3.2 AIR QUALITY

3.2.1 Existing Conditions

Area Description

The San Diego Air Basin (SDAB) lies in the southwest corner of California and comprises the entire San Diego region. However, population and emissions are concentrated mainly in the western portion of the county. The air basin covers 4,260 square miles, includes about eight percent of the state's population, and produces about seven percent of the state's criteria pollutant emissions. The City of San Diego covers approximately 330 square miles, or eight percent, of the SDAB.

Air quality in the SDAB is impacted not only by local emissions, but also by pollutants transported from other areas, in particular, ozone and ozone precursor emissions transported from the South Coast Air Basin and the Republic of Mexico. Although the impact of transport is particularly important on days with high ozone concentrations, transported pollutants and emissions cannot be blamed entirely for the ozone problem in the San Diego area. Studies show that emissions from the SDAB are sufficient, on their own, to cause ozone violations.

Topography and Climate

The topography in the San Diego region varies greatly, from beaches on the west to mountains and desert on the east. Much of the topography in between consists of mesa tops intersected by canyon areas. The topography in the San Diego region, along with local meteorology, influences the dispersal and movement of pollutants in the basin. The mountains to the east prohibit dispersal of pollutants in that direction and help trap them in inversion layers, which will be discussed in the next section.

The weather of the San Diego region, as in most of southern California, is influenced by the Pacific Ocean and its semi-permanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average temperature ranges from the mid 40s to the high 90s. Most of the county's precipitation falls from November to April, with infrequent (approximately ten percent) precipitation during the summer. The average seasonal precipitation along the coast is approximately ten inches; the amount increases with elevation as moist air is lifted over the mountains (University of California 1970).

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and drives the prevailing winds. Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

In conjunction with the two characteristic onshore/offshore wind patterns, there are two types of temperature inversions (reversals of the normal decrease of temperature with height) which occur within the region that affect atmospheric dispersive capability and that act to degrade local air

quality. In the summer, an inversion at about 1,100 to 2,500 feet is formed over the entire coastal plain when the warm air mass over land is undercut by a shallow layer of cool marine air flowing offshore. The prevailing sunny days in this region further exacerbate the smog problem by inducing additional adverse photochemical reactions. During the winter, a nightly shallow inversion layer (usually at about 800 feet) forms between the cooled air at the ground and the warmer air above, which can trap vehicular pollutants. The days of highest CO concentrations occur during the winter months.

The predominant onshore/offshore wind pattern is sometimes interrupted by so-called Santa Ana conditions, when high pressure over the Nevada-Utah area overcomes the prevailing westerly winds, sending strong, steady, hot and dry winds from the east over the mountains and out to sea. Strong Santa Ana winds tend to blow pollutants out over the ocean, producing clear days. However, at the onset or breakdown of these conditions or if the Santa Ana is weak, prevailing northwesterly winds reassert themselves and send a cloud of contamination from the Los Angeles Basin ashore in the SDAB.

Regional Air Quality

Growth rates in the SDAB during the last 20 years were among the highest in the state's urban areas. The population increased by 54 percent, from more than 1.9 million in 1982 to over 2.9 million in 2001 (California Air Resources Board [CARB] 2003a). During this same period, the number of Vehicle Miles Traveled (VMT) each day increased over 120 percent from about 34 million miles per day in 1982 to nearly 75 million miles per day in 2001. A 2005 American Communities Survey identified that 74 percent of employed San Diego residents commuted alone in automobiles to work, only slightly higher than the national average of 71 percent. Just over four percent of employed San Diego residents used public transportation to commute, more than double the national average of 2.0 percent.

As in other parts of California, overall air quality in the SDAB has improved, despite high growth rates, in part due to the benefits of cleaner technologies. In 2002, motor vehicles and other mobile sources were determined to emit 76 percent of the harmful pollutants that degrade the air quality of the San Diego region, and industrial sources emitted 14 percent. By 2004, automobiles and other mobile sources were found to emit 53 percent of the pollutants, industrial sources to emit 27 percent of the region's harmful pollutants, and natural sources (e.g., sea salt, wildfires, biogenic organic emissions, and wind erosion of undisturbed soil) to emit 20 percent of the regions harmful pollutants Air Pollution Control District ([APCD] 2004).

Significant progress has been realized in the region's air quality since the early 1970s when San Diego Association of Governments (SANDAG) and the San Diego APCD began working together to reduce regional emissions. SANDAG is governed by a Board of Directors comprised of mayors and officials from each of the region's 19 local governments, including the City of San Diego, as well as advisory representatives from San Diego and Imperial Counties, Mexico, and other local and state agencies. The County Board of Supervisors serves as the Board of Directors for the APCD.

SANDAG is responsible for developing a "Transportation Control Measures (TCM) Plan" to help achieve air quality objectives for the region. The plan provides actions to reduce air pollution such as increasing efficiency of the transportation system, motor vehicles, and encouraging bicycling and other forms of transportation. Through this planning process, the City of San Diego delivers input and assists in the formulation of air quality policies and plans through which it will be guided. The APCD adopts the TCM Plan as part of the Regional Air Quality Strategy (RAQS). The RAQS is updated on a triennial basis and outlines measures for achieving state and national air quality standards.

Control of motor vehicle emissions, a primary contributor to regional air pollution, has been a focus of federal and state air quality legislation. Consequently, legislation now includes requirements that transportation officials make a commitment to programs and projects that will help achieve national air quality goals. Recent attention has also been directed towards measures that reduce emissions from indirect sources of air pollution. The APCD is responsible for stationary source tactics to reduce air pollution resulting from industry.

