Appendix F

Other Environmental Analyses

Appendix F-1
Local Development Projects Considered in Cumulative Impact Analysis

Table F1-1
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Contra Costa Water District Bollman WWTP Improvements					
Level 2 Projects (necessary projects)					
Operations Building Rehabilitation	Bollman WTP	Repair of the spalling exterior concrete of the building	FY04 – FY05	In the vicinity of the desalination facilities	General construction effects
5 kV Electrical System Upgrades	Bollman WTP	Replacement of high voltage electrical equipment	FY04 – FY06	In the vicinity of the desalination facilities	General construction effects
Chemical Systems Repairs	Bollman WTP	Replacement of leaking portions of the bulk chemical piping system and improvements to the polymer feed system and sodium hypochlorite pumps	FY04 – FY05	In the vicinity of the desalination facilities	General construction effects
Pump Station Upgrades	Bollman WTP	Replacement or additional rehabilitation of some pump station components	FY09 – FY11 and FY13	In the vicinity of the desalination facilities	General construction effects
Filter Valves Replacement	Bollman WTP	Replacement or rehabilitation of the valves	FY08 – FY09	In the vicinity of the desalination facilities	General construction effects
Sedimentation Basin Blower	Bollman WTP	Replacement with higher energy efficiency blowers	FY06	In the vicinity of the desalination facilities	General construction effects
Level 3 Projects (discretionary projects)					
Third Ozone Contactor	Bollman WTP	Construction of a third ozone contactor to improve taste, odor and reliability	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Hydrogen Peroxide System	Bollman WTP	Addition of a hydrogen peroxide system to control taste and odor	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Advanced Treatment	Bollman WTP	Addition of advanced oxidation and/or membrane filtration technologies	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
UV System	Bollman WTP	Addition of UV disinfection	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Chlorine Dioxide System	Bollman WTP	Replacement of the free-chlorine pre-oxidant with chlorine dioxide	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Low Voltage Electrical System Upgrades	Bollman WTP	Replace aged equipment	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Sludge Pipeline to CCCSD	Bollman WTP	Full replacement of the pipeline used to transport sedimentation blowdown from Bollman to the lagoons at CCCSD	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Seismic and Reliability Projects	Bollman WTP	Seismic and reliability upgrades	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Raw Water Flow-Split Upgrades	Bollman WTP	Construct improvements to the raw water line and influent flow structure	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Sedimentation Basin Solids Treatment	Bollman WTP	Install gravity thickener and rehabilitate the Foster Wheeler Tank	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Backwash Solids Treatment	Bollman WTP	Install filter backwash flow equalization and clarification	Determined on an individual basis by CCWD	In the vicinity of the desalination facilities	General construction effects
Contra Costa County					
Canal Road Bridge Replacement	At the Contra Costa Canal/ Canal Road crossing near the south end of Alves Lane (Bay Point)	Replace the existing bridge	Construction expected FY 2005/2006	Along proposed desalination conveyance facility	General construction effects
Byron Highway Widening	Byron Highway at Byron Elementary School (Byron)	Widen the existing pavement to provide a dual left turn lane along the frontage of the School District office and elementary school	Construction expected FY 2006/2007	~ 3.5 miles east of Byron Tract site	General construction effects
SR 4/Byron Highway Intersection Improvements	Intersection of Byron Highway and SR 4 (Byron)	Widen the existing pavement to provide two lanes in each direction	Construction expected FY 2006/2007 and 2007/2008	~ 3.5 miles east of Byron Tract site	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
SR 4 Bypass Project	7 miles west of Victoria Island	Replace existing SR 4 from south of Main Street Interchange to Marsh Creek Road Intersection	Construction expected in phases through 2007	7 miles west of Victoria Island	General construction effects
DP043006	2300 Willow Pass Road, Bay Point	9 Unit Apartment	Planning	< 250 feet west of proposed desalination conveyance facility	General construction effects
DP043021/SD037787	87 North Broadway, Bay Point	15 single-family residences/subdivision	Planning	< 2,000 feet northwest of proposed desalination conveyance facility	General construction effects
DP043079/SD048888	Broadway North Avenue, Bay Point	13 single family homes	Planning	< 3,000 feet northwest of proposed desalination conveyance facility	General construction effects
DP043096	Highway 4/ Willow Pass Road, Bay Point	Business Park	Planning	< 1,500 feet west of proposed desalination conveyance facility	General construction effects
LP042112	Byer Road, Byron	Wine Tasting Facility	Planning	< 4 miles west of Byron Tract site	General construction effects
LP052010	800 Port Chicago Hwy, Bay Point	Gardening and Landscaping Retail	Planning	< 1 mile west of Byron Tract site	General construction effects
SD048828	Address Not Available, Byron	442 lots	Planning	West of Byron Tract (likely < 5 miles)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
