Appendix C

Air Quality Technical Report

AIR QUALITY

To Accompany:

LONG BEACH MEMORIAL MEDICAL CENTER EXPANSION
ENVIRONMENTAL IMPACT REPORT

Prepared by:

SCS Engineers
3711 Long Beach Boulevard
Ninth Floor
Long Beach, California 90807
(562) 426-9544

October 2004
File No. 01203219.01

TABLE OF CONTENTS

TABLES

1.0 AIR QUALITY

As a result of the Initial Study, the City of Long Beach (City) determined that the proposed Long Beach Memorial Medical Center expansion (proposed project) had the potential to result in significant impacts related to air quality. Therefore, detailed analysis on this issue is included in this draft Environmental Impact Report (DEIR). This analysis was undertaken to identify opportunities to avoid, reduce, or otherwise mitigate potential significant impacts to air quality and to identify potential alternatives.

The analysis of air quality consists of a summary of the regulatory framework that guides the decision making process, a description of the existing conditions at the proposed project area, thresholds for determining if the proposed project would result in significant impacts, anticipated impacts (direct, indirect, and cumulative), mitigation measures, and level of significance after mitigation. Potential impacts from both the construction phase and operational phase of the project were evaluated. The potential for impacts to air quality has been analyzed in accordance with Appendix G of the State California Environmental Quality Act (CEQA) Guidelines and the methodologies and significance thresholds provided by the South Coast Air Quality Management District (SCAQMD) (Appendix G, *Air Quality Report*).

1.1 REGULATORY FRAMEWORK

Regulation of air quality is achieved through both national and state ambient air quality standards (NAAQS and SAAQS) and emission limits and regulatory requirements for individual sources of air pollutants. This regulatory framework identifies the federal, state, and local laws that govern the regulation of air quality and must be considered by the City regarding decisions on projects that involve construction, operation, or maintenance activities that would have the potential to result in air emissions.

Responsibility for attaining and maintaining ambient air quality standards in California is divided between the California Air Resources Board (CARB) and regional air pollution control or air quality management districts. Areas of control for the regional districts are set by CARB, which divides the state into air basins. These air basins are based largely on topography that limits air flow access, or by county boundaries. The City of Long Beach and County of Los Angeles are located in the South Coast Air Basin (Basin), which is composed of a 6,600-square-mile area encompassing all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Federal and state air quality standards have been established for eight ambient air pollutants, primarily to protect human health and environment. The eight criteria air pollutants (CAPs) for which federal and state ambient standards have been established include: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$). Documented health effects from the exposure to these pollutants include acute respiratory infections, chronic bronchitis, pulmonary emphysema, and bronchial asthma. These pollutants are emitted from a variety of sources including power plants, wastewater treatment facilities, hospitals, oil refineries, natural gas production facilities, gasoline stations, and automobiles.

In addition to the CAPs, toxic air contaminants (TACs) are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic; i.e., cancer-causing) adverse human health effects (e.g., injury or illness). TACs include both organic and inorganic chemical substances. They are also emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. TACs are regulated separately from the CAPs at both federal and state levels.

The air quality impact assessment completed for this DEIR focused on the CAP and TAC emissions originating from the proposed expansion of the Long Beach Memorial Medical Center.

FEDERAL

Federal Clean Air Act

The 1977 Federal Clean Air Act (CAA) and the 1990 amendments to the CAA required the United States Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for the following pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb. In July 1997, the EPA promulgated stricter standards for O_3 and fine particulate matter ($PM_{2.5}$); however, deadlines for attaining the standards were extended over original proposals, with up to 10 years allowed for attaining the $PM_{2.5}$ standard. Table 1 identifies the current NAAQS.

Pursuant to the 1990 CAA Amendments (CAAA), the EPA has classified air basins (or portions thereof) as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. The SCAB is currently classified as non-attainment with the NAAQS for both O_3 and PM_{10}. The SCAB has met all other NAAQS, and is following a maintenance plan to ensure continued attainment with the NO_2 and CO standards. Attainment status with the new $PM_{2.5}$ and 8-hour O_3 standards have not yet been determined, however, the SCAB is likely to be classified as non-attainment with both standards.

The CAA requires each state to prepare an air quality control plan, referred to as the State Implementation Plan (SIP), which identifies strategies for achieving the standards by the required deadlines. The 1990 CAAA additionally required states containing areas that violate NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The EPA has responsibility to review all state SIPs to determine if they conform to the mandates of the CAAA and if implementation will achieve air quality goals. In 1999, the SCAQMD Governing Board adopted the 1999 Amendment to the 1997 Ozone SIP. The most recent update to the PM_{10} SIP for Coachella Valley was adopted in 2003.

Regulation of TACs, termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal and state controls on individual sources. Federal law defines HAPs as non-criteria air pollutants with short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. The 1977 CAAA required the EPA to identify and set forth National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare.

STATE

California Clean Air Act

The California Air Resources Board (CARB) was created in 1967, as a consolidation of various state agencies, to serve as California's state air quality management agency. CARB regulates mobile emissions sources and oversees the activities of local Air Pollution Control Districts (APCDs) and regional Air Quality Management Districts (AQMDs). The CARB regulates local air quality indirectly through the SAAQS and vehicle emission standards, by conducting research activities, and through planning and coordinating activities. In addition, CARB has established and maintains, in conjunction with local APCDs and AQMDs, a network of monitoring stations to assess ambient air quality throughout the state.

