

FINAL ENVIRONMENTAL IMPACT REPORT

**LOS ANGELES SPORTS AND
ENTERTAINMENT DISTRICT**

APPENDIX A
ANALYSIS OF PRE-AND-POST CONSTRUCTION
STORM WATER QUALITY

BACKGROUND

The Draft Environmental Impact Report (Los Angeles Arena, 2000) (DEIR) for the Los Angeles Arena project included much of the information needed to complete the analysis of pre- and post-development storm water pollutant loads. However, some critical information concerning the development was estimated from information in the DEIR as well as from other sources.

The areas and land uses required for the pre- and post-development pollutant load calculations were determined from maps and narrative descriptions provided in the DEIR and the Internet. The DEIR described the development as comprised of 27 acres divided into six areas, with three Olympic development areas and three Figueroa development areas.

The DEIR described the current land use for the project area as parking lots. This was confirmed by examining layouts of the existing Staples Center obtained on the Internet, which illustrate the parking facilities at the location of the proposed development. For post-development conditions, the distribution of land uses was not clearly illustrated in the DEIR. The DEIR described the runoff characteristics of the proposed development area as remaining similar to pre-development, and it described the new development as being comprised of hotels, office buildings, a medical center, and parking. Other Internet research into the development plans assisted in estimating the land use distribution of the proposed development.

METHODOLOGY

The pollutant load analysis was performed using a Spreadsheet Method for estimating annual pollutant loads. Event Mean Concentrations (EMCs) are required for the calculation, and these values were derived from several published sources including the Center for Watershed Protection and a recent Los Angeles area storm water monitoring study performed by Los Angeles County. Table I presents the land use categories assigned to the pre- and post-development conditions.

Table 1. Land Use Categories

<u>Land Use</u>	<u>Land Use Category</u>
<i>Pre-development</i>	
Parking Lots	Parking Lots ^{1,2}
<i>Post-development</i>	
Parking Lots	Parking Lots ^{1,2}
Hotels	Retail/Commercial
Office Building	Retail/Commercial ²
Medical Center	Retail/Commercial ²
Other Retail	Retail/Commercial ¹

¹ Center for Watershed Protection, 1996

² Los Angeles County, 1999

The formula for determining the annual load (L) in pounds per acre using the Spreadsheet Method is:

$$L = [P \times P_f \times R_v / 12] \times C \times A \times 2.72$$

P is the average annual rainfall depth in inches. P_f is a correction factor for storms that produce no runoff (i.e., less than 0.2 inches). R_v is the site response to rainfall events. A is the site area in acres, and C is an average annual flow weighted pollutant concentration or an annual EMC.

The Nationwide Urban Runoff Program (NURP) (EPA, 1983) report is a traditional source of EMCs for various land-uses. However, the NURP report was completed in the 1980's and does not offer specific geographic pollutant tendencies. Therefore, many of the land uses and pollutant behaviors described within the NURP report may require updated information. Fortunately, recent storm water studies in the Los Angeles area (Los Angeles County, 1999) and the Center for Watershed Protection (1996) offer more recent and relevant EMCs. Therefore, the annual EMCs from the Los Angeles area study and the Center for Watershed Protection were used to determine the annual pollutant loads (L), and these EMCs are provided in the attached tables. Other parameters for the calculation were determined from best professional judgement. All parameter values are shown in the attached spreadsheet tables.

SUMMARY OF RESULTS

The results of the spreadsheet analysis are shown on the attached Tables 2 and 3. Annual pollutant load analyses were performed for zinc, lead, and copper. The calculated annual loads for the post-development condition for lead and copper were reduced by 38 percent and 22 percent, respectively. The annual load of zinc increased by 10 percent.

The increased level of zinc is due to the change in land use. Some building materials, including galvanized metal, are a source of zinc in storm water runoff. This constituent increase may be addressed through the implementation of appropriate Best Management Practices, including compliance with SUSMP requirements. Implementation of appropriate Best Management Practices is expected to result in reduced pollutant levels.

