REVISED

AIR QUALITY ASSESSMENT OF CONSTRUCTION EMISSIONS

CANCER CENTER OF SANTA BARBARA

MASTER PLAN / SITE REDEVELOPMENT

(540 West Pueblo Street, Santa Barbara)

Prepared for:

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EXHIBIT F

1. Environmental Setting

1.1. Existing Physical Conditions in the Study Area

1.1.1. Regional Climate

The project site is located within the South Central Coast Air Basin (Basin), which includes all of San Luis Obispo, Santa Barbara, and Ventura Counties. The climate of the Basin is strongly influenced by its proximity to the Pacific Ocean and the location of the semi-permanent high-pressure cell in the north eastern Pacific. With a Mediterranean-type climate, the project area is characterized by warm, dry and cool winters with occasional rainy periods.

Cool, humid marine air causes frequent fog and low clouds along the coast, generally during the night and morning hours in the late spring and early summer months. The project area is subject to a diurnal cycle in which daily onshore winds from the west and northwest are replaced by mild offshore breezes flowing from warm inland valleys during night and early morning hours. This alternating cycle can create a situation where suspended pollutants are swept offshore at night, and then carried back onshore the following day. Dispersion of pollutants is further degraded when the wind velocity for both day and nighttime breezes is low.

The region is also subject to seasonal "Santa Ana" winds. These are typically hot, dry northerly winds which blow offshore at 15 to 20 miles per hour (mph), but can reach speeds of over 60 mph. A condition similar to the "Santa Ana" known as a "sundowner" can also occur along the coastal area of Santa Barbara County below the Santa Ynez Mountains.

Temperature inversions, in which warm air overlies cooler air, can limit the dispersal of air pollutants within the regional airshed or Basin. In an inversion condition, a warm upper layer of air forms a cap over the marine layer and inhibits the air pollutants generated near the ground from dispersing upward. Two types of inversions typically occur in the region. A subsidence inversion is a regional effect created by the dominant Pacific high-pressure area. It occurs when air warms up as it is compressed when it flows from high-pressure areas over the ocean to lower-pressure areas inland. This type of inversion is most common in summer, although it can occur throughout the year. Surface inversions are created when air near the ground cools more rapidly during the night, and are common in winter. They are often accompanied by stable air conditions with low wind speeds and uniform temperatures, which reduce the rate of pollutant dispersion.

1.1.2. Regulatory Setting

Federal

The Federal Clean Air Act (CAA) and its subsequent amendments form the basis for the national air pollution control effort. The CAA established the National Ambient Air Quality Standards (NAAQS) for "criteria pollutants" and delegated the regulation of air pollution control to the states. The criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).

Ozone (O_3) is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. These precursors are mainly oxides of nitrogen (NOx) and volatile organic compounds (VOC) (also known as reactive organic compounds or gases [ROC or ROG], and referenced as ROC throughout this document). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Ozone concentrations are highest during the warmer months and coincide with the seasons of maximum solar radiation.

Inert pollutant concentrations (generally, pollutants other than O_3 and its precursors) tend to be the greatest during the winter and are a product of light wind conditions and surface-based temperature inversions. Maximum inert pollutant concentrations are usually found near an emission source. For example, the main sources of CO emissions are motor vehicles and the highest ambient CO concentrations are found near congested transportation arteries and intersections.

In states where the NAAQS were exceeded, the CAA required preparation of a State Implementation Plan (SIP), which detailed how states would meet the standards within specified time frames.

State

The CAA delegated to each state the authority to establish air quality rules and regulations. The adopted rules and regulations must be at least as restrictive as the federal requirements. In California, the California Air Resources Board (CARB) is designated as the responsible agency for all air quality regulations. The CARB has established the California Ambient Air Quality standards (CAAQS), which are more restrictive than the NAAQS. The NAAQS and CAAQS are presented in Table 1, on the following page.

Table 1

California and National Ambient Air Quality Standards

Pollutant	*Averaging Time*	*California Standards* [a,c]	*National Standards* [b]	
			Primary [b,d]	*Secondary* [c,e]
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m³)		
	8-hour	0.07 ppm (137 µg/m³)	0.08 ppm (157 µg/m³)	Same as primary
Carbon monoxide (CO)	8-hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	–
	1-hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	–
Nitrogen dioxide (NO_2)	Annual [f]	–	0.053 ppm (100 µg/m³)	Same as primary
	1-hour	0.25 ppm (470 µg/m³)	–	–
Sulfur dioxide (SO_2)	Annual [f]	–	80 µg/m³ (0.030 ppm)	–
	24-hour	0.04 ppm (105 µg/m³)	365 µg/m³ (0.14 ppm)	–
	3-hour	–	–	1,300 µg/m³ (0.5 ppm)
Respirable Particulate Matter (PM_{10})	24-hour [f]	50 µg/m³	150 µg/m³	Same as primary
Fine Particulate Matter ($PM_{2.5}$)	Annual	12 µg/m³	15 µg/m³	Same as primary
	24-hour [f]	–	35 µg/m³	Same as primary

Notes:

a. California standards for O_3, CO, SO_2 (1 and 24 hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

b. National standards (other than O3, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The O3 standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the 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 parenthesis are based on a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibars). All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury; 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.

f. Measured as an arithmetic mean.