SD048918	Arnold and Industrial Way, Bay Point	14 industrial lots	Planning	In the vicinity of the proposed desalination conveyance facility	General construction effects
MS010004	Address Unavailable, Byron	Subdivide 232 acres into 4 parcels	Planning	West of Byron Tract (likely < 5 miles)	General construction effects
City of Concord					
Olivera Crossing	3365 Port Chicago Highway Road (Olivera Road), Concord	53,050 sf on 4.89 acre parcel	Under construction	> 1 mile south of Bollman WTP (south of SR 4)	General construction effects
Port Chicago Plaza	Port Chicago Highway (Bates Avenue), Concord	66,000 sf on 3.27 acres	Proposed	> 1 mile east of Bollman WTP	General construction effects
San Joaquin County					
PA-0400251	E. Jahant Road, Acampo	Subdivide 60-acre parcel into twelve 5-acre lots	Approved	30 miles northeast of Victoria Island	General construction effects
PA-0400392	Foppiano Lane, east of Stockton	Divide 15.1-acre parcel into seven lots	Approved	15-20 miles northeast of Victoria Island	General construction effects
PA-0400737	Arnaudo Blvd., Mountain House	255 condominium units on 19.4 acres	Approved	7 miles south of proposed Victoria Island intake site	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
PA-0200631	Turnpike Road, Stockton	27-lot single-family residential subdivision	Approved	12 miles northeast of the Victoria Island project site	General construction effects
PA-0200649	De Anza Blvd., Mountain House	53-acre office-commercial and industrial subdivision	Approved	7 miles south of proposed Victoria Island intake site	General construction effects
PA-0300130	Moreing Road, Stockton	3.2-acre subdivision into six parcels	Approved	12 miles northeast of the Victoria Island project site	General construction effects
PA-0300569	E St and SR 88, Clements	21.2-acre subdivision into 15 lots	Approved	35 miles northeast of Victoria Island	General construction effects
PA-0400228	Bates Road, Tracy	21-acre subdivision of 28 lots	Approved	13 miles south of the proposed Victoria Island intake site	General construction effects
City of Pittsburg					
City of Pittsburg Development Projects					
Bailey Estates (residential development)	West of Bailey Road, Pittsburg	249 units on 122 acres	Approved	< 1.5 miles south of the proposed desalination conveyance facility	General construction effects
Bancroft Gardens (residential development)	Western terminus of Wedgewood Drive, Pittsburg	22 units on 4.07 acres	Approved	~ 0.75 mile southeast of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Bancroft Gardens II (residential development)	Western terminus of Birchwood Drive, Pittsburg	28 units on 5.79 acres	Approved	~ 0.75 mile southeast of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Lawlor Estates (residential development)	West Leland Road, west of Bailey Road, Pittsburg	50 Units on 10.8 acres	Approved	< 0.5 mile south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Oak Hills South (residential development)	West Leland & Bailey roads, Pittsburg	442 units on 87.3 acres	Built	< 0.5 mile south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Oak Hills South Units 5, 6, 7 (residential development)	Oak Hills Drive (between West Leland & Southwood roads), Pittsburg	245 units on 53 acres	Built	< 0.5 mile south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
San Marco (residential development)	South of SR 4 at Willow Pass Road, Pittsburg	1,412 units on 421 acres	Under Construction	> 2 miles west of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Vista del Mar (residential development)	Western terminus of West Leland Road, Pittsburg	540 units on 104 acres	Approved	< 1 mile of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined[1]
San Marco Development (Apartments/ Condominiums)	South of SR 4 at Willow Pass Road, Pittsburg	1,526 units on 141 acres	Approved	> 2 miles west of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Vista del Mar (Apartments/ Condominiums)	Western terminus of West Leland Road, Pittsburg	617 units on 32.1 acres	Approved	< 1 mile of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Vista del Mar (Commercial)	Western terminus of West Leland Road	Unspecified square footage on 14.78 acres	Pending	< 1 mile of the proposed desalination conveyance facility (south of SR 4)	General construction effects
City of Pittsburg Capital Improvement Projects					
Range Road Interchange	Pittsburg	Construction of an interchange/over-crossing on SR 4 at Range Road	2005–2009 (awaiting funding to complete feasibility study)	~1 mile east of the proposed desalination conveyance facility (at SR 4)	General construction effects
West Leland Road Extension	Pittsburg	Extend West Leland Road from Woodhill Drive to San Marco Boulevard	2005–2009 (design completed. Constructed expected to be complete September 2005)	<1 mile southwest of the proposed desalination conveyance facility (south of SR 4)	General construction effects
West Leland Road Slurry Seal and Bicycle Lane (Dover Way to Bailey Road)	Pittsburg	Slurry seal West Leland Road to provide Class II bicycle facility	2005–2009 (awaiting design)	< 0.5 mile south of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Bailey Road/SR 4 Ramp Turn Lane Modifications	Pittsburg	Construct geometric improvements including median modifications to improve storage for left turns from northbound Bailey Road onto SR 4 westbound ramp	2005–2009 (awaiting funding)	< 500 feet south of the proposed desalination conveyance facility (at SR 4)	General construction effects