Table 2
Event Mean Concentrations (EMC) Used in the
Los Angeles Arena Pollutant Load Analysis

Retail/Commercial ⁽¹⁾			
Constituent	Pb	Cu	Zn
1994-95	0.01	0.04	0.03
1995-96	0.02	0.05	0.03
1996-97	0.010	0.031	0.21
1997-98	0.024	0.048	0.25
1998-99	0.00597	0.028	0.25
EMC	0.02	0.038	0.15
Parking Lots ⁽²⁾			
Constituent	Pb	Cu	Zn
EMC	0.028	0.051	0.139

¹ - LA County - Department of Public Works (1999)

² - Center For Watershed Protection (1996)

Pb = Lead

Cu = Copper

Zn = Zinc

EMC = Event Mean Concentration for Storm Years

Table 3
Pollutant Loads Analysis for the Los Angeles Arena Project

Property ID	Landuse	Landuse		I (%)	RV (in)	Estimated Zn Pollutant Load (L-lbs)	Zn (g/l)	Estimated Cu Pollutant Load (L-lbs)	Cu (mg/l)	Estimated Pb Pollutant Load (L-lbs)	Pb (mg/l)	Estimated Zn Pollutant Load (L-lbs)	
		Fraction of Total Area	Area of Landuse (ac)										
Olympic 1	Parking Lot	1	7.03	100	0.95								
Olympic 2	Parking Lot	1	9.52	100	0.95								
Olympic 3	Parking Lot	1	1.54	100	0.95								
Figueroa 1	Parking Lot	1	2.87	100	0.95								
Figueroa 2	Parking Lot	1	4.98	100	0.95								
Figueroa 3	Parking Lot	1	1.32	100	0.95								
Total Area = 27.3													
Olympic 1	Parking Lot			0.051	0.84		0.14		0.051	0.46	0.028	2.29	
Olympic 2	Parking Lot			0.051	1.14		0.14		0.051	0.63	0.028	3.11	
Olympic 3	Parking Lot			0.051	0.18		0.14		0.051	0.10	0.028	0.50	
Figueroa 1	Parking Lot			0.051	0.34		0.14		0.051	0.19	0.028	0.94	
Figueroa 2	Parking Lot			0.051	0.60		0.14		0.051	0.33	0.028	1.62	
Figueroa 3	Parking Lot			0.051	0.16		0.14		0.051	0.09	0.028	0.43	
Pollutant Load (lbs/yr)												Total Zn = 8.9	
												Total Cu = 3.3	
												Total Pb = 1.8	

Table 3 (cont'd)
Pollutant Loads Analysis for the Los Angeles Arena Project

Los Angeles Arena Pollutant Loads Post-Development Conditions									
Property ID	Landuse	Landuse Fraction of Area of		Area of Landuse(ac)	I (%)	Rv (in)	Estimated Cu Pollutant Load (L-lbs)	Estimated Zn Pollutant Load (L-lbs)	Reduction
		Landuse Area	Landuse Total Area						
Olympic 1	Parking Lot	0.5	3.515	100	0.95				
Olympic 1	Retail/Commercial	0.5	3.515	100	0.95				
Olympic 2	Retail/Commercial	1	9.52	100	0.95				
Olympic 3	Retail/Commercial	1	1.54	100	0.95				
Figueroa 1	Retail/Commercial	1	2.87	100	0.95				
Figueroa 2	Retail/Commercial	1	4.98	100	0.95				
Figueroa 3	Retail/Commercial	1	1.32	100	0.95				
Total Area = 27.3									
<p style="text-align: right;">P = 2.11 Pj = 0.9</p>									
Property ID	Landuse	Ph (mg/l)	Estimated Pb Pollutant Load (L-lbs)	Cu (mg/l)	Estimated Cu Pollutant Load (L-lbs)	Zn (mg/l)	Estimated Zn Pollutant Load (L-lbs)		
Olympic 1	Parking Lot	0.028	0.23	0.051	0.4	0.14	1.1		
Olympic 1	Retail/Commercial	0.016	0.1	0.038	0.3	0.15	1.3		
Olympic 2	Retail/Commercial	0.016	0.4	0.038	0.9	0.15	3.5		
Olympic 3	Retail/Commercial	0.016	0.1	0.038	0.1	0.15	0.6		
Figueroa 1	Retail/Commercial	0.016	0.1	0.038	0.3	0.15	1.0		
Figueroa 2	Retail/Commercial	0.016	0.2	0.038	0.4	0.15	1.8		
Figueroa 3	Retail/Commercial	0.016	0.05	0.038	0.1	0.15	0.5		
Pollutant Load (lbs/yr)		Total Pb = 1.1		Total Cu = 2.6		Total Zn = 9.8			
Reduction			-38.2%		-21.8%		9.8%		

P = Average Annual Precipitation (in) based on LAX Rainfall Record (1948-1998)

Pj = Precipitation Correction Factor (eliminates storms <0.2" which assumed negligible runoff)

I = Percent of site imperviousness

Rv = Site Response to Precipitation Events (=0.05 + 0.009*1)

A = Total Site Area

C = Weighted Average of Pollutant Concentration

L = Estimated Total Pollutant Load = ((P*Pj*Rv)/12)*C*A*2.72

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Pb = Lead
Cu = Copper
Zn = Zinc