Source: California Air Resources Board (2007)

The California Clean Air Act of 1988, as amended in 1992 (CCAA), Health & Safety Code 40918-40920, outlined a program to attain the CAAQS for O_3, NO_2, SO_2, and CO by the earliest practical date. However, areas in nonattainment for PM_{10} were not specifically required to develop an attainment plan under the CCAA.

Local

The CARB in turn delegates responsibility for implementing the CCAA to the local and regional air quality management districts. The SBCO APCD has the authority to regulate stationary sources of air pollution in Santa Barbara County. The *APCD Rules and Regulations* establish emission limitations and control requirements for various sources, based upon their source type and magnitude of emissions. The *Santa Barbara County Air Pollution Control District (APCD) Rule 303 Nuisance* is a specific SBCO APCD rule that could apply to fugitive dust emitted during proposed construction activities. This rule states that a person shall not discharge air contaminants from any source that can cause injury, detriment, nuisance, or annoyance to any considerable number of persons or that can endanger the comfort, repose, health, or safety of any such persons or their business or property. The SBCO APCD considers emissions of air pollution to be a significant nuisance if five or more complaints are received from different individuals/households within 24 hours, or 10 such complaints are received within 10 days.

Prior to 1999, the County exceeded the national 1-hour O_3 standard and in response to CAA requirements, the APCD prepared plans designed to bring the County into attainment of this standard. When the County adopted this standard in 1999, the APCD submitted a plan (maintenance plan) to the CARB in November 2001 that demonstrated how the County would maintain national 1-hour O_3 standard through the year 2015. This *2001 Clean Air Plan* (*2001 CAP*) was approved by both the USEPA and the CARB (SBCAPCD and Santa Barbara County Association of Governments [SBCAG] 2002). As part of the approval, EPA re-designated the County as in attainment for the national 1-hour and 8-hour O_3 standards in 2003. The *2001 CAP* also included a schedule to revise the Plan in three years, as required by the CCAA that would show how the County would work towards meeting the state one-hour O_3 standard.

The 2004 Clean Air Plan was prepared to address the California Clean Air Act mandates under Health and Safety Code sections 40924 and 40925 requiring that every three years areas update their clean air plans to attain the state 1-hour ozone standard. The 2004 Plan was a three year update to the 2001 CAP. Similarly, the 2007 Plan (Santa Barbara County APCD 2007) provides a three-year update to the APCD's 2004 Clean Air Plan. The 2007 CAP was prepared to address both federal and state requirements; specifically, the federal requirements that pertain to provisions of the Federal Clean Air Act which apply to Santa Barbara County's current designation as an attainment area for the federal 8-hour ozone standard.

1.1.3. Background Ambient Air Quality

The U.S. Environmental Protection Agency (EPA) designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. The criteria for nonattainment designation varies by pollutant: (1) an area generally is in nonattainment for O_3 if its NAAQS has been exceeded more than three times in three years; and (2) an area is in nonattainment for any other pollutant if its NAAQS has been exceeded more than once per year. The CARB also evaluates each region within California for attainment with CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in three years.

Presently, Santa Barbara County has been demonstrated to be in attainment for all NAAQS, with the exception of the new $PM_{2.5}$ standards; there is not enough data available yet to determine whether the County attains the national $PM_{2.5}$ standards (indeterminate at this time).

Presently, Santa Barbara County is in nonattainment of the CAAQS for O_3 and in attainment for NO_2, SO_2, and CO. The County is also considered in attainment for the State 1-hour standard for ozone as of June, 2007. A new California 8-hour ozone standard was implemented in May, 2006. The County violates this new state 8-hour ozone standard and continues to violate the state standard for PM_{10}.

