



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Rule 1158 Follow-Up Study #12/13

Report# MA 2006-02

Rule 1158 Follow-Up Study #12/13

Sampling Conducted
November 12, 2005 – February 1, 2006
and
December 1, 2006 – March 1, 2007

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EXECUTIVE SUMMARY

Purpose

In June 1999, Rule 1158, which affected storage, handling, and shipment of petroleum coke, coal, and sulfur, was amended to further reduce particulate emissions from these sources. The date for full compliance with the Rule was mandated for June 2004. This study is one of an ongoing series examining elemental carbon (EC) contained in the inhalable particulate fraction (PM₁₀) in the greater Long Beach/Wilmington area. This series of studies consists of PM₁₀ sampling in the spring/summer and fall/winter, observing trends in ambient PM₁₀ concentration and the EC content of collected samples.

Sampling

Sampling was conducted between November 12, 2005 and February 1, 2006, and December 1, 2006 to March 1, 2007, coincident with the AQMD PM₁₀ monitoring network one-in-six day schedule. Sampling locations were identical to those utilized for the previous Rule 1158 follow-up studies. It is intended that these sites be used throughout the entire series of studies. Field operations were conducted by RES Environmental, Inc. (RES), while all laboratory operations and data analysis were performed by AQMD staff.

1.0 INTRODUCTION

Over the course of several years prior to 1997, the AQMD had received complaints of black, oily airborne dust from residents of Long Beach and Wilmington area neighborhoods. Surveys of the area noted that there were numerous coal and petroleum coke production, storage, and shipment facilities. Open stockpiles of green coke, enclosed “coke barns”, refinery kilns producing petroleum coke, and a variety of coke-and coal-carrying trains and trucks were observed. Other industrial processes, including sulfur distribution facilities, heavy traffic patterns, and general construction activities, were also noted in the area.

In 1996, the AQMD staff coordinated with various public action groups to select several sites for particulate monitoring, including sites located at specific areas of community concern. Two studies were conducted at these sites, one in May 1997¹ and one in fall/winter 1998². These studies were designed to characterize local micrometeorological parameters, and to microscopically and chemically characterize airborne particulate collected in the area. The most pronounced findings of these studies were the elevated levels of EC and inhalable particulate matter at some study sites, including a monitoring site adjacent to Hudson K-8 School in Long Beach.

Since the June 1999 amendment to Rule 1158, subsequent California State legislation HSC 40459 (AB 1775 – Lowenthal) requires that the AQMD, in conjunction with the California Air Resources Board (CARB), prepare an annual study for the California State Legislature examining the frequency and severity of violations related to AQMD Rule 1158. To monitor the efficacy of the Rule and provide supporting data for the Legislative Report, the AQMD initiated a series of *Rule 1158 Follow-up Studies*.

Removal and enclosure of open coke storage piles, and modification to equipment and work practices to comply with Rule 1158 requirements, are ongoing. The Rule 1158 compliance schedule mandated implementation of the majority of control measures by August 1999, with full implementation of all measures by June 2004. AQMD Compliance staff has documented a high rate of compliance with the rule requirements, including covered transport, truck washing, prompt roadway/spill clean-up, and the removal of several large open coke piles that have resulted in the reduction of fugitive coke emissions from storage, handling, and shipping operations. Implementation of Rule 1158 has contributed to a decrease in ambient PM₁₀ concentrations in the local area.

¹ South Coast Air Quality Management District. (September 1997) *Micrometeorological and Ambient Air Quality Monitoring Conducted Simultaneously in the Vicinity of the Los Angeles and Long Beach Harbors*. Diamond Bar, CA.

² South Coast Air Quality Management District. (March 1999) *Micrometeorological and Ambient Air Quality Monitoring Conducted Simultaneously in the Vicinity of the Los Angeles and Long Beach Harbors*. Diamond Bar, CA.

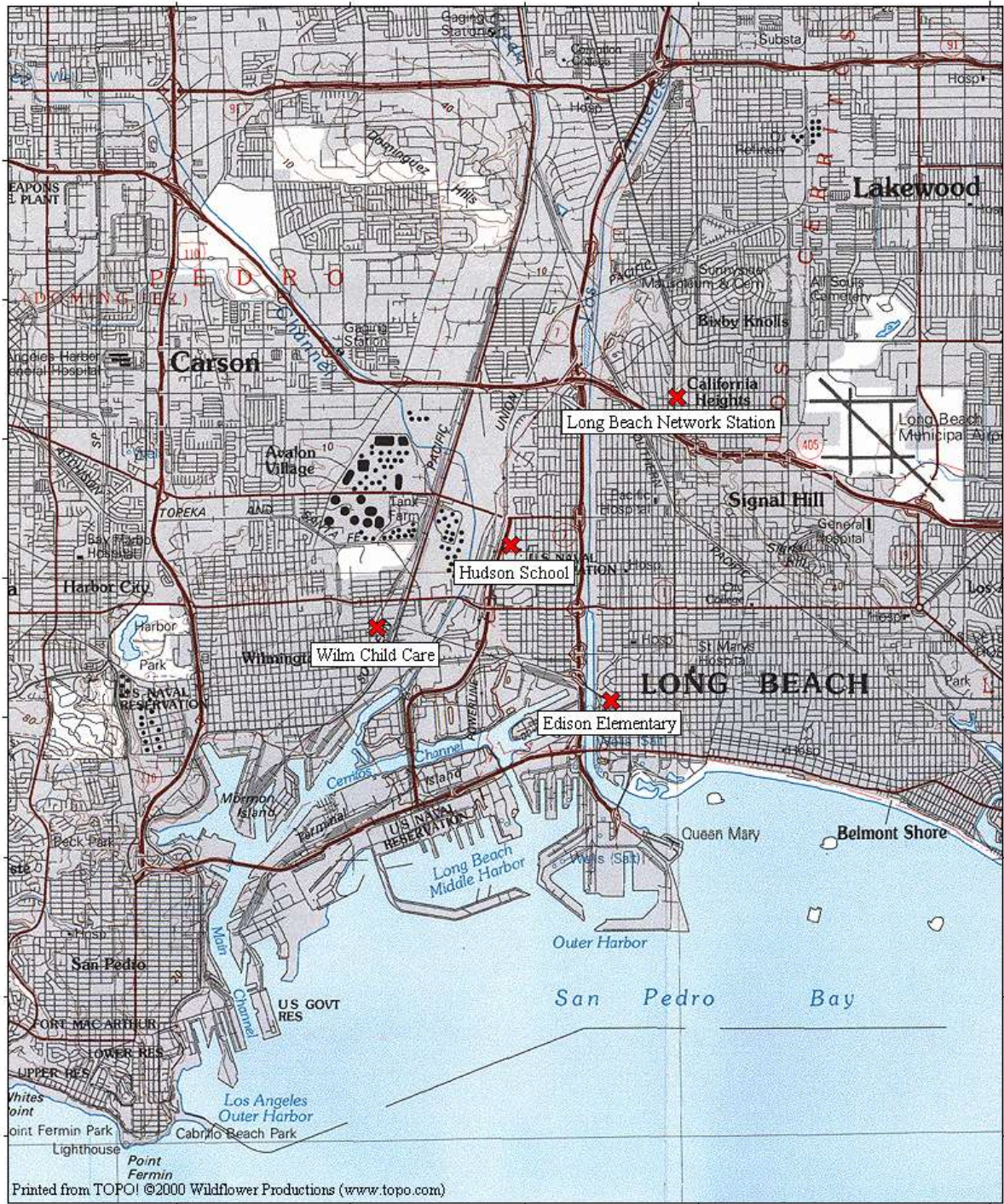


Figure 1. Study Sampling Sites

2.0 PROJECT DISCUSSION

From November 12, 2005 to February 1, 2006, and December 1, 2006 to March 1, 2007 PM₁₀ monitoring was conducted at three locations in the cities of Long Beach (two sites) and Wilmington (one site). This study constitutes the twelfth and thirteenth in a series of follow-up studies evaluating improvements in local air quality, precipitated through implementation of Rule 1158, as amended on June 11, 1999.

This study builds on a base of knowledge established by several previous studies: two prior to Rule amendment and eleven follow-up studies. Together, they constitute a set of five spring/summer studies^{3,4} and eight fall/winter^{5,6}. The primary objectives of the current study were to collect data suitable for the evaluation of:

- Current inhalable particulate (PM₁₀) ambient concentration trends for the study area.
- Speciation of the carbonaceous component of the collected particulate samples for elemental and organic carbon content.
- Comparison of 2005 and 2006 PM₁₀ mass and carbon data with that obtained during the earlier Rule 1158 studies.

The prevailing winds in the study area place portions of the community downwind of coal and coke production and/or storage facilities. Historically, fugitive dust from these activities has been a longstanding community concern. This fugitive dust contributes to increases in the PM₁₀ particulate concentration. Mobile sources, such as diesel trucks, trains, and ships in the area, also contribute to the overall ambient particulate matter concentrations.

Site selection and the sampling calendar were influenced by several factors. Sampling dates were scheduled to repeat as closely as possible the sampling dates of the previous studies, while coinciding with the U.S. Environmental Protection Agency (EPA) one-in-six monitoring schedule utilized by the AQMD in its PM₁₀ monitoring network. Samples were scheduled for collection in 2005, on November 12, 15, 18, 21, 24, 27, 30; December 9, 12, 15, 18, 21, 24, 27; and in 2006 on January 2, 5, 8, 11, 14, 17, 20, 23, 26, 29 and on February 1, producing a data set consisting of 77 samples. Nine samples were not collected due to the inaccessibility of the facility, i.e., the seasonal holidays (Thanksgiving, Christmas, and New Year's) and school closures.

Samples were scheduled for collection in 2006, on December 1, 7, 13, 19, 25, 31; and in 2007 on January 6, 18, 24, 30; February 5, 11, 17, 23; and on March 1, producing a data

³ South Coast Air Quality Management District. (September 1997)

⁴ South Coast Air Quality Management District. *Rule 1158 Follow-Up Study #2, #4, #6, #8 and #10*, Diamond Bar, CA.

⁵ South Coast Air Quality Management District. (March 1999)

⁶ South Coast Air Quality Management District. *Rule 1158 Follow-Up Study #1, #3, #5, #7, #9, and #11*, Diamond Bar, CA.

set consisting of 36 samples. Twelve 24-hour PM₁₀ particulate samples were not collected due to various sampler malfunctions or electrical interruptions.

The three current monitoring sites were chosen from seven sites used in the fall/winter 1998 study, *Micrometeorological and Ambient Air Quality Monitoring Conducted Simultaneously in the Vicinity of the Los Angeles and Long Beach Harbors* (March 1999). The sites have remained constant during the course of the *Rule 1158 Follow-Up* series of studies (Figure 1). Site selection criteria included site locations relative to coal and coke facilities with respect to the local prevailing wind patterns and their importance as locations at or near student populations. The sites include two schools and a child care center. Of the seven sites included in the 1998 study, the two school sites exhibited the highest levels of ambient PM₁₀ and EC. Detailed site maps can be found in Appendix A-3.

