AIR QUALITY EVALUATION
PACIFICA ESTATES
TM 5510

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November 1, 2010 (REVISED)
August 9, 2010
September 4, 2008
JN: 05112-04

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Subject: Pacifica Estates Screening-Level Air Quality Evaluation

PURPOSE

The purpose of this evaluation is to determine the short-term construction and long-term operational air quality impacts associated with the Pacifica Estates project which is to include the construction of 21 single family residential dwelling units located on 17.3 acres. The general location of the project is shown on the Location Map, Exhibit 1. The proposed project is located north of Stage Coach Lane and east of Mission Road in the Fallbrook community of the County of San Diego. The site plan used for this analysis is shown on Exhibit 2.

SUMMARY

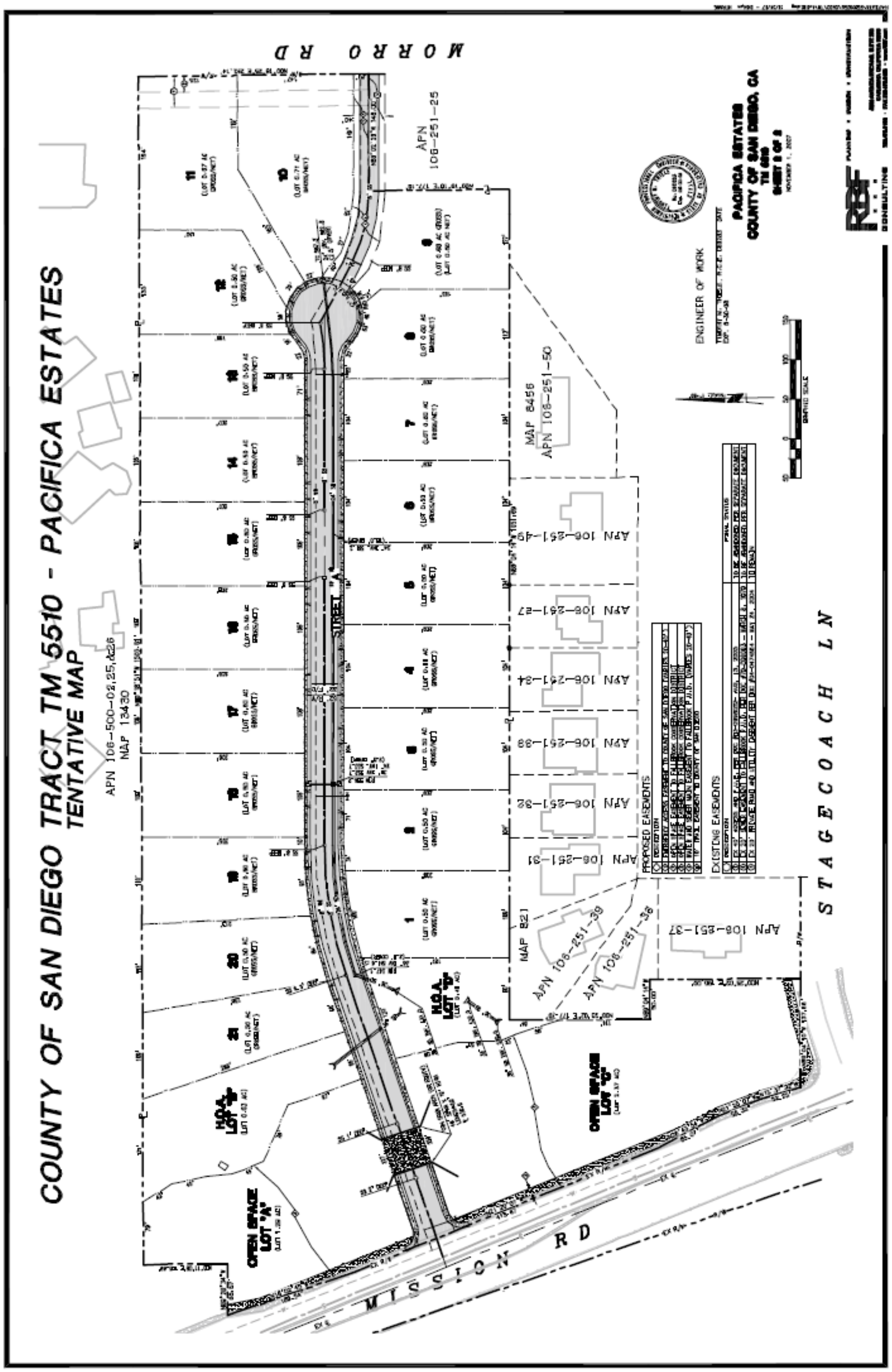
Results of the analysis indicate that the proposed projects short-term construction and long-term operational emissions will not exceed the established regional significance thresholds.

STANDARDS OF SIGNIFICANCE

The County of San Diego has adopted thresholds of significance based on Appendix "G" of the CEQA Guidelines. The County of San Diego published the document *Guidelines for Determining Significance and Report Format and Content Requirements, Air Quality*

EXHIBIT 1
LOCATION MAP

EXHIBIT 2
SITE PLAN



(March 19, 2007), the document provides guidance on determining project-related air quality impacts. The guidance states that a project would have a significant air quality impact if it would:

1. Conflict with or obstruct implementation of the San Diego Regional Air Quality Strategy (RAQS) or applicable portions of the State Implementation Plan (SIP);

2. Result in emissions that would violate any air quality standard or contribute substantially to an existing or proposed air quality violation;

3. Result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, oxides of nitrogen (NO_x) and/or volatile organic compounds (VOCs);

4. Expose sensitive receptors (i.e., schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations; or

5. Create objectionable odors affecting a substantial number of people.

The SDAPCD does not provide specific numerical values for determining significance of mobile-source related impacts. However, the district does specify Air Quality Impact Analysis (AQIA) trigger levels for new or modified stationary sources (APCD Rules 20.2 and 20.3). Although these trigger levels do not generally apply to mobile sources, for comparative purposes, these levels are used to evaluate the increased emissions which would be discharged to the SDAB if the proposed project was approved. The AQIA Screening-Level Thresholds (SLTs) applicable to this project are shown in Table 1 below.

TABLE 1 MAX DAILY EMISSIONS THRESHOLDS (SDAPCD)		
Pollutant	**Construction**	**Operational**
NO_x	250 lbs/day	250 lbs/day
PM_{10}	100 lbs/day	100 lbs/day
SO_x	250 lbs/day	250 lbs/day
CO	550 lbs/day	550 lbs/day
VOCs*	75 lbs/day	75 lbs/day

* Threshold for VOCs based on threshold of significance for VOCs from the South Coast Air Quality Management District for the Coachella Valley.

In the event that project-related emissions exceed these SLTs, specific modeling will be required for NO_2, SO_2, CO, and lead to demonstrate that the project's ground-level concentrations, including appropriate background levels, do not exceed the NAAQS/CAAQS. For ozone precursors, PM_{10}, and $PM_{2.5}$ exceedences of the SLTs have the potential to result in a significant impact. The primary reason for this is because the SDAB is currently in non-attainment for PM_{10}, $PM_{2.5}$, and ozone. Therefore, unless a project includes design considerations or mitigation measures that would reduce the daily emission to below the applicable screening levels, the impact for these pollutants (ozone precursors, PM_{10}, and $PM_{2.5}$) will be significant.

In addition to impacts from criteria pollutants, project-related impacts may include emissions of pollutants identified by the state and federal government as toxic air contaminants (TACs)/hazardous air pollutants (HAPs). In San Diego County, the Department of Planning and Land Use identifies an excess cancer risk level of 1 in 1 million for projects that do not implement Toxics Best Available Control Technology (T-BACT), and an excess cancer risk of 10 in 1 million or less for projects that do implement T-BACT as the threshold for determining significance. These significance thresholds are consistent with SDAPCD's Rule 1210 requirements for stationary sources. Therefore, if a project has the potential to result in emissions of any TAC or HAP which result in a cancer risk of greater than 1 in 1 million without T-BACT, 10 in 1 million with T-BACT, or a health hazard index greater than or equal to 1, the project would result in a potentially significant impact.

EXISTING CONDITIONS

Climate and Meteorology

The project site is located in the San Diego Air Basin (SDAB). The climate of the SDAB is dominated by a semi-permanent high pressure cell located over the Pacific Ocean. This cell influences the direction of prevailing winds (westerly to northwesterly) and maintains clear skies for much of the year. The high pressure cell also creates two types of temperature inversions that may act to degrade local air quality.

Subsidence inversions occur during the warmer months as descending air associated with the Pacific high pressure cell comes into contact with cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. The other type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone, commonly known as smog.

The climate of the coastal southern California, including the County of San Diego, is determined largely by high pressure that is almost always present off the west coast of North America. High-pressure systems are characterized by an upper layer of dry air that warms as it descends. This warm, dry air acts as a lid, restricting cool air located near the surface creating an inversion of typical temperature conditions.

During the summer and fall, emissions generated in the region combine with abundant sunshine under the influences of topography and an inversion to create conditions that are conducive to the formation of photochemical pollutants, such as ozone, and secondary particulates, such as sulfates and nitrates. As a result, air quality in the SDAB is often the poorest during the warmer summer and fall months.

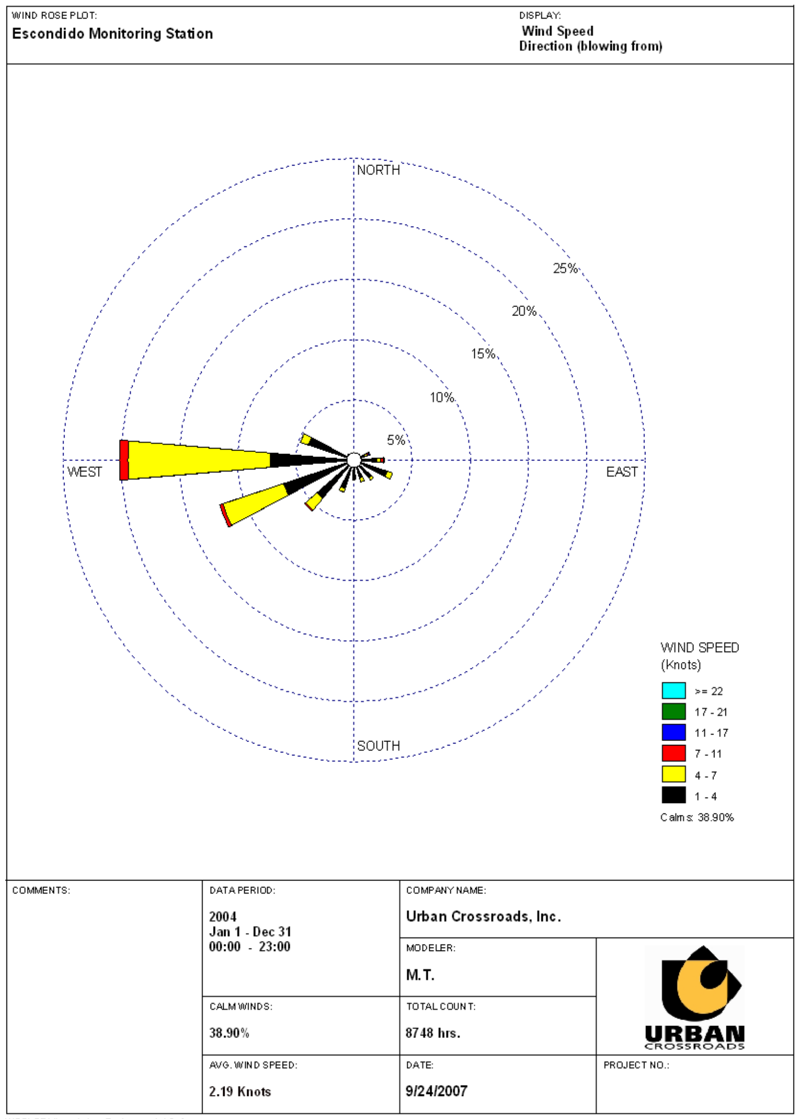
Average summer high temperatures in the project vicinity (City of Fallbrook) are approximately 80 degrees Fahrenheit (˚F). Average winter low temperatures are approximately 44˚F. The average rainfall in the project vicinity is approximately 13 inches annually (http://countrystudies.us/united-states/weather/California/fallbrook.htm).

The distinctive climate of the project area and the SDAB is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

The prevailing winds in the project area move predominately from west to east and from southwest to northeast with an average wind speed of 1.12 meters per second (m/s). A Windrose exhibit is available as follows (Exhibit 3) and shows prevailing wind patterns and average speed in the project area. Meteorological data from the Escondido air monitoring station was used to be representative of the project area.

EXHIBIT 3
WIND ROSE



Background Air Quality

Existing air quality is measured based upon ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. Those standards currently in effect for both California and federal air quality standards are shown in Table 1.

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state standards and federal standards presented in Table 1. The air quality in a region is considered to be in attainment if: the measured ambient air pollutant levels for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, and PM_{10} are not exceeded and all other standards are not equaled or exceeded at any time in any consecutive three-year period; and the federal standards (other than O_3, PM_{10}, and those based on annual averages or arithmetic mean) are not exceeded more than once per year. The O_3 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 PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. See Table 2 for attainment designations.

TABLE 1

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	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[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board (01/27/10)

TABLE 2

San Diego County Air Basin Attainment Status by Pollutant[1]

Pollutant	Averaging Time	California Standards	Federal Standards
Ozone (O_3)	1 Hour	Non-attainment	No Federal Standard
	8 Hour		Basic Non-attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	Non-attainment	No Federal Standard
	24 Hour	Non-attainment	Unclassified[1]
	Annual Arithmetic Mean	No State Standard	Unclassified[2]
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No State Standard	Attainment
	Annual Arithmetic Mean	Non-attainment	Attainment
Carbon Monoxide (CO)	8 Hour	Attainment	Maintenance Area[3]
	1 Hour		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	No State Standard	Attainment
	1 Hour	Attainment	No Federal Standard
Lead	30 Day Average	Attainment	No Federal Standard
	Calendar Quarter	No State Standard	Attainment
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	No State Standard	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	No Federal Standard
Sulfates	24 Hour	Attainment	No Federal Standard
Hydrogen Sulfide	1 Hour	Unclassified	No Federal Standard
Visibility Reducing Particulates	8 Hour (10 AM to 6 PM, PST)	Unclassified	No Federal Standard

1 Data reflects status as of March 19, 2007.

2 Unclassified; indicates data are not sufficient for determining attainment or nonattainment.

3 Maintenance Area (defined by U.S. Department of Transportation) is any geographic region of the United States previously designated nonattainment pursuant to the CAA Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA, as amended.

Source: SD County Guidelines for Determining Significance (March 19, 2007)

Local Air Quality

The nearest long-term air quality monitoring station to the project for Ozone (O_3) and Nitrogen Dioxide (NO_X) is carried out at the Camp Pendleton monitoring station located approximately 13 miles southwest of the project site. Data for Carbon Monoxide (CO), Inhalable Particulates (PM_{10}), and Ultra-Fine Particulates ($PM_{2.5}$) was obtained from the Escondido East Valley Parkway monitoring station located approximately 18 miles southeast of the project site. Table 3 shows the number of days standards were exceeded for the study area.

TABLE 3

PROJECT AREA AIR QUALITY MONITORING DATA (2004-2006)

POLLUTANT / STANDARD	2004	2005	2006
Ozone:			
1- Hour > 0.09 ppm (days)	4	0	0
1- Hour > 0.12 ppm (days)	0	0	0
Max. 1-Hour Conc. (ppm)	11	9	9
Carbon Monoxide:[2]			
8- Hour > 9.0 ppm (days)	0	0	0
Max. 1-Hour Conc. (ppm)	5.3	5.9	5.7
Max. 8-Hour Conc. (ppm)	3.6	3.1	3.6
Nitrogen Dioxide:			
1-Hour > 0.25 ppm (days)	0	0	0
Max. 1-Hour Conc. (ppm)	0.099	0.077	0.081
Inhalable Particulates (PM-10):[2]			
24-Hour > 50 ug/m^3 (days exceeding state)	XX	XX	XX
24-Hour > 150 ug/m^3 (days exceeding national)	0	0	0
Max. 24-Hour Conc. (ug/m^3)	57	42	51
Ultra-Fine Particulates (PM-2.5)[2]:			
24-Hour > 65 pg/m^3 (days)	XX	0	0
Max. 24-Hour Conc. (pg/m^3)	67	43	41

[1] Camp Pendleton Monitoring Station used unless otherwise noted
[2] Escondido Monitoring Station data
XX= Data not available
Source: SDAPCD / CARB: ADAM

CONSTRUCTION EMISSIONS

Construction activities associated with the proposed project will result in emissions of CO, VOCs, NO_x, SO_x, PM_{10}, and $PM_{2.5}$. Construction related emissions are expected from the following construction equipment and construction activities:

- Demolition
- Grading
- Paving
- Building Construction
- Architectural Coatings
- Construction Workers Commuting

Based on discussion with the project team, it is assumed for purposes of this analysis that construction activity is estimated to begin in 2008 and is to be completed in 2010. Additionally, it is assumed that construction phases will not overlap. A detailed discussion of each phase of construction activity analyzed is as follows:

Demolition

Fugitive dust (PM_{10}) emissions will be generated during demolition activities. The South Coast Air Quality Management District's (SCAQMD's) California Environmental Quality Act (CEQA) Air Quality Handbook (SCAQMD, 1993) provides methodology for calculating fugitive dust emissions resulting from demolition of buildings.