Specific Air Pollutants

Emissions of oxides of nitrogen (NO_x), Reactive Organic Gases (ROG), particulate matter equal to or less than ten microns (PM_{10}), and carbon monoxide (CO) in the SDAB have been following statewide trends for each pollutant since 1975. These trends are largely due to motor vehicle controls and reductions in evaporative emissions. Mobile sources (both on-road and other) are by far the largest contributors to NO_x, ROG, and CO emissions in the SDAB. The majority of the PM_{10} emissions are from areawide sources (CARB 2006a). Although the impact of transport is particularly important on days with high ozone concentrations, transported pollutants and emissions cannot be blamed entirely for the ozone problem in the San Diego area. Studies show that emissions from the SDAB are sufficient, on their own, to cause violations for some criteria pollutants.

Improvements from the transportation sector are primarily the result of advances in technology. The elimination of lead in gasoline, lower fuel volatility, and the advancement of emissions control systems have resulted in major reductions in emissions of lead, reactive hydrocarbons, CO, and NO_x. The cleaner-burning gasoline sold in California starting in the spring of 1996 has reduced hydrocarbons by 17 percent and CO by 11 percent relative to 1994 "conventional" gasoline. The enhanced vehicle inspection and maintenance program (Smog Check II) implemented in 1998 provides additional emission reductions.

Progress has been made in the region of attaining federal and state air quality standards. Federal and state standards have been met for lead, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and CO, and federal standards are being met for inhalable particulates. In addition, SDAB was recently determined to be in attainment for the federal one-hour ozone standards by Environmental Protection Agency (EPA).

Air quality is commonly expressed as the number of days that air pollution levels exceed state standards set by the CARB or federal standards set by the EPA (**Table 3.2-1**). The concentrations of pollutants within the SDAB are measured at the 11 monitoring stations

maintained by the APCD and the CARB. The locations of monitoring stations in the San Diego region are shown on **Figure 3.2-1**. Three of the stations are located within the jurisdictional limits of the City of San Diego: one each in Kearny Mesa, Downtown on Union Street, and Downtown on 12th Avenue.

Air quality at a particular location is a function of the type and amount of pollutants being emitted into the air locally and throughout the basin and of the dispersal rates of pollutants within the region. The major factors affecting pollutant dispersion are wind speed and direction, inversion layers (which affect vertical dispersion), and the local topography.

Carbon Monoxide

Improvements from the transportation sector, primarily resulting from advances in technology such as emissions control systems, have resulted in major reductions in CO emissions in the SDAB, following the statewide trend of declining from 1975 to 2020 (**Table 3.2-2**). After three years of no violations, the SDAB was reclassified as an attainment area for CO in 2004. The EPA approved the CO Maintenance Plan in 1998.

Ozone and Hydrocarbons

Both the peak indicator and the number of days above the state and federal ozone standards have decreased over the last 20 years as shown on **Table 3.2-3**. The peak one-hour zone indicator shows an overall decline of 40 percent from 1985 to 2004. The number of state and federal one-hour standard exceedance days has dropped even more. There were 148 state standard exceedance days in 1985 and 12 state exceedance days during 2004. This represents a decrease of about 92 percent. During 1985, there were 50 federal one-hour exceedance days. There was one federal one-hour standard exceedance day during 2004. However there were more days that exceeded the federal eight-hour standard. To fully reduce this to zero days, additional local emissions controls are needed to maintain attainment of the ozone standards in the San Diego region. However, because of transport, future air quality in this area would also be affected by emissions controls and growth in the South Coast Air Basin and, to some extent, Mexico.

On-road motor vehicle emissions account for approximately 50 percent of smog (ROG + NO_X) in the San Diego region. The NO_X and ROG emissions have been decreasing overall since 1975 (**Tables 3.2-4 and 3.2-5**). These decreases are mostly due to decreased emissions from motor vehicles, brought about by stricter motor vehicle emission standards. These large decreases helped offset stationary and area-wide source emissions of ROG which have increased slightly over the last 20 years, though ROG production has been slowed by stricter emissions standards offsetting industrial and population growth (**Table 3.2-5**).

The region exceeded the federal standard for one-hour ozone on two days in 2001, and one day in 2003, compared with 12 days in 1995 and 87 days in 1980. No violations of the federal ozone standard were recorded in the SDAB in 1999, 2000, and 2002. The region exceeded the more stringent state standards on 29 days in 2001, 15 days in 2002, and 23 days in 2003, compared with 96 days in 1995 and 167 days in 1980.

Table 3.2-1
California and Federal Air Quality Standards

Air Pollutant	State Standard[1]	Federal Primary Standard[2]	Most Relevant Health Effects
	Concentration[3]/ Averaging Time	Concentration[3, 4]/ Averaging Time	
Ozone	0.09 ppm, 1-hr. avg.> 0.07 ppm, 8-hr. avg.>	0.08 ppm, 8-hr. avg.>	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals. (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide (CO)	9.0 ppm, 8-hr. avg.> 20 ppm, 1-hr. avg.>	9.0 ppm, 8-hr. avg.> 35 ppm, 1-hr. avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	0.25 ppm, 1-hr. avg.>	0.053 ppm, ann. avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	0.04 ppm, 24-hr. avg.> 0.25 ppm, 1-hr. avg.>	0.03 ppm, ann. avg.> 0.14 ppm, 24-hr. avg.>	(a) Bronchioconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10})	20 µg/m^3, ann. geometric mean> 50 µg/m^3, 24-hr. average>	150 µg/m^3, 24-hr. avg. >	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children; (c) Increased risk of premature death from heart or lung diseases in elderly
Suspended Particulate Matter ($PM_{2.5}$)	12 µg/m^3, ann. arithmetic mean >	15 µg/m^3, ann. arithmetic mean > 35 µg/m^3, 24-hr avg.>	

