CSMIP STRONG-MOTION RECORDS FROM THE SUPERSTITION HILLS, IMPERIAL COUNTY, CALIFORNIA EARTHQUAKES OF 23 AND 24 NOVEMBER 1987

CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
OFFICE OF STONG MOTION STUDIES
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CSMIP STRONG-MOTION RECORDS FROM THE SUPERSTITION HILLS, IMPERIAL COUNTY, CALIFORNIA EARTHQUAKES OF 23 AND 24 NOVEMBER 1987

Introduction

Strong-motion records were recovered from fifteen stations of the California Strong Motion Instrumentation Program (CSMIP) following the earthquakes of 23 and 24 November 1987 which occurred approximately 15 km west of Westmorland in Imperial County, California. The stations include 10 ground-response stations, 4 buildings, and one bridge. In total, 7 records were recovered from the November 23 earthquake and 16 records were from the November 24 earthquake. This report includes all CSMIP data from the Superstition Hills earthquakes and supersedes the brief compilation distributed immediately after the earthquakes (CDMG, 1987). In addition to the CSMIP records described here, records were also recovered by other agencies such as the U.S. Geological Survey.

Current estimates of the earthquake location and magnitude are (Caltech):

* November 23 Earthquake

  Hypocenter: 33.083 N, 115.775 W, 5 km depth.
  Origin Time: 01:54:14.5 GMT, 24 November 1987 (17:54:14.5 PST, 23 Nov.)
  Magnitude: 5.8 ML (Caltech), 6.2 Ms (NEIC)

* November 24 Earthquake

  Hypocenter: 33.013 N, 115.838 W, 2 km depth.
  Origin Time: 13:15:56.5 GMT, 24 November 1987 (05:16:56.5 PST, 24 Nov.)
  Magnitude: 6.0 ML (Caltech), 6.6 Ms (NEIC)

According to Jim Kahle (CDMG, personal communication), rupture was observed along the Superstition Hills fault west of Westmorland. Kahle reported that an offset of 15 - 20 cm was observed where the Superstition Hills fault crosses Imler Road after the second event but that no rupture was observed there after the first event. CDMG field work has documented more

than 20 km of rupture along the northwest trending Superstition Hills fault; up to 60 cm of right slip was measured along with a few cm of vertical displacement (Gray, CDMG, personal communication).

Most of the damage from both earthquakes was confined to the cities of Calexico in California and Mexicali in Baja California, Mexico. Little damage was reported in the rest of the Imperial Valley (ENR, 1987).

Highlights of CSMIP Strong-Motion Data

Particularly noteworthy features of the CSMIP strong-motion data from the Superstition Hills earthquakes are:

- Westmorland. This is the closest station to the epicenters (15 and 20 km east of the epicenters). Peak horizontal acceleration of 18% g was recorded during the first earthquake, and 21% g during the second. The peak vertical acceleration from the second event was 26% g. The duration of strong shaking in the second event is over 15 seconds. This station also recorded the motion from the 1981 Westmorland earthquake (5.7 ML). For that earthquake, the station was 7 km south of the epicenter, and recorded a peak horizontal acceleration of about 50% g and a peak vertical acceleration of 80% g (McJunkin and Kaliakin, 1981).

- Niland. This station was located 30 and 39 km to the northeast of the epicenters. Peak acceleration values were 8% g and 11% g, respectively, for the first and second events.

- El Centro - Imperial County Center Freefield. This was the reference station for the 5-story Imperial County Services Building damaged in the 1979 Imperial Valley earthquake. The 5-story concrete building was subsequently torn down and a 2-story steel building was built on the same

site. However, the new building has not been instrumented. The freefield station was located at an epicentral distance of about 35 km for both November 1987 events, similar to that of the Niland station. Only 5% g was recorded here during the first event, but 36% g in the second event.

- El Centro - Hwy 8/Meloland Overpass. This is a continuous two-span reinforced concrete freeway overpass. The bridge was strongly shaken during the 1979 Imperial Valley earthquake. Peak acceleration of about 50% g was recorded on the structure during that earthquake (McJunkin and Ragsdale, 1980). The bridge was initially instrumented with 26 sensors including 3 sensors in the freefield. Because of moisture and erosion problems at the site, and to increase the effectiveness of the sensor layout, a major rework and upgrade of the instrumentation system was underway before the November 1987 earthquakes. Only 17 sensors recorded the structural response during the two earthquakes. Peak acceleration of 7% g was recorded on the bridge during the first event, 25% g during the second.

- Indio - Riverside County Administration Building. This is a 4-story concrete building, located at about 85 km from the earthquake epicenters. The peak acceleration was 1% g and 3% g at the basement from the first and second events, respectively. During the second event the building vibrated for more than 40 seconds and had a peak acceleration of 17% g on the roof. The records indicate that the fundamental period in the transverse direction was about 0.55 second during the first event and 0.60 second during the second event. The period of this building is longer than that of a typical 4-story reinforced concrete building. The records also indicate apparent floor torsional motion.

- Hemet Array. The Hemet strong-motion array is a northeast-southwest alignment of eight stations which transects the San Jacinto Fault. All the stations of the array were triggered by the 1986 Palm Springs earthquake (Huang, et al., 1986). Six stations were triggered by the 1987 Whittier earthquake (Shakal, et al., 1987). Only one station was triggered by the 23 November 1987 event and four stations were triggered by the 24 November 1987 event.

Order of Data Presentation

The locations of CSMIP stations from which strong-motion records were recovered for the two November 1987 earthquakes are shown on the map of Figure 1. A three-digit identification code is shown adjacent to each station on the map. For completeness, those CSMIP stations which were not triggered by either earthquake are also shown on the map and are denoted with open symbols. The identification code, station name, and station number are cross-referenced in Table 1. In Table 2, the stations are listed in alphabetical order and station parameters such as coordinates and site geology are given.

Detailed information on each record, including peak acceleration values, is given in Table 3 for the November 24 earthquake and in Table 4 for the November 23 earthquake. In Tables 1 through 4 the page number on which the accelerogram appears is also listed.

The part of the report containing the accelerogram reproductions has two sections. The first section contains copies of the records from the November 24 earthquake, the largest data set. The second section contains a smaller set of records from the November 23 earthquake. Each section begins with an index list for records in that section. The structural-response records are presented after the ground-response records. The structural-response records

include a description of the structure and a schematic illustration of the layout of the sensors for most structures. By convention, the orientation of sensors in a building is given by reference directions parallel to the principal building dimensions; the relation of these reference directions to true geographic directions is given on each building record.

Acknowledgments

The California Strong Motion Instrumentation Program extends its appreciation to the individuals and organizations which have permitted the installation of seismic strong-motion instruments on their property. C. Rojahn, J. Ragsdale, J. Gates, and R. Nutt assisted in planning sensor layouts for the structures considered in this report.

The records presented in this report were recovered at stations instrumented by M. Huston, H. LaGesse, R. Meneely, M. Seaton, L. Stange, V. Steeves and W. Williams. These stations have been maintained by H. LaGesse; he was assisted in record recovery by S. Rider and C. Petersen. M. Malinowski and P. Knight assisted in report preparation. The joint efforts of all those involved made the timely publication of these data possible.

References

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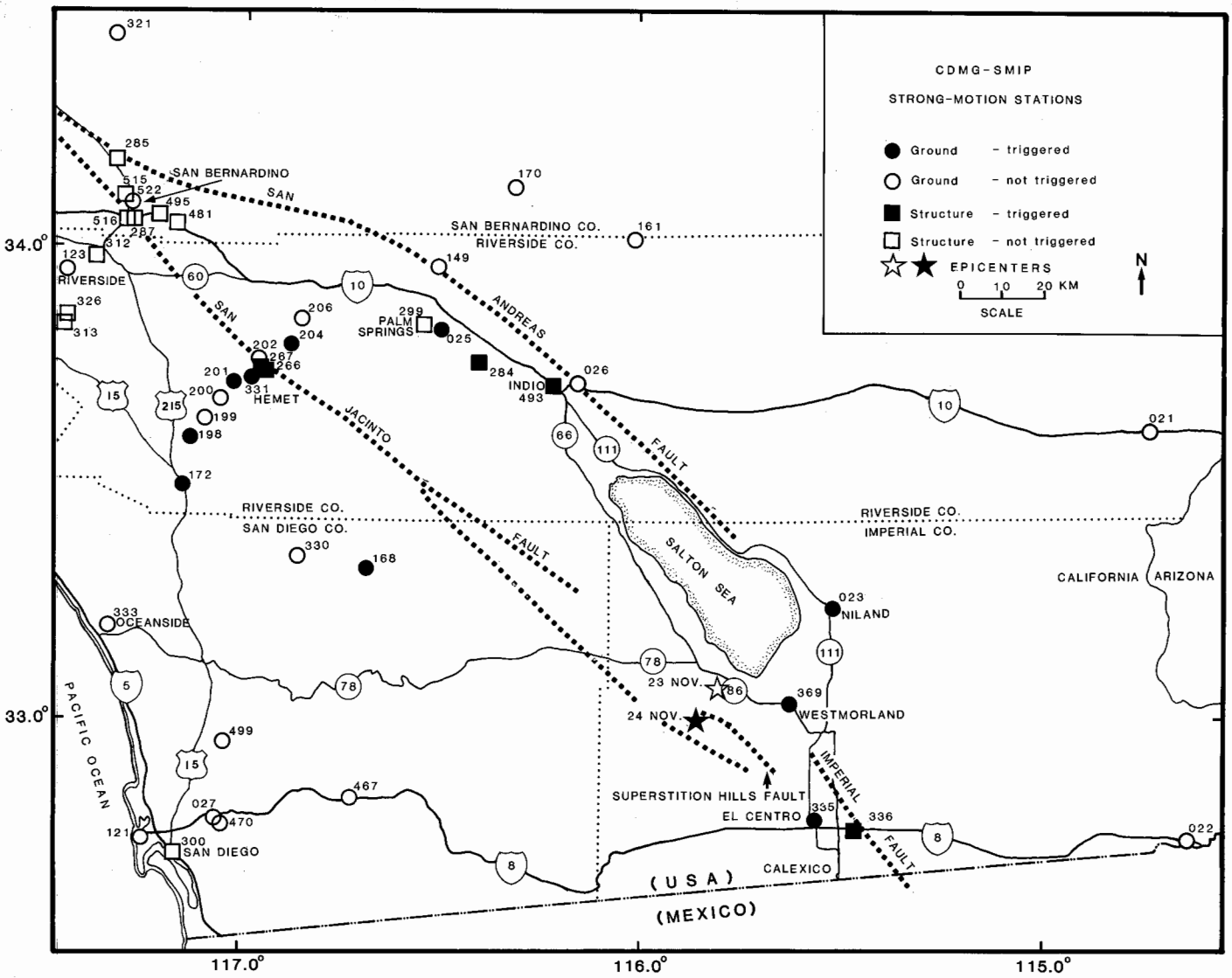

