

Appendix A
Air Quality and Greenhouse Gas Report
Giroux and Associates

AIR QUALITY IMPACT ANALYSIS
520 SOUTH EUCLID CAR WASH
CITY OF FULLERTON, CALIFORNIA

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METEOROLOGY CLIMATE

The project site's climate, as with all Southern California, is dominated by the strength and position of the semi-permanent high pressure pattern over the Pacific Ocean near Hawaii. It creates cool summers, mild winters, and infrequent rainfall. It drives the cool daytime sea breeze, and it maintains comfortable humidity levels and ample sunshine after the frequent morning clouds dissipate. Unfortunately, the same atmospheric processes that create the desirable living climate combine to restrict the ability of the atmosphere to disperse the air pollution generated by the large population attracted in part by the desirable climate. Portions of the Los Angeles Basin therefore experience some of the worst air quality in the nation for certain pollutants.

Temperatures in the City of Fullerton average 63 degrees annually. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby oceanic thermal reservoir. Summer afternoons reach 90 degrees on average, and winter mornings drop to 40 degrees. In contrast to the steady temperature regime, rainfall is highly variable. Measurable precipitation occurs mainly from early November to mid-April, but total amounts are generally small. Fullerton averages 15 inches of rain annually with January as the wettest month. Twenty-two days per year have measurable rain, with moderate to heavy rain (>0.50 inch in 24 hours) on seven days.

Winds in the project vicinity display several characteristic regimes. During the day, especially in summer, winds are from the southwest in the morning and from the northwest in the afternoon. Daytime wind speeds are 6 – 8 miles per hour on average. At night, especially in winter, the land becomes cooler than the ocean, and an off-shore wind of 2-4 miles per hour develops. One other important wind regime occurs when high pressure occurs over the western United States that creates hot, dry and gusty Santa Ana winds from the north and northeast across Fullerton.

The net effect of the wind pattern on air pollution is that any locally generated emissions will be carried seaward at night and toward western Riverside or San Bernardino Counties by day. Daytime ventilation is much more vigorous. Unless daytime winds rotate far into the northwest and bring air pollution from developed areas of the air basin into Fullerton, warm season air quality is better in the project vicinity than in inland valleys farther to the east. While winter mornings have strong stagnation potential because of light winds, automobiles have become sufficiently "clean" such that localized pollution "hot spots" have almost completely disappeared. Although there are still recurring violations of some clean air standards, the magnitude and frequency of those violations have diminished dramatically in the last 20-30 years in the project area.

In addition to winds that control the rate and direction of pollution dispersal, Southern California is notorious for strong temperature inversions that limit the vertical depth through which pollution can be mixed. In summer, coastal areas are characterized by a sharp discontinuity between the cool marine air at the surface and the warm, sinking air aloft within the high pressure cell over the ocean to the west. This marine/subsidence inversion allows for good local mixing, but acts like a giant lid over the basin. Air starting onshore at the beach is relatively clean, but becomes progressively more

polluted as sources continue to add pollution from below without any dilution from above. Fullerton is only moderately affected by the marine inversion such that the frequency of violations of smog standards is relatively low.

A second inversion type forms on clear, winter nights when cold air off the mountains sinks to the surface while the air aloft remains warm. This process forms radiation inversions. These inversions, in conjunction with calm winds, trap pollutants such as automobile exhaust near their source. During the long nocturnal drainage flow from land to sea, the exhaust pollutants continually accumulate within the shallow, cool layer of air near the ground. Some areas of Orange County thus may experience slightly elevated levels of carbon monoxide and nitrogen oxides because of this winter radiation inversion condition. However, the Fullerton area is not substantially affected by limited nocturnal mixing effects (no violations of CO standards) in more than 10 years. Both types of inversions occur throughout the year to some extent, but the marine inversions are very dominant during the day in summer, and radiation inversions are much stronger on winter nights when nights are long and air is cool. The governing role of these inversions in atmospheric dispersion leads to a substantially different air quality environment in summer in the South Coast Air Basin than in winter.

AIR QUALITY SETTING

AMBIENT AIR QUALITY STANDARDS (AAQS)

In order to gauge the significance of the air quality impacts of the proposed Fullerton Car Wash project, those impacts, together with existing background air quality levels, must be compared to the applicable ambient air quality standards. These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those people most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise, called "sensitive receptors." Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed. Recent research has shown, however, that chronic exposure to ozone (the primary ingredient in photochemical smog) may lead to adverse respiratory health even at concentrations close to the ambient standard.

National AAQS were established in 1971 for six pollution species with states retaining the option to add other pollutants, require more stringent compliance, or to include different exposure periods. The initial attainment deadline of 1977 was extended several times in air quality problem areas like Southern California. In 2003, the Environmental Protection Agency (EPA) adopted a rule which extended and established a new attainment deadline for ozone for the year 2021. Because the State of California had established AAQS several years before the federal action and because of unique air quality problems introduced by the restrictive dispersion meteorology, there is considerable difference between state and national clean air standards. Those

standards currently in effect in California are shown in Table 1. Sources and health effects of various pollutants are shown in Table 2.

The Federal Clean Air Act Amendments (CAAA) of 1990 required that the U.S. Environmental Protection Agency (EPA) review all national AAQS in light of currently known health effects.