The 1998 California Clean Air Act (CCAA) required all areas in the state to achieve and maintain attainment with the SAAQS by the earliest practical date. The ambient air quality standards adopted by

TABLE 1

STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards[a]	Federal Standards[b]	
		Concentration[c]	Primary[c, d]	Secondary[c, e]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as Primary Standard
	8 Hour	—	0.08 ppm (157 µg/m^3)	
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m^3	50 µg/m^3	
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard	65 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	—	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1 Hour	0.25 ppm (470 µg/m^3)	—	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	—
	3 Hour	—	—	0.5 ppm (1300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	—	—
Lead	30 Day Average	1.5 µg/m^3	—	—
	Calendar Quarter	—	1.5 µg/m^3	Same as Primary Standard
Visibility Reducing Particulates	8 Hour	Extinction coefficient of 0.23 kilometer- visibility of ten miles or more due to particles when relative humidity is less than 70 percent.	No Federal Standards	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

a California standards for ozone, carbon monoxide, sulfur dioxide (1 and 24 hour), nitrogen dioxide, particulate matter (PM-10, PM-2.5) and visibility reducing particles are values that are not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

b National standards, other than for ozone, particulate matter and those based on annual averages or annual arithmetic mean, are not to be exceeded more than once per year. The eight-hour ozone standard is met 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 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For PM2.5, the 24 hour standard is met when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard.

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

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

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

Source: California Air Resources Board, July 9, 2003.

California are more stringent than the national standards, and were developed for greater public health protection. In addition, California also set standards for ambient levels of visibility reducing particles, sulfates and hydrogen sulfide. The current SAAQS are listed in Table 1. Similar to the Federal CAA, under the California Clean Air Act (CCAA), areas have been designated as "attainment" or "non-attainment" with respect to SAAQS. The SCAB is currently classified as non-attainment with the SAAQS for O_3, PM_{10} and CO.

California state law defines TACs as air pollutants having carcinogenic or highly toxic non-carcinogenic effects. The State Air Toxics Program was established in 1983 under AB 1807 (Tanner). Over 200 substances have been designated TACs under California law; they include the 188 (federal) HAPs adopted in accordance with AB 2728 and additional chemicals regulated by the state. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) was enacted in 1987 and requires stationary sources to quantify and report emissions of TACs in order to evaluate localized impacts from facilities which emit air toxics.

REGIONAL

South Coast Air Quality Management District

The Los Angeles County Air Pollution Control District was formed in 1947 and was the first air pollution control agency in the United States. Over the next several decades, air pollution control districts were formed in Orange County, San Bernardino and Riverside Counties. By 1977, the four agencies were combined into one regional agency as the South Coast Air Quality Management District (SCAQMD). The jurisdiction of the SCAQMD covers all of Orange County, the non-desert areas of Los Angeles, San Bernardino and Riverside counties, and portions of the Salton Sea and Mojave Desert Air Basins. The SCAQMD is responsible for controlling stationary sources of pollution, as well as implementing transportation control measures to reduce mobile source emissions. The SCAQMD offices are currently located in Diamond Bar, California.

Since 1989, the SCAQMD has adopted and updated the Air Quality Management Plan (AQMP) to guide overall efforts for air quality improvement over a 20 year planning period. Using strategies identified in the AQMP, SCAQMD develops and submits pollutant specific attainment plans to the California Air Resources Board for incorporation in the SIP. The AQMP is updated every three years; the most recent AQMP was adopted by the SCAQMD governing Board in 2003. The 2003 AQMP includes 28 stationary and 21 mobile source control measures. Finally, the SCAQMD adopted an Air Toxics Control Plan in 2000 to guide regulatory actions targeted at reducing public exposure to toxic emissions, including strategies to reduce diesel particulate emissions.

1.2 EXISTING CONDITIONS

The factors that determine air quality are a combination of the locations of air pollutant sources, the amounts of pollutants emitted and the meteorological and topographical conditions. The project is located in the City of Long Beach, in Los Angeles County, California and located within the South Coast Air Basin (SCAB).

The SCAB is an approximately 10,743 square mile, four county area, bounded on the west by the Pacific Ocean, and the steep ranges of the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. (SCAQMD, 2003) The City of Long Beach is located along the coast in southern Los Angeles County and has relatively flat topography with an average elevation of 29 feet.

The National Weather Service (Morris, 2003) describes the area of the SCAB as having a Mediterranean climate characterized by dry summers, rainy winters and moderate changes in temperature throughout the year. From late spring through early fall, the meteorology in the basin is dictated by a semi-permanent high pressure area located over the Pacific Ocean. This pressure system creates a strong inversion by trapping cool ocean influenced air under warm, dry air aloft. Ground level air emissions are trapped under this marine inversion throughout the season, limiting dispersion and resulting in elevated pollution levels. From late fall through early spring, the high pressure system dissipates, and Pacific storms and subtropical moisture move through the area, bringing in the majority of the annual rainfall for the area. Winds throughout the year are generally light, averaging 6.2 mph, with occasional strong offshore winds known as Santa Anas.

The SCAB averages over 250 sunny days per year. The summer high temperatures in Long Beach peak at an average high of 84.5^0 F in August. The daily summer temperature variation averages 17^0 F from day to night. Winters are mild, with temperatures below freezing unusual. Average high temperatures in the winter are in the high 60's, with average daily low temperatures in the mid-40's.

Precipitation in the SCAB increases inland, ranging from an average of 12 inches per year at the coast to almost double at the foothills. The project area vicinity receives an average of 13 inches of precipitation per year. Precipitation is confined primarily to the winter and spring months.

CRITERIA AIR POLLUTANTS

Air quality within the SCAB is determined by routinely monitoring changes in the quantities of criteria pollutants in the ambient environment. Air quality in the area is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors, which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

The CARB and SCAQMD maintain ambient air quality monitoring stations at numerous locations throughout the basin. The stations provide information on average concentrations of criteria air pollutants. Monitoring data over the past several decades have indicated a trend for improved air quality in the SCAB, with decreases in the number of annual standard exceedances for both O_3 and PM_{10}.

The monitoring station nearest the proposed project site is located at 3648 North Long Beach Boulevard in the City of Long Beach, approximately 0.8 miles north of the project site. Table 2 summarizes the annual concentrations of O_3, CO, PM_{10} and $PM_{2.5}$ for the most recent years available (2000-2002). The concentration provided is for the highest daily or hourly concentration, as regulated. The numbers of days of violation of the federal and state standards are also presented.