Table 3.2-1
California and Federal Air Quality Standards

Air Pollutant	State Standard[1] Concentration[3]/ Averaging Time	Federal Primary Standard[2] Concentration[3, 4]/ Averaging Time	Most Relevant Health Effects
Sulfates	25 µg/m^3, 24-hr avg.≥	No federal standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead[5]	1.5 µg/m^3, 30-day avg.≥	1.5 µg/m^3, calendar quarter>	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Hydrogen Sulfide	0.03 ppm 1-hr. avg.>		(a) Irritation to eyes and respiratory tract; (b) Conjunctivitis, pain, lacrimation, and photophobia may persist for several days; (c) Coughing, pain in breathing, pain in nose and throat; (d) Repeated exposure causes headache, dizziness, and digestive disturbances; (e) Collapse and death.[6]
Vinyl Chloride	0.01 ppm 24-hr. avg.>		(a) Irritation to eyes and respiratory tract; (b) Acute exposure causes dizziness, drowsiness, headaches, and giddiness; (c) 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.[7]

1 California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, suspended particulate matter – PM_{10}, $PM_{2.5}$, 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. For readers' convenience in picking out standards quickly, concentration appears first; e.g. "0.12 ppm, 1-hr. avg.>" means 1-hr. avg> 0.12 ppm

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 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter (µg/m^3) is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 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 parts per million by volume, or micromoles of pollutant per mole of gas.

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

5 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.

6 Source: US Army Corps of Engineers http://el.erdc.usace.army.mil/workshops/04jun-wots/kaluschue.pdf

7 Source: EPA http://www.epa.gov/ttn/atw/hlthef/vinylchl.html Sources: CARB 2006b, South Coast Air Quality Management District, Air Quality Management Plan, 2003.

Table 3.2-2
CO Emission Trends for SDAB (tons/day, annual average)

Emission Source	1975	1985	1995	2000	2005	2010	2015	2020*
All Sources	3299	2924	1719	1279	938	742	610	539
Stationary Sources	30	28	26	40	25	31	31	33
Areawide Sources	23	27	27	28	28	28	29	30
On-Road Mobile	3059	2586	1360	930	626	438	306	225
Gasoline Vehicles	3056	2575	1347	918	616	429	298	217
Diesel Vehicles	3	11	13	11	11	9	8	8
Other Mobile	187	282	306	282	258	244	244	252

CO	1985	1990	1995	2000	2004
Peak 8-hr Indicator (ppm)	10.6	10.2	7.3	5.3	4.6
Days above State 8-hr Standard**	5	1	0	0	0

* The CARB has projected emissions to 2020. Continuing declines in CO emissions from vehicles is expected; specific projections to year 2030 will be available by summer of 2007. The URBEMIS program projects 2030 levels of CO from all sources would be down approximately 40 percent from 2020 values.

** Number of days State standard was exceeded in calendar year.
ppm=parts per million parts of air, by volume
Source: CARB 2006a

Table 3.2-3
Ozone Air Quality Trend

Ozone	1985	1990	1995	2000	2004
Peak 1-hour Indicator (ppm)	0.188	0.180	0.148	0.132	0.112
Days above State Standard	148	139	96	24	12
Days above National Standard	50	39	12	0	1

Source: CARB 2006a

The federal one-hour ozone standard is attained when each monitoring site in the region has no more than three days in a three-year period within a maximum hourly average concentration exceeding the standard. The standard has now been attained and the SDAB has recently been redesignated as an attainment area by EPA. San Diego still has not met the more restrictive state one-hour ozone standard, or the federal eight-hour ozone standard.

Table 3.2-4
NO_X Emissions Trends for SDAB (tons/day, annual average)

Emission Source	1975	1985	1995	2000	2005	2010	2015	2020*
All Sources	280	287	270	231	189	157	131	125
Stationary Sources	48	17	16	14	9	11	11	12
Area-wide Sources	2	3	3	3	3	3	3	3
On-Road Mobile	178	195	185	149	113	83	57	41
Gasoline Vehicles	168	156	133	96	62	43	30	22
Diesel Vehicles	10	39	52	52	51	40	27	20
Other Mobile	52	72	66	66	65	61	60	69

* The CARB has projected emissions to 2020. Continuing declines in NO_X emissions from vehicles is expected; specific projections to year 2030 will be available by summer of 2007. The URBEMIS program projects 2030 levels of NO_X from all sources would be down approximately 40% from 2020 values.
Source: CARB 2006a

Table 3.2-5
ROG Emission Trends for SDAB (tons/day, annual average)

Emission Source	1975	1985	1995	2000	2005	2010	2015	2020*
All Sources	439	413	267	226	186	173	168	170
Stationary Sources	40	54	45	50	55	63	70	76
Area-wide Sources	34	44	41	41	38	40	42	44
On-Road Mobile	334	272	132	89	60	43	32	25
Gasoline Vehicles	334	269	129	86	58	41	30	24
Diesel Vehicles	1	3	3	2	2	2	2	1
Other Mobile	31	44	49	46	33	27	25	24