EPA was charged with modifying existing standards or promulgating new ones where appropriate. EPA subsequently developed standards for chronic ozone exposure (8+ hours per day) and for very small diameter particulate matter (called "PM-2.5"). New national AAQS were adopted in 1997 for these pollutants.

Planning and enforcement of the federal standards for PM-2.5 and for ozone (8-hour) were challenged by trucking and manufacturing organizations. In a unanimous decision, the U.S. Supreme Court ruled that EPA did not require specific congressional authorization to adopt national clean air standards. The Court also ruled that health-based standards did not require preparation of a cost-benefit analysis. The Court did find, however, that there was some inconsistency between existing and "new" standards in their required attainment schedules. Such attainment-planning schedule inconsistencies centered mainly on the 8-hour ozone standard. EPA subsequently agreed to downgrade the attainment designation for a large number of communities to "non-attainment" for the 8-hour ozone standard.

Evaluation of the most current data on the health effects of inhalation of fine particulate matter prompted the California Air Resources Board (ARB) to recommend adoption of the statewide PM-2.5 standard that is more stringent than the federal standard. This standard was adopted in 2002. The State PM-2.5 standard is more of a goal in that it does not have specific attainment planning requirements like a federal clean air standard, but only requires continued progress towards attainment.

Similarly, the ARB extensively evaluated health effects of ozone exposure. A new state standard for an 8-hour ozone exposure was adopted in 2005, which mirrors the federal standard. The California 8-hour ozone standard of 0.07 ppm is more stringent than the federal 8-hour standard of 0.075 ppm. The state standard, however, does not have a specific attainment deadline. California air quality jurisdictions are required to make steady progress towards attaining state standards, but there are no hard deadlines or any consequences of non-attainment. During the same re-evaluation process, the ARB adopted an annual state standard for nitrogen dioxide (NO₂) that is more stringent than the corresponding federal standard, and strengthened the state one-hour NO₂ standard.

As part of EPA's 2002 consent decree on clean air standards, a further review of airborne particulate matter (PM) and human health was initiated. A substantial modification of federal clean air standards for PM was promulgated in 2006. Standards for PM-2.5 were strengthened, a new class of PM in the 2.5 to 10 micron size was created, some PM-10 standards were revoked, and a distinction between rural and urban air quality was adopted.

**Table 1
Ambient Air Quality Standards**

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O ₃)	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)		0.075 ppm (147 µg/m ³)		
Respirable Particulate Matter (PM ₁₀)	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 (PM _{2.5})	24 Hour	No Separate State Standard		35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15.0 µg/m ³		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m ³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		—		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	Gas Phase Chemiluminescence	53 ppb (100 µg/m ³) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m ³)		100 ppb (188 µg/m ³) (see footnote 8)	None	
Sulfur Dioxide (SO ₂)	24 Hour	0.04 ppm (105 µg/m ³)	Ultraviolet Fluorescence	—	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method) ⁹
	3 Hour	—		—	0.5 ppm (1300 µg/m ³) (see footnote 9)	
	1 Hour	0.25 ppm (655 µg/m ³)		75 ppb (196 µg/m ³) (see footnote 9)	—	
Lead ¹⁰	30 Day Average	1.5 µg/m ³	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m ³	Same as Primary Standard	
	Rolling 3-Month Average ¹¹	—		0.15 µg/m ³		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal 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 ¹⁰	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

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(continued)

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended 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 averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration 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 $150 \mu\text{g}/\text{m}^3$ 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 U.S. EPA for further clarification and current federal 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 procedure 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 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 EPA.
8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.
9. On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older pararosanine methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO_2 standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary 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.
10. 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.
11. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Table 2
Health Effects of Criteria Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	<ul style="list-style-type: none"> • Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter. 	<ul style="list-style-type: none"> • Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO ₂)	<ul style="list-style-type: none"> • Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions. 	<ul style="list-style-type: none"> • Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O ₃)	<ul style="list-style-type: none"> • Atmospheric reaction of organic gases with nitrogen oxides in sunlight. 	<ul style="list-style-type: none"> • Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	<ul style="list-style-type: none"> • Contaminated soil. 	<ul style="list-style-type: none"> • Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.
Fine Particulate Matter (PM-10)	<ul style="list-style-type: none"> • Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions. 	<ul style="list-style-type: none"> • Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardio respiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Fine Particulate Matter (PM-2.5)	<ul style="list-style-type: none"> • Fuel combustion in motor vehicles, equipment, and industrial sources. • Residential and agricultural burning. • Industrial processes. • Also, formed from photochemical reactions of other pollutants, including NO_x, sulfur oxides, and organics. 	<ul style="list-style-type: none"> • Increases respiratory disease. • Lung damage. • Cancer and premature death. • Reduces visibility and results in surface soiling.
Sulfur Dioxide (SO ₂)	<ul style="list-style-type: none"> • Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes. 	<ul style="list-style-type: none"> • Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002.

In response to continuing evidence that ozone exposure at levels just meeting federal clean air standards is demonstrably unhealthful, EPA has proposed a further strengthening of the 8-hour standard. Draft standards have been published. The likely future 8-hour standard will be 0.065 ppm. Environmental organizations generally praise this proposal. Most manufacturing, transportation or power generation groups oppose the new standard as economically unwise in an uncertain fiscal climate.