AIR TOXIC EMISSIONS

Air toxic emissions come from a variety of sources, including commercial, industrial, and agricultural operations. The SCAQMD 2000 Multiple Air Toxics Exposure Study (MATES II), designed to estimate carcinogenic risk from air toxic emissions, indicated that the greatest contributor to regional cancer risk from air toxic emissions was mobile sources (e.g. vehicles, trains, ships, airplanes), with associated diesel particulate emissions responsible for the majority of the risk. MATES II estimated carcinogenic risk from air toxic emissions in the SCAB to be 1,400 in a million. Areas with greater exposure to mobile source emissions experienced an increased risk. Air toxic monitoring at the fixed location in Long Beach indicated a carcinogenic risk of approximately 1,100 to 1,200 in a million. Approximately 90% of the estimated risk was associated with mobile sources, and of that, 70% was associated with diesel particulate emissions.

TABLE 2

AIR QUALITY DATA FOR SOUTH COASTAL LOS ANGELES COUNTY MONITORING STATION, LONG BEACH, CALIFORNIA

Pollutant/Standard	1999	2000	2001	2002
Ozone (O_3)				
1-Hour				
Maximum Concentration (ppm)	0.13	0.12	0.091	0.084
No. Days State Standard Exceeded (>0.09 ppm)	3	3	0	0
No. Days Federal Standard Exceeded (>0.12 ppm)	1	0	0	0
8-Hour				
Maximum Concentration (ppm)	0.08	0.080	0.070	0.065
No. Days Federal Standard Exceeded (>0.08 ppm)	0	0	0	0
Carbon Monoxide (CO)				
1-Hour				
Maximum Concentration (ppm)	7	10	6	6
No. Days State Standard Exceeded (>20 ppm)	0	0	0	0
No. Days Federal Standard Exceeded (>35 ppm)	0	0	0	0
8-Hour				
Maximum Concentration (ppm)	5.4	5.8	4.71	4.6
No. Days State Standard Exceeded (>9.0 ppm)	0	0	0	0
No. Days Federal Standard Exceeded (>9 ppm)	0	0	0	0
Respirable Particulate Matter (PM_{10})				
24-Hour				
Maximum Concentration ($\mu g/m^3$)	79	105	91	74
% Samples Exceeding State Standard (>50 $\mu g/m^3$)	22	21	17	8.6
% Samples Exceeding Federal Standard (>150 $\mu g/m^3$)	0	0	0	0
Annual Average				
Annual Arithmetic Mean ($\mu g/m^3$)[a]	38.9	37.6	37.4	35.9
Annual Geometric Mean ($\mu g/m^3$)[a]	36.4	34.0	34.8	34.1
Fine Particulate Matter ($PM_{2.5}$)				
24-Hour				
Maximum Concentration ($\mu g/m^3$)	66.9	81.5	72.9	62.7
% Samples Exceeding Standard (>65 $\mu g/m^3$)	1	1.3	0.3	0
Annual Average				
Annual Arithmetic Mean ($\mu g/m^3$)[a]	21.5	19.2	21.4	19.5

a The new PM2.5 annual arithmetic mean (AAM) state standard of 12 $\mu g/m^3$ and revised PM10 AAM state standard of 20 $\mu g/m^3$ (to replace annual geometric mean of 30 $\mu g/m^3$) recommended by CARB have been approved by the state Office of Administrative Law and will become effective on July 5, 2003. Federal PM10 standard is annual arithmetic mean (AAM) > 50 $\mu g/m^3$; Federal PM2.5 standard is AAM >15 $\mu g/m^3$.

Source: SCAQMD, March 2004

AIR POLLUTANT PROPERTIES, EFFECTS AND SOURCES

The following section describes the pollutants of greatest importance in the South Coast Air Basin, including a description of the physical properties, the health and other effects of the pollutant, and its sources.

Ozone (O_3)

O_3 is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere. Through a complex series of photochemical reactions, in the presence of strong sunlight and ozone precursors (NO_x and reactive organic gases [ROG]), O_3 is created. Motor vehicles are a major source of O_3 precursors. O_3 causes eye and respiratory irritation, reduces resistance to lung infection, and may aggravate pulmonary conditions in persons with lung disease. As shown in Table 2, from 1999 to 2002, the maximum 1-Hour O_3 concentration recorded at the Long Beach monitoring station was 0.13 ppm in 1999. The state 1-hour standard was exceeded three times in 1999 and 2000 with no violations in 2001 and 2002. One violation of the federal 1-hour standard was observed in 1999. The maximum 8-Hour O_3 concentration was 0.08 ppm from 1999 to 2002 and no violations of the federal 8-hour standard were observed.

Carbon Monoxide (CO)

CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances and is primarily a winter pollution problem. The primary source of CO emissions is motor vehicles. CO is also produced by wood and charcoal burning. CO concentrations are influenced by the spatial and temporal distributions of vehicular traffic, wind speed, and atmospheric mixing. High levels of CO can impair the transport of oxygen in the bloodstream, thereby aggravating cardiovascular disease and causing fatigue, headaches, and dizziness. As shown in Table 2, the highest 1-hour concentration of CO measured at the Long Beach monitoring station between 1999 and 2002 was 10 ppm in 2000. The highest 8-hour concentration of CO measured during the same time period was 5.8 ppm in 2000. No violations of the state or federal one-hour or 8-hour standards were observed from 1999 to 2002.

