UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

REPORT ON RECOMMENDED LIST OF STRUCTURES FOR SEISMIC INSTRUMENTATION IN THE LOS ANGELES REGION

The U.S. Geological Survey Strong-Motion Instrumentation of Structures Advisory Committee for Los Angeles Region

(Report compiled by M. Çelebi)

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OUTLINE

I. INTRODUCTION

The Los Angeles area is a seismically active region requiring earthquake hazard mitigation programs including those related to the investigation of strong shaking of structures. As part of its earthquake hazard reduction planning, the United States Geological Survey (USGS) identified the Los Angeles area as one of the regions for the implementation of a structural instrumentation program to further these studies. Selection of structures for strong-motion instrumentation is accomplished by establishing advisory committees in the various seismic regions, including the Los Angeles area.

In the State of California, the most extensive program for the instrumentation of structures is being conducted by the California Division of Mines and Geology (CDMG). Therefore, in California, the objective of the USGS program is to complement that of the CDMG program, which is readily accomplished, since the CDMG and the USGS programs for instrumentation of structures within the State of California have distinct objectives. The CDMG program is required by law to instrument typical buildings and structural systems. On the other hand, the USGS structural instrumentation program concentrates on research studies of non-typical structures of special engineering interest. Typical structures that are not thoroughly instrumented by other programs are also considered. The USGS program is in addition to the large USGS permanent network of ground stations.

It is important to note that instrumentation programs require considerable resources for planning and engineering, purchasing of equipment, electrical installation, periodic maintenance, documentation, and data processing. Therefore, it is doubly important to prevent duplication of efforts by cooperation at all stages of, and providing exchange of information on: network planning, instrumentation evaluation, data analysis and dissemination. Ultimately, both programs are serving to mitigate earthquake hazards.

This report outlines the efforts of the USGS advisory committee to prepare the recommended list of structures to be instrumented mainly within the City of Los Angeles, California but also covering the County of Los Angeles. Separate efforts are being carried out for Orange County. The San Bernardino region was covered in a previous report [1].

II. THE STATUS OF STRUCTURAL INSTRUMENTATION PROGRAMS OF THE USGS

The main objective of any seismic instrumentation program for structural systems is to improve the understanding of the behavior, and potential for damage, of structures under seismic loading. The acquisition of structural response data during earthquakes is essential to confirm and develop methodologies used for analysis and design of earthquake-resistant structural systems. This objective can best be realized by selectively instrumenting structural systems to acquire strong ground motion data, and the response of structural systems (buildings, components, lifeline structures, etc.) to the strong ground motion. As a long-term result one may expect design and construction practices to be modified to minimize future earthquake damage [2].

Various codes in effect in the United States, whether nationwide or local, recommend different quantities and schemes of instrumentation. The Uniform Building Code (UBC) [3] recommends for Seismic Zones 3 and 4 a minimum of three accelerographs be placed in every building over six stories in height with an aggregate floor area of 60,000 feet or more, and in every building over 10 stories in height regardless of floor area. The City of Los Angeles adopted this recommendation in 1966—thus enabling numerous sensors in buildings to record the motions during the 1971 San Fernando Earthquake. Experience from past earthquakes as well as the 1971 San Fernando Earthquake show that the instrumentation guidelines given by the UBC code, for example, although providing sufficient data for the limited analyses projected at the time, do not provide sufficient data to perform the model verifications and structural analyses now demanded by the profession. The City of Los Angeles, in 1983, changed the requirement of three accelerographs to only one—to be placed at the top of buildings meeting the criteria.

On the other hand, valuable lessons have been derived from the study of data obtained from a well-instrumented structure, the Imperial County Services Building, during the moderate magnitude Imperial Valley earthquake ($M_s = 6.5$) of October 15, 1979 [4].

To reiterate, it is expected that a well-instrumented structure for which a complete set of recordings has been obtained, would provide useful information to:

- check the appropriateness of the design dynamic model (both lumped mass and finite element) in the elastic range;

- determine the importance of non-linear behavior on the overall and local response of the structure;
- follow the spreading of the non-linear behavior throughout the structure as the response increases, and investigate the effect of the non-linear behavior on frequency and damping;
- correlate the damage with inelastic behavior;
- determine ground motion parameters that correlate well with building response damage; and
- make recommendations to improve seismic codes.

To enhance the effort in instrumentation of structures, the USGS recently established an advisory committee program. The advisory committees are regional committees comprised of professionals from universities, state, federal, and local government agencies, and private companies. The advisory committees are formed in regions of seismic activity and are requested to develop recommended lists of structures for possible instrumentation. The first of these committees was formed in the San Francisco Bay Region [2]. The second committee was formed in San Bernardino County [1]. Other committees followed.

A general description of the targeted regions for structural instrumentation is shown in the map in Figure 1. Whether committees have been formed in these targeted regions and whether reports have been issued by the committees are indicated in Figure 2.

III. SEISMICITY OF THE LOS ANGELES REGION

Earthquake hazards in the Los Angeles region have been recently documented in detail in a USGS professional paper (No. 1360) compiled by Ziony [5]. While the San Andreas fault is considered potentially to be the major active fault with an average slip rate of 20–30 mm/yr, other active faults also affect the seismic hazard in Los Angeles. Of these, the most important are the San Jacinto fault (slip rate of 8–12mm/yr), the Transverse Ranges faults extending from Santa Barbara to San Berbardino (6mm/yr), Palos Verdes faults