Baseline County Emissions Inventory

Table 2 (following page) summarizes the daily stationary, area-wide, mobile, and natural source air emissions estimated for Santa Barbara County in the year 2005 (CARB Almanac, 2006). The County emissions inventory is periodically updated for planning purposes to: (1) forecast future emissions inventories; (2) analyze emission control measures; and (3) use as input data for regional air quality modeling. The 2005 inventory represents the most recent estimate of daily emissions for the County. The data in Table 2 show that the largest contributors to air pollutants are on-road vehicles and other mobile sources such as aircraft, trains, sea-vessels, off-road vehicles, and farm equipment. These two categories account for approximately 38 percent of the reactive organic compounds (ROC), 78 percent of the carbon monoxide (CO), 88 percent of the nitrogen oxide (NOx), 90 percent of the sulfur dioxide (SO_2), and 23 percent of the particular matter under 10 microns (PM_{10}) emitted from non-natural sources in the County.

Table 2

Estimate of Average Daily Emissions By Major Source Category for Santa Barbara County – Year 2005 (Tons)

Source Category	*ROC*	*CO*	*NOx*	*SO_2[a]*	*PM_{10}*
Stationary Sources					
Fuel Combustion	5.13	8.28	10.54	0.40	0.58
Waste Disposal	0.46	0.10	0.02	0.02	0.01
Cleaning and Surface Coatings	5.71	--	--	--	--
Petroleum Production & Marketing	4.73	0.36	0.09	0.21	0.03
Industrial Processes	0.22	0.51	0.06	3.30	0.88
Total Stationary Sources	**16.24**	**9.26**	**10.71**	**3.93**	**1.50**
Area-wide Sources					
Solvent Evaporation	6.83	--	--	--	--
Miscellaneous Processes	4.49	31.23	2.00	0.02	19.32
Total Area-wide Sources	**11.32**	**31.23**	**2.00**	**0.02**	**19.32**
Mobile Sources					
On-Road Vehicles	11.05	110.25	18.37	0.13	0.58
Other Mobile Sources	5.95	36.14	72.90	37.10	5.73
Total Mobile Sources	**17.00**	**146.39**	**91.28**	**37.23**	**6.31**
Natural Sources					
Total Natural Sources	**60.49**	**12.07**	**0.37**	**0.11**	**1.22**
Santa Barbara County Total	**105.05**	**198.95**	**104.36**	**41.29**	**28.35**

Source: CARB 2006

[a] The largest fraction of sulfur oxides is sulfur dioxide and is therefore represented in the table in place of SO_X.

The nearest air monitoring station to the project site measuring ozone, CO, NO_X, PM_{10} and PM_{10} is at 700 East Canon Perdido, in the City of Santa Barbara approximately 1.6 miles east of the project site. Table 3 summarizes the most recent ambient air quality data for each of the aforementioned criteria pollutants from this monitoring station. No exceedances of State or federal standards for CO, NO_X, or $PM_{2.5}$ were recorded during the years 2005 - 2007, inclusive.

The primary pollutant of concern in the project area is particulate matter (PM_{10}). The State PM_{10} standards were exceeded once during the year 2005, but were not exceeded in either 2006 or 2007. No other State or federal standard, including for carbon monoxide or nitrogen dioxide, was exceeded during the years 2005 - 2007.

Table 3

Ambient Air Quality Data at the Santa Barbara Monitoring Station 700 East Canon Perdido

Pollutant	*2005*	*2006*	*2007*
Ozone, ppm - maximum hourly concentration (ppm)	0.077	0.075	0.076
Number of days of state exceedances (>0.09 ppm)	0	0	0
Number of days of federal exceedances (>0.12 ppm)	0	0	0
Ozone, ppm - maximum 8-hour concentration (ppm)	0.064	0.062	0.071
Number of days of state exceedances (0.07 ppm)[1]	0	0	0
Number of days of federal exceedances (>0.08 ppm)	0	0	0
Carbon Monoxide, ppm – Worst 1 Hour/8 Hours	1.7	1.8	3.5
Number of days of state 1-hour exceedances (>20.0 ppm)	0	0	0
Number of days of state 8-hour exceedances (>9.0 ppm)	0	0	0
Nitrogen Dioxide, ppm - Worst Hour	0.061	0.063	0.065
Number of days of state exceedances (>0.25 ppm)	0	0	0
Particulate Matter <10 microns, maximum concentration ($\mu g/m^3$)	58.8	29.6	33.9
Number of days of state exceedances (>50 $\mu g/m^3$)	1	0	0
Number of samples of federal exceedances (>150 $\mu g/m^3$)	0	0	0
Particulate Matter <2.5 microns, maximum concentration ($\mu g/m^3$)	28.3	27.9	23.5
Number of samples of federal exceedances (>65 $\mu g/m^3$)	0	0	0

Source: SBCAPD Annual Monitoring Reports 2005-2007; CARB 2008.

1. As of 2005, the California CARB established a new 8-hour-average standard for ozone.

1.1.4. Adopted Policies and Regulations that Reduce Air Quality Impacts

Measures included in the County of Santa Barbara Air Pollution Control District (SBCO APCD) Scope and Content of Air Quality Sections in Environmental Documents (SBCO APCD, 2007) to reduce construction-related emissions would apply to construction activity associated with implementation of the Cancer Center project.