2.1 SITE DESCRIPTIONS

RES was contracted by the AQMD to perform field operations for the current study at three sampling locations:

Site 1: School Building Services Facilities/Hudson School (HUD)
2401 Webster Avenue
Long Beach, California

The monitoring site is located at the Long Beach School Building Services facility (maintenance yard), adjacent to Hudson K-8 School. The PM₁₀ sampler was installed on top of two adjoining steel containers. Potential sources of PM consist of Henry Ford Freeway, which runs parallel to the monitoring site to the west and the maintenance yard to the north, east, and south of the monitoring site. The maintenance yard consists of repairs and fabrication of materials, including welding. Meteorological monitoring equipment was included at this site.

Site 2: Edison Elementary School (EDI)
625 Maine Avenue
Long Beach, California

This site is located at Edison Elementary School in Long Beach. The PM₁₀ sampler was located on a steel container at the western side of the school and playground. The sampler was also installed on a five-foot platform to clear the school building to the east. Potential sources consist of a main street artery (16th Street) located to the north, which carries heavy vehicle traffic, and a small bus terminal to the west of the monitoring site.

Site 3: Wilmington Childcare Center (WIL)
1419 Young Street
Wilmington, California

The monitoring equipment was installed on the roof of the Childcare Center. Potential nearby sources consist of commercial/industrial facilities to the east, and a parking area to the west of the monitoring site.

2.2 SAMPLING AND ANALYSIS METHODOLOGY

The AQMD maintains a PM₁₀ monitoring network throughout the South Coast Air Basin (Basin). The Federal Reference Method (FRM) selective size inlet (SSI) PM₁₀ samplers utilized in the PM₁₀ network and analytical procedures are summarized here.

The SSI sampler used in these studies are the U.S. EPA's FRM sampler found in the Code of Federal Regulations (40CFR50 Appendix J). It is used to monitor particulate matter, 10 microns in diameter and less (PM₁₀). For the purposes of this study, the SSI samplers were used to collect PM₁₀ samples, which also were used for the determination of organic carbon (OC), elemental carbon (EC), and total carbon.

The SSI sampler contains a pump controlled by a programmable timer. An elapsed time accumulator, linked in parallel with the pump, records total pump operation time in hours. During operation, a known quantity of air is drawn through a particle size separator, which achieves particle separation, by impaction. The correct flow rate through the inlet is critical to collection of the correct particle size so that after impaction, only particles with a diameter of 10 microns or less remain suspended in the airstream. The flow of air then passes through a quartz filter medium, upon which the particles are collected. A programmable timer automatically turns the pump off at the end of the 24-hour sampling period.

Once a sample has been collected, it is returned to the laboratory, following chain-of-custody protocols, where PM₁₀ mass and carbon content are determined. Ambient PM₁₀ mass is determined by subtracting the weight of the clean unsampled filter (measured in the laboratory prior to sampling) from the weight of the sampled filter containing the collected PM₁₀, to yield the mass of the PM₁₀ collected on the filter. This mass is then divided by the amount of air drawn through the filter to give the ambient concentration, expressed as mass per cubic meter ($\mu\text{g}/\text{m}^3$).

Ambient carbon levels are determined by taking a small portion of the PM₁₀ filter and putting it into a carbon analyzer. The analyzer consists of a computer-controlled programmable oven, computer-controlled gas flows, a laser, and a flame ionization detector (FID). The sample is first heated in the oven in increasing amounts of oxygen. As the temperature rises, OC followed by EC is evolved from the filter. The laser beam passes through the filter, and the transmitted intensity increases at the detector as the light-absorbing carbon leaves the filter, causing the filter to become less black. The evolved carbon is swept from the oven by gas flow, and is transported to the FID where it

is detected (in the form of methane) throughout the heating process. The computer that controls these processes collects data on the oven temperature profile, laser light absorption, and FID response to determine the OC and EC content of the filter. This information, combined with the volume of air sampled, provides the OC and EC concentration in the ambient air.

3.0 DATA ANALYSIS

Data collected from the current studies are compared with data collected from the previous Long Beach/Wilmington area studies. The following sections discuss the results of the analysis.

3.1 PM₁₀ AMBIENT CONCENTRATION ANALYSIS

PM₁₀ ambient concentrations observed during the 2005-06 study are shown in Table 1. Complete data tabulations can be found in Appendix A-1. Long Beach values are provided for comparison. The Central Los Angeles data reflect conditions within the urban core, where particulate levels are typically higher in carbonaceous content, a result of a higher contribution from vehicle emissions. Twenty-four hour ambient PM₁₀ concentrations during the study period ranged from a minimum of 17 $\mu\text{g}/\text{m}^3$ obtained at the Wilmington site on December 3, 2005, to a maximum of 112 $\mu\text{g}/\text{m}^3$ at HUD on January 17, 2006. The average PM₁₀ concentration for the three study sites was 48 $\mu\text{g}/\text{m}^3$. The two days when the highest PM values measured at HUD (January 5 and 17, 2006) occurred when winds showed a predominantly westerly component. This suggests that sources to the west of the school are contributing to the higher readings.

Table 1. Fall/Winter 2005 PM₁₀ Concentrations (µg/m³) at Sampling Sites

	HUD	EDI	WIL	Los Angeles	Long Beach
Date					
11/12/05	49	36	33	30	35
11/15/05	68	57	54	54	49
11/18/05	invalid	69	58	36	51
11/21/05	67	52	38	29	36
11/24/05	68	45	66	51	57
11/27/05	53	42	33	23	39
11/30/05	50	38	40	42	45
12/3/05	30	19	17	11	21
12/6/05	75	46	47	26	34
12/9/05	38	28	29	22	27
12/12/05	58	41	50	41	42
12/15/05	37	49	47	40	invalid
12/18/05	83	56	46	no sample	no sample
12/21/05	81	60	63	invalid	54
12/24/05	36	21	no sample	invalid	34
12/27/05	40	30	invalid	21	22
1/2/06	invalid	invalid	invalid	invalid	14
1/5/06	106	41	37	23	30
1/8/06	31	34	40	35	27
1/11/06	67	44	77	43	51
1/14/06	22	25	22	18	19
1/17/06	112	54	63	25	43
1/20/06	62	24	30	19	26
1/23/06	79	46	54	invalid	28
1/26/06	34	29	30	25	invalid
1/29/06	53	38	37	43	43
2/1/06	44	invalid	41	39	33
Average	58	41	44	32	36

Thirty-eight of the 77 (49%) samples collected during the course of the 2005-06 study exceeded the state 24-hour PM₁₀ standard of 50 µg/m³. The federal PM₁₀ 24-hour standard of 150 µg/m³ was not exceeded in the 2005-06 sampling period. The highest site average value of 58 µg/m³ over the course of the study occurred at Hudson School. As observed in previous studies, the Hudson School site ranked highest for PM₁₀. On every sampling day, one or more study site samples exceeded both the AQMD's nearby Long Beach and Central Los Angeles network stations.

PM₁₀ ambient concentrations observed during the 2006-07 study are shown in Table 2. Complete data tabulations can be found in Appendix A-2. Long Beach values are provided for comparison. The Central Los Angeles data reflect conditions within the

urban core, where particulate levels are typically higher in carbonaceous content, a result of a higher contribution from vehicle emissions. Measurements of 24-hour ambient PM₁₀ concentrations during the study period ranged from a minimum of 13 µg/m³ obtained at the Wilmington site February 11, 2007 to a maximum of 149 µg/m³ at HUD on December 7, 2006.

Table 2. Fall/Winter 2006 PM₁₀ Concentrations (µg/m³) at Sampling Sites

	HUD	EDI	WIL	Los Angeles	Long Beach
Date					
12/1/06	143	56	43	35	63
12/7/06	149	87	73	no sample	78
12/13/06	116	62	55	37	41
12/19/06	invalid	38	29	19	41
12/25/06	47	44	no sample	16	28
12/31/06	64	37	invalid	37	38
1/6/07	invalid	69	invalid	42	54
1/12/07	90	35	23	13	20
1/18/07	118	51	invalid	29	39
1/24/07	128	67	59	46	53
1/30/07	no sample	24	23	21	17
2/5/07	142	58	invalid	no sample	35
2/11/07	21	14	13	11	12
2/17/07	72	36	45	26	28
2/23/07	76	no sample	no sample	8	10
3/1/07	84	no sample	no sample	14	16
Average	96	48	40	25	36

The average PM₁₀ concentration for the three study sites was 63.6 µg/m³. The two days when the highest PM values measured at HUD (December 1 and 7, 2006) occurred when winds showed a predominantly northerly or westerly component. This suggests that sources to the north and west of the school are contributing to the higher readings.

Twenty-one of the 36 (58%) samples collected during the course of the study exceeded the state 24-hour PM₁₀ standard of 50 µg/m³. The federal PM₁₀ 24-hour standard of 150 µg/m³ was not exceeded in the 2006-07 study. The highest site average value of 96 µg/m³ over the course of the study occurred at Hudson School. As observed in previous studies, the Hudson School site ranked highest for PM₁₀. On every sampling day, one or more study site samples exceeded both the AQMD's nearby Long Beach and Central Los Angeles network stations.

For all studies, the HUD site exhibited the highest PM₁₀ average. It should also be noted that on several occasions in the previous studies, the HUD site PM₁₀ concentrations were

significantly higher than those observed at EDI and WIL. Taken together, these trends suggest that HUD consistently experiences higher PM₁₀ concentrations than elsewhere in the study area. Such elevated samples may be the result of local sources or meteorological conditions influencing the immediate area adjacent to the sampler, and underscore the complexity and variety of particulate sources that contribute to ambient PM₁₀.

3.2 PM₁₀ TREND ANALYSIS

Figure 2 summarizes the ambient PM₁₀ concentrations observed over the course of the nine fall/winter studies. The black line represents the three-site study average for each study. The data show a varying three-site seasonal PM₁₀ decline from a 2000 average of 64.5 µg/m³, to a 2004 average of 41.5 µg/m³ (an average decline of 7 µg/m³ per year). The 2005 average of 47.6 µg/m³ and 2006 average of 63.6 µg/m³ reflect an increase in PM₁₀ levels from the prior studies.