A new federal one-hour standard for nitrogen dioxide (NO₂) has also recently been adopted. This standard is more stringent than the existing state standard. Based upon air quality monitoring data in the South Coast Air Basin, the basin will likely be designated as “non-attainment” for the federal one-hour NO₂ standard. That designation will require the inclusion of NO₂ in the basin air quality management plan.

BASELINE AIR QUALITY

Existing and probable future levels of air quality in Fullerton can be best inferred from ambient air quality measurements conducted by the South Coast Air Quality Management District (SCAQMD) at its La Habra and/or Anaheim air monitoring stations. These stations measure both regional pollution levels such as dust (particulates) and smog, as well as levels of primary vehicular pollutants such as carbon monoxide.

Table 3 summarizes the last six years of the published data from a composite of gaseous species monitored at La Habra and particulates at Anaheim (there are no particulate data available from La Habra). The following conclusions can be drawn from these data:

1. Photochemical smog (ozone) levels occasionally exceed standards. The 8-hour state ozone standard has been exceeded an average of 10 times a year in the past six years. The 1-hour state standard has been violated an average of 6 times per year for the last six years near La Habra. Year 2005 was the cleanest year of recent years; however the frequency of violations rose in year 2006. While ozone levels are still high, they are much lower than 10 to 20 years ago.
2. Measurements of carbon monoxide at the La Habra station reflect the history of nocturnal air mass that has passed over heavily developed areas of the basin before following the Santa Ana River drainage toward the ocean. Despite continued basin-wide growth, maximum one- or 8-hour CO levels at the closest air monitoring station are less the 50 percent of their most stringent standards because of continued vehicular improvements. Levels are steadily declining. These data suggests that baseline CO levels in Fullerton are generally healthful and can accommodate a reasonable level of additional traffic emissions before any adverse air quality effects would be expected.
3. PM-10 levels as measured at Anaheim, periodically exceed the state standard, but no measurements in excess of the national particulate standard has been recorded in the last six years. Year 2008 had the lowest particulate pollution concentrations for the past six years.

4. Few violations of the former federal ultra-fine particulate (PM-2.5) standard of 65 $\mu\text{g}/\text{m}^3$ have been recorded in the last six years. However, the recently adopted, more stringent standard of 35 $\mu\text{g}/\text{m}^3$ has been exceeded an average of 4.6 percent of all measurement days.

Although complete attainment of every clean air standard is not yet imminent, extrapolation of the steady improvement trend suggests that such attainment could occur within the reasonably near future.

AIR QUALITY PLANNING

The Federal Clean Air Act (1977 Amendments) required that designated agencies in any area of the nation not meeting national clean air standards must prepare a plan demonstrating the steps that would bring the area into compliance with all national standards. The SCAB could not meet the deadlines for ozone, nitrogen dioxide, carbon monoxide, or PM-10. In the SCAB, the agencies designated by the governor to develop regional air quality plans are the SCAQMD and the Southern California Association of Governments (SCAG). The two agencies first adopted an Air Quality Management Plan (AQMP) in 1979 and revised it several times as earlier attainment forecasts were shown to be overly optimistic.

Table 3
Air Quality Monitoring Summary (2003-2008) (Number of Days Standards Were Exceeded, and Maximum Levels During Such Violations)
(Entries shown as ratios = samples exceeding standard/samples taken)

Pollutant/Standard	2003	2004	2005	2006	2007	2008
Ozone						
1-Hour > 0.09 ppm (S)	7	6	0	8	7	7
8-Hour > 0.07 ppm (S)	14	11	2	11	9	15
8- Hour > 0.075 ppm (F)	7	3	0	6	8	5
Max. 1-Hour Conc. (ppm)	0.16	0.10	0.09	0.15	0.15	0.10
Max. 8-Hour Conc. (ppm)	0.087	0.079	0.075	0.114	0.107	0.084
Carbon Monoxide						
1-hour > 20. ppm (S)	0	0	0	0	0	0
8- Hour > 9. ppm (S,F)	0	0	0	0	0	0
Max 1-hour Conc. (ppm)	8.0	7.0	7.0	6.0	6.0	5.0
Max 8-hour Conc. (ppm)	4.3	4.1	3.1	2.9	2.9	3.0
Inhalable Particulates (PM-10)						
24-hour > 50 $\mu\text{g}/\text{m}^3$ (S)	6/60	7/61	3/61	7/56	6/59	3/58

Pollutant/Standard	2003	2004	2005	2006	2007	2008
24-hour > 150 µg/m ³ (F)	0/61	0/61	0/61	0/150	0/59	0/58
Max. 24-Hr. Conc. (µg/m ³)	96.	74.	65.	104.	75.	61.
Ultra-Fine Particulates (PM-2.5)						
24-Hour > 65 µg/m ³ (F)	3/340	0/310	0/333	0/330	1/336	1/336
24-Hour > 35 µg/m ³ (F)*	25/340	20/319	13/333	7/314	14/336	13/335
Max. 24-Hr. Conc. (µg/m ³)	116.	59.	55.	56	79.	68.