Standard dust control measures must be implemented for any discretionary project involving earth-moving activities. Some projects have the potential for construction-related dust to cause a nuisance. Since Santa Barbara County violates the state standard for PM_{10}, dust mitigation measures are required for all discretionary construction activities regardless of the significance of the fugitive dust impacts, based on the policies in the 1979 Air Quality Attainment Plan.

Measures to limit emissions of both ozone precursors (NO_X and ROC) and fugitive dust (PM_{10}), are identified below. The first measure is required for all projects involving earthmoving activities regardless of the project size or duration.

Standard Dust Control Procedures. During clearing, grading, earth moving, or excavation operation, excessive fugitive dust emissions shall be controlled by regular watering, paving construction roads, or other dust preventive measures such as using the following procedures:

a. Use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area. At a minimum, this would include wetting down such areas in the late morning and after work is completed for the day, and whenever wind exceeds 15 miles per hour. Reclaimed water should be used whenever possible.

b. Minimize the amount of disturbed area and speeds of on-site vehicles.

c. Install gravel pads at all access points to prevent tracking of mud onto public roads.

d. Soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation.

e. After completion of clearing, grading, earthmoving, or excavation, treat the disturbed areas by watering, revegetation, or by spreading soil binders until they are paved or otherwise developed so that dust generation will not occur.

f. The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent the transport of dust off-site. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to land use clearance.

The following are standard conditions that are applied during project grading and construction to reduce NO_X and PM2.5 emissions from construction equipment:

Standard Ozone Precursor Controls. At all times, ozone precursor emissions shall be controlled not only through the routine maintenance of all construction equipment, but construction activities shall also be required to utilize new technologies to control ozone precursor emissions including:

a. Heavy-duty diesel-powered construction equipment manufactured after 1996 (with federally mandated "clean" diesel engines) shall be used.

b. The engine size of construction equipment shall be the minimum practical size.

c. The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number is operating at any one time.

d. Construction equipment shall be maintained in tune per the manufacturer's specifications.

e. Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.

f. Catalytic converters shall be installed on gasoline-powered equipment, if feasible.

g. Diesel catalytic converters, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by EPA or California shall be installed, if available.

h. Diesel powered equipment should be replaced by electric equipment whenever feasible.

i. Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible.

j. Drivers of diesel fueled commercial vehicles weighing more than 10,000 pounds:

    1. shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location; and

    2. shall not idle a diesel-fueled auxiliary power system (APS) for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle.

k. Diesel construction equipment meeting the California Air Resources Board's Tier 1 emission standards for off-road heavy-duty diesel engines shall be used. Equipment meeting Tier 2 or higher emission standards should be used to the maximum extent feasible.

l. Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

The following are standard conditions that are applied during the finishing phase of project construction to reduce ROC emissions from architectural coatings such as paints and metallic finishes:

Architectural Coating Emissions. To reduce ROC emissions associated with the application of architectural coatings during building construction, the applicant shall use the following methods during the application of necessary architectural coating materials:

a. Minimize the use of paints and solvents by using pre-coated building materials;

b. Minimize the use of paints and solvents by using naturally colored building materials;

c. Use water-based or low-ROC coatings; and

d. Utilize coating application equipment with high transfer efficiency rates to reduce off-gassing.

Demolition: Asbestos-Containing Materials

If the demolition or renovation of a commercial building is proposed, the project applicant is required to complete an Asbestos Demolition and Renovation Compliance Checklist, and the SBCO APCD must be notified even if the existing building does not contain any asbestos.

Demolition of existing structures must comply with all requirements specified in the federal National Emission Standard for Hazardous Air Pollutants (Asbestos NESHAP) governing emissions of asbestos (Title 40, Code of Federal Regulations, Part 61, Subpart M, Asbestos Emissions from Demolition/Renovation Activities). All structures should be stabilized and demolished in accordance with applicable regulations contained in the Asbestos NESHAP. This regulation is intended to limit asbestos emissions from demolition or renovation of structures and the associated disturbance of asbestos-containing waste material generated or handled during these activities. When existing commercial structures are to be demolished or renovated, the applicant is required to complete the APCD "Asbestos Demolition/Renovation Notification "form (available at the APCD website http://www.sbcapcd.org/biz/asbestos.htm) for each regulated structure. The completed form must be mailed to the Santa Barbara County Air Pollution Control District no later than 10 working days prior to starting work on the regulated structure. This notification includes a description of the structures and methods utilized to determine the presence or absence of asbestos. All asbestos-containing material found on the site must be removed prior to demolition or renovation activity. As part of project implementation, the project applicant must comply with the requirements of the Asbestos NESHAP. Project compliance with the Asbestos NESHAP ensures that asbestos-containing materials would be removed and disposed of appropriately.