Fugitive dust emissions generated from rough grading are calculated as follows (SCAQMD CEQA Handbook, Table 9-9-G-1):

PM_{10} (pounds/day) = (0.00042 pounds of PM_{10}/feet^3) x (N x O x P) / Q

Where:

- N = Building width (feet);
- O = Building length (feet);
- P = Building height (feet);
- Q = Number of days required to demolish the building.

Based on applicant-approved data:

- N = 50 feet;
- O = 20 feet;
- P = 50 feet;
- Q = 10 days.

Thus;

PM_{10} (pounds/day) = (0.00042 pounds of PM_{10}/feet^3) x (50 x 20 x 50) / 10

PM_{10} = 2.1 pounds/day

Demolition emission estimates will also result in exhaust emissions from the on-road vehicles used to haul demolished materials to the nearest landfill. The following equations (obtained from the URBEMIS 2007 User's Guide) were utilized to estimate emissions resulting from on-road vehicles:

Haul Emissions (pounds/day) = vehicle miles traveled/day x grams pollutant/mile (from EMFAC2007) x pounds/454 grams.

Round trips/day = Total yd^3 to be demolished/days demolition x trip/20yd^3

The project will result in demolition of approximately 5,000 feet^3 per day or 186 yd^3 per day; assuming a 20 yd^3 haul capacity and a round trip travel distance of 30 miles

(URBEMIS 2007 defaults), the project will require approximately 10 daily truck loads for removal of the demolition debris. Thus, the project will result in approximately 300 vehicle miles traveled resulting from removal of demolition debris. Detailed emissions calculations are presented in Attachment "A" for further review.

Demolition activities will include preparing the site for grading, specifically removing existing homes from the site and clearing of turf and trees.

Demolition Equipment		
Description	**Qty**	**Hours/day**
Rubber Tired Dozers	2	8
Concrete Saw	1	8
Three Excavators	2	8

Emissions resulting from demolition activity are summarized in the Table 4. For more detailed information on the calculations and emission factors utilized, please refer to Attachment "A."

TABLE 4

DEMOLITION ACTIVITY EMISSIONS SUMMARY

Demolition Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Fugitive Dust Demolition	0	0	0	0	2.10	0.44
On-Road Haul Activities	1.05	13.37	4.08	0.01	0.65	0.57
Demolition Equipment	11.07	89.88	43.05	0.08	4.49	4.13
Worker Trips	0.98	5.96	7.80	0.01	0.23	0.19
Peak Day Mass Emissions	**12.04**	**95.84**	**50.85**	**0.09**	**4.71**	**4.32**
SDAPCD Significance Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Grading

Fugitive dust emissions result primarily from the amount of soil moved on-site. Fugitive dust emissions generated from rough grading are calculated as follows (SCAQMD CEQA Handbook, Table 9-9-G-1):

$PM_{10} = 0.00112 \times [[(WS/5)^{1.3}]/[(SMC/2)^{1.4}]] \times ET$

Where:

- PM_{10} = Fugitive dust emissions (in pounds)
- WS = Ambient wind speed
- SMC = Soil Moisture Content
- ET = Earthwork Tonnage moved per day

Based on SCAQMD methodology, a wind speed of 12 m/s was utilized in order to represent the daily maximum. For purposes of this analysis, soil moisture content was assumed to be 10%. Earthwork tonnage was calculated based on discussions with the project engineer that approximately 85,000 cubic yards would be excavated. Based on the alluvium type material to be excavated, a weight of 1.3 tons per cubic yard of material was assumed, resulting in a total of 110,500 tons of material to be excavated. Therefore, for the purposes of this analysis, the working weight of the earthwork material capable of generating PM_{10} would be approximately 110,500 tons. With 132 working days during the grading phase, approximately 837 tons of material would be excavated each day.

$PM_{10} = 0.00112 \times [[(12/5)^{1.3}]/[(0.10/2)^{1.4}]] \times 837 = 193.96$ lbs/day (uncontrolled)

Thus, grading activities would result in fugitive dust emissions of approximately 193.96 pounds per day (before watering). It should be noted that, as part of project design, disturbed areas will be watered at least three times per day. The SCAQMD recognizes that watering disturbed surfaces substantially reduces fugitive dust emissions; based on

SCAQMD guidance watering three times per day (every 3.2 hours of construction) yields a 61% reduction in PM_{10} emissions.

Thus, assuming a 61% control efficiency resulting from watering disturbed surfaces three times per day,

PM_{10} = 196.96 – 61% = 75.65 lbs/day (controlled)

Fugitive dust emissions will also occur as a result of unpaved haul road travel. Utilizing analysis methods identified in the SCAQMD's *CEQA Air Quality Handbook*, the following equation was used to calculate emissions from unpaved public roads.

$$PM_{10} = VMT * [2.1(SLP/12)(MVS/30)(MVW/3)^{0.7}(NW/4)^{0.5}((365-RD)/365)]$$

Where:

- PM10 = Fugitive dust (in pounds per day) due to travel on unpaved haul roads
- VMT = Vehicle miles traveled per day
- SLP = Soil silt loading in percent
- MVS = Mean vehicle speed in miles per hour
- MVW = Mean vehicle weight in tons
- NW = Number of wheels per vehicle
- RD = Average number of rain days annually

In order to calculate fugitive dust resulting from unpaved haul road travel, it was estimated that haul trucks would travel approximately 25 miles per day on unpaved haul roads. Soil silt loading was estimated at 8.5 percent. Vehicle speed was estimated at 15 miles per hour, and average vehicle weight was estimated to be 3 tons. Each vehicle was assumed to have four wheels, and meteorological data representative of the project site (City of Vista, http://ggweather.com/climate/rain_days.htm) indicated approximately 42 rain days per year.

PM_{10} = 25 * [2.1(0.085/12)(15/30)(3/3)$^{0.7}$(4/4)$^{0.5}$((365-42)/365)]
PM_{10} = 16.45 lbs/day (uncontrolled)

Thus, travel on unpaved haul roads to and from the project site would result in emissions of approximately 32.91 pounds of PM_{10} per day (before watering). The SCAQMD recognizes that watering haul routes substantially reduces fugitive dust emissions; based on SCAQMD guidance a 55% reduction for watering two times per day (every 4 hours of construction) can be taken. It should also be noted that the SCAQMD identifies that limiting vehicle speeds on unpaved roads to 15 mph yields a 57% reduction. For analysis purposes, only the 55% reduction from watering two times per day was taken for PM_{10} emissions resulting from travel on unpaved roads.

Thus, assuming a 55% control efficiency resulting from watering haul routs two times per day,

PM_{10} = 16.45– 55% = 7.40 lbs/day (controlled)

Total PM_{10} levels during grading activity (rough grading + travel on unpaved roads) will approximately 75.65 + 7.40 = 83.05 pounds of PM_{10} fugitive dust generated per day. This level is below the 100 pounds per day SLT established by the County of San Diego. It should be noted that design control measures to ensure appropriate watering and limit excess dust generated from project grading activities would be incorporated as part of project design. The applicable design measures are outlined in later in this report.

Exhaust emissions from grading activity result from both on-road and off-road heavy equipment operating during this activity. Based on discussions with the project team, it is assumed that the following pieces of equipment will be used during the grading phase of construction:

Grading Equipment		
Description	**Qty**	**Hours/day**
Rubber Tired Dozers	2	8
Rubber Tired Loaders	2	8
Scrapers	2	8
Excavators	2	8
Miscellaneous	2	8
Water Trucks	2	8

Emissions resulting from grading activity are summarized in the Table 5. For more detailed information on the calculations and emission factors utilized, please refer to Attachment "A."

TABLE 5

GRADING ACTIVITY EMISSIONS SUMMARY

Grading Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Fugitive Dust Excavation	0	0	0	0	75.65	22.00
Fugitive Dust Travel on Unpaved Roads	0	0	0	0	7.40	1.55
Grading Equipment	19.87	174.17	75.87	0.15	8.07	7.42
Grading Water Truck	0.42	5.35	1.63	0	0.26	0.23
Worker Trips	1.59	9.68	12.67	0.01	0.37	0.31
Peak Day Mass Emissions	**21.88**	**189.20**	**90.18**	**0.17**	**91.74**	**31.51**
SDAPCD Significance Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Paving

Paving activity result in a small amount of VOC emissions resulting from off-gassing emissions from the laying of pavement/asphalt. Emissions from off-gassing emissions were calculated using the URBEMIS 2007 equation, as follows:

Asphalt Paving Off-Gas Emissions VOCs (lbs/day) = 2.62 lbs/VOC/acre x total acres paved / number of paving days.

Thus, for purposes of this analysis:

VOCs (lbs/day) = 2.62 lbs/VOC/acre x 2.0 acres paved / 2 days = 2.62 lbs/VOC/day

Exhaust emissions from paving activity result from both on-road and off-road heavy equipment operating during this activity. Paving activities include the movement of any remaining material as well as necessary curb and gutter work, road base material placement and blacktop. A project this size is anticipated to utilize the following pieces of equipment during the paving phase of construction:

Paving Equipment		
Description	**Qty**	**Hours/day**
Pavers	2	8
Rollers	2	8
Miscellaneous Paving Eq.	2	8

Emissions resulting from paving activity are summarized in Table 6. For more detailed information on the calculations and emission factors utilized, please refer to Attachment "A."

TABLE 6

PAVING ACTIVITY EMISSIONS SUMMARY

Paving Activity	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Off-Gas Emissions	2.62	0	0	0	0	0
Paving Equipment	7.63	46.82	23.73	0.04	3.28	3.02
Worker Trips	0.98	5.96	7.80	0.01	0.23	0.19
Peak Day Mass Emissions	**11.23**	**52.77**	**31.53**	**0.05**	**3.51**	**3.21**
SDAPCD Significance Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

<u>Building Construction</u>

Building construction activity will result in emissions from heavy equipment that will be operational during physical building construction. Based on discussions with the project team, it is assumed that the following pieces of equipment will be used during the building phase of construction:

Building Equipment		
Description	**Qty**	**Hours/day**
Crane	1	7
Welder	1	8
Forklifts	3	8
Generator Sets	1	8
Tractor/Loader/Backhoes	3	7

Emissions resulting from building construction are summarized in Table 7. For more detailed information on the calculations and emission factors utilized, please refer to Attachment “A.”

TABLE 7

BUILDING CONSTRUCTION EMISSIONS SUMMARY

Building Construction	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Building Construction Equipment	7.26	49.96	23.17	0.05	3.11	2.86
Building Worker Trips	1.34	8.19	10.72	0.01	0.31	0.26
Peak Day Mass Emissions	**8.60**	**58.15**	**33.89**	**0.06**	**3.42**	**3.12**
SDAPCD Significance Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Architectural Coatings

The application of architectural surface coatings (painting) generates VOC emissions when organic solvents in the coating evaporate as the coating dries. Based on the *County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements* (March 19, 2007); limiting the number of gallons of paint that will be used per day to 100 gallons will result in an emissions level of 63.0 lbs of VOC emissions. When added to the VOC emissions from building construction the total VOC emissions result in approximately 71.6 lbs/day which is below the 75 lbs/day SLT. For purposes of this analysis, the project applicant will not exceed the application of 100 gallons of paint per day and thus impacts are assumed to be less than significant.

Construction Workers Commuting

Worker trips resulting from all phases of construction activity are also expected to occur. The number of workers is estimated as 125% of the total number of construction equipment (vehicles and machines) selected for each phase. The emission estimates assume a construction worker commute fleet mix of 50% light duty autos and 50% light duty trucks (see Attachment “A” for more details).

Diesel-fired Particulates and Carcinogenic Impact

In order to assess the impact of particulate emissions throughout the surrounding community, air dispersion modeling using the U.S. EPA-approved SCREEN3 model was conducted. The model is a steady state Gaussian plume model utilized for estimating ground level impacts from point and fugitive sources. For purposes of this analysis, the model was used to calculate the maximum diesel-fired particulate matter concentrations associated with the worst-case phase of construction activity (grading).

To address spatial distributions and accommodate movement of equipment within the project boundary, a worst-case distribution of sensitive receptors was assumed per the model defaults from 20 to 1,000 meters from the source.

To represent the potential grading area the area-source algorithm was used, the proposed project encompasses a maximum area of approximately 17.3 acres or 70,011 square meters. Thus, an area source was programmed into the model to represent the 70,011 square meters (264.595m x 264.595m). Based on the on-site maximum diesel exhaust emissions levels, the emission rate for PM_{10} exhaust was programmed into the model in terms of grams per second per meter squared. To represent a “worst-case” scenario, diesel-fired PM_{10} emissions from rough grading activity (rough grading activity accounts for the highest diesel-fired PM_{10} levels) were modeled results indicate that rough grading activity results in approximately 8.7 pounds of PM_{10} exhaust emissions per day which yields a 1.96E-06 grams/second/meters squared value for use as an input into the SCREEN3 model (8.7 pounds/day / 8 hours/day / 3600 seconds/hour / 70,011 square meters x 453.592 grams/pound).

The SCREEN3 model estimates the maximum one-hour concentration downwind due to emissions from the source area for receptor locations of 20 to 1,000 meters. Since risk is derived as a function of annual average concentrations, the U.S. EPA and CARB

recommend using a factor to convert the maximum 1-hour average concentration to an annual average. The U.S. EPA and CARB factors range from 0.06-0.1 with a recommended value of 0.08. Thus, for purposes of this analysis, the maximum one-hour predicted concentration from the SCREEN3 model of 4.942 $\mu g/m^3$ was multiplied by 0.08 per CARB recommendations, the resulting annual average concentration of 0.395 $\mu g/m^3$ was in the risk calculation. For more information on the U.S. EPA and CARB guidance for converting one-hour concentrations to annual average concentrations, please see Attachment "B" or visit the following website:
http://o3.arb.ca.gov/toxics/harp/docs/userguide/appendixH.pdf.

Health risks associated with exposure to carcinogenic compounds are defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. The cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). The URF is a measure of carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It represents an upper-bound estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu g/m^3$) over a 70 year lifetime. The URF utilized in this analysis was obtained from the California Environmental Protection Agency, Office of Environmental Health Hazard (OEHHA).

To represent exposures accurately, an exposure frequency of 264 days and exposure duration of 132 days (0.5 years) was assumed (grading is anticipated to last 132 days). For carcinogenic exposures associated with the maximum exposed individual (MEI), the risks were predicted to be 6.5E-07 or 0.65 in one million (please see Attachment "A" for more detailed information). Therefore, risk estimates do not exceed the County of San Diego threshold of one in one million. See Attachment "A" for a summary of SCREEN3 outputs for concentrations from construction activity previously discussed. It should be noted that neither CARB, nor the EPA has established guidelines for assessing short-term exposure to diesel-fired toxics; hence, the URF that was used in this analysis is not necessarily representative as a URF for short-term exposures (i.e., 12 months), thus the calculated cancer risk probability is likely a conservative estimate.

An evaluation of the potential noncancerous effect of chronic exposures was also conducted. Adverse health effects are evaluated by comparing a compound's annual concentration with its toxicity factor or Reference Exposure Level (REL). The REL for diesel particulates was obtained from OEHHA for this analysis

To quantify noncarcinogenic impacts, the hazard index approach was used. The hazard index assumes that chronic subthreshold exposures adversely affect a specific organ or organ system. To calculate hazard index, the chemical concentration or dose is divided by its REL. Where the total equals or exceeds one, a health hazard is presumed to exist. For purposes of this analysis the hazard index for the respiratory endpoint totaled less than one and equals 7.9E-02 (.079) see Noncarcinogenic Hazards Index (column k) on in Attachment "A" for more details.