Figure 1. CSMIP strong-motion stations in the vicinity of the 23 and 24 November 1987 Superstition Hills earthquakes. Stations are identified by a 3-digit code cross-referenced to station names in Table 1.

TABLE 1

Station-Code Reference Table

Code	CSMIP Number	Station Name	Record on Page
021	10021	Blythe - Fire Station	--
022	00022	Winterhaven - Sheriff Substation	--
023	11023	Niland - Fire Station	16 & 38
025	12025	Palm Springs - Airport	17
026	12026	Indio - Coachella Canal	--
027	03027	San Diego - Murray Hill	--
121	03121	Ocean Beach	--
123	13123	Riverside - Airport	--
149	12149	Desert Hot Springs	--
161	22161	Twenty Nine Palms	--
168	12168	Puerta La Cruz - USFS Storage Bldg.	16
170	22170	Joshua Tree - Fire Station	--
172	13172	Temecula - CDF Fire Station	19
198	13198	Murrieta Hot Springs - Collins Ranch	19
199	13199	Winchester - Bergman Ranch	--
200	13200	Winchester - Hidden Valley Farms	--
201	13201	Winchester - Page Bros. Ranch	18
202	12202	San Jacinto - Valley Cemetery	--
204	12204	San Jacinto - Soboba	17 & 38
206	12206	Silent Valley - Poppet Flat	--
266	12266	Hemet - City Library	33
267	12267	Hemet - Valley Hospital	32
284	12284	Palm Desert - Kiewit Bldg.	31
285	23285	San Bernardino - State College Library	--
287	23287	San Bernardino - Hilton Inn	--
299	12299	Palm Springs - Desert Hospital	--
300	03300	San Diego - San Diego Gas & Electric Bldg.	--
312	13312	Riverside - Riverside Co. Admin. Bldg.	--
313	13313	Lake Mathews - Main Dam	--
321	23321	Hesperia	--
326	13326	Lake Mathews - Dike 1	--
330	12330	Palomar Mountain - Palomar Observatory	--
331	12331	Hemet - Stetson Ave Fire Station	18
333	13333	Oceanside B	--
335	01335	El Centro - Imperial County Center FF . .	15 & 37
336	01336	EL Centro - Hwy 8/Meloland Overpass	23 & 39
369	11369	Westmorland - Fire Station	15 & 37
467	02467	Alpine - Fire Station	--
470	03470	San Diego - Murray Dam Left Abutment	--
481	23481	Redlands - Redlands Fed. Savings Bldg. . .	--
493	12493	Indio - Riverside Co. Admin. Bldg.	27 & 41
495	23495	Redlands - Interstate Van Lines Warehouse	--
499	03499	Poway - City Hall FF	--
515	23515	San Bernardino - Vanir Towers	--
516	23516	San Bernardino - Sunwest Office Bldg. . .	--
522	23522	San Bernardino - 2nd & Arrowhead	--

TABLE 2

CSMIP Strong-Motion Stations - Superstition Hills Earthquakes

Station Name	N.Lat.	W.Long.	Sta. No.	Code	Site Geology	Record on Page*
Alpine - Fire Station	32.838	116.724	02467	467		NT
Blythe - Fire Station	33.611	114.710	10021	021	Alluvium	NT
Desert Hot Springs- Pierson Blvd Fire Station	33.962	116.509	12149	149	Alluvium	NT
El Centro - Imperial Co. Center FF	32.793	115.562	01335	335	Deep alluvium	15&37
El Centro - Hwy 8/Meloland Overpass	32.773	115.447	01336	336	Deep alluvium	23&39
Hemet - City Library	33.748	116.966	12266	266	Deep alluvium	33
Hemet - Stetson Ave Fire Station	33.729	116.979	12331	331	Deep alluvium	18
Hemet - Valley Hospital	33.750	116.959	12267	267	Deep alluvium	32
Hesperia	34.448	117.327	23321	321	Alluvium	NT
Indio - Coachella Canal	33.717	116.156	12026	026	Alluvium (Shallow Vs~1100fps)	NT
Indio - Riverside County Admin. Bldg.	33.714	116.221	12493	493		27&41
Joshua Tree - Fire Station	34.131	116.314	22170	170	Alluvium (Shallow Vs~1130fps)	NT
Lake Mathews - Dike 1	33.854	117.444	13326	326		NT
Lake Mathews - Main Dam	33.836	117.461	13313	313		NT
Murrieta Hot Springs - Collins Ranch	33.599	117.132	13198	198	Thin soil (1m) over weathered granite	19
Niland - Fire Station	33.239	115.512	11023	023	Deep alluvium	16&38
Ocean Beach	32.749	117.241	03121	121		NT
Oceanside B Fire Station #3	33.201	117.331	13333	333		NT
Palm Desert - Kiwiet Bldg.	33.762	116.407	12284	284	Alluvium	31
Palm Springs - Airport	33.829	116.501	12025	025	Sand (3m) over alluvium	17
Palm Springs - Desert Hospital	33.838	116.541	12299	299	Alluvium	NT#
Palomar Mountain - Palomar Observatory	33.353	116.862	12330	330	Granite	NT
Poway - City Hall FF	32.954	117.040	03499	499		NT
Puerta La Cruz - USFS Storage Bldg.	33.324	116.683	12168	168	Thin alluvium (8m?) over granite	16
Redlands - Interstate Van Lines	34.066	117.214	23495	495		NT

TABLE 2 (Continued)

Station Name	N.Lat.	W.Long.	Sta. No.	Code	Site Geology	Record on Page*
Redlands - Redlands Fed. Savings	34.056	117.178	23481	481		NT
Riverside - Airport	33.951	117.446	13123	123	Alluvium	NT
Riverside - Riverside Co. Admin. Bldg.	33.978	117.373	13312	312	Alluvium	NT
San Bernardino - 2nd & Arrowhead	34.103	117.289	23522	522		NT
San Bernardino - CSUSB Library	34.183	117.323	23285	285	Alluvium	NT
San Bernardino - Hilton Inn	34.065	117.279	23287	287		NT
San Bernardino - Sunwest Office Bldg.	34.065	117.289	23516	516		NT
San Bernardino - Vanir Towers	34.104	117.292	23515	515		NT
San Diego - Murray Dam Left Abutment	32.781	117.044	03470	470		NT
San Diego - Murray Hill	32.791	117.059	03027	027	Greenstone	NT
San Diego - San Diego Gas & Electric Bldg.	32.719	117.163	03300	300	Alluvium	NT
San Jacinto - Soboba	33.797	116.880	12204	204	Alluvium	17&38
San Jacinto - Valley Cemetery	33.760	116.960	12202	202	Alluvium	NT
Silent Valley - Poppet Flat	33.851	116.852	12206	206	Weathered granite	NT
Temecula - CDF Fire Station	33.496	117.149	13172	172	Alluvium	19
Twenty Nine Palms	34.021	116.009	22161	161		NT
Westmorland - Fire Station	33.037	115.623	11369	369	Deep alluvium	15&37
Winchester - Bergman Ranch	33.640	117.094	13199	199	Weathered granite	NT
Winchester - Hidden Valley Farms	33.681	117.056	13200	200	Thin soil (1m) over schist,granite	NT
Winchester - Page Bros. Ranch	33.718	117.022	13201	201	Deep (200m?) alluvium	18
Winterhaven - Sheriff Substation	32.739	114.635	00022	022	Alluvium	NT

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* Footnote: NT - Instrument not triggered, though operational.
NT# - Instrument not triggered, probable instrument malfunction.