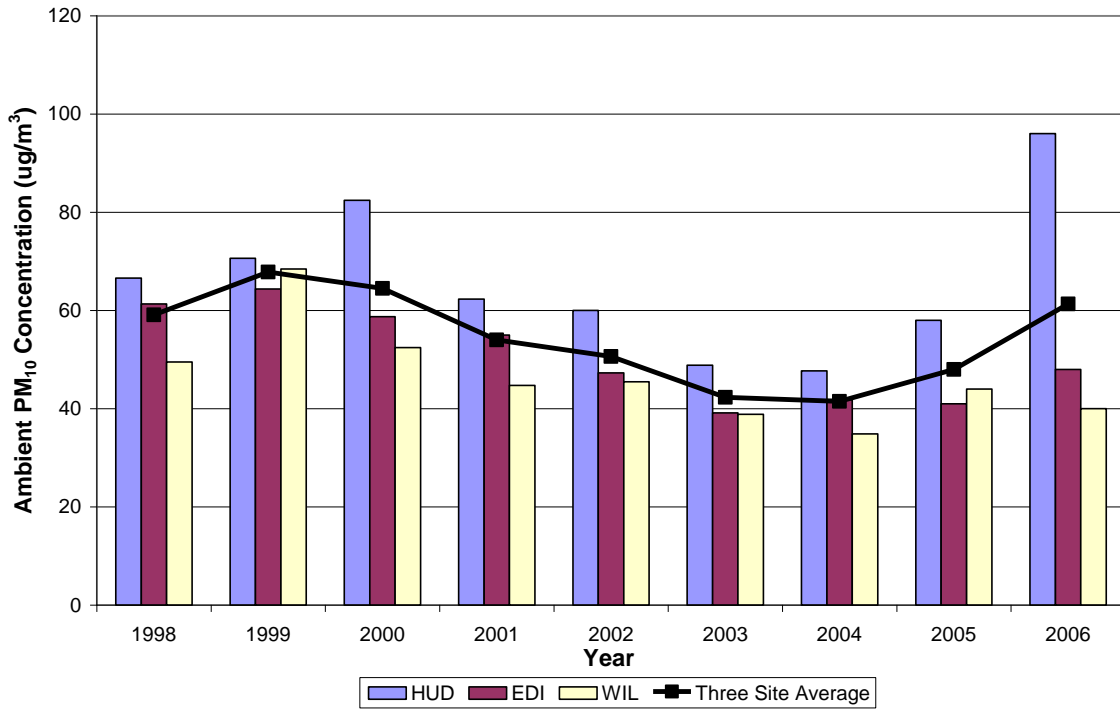


Figure 2. Fall/Winter Ambient PM₁₀ Concentrations by Site and Year

Exceedences of the state 24-hour PM₁₀ standard of 50 µg/m³ are shown in Figure 3. From 1998 to 2004, during the course of the fall/winter study sampling, yearly exceedences of the state PM₁₀ standard have declined from approximately 70% of the samples taken in 1998 to 20% of the samples in 2004. However, in 2005, nearly 50%, and in 2006, nearly 60% of all samples collected exceeded the state PM₁₀ standard. This represents a significant increase over the prior year and ends a four-year (2000 – 2004) downward trend. AQMD staff is continuing to monitor Rule 1158 compliance. As part of the Port Air Monitoring Program, air quality characterization in the region will be more extensively analyzed.

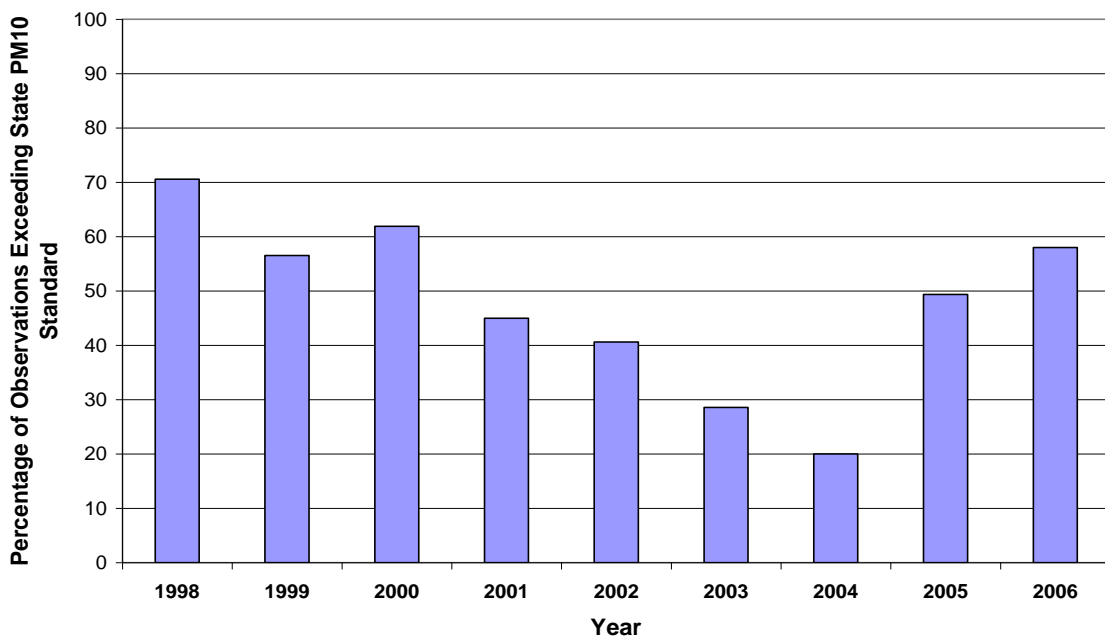


Figure 3. Percent of Study Observations Exceeding State PM₁₀ Standard

3.3 ELEMENTAL CARBON ANALYSIS

Elemental carbon is of particular interest in this study, as it arises in part from coke and coal storage as well as from transportation, including diesel emissions from trucks, trains, and ships. During the 2005 and 2006 studies, EC analysis was performed on samples collected at the Long Beach and Central Los Angeles network stations in addition to the samples collected at the study sites. The highest average ambient EC concentration in 2005 of 6.2 $\mu\text{g}/\text{m}^3$ was measured at the HUD site. A summary of the EC data is provided in Table 2. For the 2006 study, the highest average ambient EC concentration of 8.3 $\mu\text{g}/\text{m}^3$ was measured at the HUD site. A summary of the EC data is provided in Table 3.

Table 3. Fall/Winter 2005 EC Concentrations ($\mu\text{g}/\text{m}^3$) at Sampling Sites

	HUD	EDI	WIL	Los Angeles	Long Beach
Date					
11/12/05	8.0	4.2	3.3	1.8	1.7
11/15/05	6.4	4.3	4.1	3.7	3.3
11/18/05	invalid	6.3	5.0	4.6	2.3
11/21/05	7.0	5.0	2.9	1.7	3.4
11/24/05	6.1	2.9	4.8	4.6	2.3
11/27/05	4.7	2.6	1.3	0.9	1.8
11/30/05	3.4	2.4	2.3	5.3	1.9
12/3/05	2.7	1.8	0.9	0.8	1.5
12/6/05	9.5	5.6	4.8	2.4	5.0
12/9/05	5.5	4.2	3.9	3.0	4.1
12/12/05	7.8	5.0	5.4	4.8	4.2
12/15/05	4.2	4.9	3.9	4.3	invalid
12/18/05	8.1	6.7	4.8	invalid	invalid
12/21/05	6.4	7.7	6.1	invalid	2.5
12/24/05	6.4	3.2	no sample	invalid	4.7
12/27/05	5.5	3.4	no sample	2.6	1.3
1/2/06	10.2	5.4	3.7	invalid	0.4
1/5/06	9.0	4.7	3.9	3.4	3.5
1/8/06	3.0	4.0	3.3	3.2	1.6
1/11/06	7.7	5.2	6.6	1.8	2.4
1/14/06	2.1	1.5	1.6	1.1	1.6
1/17/06	8.6	6.0	6.8	1.4	2.3
1/20/06	6.9	3.2	2.9	1.3	3.4
1/23/06	6.3	3.0	3.0	invalid	1.5
1/26/06	3.6	2.5	1.8	1.7	invalid
1/29/06	5.2	3.7	2.3	3.0	1.6
2/1/06	6.1	invalid	4.7	4.5	1.8
Average	6.2	4.2	3.8	2.8	2.5

Table 4. Fall/Winter 2006 EC Concentrations ($\mu\text{g}/\text{m}^3$) at Sampling Sites

	HUD	EDI	WIL	Los Angeles	Long Beach
Date					
12/1/06	10.3	5.4	4.5	4.2	3.8
12/7/06	12.5	7.4	7.3	no sample	6.7
12/13/06	9.9	8.0	6.6	5.0	4.9
12/19/06	invalid	5.1	3.9	3.3	no sample
12/25/06	7.4	6.8		2.5	5.2
12/31/06					
1/6/07	8.4	4.1	invalid	5.1	5.3
1/12/07	invalid	4.8	invalid	3.9	5.3
1/18/07	9.6	7.0	invalid	4.3	5.1
1/24/07	11.1	8.1	6.1	5.5	5.8
1/30/07	no sample	2.5	2.5	2.3	2.4
2/5/07	8.7	7.8	invalid	no sample	4.0
2/11/07	1.9	0.9	0.6	0.7	0.8
2/17/07	6.0	3.3	4.1	3.3	2.9
2/23/07	5.7	no sample	no sample	0.7	0.9
3/1/07	7.6	no sample	no sample	1.3	1.4
Average	8.3	5.5	4.5	3.2	3.9

Elemental carbon concentrations were averaged over the duration of each study, and the results are presented in Figure 4. Complete data tabulations can be found in Appendix A-1. The compiled fall/winter data in Figure 4 show the ambient EC downward trend from 1998 through implementation of Rule 1158 revisions in 2000. Subsequently, average EC has fluctuated between $4.5 \mu\text{g}/\text{m}^3$ and $5.5 \mu\text{g}/\text{m}^3$ during the past six years.

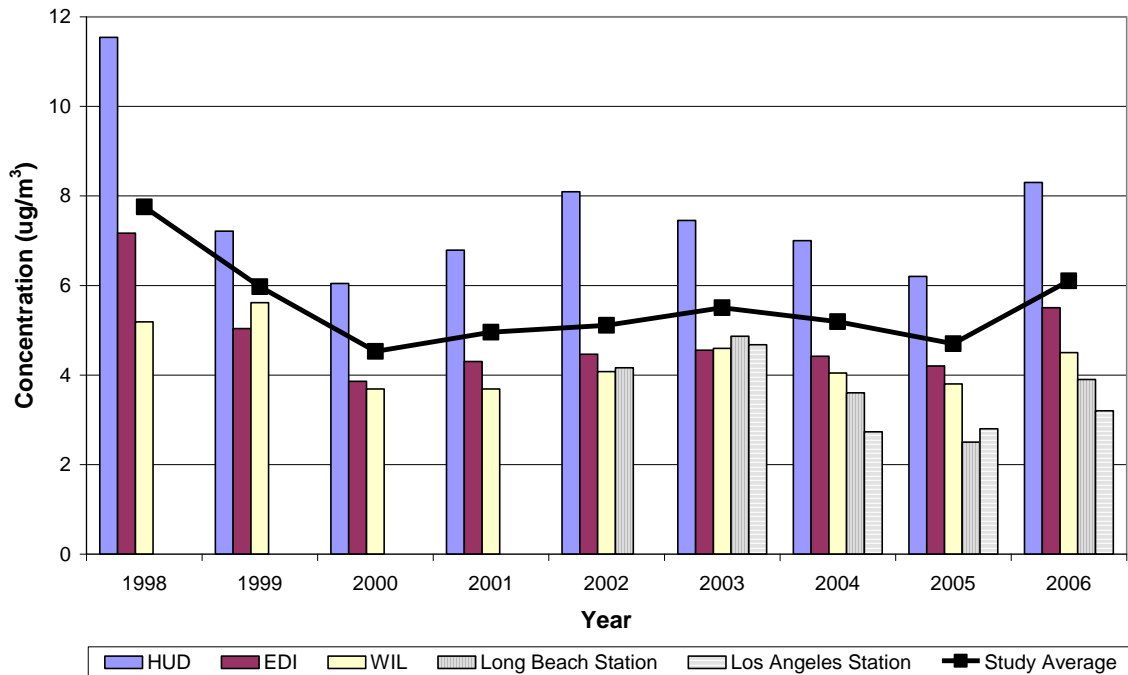


Figure 4. Fall/Winter Average EC by Site and Year

The marked EC reduction from 1998 through 2000 can be attributed to implementation of the amended Rule 1158. Since the major benefits of the Rule were realized, EC concentrations have fluctuated over a narrow range, perhaps reflecting year-to-year meteorological differences and typical measurement variability. Even so, ambient EC concentrations have not returned to pre-Rule amendment levels.