2. Consideration and Discussion of Project Environmental Effects

2.1. Significance Thresholds

The SBCO *APCD Rules and Regulations (*SBCO APCD 2006) identifies quantitative thresholds of significance that are to be applied to development projects within the county and cities falling under the jurisdiction of the CAP. The APCD defines these thresholds such that there are standards for ensuring the CAP standards are applied consistently throughout the County.

The quantitative significance thresholds of the Santa Barbara County Air Pollution Control District are used in this assessment. With respect to construction activities the following significance threshold applies:

- Generate over 25 tons per year for ROC or NO_X emissions during construction.

  (Note: this is only a SBCO APCD guideline for determining the significance; no quantitative thresholds of significance are established for short-term emissions)

2.2 Short-Term Construction Impacts

Potential Effect: ***Short-term earthwork producing fugitive dust PM_{10} emissions, and PM_{10} fraction emissions from equipment, would contribute to the existing non-attainment PM_{10} status.***

Estimates of emissions associated with construction of the proposed project were calculated using the Sacramento Metropolitan Air Quality Management construction air emissions model (http://www.airquality.org/ceqa/index.shtml#models). The model was used to quantify construction emissions on a daily basis for the following construction-related activities: site grading (equipment exhaust and fugitive dust); heavy truck trips (import of soil / export of construction debris); construction worker trips; building construction equipment use; and landscape installation equipment use.

Model inputs were modified to reflect construction details provided in the proposed project description. Input assumptions utilized in the construction air quality modeling were obtained from proposed grading / drainage plan information, development plans, and construction timelines. Appendix A contains the detailed assumptions used in the analysis of each phase of construction. These results are identified in Table 4.

Table 4

Construction Emissions By Phase

(Unmitigated Peak Emissions Level, Pounds/Day)

	ROG	CO	NOx	PM_{10}
Phase 1	12	41	38	2
Phase 2	9	37	35	2
Phase 3	21	82	76	4
Phase 4	23	87	75	5
Phase 5	11	37	31	2
Phase 6	12	47	36	2

Earth-moving activities combined with equipment exhaust would produce fugitive dust emissions ranging between 2 and 5 pounds per day (refer to Table 4). Air quality impacts from construction would be short-term and would only last for the duration of this activity. Though not subject to a significance threshold, these emissions have the potential to create a public nuisance or exacerbate the existing PM_{10} nonattainment status within the County. The project would be conditioned to implement standard SBCO APCD standard dust control measures identified in section 1.e. With application of the standard SBCO APCD dust control measures, the potential effect from proposed $PM_{10}/PM_{2.5}$ emissions during construction would be ***less than significant.***

Construction equipment, on-road heavy-duty trucks, and construction worker commute vehicles would also generate criteria air pollutant emissions (quantified as part of the total emissions represented in Table 4). Heavy-duty trucks would be used to export material from the project site. Emissions from construction-worker commute trips would be minor compared to the emissions generated by construction equipment. Emissions generated by construction trips would incrementally add to regional atmospheric loading of ozone precursors during project construction.

With regard to the SBCO APCD guideline for ozone pre-cursor emissions from construction activities, the guideline uses a tons/year basis. Table 5 (following page) provides a quantification of total project construction-related emission of ozone pre-cursors (in tons).

Table 5

Total Ozone Pre-Cursor Construction Emissions

(Unmitigated Level, Tons)

	ROG	NOx
Total Tons – Overall Construction (39 month period)	5.51	27.4
Average Tons/Year of Construction	1.84	9.13

Comparing the project's annual average construction emission of ozone precursors to the guideline of 25 tons / year, the project would be well below the threshold.

Conclusion: *Potential short-term construction effects on air quality would be less than significant.*

3. Measures that Mitigate Direct Impacts

No mitigation measures would be required, as standard conditions of approval from the Santa Barbara County Air Pollution Control District governing construction activities would ensure impacts would remain ***less than significant***.