Construction Emission Summary

Assuming a "worst case" scenario of equipment was operated on average for 8 hours per day (unless otherwise noted), along with other assumptions for construction activity by phase (previously mentioned); the estimated daily construction emissions as summarized in the tables previously presented will not exceed the SLTs for construction activity. See Attachment "A" for detailed calculations utilized to estimate short-term construction emissions.

Project Design Measures

The following design measures are required to ensure construction emissions levels are within acceptable limits:

- Adhere to best management practices which include the application of water on disturbed soils and unpaved haul roads three times per day (3.2 hour watering interval), covering haul vehicles, replanting disturbed areas as soon as practical and restricting vehicle speeds on unpaved roads to 15 mph or less, to control fugitive dust (see Attachment "C" for a copy of the SCAQMD's table which outlines the reduction percentages discussed in the fugitive dust emissions section of this report).

- During construction activities, construction equipment shall be properly maintained to ensure proper timing and tuning of engines. Equipment maintenance records and equipment design specification data sheets shall be kept on-site during construction activity. It is conservatively estimated that keeping engines timed/tuned and reducing idling time will achieve a 5% reduction for emissions of VOCs, CO, NO_x, SO_x, and PM_{10} exhaust emissions during construction activity.

- During construction activities, contractor shall ensure that all equipment on-site will not idle for more than five (5) minutes.

- Contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB).

- Project applicant shall ensure that various phases of construction activity will not overlap (i.e., demolition, grading, paving, building).

- Project applicant shall limit daily application of paint to no more than 100 gallons.

Mobile Source Emissions

Mobile source emissions associated with the proposed project will result in emissions of CO, VOCs, NO_X, SO_X, $PM_{10,}$ and $PM_{2.5}$. Projects such as Pacifica Estates impact air quality predominantly through emissions associated with increased vehicular trips.

Rimpo and Associates, in association with the California Air Resources Board (CARB) and air districts throughout the state, has developed a land use and air pollution emissions computer model (URBEMIS 2007) that is used to calculate the daily emissions increase associated with a proposed project. For purposes of this analysis, the URBEMIS 2007 v. 9.2.4 model was used to forecast emissions levels for project operational activity.

The majority of criteria pollutant emissions associated with the implementation of the expansion project are the result of motor vehicle activity. Trip characteristics, trip lengths, and fleet percentages were generated based on the applicable land use utilizing the URBEMIS 2007 model. Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust. The emissions estimates for travel on paved roads used assumptions from the URBEMIS 2007 model.

Area Source Emissions

Combustion emissions of CO, VOCs, NO_X, SO_X, $PM_{10,}$ and $PM_{2.5}$ would be generated through project natural gas usage. The emissions associated with natural gas use were calculated based on assumptions from the URBEMIS 2007 model.

Landscape maintenance equipment would also generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, trailers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the development. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in the URBEMIS 2007 model.

It is assumed that over a period of time the buildings that are part of this project will be subject to emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings as part of project maintenance. It is conservatively estimated that approximately ten percent of the buildings built as part of this project will be repainted per year.

Operational Emissions Summary

The project-related operations emissions burdens, along with a comparison of SDAPCD recommended significance thresholds, are shown in the tables 8 and 9 respectively for summer and winter operational scenarios.

TABLE 8

SUMMARY OF PEAK OPERATIONAL EMISSIONS (SUMMER)
POUNDS PER DAY

Operational Activities	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Vehicle Emissions	1.81	2.40	22.07	0.02	3.11	0.61
Natural Gas Emissions	0.02	0.26	0.11	0	0	0
Landscape Maintenance Emissions	0.17	0.01	0.94	0	0	0
Consumer Products	1.03	0	0	0	0	0
Architectural Coatings	0.30	0	0	0	0	0
Peak Day Mass Emissions	**3.33**	**2.67**	**23.12**	**0.02**	**3.11**	**0.61**
SDAPCD Regional Daily Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

TABLE 9
SUMMARY OF PEAK OPERATIONAL EMISSIONS (WINTER)
POUNDS PER DAY

Operational Activities	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Vehicle Emissions	1.99	3.51	23.88	0.02	3.11	0.61
Natural Gas Emissions	0.02	0.26	0.11	0	0	0
Fireplace Emissions	4.22	0.51	22.26	0.07	3.57	3.44
Consumer Products	1.03	0	0	0	0	0
Architectural Coatings	0.30	0	0	0	0	0
Peak Day Mass Emissions	**7.56**	**4.28**	**46.25**	**0.09**	**6.68**	**4.04**
SDAPCD Regional Daily Threshold	75	250	550	250	100	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: URBEMIS 2007 v 9.2.4

As shown, the project related emissions levels for operational emissions will not exceed the thresholds set forth by the SDAPCD. URBEMIS 2007 detailed outputs are available for review in Attachment “E.”

CONCLUSION

The following criterion were used in determining significance of the proposed project.

Criterion 1: Would the project conflict with or obstruct implementation of the San Diego Regional Air Quality Strategy (RAQS) or applicable portions of the State Implementation Plan (SIP);

Response 1: A determination of whether the potential emissions resulting from operations of the proposed project would result in a significant impact is based on an evaluation of the extent to which the proposed project conforms to existing regional or local plans.

The proposed project was assessed to determine consistency with the proposed SANDAG projections for growth within the area; since the proposed project is consistent with the existing and proposed general plan land use zoning, it has been determined that the project is consistent with the growth projections and therefore does satisfies consistency with the RAQS.

Criterion 2: Would the project result in emissions that would violate any air quality standard or contribute substantially to an existing or proposed air quality violation;

Response 2: Based on San Diego County Guidelines (County of San Diego, 2007), construction impacts are potentially significant if they exceed the quantitative screening-level thresholds for attainment pollutants (NO_X, SO_X, and CO) and would result in a significant impact if they exceed the screening-level thresholds for non-attainment pollutants (O_3, PM_{10}, and $PM_{2.5}$).

Under the assumed worst-case conditions, the project will not exceed the SLTs for construction activity and thus a less than significant impact is expected during short-term construction activity.

Based on the County of San Diego Guidelines (County of San Diego, 2007), operational emissions impacts would be potentially significant if they exceed the quantitative screening-level thresholds for attainment pollutants (NO_X, SO_X, and CO), and would result in a significant impact if they exceed the screening-level thresholds for non-attainment pollutants (ozone precursors, PM_{10}, and $PM_{2.5}$).

Air pollutant emissions related to project traffic have the potential to create new, or worsen existing localized air quality. According to the County of San Diego Guidelines for Determining Significance for Air Quality (March 19, 2007), the presence of either of the following conditions requires that a CO hotspot analysis be performed:

- Project will place receptors within 500 feet of a signalized intersection operating at or below level of service (LOS) E with over 3,000 peak-hour approach trips, or

- Project will result in intersections operating at LOS E or worse with intersection peak-hour approach volumes exceeding 3,000

The project related emissions will not exceed the SDAPCD thresholds of significance for long-term operational impacts, and therefore no significant impacts are expected. Additionally, project related traffic is not expected to result in the contribution to or creation of a CO hotspot. The roadway segments analyzed as part of the project traffic study indicate that the worst-case LOS along Mission Road will be a LOS D. Based on the Traffic Impact Analysis, the cumulative projects plus the project-related traffic will not cause increased delays (LOS E or worse) at any intersections in the study area. Thus, no impact with respect to this threshold is expected.

Criterion 3: Result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, oxides of nitrogen (NO_x) and/or volatile organic compounds (VOCs);

Response 3: Section 4.3 of the document County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements Air Quality (March 19, 2007), indicates that the following guidelines must be used for determining the cumulatively considerable net increases during the construction phase:

- A project that has a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_x and/or VOCs, would also have a significant cumulatively considerable net increase.
- In the event direct impacts from a proposed project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions of concern from the proposed project, in combination with the emissions of concern from other proposed projects or reasonably foreseeable future projects within a proximity relevant to the pollutants of concern, are in excess of the guidelines identified in Section 4.2 of the County Guidelines.

For construction activity, the proposed project complies with the first criterion as the project is not expected to result in emissions that will result in a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_x and/or VOCs (after the implementation of project design measures).

For the second criterion, the following evaluation was conducted:

A review of projects in close proximity to the proposed project's construction activities were identified. No cumulative projects with the potential to generate PM_{10} fugitive dust were identified within a 150 meter distance of proposed project construction activities (See Attachment "D" for a map of cumulative projects in the project vicinity).

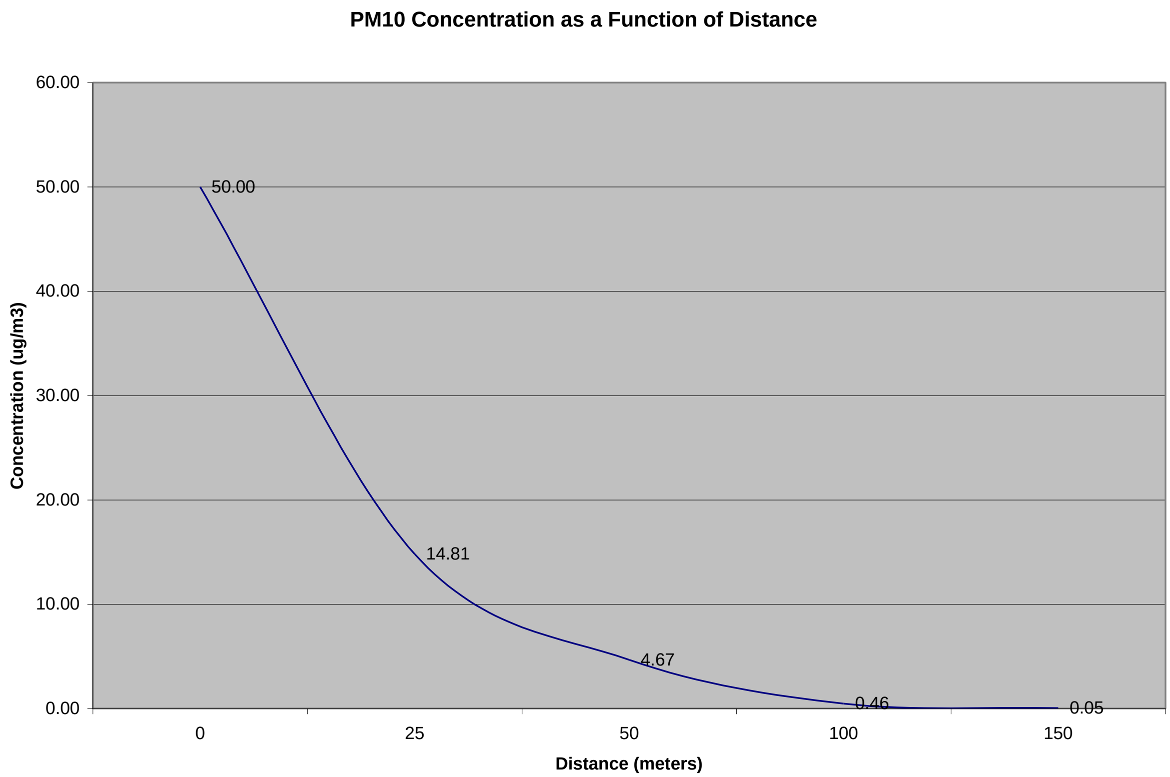
For PM_{10} fugitive dust emissions the following equation (Desert Research Institute, 1996), which is also utilized by the South Coast Air Quality Management District for purposes of determining localized PM_{10} concentrations, was used to describe the change in PM_{10} concentration versus downwind distance:

$$C_x = 0.9403\ C_0\ e^{-0.0462\ X}$$

- C_x is the predicted PM_{10} concentration at X meters from the fence line;
- C_0 is the PM_{10} concentration at the fence line;
- e is the natural logarithm (2.71828);
- X is the distance in meters from the fence line (project boundary).

Dispersion modeling required to determine C_0 was not conducted since the proposed project does not exceed the SLTs, a comparative analysis to illustrate the change in PM_{10} concentration as a function of distance is utilized for purposes of this analysis. It was arbitrarily assuming that C_0 = 50 micrograms per cubic meter ($\mu g/m^3$).

As shown in the graph below, fugitive PM_{10} concentrations decrease by 90% from the project boundary within 50 meters (165 feet) of the source. At 100 meters (330 feet) PM_{10} concentrations decrease by 99%, beyond 100 meters concentrations approach zero. Thus, no cumulative contribution of PM_{10} beyond 150 meters would be physically possible.



Furthermore, emissions associated with construction activity are by nature short-term in duration, more specifically, PM_{10} emissions (as previously discussed) tend to settle out in close proximity to the source. For purposes of this analysis the source would be the grading area which the project is expected to disturb on any given day. Thus, in order for even the potential for cumulative PM_{10} impacts to occur, simultaneous construction/grading would need to occur on both a parcel of the proposed project site and on another parcel that is located directly adjacent (within 150 meters) to the project site. Therefore the likelihood of a cumulatively considerable contribution to PM_{10} from the proposed project in conjunction with adjacent projects is highly unlikely due to the separation in distance from other projects.

Additionally, project design measures identified for the proposed Project would remain applicable, and other cumulative projects would also need to comply with local ordinances prohibiting nuisances or requiring dust control. These measures will further reduce the cumulative effect of fugitive PM_{10} emissions.

Based on the aforementioned analysis and criterion, the proposed project is not excepted to have a cumulatively considerable impact during short-term construction activity.

Section 4.3 of the document County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements Air Quality (March 19, 2007), indicates that the following guidelines must be used for determining the cumulatively considerable net increases during the operational phase:

- A project that does not conform to the RAQS and/or has a significant direct impact on air quality with regard to operational emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs, would also have a significant cumulatively considerable net increase.

- *Projects that cause road intersections or roadway segments to operate at or below a LOS E and create a CO "hotspot" create a cumulatively considerable net increase of CO.*

County guidelines state further that, it is assumed that a project which conforms to the County of San Diego General Plan, and does not have emissions exceeding the SLTs, will not create a cumulatively considerable net increase in criteria pollutants since emissions were accounted for in the RAQS.

For operational activity, the proposed project complies with the first criterion as the project is not expected to result in emissions that will result in a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_x and/or VOCs. The project is also consistent with the County of San Diego General Plan, and thus is consistent with

SANDAG growth projections for the project area and hence is consistent with the RAQS forecast.

Based on the Traffic Impact Analysis, the cumulative projects plus the project-related traffic will not cause increased delays (LOS E or worse) at any intersections in the study area. Thus, no impact with respect to this threshold is expected.

Criterion 4: Will the project expose sensitive receptors (i.e., schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations?

Response 4: The potential impact of the project on sensitive receptors has also been considered. Sensitive receptors can include uses such as long term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, child care centers, and athletic facilities are also considered to be sensitive receptors. In evaluating impacts to sensitive receptors, the two primary emissions of concern are CO and diesel particulate matter.

As previously discussed in this analysis, the project is not expected to result in a CO “hotspot” at any intersections in the project vicinity nor is the project expected to expose sensitive receptors to diesel particulate matter and cause a cancer risk greater than one in one million.

Criterion 5: Will the project create objectionable odors affecting a substantial number of people.

Response 5: The potential impact of the project on sensitive receptors has also been considered. Sensitive receptors can include uses such as long term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, child care centers, and athletic facilities are also considered to be sensitive receptors. In evaluating impacts to sensitive receptors, the two primary emissions of concern are CO and diesel particulate matter.

Section 4.5 of the document County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements Air Quality (March 19, 2007), indicates that, in general, a project will not have a significant odor impact if the following are true:

- The project does not place a new odor producing land use activity adjacent to existing sensitive receptors (ex. Waste Water Treatment facility);

- The project will not place sensitive receptors adjacent to or near a confined animal facility or other odor producing land use; and

- The project is not located near any other agricultural use with the potential to produce strong odors including but not limited to organic agricultural operations or agricultural operations that apply a substantial amount of agricultural chemicals that typically produce strong odors.

The project meets the three aforementioned criterion for determining odor impacts and thus the project is not expected to result in a significant odor impact.

SUMMARY OF RECOMMENDED PROJECT DESIGN FEATURES & IMPACTS

During construction of the proposed project, emissions will result from fugitive dust during the grading phase, heavy equipment usage, hauling away of dirt and debris, and construction workers commuting to and from the site. However, with implementation of the project design measures, emissions will not exceed SDAPCD significance thresholds, and the project is not expected to have a significant impact on air quality during short-term construction activity.