4.0 CONCLUSIONS

Measured average ambient PM₁₀ levels at all study sites were higher than those at the AQMD Long Beach and Central Los Angeles network stations for the duration of these studies. Average PM₁₀ values increased substantially over prior year studies, while EC values remained within prior year study averages. This suggests that pollution contributions from coal/coke operations have been reduced, and that the majority of existing ambient PM₁₀ in the greater Long Beach/Wilmington area arises from other sources.

The current and previous monitoring studies indicate that PM₁₀ and EC concentrations measured at the Hudson School site are often higher than the other study sites and higher than many AQMD network sites for PM₁₀. This indicates that localized sources or

meteorological conditions may disproportionately impact the Hudson site. Hudson School is located in close proximity to BP-ARCO, a large oil refining facility located to the northwest; and adjacent to the Terminal Island Freeway and a large intermodal facility (see map, Appendix A-3).

Ambient EC remains below concentrations observed in studies prior to Rule 1158 amendment (June 1999). The compiled fall/winter data in Figure 4 clearly show the ambient EC downward trend from 1998 through implementation of Rule 1158 revisions in 2000. The marked EC reduction from 1998 through 2000 can be attributed to implementation of the amended Rule 1158. Subsequently, EC has fluctuated in a narrow range over the past six years, after the major benefits of coke/coal abatement were realized. However the 2006 study average of 6.1 is above the range, however it is too early to know if this is part of a trend. AQMD staff will continue to monitor for Rule compliance.

In summary, the spring/summer series of studies has yielded increasingly less information on the impact of Rule 1158. However, the fall/winter measurements have been more illustrative of trends in the area. The longer trend shown in the data for the spring and fall studies suggests that the measurable benefits of Rule 1158 revision may have been observed, and other sources of PM₁₀ and EC in the area are now more dominant than the coke/coal contribution.

APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA

2006 Fall/Winter Ambient Concentration Results																
Location	12/1/06	12/7/06	12/13/06	12/19/06	12/25/06	12/31/06	1/6/07	1/12/07	1/18/07	1/24/07	1/30/07	2/5/07	2/11/07	2/17/07	2/23/07	3/1/07
HUD	143	149	116	invalid	47	64	invalid	90	118	128		142	21	72	76	84
EDI	56	87	62	38	44	37	69	35	51	67	24	58	14	36		
WIL	43	73	55	29		invalid	invalid	23	invalid	59	23	invalid	13	45		
Los Angeles	35	no sample	37	19	16	37	42	13	29	46	21	no sample	11	26	8	14
Long Beach	63	78	41	no sample	28	38	54	20	39	53	17	35	12	28	10	16
* Sample Invalidated																
2006 Fall/Winter Organic Carbon Ambient Concentration Results																
Location	12/1/06	12/7/06	12/13/06	12/19/06	12/25/06	12/31/06	1/6/07	1/12/07	1/18/07	1/24/07	1/30/07	2/5/07	2/11/07	2/17/07	2/23/07	3/1/07
HUD	24.6	29.5	23.8	invalid	17.1	12.3	invalid	11.2	28.2	26.8		26.5	2.8	11.8	8.4	14.2
EDI	10.5	17.5	11.4	9.3	16	8.1	11.7	5.3	11.6	13.8	4.1	10.6	1.9	6.5		
WIL	9.2	14.4	10.8	7.3		invalid	invalid	4.3	invalid	10.4	4.3	invalid	2.1	7.5		
Los Angeles	8	no sample	9.3	5.4	5.6	8.4	9.1	3.9	7.7	8.9	3.9	no sample	2.7	6.1	2.3	3.6
Long Beach	10.3	15.5	7.5	no sample	8.5	9.8	11.3	4.5	9.5	10.3	4.1	8.4	2.5	5.7	2.3	3.9
2006 Fall/Winter Elemental Carbon Ambient Concentration Results																
Location	12/1/06	12/7/06	12/13/06	12/19/06	12/25/06	12/31/06	1/6/07	1/12/07	1/18/07	1/24/07	1/30/07	2/5/07	2/11/07	2/17/07	2/23/07	3/1/07
HUD	10.3	12.5	9.9	invalid	7.4	8.4	invalid	7	9.6	11		8.7	1.9	6	5.7	7.6
EDI	5.4	7.4	8	5.1	6.8	4.1	4.8	2.5	7	8.1	2.5	7.8	0.9	3.3		
WIL	4.5	7.3	6.6	3.9		invalid	invalid	1.7	invalid	6.1	2.5	invalid	0.6	4.1		
Los Angeles	4.18	no sample	4.9	3.2	2.5	5	3.9	1	4.3	5.4	2.2	no sample	0.6	3.3	0.7	1.3
Long Beach	3.8	6.7	4.9	no sample	5.2	5.3	5.2	1.4	5.1	5.7	2.4	4	0.7	2.9	0.8	1.3
2006 Fall/Winter Total Carbon Ambient Concentration Results																
Location	12/1/06	12/7/06	12/13/06	12/19/06	12/25/06	12/31/06	1/6/07	1/12/07	1/18/07	1/24/07	1/30/07	2/5/07	2/11/07	2/17/07	2/23/07	3/1/07
HUD	34.9	42	33.7	invalid	24.6	20.7	invalid	18.2	37.8	37.9		35.2	4.7	17.8	14.2	21.8
EDI	15.9	24.9	19.4	14.4	22.7	12.2	16.5	7.7	18.6	21.9	6.6	18.4	2.8	9.9		
WIL	13.6	21.8	17.4	11.3		invalid	invalid	6	invalid	16.5	6.9	invalid	2.8	11.6		
Los Angeles	12.1	no sample	14.3	8.7	8.1	13.5	13	4.9	12	14.4	6.2	no sample	3.4	9.4	3	4.9
Long Beach	14.1	22.2	12.4	no sample	13.7	15.1	16.5	5.9	14.6	16.1	6.6	12.5	3.3	8.6	3.2	5.3

2005 Fall/Winter Ambient Concentration Results													
Location	11/12/05	11/15/05	11/18/05	11/21/05	11/24/05	11/27/05	11/30/05	12/3/05	12/6/05	12/9/05	12/12/05	12/15/05	12/18/05
HUD	49	68	*	67	68	53	50	30	75	38	58	37	83
EDI	36	57	69	52	45	42	38	19	46	28	41	49	56
WIL	33	54	58	38	66	33	40	17	47	29	50	47	46
Los Angeles	30	54	36	29	51	23	42	11	26	22	41	40	*
Long Beach	35	49	51	36	57	39	45	21	34	27	42	*	*
* Sample Invalidated													
2005 Fall/Winter Organic Carbon Ambient Concentration Results													
Location	11/12/05	11/15/05	11/18/05	11/21/05	11/24/05	11/27/05	11/30/05	12/3/05	12/6/05	12/9/05	12/12/05	12/15/05	12/18/05
HUD	8.9	11.5	25.6	11.2	9.4	8.1	10.7	7.6	18.3	9.6	9.6	6.4	22.2
EDI	7.3	8.5	16.3	10.5	4.6	6.1	7.6	4.9	10.9	7.6	7.3	8.0	10.6
WIL	7.2	9.4	12.7	7.7	7.9	5.6	7.5	4.7	10.5	6.9	8.4	6.3	9.4
Los Angeles	9.0	11.5	8.4	7.0	9.4	6.3	7.7	3.8	7.9	5.9	7.5	7.0	
Long Beach	6.9	8.3	13.3	7.2	10.3	6.6	8.9	5.6	9.2	8.4	9.8		
2005 Fall/Winter Elemental Carbon Ambient Concentration Results													
Location	11/12/05	11/15/05	11/18/05	11/21/05	11/24/05	11/27/05	11/30/05	12/3/05	12/6/05	12/9/05	12/12/05	12/15/05	12/18/05
HUD	8.0	6.4	24.2	7.0	6.1	4.7	3.4	2.7	9.5	5.5	7.8	4.2	8.1
EDI	4.2	4.3	6.3	5.0	2.9	2.6	2.4	1.8	5.6	4.2	5.0	4.9	6.7
WIL	3.3	4.1	5.0	2.9	4.8	1.3	2.3	0.9	4.8	3.9	5.4	3.9	4.8
Los Angeles	1.8	3.7	4.6	1.7	4.6	0.9	5.3	0.8	2.4	3.0	4.8	4.3	
Long Beach	1.7	3.3	2.3	3.4	2.3	1.8	1.9	1.5	5.0	4.1	4.2		
2005 Fall/Winter Total Carbon Ambient Concentration Results													
Location	11/12/05	11/15/05	11/18/05	11/21/05	11/24/05	11/27/05	11/30/05	12/3/05	12/6/05	12/9/05	12/12/05	12/15/05	12/18/05
HUD	16.9	17.9	49.8	18.1	15.5	12.8	14.1	10.2	27.8	15.0	17.5	10.6	30.2
EDI	11.6	12.8	22.6	15.5	7.5	8.8	10.0	6.7	16.5	11.8	12.4	12.9	17.4
WIL	10.5	13.6	17.7	10.6	12.7	6.9	9.8	5.7	15.3	10.9	13.7	10.3	14.2
Los Angeles	10.8	15.2	13.0	8.7	14.0	7.2	13.0	4.6	10.3	8.9	12.2	11.3	
Long Beach	8.6	11.6	15.6	10.6	12.6	8.4	10.8	7.1	14.2	12.5	14.0		

