 / 0.118511	0.5101	6.7300e-003	1.6000e-004	0.7269
Convenience Market With Gas Pumps	0.0836574 / 0.0481462	0.2073	2.7300e-003	7.0000e-005	0.2953
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.7174**	**9.4600e-003**	**2.3000e-004**	**1.0221**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.6950	0.1002	0.0000	4.1992
Unmitigated	1.6950	0.1002	0.0000	4.1992

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Convenience Market (24 Hour)	8.35	1.6950	0.1002	0.0000	4.1992
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**1.6950**	**0.1002**	**0.0000**	**4.1992**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Convenience Market (24 Hour)	8.35	1.6950	0.1002	0.0000	4.1992
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**1.6950**	**0.1002**	**0.0000**	**4.1992**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EXHIBIT I

TRAFFIC REPORT (EXCERPTS)

Project No: 584-02

TRAFFIC STUDY

PROPOSED COMMERCIAL GPA-ZC
NORTHWEST CORNER OF
COTTONWOOD ROAD AND PLANZ ROAD

Prepared for:

Gilmar Construction, Inc.

December 2018

Prepared by:

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TABLE OF CONTENTS

INTRODUCTION

The purpose of this study is to evaluate the potential traffic impact of a proposed GPA-ZC for a convenience store with gasoline pumps located at the northwest corner of Cottonwood Road and East Planz Road in the City of Bakersfield, California.

A. Land Use, Site and Study Area Boundaries

The proposed project consists of a gas station with 8 fueling positions and a 3,100 square foot convenience store (See Figure 3: Site Plan). The current land use designation for the project site is R-2 (Medium-density Residential). A general plan amendment is being proposed for a change from LMR (Light-medium Residential) to GC (General Commercial) and a zone change is being proposed from R-2 to C-2 (General Commercial).

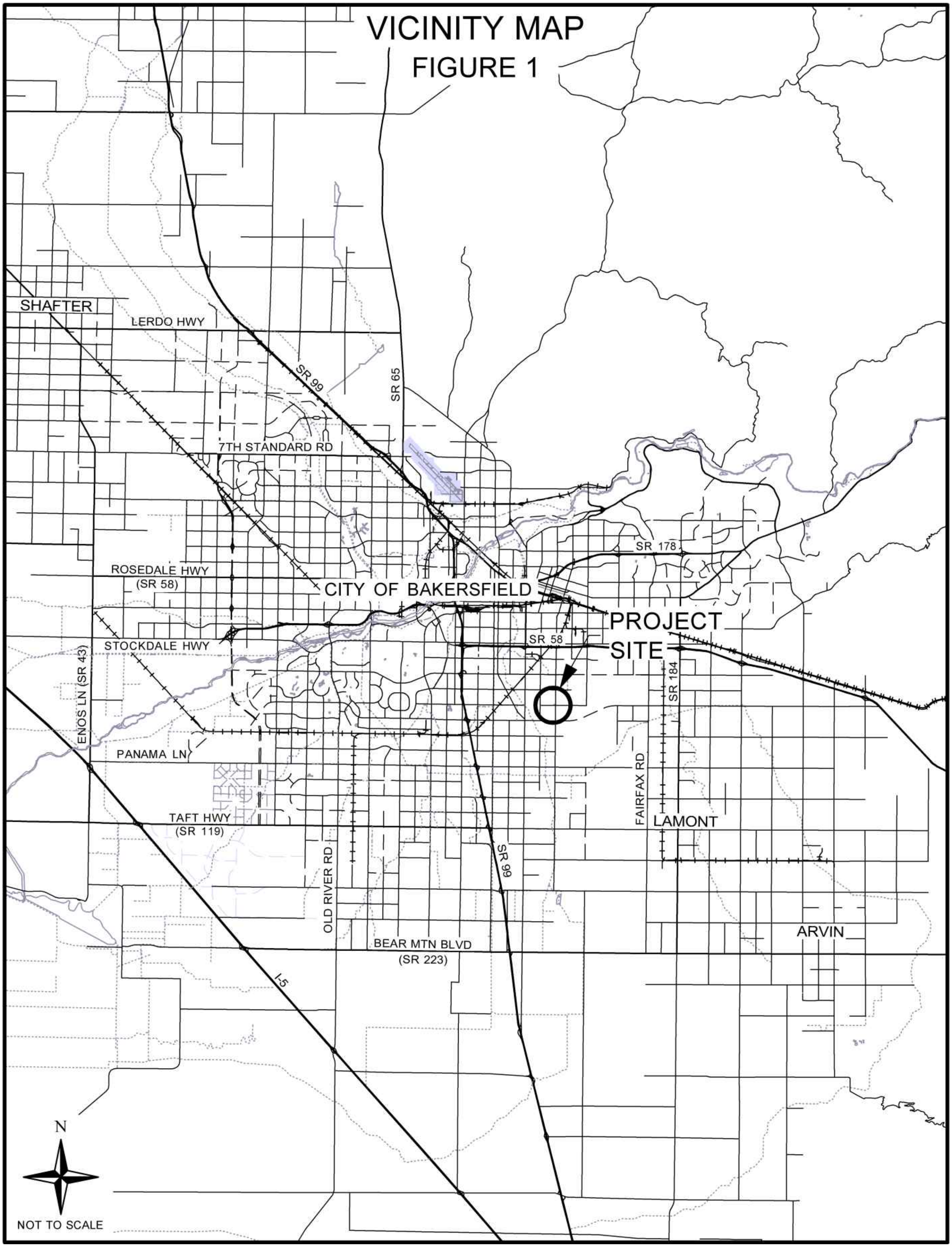
Three unsignalized intersections are included in this study. The scope of the study was developed in association with The City of Bakersfield Public Works Traffic Division. A vicinity map is presented in Figure 1 and a location map is presented in Figure 2.

B. Existing Site Uses and Site Access

The project site currently consists of vacant land, with no building or other structures. Access to the site is proposed along both E. Planz Road and Oliver Street.

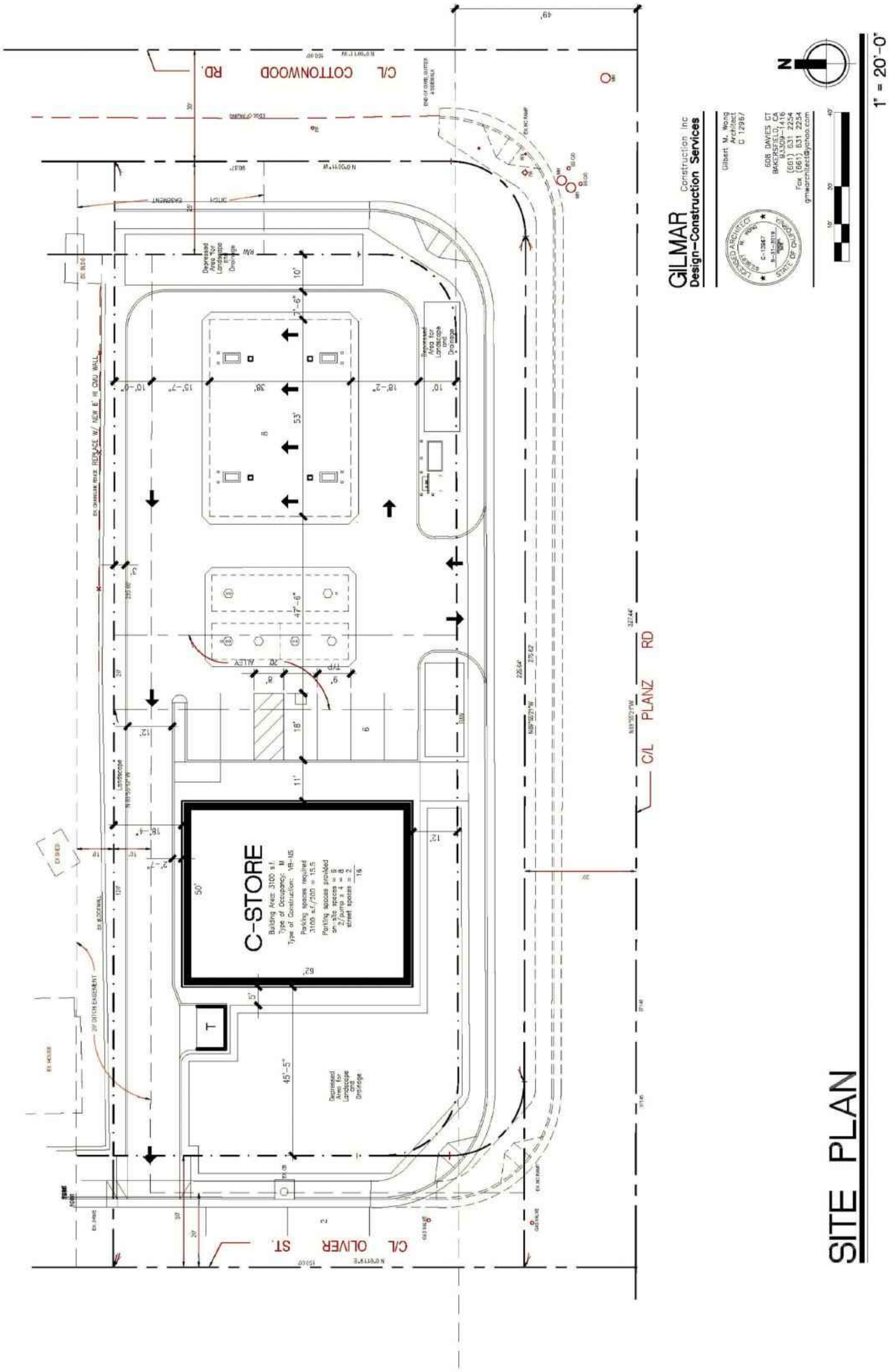
C. Existing Uses in Vicinity of the Site

Existing land uses in the vicinity of the project site include single-family residential land uses to the west, north and south, vacant land to the immediate east, and the Bakersfield Wastewater Treatment Plant further east. To the east and south, the project site is bounded by Cottonwood Road and E. Planz Road, respectively.


VICINITY MAP
FIGURE 1
SHAFTER
LERDO HWY
SR 99
SR 65
7TH STANDARD RD
SR 178
ROSEDALE HWY
(SR 58)
CITY OF BAKERSFIELD
PROJECT
SITE
SR 58
STOCKDALE HWY
SR 184
ENOS LN (SR 43)
PANAMA LN
FAIRFAX RD
LAMONT
TAFT HWY
(SR 119)
SR 99
OLD RIVER RD
ARVIN
BEAR MTN BLVD
(SR 223)
I-5
N
NOT TO SCALE

RUETTGERS & SCHULER CIVIL ENGINEERS

SITE PLAN
FIGURE 3



RUETTGERS & SCHULER CIVIL ENGINEERS

D. Roadway Descriptions

Cottonwood Road is a north-south arterial that extends south from Brundage Lane. In the vicinity of the project it exists as an undivided two-lane roadway with improvements adjacent to development. It provides access to residential and commercial land uses.

Planz Road is an east-west collector. It extends east from Wilson Road in Southwest Bakersfield to the Bakersfield Municipal Airport just east of Union Avenue. It continues east from Madison Avenue as a collector. It provides access from residential and commercial areas to north-south arterials.

Watts Drive is an east-west collector that extends west from Cottonwood Road as a two-lane roadway with curb and gutter that becomes Wilson Road as it crosses S. Union Avenue. East of Cottonwood Road, Watts Drive is a local roadway with no curb or gutter. Watts Drive provides access to residential, commercial, and industrial land uses.

White Lane is an arterial which extends west from Cottonwood Road approximately one mile south of E. Casa Loma Drive. It currently operates as a two-lane roadway with no curb and gutter in the vicinity of the project site. White Lane provides access to residential and commercial land uses within the study area.

PROJECT TRIP GENERATION AND DESIGN HOUR VOLUMES

The trip generation and design hour volumes shown in Table 1 were calculated using the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition. The ADT, AM and PM peak hour rates, and peak hour directional splits for ITE Land Use Code 853 (Convenience Market with Gasoline Pumps) were used to estimate the project traffic.

Table 1
Project Trip Generation

General Information			Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE Code	Development Type	Variable	ADT RATE	ADT	Rate	In % Split/ Trips	Out % Split/ Trips	Rate	In % Split/ Trips	Out % Split/ Trips
853	Convenience Market with Gasoline Pumps	8 Vehicle Fueling Positions	322.5	2580	20.55	50% 82	50% 82	24.25	50% 97	50% 97
sub-total				2,580		82	82		97	97
Pass-by		40%		1,032		33	33		39	39
Total				1,548		49	49		58	58

TRIP DISTRIBUTION AND ASSIGNMENT

The project trip distribution in Table 2 represents the most logically traveled routes for traffic accessing the project. Project traffic distribution was estimated based on a review of the potential draw from population centers within the region and the type of land use involved. These assumptions were used to distribute project traffic as shown in Figure 5.

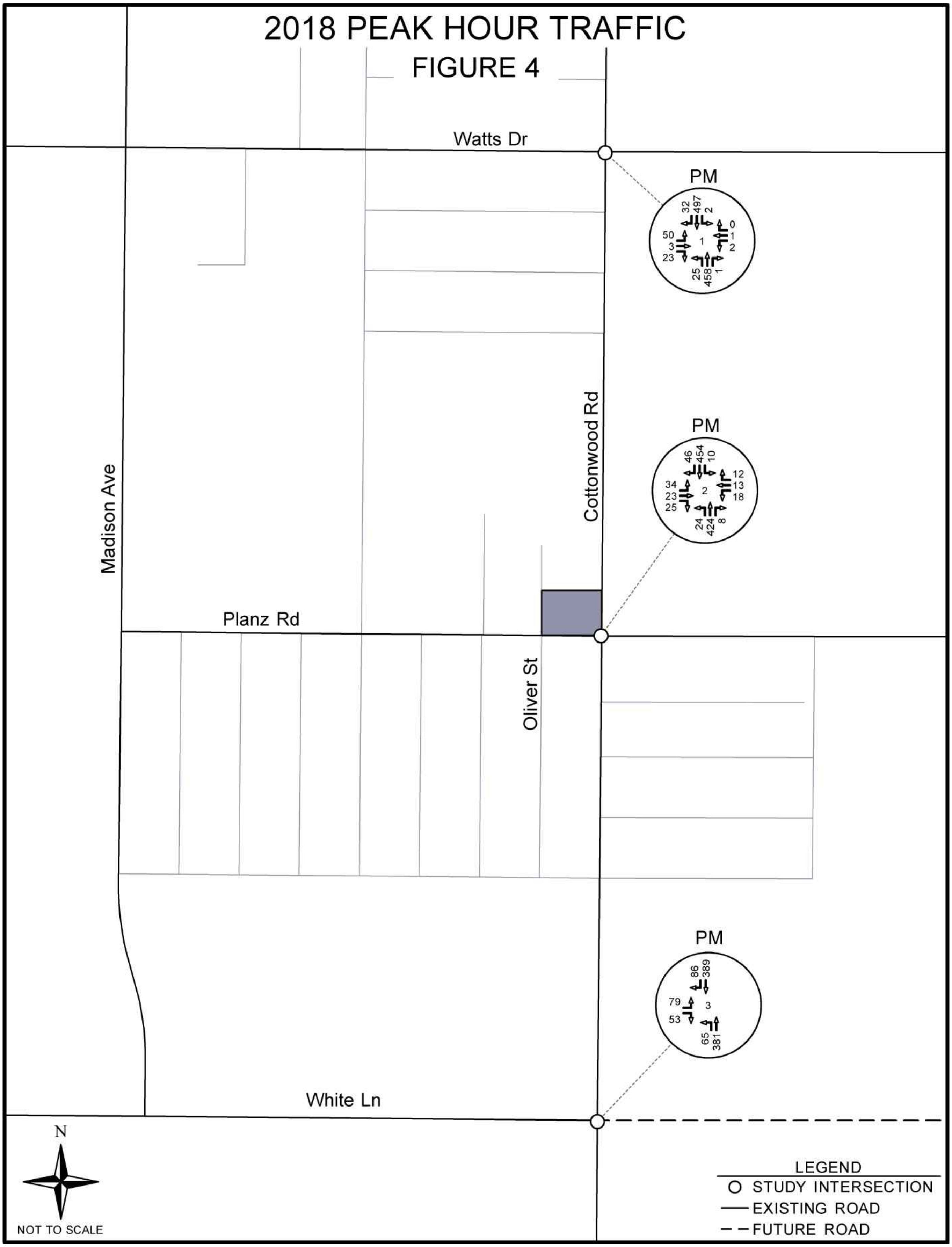
Table 2
Project Trip Distribution

Direction	Percent	Primary Roadways
North	25	Cottonwood Road
East	10	Watts Drive, E. Planz Road
South	25	Cottonwood Road
West	40	E. White Lane