TABLE 3

Strong-Motion Data - Superstition Hills Earthquake of November 24, 1987

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Comp.	Max. Acceleration Grnd. (g)	Struct. (g)	Pg.
Westmorland Fire Station	11369	1-story bldg.	20	01.5	180	0.21		15
					Up	0.26		
					90	0.17		
El Centro Imperial County Center FF	01335	Instr. shltr. H	36	06.6	90	0.27		15
					Up	0.13		
					360	0.36		
Niland Fire Station	11023	1-story bldg.	39	05.0	90	0.08		16
					Up	0.04		
					360	0.11		
El Centro Hwy 8/Meloland Overpass	01336	bridge (17 sensors)	45	08.5	360	0.18	0.21	23
					Up	0.10	0.24	
					270	0.12	0.25	
Indio Riverside County Admin. Bldg.	12493	4-story bldg. (9 sensors)	86	14.9	360	0.03	0.17	27
					Up	0.02	0.02	
					90	0.03	0.08	
Puerta La Cruz USFS Storage Bldg.	12168	1-story bldg.	86	23.1	348	0.04		16
					Up	0.03		
					258	0.03		
Palm Desert Kiewit Bldg.	12284	4-story bldg. (9 sensors)	99	---	360	0.04	0.17	31
					Up	0.02	--	
					90	0.02	0.07	
Palm Springs Airport	12025	Instr. shltr. A	110	26.5	90	0.03		17
					Up	0.02		
					360	0.03		
San Jacinto Soboba Castile Cyn Rd.	12204	1-story bldg.	130	39.0	90	0.02		17
					Up	0.01		
					360	0.03		
Hemet Valley Hospital	12267	4-story bldg. (10 sensors)	133	---	315	0.02	0.04	32
					Up	0.02	--	
					225	0.01	0.03	
Hemet Stetson Ave Fire Station	12331	1-story bldg.	133	36.8	360	0.04		18
					Up	0.02		
					270	0.03		
Hemet City Library	12266	1-story bldg. (6 sensors)	133	---	360	0.03	0.07	33
					Up	0.02	--	
					270	0.03	0.06	

TABLE 3 (Continued)

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Comp.	Max. Acceleration Grnd. (g)	Struct. (g)	Pg.
Winchester	13201	Instr.	135	39.1	90	0.02		18
Page Bros. Ranch		shltr. A			Up	0.02		
					360	0.02		
Murrieta Hot Springs	13198	Instr.	137	46.8	90	0.01		19
Collins Ranch		shltr. A			Up	0.01		
					360	0.01		
Temecula	13172	Instr.	133	38.1	90	0.03		19
CDF Fire Station		shltr. H			Up	0.02		
					360	0.02		

Footnotes:

* - Instrument shelter types:
Instr. shltr. A - small prefabricated metal building
Instr. shltr. H - small fiberglass shelter

** - Distance given (in km) relative to the presently estimated epicenter at 33.013N, 115.838W.

\# - Accelerograph trigger time, when available, in seconds after 13:16 GMT on 24 November 1987.

TABLE 4

Strong-Motion Data - Superstition Hills Earthquake of November 23, 1987

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Comp.	Max. Acceleration Grnd. (g)	Struct. (g)	Pg.
Westmorland Fire Station	11369	1-story bldg.	15	18.5	180	0.18		37
					Up	0.14		
					90	0.13		
Niland Fire Station	11023	1-story bldg.	30	21.9	90	0.06		38
					Up	0.03		
					360	0.08		
El Centro Imperial County Center FF	01335	Instr. shltr. H	38	28.0	90	0.05		37
					Up	0.03		
					360	0.04		
El Centro Hwy 8/Meloland Overpass	01336	bridge (17 sensors)	46	35.0	360	0.03	0.04	39
					Up	0.02	0.07	
					270	0.03	0.07	
Indio Riverside County Admin. Bldg.	12493	4-story bldg. (9 sensors)	81	38.9	360	0.01	0.12	41
					Up	0.01	0.01	
					90	0.01	0.05	
San Jacinto Soboba Castile Cyn Rd.	12204	1-story bldg.	130	53.9	90	0.02		38
					Up	0.01		
					360	0.02		

Footnotes:

* - Instrument shelter type:
Instr. shltr. H - small fiberglass shelter

** - Distance given (in km) relative to the presently estimated epicenter at 33.083N, 115.775W.

\# - Accelerograph trigger time, when available, in seconds after 01:54 GMT on 24 November 1987.

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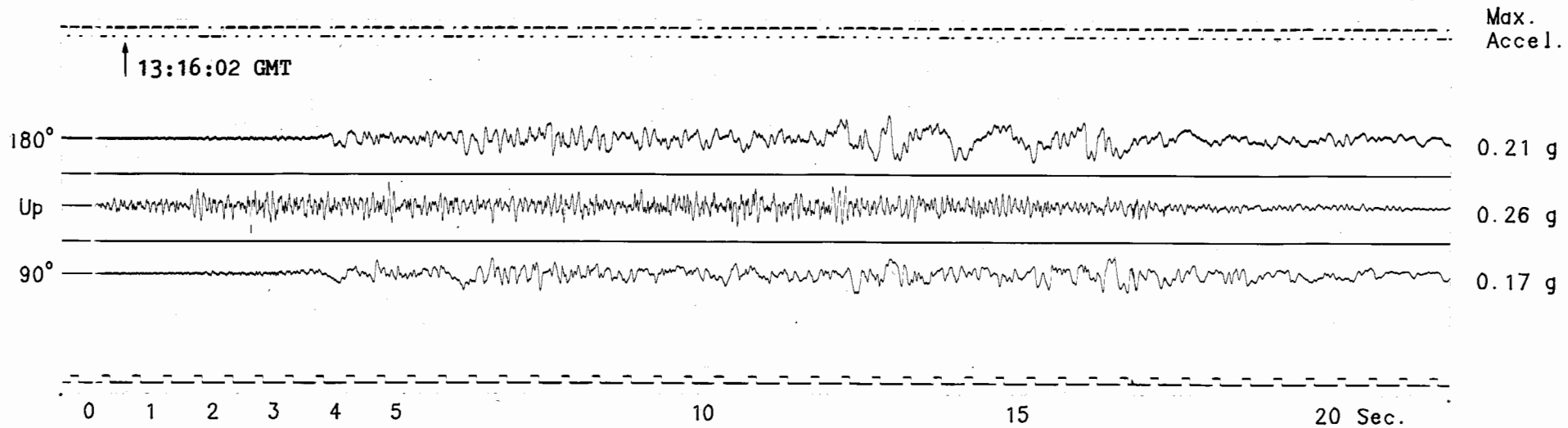
El Centro - Hwy 8/Meloland Overpass	23	Hemet - Valley Hospital	32
Indio - Riverside County Admin. Bldg.	27	Hemet - City Library	33
Palm Desert - Kiwiet Bldg.	31		

Westmorland – Fire Station
(CSMIP Station No. 11369)

Record 11369–S2588–87328.06



El Centro – Imperial County Center FF
(CSMIP Station No. 01335)

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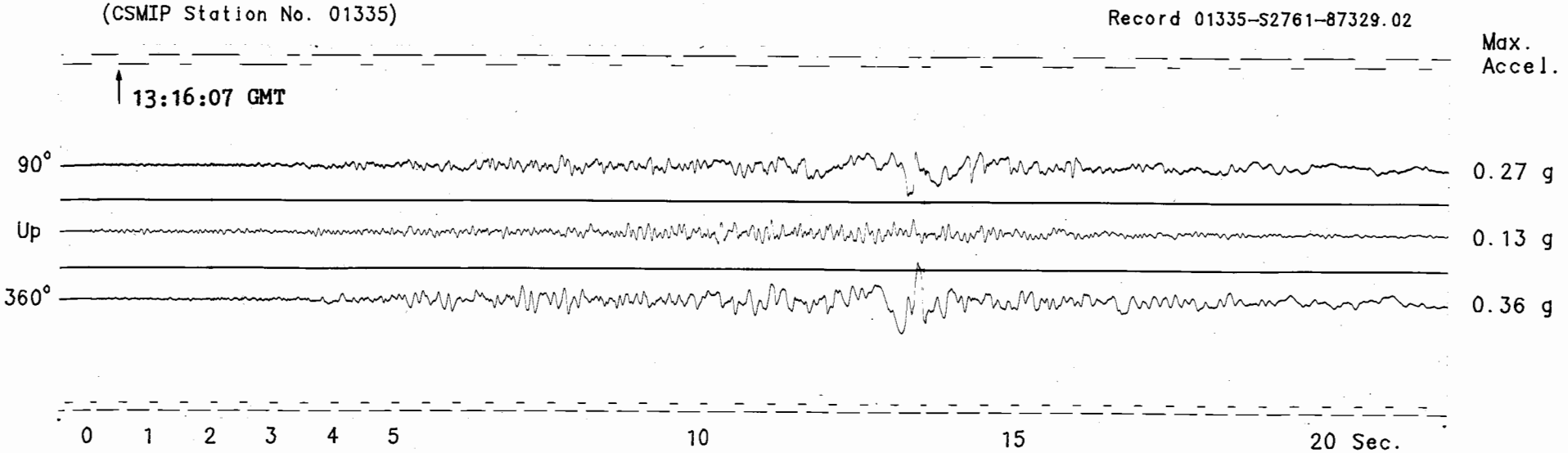

Niland – Fire Station
(CSMIP Station No. 11023)