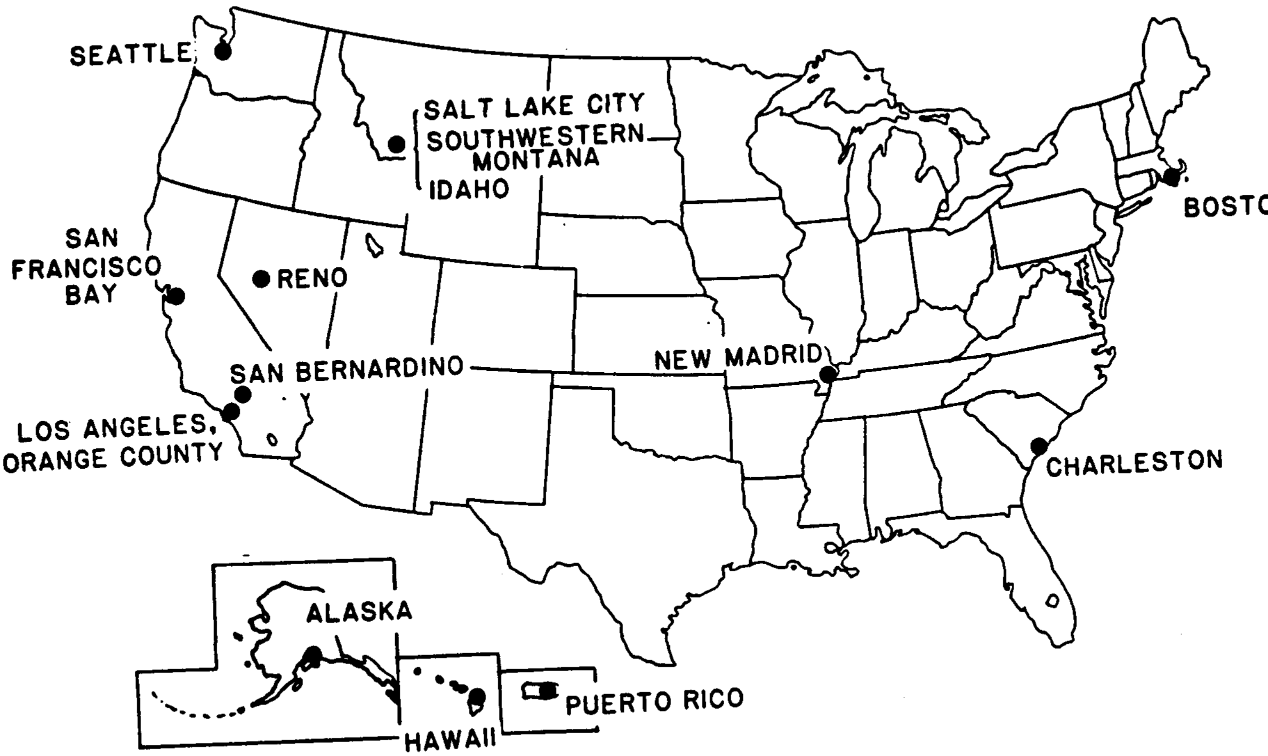

Figure 1. Targeted seismic regions for instrumentation of structures program.

Advisory Committees for Structural Instrumentation

Regions Considered	Committee Formed	Report Completed
San Francisco Area	●	●
San Bernardino	●	●
Los Angeles	●	●
Orange County	●	
Charleston, SC (Southeast)	●	●
Boston, MA (Northeast)	●	
New Madrid	●	●
Seattle, WA (Northwest)	●	
Utah, Idaho, SW Montana (Mountain Region)		
Alaska	●	●
Reno		
Hawaii	●	
Puerto Rico	●	

Figure 2. Current status of Advisory Committees.

(1mm/yr) and the Newport– Inglewood fault (1mm/yr) [6]. The San Andreas and San Jacinto faults generate earthquakes with magnitudes of 7.5–8.0 and recurrence intervals of only tens of years [6,7].

Los Angeles is therefore threatened by both near-field earthquakes as well as the distant effects of earthquakes that occur at distances of 50 miles or more. The 1971 San Fernando Earthquake (approximately 50 miles from downtown Los Angeles) caused considerable damage in the city. During this earthquake, a significant number of records was obtained from buildings instrumented according to the UBC recommendations [3].

IV. STRUCTURES INSTRUMENTED

The Los Angeles seismic region contains several buildings, dams and bridges that are extensively instrumented for strong-motion structural response studies either by the CDMG or the USGS program. These are summarized in Table 1. In the map provided in Figure 3, the locations of these structures are shown. Although this report is on Los Angeles, both Table 1 and Figure 3 covers Orange County data also.

In addition to the list of extensively instrumented structures provided in Table 1, there are numerous buildings instrumented according to the UBC recommendations [3]. These buildings were instrumented for safety evaluation; not for structural response data used for engineering analysis. A comprehensive list of these buildings provided by the City of Los Angeles is compiled in Appendix A.

V. SELECTION CRITERIA AND STRUCTURES RECOMMENDED FOR INSTRUMENTATION

Given the diversity of the structures in Los Angeles the advisory committee decided to concentrate only on those structures from which response information would be most desirable. Therefore an elaborate list and criteria for ranking were not used. Instead, only 15 structures have been considered. These were ranked using a simplified version of the criteria used in the San Bernardino Report [1].

In the selection process, a specific site term that incorporates the proximity to any of the fault systems was not considered. The reason for this is that there are a great number of faults in the region and all of the 15 structures included in this report are assumed to

Table 1: Structures Extensively Instrumented for Strong-Motion Response Studies in Los Angeles and Orange Counties (as of September 1986)

City	Map* Number	Building	Location	Structure	Program
		Buildings			
Burbank	1.	Calif. Federal Savings		6–story	CDMG
	2.	Pacific Manor		10–story	CDMC
Irvine	3.	Eng. Building	U.C. Irvine	RC**, 7–story	CDMC
Lancaster	4.	Control Tower	Airport	—	CDMC
Long Beach	5.	Harbor Admin. Bld.	L.B. Harbor	Steel, 7–story	CDMC
	6.	Eng. Building	Cal. State Long Beach	RC, 5–story	CDMC
Los Angeles	7.	Admin. Bldg.	Cal. State LA	7–story	CDMC
	8.	Bullock's	Century City Shopping Ctr	Steel, 3–story	CDMC
	9.	Holiday Inn	Van Nuys	RC, 7–story	CDMC
	10.	Hollywood Storage	Hollywood	RC, 14–story	CDMG
	11.	Math–Science Bldg.	UCLA	RC, 7–story	UCLA
	12.	Life–Sciences Bldg.	UCLA	RC, 7–story	UCLA
	13.	Sears Warehouse	East LA	5–story	CDMG
	14.	Sheraton Universal	Hollywood	RC, 20–story	CDMB
	15.	Union Bank	Sherman Oaks	13–story	CDMG
	16.	Wadsworth VA Hosp.	West LA	Steel, 6–story	VA/USGS
	17.	Century City Towers	Century City	Steel–42 story	UCLA
	18.	Wilshire Finance Bldg.	Downtown LA	Steel, 32–story	USGS/JCG
Newport Beach	19.	Pacific Mutual (2)	Newport Center	RC, 7–story	USGS
Norwalk	20.	Bechtel Bldg.		Steel, 6–story	USGS/BECHTEL
Palmdale	21.	Holiday Inn		Conc. Block, 4–story	CDMG
Pasadena	22.	Millikan Library	Caltech	RC, 9–story	CIT
	23.	Bldg. 238	JPL	7–story	CIT