* standard adopted in 2006

Source: South Coast AQMD - La Habra Air Monitoring Station; Anaheim Station for PM-10, PM-2.5

The 1990 Federal Clean Air Act Amendment (CAAA) required that all states with air-sheds with “serious” or worse ozone problems submit a revision to the State Implementation Plan (SIP). Amendments to the SIP have been proposed, revised and approved over the past decade. The most current regional attainment emissions forecast for ozone precursors (ROG and NO_x) and for carbon monoxide (CO) and for particulate matter are shown in Table 4. Substantial reductions in emissions of ROG, NO_x and CO are forecast to continue throughout the next several decades. Unless new particulate control programs are implemented, PM-10 and PM-2.5 are forecast to slightly increase.

Table 4
South Coast Air Basin Emissions Forecasts
(Emissions in tons/day)

Pollutant	2005^a	2010^b	2015^b	2020^b
NO_x	985	742	580	468
ROG	735	576	526	505
CO	4124	2950	2476	2203
PM-10	281	286	297	307
PM-2.5	103	102	102	103

^a2005 Base Year.

^bWith current emissions reduction programs and adopted growth forecasts.

Source: California Air Resources Board, The 2009 California Almanac of Emission & Air Quality.

The Air Quality Management District (AQMD) adopted an updated clean air “blueprint” in August 2003. The 2003 AQMP was approved by the EPA in 2004. The Air Quality Management Plan (AQMP) outlined the air pollution measures needed to meet federal health-based standards for ozone by 2010 and for particulates (PM-10) by 2006. The

2003 AQMP was based upon the federal one-hour ozone standard which was revoked late in 2005 and replaced by an 8-hour federal standard. Because of the revocation of the hourly standard, a new air quality planning cycle was initiated.

With re-designation of the air basin as non-attainment for the 8-hour ozone standard, a new attainment plan was developed and adopted in 2007. This plan shifted most of the one-hour ozone standard attainment strategies to the 8-hour standard. As previously noted, the planned attainment date for the existing 8-hour ozone standard is 2021. The 2007 attainment plan also includes strategies for ultimately meeting the federal PM-2.5 standard.

Because projected attainment by 2021 requires control technologies that do not exist yet, the SCAQMD has requested a voluntary “bump-up” from a “severe non-attainment” area to an “extreme non-attainment” designation for ozone. An extreme designation would allow a longer time period for these technologies to develop. If attainment cannot be demonstrated within the specified deadline without relying on “black-box” measures, EPA would be required to impose sanctions on the region. With an anticipated further strengthening of the federal eight-hour ozone standard, action on the bump-up request may be delayed until possible new standards are finalized. If/when that happens, new planning deadlines will be adopted and the 2007 AQMP will ultimately be modified to demonstrate compliance with the probable new federal ozone standard.

The current (2007) AQMP recognizes the interaction between photochemical processes that create both ozone and the smallest airborne particulates (PM-2.5). The 2007 AQMP is therefore a coordinated plan for both pollutants. Key emissions reductions strategies in the updated air quality plan include:

- Ultra-low emissions standards for both new and existing sources (including on-and-off-road heavy trucks, industrial and service equipment, locomotives, ships and aircraft).
- Accelerated fleet turnover to achieve benefits of cleaner engines.
- Reformulation of consumer products.
- Modernization and technology advancements from stationary sources (refineries, power plants, etc.)

Projects such as the proposed Fullerton Car Wash project do not directly relate to the AQMP in that there are no specific air quality programs or regulations governing “general” development. Conformity with adopted plans, forecasts and programs relative to population, housing, employment and land use is the primary yardstick by which impact significance of master planned growth is determined. If a given project incorporates any available transportation control measures that can be implemented on a project-specific basis, and if the scope and phasing of a project are consistent with adopted forecasts as shown in the Regional Comprehensive Plan (RCP), then the regional air quality impact of project growth would not be significant because of planning inconsistency. The SCAQMD, however, while acknowledging that the AQMP is a

growth-accommodating document, does not favor designating regional impacts as less-than-significant just because the proposed development is consistent with regional growth projections. Air quality impact significance for the proposed project has therefore been analyzed on a project-specific basis.

AIR QUALITY IMPACT

STANDARDS OF SIGNIFICANCE

Air quality impacts are considered “significant” if they cause clean air standards to be violated where they are currently met, or if they “substantially” contribute to an existing violation of standards. Any substantial emissions of air contaminants for which there is no safe exposure, or nuisance emissions such as dust or odors, would also be considered a significant impact.

Appendix G of the California CEQA Guidelines offers the following five tests of air quality impact significance. A project would have a potentially significant impact if it:

- a. Conflicts with or obstructs implementation of the applicable air quality plan.
- b. Violates any air quality standard or contributes substantially to an existing or projected air quality violation.
- c. Results in a cumulatively considerable net increase of any criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- d. Exposes sensitive receptors to substantial pollutant concentrations.
- e. Creates objectionable odors affecting a substantial number of people.