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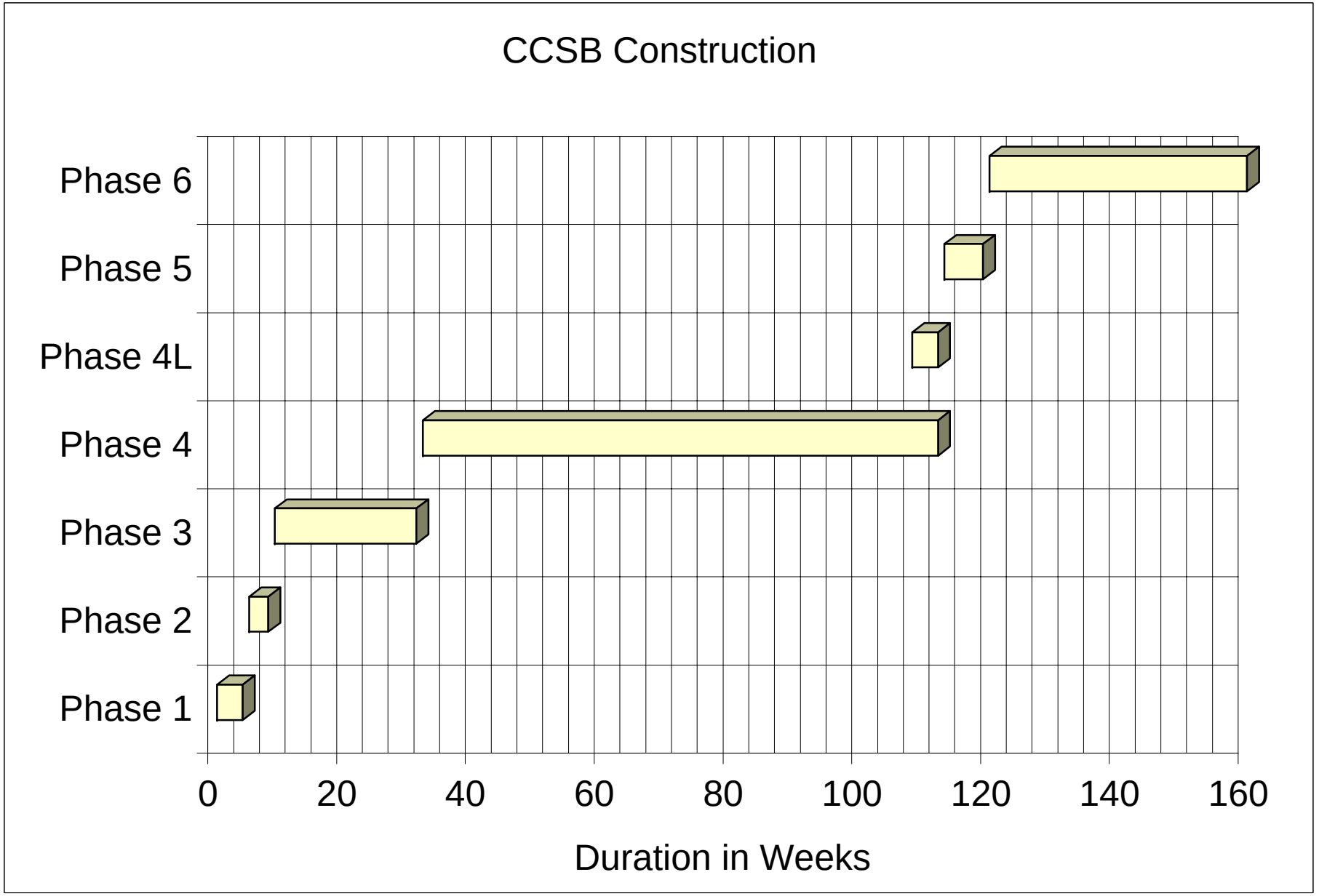
Construction Air Quality Analysis

Methodology

The URBEMIS computer model from the California Air Resources Board (ARB) has the capability to assess exhaust and fugitive dust emissions from simple construction activities. However, it does not allow the flexibility to readily define detailed and specific construction sequencing, with customized construction equipment assemblage.

The Sacramento Metropolitan Air Quality Management District (SMAQMD) has created an automated Excel-based emissions quantification program which specifically addresses construction. The Sacramento model is geared toward road construction, but has emissions sources for every type of construction equipment used in standard, large scale construction projects. The user cannot change the "name" of the construction sub-phases (defaults are clearing/grubbing, excavation/grading, drainage/sub-grade/utils, and paving) – but each sub-phase can be completely customized for the equipment used, duration, number of workers, area disturbed, and other factors that influence emissions characteristics.

Dudek employed the SMAQMD model to assess construction-related emissions of the Cancer Center project. The following pages provide the reference page for the model (available on-line), a graphic illustrating the overall project construction schedule, assumptions used as inputs for assessment of each Phase of project construction, and the model outputs for each construction phase.