	Map* Number	Location	Structure		
		Dams			
Live Oak	24.	La Verne	Earthfill	MWD/USGS	
Los Angeles	25.	San Fernando Valley	Earthfill	LAWD	
Pacoima	26.	Sylmar	Concrete	CDMG	
Puddingstone	27.	San Dimas	Earthfill	CDMG	
		Bridge			
Vincent Thomas	28.	L. A. Harbor	Steel	CDMG	

* Numbers coded to map in Figure 3
**RC–reinforced concrete

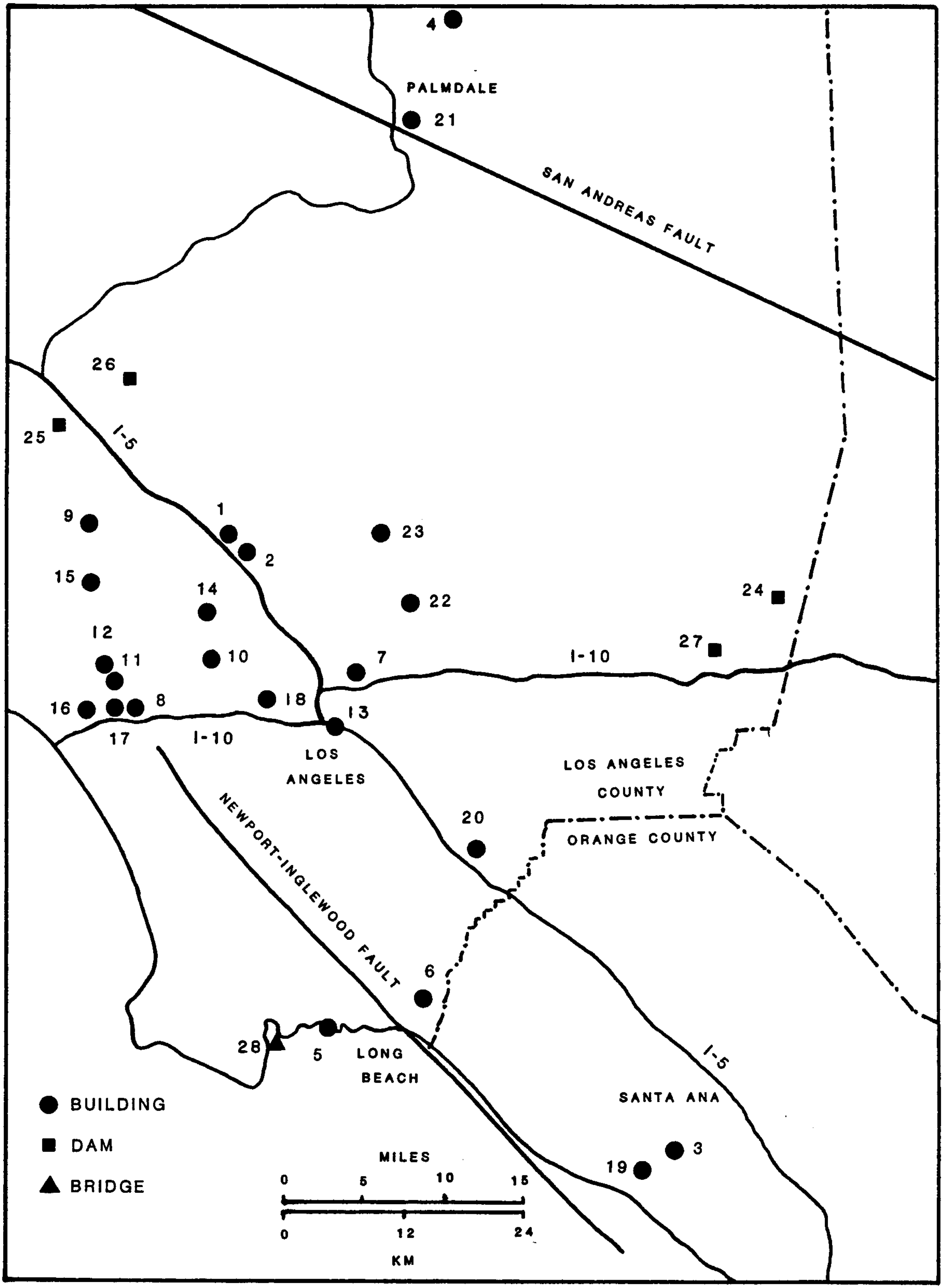

Figure 3. Location map of extensively instrumented structures in Los Angeles and Orange Counties (numbers of structures sites are coded according to Table 1).

have the same expected general level of shaking—excluding any consideration for the effect of local geology. In other words, there is no specific way to quantify the level of shaking at the site of one structure with respect to the level of shaking at the site of another structure.

On the other hand, structural parameters used in the San Bernardino report [1] were also simplified. Three separate factors (F) related to the following parameters were adopted:

- Material of Construction—1.0 for reinforced concrete, 0.5 for steel and 0.25 for timber;
- Complexity of Structure—Anti-symmetry/symmetry; or irregular/regular. 1.0 for anti-symmetry and 0.5 for symmetry;
- Special Interest—This parameter indicates the special interest the members of the committee show in the particular structure. A maximum of 3.5 has been used.

The overall index (I) by which the structures are ranked thus became:

$$I = [F_{\text{material}}] + [F_{\text{complexity of structure}}] + [F_{\text{special interest}}]$$

Description of the 15 structures considered are provided in Table 2. Rating of these structures according to the simplified criteria is tabulated in Table 3.