FY 2007/2008 Citywide Street Rehabilitation	Pittsburg	Street Rehabilitation – streets not yet determined	2007–2008 (status not provided)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
FY 2008/2009 Citywide Street Rehabilitation	Pittsburg	Street Rehabilitation – streets not yet determined	2008–2009 (awaiting funding)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
Bailey Road/West Leland Road Intersection	Pittsburg	Provide operational improvement to Bailey Road and West Leland Road, including adding a southbound right turn lane, eastbound left turn lane and a 4-foot wide median on the east leg of the intersection	2005–2009 (status not provided)	< 1,000 feet south of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
FY 2007/2008 Water Main Replacement Program	Pittsburg	Identify and replace problem water mains	FY 2007/2008 (awaiting funding)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
FY 2008/2009 Water Main Replacement Program	Pittsburg	Identify and replace problem water mains	FY 2008/2009 (awaiting funding)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
FY 2007/2008 Sewer Replacement Program	Pittsburg	Replace problem sewer mains (not yet identified)	FY 2007/2008 (awaiting funding)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
FY 2008/2009 Sewer Replacement Program	Pittsburg	Replace problem sewer mains (not yet identified)	FY 2008/2009 (awaiting funding)	Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
Highway 4 Trunk Line Relief	Pittsburg	Pipe bursting/bore and jack of 15-inch diameter pipe approximately 6,500 feet that travels under SR 4.	2005–2009 (awaiting funds - contingent on 100 units of additional growth)	Unknown, the location of the trunk line relief along SR 4 not identified.	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
West Leland Road sewer main	Pittsburg	Construct a parallel 8-inch pipe approximately 1,180-foot long north of West Leland Road, west of Bailey Road	2005–2009 (awaiting funding – contingent on development north of West Leland Road, west of Bailey Road)	< 1,000 feet south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Lawlor Creek Watershed (SR 4 to West Leland Road)	Pittsburg	Improve all undersized pipes (1,000 feet) from SR 4 to West Leland Road)	2005–2009 (awaiting funding/evaluating needs)	< 1,000 feet south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Lawlor Creek Watershed (Contra Costa Canal to Santa Maria Drive)	Pittsburg	Improve all undersized pipes (370 feet) from Contra Costa Canal to Santa Maria Drive	2005–2009 (awaiting funding/ evaluating needs)	1,000 feet or more south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Lawlor Creek Watershed (West Leland Road to Oakhills Circle)	Pittsburg	Improve all undersized pipes (1,050 feet) from West Leland Road to Oakhills Circle)	2005–2009 (awaiting funding/evaluating needs)	1,500 feet or more south of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Watershed 4 (Willow Pass Road to Contra Costa Canal	Pittsburg	Improve all undersized pipes (400 feet) from Willow Pass Road to Contra Costa Canal	2005–2009 (awaiting funding/ evaluating needs)	Locations not specifically determined. Potentially on the same streets as the proposed desalination conveyance facility alignment	General construction effects
Watershed 4 (West Leland Road to Sugartree Drive)	Pittsburg	Improve all undersized pipes (800 feet) from West Leland Road to Sugartree Drive	2005–2009 (awaiting funding/ evaluating needs)	1,500 feet or more south of the proposed desalination conveyance facility (south of SR 4)	General construction effects
Watershed 4 (Rock Ridge Way to Jacqueline Drive)	Pittsburg	Improve all undersized pipes (3,000 feet) from Rock Ridge Way to Jaqueline Drive	2005–2009 (awaiting funding/ evaluating needs)	< 3,000 feet south of the proposed desalination conveyance facility (south of SR 4)	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Regional Transportation Projects					
SR 4 East Widening: Bailey Road to Railroad Avenue	Bailey Road to Railroad Avenue, Pittsburg	Widen the existing highway from two to four lanes in each direction (including an High Occupancy Vehicle lane); restripe the existing median shoulder between Port Chicago Highway and Bailey Road and provide a wide median to allow for the future extension of BART into east County	Construction mostly completed in September 2001. A new soundwall is being constructed along the north side of the highway and should be complete by end of summer 2005	< 500 feet south of the proposed desalination conveyance facility (on SR 4)	General construction effects
SR 4 Widening Project	Railroad Avenue to Loveridge Road, Pittsburg	Widen SR 4 from two to four lanes in each direction, including carpool lanes; provide 44–60 foot median for transit	Widening under construction; landscaping in design. Construction anticipated to be complete in spring 2006	~ 3 miles east of proposed desalination conveyance facility, on SR 4	General construction effects
SR 4 East Widening: Loveridge Road to Somersville Road	Loveridge Road to Somersville Road, Pittsburg and Antioch	Construct eight through lanes (three mixed flow and one carpool lane in each direction;	Began final design. Construction expected to start mid late 2007 and complete in fall 2009	~ 4 miles east of proposed desalination conveyance facility, on SR 4	General construction effects