* The CARB has projected emissions to 2020. Continuing declines in ROG emissions from vehicles is expected; specific projections to year 2030 will be available by summer of 2007. The URBEMIS (urban emissions) software program projects 2030 levels of ROG from all sources would be down approximately 20% from 2020 values.
Source: CARB 2006a

In 2005, the EPA replaced the one-hour federal ozone standard with a more protective eight-hour standard to address the adverse health effects of prolonged exposure Although the eight-hour standard was not established until 1997, past monitoring data showed that in 1990 the region would have exceeded the standard nearly 100 days, whereas in 2003, the standard was exceeded six days. An air quality plan is due to the EPA in 2007 demonstrating how the eight-hour standard will be attained throughout the region in 2009. (San Diego Air Pollution Control District [SDAPCD], 2004b).

Particulates

This standard measures particulates (PM_{10}) in the respirable range (ten microns in diameter or less) and is reported as a 24-hour average and as an annual measure. Direct emissions of PM_{10} increased approximately 65 percent in the SDAB between 1975 and 2005 (as shown on **Table 3.2-6**). This increase is due to growth in emissions from area-wide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, dust from construction and demolition operations, and particulates from residential fuel combustion (including wood). The growth in these area-wide sources is primarily due to population growth and increases in VMT. Particulates are measured at the Chula Vista, El Cajon, Kearny Mesa, Escondido, Downtown San Diego, and Otay Mesa monitoring stations. The basin overall is currently in attainment of the federal standards but has not met the more stringent state standard.

Table 3.2-6
PM_{10} Emission Trends for SDAB (tons/day, annual average)

Emission Source	1975	1985	1995	2000	2005	2010	2015	2020*
All Sources	68	84	97	105	112	119	125	133
Stationary Sources	17	5	8	7	8	10	10	11
Area-wide Sources	43	68	79	87	94	99	104	110
On-Road Mobile	3	4	4	4	5	5	5	5
Gasoline Vehicles	2	2	3	3	3	4	4	4
Diesel Vehicles	1	2	2	1	1	1	1	1
Other Mobile	6	7	6	6	7	6	7	7

* The CARB has projected emissions to 2020. Specific projections to year 2030 will be available by summer of 2007.

PM_{10}	1988	1990	1995	2000	2004
Peak 1-hour Indicator (ppm)	80	115	121	136	138
Days above State Standard	105	60	117	144	186
Days above National Standard	0	0	0	0	0

Source: CARB 2006a

Another standard to measure $PM_{2.5}$ concentrations (2.5 microns in diameter or less) has been in use since 1999. Annual average $PM_{2.5}$ concentrations in the SDAB have declined slightly since then. Several more years are needed before determining long-term trends. Like PM_{10}, the SDAB is currently designated for $PM_{2.5}$ as in attainment for federal standards, and in non-attainment for state standards.

Nitrogen Dioxide and Sulfur Dioxide

NO_X (including NO_2) emissions in the SDAB follow the statewide trend of declining from 1985 to 2020 (**Table 3.2-4**). In the past, the SDAB had a NO_2 problem. Maximum one-hour concentrations during the 1980s occasionally exceeded the ambient air quality standards. However, ambient concentrations are now well below the levels of both the state and national

standards. Data shows that the maximum peak one-hour indicator decreased 38 percent from 1985 to 2004, and the SDAB is in attainment for the NO_2 standards.

Because NO_X emissions contribute to NO_2, many of the NO_X control measures help reduce ambient NO_2 concentrations. Furthermore, NO_X emission controls are a critical part of the ozone control strategy and are not expected to be relaxed in the future.

The SDAB has been in attainment for sulfur dioxide (SO_2) for several years. The low level of SO_2 in the basin could be attributed to use of low-sulfur fuels in the region's electrical generators, a primary source of this pollutant in other areas of the country.

Lead

The SDAB is presently in attainment for lead. San Diego no longer monitors for lead because the use of unleaded gasoline has lowered lead levels to well below air quality standards.

Regional Air Quality Summary

In summary, based on data from the regional air quality monitoring network, the CARB has classified the air basin as a non-attainment area with respect to the state standards for ozone, $PM_{10,}$ and $PM_{2.5}$.

Atmospheric Greenhouse Gases

Please see **Section 5.2** of this program EIR for a detailed discussion and analysis of atmospheric greenhouse gases.

Regulatory Framework

Federal Regulations

The federal Clean Air Act (CAA) of 1970, amended in 1977 and 1990 (42 U.S.C. 7506(c)), was enacted for the purpose of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In 1971, to achieve the purposes of Section 109 of the act, the EPA promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS require that certain pollutants should not exceed specified levels; areas that exceed the standard for specified pollutants are designated as "non-attainment areas." Five pollutants of primary concern were designated: O_3, CO, SO_2, lead, and PM_{10}. In promoting the NAAQS, the EPA allowed states the option to develop different (stricter) standards. Both sets of standards must be met in California.