VI. IMPLEMENTATION AND RECORDS ALREADY OBTAINED

It should be mentioned that while the committee was deliberating, the 1100 Wilshire Finance Building (Tables 2 and 3), then under construction, was made available for instrumentation by the owner and the structural engineering design company. The committee voted to go ahead with the instrumentation of the building and, as of the summer of 1986, the instrumentation of the building has been completed.

In Figure 4, the instrumentation scheme designed and implemented at the 1100 Wilshire Finance Building is provided. Accordingly, the instrumentation scheme is designed to record:

Table 2: Description of Buildings Considered for Strong-Motion Instrumentation

	Downtown LA	
1.)	Bunker Hill Senior Citizen Olive St. (south of 1st St.)	16–story *precast* concrete heart-module units; precast concrete walls, floors.
2.)	Beaudry 1 333 S. Beaudry	29–story, concrete ductile frames at perimeter with flat plate/large drop-panel floor system.
3.)	Grand Financial Plaza 801 S. Grand	22–story, shear walls at core with ductile steel frames (25%) at perimeter.
4.)	Sheraton Grande 333 S. Figueroa St.	13–story, shear wall, with post-tension flat plate; irregular, parabolic shaped.
5.)	Jewelry Mart 550 S. Hill St.	16–story, braced steel frames with trusses.
6.)	Wilshire Finance Bldg. 1100 Wilshire Blvd.	32–story steel frame, plan changes from rectangular to triangular after 12th floor.
7.)	California Plaza 300 S. Grand	steel frame.
	West LA	
8.)	Hughes Office Bldg. 6900 S. Sepulveda Blvd.	16–story ductile steel frames; irregular, with piles (on fill), dynamic analysis performed.
9.)	Mirabella Condos. 10430 Wilshire Blvd.	21–story condos., two interconnected tubes, dynamic analysis performed.
10.)	Westwood Manor 10535 Wilshire Blvd.	18–story masonry shear walls and precast planks with untopped slabs.
	Valley	
11.)	Getty Oil Bldg. 3838 Lankershim Studio City	36–story, eccentrically-braced frames at core with perimeter ductile steel frames (25%), dynamic analysis performed.
12.)	Trillium–Warner Ranch Bldg. 6310–30 Canoga Ave. (one tower not started)	Two 16–story ductile steel frames; piles w/high water table; located on the far west side of the valley; dynamic analysis performed.
13.)	Sherman Oaks Galleria 15301 Ventura Blvd.	4–story shopping center with multiple steel frames in each direction.
14.)	Continental Can Bldg. 8201 Woodley	1–story, 35′ high tilt-up concrete wall panels, with 292′ × 377′ plywood diaphragm.
	San Pedro	
15.)	Holiday Inn 19800 S. Vermont Ave. (not started)	13–story hotel, shear walls with one-way concrete slab; on spread footings—near fault line; typ. corridor shear walls in long direction with perimeter shear walls in short direction.

Table 3: Rating of Structures—LA City

Structure		M*	C*	I*	Total
1.)	Wilshire Finance Bldg.**	.5	1.0	3.5	5.0
2.)	Bunker Hill Senior Citizens	1.0	0.5	3.0	4.5
3.)	Sheraton Grande Hotel	1.0	1.0	2.0	4.0
4.)	Grand Financial Plaza	0.75	1.0	2.0	3.75
5.)	Beaudry One	1.0	1.0	1.5	3.5
6.)	Westwood Manor	1.0	0.75	1.5	3.25
7.)	Hughes Office Bldg.	0.5	1.0	1.5	3.0
8.)	Holiday Inn	1.0	0.5	1.5	3.0
9.)	California Plaza	.5	1.0	1.5	3.0
10.)	Continental Can Bldg.	0.62	0.5	1.5	2.62
11.)	Jewelry Mart	0.5	0.5	1.5	2.50
12.)	Mirabella Condos	0.5	0.5	1.5	2.50
13.)	Getty Oil Bldg.	0.5	0.5	1.5	2.50
14.)	Trillium-Warner Ranch Bldg.	0.5	0.5	1.5	2.50
15.)	Sherman Oaks Galleria	0.5	0.5	1.5	2.50

*M–material, C–complexity, I–interest
**Now instrumented

- translational and torsional motions at various levels of the structure.
- the effect of abrubt change of stiffness on the dynamic behavior of the structure.
- rocking motions at the basement, if any.
- soil-structure interaction effects, if any.

During the Whittier-Narrows earthquake of October 1, 1987 $M_s = 5.6$, significant set of data (21 channels) was recorded at this building as well as other structures[8]. The data set obtained from this unique building is provided in Figure 5 (basement motions) and Figure 6 (superstructure motions).

VII. CONCLUSIONS

This report represents the efforts of the USGS–Los Angeles area advisory committee for strong-motion instrumentation of structures. The committee worked over a period of two years and compiled the list of structures and developed the simplified criteria for ranking them. The committee does not claim that the list or the areas covered within the Los Angeles County is by any means complete. However, the recommendations are a beginning and it is hoped that in the future other structures in the Los Angeles region that were not covered in this report can also be considered as funds become available.