Additionally, emissions will result from the operation of the proposed project. Most of these emissions are the result of project related traffic, but also include emissions resulting from natural gas usage, landscaping equipment, consumer products, fireplace usage, and repainting. Emissions generated during long-term project operational activity are not expected to exceed SDAPCD significance thresholds, and the project is not expected to have a significant impact on air quality during long-term operational activity.

A health risk assessment was conducted to determine the potential for the project to result in a significant impact on nearby sensitive receptors during short-term construction activity. For purposes of this analysis, the primary pollutant of concern is diesel particulate matter (DPM) which is emitted by the operation of heavy diesel equipment during construction activity. The results of the health risk assessment indicate that the proposed project will not result in a significant impact to nearby sensitive receptors.

Lastly, the analysis also concluded that the proposed project will not result in a significant odor impact.

Recommended Design Measures

The following design considerations are required to ensure construction emissions levels are within acceptable limits:

- Adhere to best management practices which include the application of water on disturbed soils and unpaved haul roads three times per day (3.2 hour watering interval), covering haul vehicles, replanting disturbed areas as soon as practical and restricting vehicle speeds on unpaved roads to 15 mph or less, to control fugitive dust (see Appendix “C” for a copy of the SCAQMD’s table which outlines the reduction percentages discussed in the fugitive dust emissions section of this report).

- During construction activities, construction equipment shall be properly maintained to ensure proper timing and tuning of engines. Equipment maintenance records and equipment design specification data sheets shall be kept on-site during construction activity. It is conservatively estimated that keeping engines timed/tuned and reducing idling time will achieve a 5% reduction for emissions of VOCs, CO, NO_x, SO_x, and PM_{10} exhaust emissions during construction activity.

- During construction activities, contractor shall ensure that all equipment on-site will not idle for more than five (5) minutes.

- Contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB).

- Project applicant shall ensure that various phases of construction activity will not overlap (i.e., demolition, grading, paving, building).
- Project applicant shall limit daily application of paint to no more than 100 gallons.

If you have any questions, please contact me directly at (949) 660-1994 x217.

Respectfully submitted,

URBAN CROSSROADS, INC.

Haseeb Qureshi,
Senior Air Quality Specialist

AE:HQ
JN: 05112-06 LETTER REPORT-SOU.doc

ATTACHMENT A

CONSTRUCTION EMISSIONS
HAND CALCULATIONS

EXCAVATION FUGITIVE DUST[1]

Total Excavation Qty (CY)	Dust Generation Rate[2]	Working Days	Tonnage/CY	Ambient Wind Speed (m/s)	Soil Moisture Content
85,000	100%	132	1.3	12	0.10

Uncontrolled

PM10 Emissions (lbs/day)
193.96

Uncontrolled

PM2.5 Emissions (lbs/day)
40.73

Controlled[3]

PM10 Emissions (lbs/day)
75.65

Controlled[3]

PM2.5 Emissions (lbs/day)
22.00

[1]SCAQMD CEQA HANDBOOK

[2]Assumes that 20% soil composition is rocky material per discussion with project engineer

[3]Assumes watering 3x per day and a 61% Control Efficiency (Per SCAQMD guidelines)

FUGITIVE DUST FROM UNPAVED HAUL ROADS[1]

$$PM_{10} = VMT \times \left[2.1 \left(\frac{SLP}{12} \right) \left(\frac{MVS}{30} \right) \left(\frac{MVW}{3} \right)^{0.7} \left(\frac{NW}{4} \right)^{0.5} \left(\frac{365 - RD}{365} \right) \right]$$

PM10 = Fugitive dust emissions in pounds due to haulage on unpaved roads,
VMT = Vehicle Miles Traveled per day,
SLP= Soil Silt Loading Percent,
MVS = Mean Vehicle Speed in miles per hour,
MVW = Mean Vehicule Weight in Tons
NW = Number of Wheels on the vehicle
RD = Mean number of Rain Days with at least 0.01 inches of precipitation

VMT/day	SLP	MVW	NW	RD	MVS
25	8.5	3	4	42	15

Uncontrolled	
PM_{10} Emissions (lbs/day)	$PM_{2.5}$ Emissions (lbs/day)
16.45	3.46

Controlled[2]	
PM_{10} Emissions (lbs/day)	$PM_{2.5}$ Emissions (lbs/day)
7.40	1.55

[1]Based on SCAQMD Handbook 1993, Table A9-9-D (Estimating Emissions From Travel on Unpaved Roads)
[2]Assumes a 55% reduction based on watering of haul roads twice daily

DEMOLITION ACTIVITY

2008 SCAB Fleet Average Emission Factors For Diesel Engines (Emission Factors in lbs/hr)

		ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	Max Horsepower Rating	Pounds per hour					
Rubber Tired Dozers	Composite	0.36	1.60	3.27	0.0025	0.1409	0.1296
Concrete Saw	Composite	0.15	0.44	0.73	0.0007	0.0610	0.0561
Excavators	Composite	0.17	0.58	1.32	0.0013	0.0727	0.0669

Demolition Equipment Emissions (lbs/day)

			ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	# of equipment	Hours/day	Pounds per day					
Rubber Tired Dozers	2	8.0	5.83	25.54	52.28	0.04	2.25	2.07
Concrete Saw	1	8.0	1.17	3.53	5.81	0.01	0.49	0.45
Excavators	3	8.0	4.07	13.99	31.80	0.03	1.75	1.61
		Subtotal:	**11.07**	**43.05**	**89.88**	**0.08**	**4.49**	**4.13**

Demolition Haul Truck Emissions[1]

Construction Vehicle (Mobile Source) Emission Factors

	VOC	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Haul Truck	0.003515787	0.044580174	0.013614	0.000041	0.002156	0.001900

Construction Worker Number of Trips and Trip Length

Vehicle	**No. of One-Way Trips/Day**	**One WayTrip Length (miles)**
Haul Truck	10	15

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	VOC	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Water Truck	**1.05**	**13.37**	**4.08**	**0.0124**	**0.65**	**0.57**

[1]Emission factors and methedology obtained from SCAQMD On Road Emissions Factors (www.aqmd.gov) --Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks. Analysis year 2008.

EMISSIONS FROM DEMOLITION WORKER TRIPS*

Construction Worker Trip Emissions	
Number of Workers	8
Average Trip Length One-Way (miles)	30
Average Speed (MPH)	35
Daily VMT LDA & LDT	480

	LDA (pounds/mile)	LDT (pounds/mile)
CO	0.010548437	0.021949149
NOx	0.001102884	0.02371258
ROG/VOC	0.001079193	0.002992704
SOx	1.07474E-05	2.56467E-05
PM10	8.5055E-05	0.000856069
PM2.5	5.29282E-05	0.000739332

Emissions From Commuting (assumes 50% LDA and 50% LDT)

	VOC	NOx	CO	SOx	PM10	PM2.5
Estimated Emissions (lbs/day) from worker trips	**0.98**	**5.96**	**7.80**	**0.01**	**0.23**	**0.19**

The number of workers is estimated as 125% of the total number of construction equipment (vehicles and machines) selected. The emission estimates assume a construction worker commute fleet mix of 50% light duty autos and 50% light duty trucks.

Emissions Factor Source: Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Passanger Vehicles and Delivery Trucks, Analysis Year 2008. (http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html)

Water Truck Emissions[1]

Construction Vehicle (Mobile Source) Emission Factors						
	VOC	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Water Truck	0.003515787	0.044580174	0.013614	0.000041	0.002156	0.001900

Construction Worker Number of Trips and Trip Length		
Vehicle	**No. of One-Way Trips/Day**	**One WayTrip Length (miles)**
Water Truck	6	10

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	VOC	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Water Truck	**0.42**	**5.35**	**1.63**	**0.0050**	**0.26**	**0.23**

[1]Emission factors and methedology obtained from SCAQMD On Road Emissions Factors (www.aqmd.gov) --Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks. Analysis year 2008.

GRADING ACTIVITY

2008 SCAB Fleet Average Emission Factors For Diesel Engines (Emission Factors in lbs/hr)

		ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	Max Horsepower Rating	Pounds per hour					
Excavators	Composite	0.17	0.58	1.32	0.00	0.07	0.07
Other Material Handling	Composite	0.20	0.60	1.77	0.00	0.08	0.07
Rubber Tired Dozers	Composite	0.36	1.60	3.27	0.00	0.14	0.13
Rubber Tired Loaders	Composite	0.16	0.54	1.30	0.00	0.07	0.07
Scrapers	Composite	0.35	1.42	3.23	0.00	0.14	0.13

Grading Equipment Emissions (lbs/day)

			ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	# of equipment	Hours/day	Pounds per day					
Excavators	2	8.0	2.71	9.33	21.20	0.02	1.16	1.07
Other Material Handling	2	8.0	3.12	9.67	28.25	0.02	1.26	1.16
Rubber Tired Dozers	2	8.0	5.83	25.54	52.28	0.04	2.25	2.07
Rubber Tired Loaders	2	8.0	2.60	8.59	20.82	0.02	1.16	1.07
Scrapers	2	8.0	5.61	22.75	51.63	0.04	2.23	2.05
		Subtotal:	**19.87**	**75.87**	**174.17**	**0.15**	**8.07**	**7.42**

EMISSIONS FROM GRADING WORKER TRIPS*

Construction Worker Trip Emissions	
Number of Workers	13
Average Trip Length One-Way (miles)	30
Average Speed (MPH)	35
Daily VMT LDA & LDT	780

	LDA (pounds/mile)	LDT (pounds/mile)
CO	0.010548437	0.021949149
NOx	0.001102884	0.02371258
ROG/VOC	0.001079193	0.002992704
SOx	1.07474E-05	2.56467E-05
PM10	8.5055E-05	0.000856069
PM2.5	5.29282E-05	0.000739332

Emissions From Commuting (assumes 50% LDA and 50% LDT)

	VOC	NOx	CO	SOx	PM10	PM2.5
Estimated Emissions (lbs/day) from worker trips	**1.59**	**9.68**	**12.67**	**0.01**	**0.37**	**0.31**

The number of workers is estimated as 125% of the total number of construction equipment (vehicles and machines) selected. The emission estimates assume a construction worker commute fleet mix of 50% light duty autos and 50% light duty trucks.

Emissions Factor Source: Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Passanger Vehicles and Delivery Trucks, Analysis Year 2008. (http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html)

PAVING ACTIVITY

2008 SCAB Fleet Average Emission Factors For Diesel Engines (Emission Factors in lbs/hr)

		ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	Max Horsepower Rating	Pounds per hour					
Pavers	Composite	0.20	0.59	1.08	0.00	0.08	0.07
Paving Equipment	Composite	0.15	0.46	0.99	0.00	0.07	0.06
Rollers	Composite	0.13	0.43	0.86	0.00	0.06	0.06

Paving Equipment Emissions (lbs/day)

			ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	# of equipment	Hours/day	Pounds per day					
Pavers	2	8.0	3.14	9.40	17.27	0.01	1.23	1.13
Paving Equipment	2	8.0	2.37	7.38	15.77	0.01	1.09	1.00
Rollers	2	8.0	2.12	6.95	13.77	0.01	0.96	0.88
		Subtotal:	**7.63**	**23.73**	**46.82**	**0.04**	**3.28**	**3.02**

Asphalt Paving Off-Gas Emissions
ROG (pounds/day) = (2.62 lbs ROG/acre)* (total acres paved/paving days)

Total Acres Paved =	2
Number of Days	2
ROG/day	2.62

EMISSIONS FROM PAVING WORKER TRIPS*

Construction Worker Trip Emissions	
Number of Workers	8
Average Trip Length One-Way (miles)	30
Average Speed (MPH)	35
Daily VMT LDA & LDT	480

	LDA (pounds/mile)	LDT (pounds/mile)
CO	0.010548437	0.02194915
NOx	0.001102884	0.02371258
ROG/VOC	0.001079193	0.0029927
SOx	1.07474E-05	2.5647E-05
PM10	8.5055E-05	0.00085607
PM2.5	5.29282E-05	0.00073933

Emissions From Commuting (assumes 50% LDA and 50% LDT)

	VOC	NOx	CO	SOx	PM10	PM2.5
Estimated Emissions (lbs/day) from worker trips	**0.98**	**5.96**	**7.80**	**0.01**	**0.23**	**0.19**

The number of workers is estimated as 125% of the total number of construction equipment (vehicles and machines) selected. The emission estimates assume a construction worker commute fleet mix of 50% light duty autos and 50% light duty trucks.

Emissions Factor Source: Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Passanger Vehicles and Delivery Trucks, Analysis Year 2008. (http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html)

BUILDING ACTIVITY

2008 SCAB Fleet Average Emission Factors For Diesel Engines (Emission Factors in lbs/hr)

		ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	Max Horsepower Rating	Pounds per hour					
Cranes	Composite	0.18	0.60	1.61	0.00	0.07	0.07
Welders	Composite	0.09	0.23	0.31	0.00	0.03	0.03
Forklifts	Composite	0.08	0.24	0.60	0.00	0.03	0.03
Generator Sets	Composite	0.11	0.35	0.70	0.00	0.04	0.04
Tractors/Loaders/Backhoes	Composite	0.12	0.41	0.77	0.00	0.06	0.06

Building Equipment Emissions (lbs/day)

			ROG	CO	NOX	SOX	PM_{10}	$PM_{2.5}$
Equipment Type	# of equipment	Hours/day	Pounds per day					
Cranes	1	7.0	1.24	4.21	11.27	0.01	0.50	0.46
Welders	1	8.0	0.71	1.85	2.48	0.00	0.23	0.21
Forklifts	3	8.0	1.92	5.81	14.36	0.01	0.78	0.71
Generator Sets	1	8.0	0.86	2.77	5.58	0.01	0.34	0.32
Tractors/Loaders/Backhoes	3	7.0	2.53	8.53	16.27	0.02	1.26	1.16
		Subtotal:	**7.26**	**23.17**	**49.96**	**0.05**	**3.11**	**2.86**

EMISSIONS FROM BUILDING WORKER TRIPS*

Construction Worker Trip Emissions	
Number of Workers	11
Average Trip Length One-Way (miles)	30
Average Speed (MPH)	35
Daily VMT LDA & LDT	660

	LDA (pounds/mile)	LDT (pounds/mile)
CO	0.010548437	0.021949149
NOx	0.001102884	0.02371258
ROG/VOC	0.001079193	0.002992704
SOx	1.07474E-05	2.56467E-05
PM10	8.5055E-05	0.000856069
PM2.5	5.29282E-05	0.000739332

Emissions From Commuting (assumes 50% LDA and 50% LDT)

	VOC	NOx	CO	SOx	PM10	PM2.5
Estimated Emissions (lbs/day) from worker trips	**1.34**	**8.19**	**10.72**	**0.01**	**0.31**	**0.26**

The number of workers is estimated as 125% of the total number of construction equipment (vehicles and machines) selected. The emission estimates assume a construction worker commute fleet mix of 50% light duty autos and 50% light duty trucks.