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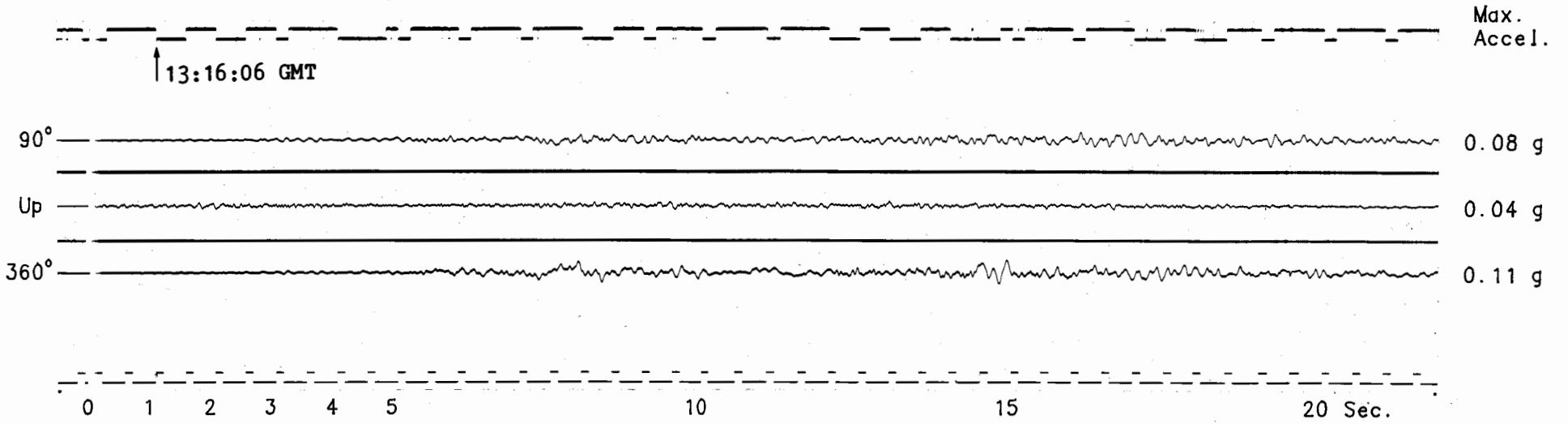
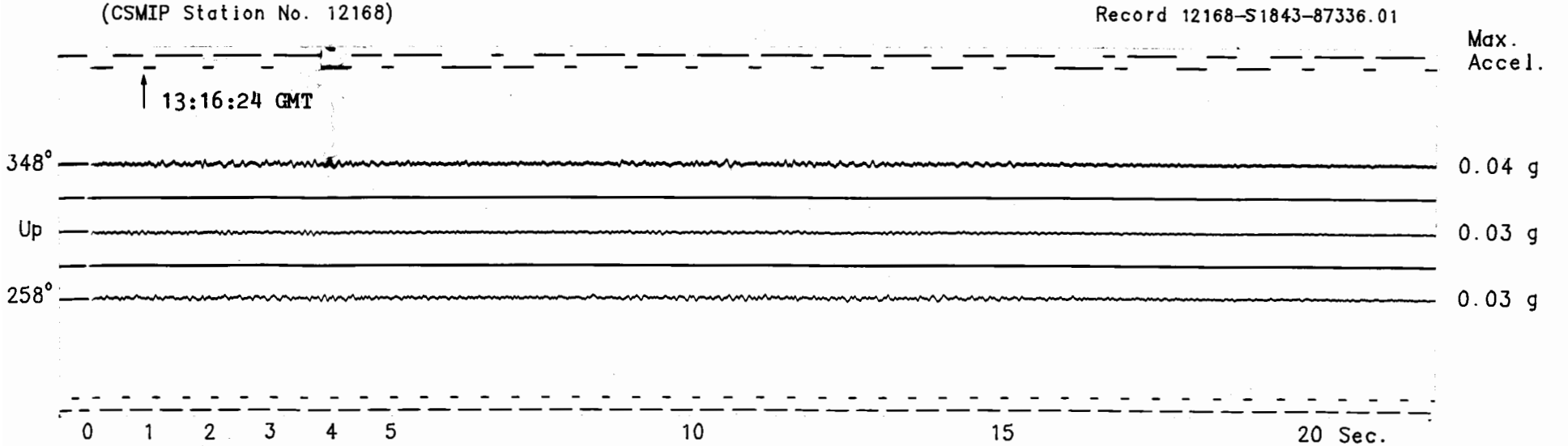


Puerta La Cruz – USFS Storage Bldg.
(CSMIP Station No. 12168)

Record 12168–S1843–87336.01



Palm Springs – Airport
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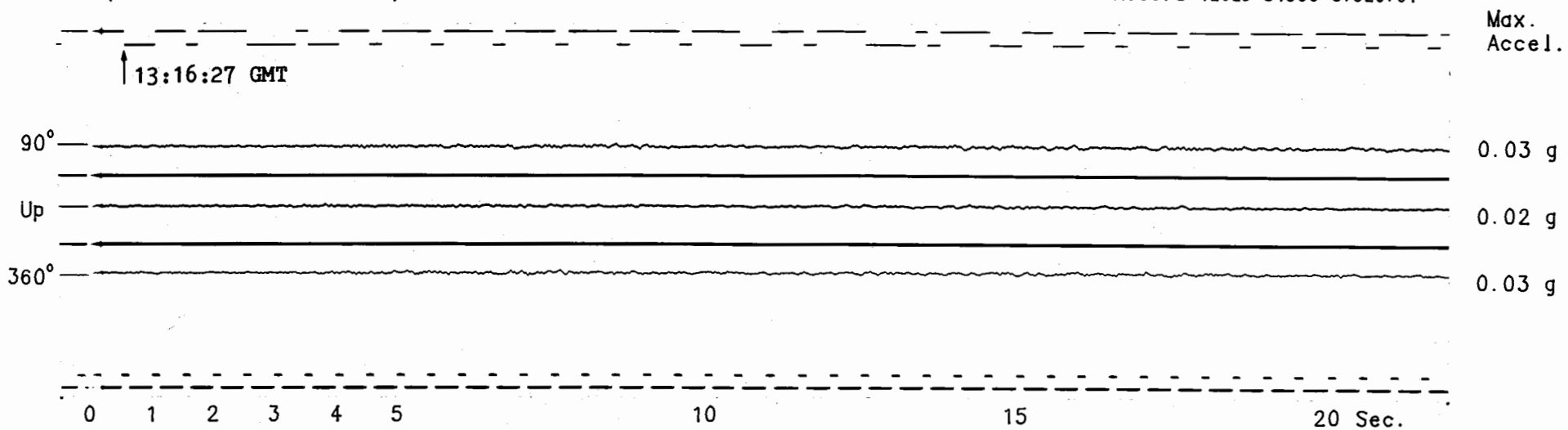
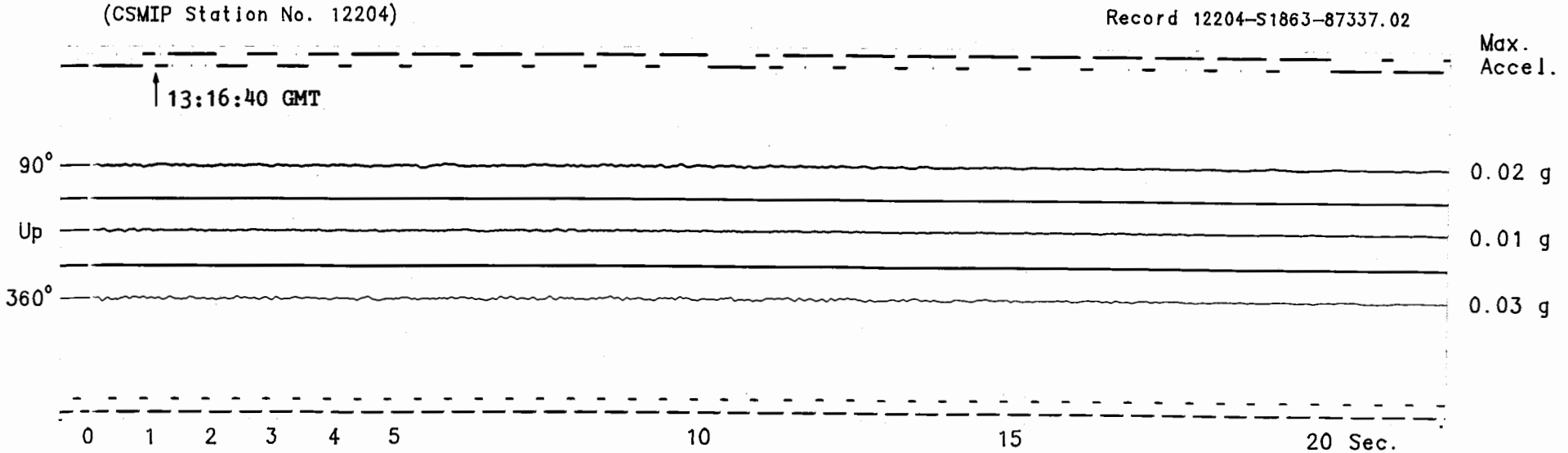


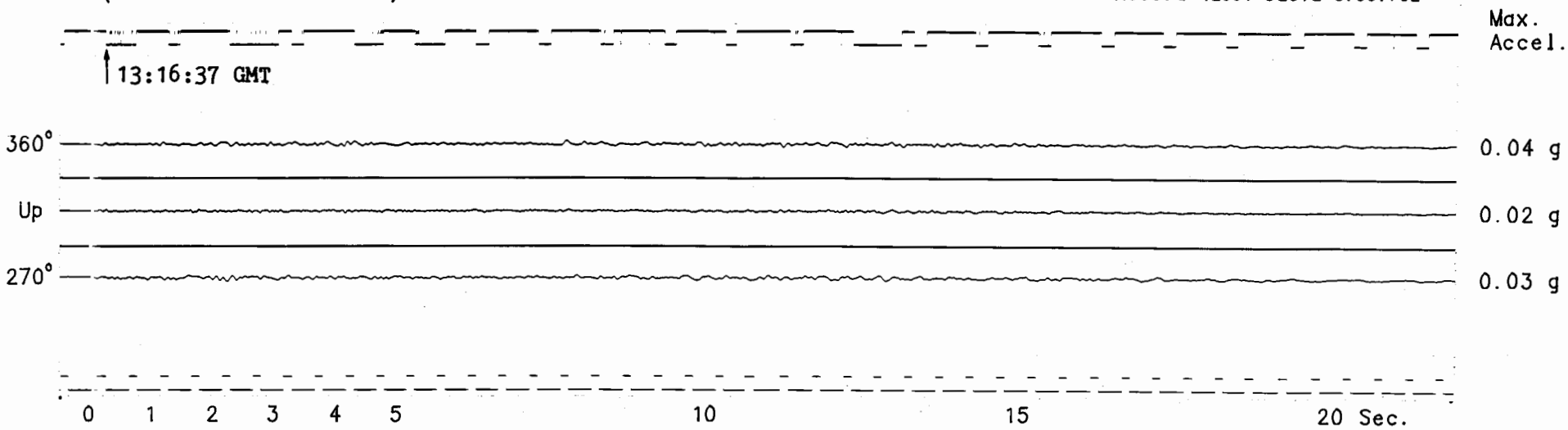
San Jacinto – Soboba
(CSMIP Station No. 12204)