Table F1-1 (continued)
Local Development Projects Considered in Cumulative Impact Analyses

Cumulative Project Name	Location	Description (Type)	Status / Schedule	Relationship to the Proposed Action	Nature of Environmental Resource Examined1
Salisbury Island Abatement[8]	Salisbury Island east of Coney Island and west of Union Island on Old River	Demolition of 39 residential structures and docks	Approved in 2003	< 1 mile south of the proposed conveyance facility corridor (Victoria Island)	General construction effects
Wastewater Treatment Plant Upgrade	Discovery Bay and Byron Tract	Install four to six greenhouse structures to dry biosolids and install new 14-inch diameter pipeline to new outfall 100 feet into channel at Old River	Approved in 2003	Outfall adjacent to proposed conveyance facility corridor at Byron Tract. Discovery Bay < 0.5 mile northwest of Byron Tract.	General construction effects

Source: Compiled by EDAW in 2005

Notes:

sf = square foot

1 General construction effects would include temporary increases in dust, noise, traffic, sedimentation, land use disruptions, and other short-term, non-operational effects that could be cumulatively considerable if the Proposed Action or a project alternative, combined with cumulative projects, were to be constructed simultaneously.

Appendix F1 References

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Luchini, Eric. Project Planner. City of Concord Planning Department, Concord, CA. May 5, 2005 – telephone conversation with Sue Chau of EDAW regarding status of City of Concord Projects (e.g., Olivera Crossing and Port Chicago Plaza).

Appendix F-1. Local Development Projects Considered in Cumulative Impact Analyses

Pittsburg, City of. 2005a (January 18). *City of Pittsburg Current Projects List.* Available < http://www.ci.pittsburg.ca.us/NR/rdonlyres/55BE8BF3-FC61-4687-9F3B-36B74BB35B69/0/CurrentProjectList.pdf>. Accessed May 3, 2005.

Pittsburg, City of. 2005b. *City of Pittsburg FY 2004/5-2008/9 Five-Year Capital Improvement Program.* Available <http://www.ci.pittsburg.ca.us/Pittsburg/Government/Departments/Engineering/engg-cip.htm>. Accessed May 3, 2005.