Respirable Particulate Matter (PM_{10})

PM_{10} consists of particulate matter 10 microns (one micron is one one-millionth of a meter) or less in diameter, which can be inhaled. Relatively small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorine or ammonia) that may be injurious to health. Primary sources of PM_{10} emissions in the South Coast Air Basin are windblown dust, entrainment by vehicle traffic of dust and dirt particles that settle onto roadways and parking lots, and crushing and grinding operations. The amount of particulate matter and PM_{10} generated is dependent on the soil type and the soil moisture content. Table 2 shows the maximum 24-hour PM_{10} concentration measured at the Long Beach monitoring station between 1999 and 2002 was 105 $\mu g/m^3$ in 2000. The state PM_{10} standard was exceeded numerous times during the time period of 1999 to 2002. No violations of the federal standard were observed.

Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ consists of fine particulate matter 2.5 microns or less in diameter. $PM_{2.5}$ can be formed through fuel combustion by motor vehicles, power plants or other industrial sources, by agricultural or residential burning, or through atmospheric reactions of gases such as sulfur oxides, nitrogen oxides and volatile organic compounds. Fine particulates can penetrate deep into the lungs and aggravate pulmonary conditions, cause acute respiratory symptoms (i.e. severe chest pain, aggravated coughing), decreased

lung function, chronic bronchitis or premature death. The maximum 24-hour $PM_{2.5}$ concentration measured at the Long Beach monitoring station between 1999 and 2002 was 81.5 $\mu g/m^3$ in 2000, as shown in Table 2. The state and federal $PM_{2.5}$ standard was exceeded between 0 to 1.3 percent of the time between 1999 to 2002.

EXISTING RECEPTOR LOCATIONS

Some receptors are more sensitive to air pollution exposure. Sensitive receptors include people with compromised immune systems, the elderly, children, and athletes. Land uses considered to be sensitive receptors are identified in the SCAQMD CEQA Handbook as Long-Term Health Care Facilities, Rehabilitation Centers, Convalescent Centers, Retirement Homes, residences, schools, playgrounds, child care centers and athletic facilities. The project is located on the campus of Long Beach Memorial Medical Center, near existing and operating medical facilities.

1.3 SIGNIFICANCE THRESHOLDS

Air quality impacts from a project can occur during both short-term construction related activities and long-term project operations. The state CEQA Guidelines recommend that potential air quality impacts from a project be evaluated against the following questions:

- Conflict with or obstruct implementation of the applicable air quality plan
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people

The SCAQMD has recommended significance thresholds for evaluating air quality impacts in the South Coast Air Basin. These thresholds were published in the CEQA Air Quality Handbook (SCAQMD, 1993). The SCAQMD is currently in the process of updating the Handbook, however at the time of this analysis, no revisions had been made to the significance thresholds or recommended analysis methods. Emission thresholds are presented for both construction and operation activities.

TABLE 3
AIR EMISSIONS SIGNIFICANCE THRESHOLDS

Pollutant	Construction		Operation
	lbs/day	tons/qtr	lbs/day
Reactive organic compounds (ROC or ROG)	75	2.5	55
Nitrogen oxides (NOx)	100	2.5	55
Carbon monoxide (CO)	550	24.75	550
Particulate matter (PM10)	150	6.75	150
Sulfur oxides (SO2)	150	6.75	150

In addition, potential project CO emissions which have may exceed the state 1-hour of 8-hour emission standard will result in a CO hotspot and will be considered significant.

1.4 IMPACT ANALYSIS

The five significance thresholds taken from Appendix G of the State CEQA Guidelines were used to evaluate the impacts to air quality and are shown in the following four categories. This section analyzes the potential for significant impacts to air quality that would occur from implementation of the proposed project. Air quality impacts of a project generally fall into four major categories:

(1) *Construction Impacts*—temporary impacts, including airborne dust from grading, demolition, and dirt hauling; gaseous emissions from heavy equipment, delivery and dirt-hauling trucks, and employee vehicles; and fumes from paints and coatings. Construction emissions vary substantially from day to day, depending on the level of construction phase and weather conditions.

(2) *Operational Regional Impacts*—primarily gaseous emissions from natural gas and electricity usage and vehicles traveling to and from a project site.

(3) *Operational Local Impacts*—increases in pollutant concentrations, primarily carbon monoxide, resulting from traffic increases in the immediate vicinity of a project, as well as any toxic and odor emissions generated on site.

(4) *Cumulative Impacts*—air quality changes resulting from the incremental impact of the project when added to other projects in the vicinity.

CONSTRUCTION IMPACTS

The project is anticipated to be developed in phases, based upon demand and available funding. The initial construction phases are expected to begin in 2005 and will include development of Phase I TCI, and preparations for Phase I MCH, including construction of the Utility Trench and Roadway Realignment. This will be followed three months later by simultaneous development of the Phase I MCH Inpatient Tower and MCH Outpatient tower and development of the Central Plant following in six months. Construction of this first stage development is expected for completion in early 2008. The second stage of development at the site is not expected to begin any sooner than 2010, and will include development of Phase II TCI and MCH Link Building, with later development of the Phase II MCH Inpatient tower. The timeline for construction of the different buildings at the site will result in the likelihood of overlapping construction activities.

Potential emission estimates from construction activities are based upon emission factors and construction scenario information for development at the site. The total amount of construction, including duration and level of construction activity occurring at the site, will influence the estimated construction emissions and resulting potential impacts. The emission forecasts are therefore based upon conservative assumptions about the construction scenario, with a large amount of construction activity occurring in a relatively short time frame. In addition worker commute trips will vary throughout the construction period. Estimates included in this analysis include the highest potential worker commute trips. Due to the conservative nature of these assumptions, actual emissions from the individual construction projects will very likely be less than the estimates forecasted.

Construction emissions are expected to result from the following activities: 1) demolition of existing structures; 2) site grading; 4) soil removal; 5) delivery and hauling of construction materials and equipment; 6) fuel combustion by on-site construction equipment; 7) construction worker commute trips; 8) application of architectural coatings; 9) asphalt operations.