Record 12204–S1863–87337.02



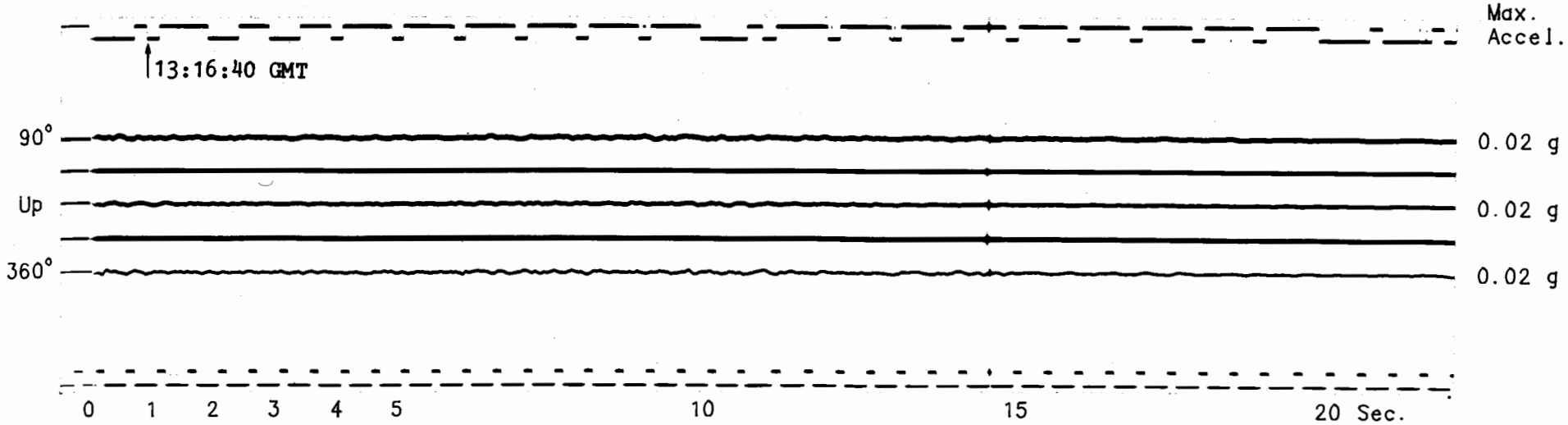
Hemet – Stetson Ave Fire Station
(CSMIP Station No. 12331)

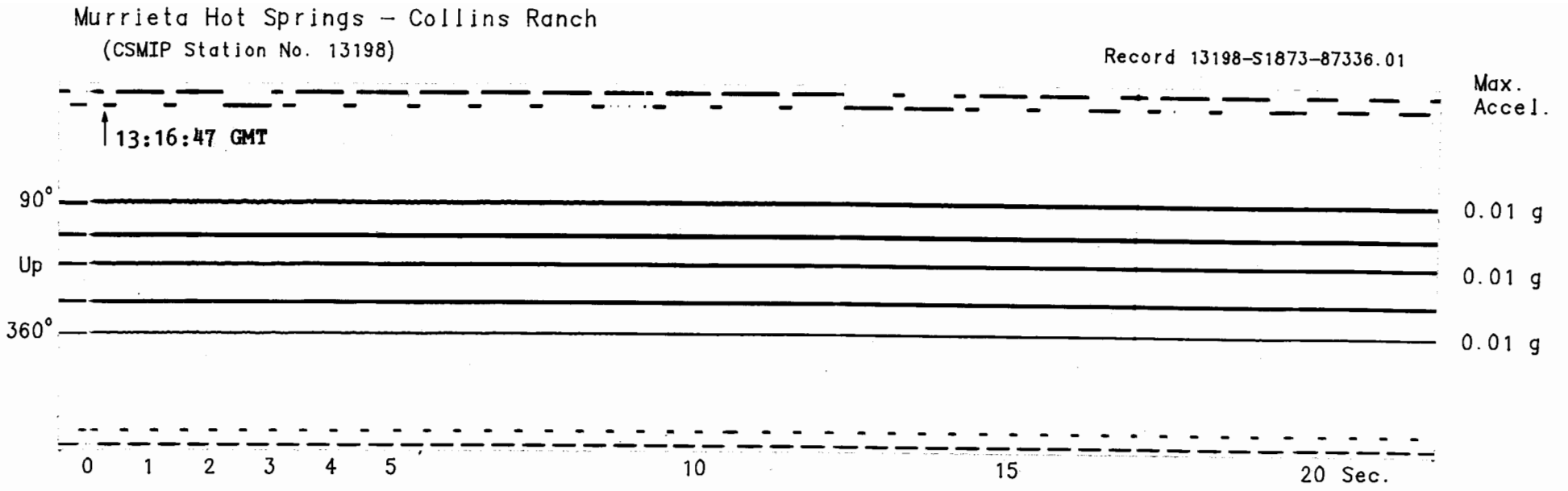
Record 12331–S2572–87337.02

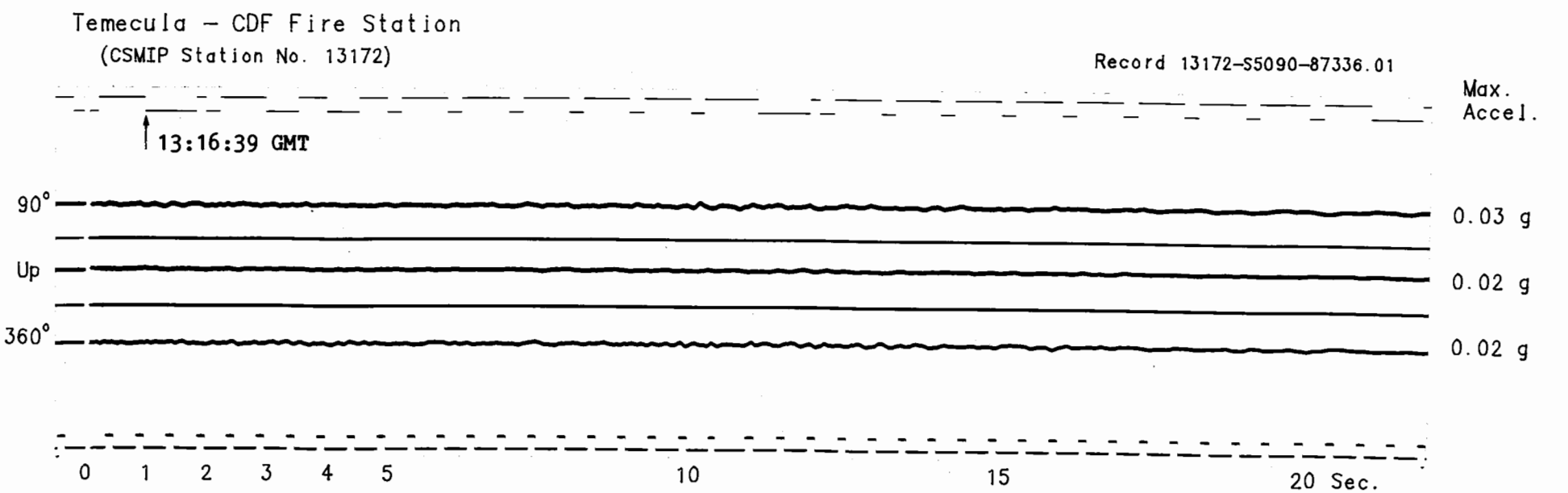


Winchester – Page Bros. Ranch
(CSMIP Station No. 13201)

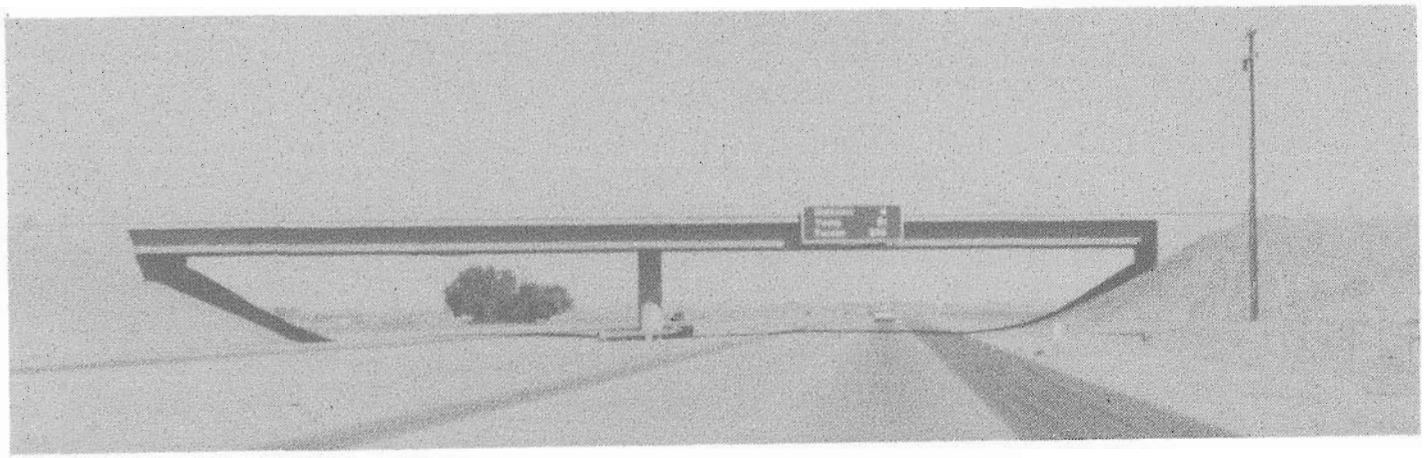
Record 13201–S1859–87336.01




Murrieta Hot Springs – Collins Ranch
(CSMIP Station No. 13198)
Record 13198-S1873-87336.01
Max. Accel.
13:16:47 GMT
90°
Up
360°
0.01 g
0.01 g
0.01 g
0 1 2 3 4 5 10 15 20 Sec.