2005 Fall/Winter Ambient Concentration Results														
Location	12/21/05	12/24/05	12/27/05	1/2/06	1/5/06	1/8/06	1/11/06	1/14/06	1/17/06	1/20/06	1/23/06	1/26/06	1/29/06	2/1/06
HUD	81	36	40	*	106	31	67	22	112	62	79	34	53	44
EDI	60	21	30	*	41	34	44	25	54	24	46	29	38	*
WIL	63	*	*	*	37	40	77	22	63	30	54	30	37	41
Los Angeles	*	*	21	*	23	35	43	18	25	19	*	25	43	39
Long Beach	54	34	22	14	30	27	51	19	43	26	28	*	43	33
* Sample Invalidated														
2005 Fall/Winter Organic Carbon Ambient Concentration Results														
Location	12/21/05	12/24/05	12/27/05	1/2/06	1/5/06	1/8/06	1/11/06	1/14/06	1/17/06	1/20/06	1/23/06	1/26/06	1/29/06	2/1/06
HUD	17.8	7.0	6.5	12.4	24.6	5.5	13.1	3.5	18.8	14.7	14.7	4.9	6.8	8.7
EDI	11.0	4.5	5.2	9.1	9.6	5.5	8.5	3.4	13.0	6.2	8.6	4.4	4.9	
WIL	11.0			8.0	7.9	5.4	13.4	3.6	14.6	6.6	9.8	3.9	4.6	7.5
Los Angeles			5.1		7.0	8.0	10.7	4.1	7.2	5.8		4.0	7.6	7.5
Long Beach	13.9	7.1	5.7	2.0	8.1	6.7	13.2	3.8	13.5	6.8	6.4		9.6	7.0
2005 Fall/Winter Elemental Carbon Ambient Concentration Results														
Location	12/21/05	12/24/05	12/27/05	1/2/06	1/5/06	1/8/06	1/11/06	1/14/06	1/17/06	1/20/06	1/23/06	1/26/06	1/29/06	2/1/06
HUD	6.4	6.4	5.5	10.2	9.0	3.0	7.7	2.1	8.6	6.9	6.3	3.6	5.2	6.1
EDI	7.7	3.2	3.4	5.4	4.7	4.0	5.2	1.5	6.0	3.2	3.0	2.5	3.7	
WIL	6.1			3.7	3.9	3.3	6.6	1.6	6.8	2.9	3.0	1.8	2.3	4.7
Los Angeles			2.6		3.4	3.2	1.8	1.1	1.4	1.3		1.7	3.0	4.5
Long Beach	2.5	4.7	1.3	0.4	3.5	1.6	2.4	1.6	2.3	3.4	1.5		1.6	1.8
2005 Fall/Winter Total Carbon Ambient Concentration Results														
Location	12/21/05	12/24/05	12/27/05	1/2/06	1/5/06	1/8/06	1/11/06	1/14/06	1/17/06	1/20/06	1/23/06	1/26/06	1/29/06	2/1/06
HUD	24.2	13.4	12.1	22.5	33.6	8.6	20.8	5.6	27.4	21.6	21.1	8.5	12.0	14.8
EDI	18.7	7.8	8.6	14.6	14.3	9.4	13.8	4.9	19.0	9.3	11.6	6.8	8.6	
WIL	17.1			11.7	11.8	8.7	20.0	5.2	21.4	9.5	12.8	5.7	6.9	12.2
Los Angeles			7.6		10.4	11.2	12.5	5.2	8.6	7.1		5.7	10.7	12.0
Long Beach	16.4	11.8	7.0	2.4	11.6	8.3	15.6	5.4	15.9	10.2	7.9		11.2	8.7

APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA (CONTINUED)

2004 Fall/Winter PM ₁₀ Ambient Concentration Results								
Location	10/30/04	11/5/04	11/11/04	11/17/04	11/23/04	11/29/04	12/5/04	Average
HUD	40	43	45	77	36	72	21	48
EDI	36	39	35	66	30	45	*	42
WIL	31	39	25	64	32	40	13	35
Los Angeles	23	31	26	41	24	28	18	27
Long Beach	47	32	28	53	30	32	18	34
* No Sample								41.5

2004 Fall/Winter Organic Carbon Ambient Concentration Results								
Location	10/30/04	11/5/04	11/11/04	11/17/04	11/23/04	11/29/04	12/5/04	Average
HUD	13.4	13.9	14.8	13.9	6.9	12.7	4.8	11.5
EDI	8.9	9.6	9.0	17.1	6.3	8.6	*	9.9
WIL	11.8	10.9	5.2	9.9	6.5	7.6	4.4	8.0
Los Angeles	7.1	6.2	5.9	7.9	5.0	7.6	5.1	6.4
Long Beach	10.5	7.4	5.6	10.2	8.4	7.5	5.3	7.8
								9.8

2004 Fall/Winter Elemental Carbon Ambient Concentration Results								
Location	10/30/04	11/5/04	11/11/04	11/17/04	11/23/04	11/29/04	12/5/04	Average
HUD	3.4	0.9	0.4	17.6	7.5	14.1	5.1	7.0
EDI	3.4	2.6	1.7	6.1	5.7	7.0	*	4.4
WIL	0.4	1.1	2.3	9.3	6.1	5.6	3.5	4.0
Los Angeles	2.5	2.8	2.4	3.7	2.5	3.5	1.7	2.7
Long Beach	4.1	3.8	3.2	5.0	3.9	3.2	2.0	3.6

2004 Fall/Winter Total Carbon Ambient Concentration Results								
Location	10/30/04	11/5/04	11/11/04	11/17/04	11/23/04	11/29/04	12/5/04	Average
HUD	16.8	14.9	15.2	31.5	14.4	26.8	9.9	18.5
EDI	12.3	12.2	10.7	23.2	12.0	15.6	*	14.3
WIL	12.2	12.0	7.5	19.2	12.6	13.2	7.9	12.1
Los Angeles	9.6	9.0	8.3	11.6	7.5	11.1	6.8	9.1
Long Beach	14.6	11.2	8.8	15.2	12.3	10.7	7.3	11.4

2003 Fall/Winter PM ₁₀ Ambient Concentration Results								
Location	10/24/03	10/30/03	11/5/03	11/11/03	11/17/03	11/23/03	11/29/03	Average
HUD	54	40	52	39	35	71	51	49
EDI	45	27	44	29	31	55	43	39
WIL	45	22	42	33	34	55	41	39
Los Angeles	81	27	32	25	24	31	24	35
Long Beach	48	24	44	26	28	50	29	36
* No Sample								42.3

2003 Fall/Winter Organic Carbon Ambient Concentration Results								
Location	10/24/03	10/30/03	11/5/03	11/11/03	11/17/03	11/23/03	11/29/03	Average
HUD	5.0	4.6	7.5	6.2	6.8	11.3	6.8	6.9
EDI	4.3	3.2	6.6	4.6	5.4	8.7	6.8	5.7
WIL	3.9	2.9	5.9	4.3	6.1	9.1	7.1	5.6
Los Angeles	9.2	3.4	4.2	4.3	5.0	2.9	3.7	4.7
Long Beach	3.5	2.6	5.2	3.9	4.9	5.3	4.3	4.2
								6.1

2003 Fall/Winter Elemental Carbon Ambient Concentration Results								
Location	10/24/03	10/30/03	11/5/03	11/11/03	11/17/03	11/23/03	11/29/03	Average
HUD	4.3	3.9	9.9	7.7	8.3	10.2	7.9	7.5
EDI	2.6	1.7	6.3	4.3	5.1	6.2	5.7	4.6
WIL	4.0	1.0	5.2	3.8	6.3	6.1	5.8	4.6
Los Angeles	7.2	2.2	4.3	4.0	4.3	6.0	4.7	4.7
Long Beach	3.6	1.6	6.6	4.5	6.9	6.7	4.3	4.9

2003 Fall/Winter Total Carbon Ambient Concentration Results								
Location	10/24/03	10/30/03	11/5/03	11/11/03	11/17/03	11/23/03	11/29/03	Average
HUD	9.3	8.5	17.4	13.9	15.1	21.5	14.7	14.3
EDI	6.9	4.9	12.9	8.9	10.5	14.9	12.5	10.2
WIL	7.9	3.9	11.1	8.1	12.4	15.2	12.9	10.2
Los Angeles	16.4	5.6	8.5	8.3	9.3	8.9	8.4	9.4
Long Beach	7.1	4.2	11.8	8.4	11.8	12.0	8.6	9.1

2002 Fall/Winter PM ₁₀ Ambient Concentration Results													
Location	10/5/02	10/17/02	10/23/02	10/29/02	11/4/02	11/10/02	11/16/02	11/22/02	11/28/02	12/4/02	12/10/02	12/16/02	Average
HUD	46	43	52	37	58	*	87	88	*	98	63	28	60
EDI	46	40	45	48	48	25	*	55	62	78	47	26	47
WIL	*	39	32	38	55	20	34	75	66	78	38	25	45
LB Station	45	35	43	32	50	23	28	51	51	75	44	24	42
* No Sample													

2002 Fall/Winter Organic Carbon Ambient Concentration Results													
Location	10/5/02	10/17/02	10/23/02	10/29/02	11/4/02	11/10/02	11/16/02	11/22/02	11/28/02	12/4/02	12/10/02	12/16/02	Average
HUD	6.6	5.1	5.3	3.6	4.7	*	10.5	10.7	*	9.8	9.8	3.0	6.9
EDI	6.9	4.4	4.4	3.9	5.0	3.8	*	7.4	8.7	7.4	8.4	2.5	5.7
WIL	*	4.8	3.3	3.8	7.5	3.0	5.3	8.6	9.9	7.3	7.8	2.2	5.8
LB Station	7.2	4.0	3.4	3.9	3.7	2.8	4.0	6.7	6.6	10.2	6.7	3.4	5.2

2002 Fall/Winter Elemental Carbon Ambient Concentration Results													
Location	10/5/02	10/17/02	10/23/02	10/29/02	11/4/02	11/10/02	11/16/02	11/22/02	11/28/02	12/4/02	12/10/02	12/16/02	Average
HUD	2.8	3.1	5.5	3.1	3.7	*	11.0	17.0	*	17.1	12.7	4.8	8.1
EDI	2.7	2.0	2.8	1.5	1.6	2.8	*	8.5	6.5	11.0	6.0	3.5	4.5
WIL	*	2.1	1.3	2.2	0.3	1.6	4.6	10.0	5.3	10.6	3.5	3.3	4.1
LB Station	2.5	1.7	3.0	1.8	3.1	2.8	4.4	7.3	7.0	5.9	7.6	2.7	4.2

2002 Fall/Winter Total Carbon Ambient Concentration Results													
Location	10/5/02	10/17/02	10/23/02	10/29/02	11/4/02	11/10/02	11/16/02	11/22/02	11/28/02	12/4/02	12/10/02	12/16/02	Average
HUD	9.5	8.2	10.8	6.7	8.4	*	21.6	27.8	*	26.9	22.4	7.7	15.0
EDI	9.6	6.4	7.2	5.4	6.6	6.6	*	15.9	15.2	18.5	14.4	6.0	10.2
WIL	*	7.0	4.6	6.0	7.8	4.7	9.9	18.7	15.2	17.9	11.3	5.5	9.9
LB Station		5.7	6.4	5.7	6.8	5.7	8.4	13.9	13.6	16.2	14.3	6.1	9.3

2002 Fall/Winter Elemental Carbon as a Percentage of Total PM ₁₀													
Location	10/5/02	10/17/02	10/23/02	10/29/02	11/4/02	11/10/02	11/16/02	11/22/02	11/28/02	12/4/02	12/10/02	12/16/02	Average
HUD	6.2%	7.2%	10.6%	8.4%	6.4%	*	12.7%	19.4%	*	17.5%	20.1%	17.1%	12.6
EDI	5.9%	5.1%	6.3%	3.2%	3.3%	11.2%	*	15.5%	10.6%	14.1%	12.8%	13.3%	9.2
WIL	*	5.4%	4.1%	5.7%	0.5%	8.1%	13.5%	13.4%	8.0%	13.6%	9.3%	13.2%	8.6
LB Station		4.8%	7.1%	5.7%	6.3%	12.3%	15.9%	14.3%	13.8%	7.9%	17.2%	11.1%	10.6

APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA (CONTINUED)