Emissions Factor Source: Highest (Most Conservative) EMFAC 2007 Emission Factors for On-Road Passanger Vehicles and Delivery Trucks, Analysis Year 2008. (http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html)

SCAB Fleet Average Emission Factors (Diesel)

2008

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	MaxHP	ROG	CO	NOX	SOX	PM
Aerial Lifts	15	0.0113	0.0534	0.0736	0.0001	0.0048
	25	0.0249	0.0644	0.1073	0.0001	0.0077
	50	0.0833	0.2011	0.2037	0.0003	0.0203
	120	0.0781	0.2542	0.4910	0.0004	0.0386
	500	0.1719	0.6822	2.1178	0.0021	0.0668
	750	0.3198	1.2331	3.9213	0.0039	0.1223
Aerial Lifts Composite		0.0746	0.2200	0.3885	0.0004	0.0269
Air Compressors	15	0.0157	0.0530	0.0899	0.0001	0.0068
	25	0.0359	0.0905	0.1448	0.0002	0.0108
	50	0.1265	0.2903	0.2442	0.0003	0.0283
	120	0.1112	0.3395	0.6505	0.0006	0.0578
	175	0.1383	0.5136	1.1024	0.0010	0.0600
	250	0.1381	0.3847	1.5340	0.0015	0.0525
	500	0.2172	0.8107	2.4338	0.0023	0.0844
	750	0.3420	1.2529	3.8533	0.0036	0.1321
	1000	0.5751	2.1596	6.3733	0.0049	0.1969
Air Compressors Composite		0.1232	0.3782	0.7980	0.0007	0.0563
Bore/Drill Rigs	15	0.0122	0.0632	0.0767	0.0002	0.0047
	25	0.0210	0.0674	0.1343	0.0002	0.0080
	50	0.0813	0.2734	0.2898	0.0004	0.0253
	120	0.1021	0.4934	0.7562	0.0009	0.0597
	175	0.1203	0.7541	1.1469	0.0016	0.0585
	250	0.1055	0.3502	1.4604	0.0021	0.0409
	500	0.1566	0.5631	2.0226	0.0031	0.0640
	750	0.3207	1.1127	4.1945	0.0062	0.1297
	1000	0.6291	1.8100	9.2766	0.0093	0.2299
Bore/Drill Rigs Composite		0.1295	0.5281	1.3416	0.0017	0.0591
Cement and Mortar Mi	15	0.0087	0.0394	0.0562	0.0001	0.0037
	25	0.0402	0.1038	0.1722	0.0002	0.0125
Cement and Mortar Mixers Composit		0.0113	0.0447	0.0658	0.0001	0.0044
Concrete/Industrial Sa	25	0.0206	0.0681	0.1344	0.0002	0.0079
	50	0.1418	0.3412	0.3179	0.0004	0.0335
	120	0.1545	0.5088	0.9632	0.0009	0.0792
	175	0.2192	0.8877	1.8557	0.0018	0.0944
Concrete/Industrial Saws Composite		0.1460	0.4411	0.7263	0.0007	0.0610
Cranes	50	0.1466	0.3359	0.2624	0.0003	0.0320
	120	0.1261	0.3807	0.7275	0.0006	0.0664
	175	0.1345	0.4936	1.0417	0.0009	0.0589
	250	0.1392	0.3881	1.3867	0.0013	0.0535
	500	0.2012	0.7762	1.9878	0.0018	0.0771
	750	0.3409	1.3011	3.4224	0.0030	0.1310
	9999	1.2096	4.8072	13.0905	0.0098	0.4143
Cranes Composite		0.1778	0.6011	1.6100	0.0014	0.0715
Crawler Tractors	50	0.1635	0.3714	0.2856	0.0003	0.0352
	120	0.1743	0.5147	1.0019	0.0008	0.0901
	175	0.2146	0.7734	1.6473	0.0014	0.0937
	250	0.2263	0.6360	2.1648	0.0019	0.0880
	500	0.3175	1.4049	3.0311	0.0025	0.1222
	750	0.5713	2.5044	5.5421	0.0047	0.2205
	1000	0.8802	3.9536	9.2251	0.0066	0.3088
Crawler Tractors Composite		0.2068	0.6843	1.5395	0.0013	0.0943
Crushing/Proc. Equipn	50	0.2519	0.5828	0.4821	0.0006	0.0563
	120	0.1955	0.6048	1.1410	0.0010	0.1031
	175	0.2596	0.9790	2.0557	0.0019	0.1141
	250	0.2529	0.7004	2.8190	0.0028	0.0959
	500	0.3442	1.2591	3.8371	0.0037	0.1336
	750	0.5502	1.9179	6.2394	0.0059	0.2117
	9999	1.5285	5.5592	17.0748	0.0131	0.5223
Crushing/Proc. Equipment Composite		0.2385	0.7620	1.5831	0.0015	0.1012
Dumpers/Tenders	25	0.0121	0.0356	0.0681	0.0001	0.0043
Dumpers/Tenders Composite		0.0121	0.0356	0.0681	0.0001	0.0043
Excavators	25	0.0201	0.0677	0.1291	0.0002	0.0077
	50	0.1381	0.3393	0.2727	0.0003	0.0319
	120	0.1649	0.5437	0.9632	0.0009	0.0902
	175	0.1674	0.6735	1.2913	0.0013	0.0748
	250	0.1620	0.4374	1.7260	0.0018	0.0596
	500	0.2175	0.7092	2.2162	0.0023	0.0803
	750	0.3637	1.1724	3.7953	0.0039	0.1352

Excavators Composite		0.1695	0.5828	1.3249	0.0013	0.0727
Forklifts	50	0.0846	0.2020	0.1603	0.0002	0.0192
	120	0.0724	0.2304	0.4055	0.0004	0.0402
	175	0.0867	0.3326	0.6493	0.0006	0.0391
	250	0.0716	0.1822	0.8315	0.0009	0.0254
	500	0.0937	0.2573	1.0380	0.0011	0.0340
Forklifts Composite		0.0799	0.2422	0.5982	0.0006	0.0324
Generator Sets	15	0.0189	0.0749	0.1237	0.0002	0.0077
	25	0.0332	0.1105	0.1767	0.0002	0.0118
	50	0.1238	0.3024	0.3155	0.0004	0.0307
	120	0.1558	0.5141	0.9918	0.0009	0.0767
	175	0.1854	0.7531	1.6223	0.0016	0.0771
	250	0.1859	0.5644	2.2800	0.0024	0.0697
	500	0.2648	1.0375	3.3136	0.0033	0.1028
	750	0.4404	1.6748	5.4793	0.0055	0.1680
	9999	1.1329	4.1271	12.8919	0.0105	0.3964
Generator Sets Composite		0.1075	0.3461	0.6980	0.0007	0.0430
Graders	50	0.1622	0.3813	0.3051	0.0004	0.0362
	120	0.1780	0.5585	1.0405	0.0009	0.0948
	175	0.1956	0.7486	1.5300	0.0014	0.0864
	250	0.1966	0.5482	2.0220	0.0019	0.0751
	500	0.2360	0.8828	2.3908	0.0023	0.0904
	750	0.5040	1.8609	5.1931	0.0049	0.1935
Graders Composite		0.1936	0.6561	1.6191	0.0015	0.0840
Off-Highway Tractors	120	0.2703	0.7625	1.5479	0.0011	0.1355
	175	0.2532	0.8741	1.9339	0.0015	0.1094
	250	0.2053	0.5852	1.8670	0.0015	0.0812
	750	0.8003	4.0719	7.4850	0.0057	0.3122
	1000	1.2211	6.3076	12.1964	0.0082	0.4364
Off-Highway Tractors Composite		0.2578	0.8959	2.1767	0.0017	0.1061
Off-Highway Trucks	175	0.1962	0.7669	1.4779	0.0014	0.0867
	250	0.1822	0.4799	1.8617	0.0019	0.0659
	500	0.2727	0.8739	2.6600	0.0027	0.0984
	750	0.4454	1.4136	4.4516	0.0044	0.1621
	1000	0.7106	2.4058	7.9819	0.0063	0.2445
Off-Highway Trucks Composite		0.2730	0.8499	2.7256	0.0027	0.0989
Other Construction Eq	15	0.0119	0.0617	0.0750	0.0002	0.0046
	25	0.0174	0.0557	0.1110	0.0002	0.0066
	50	0.1244	0.3144	0.2884	0.0004	0.0303
	120	0.1570	0.5538	0.9885	0.0009	0.0842
	175	0.1356	0.5932	1.1451	0.0012	0.0606
	500	0.1944	0.7066	2.2771	0.0025	0.0770
Other Construction Equipment Comp		0.1215	0.4504	1.1575	0.0013	0.0503
Other General Industri	15	0.0066	0.0391	0.0466	0.0001	0.0026
	25	0.0188	0.0632	0.1207	0.0002	0.0072
	50	0.1421	0.3211	0.2473	0.0003	0.0308

	120	0.1605	0.4723	0.8979	0.0007	0.0854
	175	0.1647	0.5860	1.2490	0.0011	0.0726
	250	0.1553	0.4131	1.6545	0.0015	0.0579
	500	0.2735	0.9583	2.8780	0.0026	0.1032
	750	0.4552	1.5794	4.8663	0.0044	0.1724
	1000	0.6979	2.5724	7.5922	0.0056	0.2387
Other General Industrial Equipmen C		0.2025	0.6617	1.8248	0.0016	0.0815
Other Material Handlin	50	0.1961	0.4431	0.3438	0.0004	0.0426
	120	0.1558	0.4596	0.8749	0.0007	0.0827
	175	0.2078	0.7420	1.5840	0.0014	0.0915
	250	0.1646	0.4403	1.7636	0.0016	0.0616
	500	0.1952	0.6904	2.0733	0.0019	0.0741
	9999	0.9197	3.4021	10.0283	0.0073	0.3143
Other Material Handling Equipment C		0.1952	0.6041	1.7655	0.0015	0.0786
Pavers	25	0.0329	0.0930	0.1706	0.0002	0.0112
	50	0.1797	0.4041	0.3191	0.0004	0.0386
	120	0.1823	0.5356	1.0659	0.0008	0.0924
	175	0.2253	0.8121	1.7679	0.0014	0.0977
	250	0.2693	0.7767	2.5756	0.0022	0.1066
	500	0.2880	1.3755	2.7966	0.0023	0.1134
Pavers Composite		0.1963	0.5874	1.0796	0.0009	0.0769
Paving Equipment	25	0.0166	0.0532	0.1061	0.0002	0.0063
	50	0.1525	0.3426	0.2722	0.0003	0.0328
	120	0.1425	0.4189	0.8352	0.0006	0.0721
	175	0.1757	0.6336	1.3860	0.0011	0.0760
	250	0.1678	0.4852	1.6129	0.0014	0.0665
Paving Equipment Composite		0.1479	0.4616	0.9857	0.0008	0.0681
Plate Compactors	15	0.0052	0.0263	0.0328	0.0001	0.0021
Plate Compactors Composite		0.0052	0.0263	0.0328	0.0001	0.0021
Pressure Washers	15	0.0091	0.0359	0.0592	0.0001	0.0037
	25	0.0135	0.0448	0.0717	0.0001	0.0048
	50	0.0466	0.1197	0.1429	0.0002	0.0126
	120	0.0438	0.1514	0.2928	0.0003	0.0209
Pressure Washers Composite		0.0223	0.0692	0.1049	0.0001	0.0077
Pumps	15	0.0161	0.0545	0.0924	0.0001	0.0070
	25	0.0485	0.1221	0.1954	0.0002	0.0146
	50	0.1479	0.3563	0.3574	0.0004	0.0359
	120	0.1605	0.5221	1.0065	0.0009	0.0798
	175	0.1888	0.7547	1.6251	0.0016	0.0792
	250	0.1823	0.5452	2.1931	0.0023	0.0688
	500	0.2801	1.1093	3.4347	0.0034	0.1090
	750	0.4762	1.8340	5.8162	0.0057	0.1825
	9999	1.4880	5.5294	16.8363	0.0136	0.5197
Pumps Composite		0.1040	0.3194	0.5999	0.0006	0.0424
Rollers	15	0.0074	0.0386	0.0469	0.0001	0.0029
	25	0.0175	0.0562	0.1121	0.0002	0.0067
	50	0.1438	0.3348	0.2839	0.0003	0.0323
	120	0.1363	0.4271	0.8203	0.0007	0.0703
	175	0.1653	0.6345	1.3433	0.0012	0.0717
	250	0.1750	0.5082	1.8153	0.0017	0.0684
	500	0.2235	0.9142	2.3380	0.0022	0.0880
Rollers Composite		0.1328	0.4341	0.8607	0.0008	0.0601
Rough Terrain Forklifts	50	0.1873	0.4479	0.3678	0.0004	0.0427
	120	0.1404	0.4543	0.8292	0.0007	0.0757
	175	0.1859	0.7353	1.4705	0.0014	0.0829
	250	0.1745	0.4855	1.9002	0.0019	0.0661
	500	0.2357	0.8189	2.5155	0.0025	0.0905
Rough Terrain Forklifts Composite		0.1469	0.4869	0.9051	0.0008	0.0759
Rubber Tired Dozers	175	0.2603	0.8866	1.9566	0.0015	0.1120
	250	0.3011	0.8463	2.6790	0.0021	0.1179
	500	0.3895	1.9869	3.5050	0.0026	0.1495
	750	0.5869	2.9735	5.3538	0.0040	0.2260
	1000	0.9153	4.7521	9.0204	0.0060	0.3279
Rubber Tired Dozers Composite		0.3644	1.5961	3.2672	0.0025	0.1409
Rubber Tired Loaders	25	0.0212	0.0699	0.1381	0.0002	0.0082
	50	0.1812	0.4267	0.3437	0.0004	0.0406
	120	0.1384	0.4364	0.8116	0.0007	0.0737
	175	0.1659	0.6383	1.3029	0.0012	0.0733
	250	0.1674	0.4680	1.7361	0.0017	0.0640
	500	0.2394	0.8884	2.4484	0.0023	0.0919
	750	0.4955	1.8130	5.1493	0.0049	0.1905
	1000	0.6887	2.5960	7.7048	0.0060	0.2364
Rubber Tired Loaders Composite		0.1626	0.5369	1.3014	0.0012	0.0728
Scrapers	120	0.2502	0.7352	1.4405	0.0011	0.1289
	175	0.2636	0.9463	2.0299	0.0017	0.1150
	250	0.2889	0.8161	2.7553	0.0024	0.1128

	500	0.3979	1.7915	3.8005	0.0032	0.1538
	750	0.6903	3.0788	6.6918	0.0056	0.2675
Scrapers Composite		0.3505	1.4220	3.2269	0.0027	0.1391
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0025
	50	0.1661	0.3989	0.3791	0.0005	0.0396
	120	0.1679	0.5473	1.0392	0.0009	0.0854
	175	0.2118	0.8499	1.7913	0.0017	0.0908
	250	0.2346	0.6902	2.7794	0.0029	0.0895
Signal Boards Composite		0.0244	0.0965	0.1739	0.0002	0.0104
Skid Steer Loaders	25	0.0292	0.0774	0.1321	0.0002	0.0093
	50	0.1007	0.2724	0.2552	0.0003	0.0259
	120	0.0756	0.2886	0.4848	0.0005	0.0421
Skid Steer Loaders Composite		0.0879	0.2647	0.3209	0.0004	0.0300
Surfacing Equipment	50	0.0668	0.1602	0.1495	0.0002	0.0157
	120	0.1362	0.4436	0.8544	0.0007	0.0686
	175	0.1207	0.4852	1.0245	0.0010	0.0516
	250	0.1424	0.4314	1.5397	0.0015	0.0555
	500	0.2091	0.9084	2.2929	0.0022	0.0826
	750	0.3341	1.4189	3.6763	0.0035	0.1305
Surfacing Equipment Composite		0.1751	0.7086	1.7497	0.0017	0.0674
Sweepers/Scrubbers	15	0.0124	0.0729	0.0870	0.0002	0.0049
	25	0.0245	0.0811	0.1604	0.0002	0.0095
	50	0.1831	0.4265	0.3449	0.0004	0.0410
	120	0.1758	0.5472	0.9960	0.0009	0.0956
	175	0.2154	0.8121	1.6539	0.0016	0.0964
	250	0.1512	0.3965	1.7857	0.0018	0.0552
Sweepers/Scrubbers Composite		0.1830	0.5575	0.9678	0.0009	0.0778
Tractors/Loaders/Back	25	0.0237	0.0716	0.1396	0.0002	0.0086
	50	0.1537	0.3831	0.3222	0.0004	0.0362
	120	0.1083	0.3703	0.6510	0.0006	0.0595
	175	0.1405	0.5903	1.1212	0.0011	0.0634
	250	0.1598	0.4453	1.7937	0.0019	0.0598
	500	0.2897	0.9592	3.1387	0.0039	0.1102
	750	0.4409	1.4353	4.8706	0.0058	0.1681
Tractors/Loaders/Backhoes Composi		0.1204	0.4063	0.7746	0.0008	0.0599
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0034
	25	0.0412	0.1360	0.2685	0.0004	0.0159
	50	0.2019	0.4556	0.3714	0.0004	0.0438
	120	0.1678	0.4963	0.9961	0.0008	0.0837
	175	0.2480	0.9026	1.9770	0.0016	0.1068
	250	0.3077	0.9009	2.9500	0.0025	0.1227
	500	0.3821	1.9131	3.7466	0.0031	0.1515
	750	0.7263	3.5858	7.1748	0.0059	0.2867
Trenchers Composite		0.1851	0.5080	0.8237	0.0007	0.0688
Welders	15	0.0135	0.0456	0.0772	0.0001	0.0058
	25	0.0281	0.0707	0.1131	0.0001	0.0085
	50	0.1344	0.3128	0.2792	0.0003	0.0308
	120	0.0891	0.2778	0.5338	0.0005	0.0456
	175	0.1456	0.5548	1.1927	0.0011	0.0625
	250	0.1192	0.3403	1.3579	0.0013	0.0454
	500	0.1495	0.5771	1.7272	0.0016	0.0583
Welders Composite		0.0882	0.2309	0.3102	0.0003	0.0288

Emission factors sent by ARB on December 7, 2006 in grams per hour. EF converted by SCAQMD to pounds per hour.