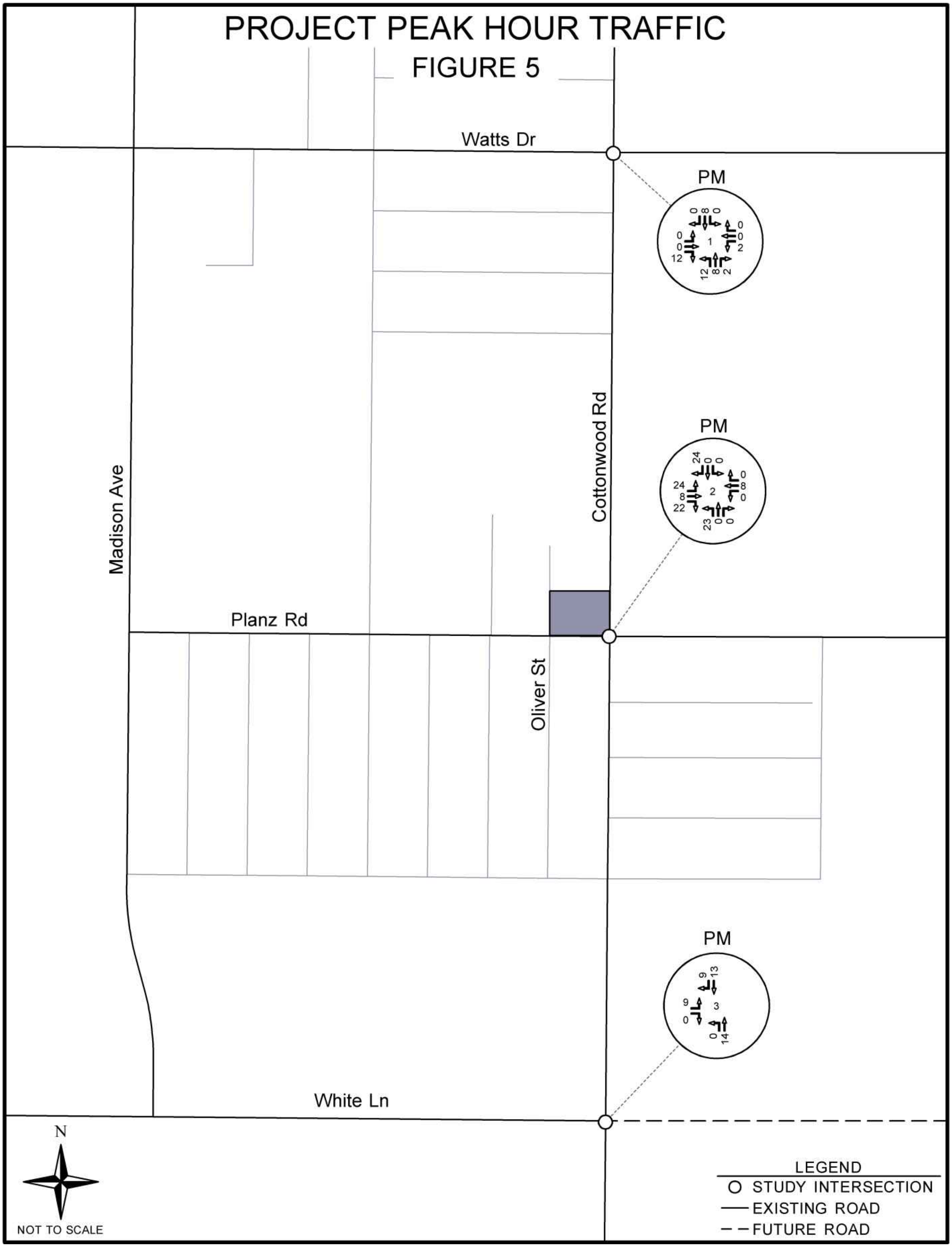
EXISTING AND FUTURE TRAFFIC

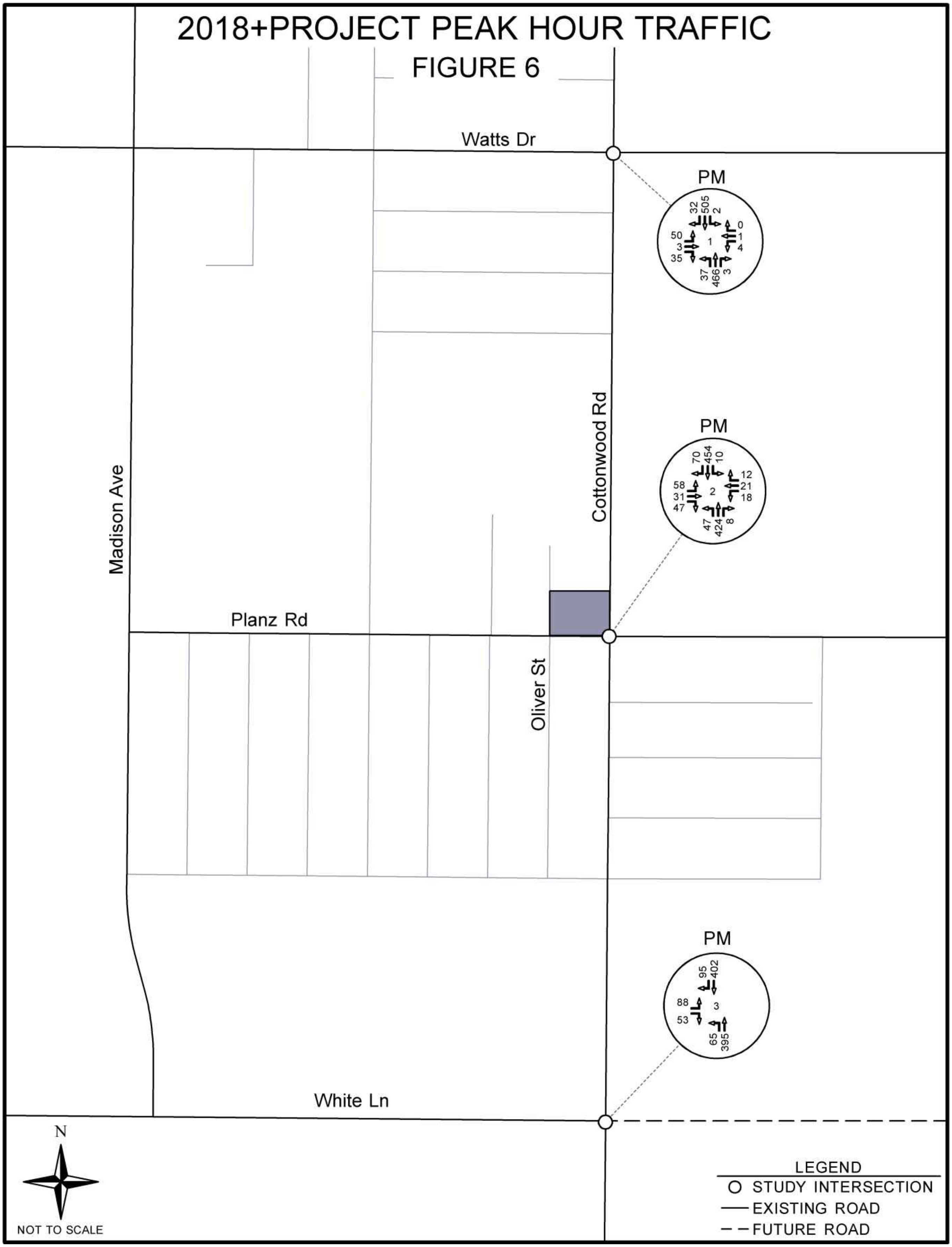
Existing peak hour turn movement volumes were field measured on December 5, 2018 at the study intersections and are shown in Figure 4. Existing+Project peak hour volumes are shown in Figure 6.

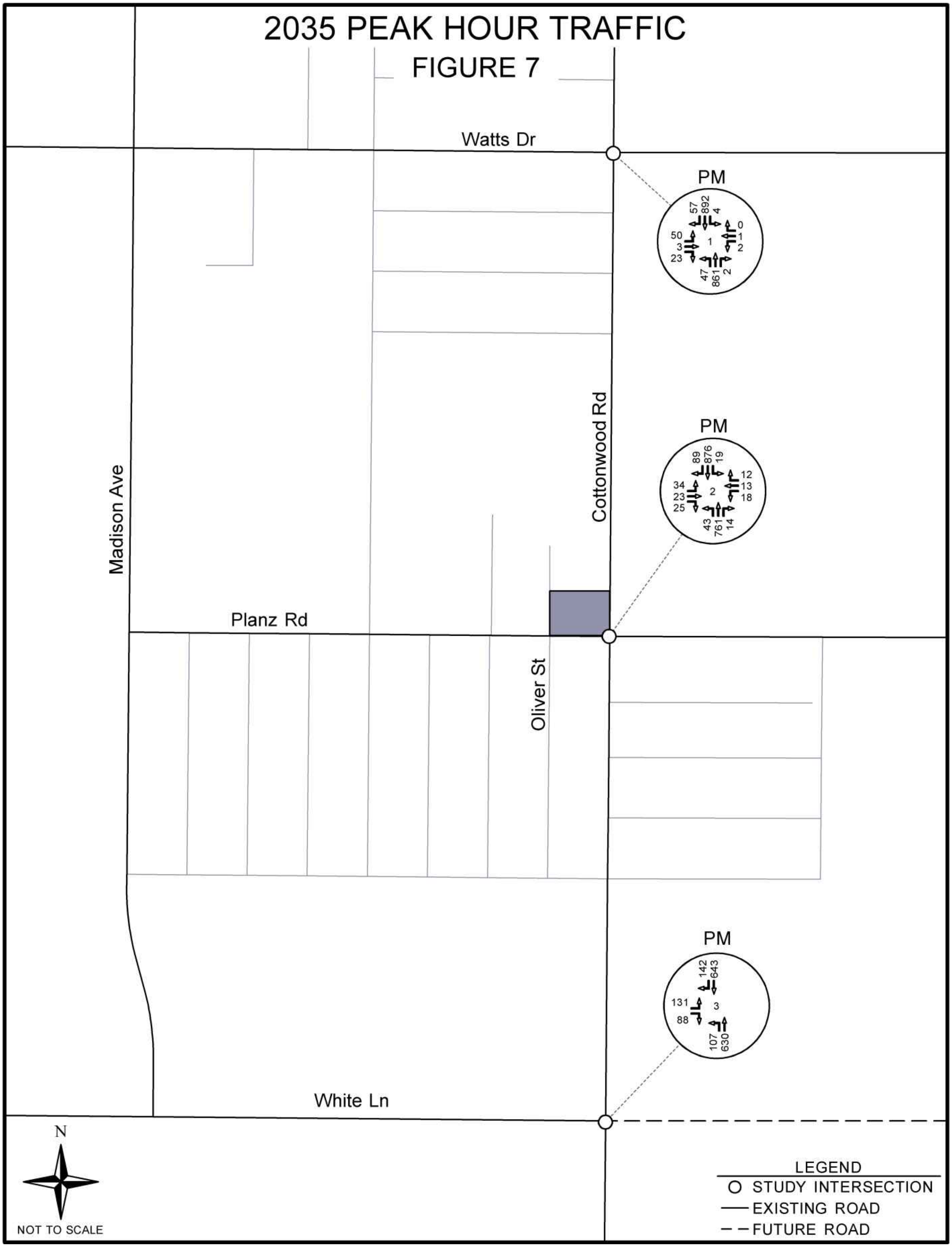
Annual growth rates from approximately 0.05% to 3.78% were applied to existing traffic volumes to estimate future traffic volumes for the year 2035. These growth rates were estimated based on a review of existing developments and KernCOG traffic model data. Future peak hour volumes are shown in Figures 7 and 8.