The proposed project would include the demolition of two structures: the existing parking structure at the Miller Children's Center to accommodate construction of the Inpatient Tower and the wood-framed "WIC Building" to accommodate the Central Plant. Dimensions for the structures were estimated from the site plan by TAYLOR, the project architect. Demolition of the two structures would be preceded by asbestos abatement, as necessary. The contractor would comply with requirements of SCAQMD Rule 1403 regarding asbestos control during demolition. This rule ensures that if there is any asbestos present in the buildings scheduled for demolition, it is removed and encapsulated prior to demolition so that no asbestos fibers are released. The SCAQMD CEQA Air Quality Handbook states that asbestos emissions from a project are fully mitigated and do not present a significant impact when the project is in compliance with Rule 1403. In addition, should any contamination be found to be present in the soils in the area exposed after demolition, construction would stop and appropriate health and safety procedures and agency coordination would be undertaken prior to continuing work on site.

Estimates of construction work for the project indicate a maximum total of 16 acres of disturbance around the site. In addition, potentially contaminated soil in the former ravine and around the site must be removed prior to construction. Fugitive dust emissions from soil handling during remediation were estimated using the Compilation of Air Pollution Emissions Factors, AP-42 (EPA, 1997). Potential VOC emissions from removal of VOC contaminated soil were estimated using the assumption that 50% of VOC in the soil would be released during the excavation and stockpiling process, prior to removal from the site for disposal. A conservative estimate of 57.8 ppm VOCs in the soil was used, which represents the sum of the maximum levels of VOCs found in soil boring at the site, as evaluated by SCS Engineers.

Maximum potential air quality impacts were determined by calculating emissions using a worst-case daily construction scenario for each phase. The analysis also considered the potential overlap of construction activities of different projects at the site. Equipment mixes and amount of activity for construction for each phase and building were calculated using the phasing schedule and equipment list provided in the Project Description section of this report. Maximum daily construction emissions for each building and each phase are presented in Table 4.

Pollutant emissions were estimated using the California Air Resources Board's URBEMIS2002 model, a methodology approved by the SCAQMD. The URBEMIS2002 model separates construction emissions into three phases: 1) demolition; 2) site grading; and 3) building construction. Demolition emission include demolition fugitive dust, on-road emissions from truck trips for hauling debris, off-road emissions from equipment and worker commute trips. Site grading emissions include fugitive dust, on-road emissions from truck trips for hauling soil, off-road emissions from equipment and worker commute trips. Building construction emissions are subdivided into building construction (i.e. equipment and worker

commute), application of architectural coatings (i.e. architectural emission off-gassing and worker commute) and asphalt (i.e. asphalt off-gassing, equipment, truck trips and worker commute). Equipment exhaust emissions were determined using the URBEMIS2002 default values for horsepower, load factors and working schedule (i.e. 8 hours per day, 22 days per month). The URBEMIS2002 User's Manual (Jones & Stokes, 2003) provides information on construction emission estimation and default assumptions. URBEMIS2002 modeling outputs are provided at the end of this technical appendix.

Concurrent construction and operation emissions will likely occur during later stages of the project. Construction of TCI Phase II and the MCH Link Building will occur after the earlier stages of construction are complete and operational activities have commenced. Therefore, emission of concurrent construction and operation activities were evaluated. Expected emissions will likely exceed SCAQMD significance thresholds for CO, NOx and ROG. The significance of these emissions is driven by the high level of short term emissions from construction activities. Emissions are expected to be less than significant for PM_{10} and SO_2. Results are presented in Table 7.

Construction equipment emissions during grading and construction activities at the site will include emissions of the toxic air contaminant diesel particulate matter. As mentioned above, the results of the MATESII study conducted by SCAQMD indicated that air toxics in the Long Beach area present a carcinogenic risk of approximately 1,100 to 1,200 in a million, with approximately 90% of the risk from mobile sources, and of that, 70% of the risk from diesel particulate. Risks associated with diesel particulate from this project are qualitatively evaluated in the risk assessment appendix of this report.

TABLE 4
PROJECT RELATED MAXIMUM DAILY REGIONAL CONSTRUCTION EMISSIONS BEFORE MITIGATION (1)

	CO (lbs/day)	SO_x (lbs/day)	PM_{10} (2) (lbs/day)	NO_x (lbs/day)	ROG (lbs/day)
TCI Phase I	327.47	0.03	29.87	338.06	161.1
Utility Trench	99.14	0	9.9	105.23	13.44
Roadway Realignment	216.84	0.43	49.67	224.71	28.51
Parking Structure	361.95	0.23	35.03	344.21	46.3
MCH Inpatient Tower Phase I	594	0.13	35.34	550.33	162.05
MCH Outpatient Tower	589.52	0.17	36.35	578.85	150.63
Central Plant	90.59	0.01	8.95	84.71	11.62
TCI Phase II	230.81	0	25.48	170.78	92.55
MCH Link Building	230.76	0.01	10.53	170.38	58.27
MCH Inpatient Tower Phase II	432.95	0.02	12.69	313.15	119.04
Worst Case Daily Emissions (3)	1758.25	0.47	86.94	1758.21	352.21
SCAQMD Thresholds	550	150	150	100	75
Significant?	Yes	No	No	Yes	Yes

(1) Maximum daily emissions are the maximum emissions of each pollutant from any stage (i.e. demolition, soil excavation, site grading, or building construction) of the construction activities.
(2) PM_{10} is the total of PM_{10} dust and PM_{10} exhaust.
(3) Worst Case Daily Emissions are based on estimated emissions from July 2006, when maximum daily emissions from grading for the Central Plant and building construction of TCI Phase I, MCH Inpatient Tower Phase I, Utility Trench, MCH Outpatient Tower and the Parking Structure have the potential to occur simultaneously.