If an air basin is not in attainment with federal standards for a particular pollutant, the basin is classified as non-attainment. The Federal CAA Amendments of 1990 (CAA) require each state containing non-attainment areas to submit a State Implementation Plan (SIP) to the federal EPA. The SIP specifies measures to be taken to attain the NAAQS by a specified attainment deadline. California's 1994 Ozone SIP was approved by the EPA in February 1997. In a series of rulemakings published from August to October 2002, the EPA published a final determination that the SDAB has attained the one-hour ozone federal standard (EPA 2002). Prior to

determination, San Diego had been designated as a "serious" non-attainment area. The SDAB remains in non-attainment for the eight-hour ozone standard, is designated as a maintenance area for CO. It is in federal attainment for all other criteria pollutants

The CAA, the Intermodal Surface Transportation Efficiency Act of 1991, and the subsequent Transportation Equity Act -21 of 1998 signaled the intent of Congress to promote major reforms in the transportation planning process. The conformity provisions of the CAA require that transportation officials make a commitment to programs and projects that help achieve national air quality goals. Among the goals are providing for greater integration of the transportation and air quality planning processes; ensuring that transportation plans, programs, and projects conform to the "purpose" of the SIP for the attainment of the NAAQS; and reducing the growth in VMT and congestion in areas that have not attained the NAAQS. To conform to the San Diego portion of the SIP, the RTP considered the most recent estimates of mobile source emissions and contributed to emissions reductions for areas designated non-attainment for ozone or CO. In addition, transportation projects must come from a conforming transportation plan and program.

"Conformity" is a determination that transportation plans and programs in non-attainment areas meet the purpose of the SIP. The Metropolitan Planning Organization (in the San Diego region, SANDAG) and the United States Department of Transportation (USDOT) make this determination. Conformity determinations for transportation plans, programs, and projects are based on the USDOT/EPA conformity rule issued in November 1993 and subsequent amendments.

The EPA revised the NAAQS in 1997 to set new eight-hour ozone and particulate matter standards, including a new standard for fine particulate matter ($PM_{2.5}$ –particulate 2.5 micrograms or smaller). After several lower court actions, the U.S. Supreme Court in 2001 upheld EPA's authority to establish the standard for $PM_{2.5}$ but ordered EPA to develop a new implementation policy. In 2004, the EPA began designating areas as either attainment or non-attainment for the eight-hour ozone standard and classifying the areas according to how badly polluted they are. The SDAB is designated non-attainment for the eight-hour ozone standard.

State Legislation

The 1982 SIP anticipated attaining federal ozone and CO standards by 1987. However, these standards were not attained at that time. A lack of congressional action to reauthorize the federal CAA served as the impetus for the California Legislature to address the state's continuing effort to improve air quality. In 1988, the California Clean Air Act (CCAA) was enacted requiring that the APCD prepare a revised RAQS for achieving the state and national air quality standards.

The state of California has set more stringent limits than the federal standards on the six pollutants of national concern. These standards are shown on **Table 3.2-1**. California has established ambient standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Furthermore, the following RAQS and TCM Plan objectives are required by state law for the San Diego region:

- Reasonably available TCM sufficient to substantially reduce the rates on increase in passenger vehicle trips and miles traveled per trip;

- Measures to achieve the use of significant number of low-emission motor vehicles by operators of motor vehicle fleets (e.g., CARB's Low Emission Vehicle program); and

- Provisions to develop indirect source control programs.

California Clean Air Act. Amendments to the CCAA became effective on January 1, 1989. The act requires that APCDs implement regulations to reduce emissions from mobile sources through adoption and enforcement of TCM. The CCAA also requires that air districts not meeting state air quality standards prepare local air plans to demonstrate strategies for attainment of those standards.

Requirements for "serious" areas also include implementing a permit program to achieve no-net-increase in emissions of non-attainment pollutants from all permitted new and modified stationary sources, and a requirement for best available retrofit control technology for existing stationary sources. Some of the measures required by the CCAA would reduce energy consumption as well as pollutant emissions.

State Implementation Plan (SIP). The SIP sets forth the state's strategies for achieving air quality standards. The San Diego APCD is responsible for preparing and implementing the RAQS (that portion of the SIP applicable to the SDAB). In San Diego, the Air Pollution Control Board, which governs the APCD, is comprised of the San Diego County Board of Supervisors. The San Diego APCD adopts rules, regulations, and programs to attain state and federal air quality standards and appropriates funds (including permit fees) to achieve these objectives.

To ensure that the SIP does not become outdated, the CCAA requires annual updates reporting on the implementation schedule of the control measures. Every three years, the overall effectiveness of the RAQS must be addressed and submitted to the CARB in a report adopted at a public hearing (APCD 1992).

The specific actions included in the TCMs in the 1982 SIP have been fully implemented and continue to be funded. These tactics can be grouped into the following three major categories, as indicated below:

Transportation Capacity Expansion Tactics	• The *Transit Improvement and Expansion Program* includes converting the current bus fleet to low emission vehicles, and 29 percent increase in bus service, and a 130 percent increase in rail service (from 1990 levels) to be accomplished by the year 2000. • The *Vanpool Program* includes the addition of 80 new vanpools, at a rate of 10 vanpools per year, by the year 2000. • The *High Occupancy Vehicle Lanes Tactic* includes the provision of HOV bypass lanes at metered ramps and implementation of additional HOV lanes as state and federal funding becomes available. • The *Park-and-Ride Facilities Tactic* includes strategies to encourage utilization of the existing park-and-ride facilities, as well as the development of 4,800 additional spaces, if state and federal funds are available. • The *Bicycle Facilities Tactic* includes the construction of 25 miles of bikeways per year and other actions to promote bicycle usage.