2001 Fall/Winter PM ₁₀ Ambient Concentration Results								
Location	11/27/01	12/3/01	12/9/01	12/15/01	12/21/01	12/27/01	1/8/02	Average
HUD	40	62	97	39	36	76	86	62
EDI	24	*	105	33	33	63	72	55
WIL	16	43	47	37	25	75	70	45
LB Station	25	14	24	30	24	56	*	29
No Sample								54.0
2001 Fall/Winter Organic Carbon Ambient Concentration Results								
Location	11/27/01	12/3/01	12/9/01	12/15/01	12/21/01	12/27/01	1/8/02	Average
HUD	5.6	12.9	10.9	9.7	6.9	16	17.2	11.3
EDI	3.3	*	8.8	8.7	7	13.9	15.9	9.6
WIL	2.9	9.2	6.9	9.4	4.7	15.5	13.5	8.9
								9.9
2001 Fall/Winter Elemental Carbon Ambient Concentration Results								
Location	11/27/01	12/3/01	12/9/01	12/15/01	12/21/01	12/27/01	1/8/02	Average
HUD	5.2	7.8	7.1	4.7	4.6	8.4	9.7	6.8
EDI	2.3	*	4.3	3.8	3.3	5.5	6.6	4.3
WIL	1.4	4.2	2.7	4.1	1.8	6.2	5.4	3.7
	3.0	6.0	4.7	4.2	3.2	6.7	7.2	5.0
2001 Fall/Winter Total Carbon Ambient Concentration Results								
Location	11/27/01	12/3/01	12/9/01	12/15/01	12/21/01	12/27/01	1/8/02	Average
HUD	10.8	20.7	18	14.4	11.5	24.4	26.9	18.1
EDI	5.6	*	13.1	12.5	10.3	19.4	22.5	13.9
WIL	4.3	13.4	9.6	13.5	6.5	21.7	18.9	12.6

2000 Fall/Winter PM ₁₀ Ambient Concentration Results								
Location	11/8/00	11/14/00	11/20/00	11/26/00	12/2/00	12/8/00	12/14/00	Average
HUD	134	56	143	73	100	28	43	82
EDI	52	48	78	73	105	18	37	59
WIL	56	45	55	65	93	16	37	52
LB Station	44	49	92	*	105	20	35	58
No Sample								64.5
2000 Fall/Winter Organic Carbon Ambient Concentration Results								
Location	11/8/00	11/14/00	11/20/00	11/26/00	12/2/00	12/8/00	12/14/00	Average
HUD	17.1	10.6	22.6	9	9.2	4.6	8.7	11.7
EDI	8.9	9.7	15.4	7.6	10.2	2.8	7.8	8.9
WIL	10.5	9.7	10.9	7	8.1	2.9	7.2	8.0
2000 Fall/Winter Elemental Carbon Ambient Concentration Results								
Location	11/8/00	11/14/00	11/20/00	11/26/00	12/2/00	12/8/00	12/14/00	Average
HUD	7.6	6.4	11.6	4.8	4.6	3.7	3.6	6.0
EDI	3.8	4.1	7.4	4.3	3.3	2	2.1	3.9
WIL	4.6	4.1	5.1	3.8	3.6	1.7	2.9	3.7
	5.3	4.9	8.0	4.3	3.8	2.5	2.9	4.5
2000 Fall/Winter Total Carbon Ambient Concentration Results								
Location	11/8/00	11/14/00	11/20/00	11/26/00	12/2/00	12/8/00	12/14/00	Average
HUD	24.7	17	34.2	13.8	13.8	8.3	12.3	17.7
EDI	12.7	13.8	22.8	11.9	13.5	4.8	9.9	12.8
WIL	15.1	13.8	16	10.8	11.7	4.6	10.1	11.7

APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA (CONTINUED)

1999 Fall/Winter PM ₁₀ Ambient Concentration Results									
Location	11/2/99	11/8/99	11/14/99	11/20/99	11/26/99	12/2/99	12/8/99	12/14/99	Average
HUD	92	38	50	30	47	69	68	171	71
EDI	85	33	47	37	49	74	93	97	64
WIL	92	89	46	30	65	70	*	87	68
LB Station	77	22	38	27	38	50	55	59	46
* No Sample									
1999 Fall/Winter Organic Carbon Ambient Concentration Results									
Location	11/2/99	11/8/99	11/14/99	11/20/99	11/26/99	12/2/99	12/8/99	12/14/99	Average
HUD	9.9	6	6	4.5	11	13.3	10.4	22.2	10.4
EDI	8.3	4.8	5.8	4.9	10.5	14.1	13.4	14.2	9.5
WIL	8.1	14.1	6.4	4.4	12.6	13.5	*	12.2	10.2
1999 Fall/Winter Elemental Carbon Ambient Concentration Results									
Location	11/2/99	11/8/99	11/14/99	11/20/99	11/26/99	12/2/99	12/8/99	12/14/99	Average
HUD	7.9	4.1	4.8	2.7	5.9	7.9	6.6	17.8	7.2
EDI	5.7	2.6	4	2.7	4.6	6.1	6.1	8.5	5.0
WIL	6	6.7	4.1	2.4	7.4	5.5	*	7.2	5.6
1999 Fall/Winter Total Carbon Ambient Concentration Results									
Location	11/2/99	11/8/99	11/14/99	11/20/99	11/26/99	12/2/99	12/8/99	12/14/99	Average
HUD	17.8	10.1	10.8	7.2	16.9	21.2	17	40	17.6
EDI	14	7.4	9.8	7.6	15.1	20.2	19.5	22.6	14.5
WIL	14.1	20.8	10.5	6.8	20	19	*	19.4	15.8

1998 Fall/Winter PM ₁₀ Ambient Concentration Results							
Location	11/1/98	11/7/98	11/13/98	11/19/98	11/25/98	12/13/98	Average
HUD	61	56	72	89	*	55	67
EDI	50	49	67	73	74	55	61
WIL	54	43	45	52	70	33	50
LB Station	43	31	39	54	*	27	39
* No Sample							
1998 Fall/Winter Organic Carbon Ambient Concentration Results							
Location	11/1/98	11/7/98	11/13/98	11/19/98	11/25/98	12/13/98	Average
HUD	7.5	6.4	11.2	14.2	*	8.6	9.6
EDI	7	5.5	11.3	10.4	9.3	10.1	8.9
WIL	6.9	5.7	8.4	8.3	9.9	5.8	7.5
1998 Fall/Winter Elemental Carbon Ambient Concentration Results							
Location	11/1/98	11/7/98	11/13/98	11/19/98	11/25/98	12/13/98	Average
HUD	6.2	6.2	16.6	19.8	*	8.9	11.5
EDI	4.3	3.3	9.2	12.5	7.9	5.8	7.2
WIL	4.1	3.8	5.9	7.3	6.6	3.4	5.2
1998 Fall/Winter Total Carbon Ambient Concentration Results							
Location	11/1/98	11/7/98	11/13/98	11/19/98	11/25/98	12/13/98	Average
HUD	13.7	12.6	27.9	34	*	17.5	21.1
EDI	11.3	8.8	20.5	22.9	17.2	15.9	16.1
WIL	11	9.4	14.4	15.6	16.5	9.2	12.7

APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA (CONTINUED)

2004 Spring/Summer PM ₁₀ Ambient Concentration Results										
Location	5/15/04	5/21/04	5/27/04	6/2/04	6/8/04	6/14/04	6/20/04	7/2/04	Average	
HUD	37	28	32	36	38	32	37	32	34	
EDI	37	20	33	31	34	21	39	23	30	
WIL	34	23	25	33	31	29	30	23	27	
LB Station	34	20	31	33	30	30	34	24	30	
LA Station	37	20	31	44	29	41	35	25	33	

2004 Spring/Summer Organic Carbon Ambient Concentration Results										
Location	5/15/04	5/21/04	5/27/04	6/2/04	6/8/04	6/14/04	6/20/04	7/2/04	Average	
HUD	3.6	3.4	3.7	3.3	4.3	3.1	4.0	6.8	4.0	
EDI	3.9	2.8	5.0	3.3	4.0	2.9	3.6	4.0	3.7	
WIL	3.7	2.4	3.1	3.9	3.3	2.4	3.1	3.9	3.2	
LB Station	3.5	3.2	3.6	3.8	3.8	2.6	3.7	3.5	3.5	
LA Station	4.5	3.0	3.6	4.5	4.3	4.1	3.5	3.6	3.9	

2004 Spring/Summer Elemental Carbon Ambient Concentration Results										
Location	5/15/04	5/21/04	5/27/04	6/2/04	6/8/04	6/14/04	6/20/04	7/2/04	Average	
HUD	2.1	2.5	2.2	2.1	2.8	2.3	2.2	3.5	2.5	
EDI	2.0	1.4	2.4	1.9	2.1	1.4	2.6	2.3	2.0	
WIL	1.7	1.0	1.4	1.7	1.2	1.5	0.7	2.0	1.4	
LB Station	0.8	1.0	1.2	0.8	0.9	0.9	1.0	1.2	1.0	
LA Station	2.1	0.7	1.3	1.5	1.1	1.2	0.8	0.9	1.2	

2004 Spring/Summer Total Carbon Ambient Concentration Results										
Location	5/15/04	5/21/04	5/27/04	6/2/04	6/8/04	6/14/04	6/20/04	7/2/04	Average	
HUD	5.7	5.9	5.9	5.4	7.1	5.4	6.2	10.3	6.5	
EDI	5.9	4.2	7.4	5.2	6.1	4.3	5.2	6.3	5.6	
WIL	5.4	3.4	4.5	5.6	4.5	3.9	3.8	5.9	4.6	
LB Station	4.3	4.2	4.8	4.6	4.7	3.5	4.7	4.7	4.4	
LA Station	6.6	3.7	4.9	6.0	5.4	5.3	4.3	4.5	5.1	

2003 Spring/Summer PM ₁₀ Ambient Concentration Results										
Location	5/15/03	5/21/03	5/27/03	6/2/03	6/8/03	6/14/03	6/20/03	Average		
HUD	29	53	44	31	20	41	37	36		
EDI	28	50	48	26	9	48	31	34		
WIL	29	48	38	32	19	33	27	32		
LB Station	26	38	49	22	18	31	24	30		
LA Station	35	46	53	58	35	41	28	42		

2003 Spring/Summer Organic Carbon Ambient Concentration Results										
Location	5/15/03	5/21/03	5/27/03	6/2/03	6/8/03	6/14/03	6/20/03	Average		
HUD	4.0	8.7	5.5	2.9	2.9	5.3	3.2	4.6		
EDI	3.2	6.9	6.0	2.7	2.8	5.0	2.8	4.2		
WIL	3.4	6.6	4.2	2.9	2.7	4.2	2.6	3.8		
LB Station	3.2	4.7	3.7	2.9	2.8	4.1	3.0	3.5		
LA Station	4.7	7.6	6.9	6.1	4.1	3.4	3.0	5.1		

2003 Spring/Summer Elemental Carbon Ambient Concentration Results										
Location	5/15/03	5/21/03	5/27/03	6/2/03	6/8/03	6/14/03	6/20/03	Average		
HUD	1.5	3.9	1.7	1.4	1.6	3.3	4.5	2.6		
EDI	1.1	3.4	0.9	0.9	0.6	2.4	1.7	1.6		
WIL	1.1	4.7	1.4	1.0	1.0	1.7	1.1	1.7		
LB Station	1.1	2.3	2.4	0.5	0.9	1.1	1.3	1.4		
LA Station	2.1	3.7	3.4	0.9	0.4	3.2	1.1	2.1		

2003 Spring/Summer Total Carbon Ambient Concentration Results										
Location	5/15/03	5/21/03	5/27/03	6/2/03	6/8/03	6/14/03	6/20/03	Average		
HUD	5.5	12.6	7.2	4.3	4.5	8.6	7.7	7.2		
EDI	4.3	10.3	6.9	3.6	3.4	7.4	4.5	5.8		
WIL	4.5	11.3	5.6	3.9	3.7	5.9	3.7	5.5		
LB Station	4.3	7.0	6.1	3.4	3.7	5.2	4.3	4.9		
LA Station	6.8	11.3	10.3	7.0	4.5	6.6	4.1	7.2		