Potential sources of odors during the construction phase include the use of architectural coating and solvents. Under SCAQMD Rule 1113, VOCs in architectural coatings and solvents are limited. Coating and solvents used during the project must comply with these regulatory requirements, therefore limiting the potential for objectionable odors. Therefore, no odor impacts are expected and no further mitigation is required.

OPERATIONAL IMPACTS

Post-construction air emissions at the site are likely to result from both area sources (i.e. natural gas, landscaping and consumer products) and operational sources (i.e. on-road vehicles). Emissions from these sources were modeled using URBEMIS2002. Mobile source emissions in URBEMIS2002 are based upon the EMFAC2002 Version 2.2 emission inventory model, which projects emission estimates based upon assumptions including the expected vehicle fleet mix for the estimated start date of the project, the vehicle speed and distance assumptions and temperature conditions. Trip generation rates were determined using the values included in URBEMIS2002 based upon the land uses to be developed at the site. Vehicle speeds, distances, and fleet mix were based upon the default values in the URBEMIS2002 model. Input parameters used in URBEMIS2002 are listed in Table 5. Area source emissions were calculated using the default values in the model. URBEMIS2002 modeling outputs are provided at the end of this technical appendix.

The Long Beach Memorial Medical Center and Miller Children's Hospital are served on Willow, Atlantic and Long Beach Boulevard by Long Beach Transit Services. The Willow-Metro Rail Station is located on the corner of Willow and Long Beach Boulevard. Easy access to these transit and rail services have the potential to reduce patient and worker commute trips to and from the site.

On-site stationary sources will include emergency diesel generators in the Central Plant that will be used for emergency back-up power. Two diesel generators will be installed at the Central Plant, with a third planned for installation during Phase II of the MCH Inpatient Tower. These stationary sources will require permits from SCAQMD pursuant to Regulation II, Rules 201, 202 and 203. Emission increases related to those sources will also be subject to Regulation XIII, New Source Review, which requires the utilization of Best Available Control Technology (BACT) to minimize emissions of CO, NO_x, VOC, and PM_{10}. The generators will be used in an emergency back-up capacity and, unless a power failure occurs, are not expected to be operated for greater than 1 hour per month for routine maintenance and testing. Emergency equipment is exempt from modeling and offset requirements under SCAQMD Rule 1304 and will not require a health risk assessment under Rule 1401. Since the emergency generators will be under permit with the SCAQMD and will meet BACT requirements, any potential air quality impacts from these sources are expected to be less than significant, and will not require further mitigation.

Emissions from mobile and area sources during project operation were summed to determine total daily emissions. These emissions were then compared to SCAQMD significance thresholds, as shown in Table 6. Operational emissions at build-out were determined to be less than significant for CO, SO_x, PM_{10}, and ROG. The potential daily maximum NO_x emissions at build-out were determined to be greater than the SCAQMD significance threshold, and thus will require mitigation.

TABLE 5
URBEMIS2002 INPUT PARAMETERS FOR MOBILE SOURCE EMISSIONS

Parameter	Value	Unit	Comment
Air Basin	South Coast		Project is located in the City of Long Beach
Analysis Year	2015		Projected buildout year
Temperature	60, 75 and 85	˚ F	Recommended temperatures in Table A9-5-I of SCAQMD Handbook for CO, NOx and ROG emissions, respectively.
Land Use Categories	Hospital = 423,930	Sq ft	Hospital(1): TCI Ph I = 83,630 TCI Ph II = 42,300 MCH Inpatient Ph I = 124,500 MCH Inpatient Ph II = 73,500 MCH Link = 20,000 MCH Outpatient = 80,000
Vehicle Fleet Mix	Light Auto = 56 Light Truck (<3750) = 15.3 Light Truck (3751 – 5750) = 16.4 Med Truck (5751-8500) = 7.3 Lite-Heavy (8501 – 10000) = 1.1 Lite-Heavy (10001 – 14000) = 0.3 Med-Heavy (14001 – 33000) = 1.0 Heavy-Heavy (33001 – 60000) = 0.8 Line Haul (>60,000) = 0 Urban Bus = 0.2 Motorcycle = 1.6 School Bus = 0 Motor Home = 0	%	Default values, with the exception of School Bus and Motor Home trips redistributed to Light Auto, which is more likely for the proposed project
All other parameters	Default values		Default values for SCAB in URBEMIS2002

1) Hospital land use is defined as any institution where medical or surgical care is given to non-ambulatory and ambulatory patients and overnight accommodations are provided.

TABLE 6
PROJECT RELATED MAXIMUM OPERATIONAL EMISSIONS AT BUILD-OUT

	CO (lbs/day)	SO_x (lbs/day)	PM_{10} (lbs/day)	NO_x (lbs/day)	ROG (lbs/day)
Area Sources	1.71	0.00	0.01	2.83	0.29
Energy Consumption	5.04	3.02	1.01	28.98	0.25
Operational (Vehicle) Sources	279.20	0.36	64.12	32.28	25.27
Total Emissions at Buildout	285.95	3.38	65.14	64.09	25.81
SCAQMD Thresholds	550	150	150	55	55
Significant?	No	No	No	Yes	No

TABLE 7
CONCURRENT CONSTRUCTION AND OPERATIONAL EMISSIONS IN 2010

	CO (lbs/day)	SO_x (lbs/day)	PM_{10} (lbs/day)	NO_x (lbs/day)	ROG (lbs/day)
Net Operation Emissions[(1)]	369.26	2.32	50.24	66.08	30.66
Construction Emissions[(2)]	453.04	0.00	12.95	340.46	150.13
Total Combined Emissions	822.30	2.32	63.19	406.54	180.79
SCAQMD Construction Significance Threshold	550	150	150	100	75
Significant?	Yes	No	No	Yes	Yes
SCAQMD Operation Significance Threshold	550	150	150	55	55
Significant?	Yes	No	No	Yes	Yes

1) The estimated emissions represent year 2010 vehicle trips, energy consumption and area source emissions. Emissions of NOx, ROG and CO are reduced at build-out due to the expected reduction in vehicle emissions into the future, as modeled by EMFAC2002.
2) The estimated emissions represent the maximum daily emissions from building construction of TCI Phase II and the MCH Link Building for the year 2011.