CCSB Construction
Phase 6
Phase 5
Phase 4L
Phase 4
Phase 3
Phase 2
Phase 1
0
20
40
60
80
100
120
140
160
Duration in Weeks

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Construction Phase 1

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	1
Sub-Phases in Phase ?	NO
Schedule Overlap in Sub-Phases ?	NO
Total Ground Area Disturbed (Acres)	0.15
Maximum Area Disturbed / Day (Acres)	0.05
Soil Import [Debris Export] Truck Trips / Day	5
Length of Truck Round-Trip (Miles)	30
Peak Number of Workers	10
Length of Worker Round-Trip (Miles)	40
Construction Equipment List:	
Water Truck	1
Excavator	2
Dump Truck	2

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Construction Phase 2

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	1
Sub-Phases in Phase ?	YES
Schedule Overlap in Sub-Phases ?	NO
Total Ground Area Disturbed (Acres)	0.15
Maximum Area Disturbed / Day (Acres)	0.05
Soil Import [Debris Export] Truck Trips / Day	0
Length of Truck Round-Trip (Miles)	NA
Length of Worker Round-Trip (Miles)	40
SUB-PHASE Duration - Grade / Excavate (Months)	0.25
Peak Number of Workers (Grade/Excavate)	10
Construction Equipment List (Grade/Excavate):	
Water Truck	1
Dozer	1
SUB-PHASE Duration – Paving (Months)	0.75
Peak Number of Workers (Paving)	10
Construction Equipment List (Paving):	
Truck	2
Paving Machine	1
Roller	1

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Construction Phase 3

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	5.5
Sub-Phases in Phase ?	YES
Schedule Overlap in Sub-Phases ?	NO
Total Ground Area Disturbed (Acres)	0.5
Maximum Area Disturbed / Day (Acres)	0.15
Soil Import [Debris Export] Truck Trips / Day	0
Length of Truck Round-Trip (Miles)	NA
Length of Worker Round-Trip (Miles)	40
SUB-PHASE Duration - Grade / Excavate (Months)	0.75
Peak Number of Workers (Grade/Excavate)	5
Construction Equipment List (Grade/Excavate):	
Water Truck	1
Dozer	1
Excavator	1
Vibratory Roller	1
Dump Truck	1
SUB-PHASE Duration – Utilities (Months)	0.25
Peak Number of Workers (Utils)	5
Construction Equipment List (Utils):	
Backhoe	2
SUB-PHASE Duration - Construction (Months)	4.5
Peak Number of Workers (Construct)	20
Construction Equipment List (Construct):	
Crane	1
Snorkel Lift	1
Scissor Lift	2
Concrete Truck	4
Concrete Pump	1

CANCER CENTER OF SANTA BARBARA

Construction Phase 4

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	20
Sub-Phases in Phase ?	YES
Schedule Overlap in Sub-Phases ?	YES (Construct & Landscape)
Total Ground Area Disturbed (Acres)	0.5
Maximum Area Disturbed / Day (Acres)	0.15
Soil Import [Debris Export] Truck Trips / Day	5
Length of Truck Round-Trip (Miles)	30
Length of Worker Round-Trip (Miles)	40
SUB-PHASE Duration - Grade / Excavate (Months)	1
Peak Number of Workers (Grade/Excavate)	15
Construction Equipment List (Grade/Excavate):	
Water Truck	1
Dozer	1
Vibratory Roller	1
Dump Truck	5
SUB-PHASE Duration – Utilities (Months)	1
Peak Number of Workers (Utils)	5
Construction Equipment List (Utils):	
Backhoe	2
SUB-PHASE Duration - Construction (Months)	18
Peak Number of Workers (Construct)	75
Construction Equipment List (Construct):	
Crane	1
Snorkel Lift	1
Scissor Lift	2
Concrete Truck	4
Concrete Pump	1
SUB-PHASE Duration - Landscape (Months)	1
Peak Number of Workers (Landscape)	5
Construction Equipment List (Landscape):	
Flat-bed Truck	1
Bob-cat with Auger	1

CANCER CENTER OF SANTA BARBARA

Construction Phase 5

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	1.5
Sub-Phases in Phase ?	YES
Schedule Overlap in Sub-Phases ?	NO
Total Ground Area Disturbed (Acres)	0.5
Maximum Area Disturbed / Day (Acres)	0.15
Soil Import [Debris Export] Truck Trips / Day	0
Length of Truck Round-Trip (Miles)	NA
Length of Worker Round-Trip (Miles)	40
SUB-PHASE Duration - Demolition (Months)	0.75
Peak Number of Workers (Demolition)	15
Construction Equipment List (Demolition):	
Water Truck	1
Dump Truck	2
Excavator	2
SUB-PHASE Duration – Landscape (Months)	0.75
Peak Number of Workers (Landscape)	15
Construction Equipment List (Landscape):	
Flat-bed Truck	1
Bob-cat with Auger	1