Transportation System Management Tactics	The *Traffic Flow Improvements Tactic* includes the coordination and optimization of traffic signals and computerized signal control to increase traffic flow and reduce emissions caused by motor vehicle stops and starts.
Indirect Source Control Tactics	The *Indirect Source Program* identifies land use and transportation actions and principles to deal with vehicle-related air pollution.

Sensitive Receptors

The San Diego APCD identifies sensitive receptors as populations that are more susceptible to the effects of air pollution than the general population. Sensitive receptors located in or near the vicinity of known air emission sources, including freeways and congested intersections, are of particular concern. Sensitive receptors are located throughout the Project Area and include but are not limited to the following: hospitals, libraries, child care centers, adult assisted care facilities, and schools. Land use compatibility issues relative to siting of pollution-emitting uses or siting of sensitive receptors must be considered.

3.2.2 Thresholds of Significance

A significant impact could occur if implementation of the Draft General Plan:

- Results in an increased number of automobile, train, or airplane trips or stationary source emissions which could potentially affect San Diego's ability to meet regional, state and federal clean air standards, including the RAQS or SIP; or,

- Results in air emissions that could substantially deteriorate ambient air quality, including the exposure of sensitive receptors to substantial pollutant concentrations.

3.2.3 Impact Analysis

Could implementation of the Draft General Plan result in an increased number of automobile trips or stationary source emissions which could potentially affect San Diego's ability to meet regional, state and federal clean air standards, including the (RAQS) or SIP?

The Draft General Plan calls for most future growth to be focused into mixed-use activity centers. Implementation of the Plan would result in infill, redevelopment and new development occurring in selected areas, which would be identified through the community plan update/amendment process. The effects of the Draft General Plan will be predominantly associated with the potential future changes in land use, and housing that may occur through these future projects, and have the potential to result in a physical impact. Transportation improvements are addressed in the recently adopted Environmental Impact Report (EIR) prepared for the Regional Transportation Plan (RTP) MOBILITY 2030 (SANDAG 2003). The impacts addressed in this EIR include the effects of commuting to and from work and home, light industrial or commercial operations, and new construction. The majority of the following discussion of air quality in the San Diego region as it relates to implementation of the Draft General Plan will focus on emissions of automobiles and other mobile sources of harmful pollutants and construction-related emissions.

Carbon Monoxide, Ozone and Hydrocarbons, and Nitrogen and Sulfur Oxides

From 2004 to 2030, SANDAG estimates that the population in the City will increase 28 percent to 1,656,257, while the number of housing units is expected to increase by 24 percent or 119,783. While the Draft General Plan provides the policy framework to address this growth, actual land use designations are made through the City's community plans. Typically there is a direct positive relation to new population, automobile use, and resultant pollutant emission. However, much of the new residential development is proposed to occur around transit-accessible nodes and alternative transportation means is a strategy encouraged by the Draft General Plan and previous plans. This relieves some of the increased automobile trips that would have otherwise occurred without alternative transportation planning in mind.

Transportation plans and programs associated with the Draft General Plan must conform to the purpose of the SIP for the attainment of the NAAQS and state air quality standards to avoid significant impacts on air quality. This can be achieved by including air quality planning committed to attaining federal and state air quality goals such as (1) providing for greater integration of the transportation and air quality planning process; (2) ensuring that transportation plans, programs, and projects conform with the SIP and contribute to attainment of the NAAQS; and (3) reducing the growth in VMT and congestion in areas that have not attained the NAAQS.

A major goal of the Draft General Plan to protect air quality in the region will be to continue to implement the RAQS to achieve federal and state air quality standards. One way to achieve the RAQS will be to implement the TCMs contained in the federal and state air quality plans such as ridesharing, transit improvements, traffic flow improvements, and bicycle facilities and programs. Traffic flow improvements will reduce the amount of pollution created by vehicle emissions by reducing the amount of time vehicles spend on roads, while ridesharing, transit improvements, and bicycle facilities and programs will reduce VMT.

Air quality conditions can also be improved with the implementation of programs and needed infrastructure to increase the availability and usage of energy-efficient vehicles such as hybrid electric vehicles, electric vehicles, or those that run on alternative fuels. Replacing combustion engine vehicles with these other options will reduce the amount of harmful emissions produced by vehicles. These efforts to combat mobile sources of pollution will be supplemented by emission control programs for stationary sources.

Overall, implementation of the Draft General Plan would benefit the region's air quality by helping to relieve traffic congestion and by encouraging the use of more efficient transportation methods. As described in **Section 3.15** Transportation/Traffic/Circulation/Parking of this EIR, the percentage of VMT at a level of service (LOS) E or F is expected to decrease from 57 percent to 39 percent between 2005 and 2030. The future smart growth/City of Villages land use pattern under the Draft General Plan would support a mixed-use development facilitating alternative modes of transportation such as walking or bicycling. The smart growth concept and concentrated urban nodes could reduce average trip distances and encourage transit use. By including policies and actions that conform to air quality planning by the APCD and other agencies, the Draft General Plan would provide for the integration of the transportation and air

quality planning processes. Policies and actions specifically require conformance of the transportation plans and programs with the SIP, RAQS, and TCM Plan, and encourage the conformance of individual projects through the environmental review process. The application of advanced transportation and vehicle technologies and specific measures adopted in the TCM Plan are designed to counter the growth in VMT and congestion. Policies are addressed in the Conservation Element which seeks to assist the regional air quality in meeting state and federal standards. These policies include developing a fuel efficiency policy to reduce fossil fuel use by the City, upgrading energy conservation in City buildings, using CH_4 as an energy source from landfills, preserving and planting trees and vegetation to absorb CO_2 and other pollutants, promoting technological innovations, and encouraging alternative fuels and carpooling. The City will work with the SANDAG, the APCD, and other agencies to strengthen air quality regulations and enhance programs to help meet air quality standards.