Primary Pollutants

Air quality impacts generally occur on two scales of motion. Near an individual source of emissions or a collection of sources such as a crowded intersection or parking lot, levels of those pollutants that are emitted in their already unhealthy form will be highest. Carbon monoxide (CO) is an example of such a pollutant. Primary pollutant impacts can generally be evaluated directly in comparison to appropriate clean air standards. Violations of these standards where they are currently met, or a measurable worsening of an existing or future violation, would be considered a significant impact. Many particulates, especially fugitive dust emissions, are also primary pollutants. Because of the non-attainment status of the South Coast Air Basin (SCAB) for PM-10, an aggressive dust control program is required to control fugitive dust.

Secondary Pollutants

Many pollutants, however, require time to transform from a more benign form to a more unhealthy contaminant. Their impact occurs regionally far from the source. Their incremental regional impact is minute on an individual basis and cannot be quantified except through complex photochemical computer models. Analysis of significance of such emissions is based upon a specified amount of emissions (pounds, tons, etc.) even though there is no way to translate those emissions directly into a corresponding ambient air quality impact.

Because of the chemical complexity of primary versus secondary pollutants, the South Coast Air Quality Management District (SCAQMD) has designated significant emissions levels as surrogates for evaluating regional air quality impact significance independent of chemical transformation processes. Projects with daily emissions that exceed any of the following emission thresholds are recommended by the SCAQMD to be considered significant under CEQA guidelines (See Table 5).

Table 5
SCAQMD Emissions Significance Thresholds (lbs/day)

Pollutant	Construction	Operations
ROG	75	55
NOx	100	55
CO	550	550
PM-10	150	150
PM-2.5	55	55
SOx	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

Additional Indicators

In its CEQA Handbook, the SCAQMD also states that additional indicators should be used as screening criteria to determine the need for further analysis with respect to air quality. The additional indicators are as follows:

- Project could interfere with the attainment of the federal or state ambient air quality standards by either violating or contributing to an existing or projected air quality violation
- Project could result in population increases within the regional statistical area which would be in excess of that projected in the AQMP and in other than planned locations for the project's build-out year.

- Project could generate vehicle trips that cause a CO hot spot.

The SCAQMD CEQA Handbook also identifies various secondary significance criteria related to toxic, hazardous or odorous air contaminants. Hazardous air contaminants are contained within the small diameter particulate matter ("PM-2.5") fraction of diesel exhaust. However, except during construction, the proposed project will generate negligible levels of diesel exhaust.

Construction Activity Impacts

Dust is typically the primary concern during construction of new buildings and infrastructure. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions." Emission rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). These parameters are not known with any reasonable certainty prior to project development and may change from day to day. Any assignment of specific parameters to an unknown future date is speculative and conjectural.

Because of the inherent uncertainty in the predictive factors for estimating fugitive dust generation, regulatory agencies typically use one universal "default" factor based on the area disturbed assuming that all other input parameters into emission rate prediction fall into midrange average values. This assumption may or may not be totally applicable to site-specific conditions on the proposed project site. As noted previously, emissions estimation for project-specific fugitive dust sources is therefore characterized by a considerable degree of imprecision.

Average daily PM-10 emissions during site grading and other disturbance are stated in the SCAQMD Handbook to be 26.4 pounds/acre. This estimate is based upon required dust control measures in effect in 1993 when the AQMD CEQA Air Quality Handbook was prepared. Rule 403 was subsequently strengthened to require use of a greater array of fugitive dust control on construction projects. All construction projects in the SCAQMD are required to use strongly enhanced control procedures. Use of enhanced dust control procedures such as continual soil wetting, use of supplemental binders, early paving, etc. can achieve a substantially higher PM-10 control efficiency. Daily emissions with use of reasonably available control measures (RACMs) for PM-10 can reduce emission levels to around ten (10) pounds per acre per day. With the use of best available control measures (BACMs) the California Air Resources Board URBEMIS2007 computer model predicts that emissions can be reduced to 1-2 pounds per acre per day. Because of the PM-10 non-attainment status of the air basin, construction activity dust emissions are considered to have a cumulatively significant impact. Use of BACMs is thus required even if SCAQMD individual CEQA thresholds are not exceeded by use of RACMs.

Current research in particulate-exposure health suggests that the most adverse effects derive from ultra-small diameter particulate matter comprised of chemically reactive pollutants such as sulfates, nitrates or organic material. A national clean air standard for particulate matter of 2.5 microns or smaller in diameter (called "PM-2.5") was adopted in 1997. A limited amount of construction activity particulate matter is in the PM-2.5 range. PM-2.5 emissions are estimated by the SCAQMD to comprise 20.8 percent of PM-10. Other studies have shown that the fugitive dust fraction of PM-2.5 is closer to 10 percent. Daily PM-2.5 emissions during construction with the use of BACMs will be around 1 pound per day compared to the SCAQMD CEQA significance threshold of 55 pounds per day.

In addition to fine particles that remain suspended in the atmosphere semi-indefinitely, construction activities generate many larger particles with shorter atmospheric residence times. This dust is comprised mainly of large diameter inert silicates that are chemically non-reactive and are further readily filtered out by human breathing passages. These fugitive dust particles are therefore more of a potential soiling nuisance as they settle out on parked cars, outdoor furniture or landscape foliage rather than any adverse health hazard. The deposition distance of most soiling nuisance particulates is less than 100 feet from the source (EPA, 1995). There are several sensitive receptors within 100 feet from the primary construction site.