Quantification of Carcinogenic Risks and Noncarcinogenic Hazards (Short-Term Construction Activity)

Source	Maximum Concentration		Weight Fraction	Contaminant	Carcinogenic Risk			Noncarcinogenic Hazards		
	(ug/m3)	(mg/m3)			URF (ug/m3)	CPF (mg/kg/day)	RISK	REL (ug/m3)	RfD (mg/kg/day)	Index
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Diesel	0.39539	4.0E-04	1.00E+00	Particulates	3.0E-04	1.1E+00	6.5E-07	5.0E+00	1.4E-03	7.9E-02

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	264
exposure duration (years)[1]	0.50000
inhalation rate (m3/day)*	21.14
average body weight (kg)	70
averaging time$_{(cancer)}$ (days)	25550
averaging time$_{(noncancer)}$ (days)	182.5

[1]Equals 120 days of activity

*Inhalation Rate of 21.14 m3/day equates to the ARB breathing 302 liters per kilogram-day

U:\UcJobs_05100-05500_05100\05112\Excel\[Construction Hand Calcs - 08.xls]DPM

ATTACHMENT B

CARB RECOMMENDED CONVERSION FACTORS
FOR ONE-HOUR AVERAGE TO ANNUAL AVERAGE CONCENTRATIONS

Appendix H

Recommendations for Estimating Concentrations of Longer Averaging Periods from the Maximum One-Hour Concentration for Screening Purposes

Appendix H

Recommendations for Estimating Concentrations of Longer Averaging Periods from the Maximum One-Hour Concentration for Screening Purposes

A. Introduction

The U.S. Environmental Protection Agency (U.S. EPA) SCREEN3 air dispersion model is frequently used to estimate the maximum one-hour concentration downwind due to emissions from a point source to assess impacts from a source. The SCREEN3 model results (or ISCST3 with screening meteorological data), in conjunction with the U.S. EPA screening factors, are frequently used to estimate concentrations for longer averaging periods, such as the maximum annual average concentration. In addition, it is permissible to use the ISCST3 air dispersion model in a screening mode with identical meteorological conditions as used in the SCREEN3 model to superimpose results from multiple sources.

This method to assess short-term and long-term impacts may be used as a first-level screening indicator to determine if a more refined analysis is necessary. In the event that representative meteorological data are not available, the screening assessment may be the only computer modeling method available to assess source impacts.

In California, this standard procedure will generally bias concentrations towards overprediction in most cases when the source is a continuous release. However, in the case when a source is not continuous, these screening factors may not be biased towards overprediction. In this case, we recommend an alternative procedure for estimating screening value concentrations for longer averaging periods than one-hour for intermittent releases.

B. Current Procedures

The current screening factors used to estimate longer term averages (i.e., 3-hour, 8-hour, 24-hour, 30-day, and annual averages) from maximum one-hour concentrations in California are shown in Table H.1 and Figure H.1. The factors are U.S. EPA recommended values with the exception of the 30-day factor. The 30-day factor is an ARB recommended value (ARB, 1994). The maximum and minimum values are recommended limits to which one may diverge from the general (Rec.) case, (U.S. EPA, 1992). Diverging from the general case should only be done on a case by case basis with prior approval from the reviewing agency.

C. Non-Standard Averaging Periods with a Continuous Release

The following is the ARB recommendation for estimating screening concentrations for non-standard averaging periods that are not listed in Table H.1 or Figure H.1. Specifically, the recommendation is for estimating screening concentrations for 4-hour, 6-hour, and 7-hour averaging periods.

The current U.S. EPA screening factors applicable to standard averaging periods should be used for non-standard averaging periods. Specifically for the 4-hour, 6-hour, and 7-hour averaging periods, we recommend that the 3-hour screening factor of (0.9± 0.1) be used. The following illustrates the method to estimate a 6-hour average concentration from a continuous release from a single point source:

1. determine the maximum 1-hour concentration according to standard screening procedures ($C_{max1\text{-}hr}$),
2. scale the maximum 1-hour concentration by (0.9±0.1), and
3. the result is the maximum 6-hour concentration ($C_{max6\text{-}hr} = C_{max1\text{-}hr} * (0.9 \pm 0.1)$).

In the case for the 6-hour and 7-hour average concentration estimates, the user may wish to take the lower bound of (0.9±0.1), or 0.8. For the 4-hour average estimate, we recommend the user to use the 3-hour factor as is, 0.9.

Figure H.1
Screening Factors to Convert
1-hr Max. to Longer Avg. Periods

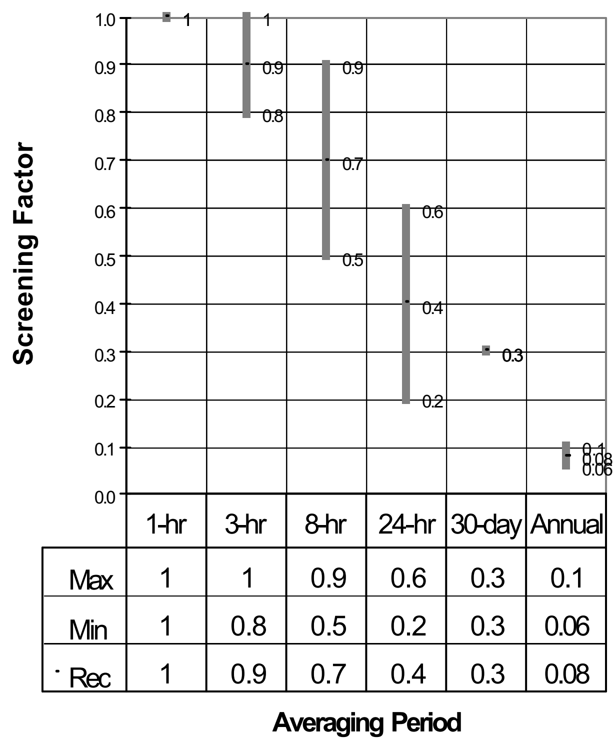


Table H.1 Recommended Factors to Convert Maximum 1-hour Avg. Concentrations to Other Averaging Periods (U.S. EPA, 1992; ARB, 1994).

Averaging Time	Range	Typical Recommended
3 hours	0.8 - 1.0	0.9
8 hours	0.5 - 0.9	0.7
24 hours	0.2 - 0.6	0.4
30 days	0.2 - 0.3	0.3
Annual	0.06 - 0.1	0.08

Table H.2 summarizes these recommendations for the non-standard averaging periods.

Table H.2 Recommended Factors to Convert Maximum 1-hour Avg. Concentrations to Non-Standard Averaging Periods.

Averaging Time	Range	Typical Recommended
4 hours	0.8 - 1.0	0.9
6 hours	0.8 – 1.0	0.8
7 hours	0.8 – 1.0	0.8

D. Definitions

It is convenient to define the following terms relating to sources with respect to the duration of the release.

- Continuous Release – this is a release that is continuous over the duration of a year. An example of this type of release would be fugitive emissions from a 24-hour per day, 7-day per week operation or an operation that is nearly continuous.

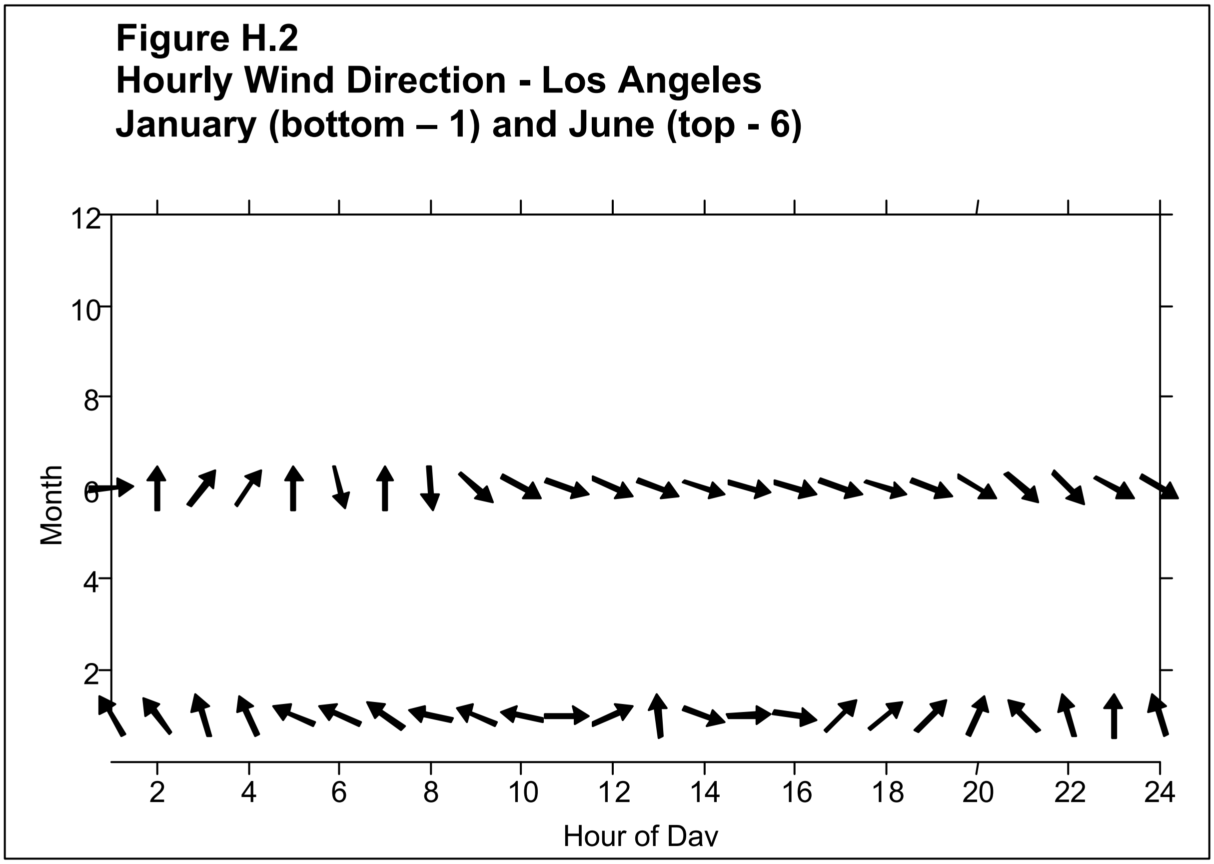
- Intermittent Release – many emissions fall under this category. These are emission types that are not continuous over the year. Any operation that has normal business hours (e.g., 8 am to 6 pm) would fall into this category.

- Systematic Release – these are intermittent releases that occur at a specific time of the day. As an example, these type of releases can occur when a process requires clean out at the end of the work day. Thereby releasing emissions only at the end of the workday systematically. Systematic releases are similar to intermittent releases with a shorter duration during the normal operating schedule.

- Random Release – these are intermittent releases that can occur any time during the operating schedule. An example of this type of release would be of the type that depends on batch processing. For example, a brake shop may emit pollutants only when the brakes are cleaned which happens randomly throughout the normal business hours.

E. Screening Factors

The U.S. EPA screening factors, as shown in Table H.1, compensate for the effects of varying conditions of wind speed, wind direction, ambient temperature, atmospheric stability, and mixing height over longer averaging periods, even though it is not explicitly indicated in the U.S. EPA Guidance (U.S. EPA, 1992). Figure H.2 shows the variability in wind direction over a 24-hour period. The data are averaged for two seven-day periods from data collected at Los Angeles International Airport (LAX). Figure H.2 was compiled for data collected in 1989 for January 1 to January 7 and June1 through June 7, 1989. The ordinate in Figure H.2 shows the months of the year. Only two months are plotted. The abscissa shows the hour of the day.



As seen in Figure H.2, the wind direction changes throughout all hours of the day. In addition, the wind direction for LAX, in the overnight and early morning hours, can vary from January to June. During the afternoon hours of 1400 – 1600, the wind direction is similar in both months of January and June.

The standard U.S. EPA screening factor to estimate the maximum 24-hour concentration from the maximum 1-hour concentration is 0.4, as seen in Table H.1. Figure H.2 shows that for 15 of 24 hours the wind blows from the west-northwest during June. A 24-hour screening factor could be 0.6 (0.6 ≈ 15hrs/24hrs) based on wind direction alone. This is consistent with the upper bound of the adjustment factors shown in Table H.1. Including the variability for wind speed, ambient temperature, and atmospheric stability could further reduce the estimated scaling factor of 0.6 closer towards the U.S. EPA recommended value of 0.4.

F. Intermittent Release

Support for the U.S. EPA screening factor is demonstrated for a continuous release (i.e., 24 hours per day) in the description above. It is important to be cautious when applying the U.S. EPA screening factors to an intermittent source for the purposes of estimating an annual average concentration (e.g., a business that may only emit during normal operating hours of 8 am to 6 pm).

Intermittent emissions, such as those from burning barrels, testing a standby diesel generator, or any normal business hour operation (e.g., 8am to 6pm Monday through Friday), could have the effect of eliminating some of the annual variability of meteorological conditions. For example, emissions only during the daytime could eliminate the variability of a drainage flow pattern in mountainous terrain. Guidance for estimating long-term averages for a screening approach and intermittent emissions is not available.

For a source located in the LAX meteorological domain, an emission pattern confined to the hours of 1400 to 1600 would eliminate any variability associated with the wind direction. In this case, estimating a 24-hour average with the U.S. EPA scaling factor of 0.4 would be incorrect.

In the event the emissions are intermittent but randomly distributed throughout the day, the scaling factor of 0.4 may be appropriate because the natural diurnal variability of meteorological conditions are concurrent with emissions. An additional pro-rating of the concentration, when estimating a 24-hour concentration, would be required to discount due to the intermittent nature of the emissions.

We recommend the following steps to estimate a screening based estimate of annual average concentrations from intermittent emissions.

1. Estimate the maximum one-hour concentration ($\chi_{1\text{-hr}}$) based on the SCREEN3 model approach (or similar, e.g., ISCST3 with screening meteorological data) for possible meteorological conditions consistent with the operating conditions and the actual hourly emission rate. It is acceptable to estimate downwind concentrations using all meteorological combinations available to SCREEN3. However, it is possible to be selective for the choices of meteorological conditions and still be conservative. For example, daytime only emissions need not be evaluated for nighttime stable atmospheric conditions (Pasquill-Gifford classes A through D are unstable and neutral atmospheric conditions applicable during the day. Classes D through F are neutral and stable atmospheric conditions applicable during the night.)

2. Estimate the concentration for the longest averaging period applicable based on the length of time of the systematic or randomly distributed emissions and the factors in Table H.1. For example, the longest averaging period concentration that may be estimated with the U.S. EPA scaling factors is an 8-hour concentration ($\chi_{8\text{-hr}}$) for emissions that are systematically released for 12 hours. Scaling factors between 8-hours and 12-hours are not available. In the case of the 8-hour concentration, the U.S. EPA screening factor of 0.7 ± 0.2 to estimate the maximum 8-hour concentration is appropriate.

   The U.S. EPA Screening Guidance allows for deviation from the suggested conversion factor on a case-by-case basis. We recommend the lower end of the range for the conversion factor (i.e., 0.5 for the 8-hour average) when estimating an annual average concentration. This is because variability associated with seasonal differences in wind speed, wind direction, and atmospheric stability would not be addressed otherwise. As seen in Figure H.2, there are seasonal differences in the wind direction.

For example, if X is the length of time of systematic or randomly distributed emissions, the following scalars can apply.

- $X \leq 2$ hrs; Scalar = 1.0 to estimate a 1-hour average
- 3 hrs $\leq X \leq$ 7 hrs; Scalar = 0.8 to estimate a 3-hour average
- 8 hrs $\leq X \leq$ 20 hrs; Scalar = 0.5 to estimate an 8-hour average (the selection of 20 hours is arbitrary)
- 21 hrs $\leq X \leq$ 24 hrs; this may be a continuous release, use standard screening procedures.

3. Estimate the annual average concentration (χ_{annual}) by assuming the longer averaging period estimated above is persistent for the entire year. In the above example the 8-hour concentration is assumed to be persistent for an entire year to estimate an annual average concentration (i.e., the annual average concentration is assumed to be equal to the 8-hour concentration).