Encouraging and creating incentives for energy-efficient design in new developments and promoting the reduction of industrial emissions through use of least-polluting cost-effective processes and technologies will benefit the region's air quality by reducing the amount of harmful pollutants being released into the region's air. Implementing the air quality control policies, programs, and measures as described above will ensure that implementation of the Draft General Plan would not conflict with or obstruct implementation of the applicable Air Quality Management Plan. Similarly, the environmental analysis of the RTP 2030 concluded that implementation of the RTP would not conflict with or obstruct implementation of the RAQS. The CARB, using similar considerations as the RTP and the Draft General Plan, recognizes through the quality improvements above that harmful pollutants resulting from mobile sources will continue to decline; as the precursors to ozone are diminished, attainment under state standards will be reached even with implementation of the Draft General Plan. The implementation of the Draft General Plan overall would have impacts below a level of significance with regards to standards for CO, ozone and hydrocarbons, NO_2 and SO_2.

Particulate Matter and Construction Emissions

As stated above, additional growth in the City of San Diego is projected to occur. This growth is to occur in a manner that is consistent with the Draft General Plan. Construction activities associated with growth could impact the region's air quality. A major source of pollution results from construction equipment that operates on diesel fuel which emits NO_X, CO, and ROG into the air during construction activities. These emissions would have the potential to exceed daily emissions standards set by the APCD. Similarly, construction activities would generate additional vehicle trips by construction workers traveling to and from construction sites. These additional trips would contribute more harmful emissions to the current level of emissions related to existing VMT in the region. Therefore, future development that may occur in the course of implementation of the Draft General Plan will result in localized short term air quality impacts, and this would amount to temporary significant and unavoidable impacts. However, in combination with the large decrease in mobile source pollutants as described above, the overall emissions of NO_X, CO, and ROG will nonetheless still decline and air quality will improve as the Draft General Plan is implemented.

Grading and earth moving activities associated with preparation of the site for construction, would emit PM_{10} and $PM_{2.5}$ into the air and could potentially exceed daily emissions standards set by the City. These potential impacts related to construction activities associated with the Draft General Plan would cease once construction was completed and thus would be localized and short term. Still, these impacts would be significant despite their short duration. As demolition and other development activities continue, the trend for particulate matter released into the air will rise as anticipated by the CARB (**Table 3.2-6**) and the region will still be in non-attainment for PM_{10} as a result, in part, of implementation of the Draft General Plan. Therefore, impacts associated with attainment of air quality standards with respect to particulate matter are significant at the program level. Mitigation Framework Measures Draft General Plan policies CE-F.1 through CE-F.8, and programs to reduce ozone and diesel PM have been identified to reduce these program level impacts. Because of the degree of impact and applicability, feasibility, and success of these measures cannot be adequately known for each specific project at this program level of analysis, the program level impact related to the ability of San Diego to meet particulate matter emissions standards remains significant and unavoidable.

Could implementation of the Draft General Plan result in air emissions that could substantially deteriorate ambient air quality, including the exposure of sensitive receptors to substantial pollutant concentrations?

Criteria Pollutants

As analyzed above, the proposed land use changes and growth expected to occur through the duration of the Draft General Plan implementation have the potential to increase PM_{10} emissions through construction activities which could deteriorate ambient air quality. In addition, the Draft General Plan allows for residential and industrial uses or residential and commercial uses on the same parcels (mixed-use) or on adjacent parcels. This could cause criteria pollutants or other air contaminants produced by industrial or commercial uses to affect the nearby sensitive receptors in residential units or other sensitive land uses. This is a potentially significant impact. Implementation of Draft General Plan policy EP-A.17 would focus residential and industrial collocation in areas not identified as prime industrial lands based on collocation suitability factors listed in Appendix C to the Economic Prosperity Element. Project-level assessments of toxic or hazardous air contaminants from industrial use will be performed to ensure that effects of industrial pollutants will be reduced. Because the degree of impact and applicability, feasibility, and success of these measures cannot be adequately known for each specific project at this program level of analysis, the program level impact related to deterioration of ambient air quality remains significant and unavoidable.

In addition, severe traffic congestion at large intersections could create localized CO "hot spots," which are areas where an increased number of vehicles are idling at intersections releasing emissions and causing CO concentrations to exceed state and federal standards. One of the main goals of the Draft General Plan is to focus growth into compact, mixed-use activity centers through the implementation of the City of Villages strategy. Future City of Villages developments associated with the General Plan would be designed to facilitate alternative modes of transportation such as walking or bicycling, and could reduce average trip distances and encourage transit use.

However, increases in vehicle congestion associated with increases in urban density could increase the volume of traffic flow at some existing intersections which could potentially create localized "hot spots." This typically occurs where intersections are below a Level of Service (LOS) E or worse with atmospheric conditions that do not facilitate dispersal of pollutants. The potential for hot spots to develop has been reduced significantly over the years. Implementations of air quality control measures and improvements on car emissions have greatly reduced the background levels of CO within the region. Consequently, this has greatly reduced the likelihood that increases in vehicle congestion will lead to the creation of hot spots.