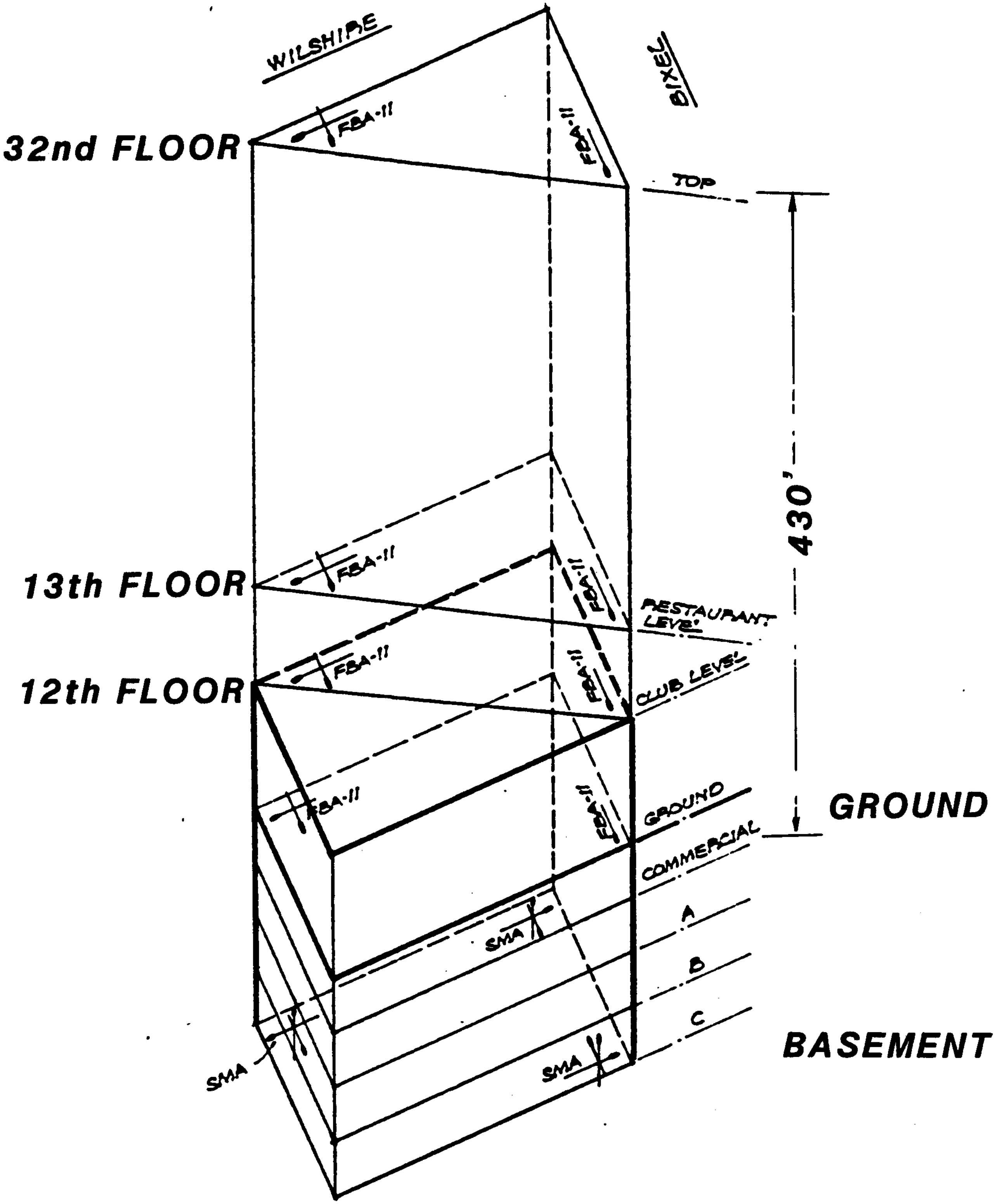

Figure 4. Instrumentation scheme of the 1100 Wilshire Finance Building.

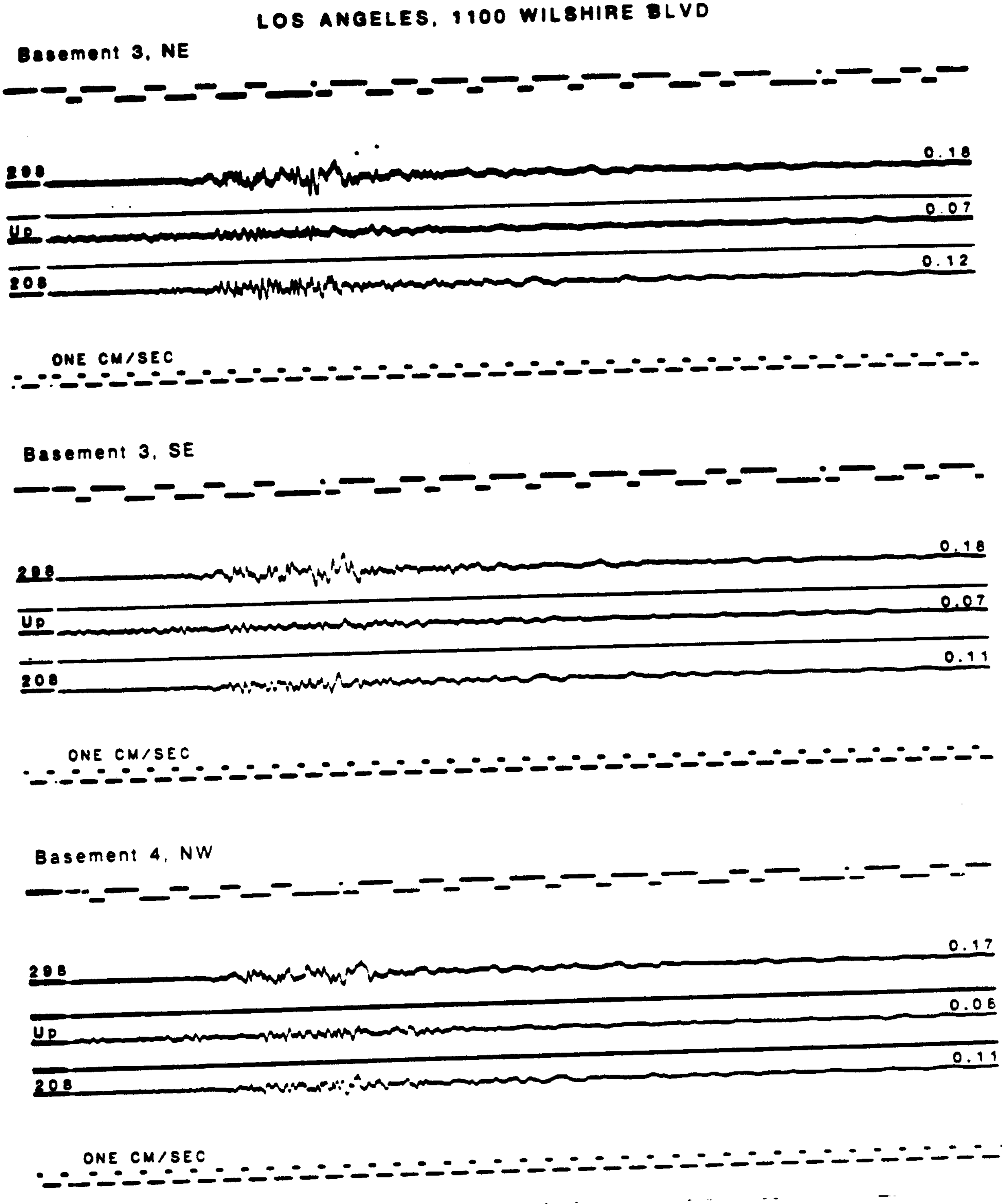

Figure 5. Acceleration records obtained at the basement of the 1100 Wilshire Finance Building.