   In addition, the annual average concentration should be pro-rated over the final averaging period based on the pro-rated emissions (i.e., the calculation should include the fact that for some hours over the year, the emission rate is zero).

   For example, if Y is the number of operating hours in the year (e.g., Y = X * 365), the following may apply.
   $(\chi_{annual}) = (\chi_{1\text{-hr}})$ (Scalar) (Y/8760hrs/yr)

4. The hourly emission rate should be calculated based on the assumed operating schedule in the steps above. An example for a facility operating Y hours per year follows.
   $(q_{hourly}) = (Q_{yearly})/(Y \text{ hrs/yr})$

5. The annual average concentration (or ground level concentration GLC) can be estimated as follows.
   GLC = $(\chi_{annual})\ (q_{hourly})$
   $= (\chi_{1\text{-hr}})$(Scalar) (Yhrs/8760hrs) $(Q_{yearly})/(Y \text{ hrs/yr})$
   $= (\chi_{1\text{-hr}})$(Scalar) $(Q_{yearly})/(8760 \text{ hrs/yr})$

Practically speaking, the above five steps condense down to determining three values. The first value is the maximum 1-hour concentration. The second value is the Scalar (either 1.0, 0.8, or 0.5). And the third value is the hourly emission rate estimated by uniformly distributed over the entire year (8760 hours). The operating hours per year drops out of the calculations for an annual average concentration provided the emissions are based on an annual inventory (See step 5).

In the event that the acute averaging period is required and the emissions are based on an annual inventory, then the annual operating hours are required.

Below are four examples using the steps as outlined above. In each case, the annual average concentration is the desired value for use in risk assessment calculations. A fifth example is also included to demonstrate the need for the operating hours per year for an acute analysis when the inventory is provided on an annual basis.

Example 1 - Fugitive Gasoline Station Emissions

Emissions are **continuous** for 24 hours per day and 365 days per year.

1. Estimate the maximum 1-hour concentration with the Screen3 model (or similar screening modeling approach), $\chi_{1\text{-hr}}$.

2. Estimate the annual average concentration, χ_{annual}, with the U.S. EPA screening factor of 0.08.
   $(\chi_{annual}) = (\chi_{1\text{-hr}})(0.08)$

3. The hourly emission rate, q_{hourly}, for the annual average concentration is based on 24 hours per day and 365 days per year (8760 hours per year).
   $(q_{hourly}) = (Q_{yearly})/(8760\text{ hrs/yr})$

4. The annual average concentration (or ground level concentration GLC) can be estimated as follows.
   $GLC = (\chi_{annual})\,(q_{hourly})$
   $GLC = (\chi_{1\text{-hr}})(0.08)\,(Q_{yearly})/(8760\text{ hrs/yr})$

Example 2 - Dry Cleaner Emissions

Emissions are **intermittent** over the year but **systematic** for 10 hours per day, 5 days per week and 50 weeks per year.

1. Estimate the maximum 1-hour concentration with the Screen3 model (or similar screening modeling approach), $\chi_{1\text{-hr}}$.

2. Estimate the maximum 8-hour average concentration, $\chi_{8\text{-hr}}$, with the U.S. EPA screening factor of 0.7 ±0.2 as the longest averaging period of continuous release. The averaging period would need to be less than 10 hours. Use the lower range of the screening factor, 0.5, because the annual average is the final product and variability due to seasonal differences are not accounted for otherwise.
   $(\chi_{8\text{-hr}}) = (\chi_{1\text{-hr}})(0.5)$

3. Assume the worst-case 8-hour concentration is persistent throughout the year and pro-rate the concentration based on emissions over the year. For this dry cleaner, there are 2500 hours of operating condition emissions. Therefore the annual average is calculated as follows.
   $(\chi_{annual}) = (\chi_{8\text{-hr}})\,(2500\text{hrs}/8760\text{hrs})$
   $= (\chi_{1\text{-hr}})(0.5)\,(2500\text{hrs}/8760\text{hrs})$

4. The hourly emission rate, q_{hourly}, for the annual average concentration is based on 2500 hours per year.
   $(q_{hourly}) = (Q_{yearly})/(2500\text{ hrs/yr})$

5. The annual average concentration (or ground level concentration GLC) can be estimated as follows.
   $GLC = (\chi_{annual})\ (q_{hourly})$
   $= (\chi_{1\text{-}hr})(0.5)\ (2500hrs/8760hrs)\ (Q_{yearly})/(2500\ hrs/yr)$
   $= (\chi_{1\text{-}hr})(0.5)\ (Q_{yearly})/(8760\ hrs/yr)$

Example 3 - Burning Barrel Emissions

Emissions are **intermittent** over the year and **random** during daylight hours for two hours per burn, two burns per week, and 52 weeks per year.

1. Estimate the maximum 1-hour concentration with the Screen3 model (or similar screening modeling approach), $\chi_{1\text{-}hr}$. Meteorological combinations may be restricted to daytime conditions for this screening analysis. Pasquill-Gifford stability classes A, B, C, and D are unstable and neutral conditions for daytime conditions.

2. Estimate the maximum 8-hour average concentration, $\chi_{8\text{-}hr}$, with the U.S. EPA screening factor of 0.7 ±0.2 as the longest averaging period where the emissions have the potential to be randomly distributed. Depending on the day of the year and latitude of the emissions, the daylight hours can vary. For this example, we assume the daylight hours can be as short as 10 hours per day to as long as 14 hours per day. Since the emissions are randomly distributed throughout the daylight hours, the longest averaging period we can scale with U.S. EPA scaling factors is a 10 hour average. In this case, the averaging period becomes the 8-hour average and the scaling factor becomes 0.7±0.2. Again since this is for an annual average, we use the lower end of the range, 0.5.
   $(\chi_{8\text{-}hr}) = (\chi_{1\text{-}hr})(0.5)$

3. Assume the worst-case 8-hour concentration is persistent throughout the year and pro-rate the concentration based on the emissions over the year. For the burning barrels there are 208 hours of operating condition emissions (208 hrs = (2hrs/burn)(2burns/wk)(52wk/yr)). Therefore the annual average concentration is calculated as follows.
   $(\chi_{annual}) = (\chi_{8\text{-}hr})\ (208hrs/8760hrs)$
   $= (\chi_{1\text{-}hr})(0.5)\ (208hrs/8760hrs)$

4. The hourly emission rate, q_{hourly}, for the annual average concentration is based on 208 hours per year.
   $(q_{hourly}) = (Q_{yearly})/(208\ hrs/yr)$

5. The annual average concentration (or ground level concentration GLC) can be estimated as follows.
   $GLC = (\chi_{annual})\ (q_{hourly})$
   $= (\chi_{1\text{-}hr})(0.5)\ (208hrs/8760hrs)\ (Q_{yearly})/(208\ hrs/yr)$
   $= (\chi_{1\text{-}hr})(0.5)\ (Q_{yearly})/(8760\ hrs/yr)$

Example 4 - Standby Diesel Engine Testing

Emissions are **intermittent** over the year and **systematic** for two hours per week and 50 weeks per year. The engine testing is conducted at 2 pm on Fridays.

1. Estimate the maximum 1-hour concentration with the Screen3 model (or similar screening modeling approach), $\chi_{1\text{-hr}}$. Meteorological combinations may be restricted to daytime conditions in this screening analysis because the engine test is conducted at 2 pm. Pasquill-Gifford stability classes A, B, C, and D are unstable and neutral conditions for daytime conditions.

2. In this case, the emission schedule is systematically fixed over a two hour period. Therefore, the longest averaging period which is applicable for the U.S. EPA screening factors is one-hour because a two-hour conversion factor is not available. Therefore, we assume the maximum 1-hour concentration is persistent for the entire year. We still prorate the concentration based on the emissions. There are 100 hours of engine testing per year. Therefore the annual average concentration becomes.
   $(\chi_{annual}) = (\chi_{1\text{-hr}})$ (100hrs/8760hrs)

3. The hourly emission rate, q_{hourly}, for the annual average concentration is based on 100 hours per year.
   $(q_{hourly}) = (Q_{yearly})$/(100 hrs/yr)

4. The annual average concentration (or ground level concentration GLC) can be estimated as follows.
   GLC = (χ_{annual}) (q_{hourly})
   = $(\chi_{1\text{-hr}})$ (100hrs/8760hrs) (Q_{yearly})/(100 hrs/yr)
   = $(\chi_{1\text{-hr}})$ (Q_{yearly})/(8760 hrs/yr)

Below is an example using the steps above to estimate an acute concentration longer than a 1-hour averaging period. This case is similar to Example 3 above with the exception of the averaging period.

Example 5 - Burning Barrel Emissions – Acute REL

Emissions are **intermittent** over the year and **random** during daylight hours for two **continuous** hours per burn, two burns per week, and 52 weeks per year. The arsenic acute REL is for a 4-hour averaging period. The steps below are used to estimate the acute concentration, 4-hour REL, for arsenic.

1. Estimate the maximum 1-hour concentration with the Screen3 model (or similar screening modeling approach), $\chi_{1\text{-hr}}$. Meteorological combinations may be restricted to daytime conditions for this screening analysis. Pasquill-Gifford stability classes A, B, C, and D are unstable and neutral conditions for daytime conditions.

2. The maximum 1-hour concentration is used as is without screening adjustment factors listed in Tables H.1 or H.2. The emissions are **continuous** through a 2-hour event within a 4-hour window. The adjustments in Table H.2 would only be used if the

emissions were continuous for a 4-hour event or **randomly** distributed through a 4-hour event.

3. Assume the worst-case 1-hour concentration is persistent for the 4-hour averaging period and pro-rate the concentration based on the emissions over the 4-hour window. For the burning barrels there are 2 hours of operating condition emissions (2hrs/burn). Therefore the 4-hour average concentration is calculated as follows.
   $(\chi_{4\text{-hr}}) = (\chi_{1\text{-hr}})$ (2hrs/4hrs)

4. The hourly emission rate, q_{hourly}, for the annual average concentration is based on 208 hours per year (208 hrs = (2hrs/burn)(2burns/wk)(52wk/yr)).
   $(q_{hourly}) = (Q_{yearly})$/(208 hrs/yr)

5. The 4-hr average concentration (or ground level concentration $GLC_{4\text{-hr}}$) can be estimated as follows.
   $GLC_{4\text{-hr}} = (\chi_{4\text{-hr}})\ (q_{hourly})$
   $= (\chi_{1\text{-hr}})$ (2hrs/4hrs) (Q_{yearly})/(208 hrs/yr)

   This step of Example 5 differs from the previous Examples because the number of operating hours per year does not drop out of the calculation as seen above.

The above methods were used in a recent modeling evaluation for emissions from a burning barrel (example 3 above) (ARB, 2002). Table H.3, below, shows results from the modeling evaluation. Shown in Table H.3 are the maximum annual average concentration based on the screening approach outlined above as well as a refined approach with site specific meteorological data from four locations, Alturas, Bishop, San Benito, and Escondido. As seen in Table H.3, the screening evaluation as described in the example overestimates the values calculated based on the refined analysis. This is the desired outcome of a screening approach.

Table H.3 Maximum Annual Average Concentration (χ/q) Above Ambient Conditions - Burning Barrel Emissions					
Met. City	Alturas	Bishop	San Benito	Escondido	*SCREENING*
D (m)	(μg/m^3)/(g/s)	(μg/m^3)/(g/s)	(μg/m^3)/(g/s)	(μg/m^3)/(g/s)	*(μg/m^3)/(g/s)*
20	44.	61.	85.	110.	*590.*
50	12.	16.	22.	30.	*230.*
100	4.	5.	7.	9.	*85.*
Notes: (a) Annual χ/q is based on 208 hours of emissions at 1 g/s. (b) χ/q is the concentration in μg/m^3 based on an hourly emission rate of 1 g/s.					

G. Implementation

The approach outlined above has been implemented in the HARP program. Appendix J provides example output files from the Hot Spot Analysis and Reporting Program (HARP). The HARP software has been developed by a contractor through consultation with OEHHA, Air Resources Board (ARB), and District representatives. The HARP software is the recommended model for calculating and presenting HRA results for the Hot Spots Program. Information on obtaining the HARP software can be found on the ARB's web site at www.arb.ca.gov. Note, since the HARP software is a tool that uses the methods specified in this document, the software will be available after these guidelines have undergone public and peer review, been endorsed by the state's Scientific Review Panel (SRP) on Toxic Air Contaminants, and adopted by OEHHA.

References

ARB (1994). ARB memorandum dated 4/11/94 from A. Ranzieri to J. Brooks on the subject, "One-hour to Thirty-day Average Screening Factor."

ARB (2002). Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure to Reduce Emissions of Toxic Air Contaminants from Outdoor Residential Waste Burning, January 2002. California Air Resources Board.

U.S. EPA (1992). Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, October 1992, EPA-454/R-92-019. U.S. Environmental Protection Agency, Research Triangle Park, NC.

U.S. EPA (1995). User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, September 1995, EPA-454/B-95-003a. U.S. Environmental Protection Agency, Research Triangle Park, NC.

U.S. EPA (2001). Appendix W to Part 51 - Guideline on Air Quality Models, 2001. U.S. Environmental Protection Agency, Research Triangle Park, NC.

ATTACHMENT C

SCAQMD RECOMMENDED EMISSIONS REDUCTION PERCENTAGES FOR CONSTRUCTION-RELATED MITIGATION MEASURES

OVERVIEW – FUGITIVE DUST MITIGATION MEASURE TABLES

Summary

This document provides an overview of the fugitive dust mitigation measures compiled in Tables XI-A, XI-B, XI-C, XI-D and XI-E, and how to use the information presented in the tables. The listed examples illustrate readily available dust control measures and are therefore considered achieved in practice.

Mitigation Measure Tables

The tables provide examples of specific mitigation measures available to control fugitive dust from projects within the AQMD's jurisdiction, grouped into five categories of dust generating activities:

- Table XI-A: Construction & Demolition
- Table XI-B: Materials Handling
- Table XI-C: Paved Roads
- Table XI-D: Unpaved Roads
- Table XI-E: Storage Piles

In particular, each table provides the following details:

- Source Activity
- Mitigation Measure
- PM10 Control Efficiency
- Comments
- Estimated Cost

The CEQA practitioner can estimate emission reductions by implementing a given listed mitigation measure. To do so, apply the control efficiency to the applicable uncontrolled pollutant emission rate.

As an example, water application every three hours to disturbed areas within a construction site undergoing construction activities yields an emission reduction of 61% PM10. Assuming the construction activities emit 100 pounds per day (lb/day) PM10, the quantity mitigated is 61 lb/day PM10, while the remaining emission rate is 39 lb/day PM10.

The fugitive dust tables can be downloaded from the following location:
http://www.aqmd.gov/ceqa/handbook/mitigation/fugitive/MM_fugitive.html.

TABLE XI-A
MITIGATION MEASURE EXAMPLES:
FUGITIVE DUST FROM CONSTRUCTION & DEMOLITION

Source Activity	Mitigation Measure[1]	PM10 Control Efficiency	Comments	Estimated Cost[2]
Active demolition and debris removal	Apply water every 4 hours to the area within 100 feet of a structure being demolished, to reduce vehicle trackout.	36%		ND
Trackout	Use a gravel apron, 25 feet long by road width, to reduce mud/dirt trackout from unpaved truck exit routes.	46%		$1,360/year (gravel apron dimensions: 50' x 30' x 3" thick)
Post-demolition stabilization	Apply dust suppressants (e.g., polymer emulsion) to disturbed areas upon completion of demolition.	84%	For actively disturbed areas.	$5,340/acre-year (Useful life of 1 year)
Demolition Activities	Apply water to disturbed soils after demolition is completed or at the end of each day of cleanup.	10%	14-hour watering interval.	$68-$81/acre-day
Demolition Activities	Prohibit demolition activities when wind speeds exceed 25 mph.	98%	Estimated for high wind days in absence of soil disturbance activities. Demolition of 1,000 ft^2 structure on 1.2 acres.	$1.36 per 8 hour day idled
Construction Activities	Apply water every 3 hours to disturbed areas within a construction site.	61%	3.2-hour watering interval.	ND
Scraper loading and unloading	Require minimum soil moisture of 12% for earthmoving by use of a moveable sprinkler system or a water truck. Moisture content can be verified by lab sample or moisture probe.	69%	AP-42 emission factor equation for materials handling due to increasing soil moisture from 1.4% to 12%.	$138/acre (sprinkler system to maintain minimum soil moisture of 12%)
Construction traffic	Limit on-site vehicle speeds (on unpaved roads) to 15 mph by radar enforcement.	57%	Assume linear relationship between PM10 emissions and uncontrolled vehicle speed of 35 mph.	$22/inspection $180/sign

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.