Exhaust emissions will result from on and off-site heavy equipment. The types and numbers of equipment will vary among contractors such that such emissions cannot be quantified with certainty. Initial demolition will gradually shift toward building construction and then for finish construction, paving, landscaping, etc. The URBEMIS2007 computer model was used to calculate emissions from the following prototype construction equipment fleet:

**Table 6
Construction Equipment Emissions**

Demolition (existing on-site building)	1 Concrete Saw
	1 Dozer
	2 Tractor/Loader/Backhoes
Grading	1 Grader
	1 Dozer
	1 Tractor/Loader/Backhoe
	1 Water Truck
Paving	4 Cement Mixers
	1 Paver
	1 Roller
	1 Tractor/Loader/Backhoe
Construction	1 Crane
	2 Forklifts
	1 Tractor/Loader/Backhoe

Utilizing the above equipment fleet and the indicated construction information, emissions are calculated by URBEMIS2007 and shown in Table 7:

**Table 7
Construction Activity Emissions (pounds/day)**

Activity	ROG	NOx	CO	SO ₂	PM-10	PM-2.5	CO ₂
Grading and Demolition (2010)							
No Mitigation	3.0	25.1	13.4	0.0	2.8	1.5	2,371.8
With Mitigation	3.0	25.1	13.4	0.0	1.4	1.2	2,371.8
Construction and Paving (2011)							
No Mitigation	7.0	11.4	8.6	0.0	1.0	0.9	1,215.2
With Mitigation	7.0	11.4	8.6	0.0	1.0	0.9	1,215.2
SCAQMD Threshold	75	100	550	150	150	55	-

Source: URBEMIS2007 Model, Output in Appendix

With or without the use of mitigation, peak daily construction activity emissions will be below SCAQMD CEQA thresholds and will be further reduced by recommended mitigation. The recommended emissions mitigation measures are detailed in the "Mitigation" section of this report.

As previously noted, construction equipment exhaust contains carcinogenic compounds within the diesel exhaust particulates. The toxicity of diesel exhaust is evaluated relative to a 24-hour per day, 365 days per year, 70-year lifetime exposure. Public exposure to heavy equipment emissions will be an extremely small fraction of the above dosage assumption. Diesel equipment is also becoming progressively "cleaner" in response to air quality rules on new off-road equipment. Any public health risk associated with project-related heavy equipment operations exhaust is therefore not quantifiable, but small.

Local Significance Thresholds

The SCAQMD has developed analysis parameters to evaluate ambient air quality on a local level in addition to the more regional emissions-based thresholds of significance. These analysis elements are called Local Significance Thresholds (LSTs). LSTs were developed in response to Governing Board's Environmental Justice Enhancement Initiative 1-4 and the LST methodology was provisionally adopted in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005.

Use of an LST analysis for a project is optional. For car wash construction, the only source of LST impact would typically be during construction. LSTs are only applicable to the following criteria pollutants: oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM-10 and PM-2.5). LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor.

LST pollutant concentration data is currently published for 1, 2 and 5 acre sites. The proposed project construction area is less than one acre. Utilizing data for a 1 acre site and a source receptor distance of 25 meters, the following thresholds are determined (pounds per day) and shown in Table 8:

**Table 8
Project Construction Emission Thresholds**

North Orange County	CO	NOx	PM-10	PM-2.5
LST Threshold (1 acre site)	522	103	4	3
Proposed Project				
Max Unmitigated	13	25	3	1
Max Mitigated	13	25	1	1

As shown above, all project emissions are below LST thresholds for construction.

Operational Impacts

TRAFFIC

Possible project-related air quality concern will derive from the mobile source emissions that will be generated from the commercial use for the project site. Operational emissions for project-related traffic were calculated using a computerized procedure developed by the California Air Resources Board (CARB) for urban growth mobile source emissions. The URBEMIS2007 model was run for a predicted 784 trips each day with an associated vehicle miles traveled (VMT) of 7,039 miles for a project build-out year of 2011. The results are shown in Table 9.

In addition to mobile sources from vehicles, general development causes smaller amounts of “area source” air pollution to be generated from on-site energy consumption (natural gas combustion) and from off-site electrical generation. These sources represent a small percentage of the total project NOx and CO burdens, and a few percent other pollutants. The inclusion of such emissions adds negligibly to the total significant project-related emissions burden as shown in Table 9.

The project will not cause the SCAQMD's recommended threshold levels to be exceeded. Operational emissions impacts will be at a less-than-significant level.

ON-SITE EMISSIONS

Express car wash operations entail brief periods of vehicles idling at the fee kiosk and while maneuvering onto the conveyor. For an assumed 400 car washes on a typical day and an average on-site idling duration of one minute per vehicle, 400 idle-minutes for light duty autos would produce the exhaust emissions (in comparison to the local significance threshold for a one-acre site) shown in Table 10.

Idling emissions would create a localized air quality impact that is well below one percent of the most stringent localized threshold.