Temecula – CDF Fire Station
(CSMIP Station No. 13172)
Record 13172-S5090-87336.01
Max. Accel.
13:16:39 GMT
90°
Up
360°
0.03 g
0.02 g
0.02 g
0 1 2 3 4 5 10 15 20 Sec.

El Centro - Hwy 8/Meloland Overpass



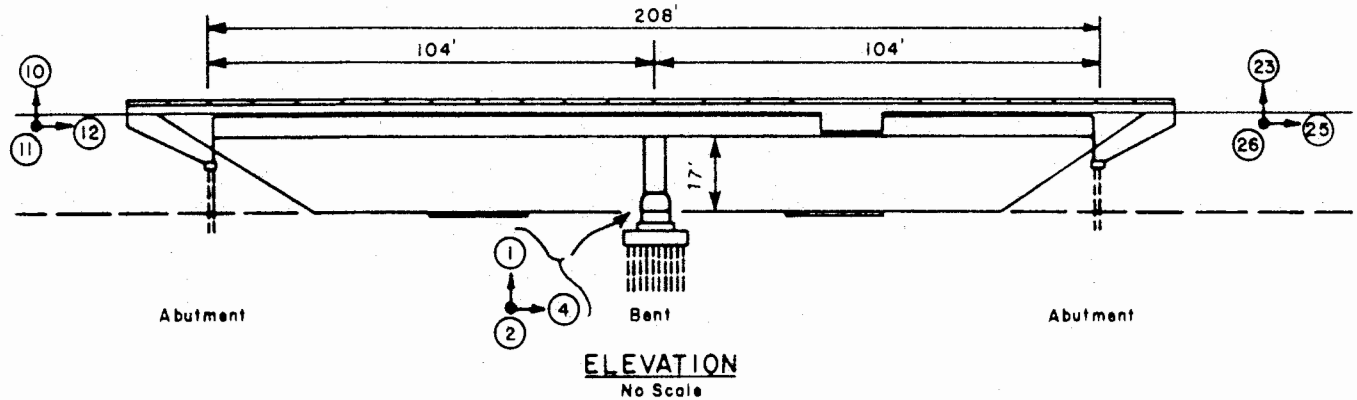
Address: Highway 8 at Meloland Road
near El Centro, CA
No. of Spans and Length:
Two spans, each 104 ft long,
no skew.
Width: 34 ft
Design Date: 1968-69
Construction Date: 1971

Superstructure Type:
Continuous reinforced concrete three-cell box-girder deck supported by open-end diaphragm abutments and a concrete single-column bent.
Column Type:
Reinforced concrete column, 5 ft diameter.
Foundation Type:
Reinforced concrete piles.

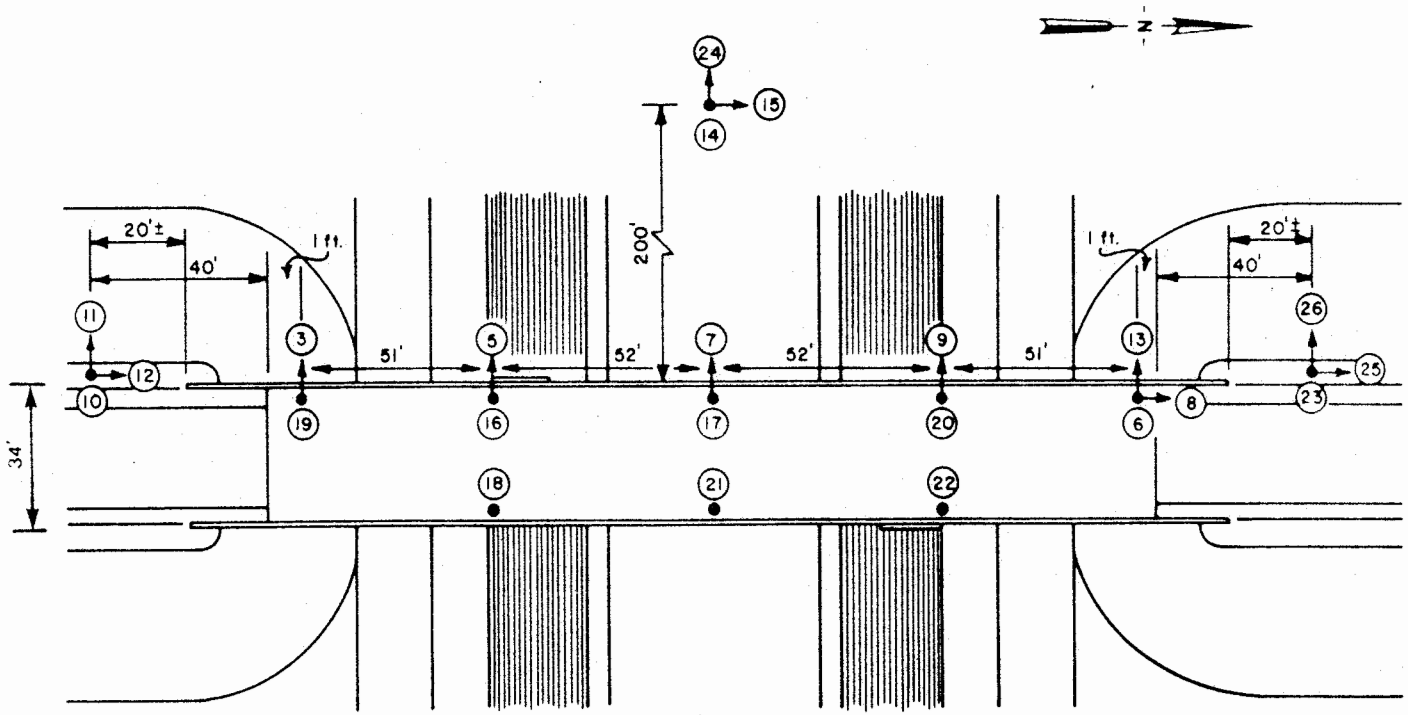
El Centro - Hwy 8/Meloland Overpass

(CSMIP Station No. 01336)

SENSOR LAYOUT



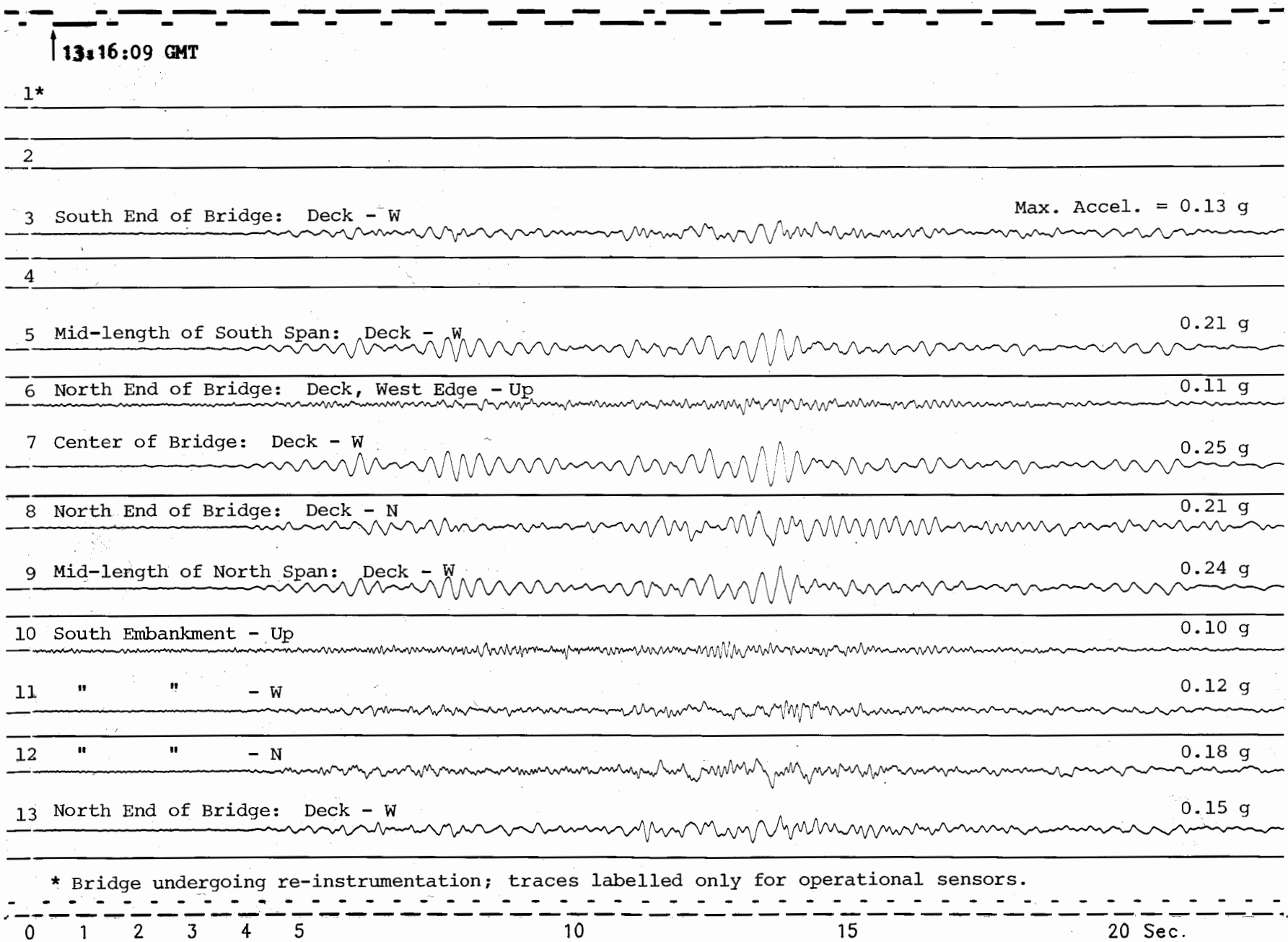
ELEVATION
No Scale



PLAN
No Scale

El Centro – Hwy 8/Meloland Overpass (Channels 1 – 13)
(CSMIP Station No. 01336)