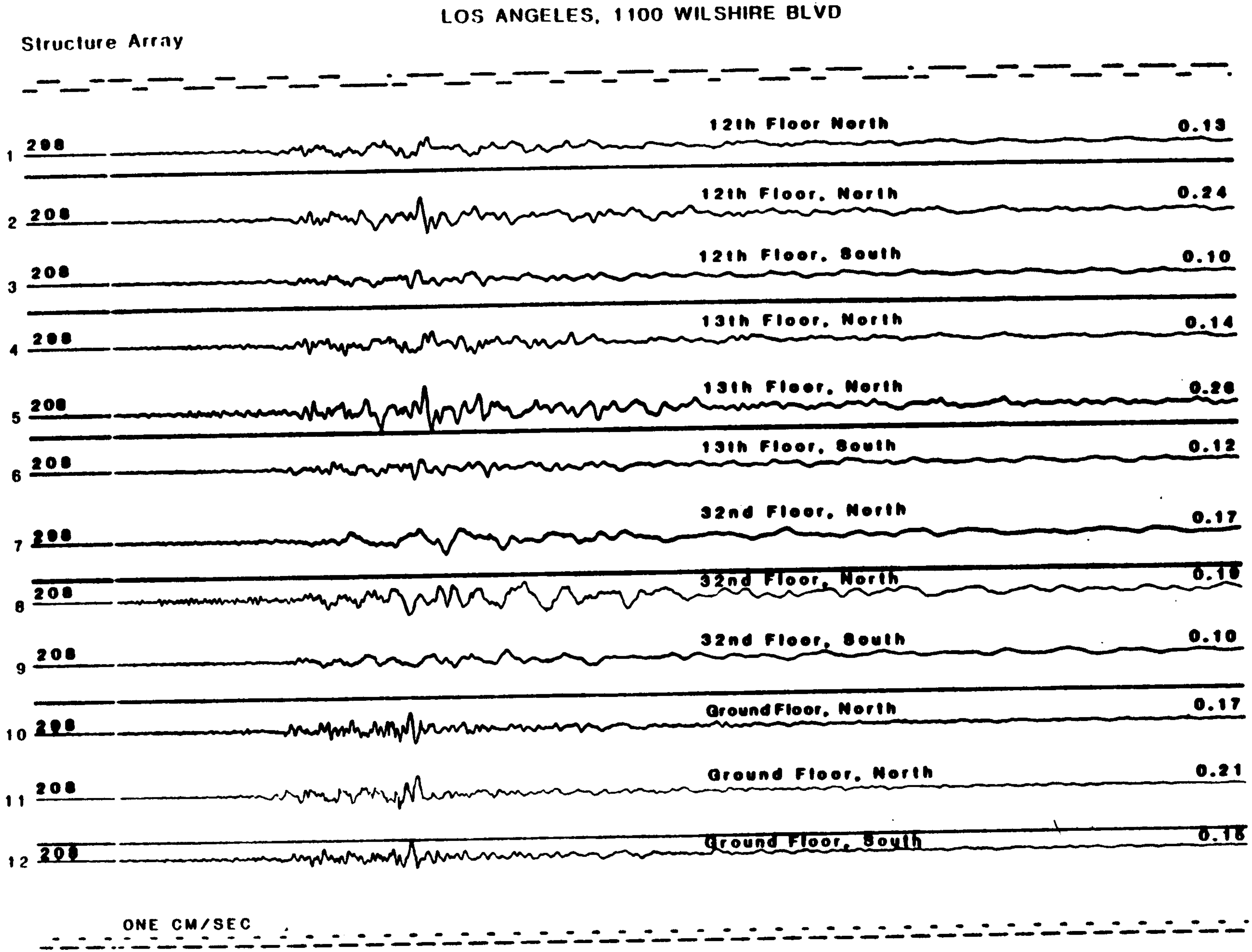

Figure 6. Acceleration records obtained at different levels of the 1100 Wilshire Finance Building.

REFERENCES

[1.] Celebi, M. (Chairman), *et al.*, 1985, Report on recommended list of structures for seismic instrumentation in San Bernardino County, California: *U. S. Geol. Surv. Open-File Rep.* **85–583**.

[2.] Celebi, M. (Chairman) *et al.*, 1984, Report on recommended list of structures for seismic instrumentation in the San Francisco Bay region: *U. S. Geol. Surv. Open-File Rep.* **84–488**.

[3.] Uniform Building Code, *International Conference of Building Officials*, Whittier, CA, 1970, 1976, 1982 edition.

[4.] Rojahn, C. and Mork, P. N., 1982, An analysis of strong motion data from a severely damaged structure—The Imperial County Services Building, El Centro, California, *in* The Imperial Valley, California, earthquake of October 15, 1979: *U. S. Geol. Surv. Prof. Pap.* **1254**.

[5.] Ziony, J. I.(editor), 1985, Evaluating Earthquake Hazards in the Los Angeles Region—An Earth-Science Perspective, *U. S. Geol. Surv. Prof. Pap.* **1360**.

[6.] Ziony, J. I. and Yerkes, R. F., 1985, Evaluating Earthquake Potential and Surface-Faulting Potential, *in* Evaluating Earthquake Hazards in the Los Angeles Region—An Earth-Science Perspective, edited by J. I. Ziony, *U. S. Geol. Surv. Prof. Pap.* **1360**.

[7.] Lindh, A., G., 1983, Preliminary Assessment of Long-Term Probabilities of Large Earthquakes Along Selected Fault Segments of the San Andreas Fault System in California, *U. S. Geol. Surv. Open-File Rep.* **83—63**.

[8.] Etheredge, E. and Porcella, R., 1987, Strong-motion data from the October 1, 1987 Whittier Narrows earthquake, *U. S. Geol. Surv. Open-File Rep.* **87–616**.