As identified in the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural operations, wastewater treatment facilities, food processing plants, chemical manufacturing, composting, refineries, landfills, dairies, and fiberglass operations. The proposed project does not include any land uses identified as being associated with odors. Therefore project operation will not create adverse odors and will not result in significant impacts requiring mitigation.

CUMULATIVE IMPACTS

The SCAQMD Air Quality Handbook provides guidance for conducting a cumulative impact analysis. One approach provided in the Handbook, suggests that analysis could be performed by analyzing whether the rate of growth in vehicle miles traveled (VMT) or trips is consistent with the rate of population or household growth. To assess this indicator, population growth for the project should be compared to the population projection for the build-out year. The proposed project is not expected to be growth inducing, but rather, growth accommodating and will provide essential services for the anticipated population growth in the area. Development of the proposed project is consistent with the population growth in the area and is designed to serve the health care needs of the growing Long Beach population. Further, as

operational emissions from this project are individually insignificant and will be consistent with land use plans and zoning, cumulative emissions are considered to be accounted for in the forecasting for the Air Quality Management Plan. Under this analysis therefore, the proposed project is not expected to result in a cumulatively significant impact to air quality.

ALTERNATIVES ANALYSIS

Three project alternatives are considered for this environmental analysis: 1) No project; 2) Delaying construction of TCI Phase I until adequate parking can be secured; and 3) Expedited construction of an on-site parking structure with a capacity of 1700 cars. The no project alternative will likely result in increased vehicle miles traveled throughout the region. Expansion of the medical facilities in Long Beach will serve a need for the growing population. If this need can not be filled locally by moving forward with the project, residents will need to travel to surrounding communities, resulting in increased vehicle miles traveled and increased regional air emissions from vehicles. For alternatives 2 and 3, operational emissions of the total project at build-out are not expected to be significant, therefore the only affect that the alternatives may have on the significance of air quality impacts will occur during the construction phase. Delaying construction of TCI Phase I has the potential to decrease the worst case construction emissions predicted to occur, based upon the initial project schedule, in the summer of 2006. Conversely, expediting construction of the parking structure for completion prior to the scheduled date of December 2007 will have the effect of increasing emissions from the construction of this facility into a shorter time frame, coinciding with construction emissions from TCI Phase I, MCH Inpatient Tower Phase I, Utility Trench, Central Plant, MCH Pediatric Outpatient Building and Roadway Realignment. Therefore, Alternative 1 has the potential to decrease short term air quality impacts, while Alternative 2 has the potential to increase short term air quality impacts. Neither alternative will have an affect on long term air quality impacts.

1.5 MITIGATION MEASURES

The following air quality mitigation measures are provided to reduce the potential air quality impacts from both the construction and operational phases of the project.

Construction Mitigation Measures:

Measure Air-1 Fugitive Dust:

- Comply with SCAQMD Rules 402, 403 and proposed Rule 1157, as they apply to the project.
- All site grading/earth moving activity areas shall be watered to control dust as necessary to remain visibly moist during active operations.
- Streets shall be swept as needed, but not more frequently than hourly, if visible soil material has been carried onto adjacent public paved roads.
- Construction equipment shall be visibly inspected prior to leaving the site and loose dirt shall be removed using rumble pads or washed off with wheel washers as necessary.
- Water three times daily or non-toxic soil stabilizers shall be applied, according to manufacturer's specifications, to reduce off-site transport of fugitive dust from all unpaved staging areas and unpaved road surfaces.
- Water three times daily and cover all soil stockpiles with tarps to reduce off-site transport of fugitive dust from soil stockpiles.

- Traffic speeds on unpaved roads shall not exceed 15 mph.

- On-site construction equipment staging areas and construction worker parking lots shall be located on either paved surfaces or unpaved surfaces subject to soil stabilization.

- Replace ground cover in disturbed areas as quickly as possible.

- Suspend all excavating and grading operations when wind speeds exceed 25 mph.

- All trucks hauling dirt, sand, soil, or other loose material are to be covered or should maintain at least two feet of freeboard in accordance with requirements of CVC Section 23114.

- All fugitive dust requirements shall be included in construction bid specifications and listed on grading plans for the project.

Measure Air-2 Soil Excavation:

- Continuous monitoring for VOCs will be employed during excavation. If preset thresholds are exceeded, mitigation will be implemented, such as covering the emitting area with soil, spraying with water, foam, surfactant (e.g. Simple Green), or other approved method.

- Soil stockpiles will be watered and covered with plastic sheeting and all trucks transporting soil will be covered with tarps to control fugitive dust emissions.

Measure Air-3 Equipment Emissions:

- All equipment shall be tuned and maintained in accordance with manufacturer's specifications.

- Maximize to the extent feasible the use of diesel construction equipment meeting the CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.

- Fuel all off-road and portable diesel powered equipment, including but not limited to bulldozers, graders, cranes, loaders, scrapers, backhoes, generator sets, compressors, auxiliary power units, with ARB certified motor vehicle diesel fuel (non-taxed version suitable for use off-road). CARB certified diesel fuel has a maximum sulfur content of 500 ppm, which minimizes particulate emissions of sulfur compounds.

- General contractors shall maintain and operate equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues will have their engines turned off when not in use, to reduce vehicle emissions. Construction activities should be phased and scheduled to avoid emission peaks and discontinued during second stage smog alerts.

- The engine size for each piece of equipment should be the minimum practical size.

- The number of pieces of equipment operating simultaneously should be minimized through efficient management practices.

- To the extent possible, petroleum powered construction activity shall utilize electricity from power poles rather than temporary diesel power generators and/or gasoline power generators.