Appendix F-2
Air Quality Modeling Analyses

Welcome to the Road Construction Emissions Model, Version 5.1

User Instructions

This spreadsheet system contains the following individual worksheets:

1. This worksheet of User Instructions
2. Emission estimates
3. Data Entry
4. Emfac7f worksheet
5. Emfac7g worksheet
6. Emfac2001 worksheet
7. Emfac2002 worksheet
8. Appendix D worksheet
9. Appendix B worksheet

Changes from previous version of Road Construction Emissions Model (Version 4.1)

1) EMFAC2002 emission rates included.

2) Off-Road equipment emission estimates stratified by horsepower.

3) Water trucks reclassified as on-road emissions.

4) PM10 dust assumed reduced by 50% if water trucks are specified as part of project.

The Emission Estimates worksheet summarizes a project's emissions in pounds per day (and kilograms per day) by project phase.
The Emission Estimates worksheet also shows total emissions in tons (and megagrams) over the construction period.
The worksheet can be used to estimate emissions for both vehicle exhaust and fugitive dust. The methodology used to estimate fugitive dust emissions is a simplified methodology involving estimates of the maximum area (acreage) of land disturbed daily. Detailed fugitive dust emission estimates associated with individual materials handling operations and/or activity/vehicle types cannot be conducted with this version of the model.
The Emission Estimates worksheet cannot be modified directly, it is a protected worksheet. It can only be modified indirectly by entering information for the project in selected areas of the Data Entry worksheet.
The last six of these worksheets - Emfac7f, Emfac7g, Emfac2001, Emfac2002, Appendix D, and Appendix B - cannot be modified by the user. They are protected worksheets. Even though all or portions of several worksheets are protected, the individual formulas used in the calculations can be seen by the user.
The Data Entry worksheet includes several areas that can be modified by the user.
User instructions in the Data Entry worksheet are highlighted in red.
On the Data Entry worksheet, the user has two options for entering project data: required data and optional data. Required data is entered in the data input section (yellow cells). That required data is then used by the worksheet to calculate default values for the project.
The user can override the default values (blue cells) calculated for a project and is encouraged to do so if project specific information is available. Due to the difficulty in developing reliable default values for road construction projects, the user is encouraged to enter as much site specific information as is available for the project being analyzed.
The Data Entry Worksheet also includes a button that allows the user to clear previously entered data. This button is found just at the top of and to the right of the data entry portion of the worksheet.
When projects are discontinuous, the user must make adjustments to the spreadsheet manually, since the program cannot be setup to anticpate unexpected project delays.

#VALUE! <- This error message may occur during use of the spreadsheets. This occurs whenever the user enters a non numeric value, including a space character, into a cell that is used to calculate a numeric value. Consequently, to erase values entered into the spreadsheets, use the delete key instead of the space bar!

Note: Information in this worksheet is based on conversations with knowledgeable individuals at the Sacramento Metropolitan Air Quality Management District, the California Department of Transportation, the California Air Resources Board, the U.S. EPA, and private industry involved in road construction.
Also, the 26th edition of Walker's Building Estimator's Reference Book (1999) was used in the development of this spreadsheet.
This spreadsheet was prepared by CCS Planning & Engineering under the financial support and direction of the Sacramento Metropolitan Air Quality Management District.

http://www.airquality.org
Peter Christensen
916/874-4886

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Road Construction Emissions Model, Version 5.1

Emission Estimates for -> CCWD					Exhaust	Fugitive Dust	
Project Phases (English Units)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	**PM10 (lbs/day)**	
Grubbing/Land Clearing	0	0	0	0	0	0	
Grading/Excavation	4	35	41	7	1	6	
Drainage/Utilities/Sub-Grade	38	227	165	14	9	5	
Paving	0	0	0	0	0	0	
Maximum (pounds/day)	38	227	165	14	9	6	
Total (tons/construction project)	15	58	102	6	4	2	<-tons

Notes: Project Start Year -> 2007

Project Length (months) -> 36

Total Project Area (acres) -> 0

Maximum Area Disturbed/Day (acres) -> 0

Total Soil Imported/Exported (yd^3/day)-> 0

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

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

Emission Estimates for -> CCWD					Exhaust	Fugitive Dust	
Project Phases (Metric Units)	**ROG (kgs/day)**	**CO (kgs/day)**	**NOx (kgs/day)**	**PM10 (kgs/day)**	**PM10 (kgs/day)**	**PM10 (kgs/day)**	
Grubbing/Land Clearing	0	0	0	0	0	0	
Grading/Excavation	2	16	19	3	1	3	
Drainage/Utilities/Sub-Grade	17	103	75	6	4	2	
Paving	0	0	0	0	0	0	
Maximum (kilograms/day)	17	103	75	6	4	3	
Total (megagrams/construction project)	14	53	93	6	3	2	<-megagrams