CANCER CENTER OF SANTA BARBARA

Construction Phase 6

Air Quality Analysis
Inputs/ Assumptions

Duration of Phase (Months)	10
Sub-Phases in Phase ?	YES
Schedule Overlap in Sub-Phases ?	NO
Total Ground Area Disturbed (Acres)	0.5
Maximum Area Disturbed / Day (Acres)	0.15
Soil Import [Debris Export] Truck Trips / Day	0
Length of Truck Round-Trip (Miles)	NA
Length of Worker Round-Trip (Miles)	40
SUB-PHASE Duration – Grade / Excavate (Months)	0.75
Peak Number of Workers (Grade)	10
Construction Equipment List (Grade):	
Water Truck	1
Backhoe	1
Crane	1
Snorkel Lift	1
SUB-PHASE Duration – Utilities (Months)	0.25
Peak Number of Workers (Utilities)	5
Construction Equipment List (Utilities):	
Backhoe	2
SUB-PHASE Duration - Construct (Months)	9
Peak Number of Workers (Construct)	25
Construction Equipment List (Construct):	
Scissor Lift	2
Concrete Truck	2
Concrete Pump	1

Road Construction Emissions Model

Data Entry Worksheet

Version 5.2

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C28.

To begin a new project, click this bu
data previously entered. This button
if you opted not to disable macros v
this spreadsheet.

Input Type		
Project Name	CCSB Construct Phase 6	
Construction Start Year	2010	Enter a Year between 2000 and 2010 inclusive
Project Type	3	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	10	months
Predominate Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7fv1.1 4. Emfac2002 (default) 2. Emfac7G 3. Emfac2001
Project Length	0.05	miles
Total Project Area	1	acres
Maximum Area Disturbed/Day	0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported		yd^3/day
Soil Exported	0	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 1					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	0	0	0	1	0	1	
Grading/Excavation	12	41	38	2	2	0	
Drainage/Utilities/Sub-Grade	0	0	0	1	0	1	
Paving	0	0	0	0	0	0	
Maximum (pounds/day)	12	41	38	2	2	1	
Total (tons/construction project)	0.13	0.39	0.48	0.02	0.02	0.00	<-tons

Notes:

Project Start Year ->	2009
Project Length (months) ->	1
Total Project Area (acres) ->	0
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	100

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 2					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	0	0	0	1	0	1	
Grading/Excavation	4	23	20	1	1	0	
Drainage/Utilities/Sub-Grade	0	0	0	1	0	1	
Paving	9	37	35	2	2	0	
Maximum (pounds/day)	9	37	35	2	2	1	
Total (tons/construction project)	0.06	0.22	0.30	0.01	0.01	0.00	<-tons

Notes:

Project Start Year ->	2009
Project Length (months) ->	1
Total Project Area (acres) ->	0
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	0

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 3					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	0	0	0	2	0	2	
Grading/Excavation	10	39	41	3	2	1	
Drainage/Utilities/Sub-Grade	2	8	9	2	1	1	
Paving	21	82	76	4	4	0	
Maximum (pounds/day)	21	82	76	4	4	2	
Total (tons/construction project)	1.13	3.76	4.76	0.24	0.23	0.01	<-tons

Notes:

Project Start Year ->	2009
Project Length (months) ->	6
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	0

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 4					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	4	15	15	2	1	1	
Grading/Excavation	23	77	75	5	4	1	
Drainage/Utilities/Sub-Grade	2	8	8	1	1	1	
Paving	13	72	33	2	2	0	
Maximum (pounds/day)	23	77	75	5	4	1	
Total (tons/construction project)	2.82	6.77	16.09	0.49	0.46	0.02	<-tons

Notes:

Project Start Year ->	2010
Project Length (months) ->	21
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	100

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 5					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	5	20	15	2	1	1	
Grading/Excavation	11	37	31	2	2	1	
Drainage/Utilities/Sub-Grade	0	0	0	2	0	2	
Paving	0	0	0	0	0	0	
Maximum (pounds/day)	11	37	31	2	2	2	
Total (tons/construction project)	0.13	0.33	0.51	0.03	0.02	0.01	<-tons

Notes:

Project Start Year ->	2010
Project Length (months) ->	2
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	0

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.

Road Construction Emissions Model, Version 5.2

Emission Estimates for -> CCSB Construct Phase 6					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	0	0	0	2	0	2	
Grading/Excavation	9	29	27	2	2	1	
Drainage/Utilities/Sub-Grade	2	8	8	1	1	1	
Paving	12	47	36	2	2	0	
Maximum (pounds/day)	12	47	36	2	2	2	
Total (tons/construction project)	1.24	3.45	5.27	0.23	0.22	0.01	<-tons

Notes:

Project Start Year ->	2010
Project Length (months) ->	10
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	0
Total Soil Imported/Exported (yd^3/day)->	0

PM10 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I.