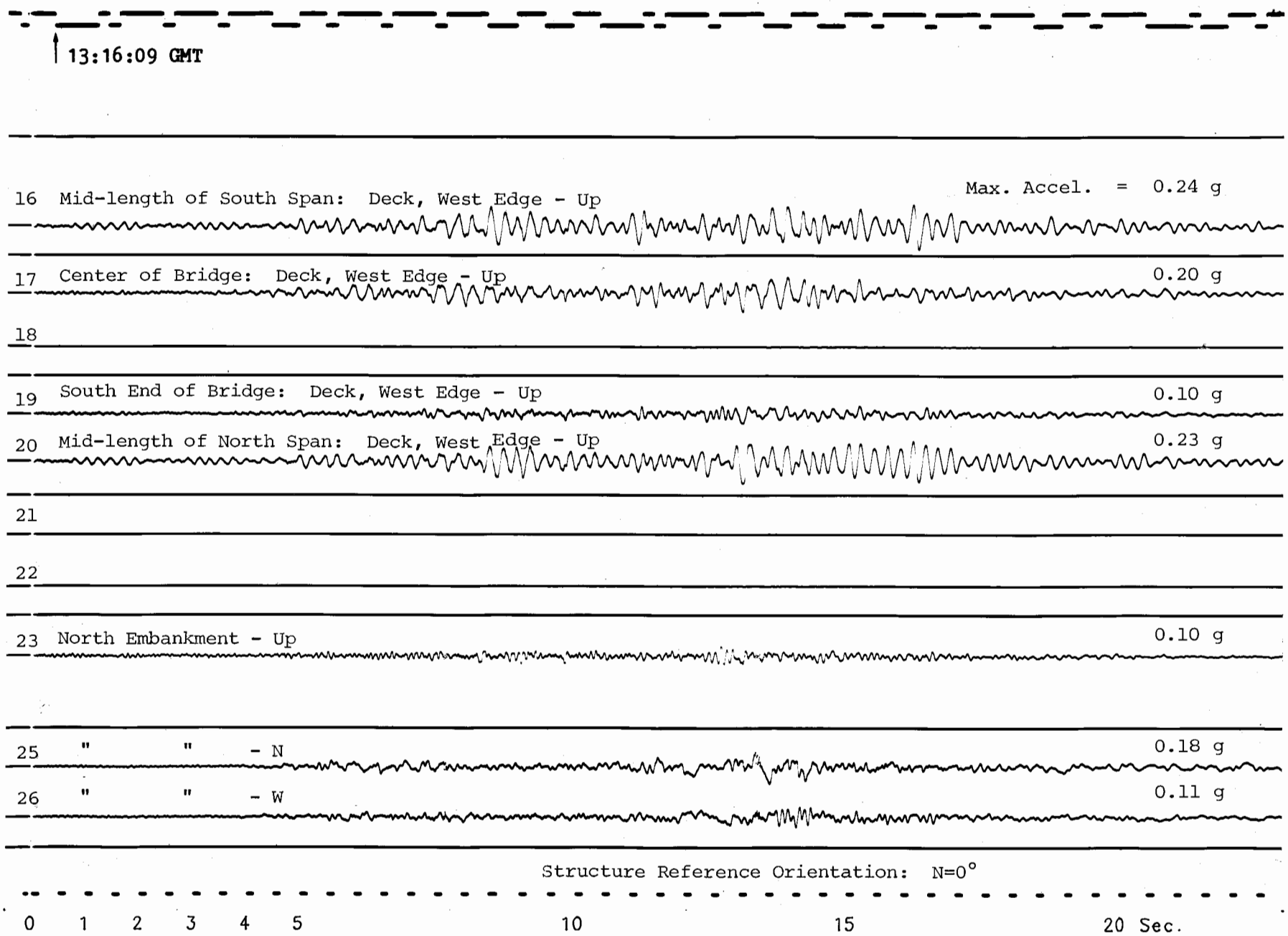
Record 01336–C0164–87329.06



* Bridge undergoing re-instrumentation; traces labelled only for operational sensors.

El Centro – Hwy 8/Meloland Overpass (Channels 14 – 26)
(CSMIP Station No. 01336)

Record 01336-C0165-87329.07



Indio - Riverside County Administration Bldg.

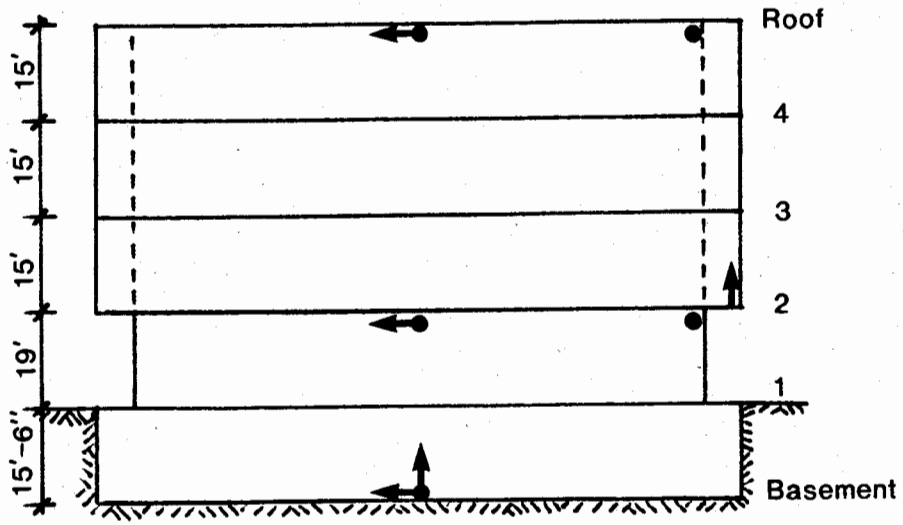
Address: 46209 Oasis Street
Indio, CA
No. of Stories above/below ground: 4/1
Plane Shape: Rectangular
Base Dimensions: 195' x 85'
Typical Floor Dimensions: Same
Design Date: 1966
Construction Date: 1967

Vertical Load Carrying System:
Reinforced concrete frame with concrete slab floors and roof.
Lateral Force Resisting System:
Moment resisting reinforced concrete frame with concrete shear walls around stairs and elevators.
Foundation Type:
Concrete piles.

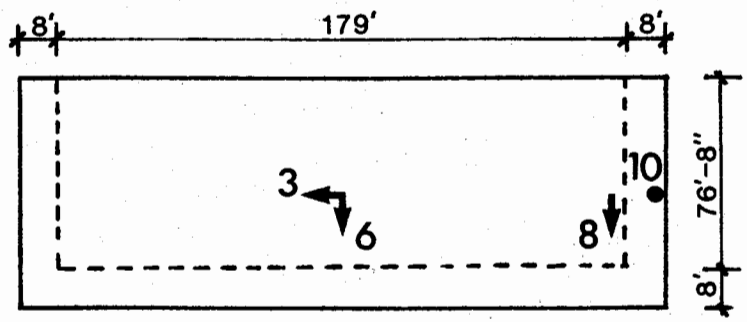
Indio – Riverside Co. Admin. Bldg.

(CSMIP Station No. 12493)