2018 PEAK HOUR TRAFFIC
FIGURE 4
Watts Dr
Madison Ave
Cottonwood Rd
Planz Rd
Oliver St
White Ln
PM
32 497 2
0 1 2
50 3 23
1
25 458 1
PM
46 454 10
12 13 18
34 23 25
2
24 424 8
PM
86 389
79 53
3
65 381
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD

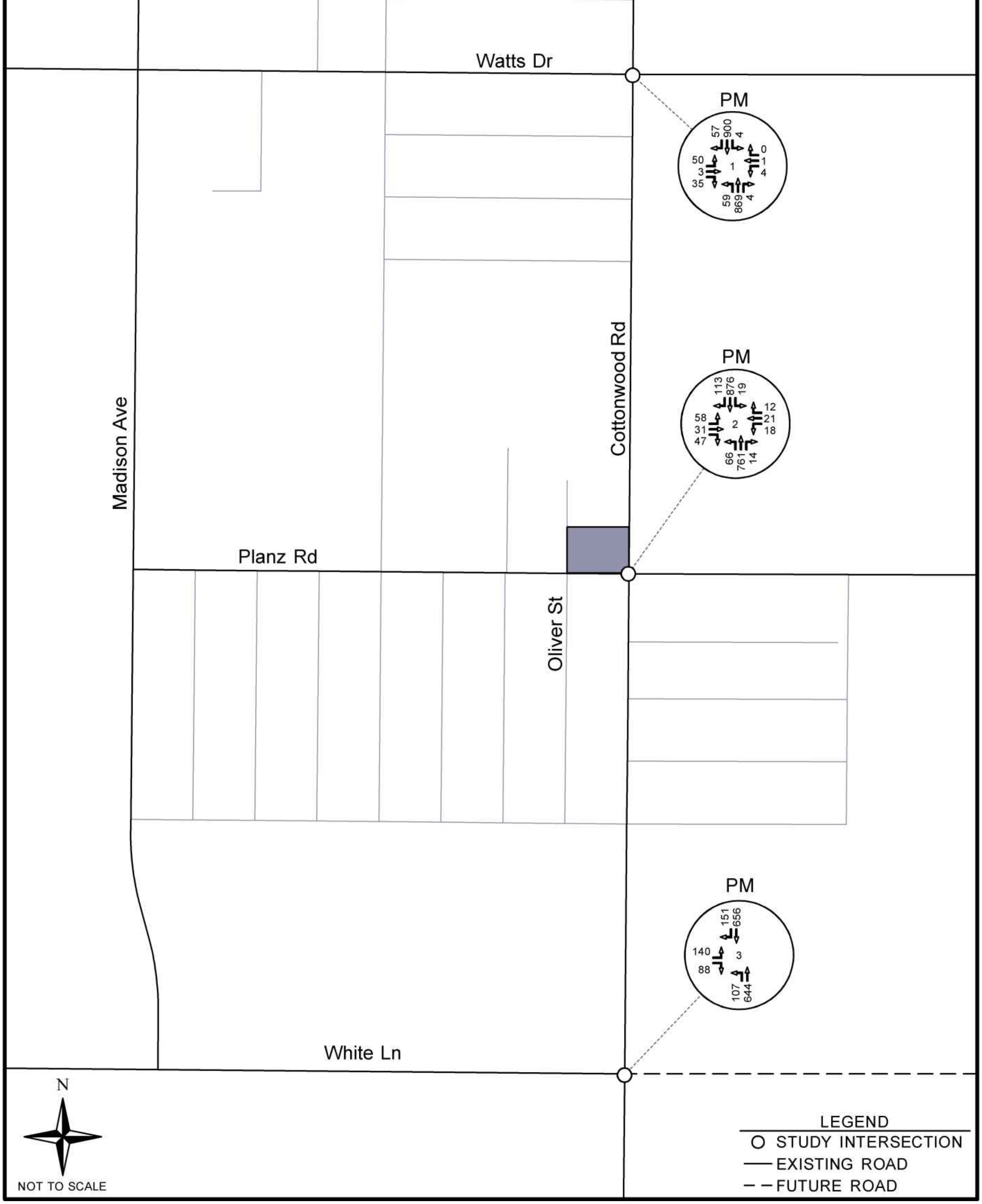
PROJECT PEAK HOUR TRAFFIC
FIGURE 5




2018+PROJECT PEAK HOUR TRAFFIC
FIGURE 6
Watts Dr
Madison Ave
Cottonwood Rd
Planz Rd
Oliver St
White Ln
PM
32 505 2
0 1 4
50 3 35
37 466 3
1
PM
70 454 10
12 21 18
58 31 47
47 424 8
2
PM
95 402
88 53
65 395
3
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD


2035 PEAK HOUR TRAFFIC
FIGURE 7
Watts Dr
Madison Ave
Cottonwood Rd
Planz Rd
Oliver St
White Ln
PM
57 892 4
50 3 23
1
0 1 2
47 861 2
PM
89 876 19
34 23 25
2
12 13 18
43 761 14
PM
142 643
131 88
3
107 630
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD

2035+PROJECT PEAK HOUR TRAFFIC
FIGURE 8



INTERSECTION ANALYSIS

A capacity analysis of the study intersections was conducted using Synchro 9 software from Trafficware. This software utilizes the 2010 capacity analysis methodology in the Transportation Research Board's Highway Capacity Manual. The analysis was performed for the following traffic scenarios:

- Existing (2018)
- Existing+Project (2018)
- Future (2035)
- Future+Project (2035)

Level of service (LOS) criteria for unsignalized and signalized intersections, as described in HCM 2010, are presented in the tables below. Level of service analysis results for the study intersections are presented in Table 3. The intersection peak hour level of service goal for the City of Bakersfield is LOS C or better.

LEVEL OF SERVICE CRITERIA
UNSIGNALIZED INTERSECTION

Average Control Delay (sec/veh)	Level of Service	Expected Delay to Minor Street Traffic
≤ 10	A	Little or no delay
> 10 and ≤ 15	B	Short traffic delays
> 15 and ≤ 25	C	Average traffic delays
> 25 and ≤ 35	D	Long traffic delays
> 35 and ≤ 50	E	Very long traffic delays
> 50	F	Extreme delays

LEVEL OF SERVICE CRITERIA
SIGNALIZED INTERSECTIONS

Volume/Capacity	Control Delay (sec/veh)	Level of Service
< 0.60	≤ 10	A
0.61 - 0.70	> 10 and ≤ 20	B
0.71 - 0.80	> 20 and ≤ 35	C
0.81 - 0.90	> 35 and ≤ 55	D
0.91 - 1.00	> 55 and ≤ 80	E
> 1.0	> 80	F

Table 3
PM Unsignalized Intersection Level of Service

#	Intersection	Movement	2018	2018+ Project	2035	2035+ Project	2035+ Project w/Mitigation[1]
1	Cottonwood Rd & Watts Dr	EB WB	D (31.1) D (26.6)	D (33.2) D (30.3)	F (>300) F (121.8)	F (>300) F (176.9)	B
2	Cottonwood Rd & E. Planz Rd	Overall Intersection	C	D (27.1)	F (54.4)	F (54.9)	C
3	Cottonwood Rd & E. White Ln	EB	D (26.0)	D (30.2)	F (>300)	F (>300)	C

[1] See Table 6 for mitigation measures.

TRAFFIC SIGNAL WARRANT ANALYSIS

Peak hour signal warrants were evaluated for each of the unsignalized intersections within the study based on the California Manual on Uniform Traffic Control Devices (MUTCD). Peak hour signal warrants assess delay to traffic on the minor street approaches when entering or crossing a major street. Signal warrant analysis results for the PM peak hour are shown in Table 4.

It is important to note that a signal warrant defines the minimum condition under which signalization of an intersection might be warranted. Meeting this threshold does not suggest traffic signals are required, but rather, that other traffic factors and conditions be considered in order to determine whether signals are truly justified.

It is also noted that signal warrants do not necessarily correlate with level of service. An intersection may satisfy a signal warrant condition and operate at or above an acceptable level of service, or operate below an acceptable level of service and not meet signal warrant criteria.

Table 4
PM Traffic Signal Warrants

		2018			2018+Project			2035			2035+Project		
#	Intersection	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Watts Rd	1015	76	NO	1045	88	YES	1863	76	YES	1893	88	YES
2	Cottonwood Rd at E Planz Rd	966	82	NO	1013	136	YES	1802	82	YES	1849	136	YES
3	Cottonwood Rd at White Ln	921	132	YES	957	141	YES	1522	219	YES	1558	228	YES

ROADWAY ANALYSIS

The volume-to-capacity ratios shown in Table 5 were calculated for roadways with published ADT information and future projected traffic.

A volume-to-capacity ratio (v/c) of greater than 0.80 corresponds to a LOS of less than C, as defined in the Highway Capacity Manual. Mitigation is required where project traffic reduces the LOS to below an acceptable level, or where the pre-existing condition of the roadway is below an acceptable level of service and degrades below the pre-existing LOS with the addition of the project.

Table 5
Roadway Capacity

Street	2018[1]	2035 ADT	2035+ Project	v/c(Ex) 2018	v/c(Ex) 2018+Proj	v/c(Ex) 2035	v/c(Ex) 2035+Proj	v/c(Mit) 2035+Proj[2]
Cottonwood Rd: Watts Dr - E Planz Rd	10457	19654	20015	0.70	0.72	**1.31**	**1.33**	0.67
Cottonwood Rd: E White Ln - E Planz Rd	10429	18727	19329	0.70	0.74	**1.25**	**1.29**	0.64

[1]2018 data not available; data grown out from most recent year available.
[2]See Table 7 for mitigation measures.

MITIGATION

Intersection and roadway improvements needed by the year 2035 to maintain or improve the operational level of service of the street system in the vicinity of the project are shown in Tables 6 and 7. The Regional Transportation Impact Fee (RTIF) Program is a fee imposed on new development and contains a Regional Transportation Facilities List and a Transportation Impact Fee Schedule. The Facilities List includes many of the facilities needed to maintain a Level of Service (LOS) C or better for new growth or to prevent the degradation of facilities which are currently operating below LOS C. The Fee Schedule sets forth the fees to be collected from new development to mitigate the need for the facilities.

Table 6
Future Intersection Improvements and Local Mitigation

#	Intersection	Total Improvements Required by 2035	Local Mitigation (Improvements not covered by RTIF or adjacent development)	Project Share for Local Mitigation
1	Cottonwood Rd & Watts Dr.	Signal; NBL,NBR; SBL, SBR	Signal	4.93%
2	Cottonwood Rd & E. Planz Rd	Signal; NBL,NBR; SBL, SBR	-	-
3	Cottonwood Rd & E. White Ln	Signal; NBL,NBR; SBL, SBR; WBL, WBR	-	-

Notes: NB = Northbound, SB = Southbound, L = Left-Turn Lane, WB = Westbound, T = Through Lane, EB = Eastbound, R = Right-Turn Lane

Table 7
Future Roadway Improvements and Local Mitigation

Roadway Segment	Total Improvements Required by 2035	Local Mitigation (Improvements not covered by RTIF or adjacent development)
Cottonwood Rd: Watts Dr - E Planz Rd	Add two lanes	-
Cottonwood Rd: E White Ln - E Planz Rd	Add two lanes	-

SUMMARY AND CONCLUSIONS

This study evaluated the potential traffic impact of a proposed general plan amendment and zone change for a convenience store with gasoline pumps located at the northwest corner of Cottonwood Road and E. Planz Road.

Level of Service Analysis

The intersections at Cottonwood Road & Watts Drive and Cottonwood Road & E. Planz Road operate below an acceptable level of service prior to the addition of project traffic in existing and future year scenarios. The intersection of Cottonwood Road and White Lane operates at an acceptable level of service during peak hours in the existing year, but is anticipated to operate below an acceptable level of service with the addition of project traffic; both in existing and future year scenarios.

Roadway Capacity

The roadway segments of Cottonwood Road from Watts Drive to E. White Lane are anticipated to operate below an acceptable level of service in the future year (2035) prior to the addition of project traffic.

Conclusion

Three study intersections and two roadway segments were identified to need improvements in order to maintain acceptable levels of service as shown in Tables 6 and 7. These improvements, with the exception of the addition of a signal at the intersection of Cottonwood Road and Watts Drive, are included in the RTIF facilities list. Provided that the improvements listed in Tables 6 and 7 are constructed, it is anticipated that the proposed commercial General Plan Amendment (GPA) and Zone Change will have a less-than-significant impact on traffic operations in the vicinity of the project.

REFERENCES

1. Annual Traffic Census, Kern COG
2. City of Bakersfield General Plan, approved 2010
3. Highway Capacity Manual, Special Report 209, Transportation Research Board
4. California Manual on Uniform Traffic Control Devices for Streets and Highways, 2012 Edition, Federal Highway Administration (FHA)
5. Trip Generation, 10th Edition, Institute of Transportation Engineers (ITE)

APPENDIX

Intersection 1
Cottonwood Rd & Watts Rd

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	3	23	2	1	0	25	458	1	2	497	32
Future Vol, veh/h	50	3	23	2	1	0	25	458	1	2	497	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	3	25	2	1	0	27	498	1	2	540	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1125	1125	568	1139	1142	508	580	0	0	504	0	0
Stage 1	567	567	-	558	558	-	-	-	-	-	-	-
Stage 2	558	558	-	581	584	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	182	205	522	178	200	565	994	-	-	1061	-	-
Stage 1	508	507	-	514	512	-	-	-	-	-	-	-
Stage 2	514	512	-	499	498	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	174	195	518	161	190	560	990	-	-	1057	-	-
Mov Cap-2 Maneuver	174	195	-	161	190	-	-	-	-	-	-	-
Stage 1	487	503	-	492	490	-	-	-	-	-	-	-
Stage 2	491	490	-	468	494	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	26.6	0.5	0
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	990	-	-	219	170	1057	-	-
HCM Lane V/C Ratio	0.027	-	-	0.377	0.019	0.002	-	-
HCM Control Delay (s)	8.7	0	-	31.1	26.6	8.4	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.1	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	3	35	4	1	0	37	466	3	2	505	32
Future Vol, veh/h	50	3	35	4	1	0	37	466	3	2	505	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	3	38	4	1	0	40	507	3	2	549	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1170	1171	576	1190	1187	518	589	0	0	515	0	0
Stage 1	576	576	-	594	594	-	-	-	-	-	-	-
Stage 2	594	595	-	596	593	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	170	193	517	165	188	558	986	-	-	1051	-	-
Stage 1	503	502	-	491	493	-	-	-	-	-	-	-
Stage 2	491	492	-	490	493	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	160	180	513	143	175	553	982	-	-	1047	-	-
Mov Cap-2 Maneuver	160	180	-	143	175	-	-	-	-	-	-	-
Stage 1	472	498	-	461	463	-	-	-	-	-	-	-
Stage 2	460	462	-	447	489	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.2	30.3	0.6	0
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	982	-	-	221	148	1047	-	-
HCM Lane V/C Ratio	0.041	-	-	0.433	0.037	0.002	-	-
HCM Control Delay (s)	8.8	0	-	33.2	30.3	8.4	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2	0.1	0	-	-

Intersection	
Int Delay, s/veh	22.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	3	23	2	1	0	47	861	2	4	892	57
Future Vol, veh/h	50	3	23	2	1	0	47	861	2	4	892	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	3	25	2	1	0	51	936	2	4	970	62

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2059	2059	1011	2072	2089	947	1037	0	0	943	0	0
Stage 1	1014	1014	-	1044	1044	-	-	-	-	-	-	-
Stage 2	1045	1045	-	1028	1045	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 40	55	291	40	53	317	670	-	-	727	-	-
Stage 1	288	316	-	277	306	-	-	-	-	-	-	-
Stage 2	276	306	-	283	306	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 34	45	289	30	44	314	667	-	-	724	-	-
Mov Cap-2 Maneuver	~ 34	45	-	30	44	-	-	-	-	-	-	-
Stage 1	241	311	-	232	256	-	-	-	-	-	-	-
Stage 2	230	256	-	251	301	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 551.5	121.8	0.6	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	667	-	-	47	34	724	-	-
HCM Lane V/C Ratio	0.077	-	-	1.758	0.096	0.006	-	-
HCM Control Delay (s)	10.8	0	-	$ 551.5	121.8	10	0	-
HCM Lane LOS	B	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.2	-	-	8.2	0.3	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	28.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	50	3	35	4	1	0	59	869	4	4	900	57
Future Vol, veh/h	50	3	35	4	1	0	59	869	4	4	900	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	3	38	4	1	0	64	945	4	4	978	62

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2104	2105	1019	2124	2134	957	1045	0	0	954	0	0
Stage 1	1023	1023	-	1080	1080	-	-	-	-	-	-	-
Stage 2	1081	1082	-	1044	1054	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 38	51	288	36	49	313	666	-	-	720	-	-
Stage 1	284	313	-	264	294	-	-	-	-	-	-	-
Stage 2	264	294	-	277	303	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 31	40	286	24	38	310	663	-	-	717	-	-
Mov Cap-2 Maneuver	~ 31	40	-	24	38	-	-	-	-	-	-	-
Stage 1	225	308	-	209	233	-	-	-	-	-	-	-
Stage 2	208	233	-	234	298	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 625	176.9	0.7	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	663	-	-	49	26	717	-	-
HCM Lane V/C Ratio	0.097	-	-	1.952	0.209	0.006	-	-
HCM Control Delay (s)	11	0	-	$ 625	176.9	10.1	0	-
HCM Lane LOS	B	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	9.6	0.6	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