OPERATIONAL EMISSIONS

Car washes use chemicals to condition the wash water, to wash and wax the car and to spot clean stubborn stains (bugs, tar, etc.). None of these chemicals are considered toxic. Car washes are not required to post Proposition 65 warnings as opposed to grocery stores, gas stations or even office buildings where such warnings are required. A list of the primary chemicals used at an existing express wash in Anaheim is shown in Table 11, along with a summary if any of them are toxic (Prop 65 Warning), carcinogenic (cancer lists) or smog-forming (photo-chemically reactive). No public health concern is identified of the material safety data sheets (MSDS) that accompany any of the common car wash chemicals. No public health concern is connected to a car wash operation that does not also have gasoline dispensing facilities.

**Table 9
Project-Related Emissions Burden**

Year 2011	Emissions (lbs/day)						
	ROG	NOx	CO	SO2	PM-10	PM-2.5	CO2
Area Sources	0.1	0.1	1.6	0.0	0.0	0.0	42.8
Mobile Sources	4.7	6.5	63.3	0.1	12.1	2.3	7,124.8
Total	4.8	6.5	64.9	0.1	12.1	2.3	7,167.6
SCAQMD Threshold	55	55	550	150	150	55	-

Source: URBEMIS2007 Computer Model

**Table 10
On-Site Idling Emissions Burden**

Pollutant	Idling (400 min)		Significance Threshold	Share of Threshold
	grams/day	Pounds/day		
ROG	11.3	0.025	n/a	-
CO	143.5	0.316	522	0.06%
NOx	12.5	0.028	103	0.03%
PM-10	1.7	0.004	1	0.40%

**Table 11
Car Wash Chemical Safety**

Kaady Rapid Dry - Speed Drying

California Prop 65 Warning	No
Ingredients on Cancer Lists	None
Photo-chemically Reactive	No

Kaady Tire, Wheel and Body Cleaner – Multipurpose

California Prop 65 Warning	No
Ingredients on Cancer Lists	None
Photo-chemically Reactive	No

Kaady Polish – Detergent and Polish

California Prop 65 Warning	No
Ingredients on Cancer Lists	None
Photo-chemically Reactive	No

Source: MSDS, Kaady Chemicals, San Leandro, CA

Odor Control

Odors can be created by bacterial growth within the water reclamation/recycling system. Such odors are controlled by disinfection systems developed especially for car washes. Although chemical additives may be used, an ozone generator using a U.V. lamp is equally effective and creates no chemical (Lysol, bleach, etc.) odor of itself. If any faint odor were detectable, it would typically be within the car wash tunnel, and not off-site. If staff were to notice any “wet shower” odor, the dosing rate would be increased as to not offend any clients. Odor complaints from the public are rare near a properly maintained car wash facility.

Greenhouse Gas Emissions

“Greenhouse gases” (so called because of their role in trapping heat near the surface of the earth) emitted by human activity are implicated in global climate change, commonly referred to as “global warming.” These greenhouse gases contribute to an increase in the temperature of the earth’s atmosphere by transparency to short wavelength visible sunlight, but opacity to outgoing terrestrial long wavelength heat radiation in some parts of the infra-red spectrum. The principal greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

California has passed several bills and the Governor has signed at least three executive orders regarding greenhouse gases. GHG statues and executive orders (EO) include AB 32, SB 1368, EO S-03-05, EO S-20-06 and EO S-01-07. The Governor’s Office of Planning and Research has developed guidelines for inclusion of a GHG/climate change analysis in the CEQA process. The guidelines require a good faith effort to quantify project-related GHG emissions, determine their impact significance and to provide mitigation as necessary. The amended CEQA guidelines do not include a numerical threshold of significance for GHG emissions. That determination rests with the lead agency.

AB 32 is one of the most significant pieces of environmental legislation that California has adopted. Among other things, it is designed to maintain California’s reputation as a “national and international leader on energy conservation and environmental stewardship.” It will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short time frames within which it must be implemented. Major components of the AB 32 include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate “early action” control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California’s GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40%, from business as usual, over the next 13 years (by 2020).
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Statewide, the framework for developing the implementing regulations for AB 32 is under way. Additionally, through the California Climate Action Registry (CCAR now

called the Climate Action Reserve), general and industry-specific protocols for assessing and reporting GHG emissions have been developed. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e. not company owned). Direct sources include combustion emissions from on-and off-road mobile sources, and fugitive emissions. Indirect sources include off-site electricity generation and non-company owned mobile sources.

Greenhouse Gas Emissions Significance Thresholds

There are currently no adopted GHG significance thresholds for project CEQA clearance. The California Governor's Office of Planning and Research (OPR) has developed revisions to CEQA implementation guidelines to incorporate GHG. These were forwarded to the California National Resource Agency on April 13, 2009. They contain requirements to characterize the GHG setting, quantify the impacts resulting from the proposed project, determine impact significance, and mitigate as appropriate. They leave the determination of significance to the Lead Agency.