Notes: Project Start Year -> 2007

Project Length (months) -> 36

Total Project Area (hectares) -> 0

Maximum Area Disturbed/Day (hectares) -> 0

Total Soil Imported/Exported ($meters^3$/day)-> 0

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

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

Road Construction Emissions Model

Version 5.1

Data Entry Worksheet

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

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type

Project Name	CCWD	
Construction Start Year	2007	Enter a Year between 2000 and 2010 inclusive
Project Type Please note: Select either 1, 2, or 3		1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	36	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, or 3	4	1. Emfac7fv1.1 4. Emfac2002 2. Emfac7G 3. Emfac2001
Project Length		miles
Total Project Area		acres
Maximum Area Disturbed/Day		acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0	yd^3/day
Soil Exported	0	yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

Construction Periods	User Override of Construction Months	Program Calculated Months
Grubbing/Land Clearing	0	3.6
Grading/Excavation	6	14.4
Drainage/Utilities/Sub-Grade	36	12.6
Paving	0	5.4
Totals	42	36

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip	20	30
Round trips/day	100	0
Vehicle miles traveled/day (calculated)	2000	0

Hauling Emissions	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.89	9.30	7.90	0.29
Pounds per day	3.9	41.0	34.8	1.3
Tons per contruction period	0.26	2.70	2.30	0.08

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	20	20
One-way trips/day	2	2
No. of employees: Grubbing/Land Clearing	0	0
No. of employees: Grading/Excavation	0	0
No. of employees: Drainage/Utilities/Sub-Grade	125	0
No. of employees: Paving	0	0

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.38	0.61	6.83	0.04
Emission rate (grams/trip)	1.83	0.77	17.32	0.02
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.0	0.0	0.0	0.0
Pounds per day - Grading/Excavation	0.0	0.0	0.0	0.0
Tons per const. Period - Grading/Excavation	0.0	0.0	0.0	0.0
Pounds per day - Drainage/Utilities/Sub-Grade	6.2	7.5	94.3	0.5
Tons per const. Period - Drain/Util/Sub-Grade	2.5	3.0	37.4	0.2
Pounds per day - Paving	0.0	0.0	0.0	0.0
Tons per const. Period - Paving	0.0	0.0	0.0	0.0
tons per construction period	2.5	3.0	37.4	0.2

Water Truck Emissions	Number of Water Trucks	Program Estimate of Number of Water Trucks	User Override of Water Truck Miles Traveled	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust	0	0	0	0
Grading/Excavation - Exhaust	0	0	0	0
Drainage/Utilities/Subgrade	1	0	10	0
	ROG	**NOx**	**CO**	**PM10**
Emission rate (grams/mile)	0.89	9.30	7.90	0.29
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.0	0.0	0.0	0.0
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.0	0.2	0.2	0.0
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.08	0.07	0.00

Fugitive PM10 Dust	User Override of Max Acrerage/Day	Default Maximum Acreage/Day	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing	0	0	0.0	0.0
Fugitive Dust - Grading/Excavation	1	0	5.6	0.4
Fugitive Dust - Drainage/Utilities/Subgrade	1	0	5.0	2.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
0		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
0		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0	0	Dozer	0.00	0.00	0.00	0.00
0		Excavator	0.00	0.00	0.00	0.00
0		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0		Grader	0.00	0.00	0.00	0.00
0		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
0		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	0	Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Grading/Excavation	Number of Vehicles		ROG	CO	NOx	PM10
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day
0		Backhoes	0.00	0.00	0.00	0.00
0		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
0	0	Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0		Dozer	0.00	0.00	0.00	0.00
0	0	Excavator	0.00	0.00	0.00	0.00
0		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0	0	Grader	0.00	0.00	0.00	0.00
0	0	Loaders, Rubber Tired	0.00	0.00	0.00	0.00
0		Off-Highway Trucks	0.00	0.00	0.00	0.00
	0	Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	0	Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade	Number of Vehicles		ROG	CO	NOx	PM10
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day
2		Backhoes	1.34	4.77	8.79	0.74
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0	0	Compactor	0.00	0.00	0.00	0.00
2		Cranes	2.89	11.92	11.37	0.62
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
2		Dozer	7.27	34.10	40.92	2.14
2		Excavator	3.68	11.64	11.91	0.64
2		Forklifts, Rough Terrain	1.56	5.74	8.78	0.65
2	0	Grader	2.40	11.46	18.77	1.03
2		Loaders, Rubber Tired	1.84	9.23	13.19	0.72
1		Off-Highway Trucks	3.60	12.55	13.09	0.68
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
2	0	Scrapper	7.28	31.47	30.44	1.62
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
0	0	Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	31.9	132.9	157.3	8.8
		tons per period	12.6	52.6	62.3	3.5