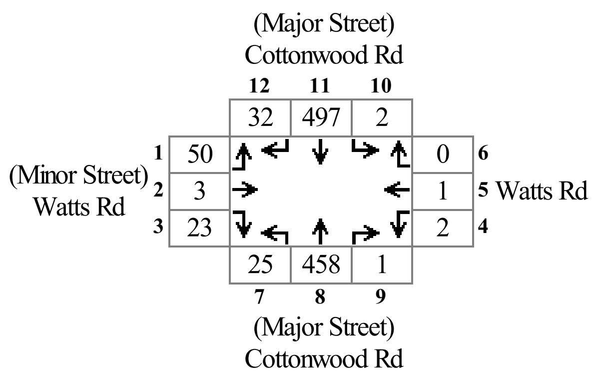
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	3	35	4	1	0	59	869	4	4	900	57
Future Volume (veh/h)	50	3	35	4	1	0	59	869	4	4	900	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1750	1863	1750	1750	1863	1750	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	54	3	38	4	1	0	64	945	4	4	978	62
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	5	48	217	41	0	76	1239	970	7	1160	908
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.00	0.09	1.00	1.00	0.00	0.62	0.62
Sat Flow, veh/h	840	57	598	1209	510	0	1634	1863	1458	1634	1863	1458
Grp Volume(v), veh/h	95	0	0	5	0	0	64	945	4	4	978	62
Grp Sat Flow(s),veh/h/ln	1496	0	0	1719	0	0	1634	1863	1458	1634	1863	1458
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.1	22.5	0.9
Cycle Q Clear(g_c), s	3.4	0.0	0.0	0.1	0.0	0.0	2.1	0.0	0.0	0.1	22.5	0.9
Prop In Lane	0.57		0.40	0.80		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	0	0	258	0	0	76	1239	970	7	1160	908
V/C Ratio(X)	0.42	0.00	0.00	0.02	0.00	0.00	0.84	0.76	0.00	0.57	0.84	0.07
Avail Cap(c_a), veh/h	601	0	0	622	0	0	121	1239	970	121	1160	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.69	0.69	0.69	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	0.0	22.9	0.0	0.0	24.3	0.0	0.0	26.8	8.1	4.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.0	0.0	0.0	18.0	3.1	0.0	56.2	7.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.1	0.0	0.0	1.3	1.1	0.0	0.2	13.6	0.4
LnGrp Delay(d),s/veh	25.6	0.0	0.0	22.9	0.0	0.0	42.3	3.1	0.0	83.0	15.6	4.2
LnGrp LOS	C			C			D	A	A	F	B	A
Approach Vol, veh/h		95			5			1013			1044	
Approach Delay, s/veh		25.6			22.9			5.6			15.2	
Approach LOS		C			C			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.7	40.4		8.8	7.0	38.1		8.8
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	4.0	18.0		18.0	4.0	18.0		18.0
Max Q Clear Time (g_c+I1), s	2.1	2.0		5.4	4.1	24.5		2.1
Green Ext Time (p_c), s	0.0	9.2		0.2	0.0	0.0		0.3

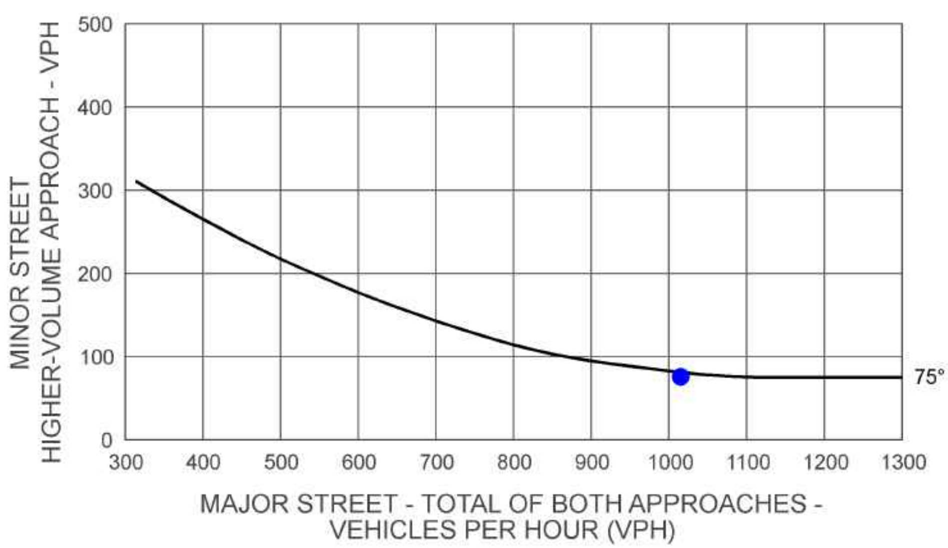
Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: PM Existing
Intersection #: 1

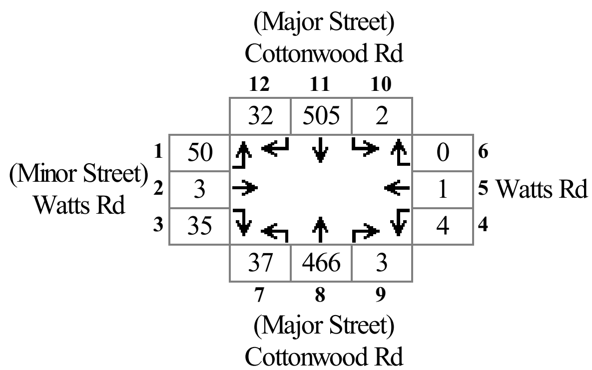


Major Total: 1015
Minor High Volume: 76

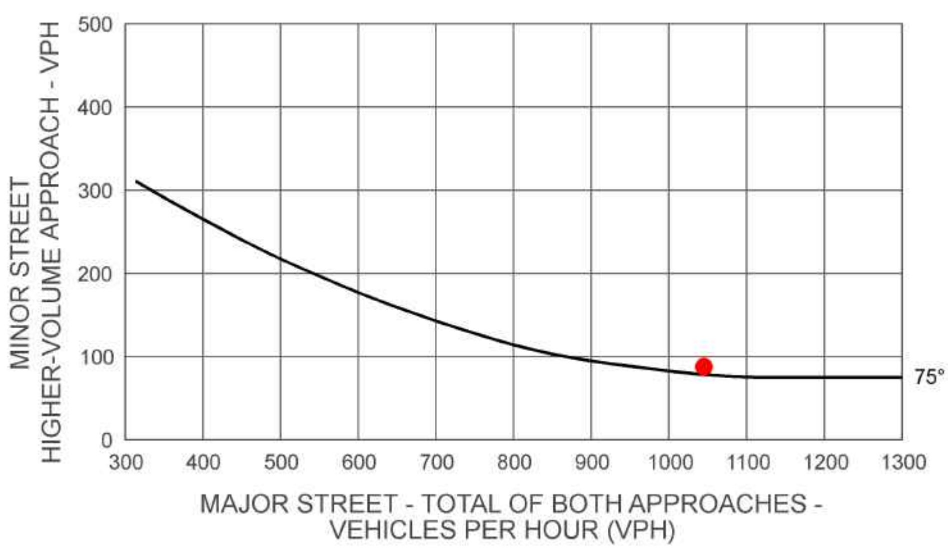


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Existing+Project
Intersection #: 1