Overall, impacts associated with degradation of ambient air quality are significant at the program level. Draft General Plan policies CE-F.1 through CE-F.8 and Mitigation Framework Measures have been identified to reduce these program level impacts. Because the degree of impact and applicability, feasibility, and success of these measures cannot be adequately known for each specific project at this program level of analysis, the program level impact related to deterioration of ambient air quality remains significant and unavoidable.

Greenhouse Gases (GHG)

Implementation of the Draft General Plan would result in increased emissions of GHGs, primarily due to increased VMT. The source of the CO_2 is the combustion of gasoline or diesel fuel in the vehicles. Diesel fuel has a slightly higher CO_2 emission factor per gallon than gasoline. Using the emission factors and assumptions provided in **Section 5.2 and Table 3.2.7** Vehicular Greenhouse Emissions (at the end of the section) during implementation of the Draft General Plan would generate approximately 6.7 million tons of carbon-equivalent in 2030. In addition, the City's Climate Protection Action Plan indicates that approximately one-half of the City's GHG emissions come from the energy and waste sectors. Thus, the projected population increase by 2030 during implementation of the Draft General Plan is anticipated to generate substantial levels of GHG emissions due to increased energy consumption and waste generation in addition to the GHG emissions associated with increased VMT. At the program-level, this is considered a significant and unavoidable impact. Please see **Section 5.2** of this EIR for a more detailed discussion of global warming impacts and mitigation measures.

3.2.4 Mitigation Framework

Goals, policies, and recommendations enacted by the City combined with the federal, state and local regulations described above provide a framework for developing project level air quality protection measures for future discretionary projects. The City's process for the evaluation of discretionary projects includes environmental review and documentation pursuant to CEQA as well as an analysis of those projects for consistency with the goals, policies and recommendations of the General Plan. In general, implementation of the above policies would preclude or reduce air quality impacts. Compliance with the standards is required of all projects and is not considered to be mitigation. However, it is possible that for certain projects, adherence to the regulations may not adequately protect air quality, and such projects would require additional measures to avoid or reduce significant air quality impacts. These additional measures would be considered mitigation.

For each future project requiring mitigation (i.e., measures that go beyond what is required by existing regulations), site-specific measures will be identified that reduce significant project-level impacts to less than significant or the project level impact may remain significant and unavoidable where no feasible mitigation exists. Where mitigation is determined to be necessary and feasible, these measures will be included in a Mitigation Monitoring and Reporting Program (MMRP) for the project.

Mitigation Framework Measures summarize general measures that may be implemented to preclude project-level impacts. These measures may be updated, expanded and refined when applied to specific future projects based on project-specific design and changes in existing conditions, and local, state and federal laws.

- For projects that may exceed daily construction emissions established by the City of San Diego, Best Available Control Measures will be incorporated to reduce construction emissions to below daily emission standards established by the City of San Diego. Project proponents must prepare and implement a Construction Management Plan which includes but is not limited to Best Available Control Measures. Appropriate control measures will be determined on a project-by-project basis, and are specific to the pollutant for which the daily threshold may be exceeded. Control measures may include:

    - Minimizing simultaneous operation of multiple construction equipment units;
    - Use of low pollutant emitting equipment;
    - Use of catalytic reduction for gasoline-powered equipment;
    - Watering the construction area to minimize fugitive dust; and
    - Minimizing idling time by construction vehicles.

- Development that could significantly impact air quality, either individually or cumulatively, would receive entitlement only if it is conditioned with all reasonable mitigation to avoid, minimize, or offset the impact. As a part of this process, future projects may be required to buffer sensitive receptors from air pollution sources through the use of landscaping, open space, and other separation techniques.

3.2.5 Significance of Impact with Mitigation Framework

The potential program level impacts on the ability of San Diego to reach the RAQS standards for other criteria pollutants are less than significant.

Particulate matter from construction and concentrated carbon monoxide (CO) "hot spots" would be significant and unavoidable at the program level. The Draft General Plan would have a less than significant impact on ambient air quality for other criteria pollutants.

Greenhouse gas emissions would also be significant and unavoidable. This impact is further discussed in **Section 5.2** of this document.

Notes and References

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TABLE 3.2.7
VEHICULAR GREENHOUSE GAS EMISSIONS

Year	Daily VMT[1]	Annual VMT	Fuel Economy (MPG)[2]	Total Gasoline Consumption (gallons)	Emission Factors (Lbs./Gallon of Gasoline)[3]			Total Vehicular Emissions by GHG (tons)			Global Warming Potential[4]			Carbon Dioxide Equivalent Emissions (tons)		
					CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
1990	30,583,000	11,162,795,000	20.300	549,891,379	19.564	0.00055	0.00020	5,379,037	151	55	1	23	300	5,379,037	3,478	16,497
2005	35,014,269	12,780,208,185	21.739	587,893,104	19.564	0.00055	0.00020	5,750,770	162	59	1	23	300	5,750,770	3,718	17,637
2006	35,330,273	12,895,549,645	21.833	590,644,879	19.564	0.00055	0.00020	5,777,688	162	59	1	23	300	5,777,688	3,736	17,719
2020	39,754,333	14,510,331,399	22.779	637,004,759	19.564	0.00055	0.00020	6,231,181	175	64	1	23	300	6,231,181	4,029	19,110
2030	42,914,375	15,663,746,875	22.893	684,215,563	19.564	0.00055	0.00020	6,692,997	188	68	1	23	300	6,692,997	4,328	20,526

1. Section 3.15, Transportation/Traffic.