Paving	Number of Vehicles		ROG	CO	NOx	PM10
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
0	0	Pavers	0.00	0.00	0.00	0.00
0	0	Paving Equipment	0.00	0.00	0.00	0.00
0	0	Rollers	0.00	0.00	0.00	0.00
		Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)			12.6	52.6	62.3	3.5

Equipment		Default Values Horsepower		Default Values Load Factor		Default Values Hours/day
Bore/Drill Rigs		218		0.75		8
Concrete/Industrial Saws		84		0.73		8
Cranes		190		0.43		8
Crawler Tractors		143		0.575		8
Crushing/Proc. Equipment		154		0.78		8
Excavators		180		0.58		8
Graders		174		0.575		8
Off-Highway Tractors		255		0.41		8
Off-Highway Trucks		417		0.49		8
Other Construction Equipment		190		0.62		8
Pavers		132		0.59		8
Paving Equipment		111		0.53		8
Rollers		114		0.43		8
Rough Terrain Forklifts		94		0.475		8
Rubber Tired Dozers		352		0.59		8
Rubber Tired Loaders		165		0.465		8
Scrapers		313		0.66		8
Signal Boards		25		0.82		8
Skid Steer Loaders		62		0.515		8
Surfacing Equipment		437		0.49		8
Tractors/Loaders/Backhoes		79		0.465		8
Trenchers		82		0.695		8

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

Appendix F-3
Acoustic Fundamentals

The following provides an overview of acoustic fundamentals as background information for Section 4.11, "Noise," of the EIR/EIS.