APPENDIX A

LIST OF STRUCTURES IN LOS ANGELES WITH CODE-TYPE INSTRUMENTATION

List prepared by the City of Los Angeles

ADDRESS

1) 9750 AIRPORT BL
2) 9841 AIRPORT BL
3) 201 ALVARADO S.
4) 727 ARDMORE S
5) 1900 AVENUE OF THE STARS
6) 1901 AVENUE OF THE STARS
7) 2020 AVENUE OF THE STARS
8) 2040 AVENUE OF THE STARS
9) 2055 AVENUE OF THE STARS
10) 2121 AVENUE OF THE STARS
11) 212 BAILEY
12) 233 BEAUDRY AV S
13) 333 BEAUDRY AV S
14) 8720 BEVERLY BL
15) 1125 BEVERLY DR S
16) 1150 BEVERLY DR S
17) 1177 BEVERLY DR S
18) 600 BROADWAY N
19) 18370 BURBANK BL
20) 18425 BURBANK BL
21) 6310-22 CANOGA AVENUE
22) 4827 CENTRAL AV S
23) 5200 CENTURY BL W
24) 5249 CENTURY BL
25) 5250 CENTURY BL W
26) 5400 CENTURY BL W
27) 5747 CENTURY BL
28) 5855 CENTURY BL
29) 5933 CENTURY BL
30) 5959 CENTURY BL
31) 5985 CENTURY BL
32) 6033 CENTURY BL
33) 6101 CENTURY BL
34) 1800 CENTURY PARK EAST
35) 1801 CENTURY PARK EAST
36) 1875 CENTURY PARK EAST
37) 1840 CENTURY PARK EAST
38) 1880 CENTURY PARK EAST
39) 1888 CENTURY PARK EAST
40) 1925 CENTURY PARK EAST
41) 2029 CENTURY PARK EAST
42) 2049 CENTURY PARK EAST
43) 2070 CENTURY PARK EAST
44) 2080 CENTURY PARK EAST
45) 1801 CENTURY PARK WEST
46) 170 CHURCH LANE N
47) 18365 CLARK
48) 414 COMMERCIAL

ADDRESS

49) 600 COMMONWEALTH
50) 10117 CONSTELLATION
51) 100 DOHENY S
52) 300 DOHENY DR S
53) 1441 EASTLAKE AV
54) 1526 EDGEMONT
55) 1013 EIGHTH ST W
56) 4411 ELEVENTH AV
57) 701 EXPOSITION BL
58) 1200 FAIRFAX AV N
59) 201 FIGUEROA ST N
60) 222 FIGUEROA ST S
61) 227 FIGUEROA ST N
62) 234 FIGUEROA ST S
63) 333 FIGUEROA ST S
64) 404 FIGUEROA ST S
65) 445 FIGUEROA ST S
66) 515 FIGUEROA ST S
67) 800 FIGUEROA ST S
68) 888 FIGUEROA ST S
69) 3540 FIGUEROA ST S
70) 250 FIRST ST E
71) 328-36 1/2 FIRST ST E
72) 800 FIRST ST W
73) 333 FLOWER ST S
74) 444 FLOWER ST S
75) 515 FLOWER ST S
76) 525 FLOWER ST S
77) 555 FLOWER ST S
78) 533 FREMONT ST S
79) 1627 FULLER AV
80) 750 GARLAND AV
81) 300 GRAND AV S
82) 333 & 335 GRAND AV S
83) 420 GRAND AV S
84) 500 GRAND AV S
85) 801 GRAND AV S
86) 450 GRANDVIEW S
87) 944 GRATTAN ST
88) 1755 HIGHLAND AV N
89) 2005 HIGHLAND AV N
90) 930 HILLGARD
91) 200 HILL ST S
92) 220 HILL ST S
93) 255 HILL ST S
94) 550 HILL ST S
95) 1150 HILL ST
96) 6381 HOLLYWOOD BL

ADDRESS

97) 6383 HOLLYWOOD BL
98) 7060 HOLLYWOOD BL
99) 7080 HOLLYWOOD BL
100) 947 HOOVER ST. S
101) 3663 HOOVER ST S
102) 333 HOPE ST S
103) 400 HOPE ST S
104) 800 HOPE ST S
105) 3831 HUGHES AV
106) 9901 LA CIENEGA BL
107) 1441 LAKE AVE E
108) 3800 LANKERSHIM BL
109) 3838 LANKERSHIM BL
110) 4605 LANKERSHIM BL
111) 3010 LEEWARD AV
112) 8601 LINCOLN BL
113) 8639 LINCOLN BL
114) 120 LOS ANGELES ST S
115) 11035 MAGNOLIA BL
116) 200 MAIN ST N
117) 6255 MANCHESTER BL
118) 8055 MANCHESTER BL
119) 615 MANHATTAN PL S
120) 1640 MARENGO ST
121) 3620 MCCLINTOCK AV
122) 340 MESA S
123) 1818 MICHIGAN E
124) 2000 MIRAMAR W
125) 110 NINTH ST E
126) 600 NINTH ST W
127) 5660 NINETY-EIGHT ST W
128) 5700 NINETY-EIGHT ST
129) 6033 NINETY-EIGHT ST
130) 6050 NINETY-EIGHT ST W
131) 616 NORMANDIE S AV
132) 1427 NORMANDIE AVE N
133) 1428 NORMANDIE AVE N
134) 200 OLIVE ST S
135) 220 OLIVE ST S
136) 221 OLIVE ST S
137) 627 OLIVE ST S
138) 646 OLIVE ST S
139) 740 OLIVE ST S
140) 808 OLIVE ST S
141) 1605 OLYMPIC BL W
142) 1625 OLYMPIC BL W
143) 2555 OLYMPIC BL W
144) 11150 OLYMPIC BL
145) 11300 OLYMPIC BL
146) 11355 OLYMPIC BL
147) 11377 OLYMPIC BL