On December 5, 2008 the SCAQMD Governing Board adopted an Interim quantitative GHG Significance Threshold for industrial projects where the SCAQMD is the lead agency (e.g., stationary source permit projects, rules, plans, etc.) of 10,000 Metric Tons CO₂ equivalent/year. As part of the Interim GHG Significance Threshold development process for industrial projects, the SCAQMD established a working group of stakeholders that also considered thresholds for commercial or residential projects. As discussed in the Interim GHG Significance Threshold guidance document, the focus for commercial projects is on performance standards and a screening level threshold. For discussion purposes, the SCAQMD's working group considered performance standards primarily focused on energy efficiency measures beyond Title 24 and a screening level of 3,000 metric tons (MT) CO₂ equivalent/year based on the relative GHG emissions contribution between non-industrial sectors versus stationary source (industrial) sectors. The working group and staff ultimately decided that additional analysis was needed to further define the performance standards and to coordinate with CARB staff's interim GHG proposal. Staff, therefore, did not recommend action for adopting an interim threshold for non-industrial projects but rather recommended bringing this item back to the Board for discussion and possible action in March 2009 if the CARB board did not take its final action by February 2009. As of this date, no final action on a quantitative significance threshold has been taken for projects in Southern California. CEQA precedents typically encourage guidance from a responsible agency in the selection of a threshold of significance. Since the City of Fullerton has not adopted a numerical threshold for GHG emissions, the most closely linked responsible agency is the SCAQMD. Although the Bay Area AQMD has adopted an annual significance threshold of 1,100 metric tons of CO₂-equivalent GHG emissions, the SCAQMD's interim screening level of 3,000 MT is more appropriate for projects in the South Coast Air Basin. The 3,000 MT value is recommended for use in the ensuing analysis.

Construction Activity GHG Emissions

During project construction, the URBEMIS2007 computer model predicts that the indicated activities will generate the following annual CO₂ emissions as shown in Table 12:

Table 12
Construction Emissions

<i>Car Wash Construction</i>	Year 2010	37 short tons = 33 metric tons
	Year 2011	42 short tons = 38 metric tons

*Output provided in appendix

Equipment exhaust also contains small amounts of methane and nitric oxides which are also GHGs. Non-CO₂ GHG emissions represent approximately a three percent increase in CO₂-equivalent emissions from diesel equipment exhaust. For screening purposes, the temporary construction activity GHG emissions were compared to the chronic operational emissions in the SCAQMD's interim thresholds. The screening level operational threshold is 3,000 metric tons (MT) of CO₂-equivalent (CO₂(e)) per year. Worst year construction activities generating a total of 42 "short tons" (38 MT) are well below this threshold.

Operational activity GHG emissions would derive from on-road traffic from vehicles accessing the site and from secondary emissions associated with car wash equipment electrical use and from delivery of water from off-site sources. To be sure, cars would probably drive to other car washes with identical GHG emissions from transportation and utility distribution. A number of daily trips are pass-by trips where a driver utilizes the services of the facility en-route to a farther destination. Daily project trip generation is not one hundred percent new trips to the region. They are new driveway trips, but not new regional trips. Because GHG/Climate Change is a global issue, the proposed car wash will not necessarily contribute to any globally cumulative increases in GHG emissions. As a frame of reference, however, the projects contribution to the global GHG burden was individually analyzed.

Transportation-related GHG emissions were calculated using the URBEMIS2007 computer model. Although minor amounts of non-CO₂ GHGs are generated by vehicles, the CO₂ fraction represents more than 95 percent of the GHG total. Annual vehicular CO₂ emissions are predicted by the model to total 1,258 "short" tons (1,144 metric tons).

Secondary GHG emissions will result from utility generation and distribution. Water and energy consumption for the proposed project was assumed to be comparable to the express wash on Magnolia in Anaheim. In June, 2010, the Anaheim facility used 36,000 KWH of electricity and 570,000 gallons of water (more is actually used, but much water is internally recycled). The GHG conversion factors for electricity and water distribution were combined with utility consumption as follows:

Electricity	432 MW-hr/yr x 0.331 MT/MW-hr	=	143 MT/yr
Water	6.84 million gal./yr x 4.20 MT/million gal	=	29 MT/yr
<u>Transportation</u>	<u>(URBEMIS2007 Model)</u>	=	<u>1,144 MT/yr</u>
Total =			1,316 MT/yr

Current Appendix G CEQA guidelines state that GHG impacts should be considered potentially significant if they represent a substantial increase in GHG emissions. If impacts were to inhibit the effective implementation of adopted GHG reduction plans and policies, impacts would similarly be considered significant. The City of Fullerton is developing a Climate Action Plan (CAP) that will define local GHG reduction goals to supplement state and federal programs. An express car wash is designed to minimize water and electrical consumption per wash cycle. As such, the project is consistent with energy conservation/GHG reduction goals.

The annual GHG emissions total is well below the recommended 3,000 MT per year screening threshold. Project implementation will not impede compliance with AB-32. GHG impacts are considered less than significant.

Mitigation

CONSTRUCTION EMISSIONS MITIGATION

Construction activity air pollution emissions are not anticipated to individually exceed SCAQMD CEQA emissions thresholds. However, use of best management practices for dust control is mandatory for construction in Southern California. Required construction dust control measures include:

Dust Control

- Apply soil stabilizers to inactive areas.
- Prepare a high wind dust control plan and implement plan elements and terminate soil disturbance when winds exceed 25 mph.
- Stabilize previously disturbed areas if subsequent construction is delayed.
- Water exposed surfaces 3 times/day.
- Cover all stock piles with tarps if left undisturbed for more than 72 hours.
- Replace ground cover in disturbed areas as soon as feasible.

APPENDIX

URBEMIS2007 Model Output