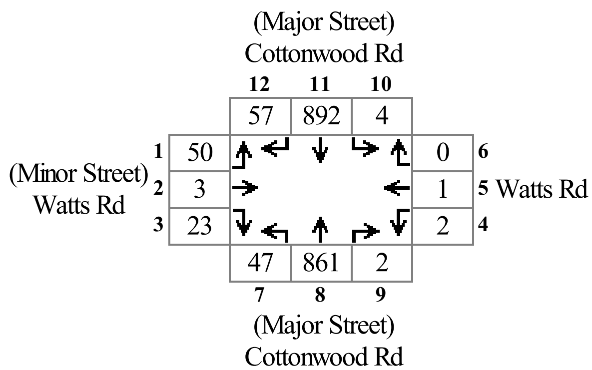


Major Total: 1045
Minor High Volume: 88

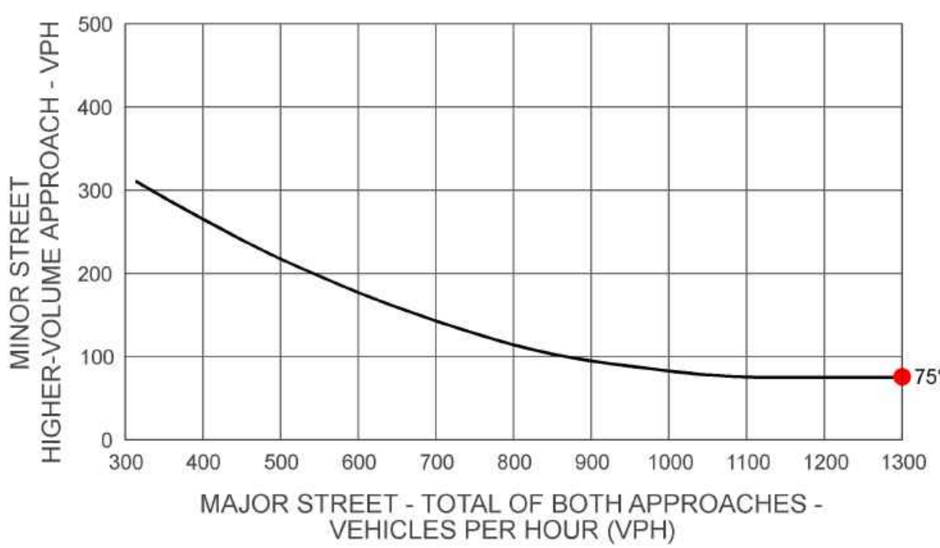


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Future
Intersection #: 1



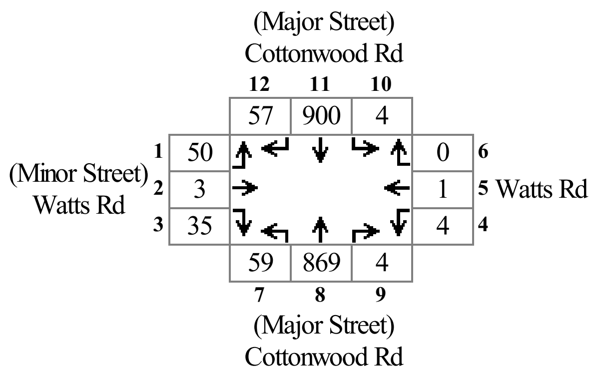
Major Total: 1863
Minor High Volume: 76



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

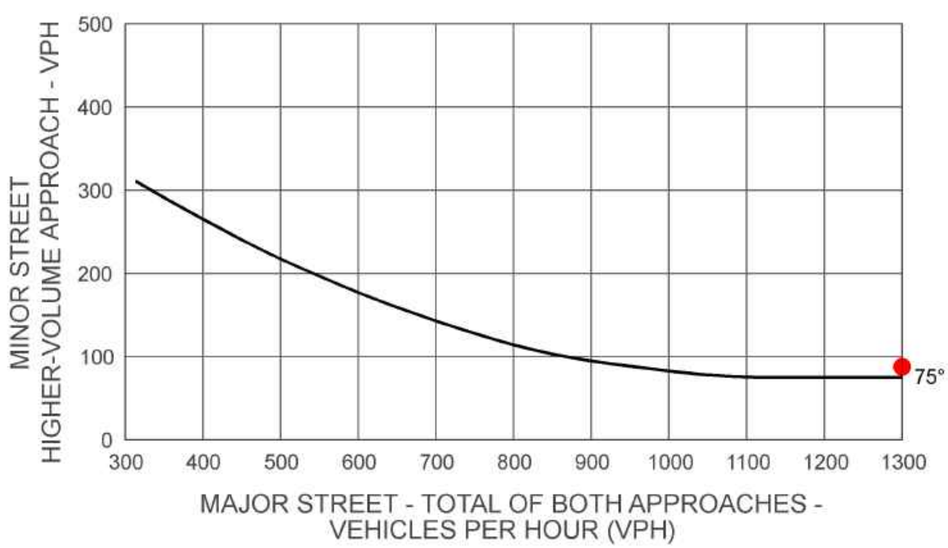
Scenario: PM Future+Project

Intersection #: 1



Major Total: 1893

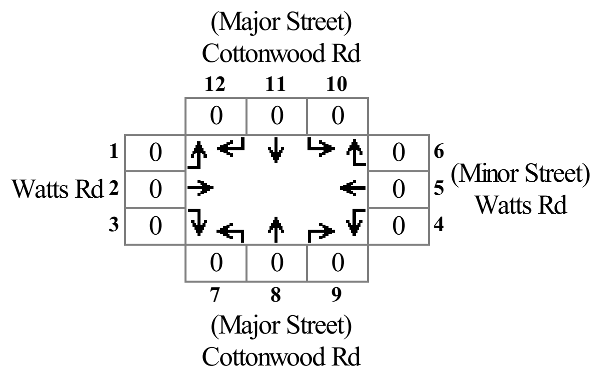
Minor High Volume: 88



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

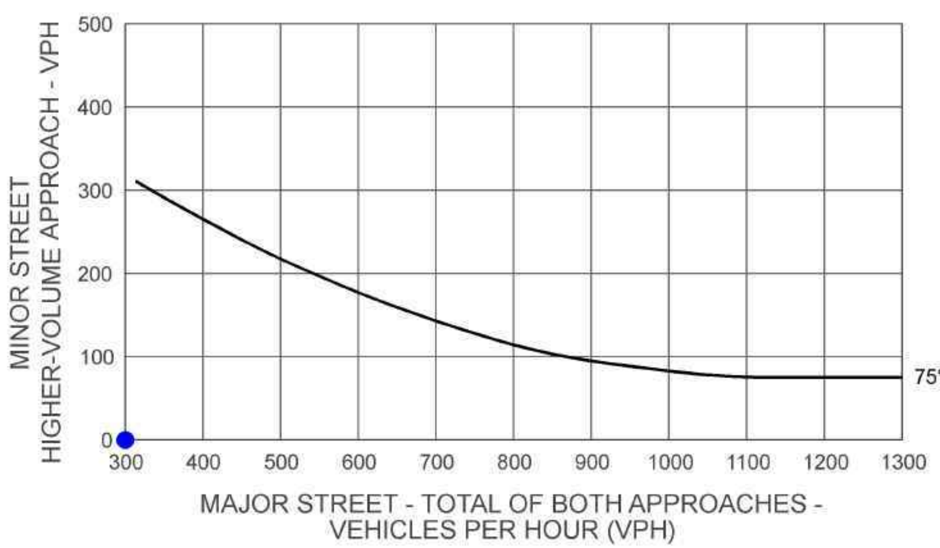
Scenario: AM Existing

Intersection #: 1



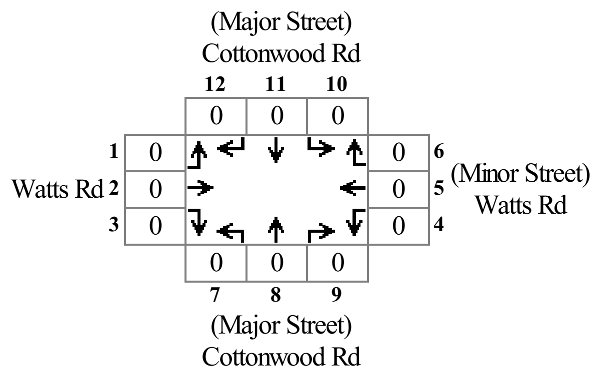
Major Total: 0

Minor High Volume: 0

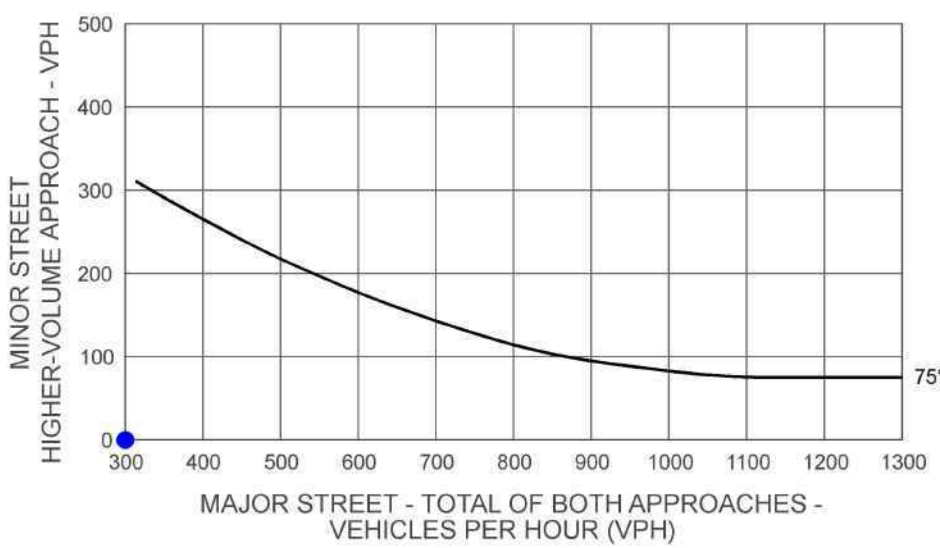


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Existing+Project
Intersection #: 1

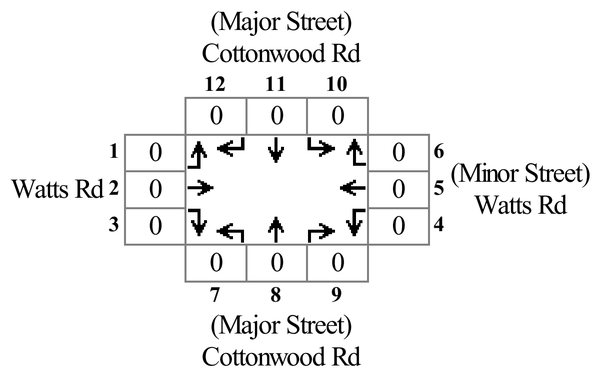


Major Total: 0
Minor High Volume: 0

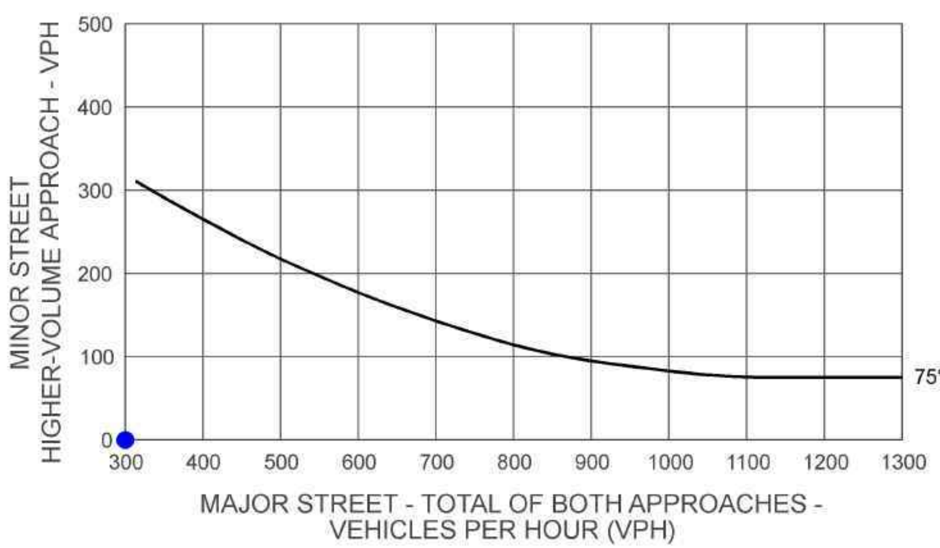


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Future
Intersection #: 1



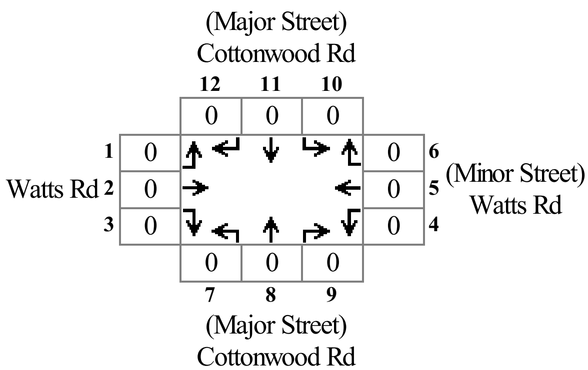
Major Total: 0
Minor High Volume: 0



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

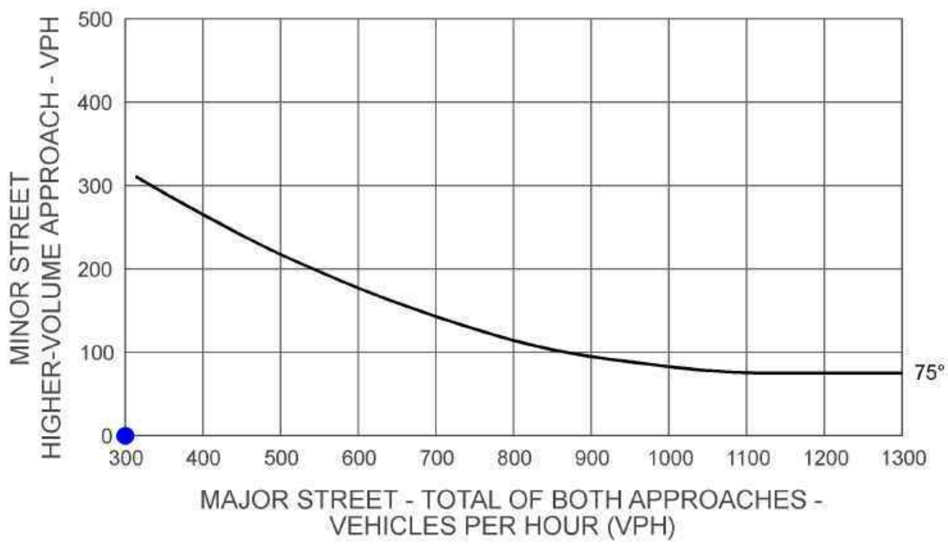
Scenario: AM Future+Project

Intersection #: 1



Major Total:0

Minor High Volume:0



Intersection 2
Cottonwood Rd & E Planz Rd

Intersection	
Intersection Delay, s/veh	19.9
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	34	23	25	0	18	13	12	0	24	424	8	0	10	454	46
Future Vol, veh/h	0	34	23	25	0	18	13	12	0	24	424	8	0	10	454	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	37	25	27	0	20	14	13	0	26	461	9	0	11	493	50
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.8	10.3	19.4	22.7
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	41%	42%	2%
Vol Thru, %	93%	28%	30%	89%
Vol Right, %	2%	30%	28%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	456	82	43	510
LT Vol	24	34	18	10
Through Vol	424	23	13	454
RT Vol	8	25	12	46
Lane Flow Rate	496	89	47	554
Geometry Grp	1	1	1	1
Degree of Util (X)	0.703	0.16	0.086	0.769
Departure Headway (Hd)	5.105	6.459	6.616	4.993
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	554	540	726
Service Time	3.14	4.516	4.68	3.026
HCM Lane V/C Ratio	0.7	0.161	0.087	0.763
HCM Control Delay	19.4	10.8	10.3	22.7
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	5.8	0.6	0.3	7.4

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	58	31	47	0	18	21	12	0	47	424	8	0	10	454	70
Future Vol, veh/h	0	58	31	47	0	18	21	12	0	47	424	8	0	10	454	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	63	34	51	0	20	23	13	0	51	461	9	0	11	493	76
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.5	11.2	26.7	32.8
HCM LOS	B	B	D	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	43%	35%	2%
Vol Thru, %	89%	23%	41%	85%
Vol Right, %	2%	35%	24%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	479	136	51	534
LT Vol	47	58	18	10
Through Vol	424	31	21	454
RT Vol	8	47	12	70
Lane Flow Rate	521	148	55	580
Geometry Grp	1	1	1	1
Degree of Util (X)	0.795	0.28	0.112	0.862
Departure Headway (Hd)	5.496	6.828	7.247	5.344
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	651	529	497	673
Service Time	3.582	4.832	5.256	3.427
HCM Lane V/C Ratio	0.8	0.28	0.111	0.862
HCM Control Delay	26.7	12.5	11.2	32.8
HCM Lane LOS	D	B	B	D
HCM 95th-tile Q	7.9	1.1	0.4	10

Intersection	
Intersection Delay, s/veh	54.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	34	23	25	0	18	13	12	0	43	761	14	0	19	876	89
Future Vol, veh/h	0	34	23	25	0	18	13	12	0	43	761	14	0	19	876	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	37	25	27	0	20	14	13	0	47	827	15	0	21	952	97
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.7	11.2	57.5	57.2
HCM LOS	B	B	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	41%	42%	2%
Vol Thru, %	93%	28%	30%	89%
Vol Right, %	2%	30%	28%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	818	82	43	984
LT Vol	43	34	18	19
Through Vol	761	23	13	876
RT Vol	14	25	12	89
Lane Flow Rate	889	89	47	1070
Geometry Grp	1	1	1	1
Degree of Util (X)	1	0.177	0.096	1
Departure Headway (Hd)	5.331	7.165	7.387	5.281
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	685	503	487	695
Service Time	3.364	5.181	5.408	3.314
HCM Lane V/C Ratio	1.298	0.177	0.097	1.54
HCM Control Delay	57.5	11.7	11.2	57.2
HCM Lane LOS	F	B	B	F
HCM 95th-tile Q	15.9	0.6	0.3	15.9

Intersection	
Intersection Delay, s/veh	54.9
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	58	31	47	0	18	21	12	0	66	761	14	0	19	876	113
Future Vol, veh/h	0	58	31	47	0	18	21	12	0	66	761	14	0	19	876	113
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	63	34	51	0	20	23	13	0	72	827	15	0	21	952	123
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.2	11.8	59.4	59
HCM LOS	B	B	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	43%	35%	2%
Vol Thru, %	90%	23%	41%	87%
Vol Right, %	2%	35%	24%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	841	136	51	1008
LT Vol	66	58	18	19
Through Vol	761	31	21	876
RT Vol	14	47	12	113
Lane Flow Rate	914	148	55	1096
Geometry Grp	1	1	1	1
Degree of Util (X)	1	0.295	0.119	1
Departure Headway (Hd)	5.652	7.195	7.697	5.583
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	649	501	467	657
Service Time	3.702	5.219	5.728	3.632
HCM Lane V/C Ratio	1.408	0.295	0.118	1.668
HCM Control Delay	59.4	13.2	11.8	59
HCM Lane LOS	F	B	B	F
HCM 95th-tile Q	15.4	1.2	0.4	15.5

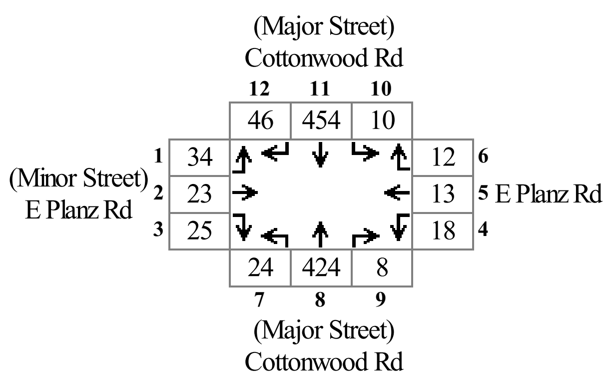
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	31	47	18	21	12	66	761	14	19	876	113
Future Volume (veh/h)	58	31	47	18	21	12	66	761	14	19	876	113
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1750	1863	1750	1750	1863	1750	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	63	34	51	20	23	13	72	827	15	21	952	123
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	70	77	143	135	57	87	1093	834	33	1031	786
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.02	0.19	0.19	0.01	0.37	0.37
Sat Flow, veh/h	532	489	537	365	941	395	1634	1863	1421	1634	1863	1421
Grp Volume(v), veh/h	148	0	0	56	0	0	72	827	15	21	952	123
Grp Sat Flow(s),veh/h/ln	1558	0	0	1701	0	0	1634	1863	1421	1634	1863	1421
Q Serve(g_s), s	3.3	0.0	0.0	0.0	0.0	0.0	2.4	22.6	0.5	0.7	26.4	3.1
Cycle Q Clear(g_c), s	4.8	0.0	0.0	1.5	0.0	0.0	2.4	22.6	0.5	0.7	26.4	3.1
Prop In Lane	0.43		0.34	0.36		0.23	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	318	0	0	334	0	0	87	1093	834	33	1031	786
V/C Ratio(X)	0.47	0.00	0.00	0.17	0.00	0.00	0.82	0.76	0.02	0.64	0.92	0.16
Avail Cap(c_a), veh/h	606	0	0	628	0	0	121	1093	834	121	1031	786
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.75	0.75	0.75	0.33	0.33	0.33
Uniform Delay (d), s/veh	21.8	0.0	0.0	20.5	0.0	0.0	26.3	18.1	9.2	26.4	15.9	8.6
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.2	0.0	0.0	20.9	3.7	0.0	6.7	5.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	0.8	0.0	0.0	1.6	12.8	0.2	0.4	15.3	1.3
LnGrp Delay(d),s/veh	22.9	0.0	0.0	20.7	0.0	0.0	47.2	21.8	9.2	33.2	21.8	8.7
LnGrp LOS	C			C			D	C	A	C	C	A
Approach Vol, veh/h		148			56			914			1096	
Approach Delay, s/veh		22.9			20.7			23.6			20.5	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.6	36.2		12.2	7.4	34.4		12.2
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	4.0	18.0		18.0	4.0	18.0		18.0
Max Q Clear Time (g_c+I1), s	2.7	24.6		6.8	4.4	28.4		3.5
Green Ext Time (p_c), s	0.0	0.0		0.5	0.0	0.0		0.6