2002 Spring/Summer PM ₁₀ Ambient Concentration Results										
Location	5/8/02	5/14/02	5/20/02	5/26/02	6/1/02	6/7/02	6/13/02	6/19/02	Average	
HUD	50	58	22	22	28	20	55	32	36	
EDI	40	56	18	21	31	18	50	32	33	
WIL	37	54	47	19	21	17	41	31	33	
LB Station	NS	NS	16	27	24	21	34	30	25	

2001 Spring/Summer Organic Carbon Ambient Concentration Results										
Location	5/8/02	5/14/02	5/20/02	5/26/02	6/1/02	6/7/02	6/13/02	6/19/02	Average	
HUD	5.4	4.8	3.3	2.1	1.8	2.4	5.0	2.4	3.4	
EDI	3.4	4.5	3.1	2.3	2.6	2.0	3.5	2.8	3.0	
WIL	2.8	4.5	2.2	1.9	2.0	2.4	3.2	2.6	2.7	

2001 Spring/Summer Elemental Carbon Ambient Concentration Results										
Location	5/8/02	5/14/02	5/20/02	5/26/02	6/1/02	6/7/02	6/13/02	6/19/02	Average	
HUD	3.5	2.2	2.6	0.9	1.0	1.2	3.5	1.0	2.0	
EDI	1.5	2.0	1.7	1.1	0.8	0.9	1.7	0.9	1.3	
WIL	1.1	1.8	0.7	0.8	0.5	1.1	1.3	1.1	1.0	

2001 Spring/Summer Total Carbon Ambient Concentration Results										
Location	5/8/02	5/14/02	5/20/02	5/26/02	6/1/02	6/7/02	6/13/02	6/19/02	Average	
HUD	8.9	7.1	5.9	3.1	2.8	3.6	8.5	3.4	5.4	
EDI	4.9	6.5	4.9	3.4	3.4	3.0	5.2	3.7	4.4	
WIL	3.8	6.3	2.9	2.7	2.5	3.5	4.5	3.7	3.7	

2001 Spring/Summer PM ₁₀ Ambient Concentration Results										
Location	5/25/01	5/31/01	6/6/01	6/12/01	6/18/01	6/24/01	6/30/01	Average		
HUD	39	70	47	34	63	36	38	47		
EDI	31	67	41	32	49	36	33	41		
WIL	39	56	43	36	47	35	35	42		
LB Station	30	48	45	29	43	32	37	38		

2001 Spring/Summer Organic Carbon Ambient Concentration Results										
Location	5/25/01	5/31/01	6/6/01	6/12/01	6/18/01	6/24/01	6/30/01	Average		
HUD	3.6	6.6	4.6	3.1	6.1	3.2	3.4	4.4		
EDI	3.4	5.1	4.9	2.5	4.9	3.4	3.3	3.9		
WIL	4.1	3.7	4.0	3.2	4.8	3.1	3.1	3.7		

2001 Spring/Summer Elemental Carbon Ambient Concentration Results										
Location	5/25/01	5/31/01	6/6/01	6/12/01	6/18/01	6/24/01	6/30/01	Average		
HUD	1.7	3.9	2.0	1.1	3.5	1.3	2.2	2.3		
EDI	1.0	2.9	1.6	1.1	3.0	1.2	1.5	1.8		
WIL	2.3	1.2	1.8	1.1	2.1	1.1	0.9	1.5		

2001 Spring/Summer Total Carbon Ambient Concentration Results										
Location	5/25/01	5/31/01	6/6/01	6/12/01	6/18/01	6/24/01	6/30/01	Average		
HUD	5.3	10.5	6.6	4.2	9.6	4.6	5.6	6.6		
EDI	4.4	8.0	6.5	3.6	7.9	4.7	4.8	5.7		
WIL	6.4	4.9	5.8	4.3	6.9	4.2	4.0	5.2		

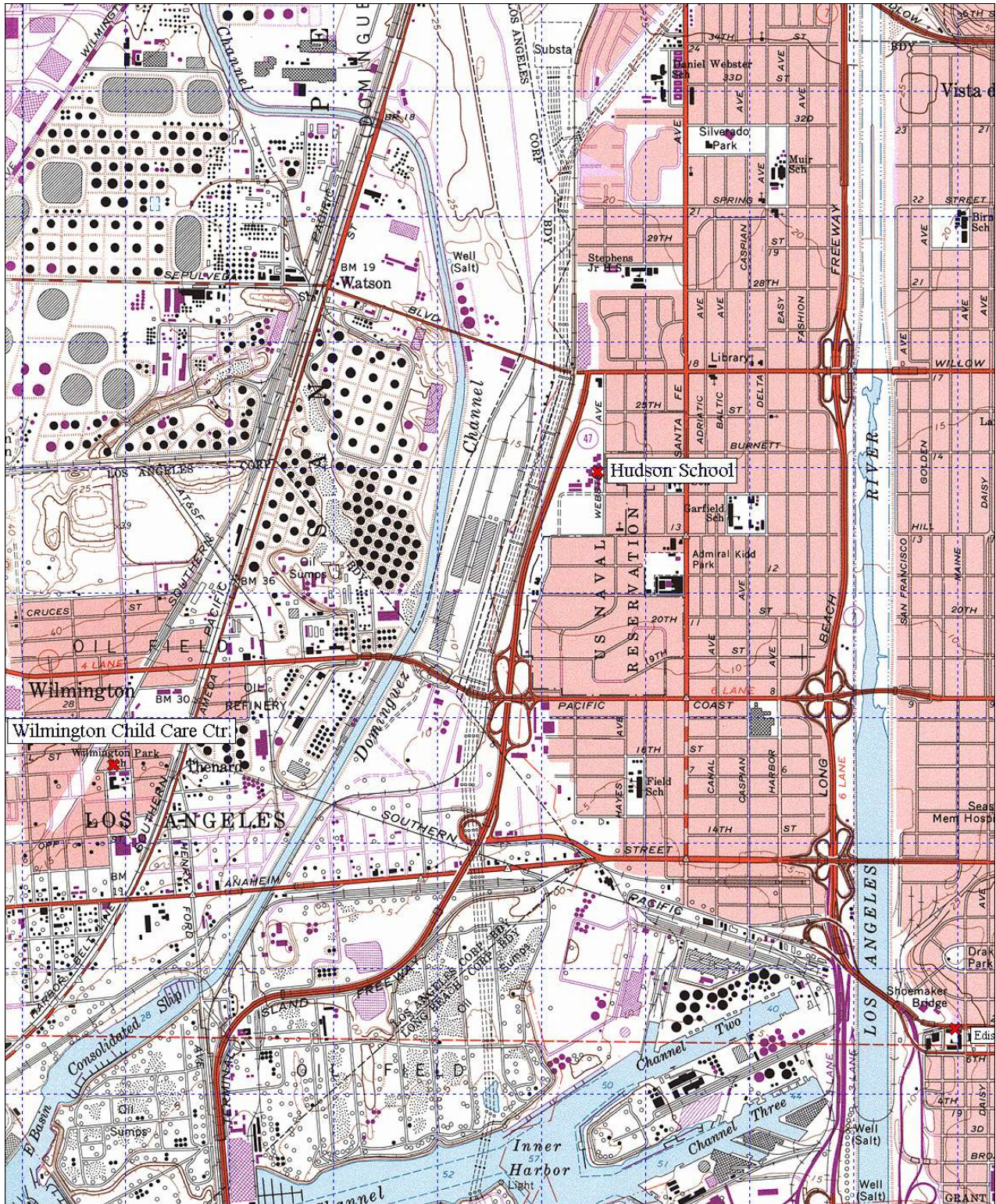
APPENDIX A-1

RULE 1158 LONG BEACH PM₁₀ MONITORING DATA (CONTINUED)

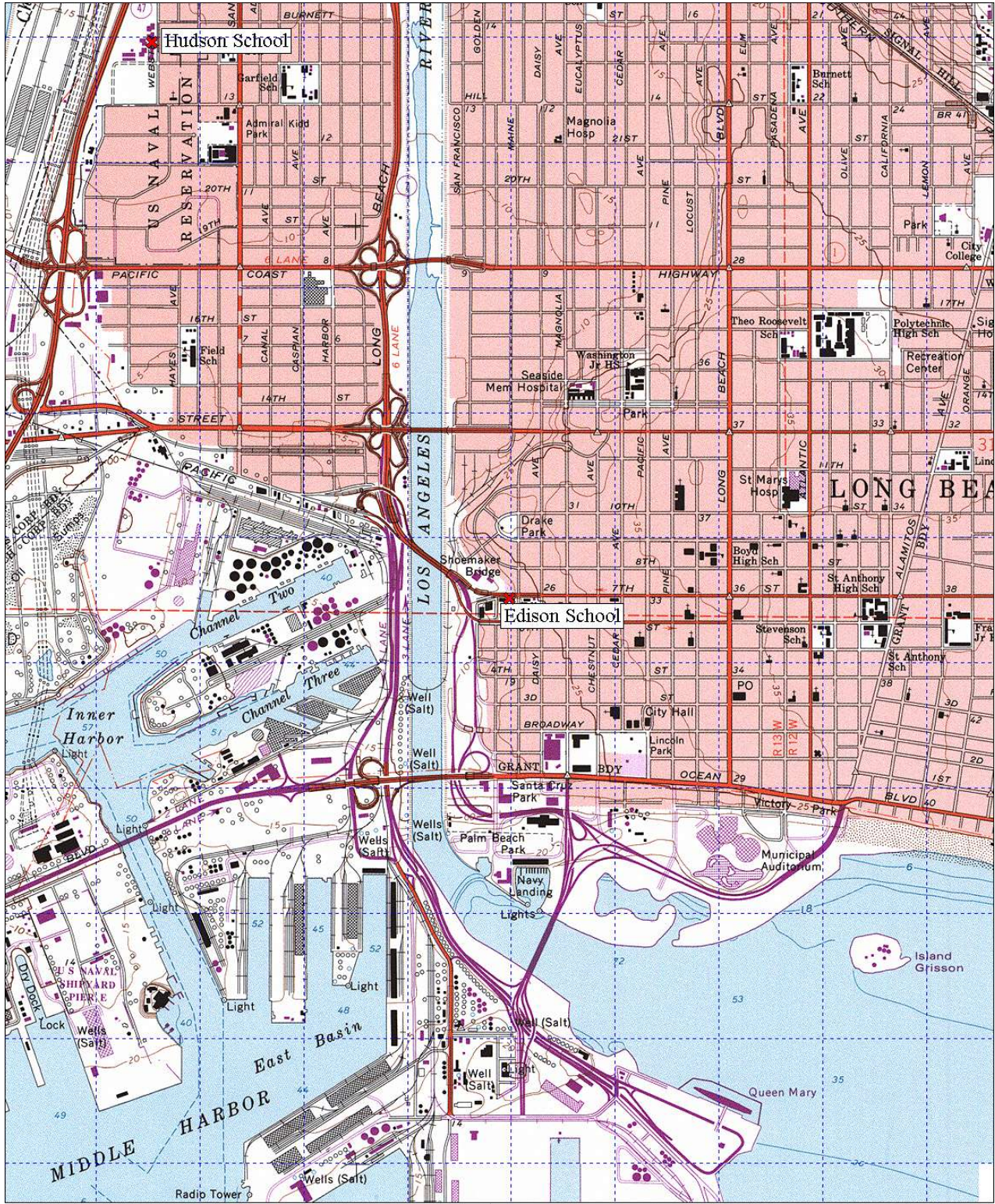
2000 Spring/Summer PM ₁₀ Ambient Concentration Results								
Location	5/24/00	5/30/00	6/5/00	6/11/00	6/17/00	6/23/00	6/29/01	Average
HUD	27	31	40	32	18	19	42	30
EDI	20	28	37	31	25	17	35	28
WIL	22	38	41	33	19	24	37	31
LB Station	*	*	32	30	17	19	34	26
* No Sample								
2000 Spring/Summer Organic Carbon Ambient Concentration Results								
Location	5/24/00	5/30/00	6/5/00	6/11/00	6/17/00	6/23/00	6/29/01	Average
HUD	2.9	2.6	3.8	3.0	2.3	2.0	3.7	2.9
EDI	2.5	2.6	3.6	2.8	2.6	2.1	3.1	2.8
WIL	2.5	2.9	3.7	3.0	2.4	2.9	3.3	3.0
2000 Spring/Summer Elemental Carbon Ambient Concentration Results								
Location	5/24/00	5/30/00	6/5/00	6/11/00	6/17/00	6/23/00	6/29/01	Average
HUD	1.7	1.2	2.6	1.4	0.7	0.8	2.5	1.6
EDI	1.2	1.2	1.7	1.4	0.8	0.6	1.3	1.3
WIL	1.3	1.2	1.8	1.1	0.9	1.0	1.6	1.2
2000 Spring/Summer Total Carbon Ambient Concentration Results								
Location	5/24/00	5/30/00	6/5/00	6/11/00	6/17/00	6/23/00	6/29/01	Average
HUD	4.6	3.7	6.4	4.4	3	2.8	6.2	4.4
EDI	3.7	3.8	5.3	4.2	3.4	2.7	4.4	3.9
WIL	3.8	4.1	5.5	4.1	3.3	3.9	4.9	4.2