ADDRESS

148) 11444 OLYMPIC BL
149) 11835 OLYMPIC BL W
150) 1760 ORCHID AV N
151) 8244 ORION WAY
152) 14555 OSBORNE
153) 5916 OWENSMOUTH AV
154) 6301 OWENSMOUTH AV
155) 21555 OXNARD ST
156) 21800 OXNARD ST
157) 21810 OXNARD ST
158) 9911 PICO BL W
159) 120 ROBERTSON N
160) 18350 ROSCOE BL
161) 120 SAN VICENTE BL S
162) 321 SAN VICENTE BL S
163) 444 SAN VICENTE BL
164) 1020 SAN VICENTE BL S
165) 5877 SAN VICENTE BL S
166) 11611 SAN VICENTE BL
167) 11661 SAN VICENTE BL N
168) 11777 SAN VICENTE BL
169) 11980 SAN VICENTE BL
170) 10100 SANTA MONICA BL
171) 11111 SANTA MONICA BL
172) 3415 SEPULVEDA AVE
173) 4617 SEPULVEDA BL
174) 6900 SEPULVEDA BL
175) 8540 SEPULVEDA BL
176) 8055 SEPULVEDA BL
177) 100 SEVENTH ST W
178) 431 SEVENTH ST W
179) 700 SEVENTH ST W
180) 1200 SEVENTH ST W
181) 14500 SHERMAN CIRCLE
182) 14801 SHERMAN WAY
183) 611 SIXTH ST W
184) 800 SIXTH ST W
185) 888 SIXTH ST W
186) 3407 SIXTH ST W
187) 623 SPRING ST W
188) 1111 SUNSET BL
189) 4867 SUNSET BL
190) 4960 SUNSET BL W
191) 5000 SUNSET BL
192) 6255 SUNSET BL
193) 6430 SUNSET BL W
194) 6464 SUNSET BL
195) 6553 SUNSET BL
196) 6553 SUNSET BL
197) 210 TEMPLE ST
198) 717 TEMPLE ST W

ADDRESS

199) 1000 TEMPLE ST W
200) 1711 TEMPLE ST W
201) 455 THIRD ST W
202) 2131 THIRD ST W
203) 8436 THIRD ST W
204) 8631 THIRD ST W
205) 8635 THIRD ST W
206) 615 THIRTY-FIFTH PL W
207) 1015 THIRTY-FOURTH ST W
208) 1027 THIRTY-FOURTH ST W
209) 910 THIRTY-SEVENTY PL W
210) 945 TIVERTON
211) 455 UNION AV S
212) 936 UNION AV S
213) 30 UNIVERSAL CITY PLAZA
214) 555 UNIVERSAL TERRACE PKWY
215) 3440 UNIVERSITY
216) 15107 VANOWEN
217) 14724 VENTURA BL
218) 14800 VENTURA BL
219) 15250 VENTURA BL
220) 15260 VENTURA BL
221) 15303 VENTURA BL
222) 15433 VENTURA BL
223) 15760 VENTURA BL
224) 15910 VENTURA BL
225) 16000 VENTURA BL
226) 16055 VENTURA BL
227) 16133 VENTURA BL
228) 16255 VENTURA BL
229) 16311 VENTURA BL
230) 16633 VENTURA BL
231) 16661 VENTURA BL
232) 18321 VENTURA BL
233) 21031 VENTURA BL
234) 695 VERMONT AV N
235) 1300 VERMONT AV N
236) 19253 VERMONT AV N
237) 19800 VERMONT AV S
238) 3401 VIA DOLCE
239) 21300 VICTORY BL
240) 4222 VINELAND AV
241) 310-30 WASHINGTON BL
242) 415 WASHINGTON BL
243) 924 WESTWOOD BL
244) 600 WILSHIRE BL
245) 637 WILSHIRE BL
246) 707 WILSHIRE BL
247) 770 WILSHIRE BL
248) 800 WILSHIRE BL
249) 911 WILSHIRE BL
250) 1000 WILSHIRE BL
251) 1010 WILSHIRE BL

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252) 1055 WILSHIRE BL
253) 1100 WILSHIRE BL
254) 1200 WILSHIRE BL
255) 1245 WILSHIRE BL
256) 2500 WILSHIRE BL
257) 2560 WILSHIRE BL
258) 3055 WILSHIRE BL
259) 3250 WILSHIRE BL
260) 3255 WILSHIRE
261) 3303 WILSHIRE BL
262) 3333 WILSHIRE BL
263) 33455 WILSHIRE BL
264) 3435 WILLSHIRE BL
265) 3470 WILSHIRE BL
266) 3530 WILSHIRE BL
267) 3550 WILSHIRE BL
268) 3580 WILSHIRE BL
269) 3660 WILSHIRE BL
270) 3699 WILSHIRE BL
271) 3710 WILSHIRE BL
272) 3731 WILSHIRE BL
273) 4680 WILSHIRE BL
274) 4929 WILSHIRE BL
275) 5900 WILSHIRE BL
276) 6100 WILSHIRE BL
277) 6200 WILSHIRE BL
278) 6300 WILSHIRE BL
279) 6420 WILSHIRE BL
280) 8484 WILSHIRE BL
281) 10350 WILSHIRE BL
282) 10390 WILSHIRE BL
283) 10430 WILSHIRE BL
284) 10445 WILSHIRE BL
285) 10535 WILSHIRE BL
296) 10550 WILSHIRE BL
297) 10551 WILSHIRE BL
298) 10590 WILSHIRE BL
299) 10601 WILSHIRE BL
290) 10660 WILSHIRE BL
291) 10740 WILSHIRE BL
292) 10747 WILSHIRE BL
293) 10750 WILSHIRE BL
294) 10751 WILSHIRE BL
295) 10790 WILSHIRE BL
296) 10850 WILSHIRE BL
297) 10866 WILSHIRE BL
298) 10880 WILSHIRE BL
299) 10920 WILSHIRE BL
300) 10960 WILSHIRE BL
301) 10990 WILSHIRE BL
302) 11600 WILSHIRE BL
303) 11601 WILSHIRE BL
304) 11620 WILSHIRE BL

ADDRESS

305) 11645 WILSHIRE BL
306) 11755 WILSHIRE BL
307) 12100 WILSHIRE BL
308) 12121 WILSHIRE BL
309) 12400 WILSHIRE BL
310) 616 WITMER S
311) 7401 WORLDWAY W
312) 8201 WOODLEY AV
313) 1975 ZONAL
314) 1985 ZONAL
315) 2011 ZONAL
316) 970 190TH ST W
317) 1411 190TH ST W