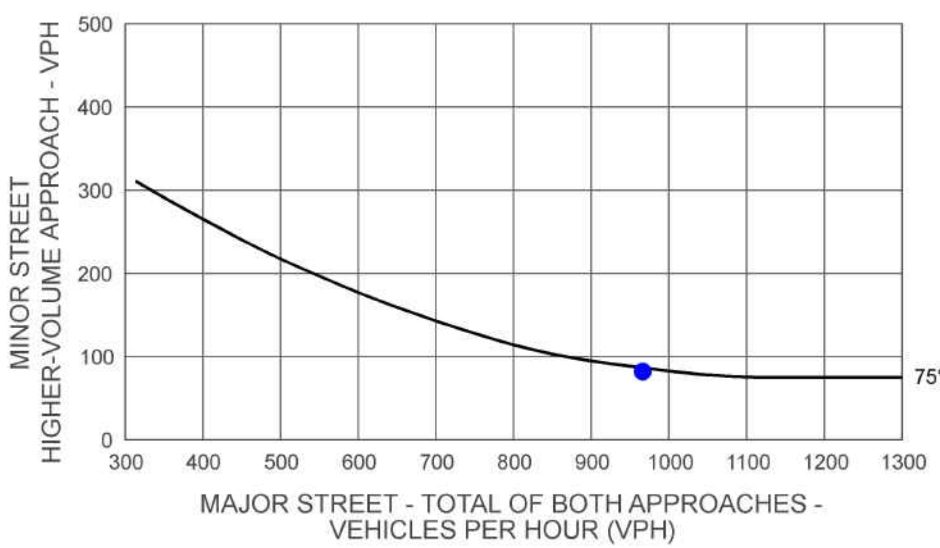
Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: PM Existing
Intersection #: 2



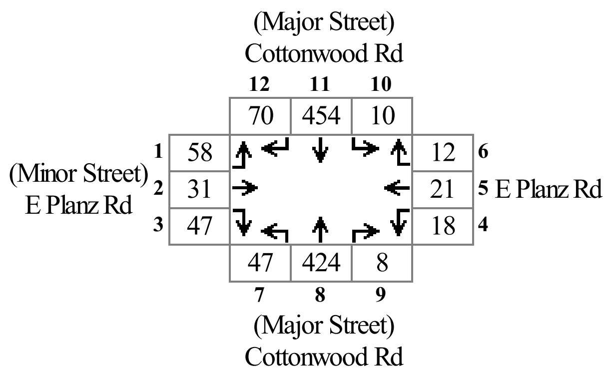
Major Total: 966
Minor High Volume: 82



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

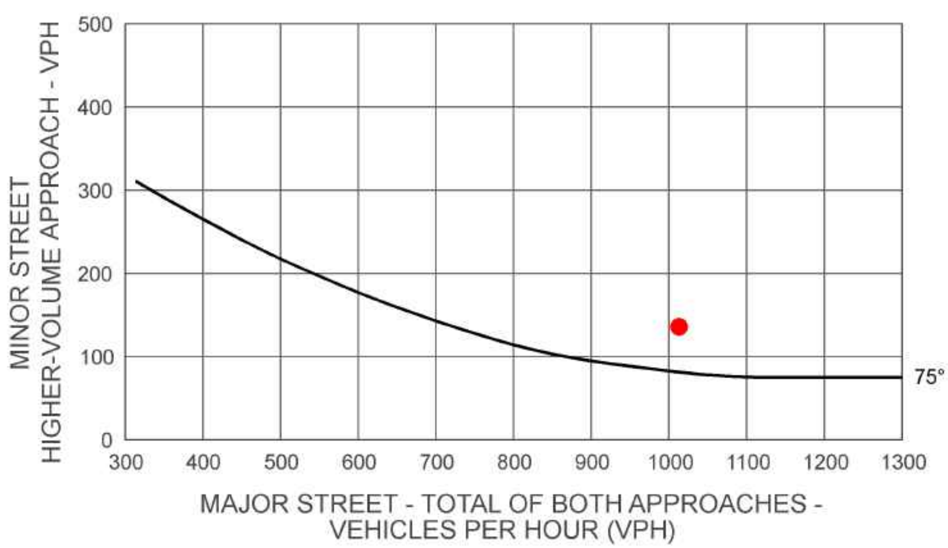
Scenario: PM Existing+Project

Intersection #: 2



Major Total: 1013

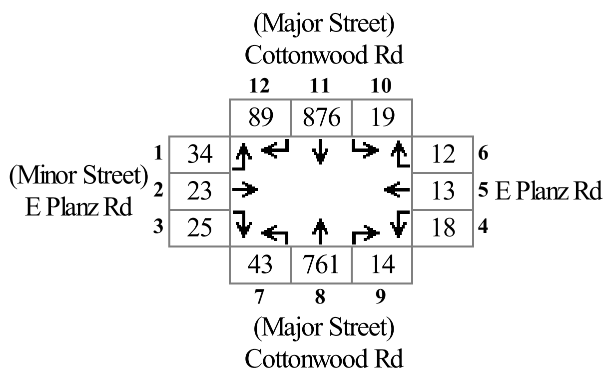
Minor High Volume: 136



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

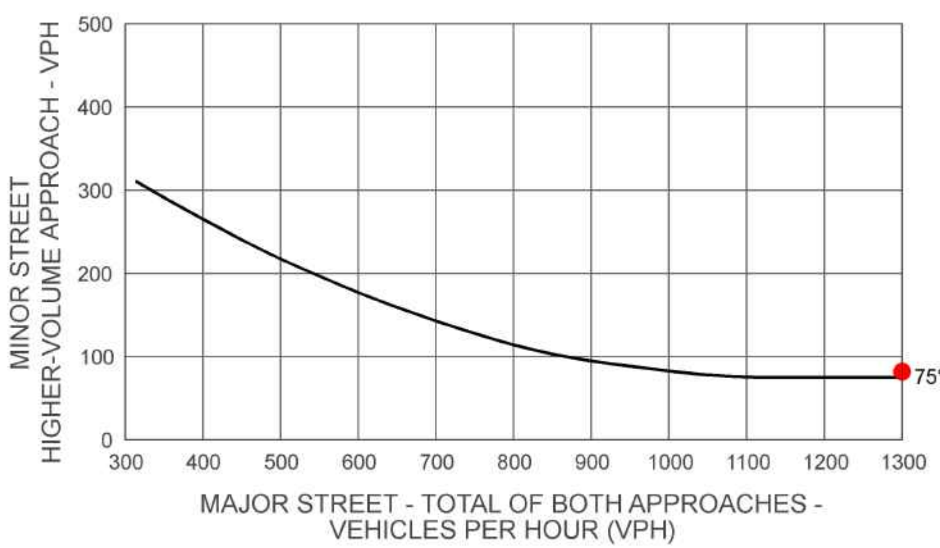
Scenario: PM Future

Intersection #: 2



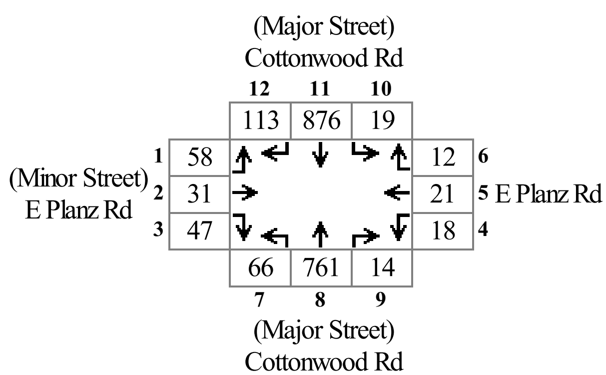
Major Total: 1802

Minor High Volume: 82

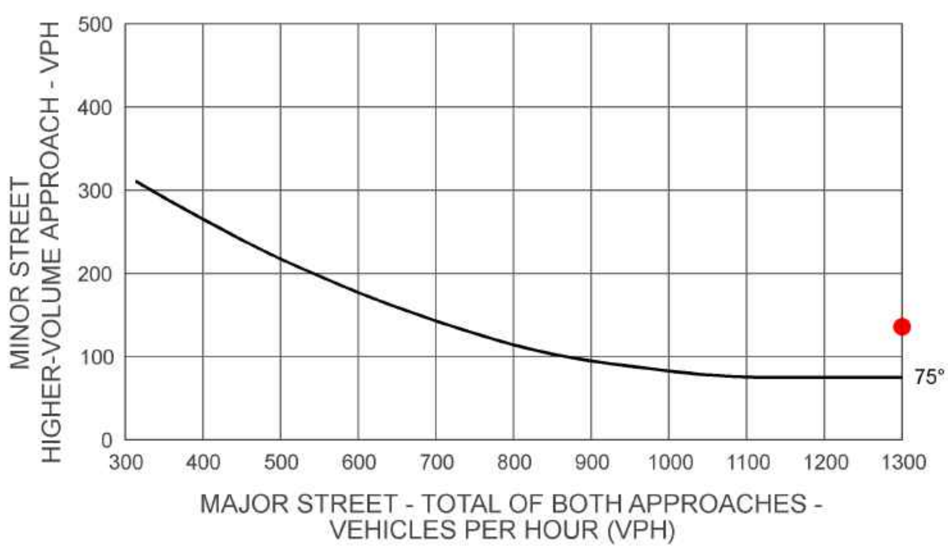


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Future+Project
Intersection #: 2

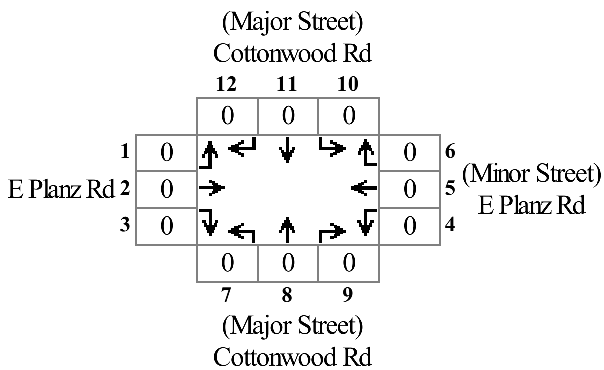


Major Total: 1849
Minor High Volume: 136

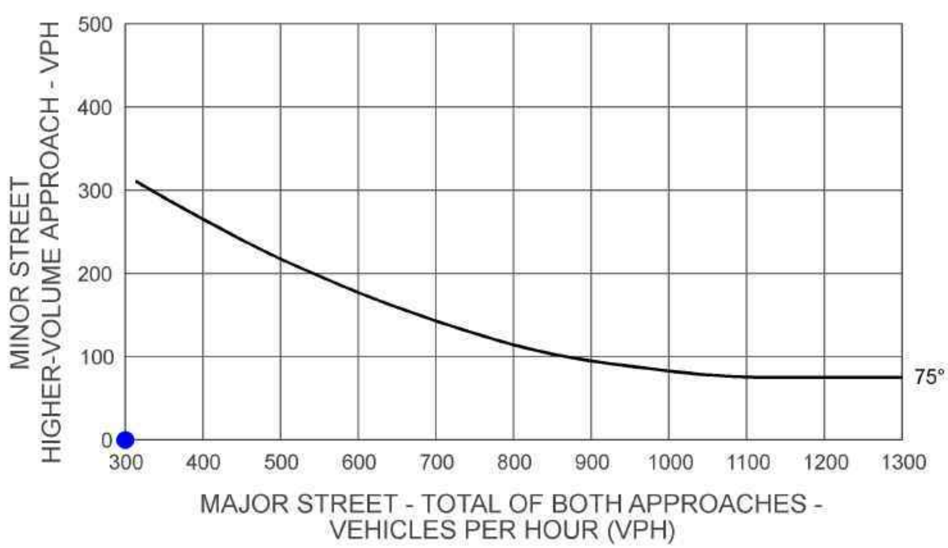


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Existing
Intersection #: 2

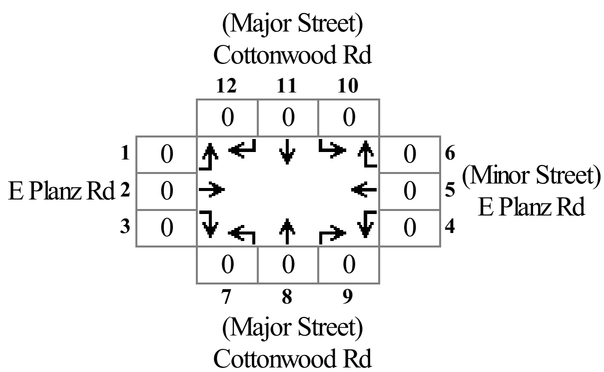


Major Total: 0
Minor High Volume: 0

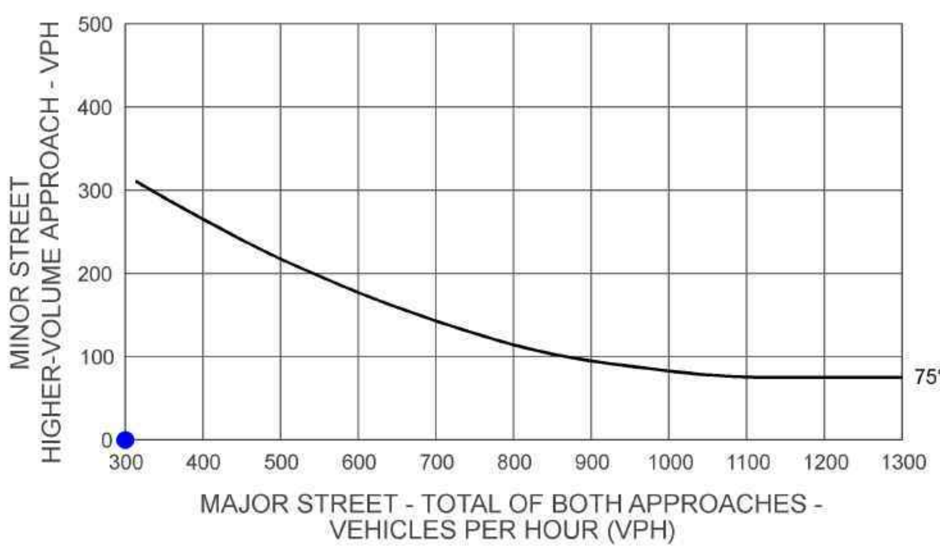


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Existing+Project
Intersection #: 2