Sound and the Human Ear

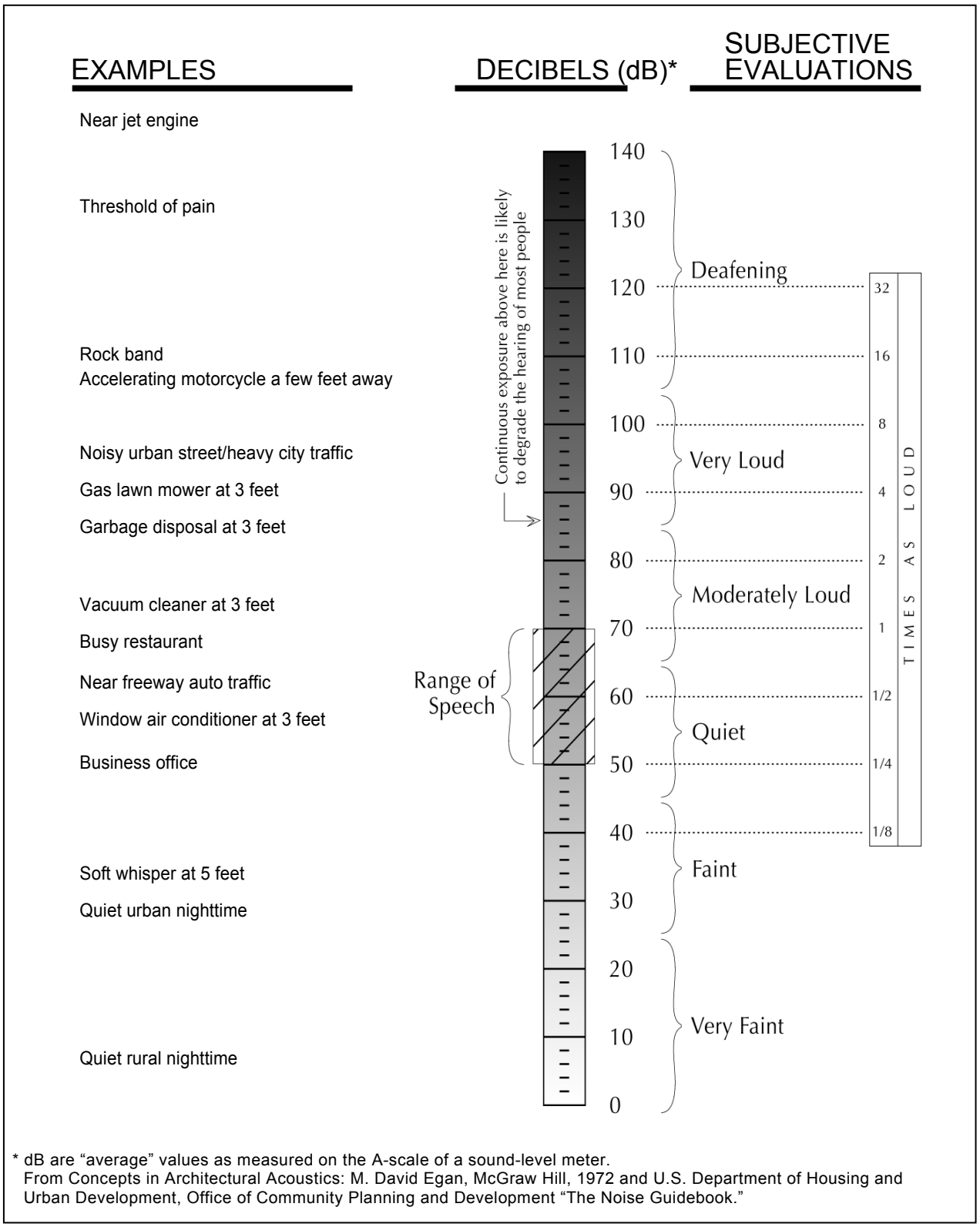
Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave due to a disturbance or vibration. Due to the ability of the human ear to detect a wide range of sound pressure fluctuations, sound pressure levels are expressed in logarithmic units called decibels (dB). The sound pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (California Department of Transportation 1998).

Because the human ear is not equally sensitive to all sound frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been adopted by most authorities for the purpose of regulating environmental noise. Typical indoor and outdoor noise levels are presented in Exhibit F3-1.

Because the decibel scale is logarithmic, sound levels measured in decibels are not additive. For example, a 65-dBA source of sound, such as a truck, when joined by another 65-dBA source results in a sound amplitude of 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by 3 dBA). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10-dBA increase in amplitude with a perceived doubling of loudness and establish a 3-dBA change in amplitude as the minimum difference perceptible to the average person (California Department of Transportation 1998).

Sound Propagation

As sound (or noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law describes the attenuation due to the pattern in which sound travels from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD). However, from a line source (e.g., a road), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA/DD. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels.



* dB are "average" values as measured on the A-scale of a sound-level meter.
From Concepts in Architectural Acoustics: M. David Egan, McGraw Hill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook."

Source: EDAW 2003

Exhibit F3-1
Typical Noise Levels

Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (California Department of Transportation 1998).

Noise Descriptors

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (California Department of Transportation 1998, Lipscomb and Taylor 1978).

- **L_{max} (Maximum Noise Level)**: The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- **L_{min} (Minimum Noise Level)**: The minimum instantaneous noise level during a specific period of time.
- **L_X (Statistical Descriptor)**: The noise level exceeded X percent of a specific period of time.
- **L_{eq} (Equivalent Noise Level)**: The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}.
- **L_{dn} (Day-Night Noise Level)**: The 24-hour L_{eq} with a 10-dBA "penalty" for the noise-sensitive hours between 10:00 p.m. and 6:00 a.m. The L_{dn} is intended to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- **CNEL (Community Noise Equivalent Level)**: The CNEL is similar to the L_{dn} described above, but with an additional 4.77-dBA "penalty" for the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. If the same 24-hour noise data are used, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.

References

California Department of Transportation. 1998 (October).*Traffic Noise Analysis Protocol: Technical Noise Supplement.* Sacramento, CA.

Lipscomb, David M., Ph.D., and Arthur C. Taylor, Jr., Ph.D. 1978. *Noise Control Handbook of Principles and Practices*. Van Nostrand Reinhold Company. New York, NY.