TABLE XI-A
MITIGATION MEASURE EXAMPLES:
FUGITIVE DUST FROM CONSTRUCTION & DEMOLITION

Source Component	Mitigation Measure[1]	PM10 Control Efficiency	References & Assumptions	Estimated Cost[2]
Grading	Replace ground cover in disturbed areas as quickly as possible.	5%[3]	EPA, "Control of Fugitive Dust Sources" EPA-450/3-88-008, September 1988	ND
Grading	All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches.	91%	Arizona Department of Transportation Construction Analysis Services, "Final Field Study Report - PM10 Control Management Study for ADOT Construction Projects, June 1994	ND

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2] 2003 dollars.
[3] Higher than 5% control efficiency may be used. However, please provide the supporting analysis and data in the environmental documentation.

TABLE XI-B
MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM MATERIALS HANDLING

Source Activity	Mitigation Measure[1]	PM10 Control Efficiency	Comments	Estimated Cost[2]
Conveyors	Continuous water spray at conveyor transfer point	62%	The control efficiency achieved by increasing the moisture content of the material from 1% to 2% is calculated utilizing the AP-42 emission factor equation for materials handling which contains a correction term for moisture content.	ND
Storage piles	Require construction of 3-sided enclosures with 50% porosity for storage pile.	75%	Determined through modeling of open area windblown emissions with 50% reduction in wind speed and assuming no emission reduction when winds approach open side.	$109/year (useful life of 15 years; pile volume = 5 yd^3)
Storage piles	Water the storage pile by hand at a rate of 1.4 gallons/hour-$yard^2$, or apply cover when wind events are declared.	90%		ND

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.

TABLE XI-C
MITIGATION MEASURE EXAMPLES:
FUGITIVE DUST FROM PAVED ROADS

Source Activity	Mitigation Measure[1]	PM10 Control Efficiency	Comments	Estimated Cost[2]
Local streets	Implement street sweeping program with Rule 1186 compliant PM10 efficient vacuum units (14-day frequency)	16%	For PM10 efficient sweepers, based on 86% efficient sweeping, 8.6 day return time, and CA-VMT weighted sweeping frequency (7 to 30 days)	Purchase PM10 efficient sweeper: $190/mile-year (useful life of 8 years; sweep 15 centerline miles per day)
Arterial/collector streets		26%		
Local, arterial and collector streets	Require streets to be swept by Rule 1186 compliant PM10 efficient vacuum units (once per month frequency)	9%	For PM10 efficient sweepers, based on 86% efficient sweeping, 8.6 day return time, and CA-VMT weighted sweeping frequency (7 to 30 days)	Purchase PM10 efficient sweeper: $190/mile-year (useful life of 8 years; sweep 15 centerline miles per day)
Mud/dirt trackout	Install pipe-grid trackout-control device to reduce mud/dirt trackout from unpaved truck exit routes.	80%		$1,820/year (useful life of 8 years)
Mud/dirt trackout	Install gravel bed trackout apron (3 inches deep, 25 feet long, 12 feet wide per lane and edged by rock berm or row of stakes) to reduce mud/dirt trackout from unpaved truck exit routes.	46%		$1,360/year (50' x 30' x 3" thick)
Mud/dirt trackout	Require paved interior roads to be 100 feet long, 12 feet wide per lane and edged by rock berm or row of stakes, or add 4 foot shoulder for paved roads.	42%		4' Paved Shoulders: $8,200/mile-year (useful life of 20 years)

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.

TABLE XI-D
MITIGATION MEASURE EXAMPLES:
FUGITIVE DUST FROM UNPAVED ROADS

Source Activity	Mitigation Measure[1]	PM10 Control Efficiency	Comments	Estimated Cost[2]
Travel over unpaved roads	Limit maximum speed on unpaved roads to 25 miles per hour.	44%	Assumes linear relationship between PM10 emissions and vehicle speed and an uncontrolled speed of 45 mph.	ND
Travel over unpaved roads	Pave unpaved roads and unpaved parking areas.	99%	Based on comparison of paved road and unpaved road PM10 emission factors.	$44,100/mile-year (useful life of 25 years)
Travel over unpaved roads	Implement watering twice a day for industrial unpaved road.	55%		ND
Travel over unpaved roads	Apply chemical dust suppressant annually to unpaved parking areas.	84%		$5,340/acre-year (useful life of 1 year)

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.

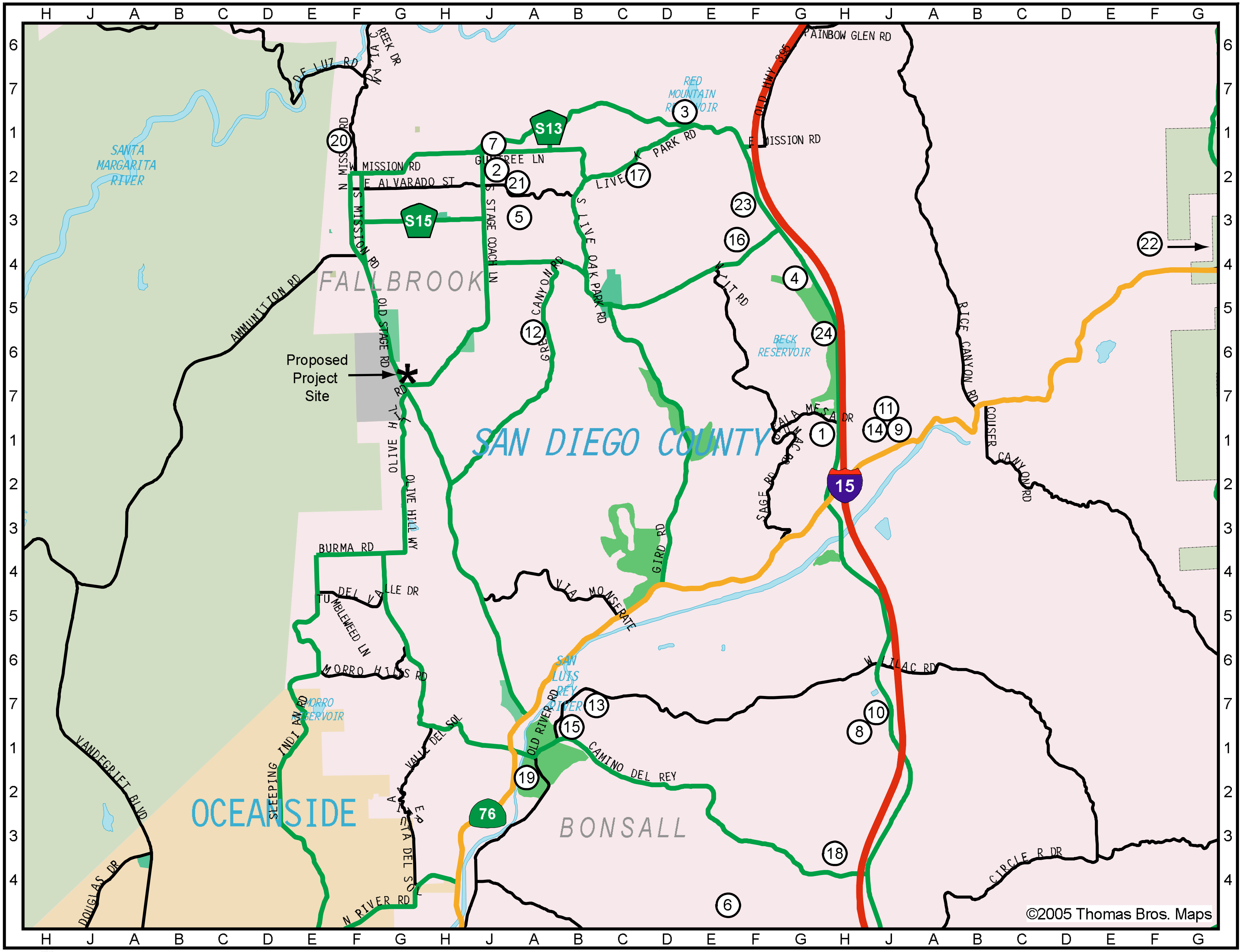
TABLE XI-E
MITIGATION MEASURE EXAMPLES:
FUGITIVE DUST FROM STORAGE PILES

Source Activity	Mitigation Measure[1]	PM10 Control Efficiency	Comments	Estimated Cost[2]
Storage pile wind erosion	Require construction of 3-sided enclosures with 50% porosity.	75%	Determined through modeling of open area windblown emissions with 50% reduction in wind speed and assuming no emission reduction when winds approach open side	$109/year (Useful life of 15 years; pile volume = 5 yd^3)
Storage pile wind erosion	Water the storage pile by hand or apply cover when wind events are declared.	90%		$22/day (100 cubic yard pile)
Windblown dust from inactive areas[3]	Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).	Up to 80%	Wind erosion from inactive areas.	ND
Windblown dust from disturbed areas[4]	Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.	4% (15% for mature trees)		ND
Windblown dust from disturbed areas[4]	Plant vegetative ground cover in disturbed areas as soon as possible.	15%		ND

[1]Unless otherwise noted, information presented in this table is from the following reference: *WRAP Fugitive Dust Handbook*, September 7, 2006 (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf). ND = No Data.
[2]2003 dollars.
[3]Reference: U.S. EPA, "AP-42, Vol. I." Pg. 11.2.4-1 (http://www.epa.gov/ttn/chief/old/ap42/4th_edition/ap42_4thed_withsuppsa_f.pdf).
[4]Reference: SCAQMD, *SIP for PM10 in the Coachella Valley*, 1990, Pg 5-15.

ATTACHMENT D

CUMULATIVE PROJECTS EXHIBIT



RBF

APPROVED/PENDING CUMULATIVE PROJECTS LOCATION MAP

JN: 55-100256.001 NOVEMBER 2007

EXHIBIT 8

Table 7
Approved/Pending Cumulative Projects Trip Generation

Project Number		Project Name	Land Use	Intensity	Unit	Daily Trips	AM Trips	AM In	AM Out	PM Trips	PM In	PM Out
1.	TM 5187	NA	SFDU	126	DU	1,260	101	30	71	126	88	38
2.	TM 5195	NA	SFDU	101	DU	1,010	81	24	57	101	71	30
3.	TM 5227	NA	SFDU	4	DU	40	3	1	2	4	3	1
4.	TM 5231	NA	condos	39	DU	390	31	9	22	39	27	12
5.	TM 5243	NA	SFDU	8	DU	80	6	2	4	8	6	2
6.	TM 5264	NA	SFDU	9	DU	90	7	2	5	9	6	3
7.	TM 5268	The Arbors	SFDU	17	DU	170	14	4	10	17	12	5
8.	TM 5276	NA	SFDU	8	DU	80	6	2	4	8	6	2
9.	TM 5338	Campus Park	SFDU	529	DU	5,290	423	127	296	529	370	159
			condos	472	DU	3,776	302	60	242	340	238	102
			Total Project Trips			*9,066*	*725*	*187*	*538*	*869*	*608*	*261*
10.	TM 5346	NA	SFDU	9	DU	90	7	2	5	9	6	3
11.	TM 5354	The Meadowood (1)	SFDU	394	DU	3,940	315	95	221	394	276	118
			condos	756	DU	6,048	484	97	387	544	381	163
			Total Project Trips			*9,988*	*799*	*191*	*608*	*938*	*657*	*281*
12.	TM 5364	NA	SFDU	10	DU	100	8	2	6	10	7	3
13.	TM 5387	Las Casitas	SFDU	130	DU	1,300	104	31	73	130	91	39
14.	TM 5424	Campus Park West	SFDU	109	DU	1,090	87	26	61	109	76	33
			condos	457	DU	3,656	292	58	234	329	230	99
			retail	22	acres	15,400	616	370	246	1,540	770	770
			office	10	acres	3,000	420	378	42	390	78	312
			Total Project Trips			*23,146*	*1,416*	*832*	*583*	*2,368*	*1,155*	*1,213*
15.	TM 5427	NA	condos	76	DU	608	49	10	39	55	38	16
16.	TM 5449	Fallbrook Oaks	SFDU	19	DU	190	15	5	11	19	13	6
17.	TM 5469	Ridge Creek	SFDU	14	DU	140	11	3	8	14	10	4
18.	TM 5492	NA	SFDU	22	DU	220	18	5	12	22	15	7
19.	TM 5498	NA	SFDU	116	DU	1,160	93	28	65	116	81	35
20.	TM 5502	NA	SFDU	13	DU	130	10	3	7	13	9	4
21.	TM 5503	NA	SFDU	10	DU	100	8	2	6	10	7	3
22.	TM 5508	Warner Ranch	SFDU	732	DU	7,320	586	176	410	732	512	220
			condos	168	DU	1,344	108	22	86	121	85	36
			Total Project Trips			*8,664*	*693*	*197*	*496*	*853*	*597*	*256*
23.	TM 5532	NA	SFDU	11	DU	110	9	3	6	11	8	3
24.	TM 5534	Pala Mesa Resort Expansion	SFDU	10	DU	100	8	2	6	10	7	3
			condos	148	DU	1,184	95	19	76	107	75	32
			timeshare units	78	DU	624	31	19	12	44	17	26
			resort hotel	54	rooms	432	22	13	9	30	12	18
			Total Project Trips			*2,340*	*156*	*53*	*102*	*190*	*111*	*79*
Total Cumulative Project Trips						**60,472**	**4,370**	**1,631**	**2,739**	**5,939**	**3,632**	**2,307**

Source: County of San Diego Department of Planning and Land Use.

(1) This project also includes a 600-student elementary school to serve the residential component of the project. The school would not generate new traffic outside of the immediate neighborhood surrounding the school; therefore, the traffic generated by the elementary school was not included in the analysis. The proposed Pacifica Estates project is located approximately 10 miles from the Meadowood project.

ATTACHMENT E

URBEMIS 2007
MODEL OUTPUT

11/1/2010 5:25:51 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: U:\UcJobs_05100-05500_05100\05112\Urbemis\5112 Operations.urb9

Project Name: Pacifica Estates Operations

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	1.52	0.27	1.05	0.00	0.00	0.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	1.81	2.40	22.07	0.02	3.11	0.61

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	3.33	2.67	23.12	0.02	3.11	0.61

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Natural Gas	0.02	0.26	0.11	0.00	0.00	0.00
Hearth - No Summer Emissions						
Landscape	0.17	0.01	0.94	0.00	0.00	0.00
Consumer Products	1.03					
Architectural Coatings	0.30					
TOTALS (lbs/day, unmitigated)	1.52	0.27	1.05	0.00	0.00	0.00

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25
Single family housing	1.81	2.40	22.07	0.02	3.11	0.61
TOTALS (lbs/day, unmitigated)	1.81	2.40	22.07	0.02	3.11	0.61

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	17.30	10.00	dwelling units	21.00	210.00	1,795.44
					210.00	1,795.44

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.9	1.2	98.4	0.4
Light Truck < 3750 lbs	10.9	2.8	91.7	5.5
Light Truck 3751-5750 lbs	21.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.5	68.6	31.4	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

11/1/2010 5:26:05 PM

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: U:\UcJobs_05100-05500_05100\05112\Urbemis\5112 Operations.urb9

Project Name: Pacifica Estates Operations

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	5.57	0.77	22.37	0.07	3.57	3.44

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	1.99	3.51	23.88	0.02	3.11	0.61

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	7.56	4.28	46.25	0.09	6.68	4.05

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Natural Gas	0.02	0.26	0.11	0.00	0.00	0.00
Hearth	4.22	0.51	22.26	0.07	3.57	3.44
Landscaping - No Winter Emissions						
Consumer Products	1.03					
Architectural Coatings	0.30					
TOTALS (lbs/day, unmitigated)	5.57	0.77	22.37	0.07	3.57	3.44

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25
Single family housing	1.99	3.51	23.88	0.02	3.11	0.61
TOTALS (lbs/day, unmitigated)	1.99	3.51	23.88	0.02	3.11	0.61

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

11/1/2010 5:26:05 PM

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	17.30	10.00	dwelling units	21.00	210.00	1,795.44
					210.00	1,795.44

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.9	1.2	98.4	0.4
Light Truck < 3750 lbs	10.9	2.8	91.7	5.5
Light Truck 3751-5750 lbs	21.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	9.5	1.1	98.9	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.5	68.6	31.4	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)