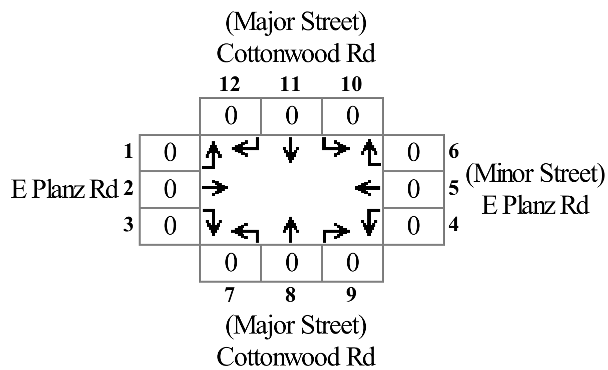
Major Total: 0
Minor High Volume: 0



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

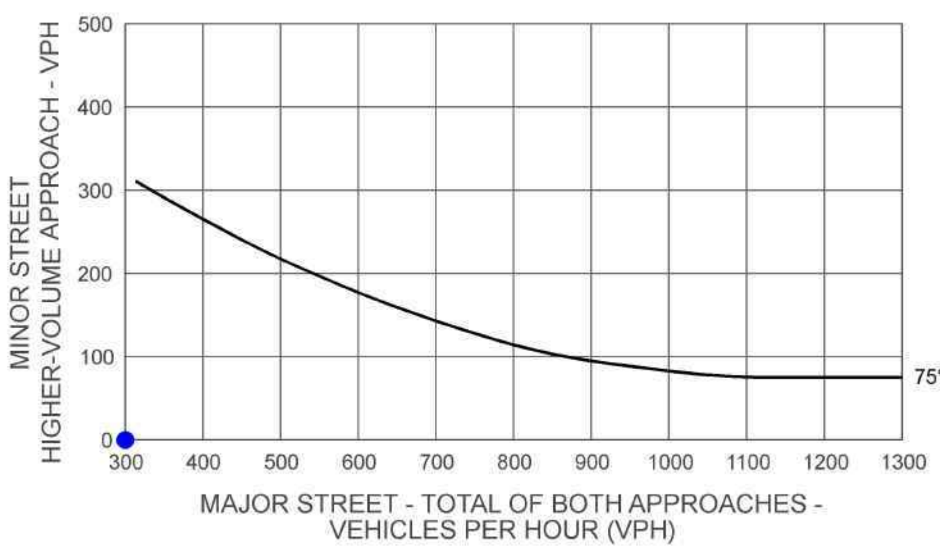
Scenario: AM Future

Intersection #: 2



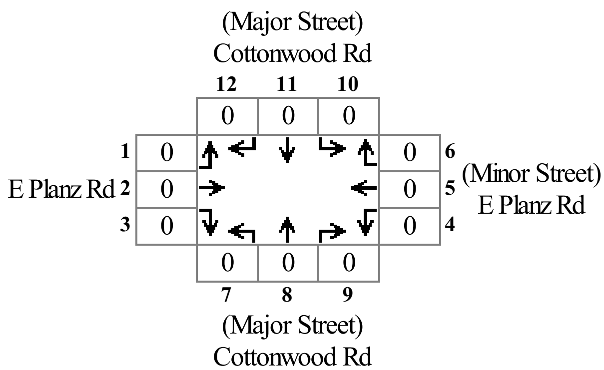
Major Total: 0

Minor High Volume: 0

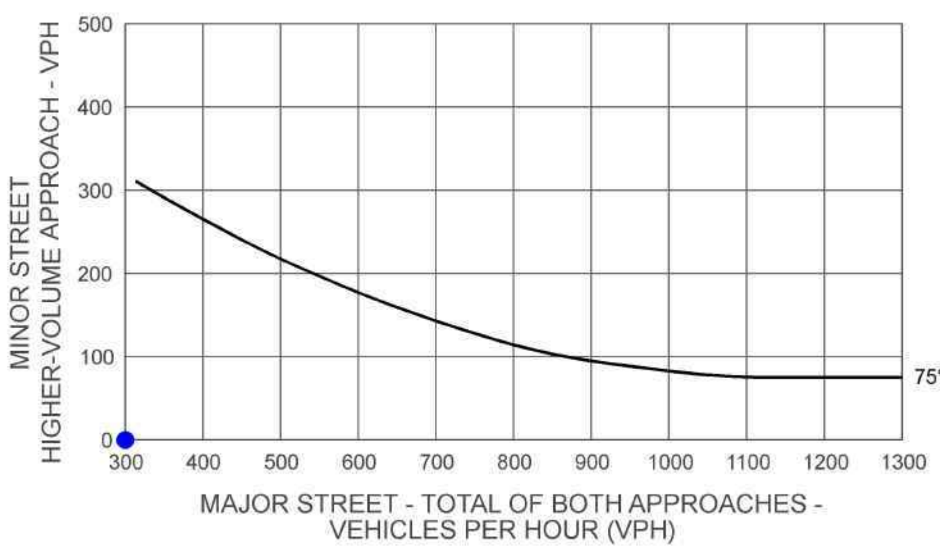


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Future+Project
Intersection #: 2



Major Total: 0
Minor High Volume: 0



Intersection 3
Cottonwood Rd & White Ln

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	79	53	65	381	389	86
Future Vol, veh/h	79	53	65	381	389	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	86	58	71	414	423	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1025	475	516	0	-	0
Stage 1	470	-	-	-	-	-
Stage 2	555	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	260	590	1050	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	575	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	237	588	1046	-	-	-
Mov Cap-2 Maneuver	237	-	-	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	524	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26	1.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1046	-	312	-	-
HCM Lane V/C Ratio	0.068	-	0.46	-	-
HCM Control Delay (s)	8.7	0	26	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	88	53	65	395	402	95
Future Vol, veh/h	88	53	65	395	402	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	58	71	429	437	103

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1060	494	540	0	-	0
Stage 1	489	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	248	575	1028	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	225	573	1024	-	-	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	514	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.2	1.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1024	-	292	-	-
HCM Lane V/C Ratio	0.069	-	0.525	-	-
HCM Control Delay (s)	8.8	0	30.2	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	2.8	-	-

Intersection	
Int Delay, s/veh	72.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	131	88	107	630	643	142
Future Vol, veh/h	131	88	107	630	643	142
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	142	96	116	685	699	154

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1693	781	853	0	-	0
Stage 1	776	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 102	395	786	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 78	393	783	-	-	-
Mov Cap-2 Maneuver	~ 78	-	-	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	297	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 572.2	1.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	783	-	115	-	-
HCM Lane V/C Ratio	0.149	-	2.07	-	-
HCM Control Delay (s)	10.4	0	$ 572.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.5	-	19.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	89.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	140	88	107	644	656	151
Future Vol, veh/h	140	88	107	644	656	151
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	96	116	700	713	164

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1728	800	877	0	-	0
Stage 1	795	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 97	385	770	-	-	-
Stage 1	445	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 73	383	767	-	-	-
Mov Cap-2 Maneuver	~ 73	-	-	-	-	-
Stage 1	445	-	-	-	-	-
Stage 2	288	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 695.5	1.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	767	-	106	-	-
HCM Lane V/C Ratio	0.152	-	2.338	-	-
HCM Control Delay (s)	10.5	0	$ 695.5	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.5	-	22	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	140	88	107	644	656	151
Future Volume (veh/h)	140	88	107	644	656	151
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1750	1716	1863	1863	1716
Adj Flow Rate, veh/h	152	96	116	700	713	164
Adj No. of Lanes	0	0	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	186	117	121	1189	896	701
Arrive On Green	0.20	0.20	0.07	0.64	0.16	0.16
Sat Flow, veh/h	953	602	1634	1863	1863	1458
Grp Volume(v), veh/h	249	0	116	700	713	164
Grp Sat Flow(s),veh/h/ln	1562	0	1634	1863	1863	1458
Q Serve(g_s), s	8.2	0.0	3.8	11.8	19.9	5.3
Cycle Q Clear(g_c), s	8.2	0.0	3.8	11.8	19.9	5.3
Prop In Lane	0.61	0.39	1.00			1.00
Lane Grp Cap(c), veh/h	305	0	121	1189	896	701
V/C Ratio(X)	0.82	0.00	0.96	0.59	0.80	0.23
Avail Cap(c_a), veh/h	521	0	121	1189	896	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.32	0.32
Uniform Delay (d), s/veh	20.8	0.0	24.9	5.7	20.2	14.0
Incr Delay (d2), s/veh	5.4	0.0	68.6	2.1	2.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	4.0	6.5	10.9	2.2
LnGrp Delay(d),s/veh	26.2	0.0	93.5	7.8	22.6	14.3
LnGrp LOS	C		F	A	C	B
Approach Vol, veh/h	249			816	877	
Approach Delay, s/veh	26.2			20.0	21.1	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		39.0		15.0	8.5	30.5		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		18.0		18.0	4.0	18.0		
Max Q Clear Time (g_c+I1), s		13.8		10.2	5.8	21.9		
Green Ext Time (p_c), s		2.7		0.5	0.0	0.0		

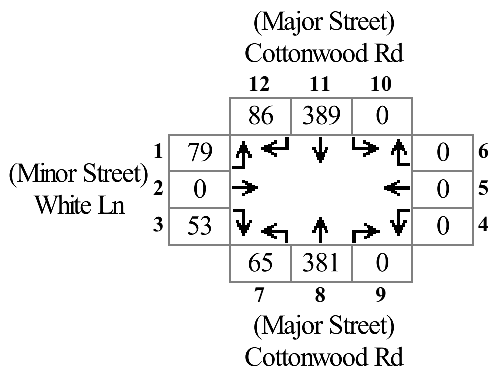
Intersection Summary	
HCM 2010 Ctrl Delay	21.3
HCM 2010 LOS	C

Notes

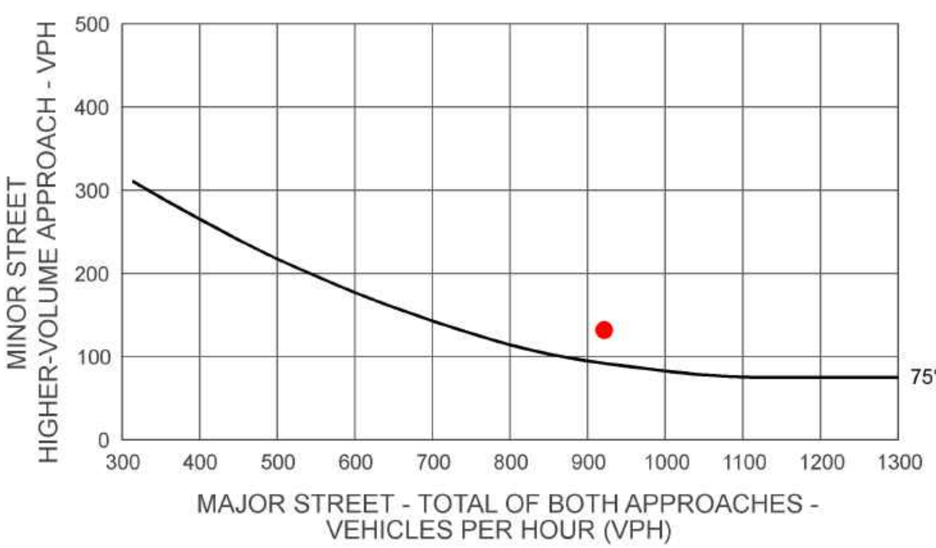
User approved volume balancing among the lanes for turning movement.

Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Existing
Intersection #: 3



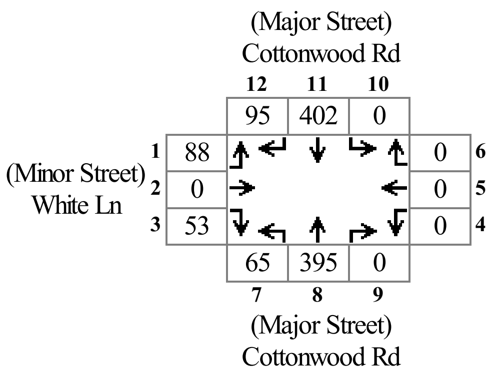
Major Total: 921
Minor High Volume: 132



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

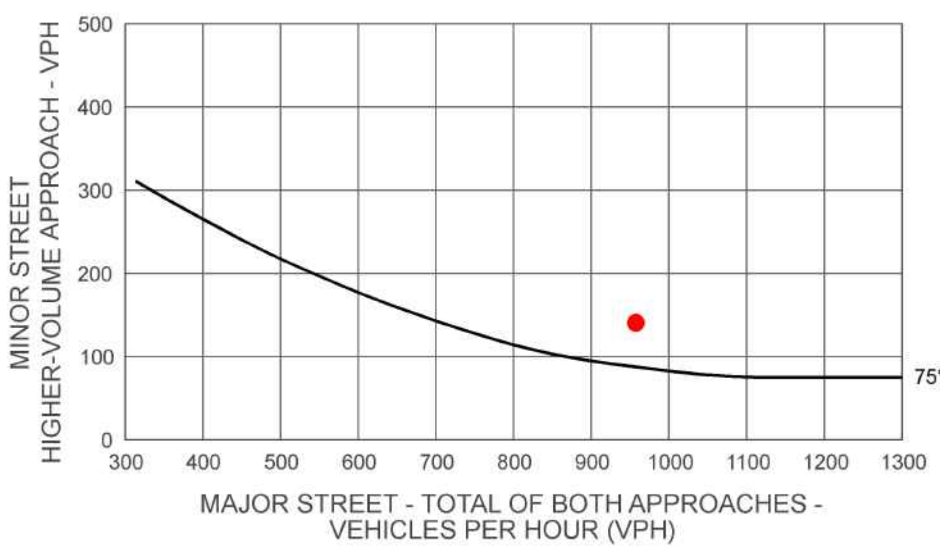
Scenario: PM Existing+Project

Intersection #: 3



Major Total: 957

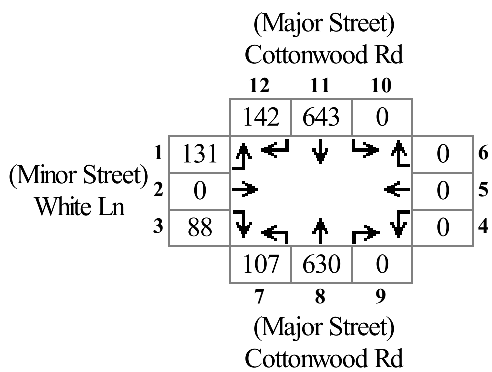
Minor High Volume: 141



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

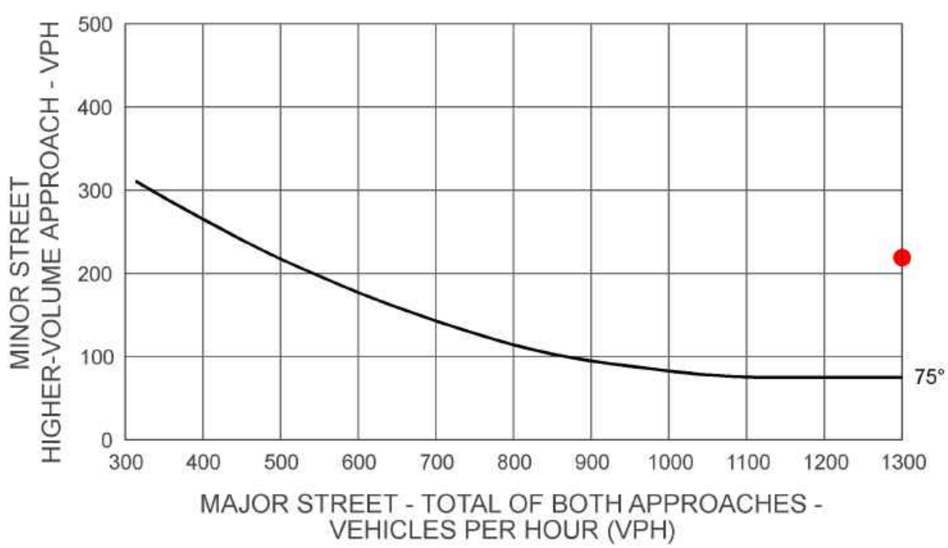
Scenario: PM Future

Intersection #: 3



Major Total: 1522

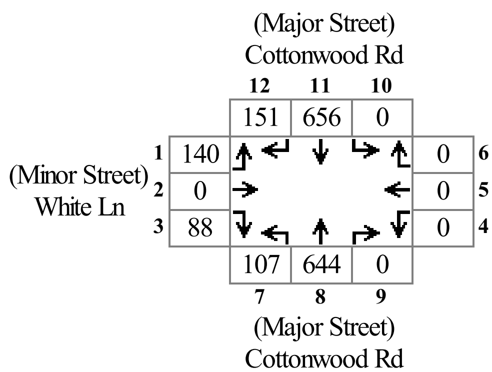
Minor High Volume: 219



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

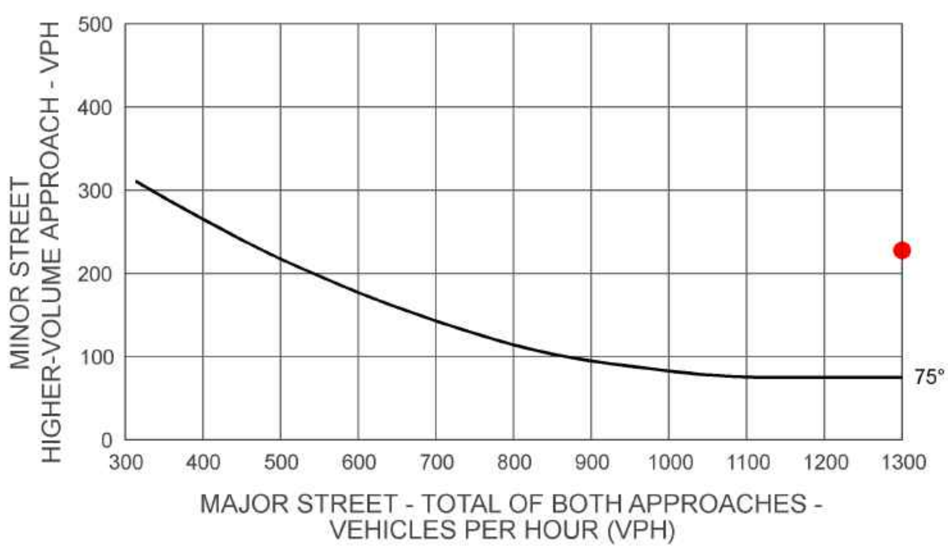
Scenario: PM Future+Project

Intersection #: 3



Major Total: 1558

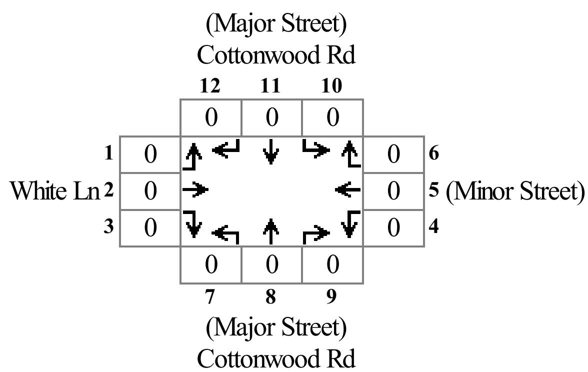
Minor High Volume: 228



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

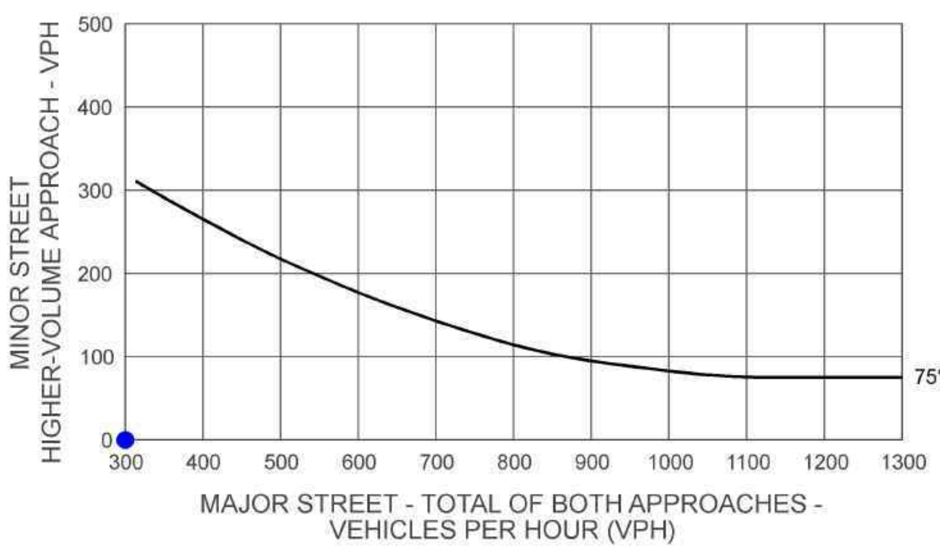
Scenario: AM Existing

Intersection #: 3



Major Total: 0

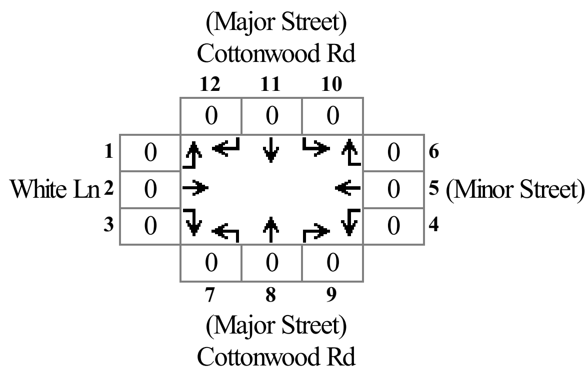
Minor High Volume: 0



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

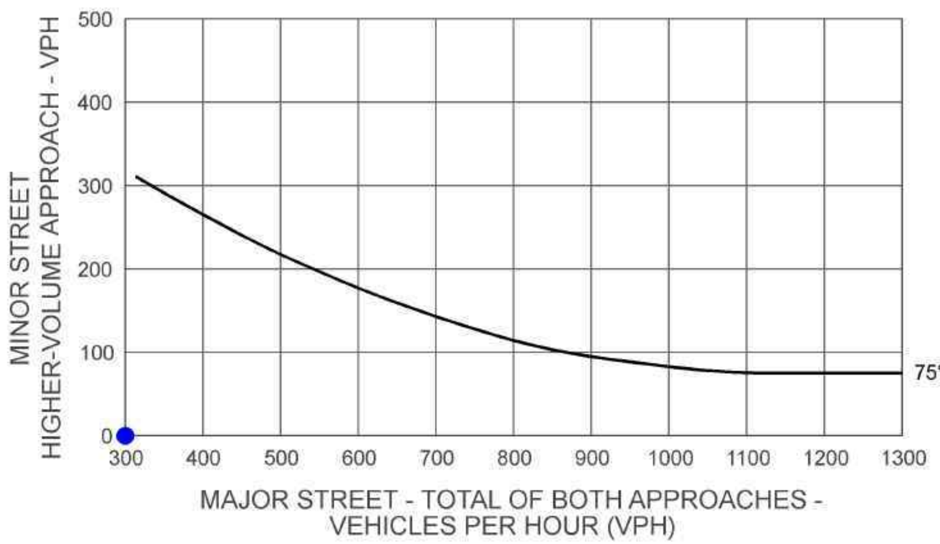
Scenario: AM Existing+Project

Intersection #: 3



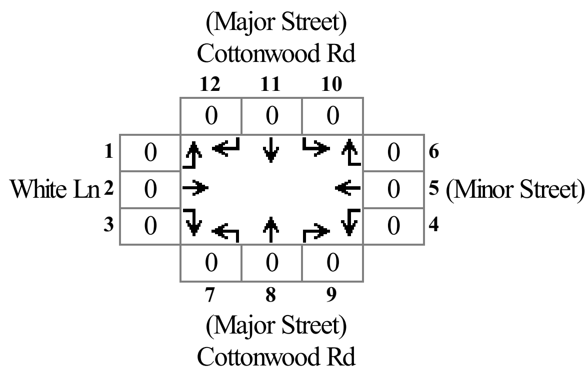
Major Total: 0

Minor High Volume: 0

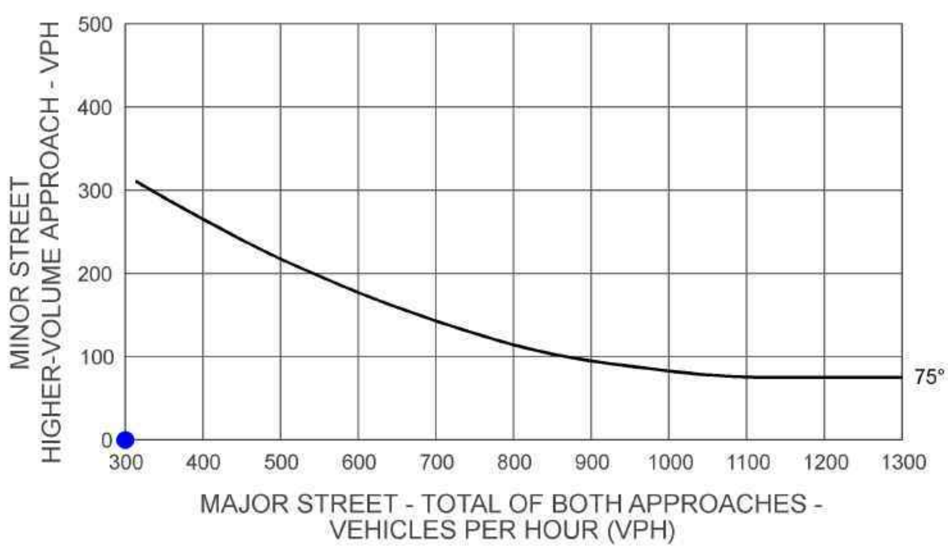


Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Future
Intersection #: 3



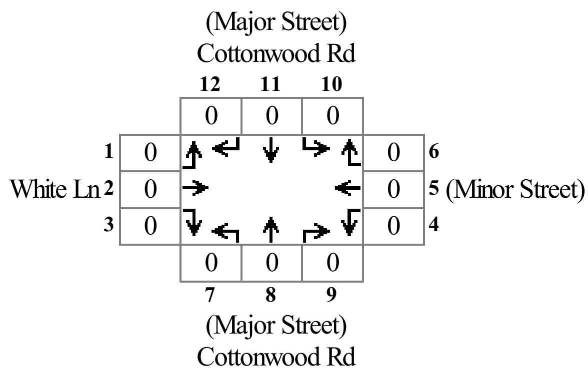
Major Total: 0
Minor High Volume: 0



Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

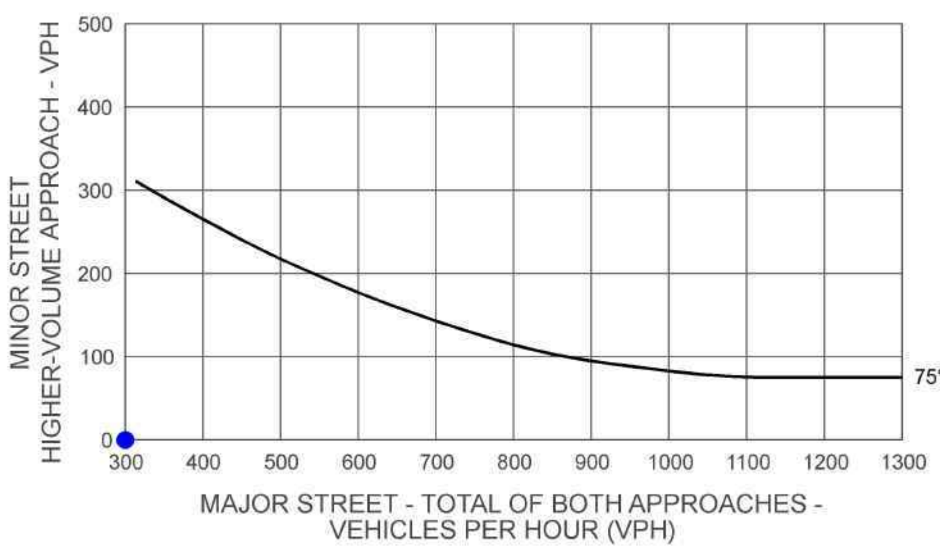
Scenario: AM Future+Project

Intersection #: 3



Major Total: 0

Minor High Volume: 0



Vehicle Turn Movement Data

VEHICLE TURNING MOVEMENT COUNT

#1 Cottonwood Rd & Watts Rd - PM PEAK HOUR

LOCATION #:	1	PEAK HOUR	4:30 AM to 5:30 AM
NORTH / SOUTH:	Cottonwood Rd	DATE:	12/06/2018
EAST / WEST:	Watts Rd	VICINITY:	Bakersfield, CA

DIRECTION:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTALS:
4:30 AM	5	137	0	0	118	7	12	2	6	1	0	0	288
4:45 AM	8	121	1	1	128	6	16	1	4	1	0	0	287
5:00 AM	8	106	0	1	131	8	7	0	7	0	0	0	268
5:15 AM	4	94	0	0	120	11	15	0	6	0	1	0	251

VOLUME STATS:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
TOTAL:	25	458	1	2	497	32	50	3	23	2	1	0	1094
[1]PHF:		0.852			0.948			0.905			0.750		0.950

[1]Peak Hour Factor (directional aggregate)

VEHICLE TURNING MOVEMENT COUNT

#2 Cottonwood Rd & E Planz Rd - PM PEAK HOUR

LOCATION #:	2	PEAK HOUR	4:30 AM to 5:30 AM
NORTH / SOUTH:	Cottonwood Rd	DATE:	12/06/2018
EAST / WEST:	E Planz Rd	VICINITY:	Bakersfield, CA

DIRECTION:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTALS:
4:30 AM	4	128	1	4	110	9	7	2	12	8	7	3	295
4:45 AM	10	103	2	1	106	11	11	12	3	4	1	2	266
5:00 AM	6	98	2	4	130	10	8	5	5	4	4	5	281
5:15 AM	4	95	3	1	108	16	8	4	5	2	1	2	249
VOLUME STATS:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
TOTAL:	24	424	8	10	454	46	34	23	25	18	13	12	1091
[1]PHF:		0.857			0.885			0.788			0.597		0.925

[1]Peak Hour Factor (directional aggregate)

VEHICLE TURNING MOVEMENT COUNT

#3 Cottonwood Rd & White Ln - PM PEAK HOUR

LOCATION #:	3	PEAK HOUR	4:30 AM to 5:30 AM
NORTH / SOUTH:	Cottonwood Rd	DATE:	12/06/2018
EAST / WEST:	White Ln	VICINITY:	Bakersfield, CA

DIRECTION:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTALS:
4:30 AM	15	116	0	0	89	25	18	0	7	0	0	0	270
4:45 AM	20	104	0	0	97	16	17	0	19	0	0	0	273
5:00 AM	18	82	0	0	103	24	25	0	18	0	0	0	270
5:15 AM	12	79	0	0	100	21	19	0	9	0	0	0	240

VOLUME STATS:	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
TOTAL:	65	381	0	0	389	86	79	0	53	0	0	0	1053
[1]PHF:		0.851			0.935			0.767			0.000		0.964

[1]Peak Hour Factor (directional aggregate)