1997 Spring/Summer PM ₁₀ Ambient Concentration Results								
Location	5/4/97	5/8/97	5/12/97	5/14/97	5/20/97	5/22/97	5/27/97	Average
HUD	48	50	36	*	32	39	58	44
EDI	*	*	*	*	*	*	*	*
WIL	43	50	35	42	30	36	48	41
LB Station								
* No Sample								
1997 Spring/Summer Organic Carbon Ambient Concentration Results								
Location	5/20/97	5/22/97	5/27/97	Average				
HUD	3.6	4.3	6.9	4.9				
EDI	*	*	*	*				
WIL	4.1	4.2	5.8	4.7				
1997 Spring/Summer Elemental Carbon Ambient Concentration Results								
Location	5/20/97	5/22/97	5/27/97	Average				
HUD	2.3	2.4	5.4	3.4				
EDI	*	*	*	*				
WIL	1.2	1.6	3.3	2.0				
1997 Spring/Summer Total Carbon Ambient Concentration Results								
Location	5/20/97	5/22/97	5/27/97	Average				
HUD	5.9	6.7	12.3	8.3				
EDI	*	*	*	*				
WIL	5.3	5.8	9.1	6.7				

A-2 SAMPLING LOCATION DETAIL MAPS

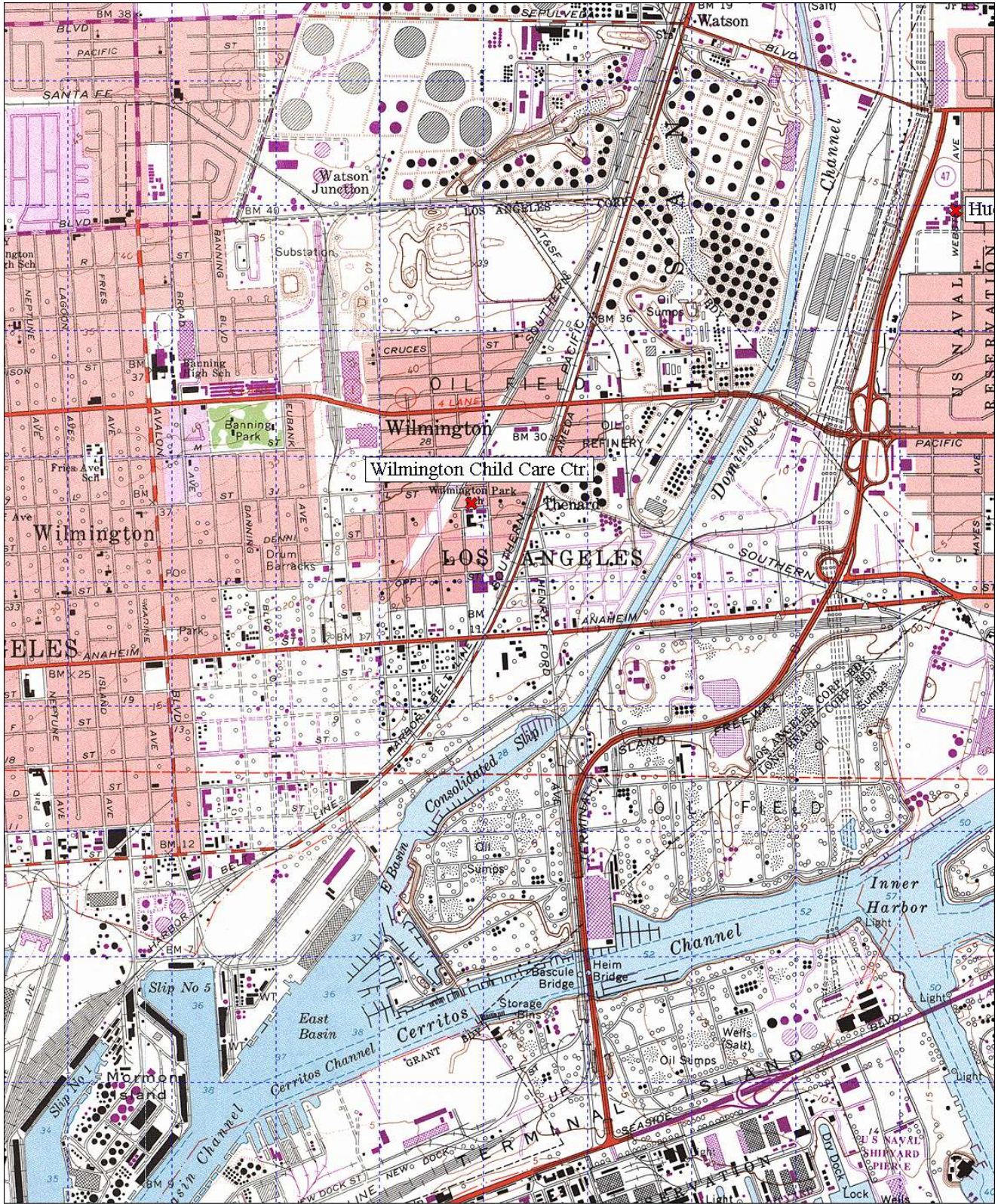


Hudson School and Surrounding Area

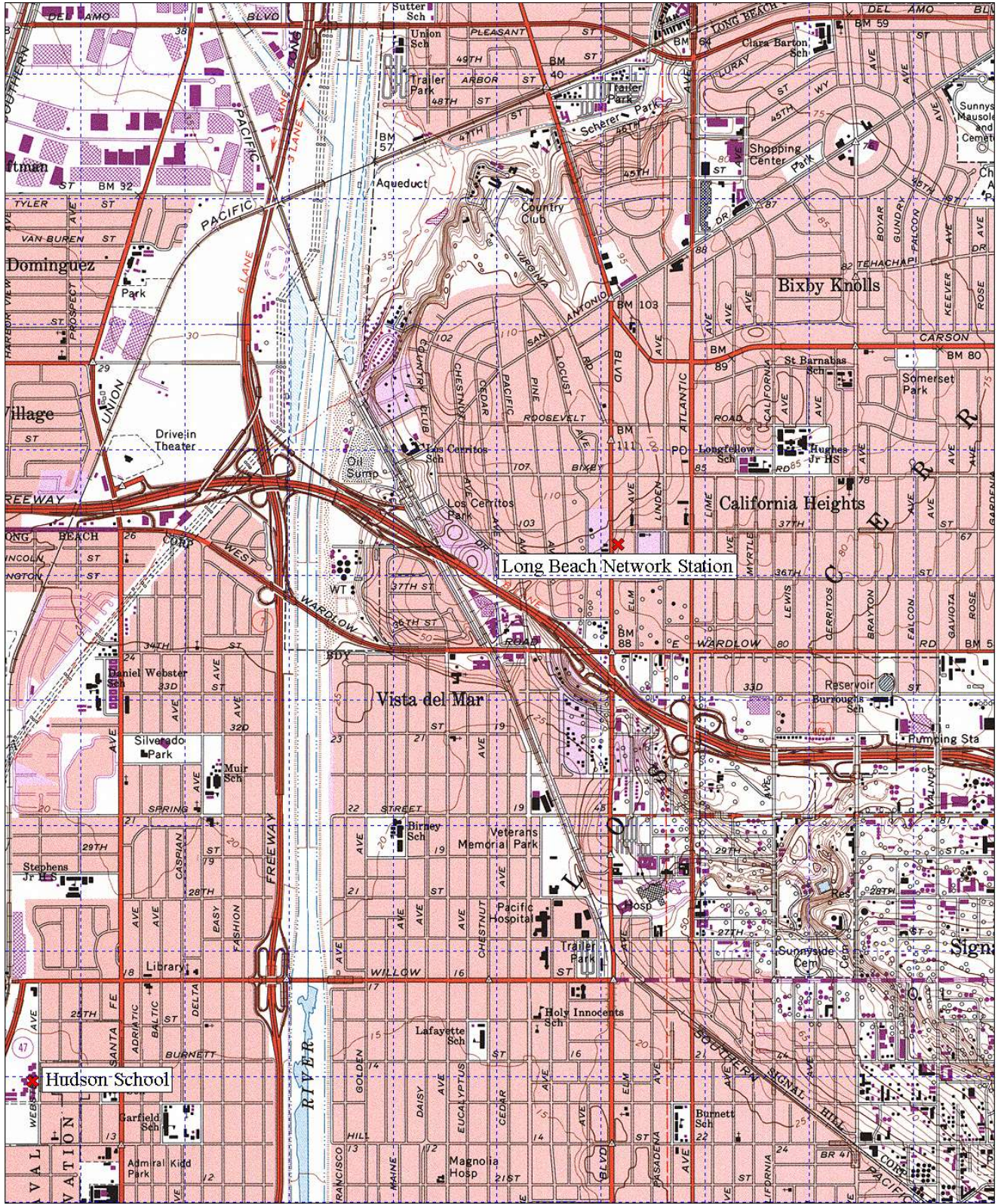


0 1000 FEET 0 1/2 1 MILE
0 500m 1000m
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Edison School and Surrounding Area



Wilmington Childcare Center and Surrounding Area



0 1000 FEET 0 1/2 500 m 1000 m
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Long Beach Station and Surrounding Area