- On-site mobile equipment shall be powered by alternative fuel sources (i.e. methanol, natural gas, propane, butane or electricity) as feasible.

- All equipment emission requirements shall be included in construction bid specifications for the project.

Measure Air-4 All construction equipment used in the project construction shall be stored within the project site (and away from medical facility buildings) to reduce impact to the street system and to avoid impacts from cold start emissions at the beginning of the workday.

Measure Air-5 Deliveries related to construction activities that affect traffic flow shall be scheduled during off-peak hours (e.g. between 10:00 a.m. and 3:00 p.m.) and coordinated to achieve consolidated truck trips. When traffic flow is impacted by the movement of construction materials and/or equipment, temporary traffic controls shall be provided to improve traffic flow (e.g. flag person).

Measure Air-6 Building materials, architectural coatings and cleaning solvents shall comply with all applicable SCAQMD rules and regulations.

Operational Mitigation Measures

Measure Air-7 Permits from the SCAQMD shall be obtained for the proposed emergency generators. The issuance of permits for these generators by the SCAQMD will require the operators of these facilities to implement Best Available Control Technology to minimize emissions of criteria air pollutants.

Measure Air-8 Energy Efficiency:

- All buildings shall meet the California Title 24 Energy Efficiency standards for water heating, space heating and cooling and insulation.

- Install energy efficient lighting in interiors of all buildings.

- Install energy efficient parking lot lighting and exterior building lighting.

- Use energy efficient appliances, where applicable.

- Plant shade trees near buildings and in parking lots to reduce summer cooling needs and reduce evaporative emissions from vehicles.

Measure Air-9 Vehicle Trip Reduction:

- Consider on-site vehicle queuing reduction in the design of the roadway realignment and parking projects.

- Provide on-site bicycle parking.

- Provide information on Long Beach Transit services to employees at LBMMC and MCH.

- Provide on-site eating and refrigeration services for employees to reduce lunch time trips.

1.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Prior to mitigation, construction related NO_x, CO and ROG emissions, mainly from the use of off-road mobile equipment, will be significant. SO_x and PM_{10} emissions, including the toxic air contaminant diesel particulate matter are expected to be less than significant and therefore not a concern for the sensitive receptors located within the medical facilities on-site. Fugitive dust emissions from site grading and earth moving, while also expected to be less than significant, have the potential to create nuisance concerns if unmitigated. Mitigation Measure Air-1 will control potential fugitive dust emissions and reduce the potential for nuisance. Measure Air-2 will control potential VOC and fugitive dust emissions duting soil excavation. Measure Air-3 will reduce equipment emissions of all criteria pollutants, including the localized pollutant CO and the ozone precursors NO_x and ROG. Measures Air-4 and Air-5 will avoid any undue impacts to traffic flow from moving construction equipment. In addition, Measure Air-4 will protect medical facilities and sensitive receptors from cold start emissions at the beginning of the workday. Measure Air-6 will ensure compliance with SCAQMD requirements for architectural coatings and minimize ROG emissions during the final stages of building construction. The above measures will reduce emissions of NO_x, ROG and CO, however due to the potential level of construction activity throughout the site and the potential for multiple projects to proceed simultaneously, these emissions from the worst case scenario, while reduced, are expected to remain significant and unavoidable. While total CO emissions from the worst case construction scenario will remain significant and unavoidable, CO is a localized pollutant and impacts must also be considered in a localized context in addition to considering emissions throughout the entire 54-acre project site. CO emissions for individual project construction only exceed SCAQMD's 550 lb/day CO CEQA significance threshold for the construction of the MCH Inpatient Tower Phase I, estimated at 44 lbs/day above the threshold, and MCH Outpatient Building, estimated at 39.52 lbs/day above the threshold. The construction equipment mitigation measures listed above have the potential to reduce CO emissions on an individual project basis to below the level of significance, therefore reducing impacts to localized receptors. Emissions of SO_x, fugitive dust and diesel particulate matter, which is of greatest concern to potential sensitive receptors at the site, will be less than significant.

Prior to mitigation, operational emissions of NO_x have the potential to be significant, due mainly to vehicle emissions and energy consumption. All other criteria air pollutant emissions are expected to be less than significant. Mitigation Measure Air-7 will ensure compliance with SCAQMD requirements and minimize emissions from the proposed emergency generators in the Central Plant. Measure Air-8 will increase energy efficiency in the new buildings and reduce emissions at the power plant source regionally within the air basin. Finally, Measure Air-9 will potentially reduce vehicle emissions by improving traffic flow, promoting alternative transportation and offering options to eliminate trips. With the implementation of the operational phase mitigation measures, potentially significant emissions of NO_x are expected to be reduced to less than significant.

REFERENCES

California Air Resources Board (CARB), *2002 State and National Area Designations Maps of California*, http://www.arb.ca.gov/desig/adm/adm.htm. May 2003.

California Air Resources Board (CARB), 2003. *Ambient Air Quality Standards*. July 2003.

City Data. *www.city-data.com*, accessed August 2004.

Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors*, AP-42, Volume I, Stationary Sources, 1997.

Jones & Stokes Associates, 2003. *Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module.* May 2003.

Morris, Todd. (NWS) *Local Climate Studies Downtown Los Angeles California.* National Weather Service Forecast Office. December 2003.

SCAQMD, 2004. *Rules and Regulations.* http://www.aqmd.gov/rules/rulesreg.html. October 2004.

SCAQMD, 2004. *Historical Data by Year*. http://www.aqmd.gov/smog/historicaldata.htm. March 2004.

SCAQMD, 2003. *Air Quality Management Plan*. August 2003.

SCAQMD, 1999. *Final 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin.* December 1999.

SCAQMD, 1993. *CEQA Air Quality Handbook*. November 1993.

EMISSION CALCULATION SPREADSHEETS

AND

URBEMIS2002 MODELING OUTPUTS