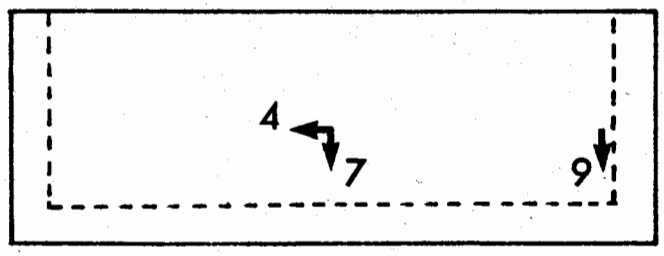
SENSOR LAYOUT



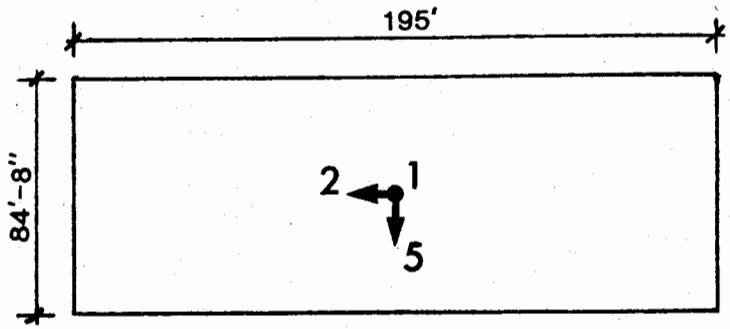
E/W Elevation



2nd Floor Plan



Roof Plan

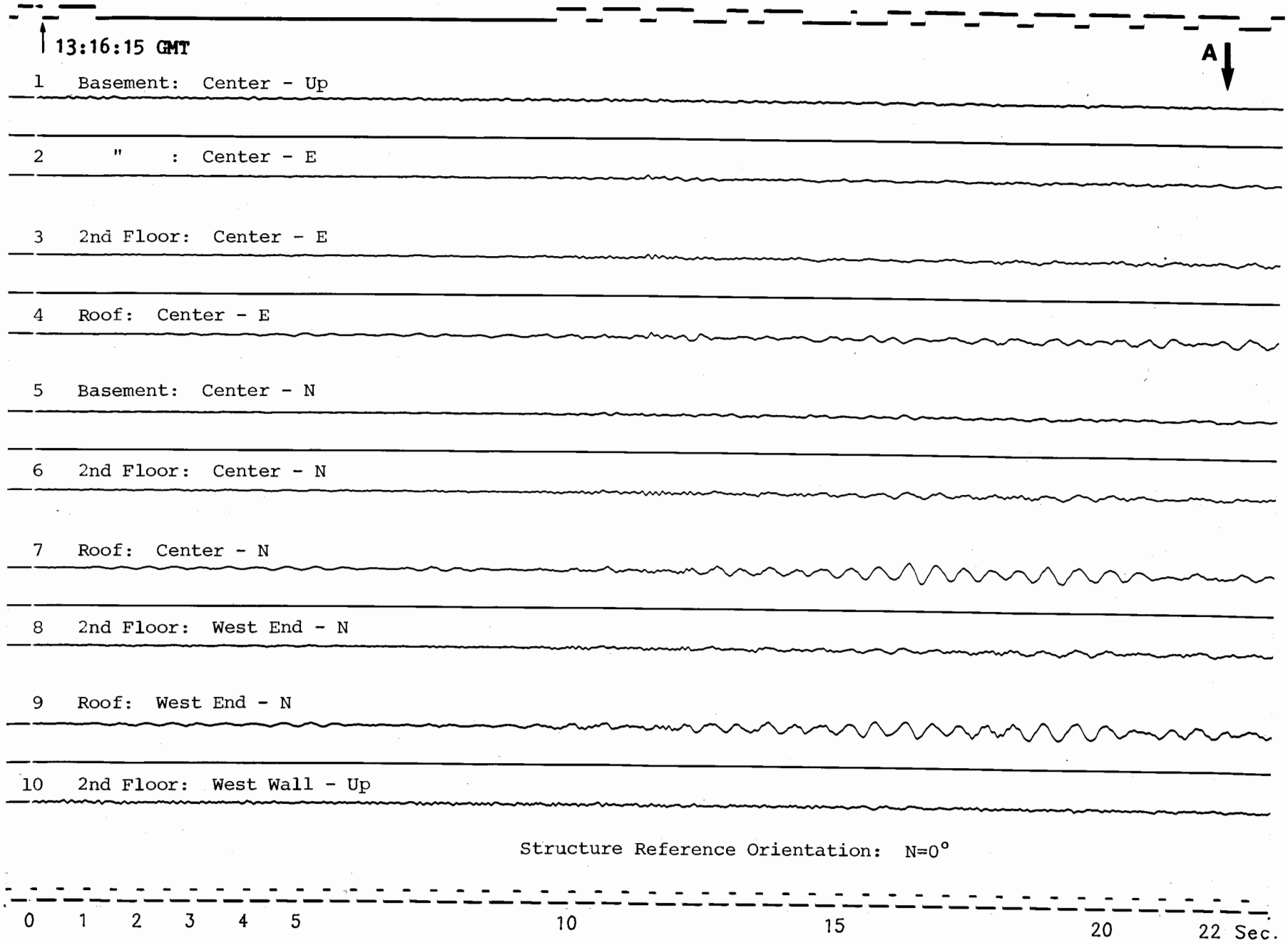


Basement Plan

Structure Reference
Orientation: N= 0°

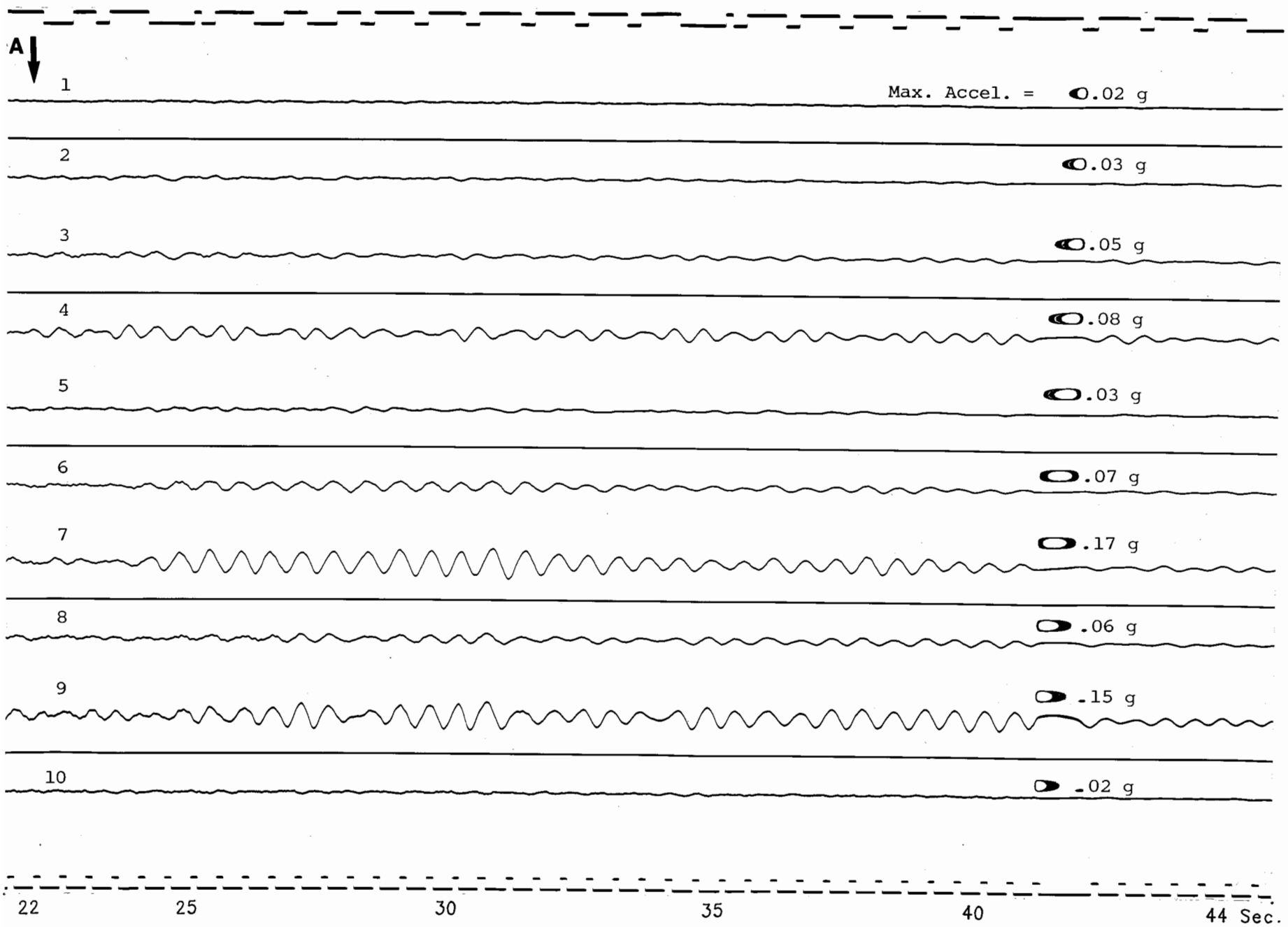
Indio – Riverside County Admin. Bldg.
(CSMIP Station No. 14406) (0 – 22 secs)

Record 12493–C0125–87329.02



Indio – Riverside County Admin. Bldg.
(CSMIP Station No. 14406) (22 – 44 secs)

Record 12493–0125–87329.02



Palm Desert - Kiewit Building, Eisenhower Medical Center

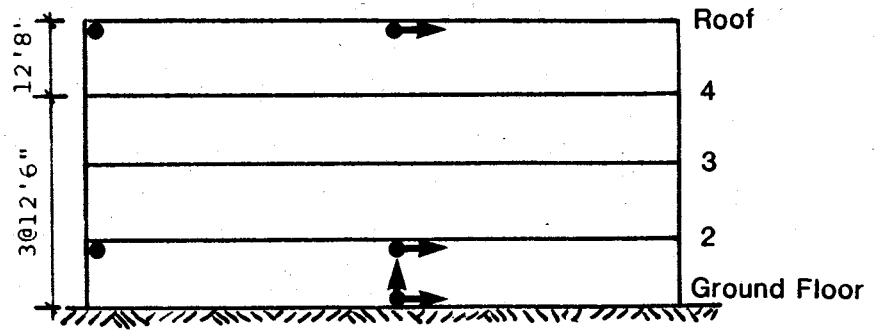
Address: 39000 Bob Hope Drive
Palm Desert, CA
No. of Stories above/below ground: 4/0
Plane Shape: Rectangular
Base Dimensions: 180' x 60'
Typical Floor Dimensions: Same
Design Date: 1974
Construction Date: 1975

Vertical Load Carrying System:
Precast prestressed concrete slabs supported by precast beams and columns.
Lateral Force Resisting System:
Precast element system with concrete shear walls around elevator near center of plan and around stair at each end wall.
Foundation Type:
Spread footings.

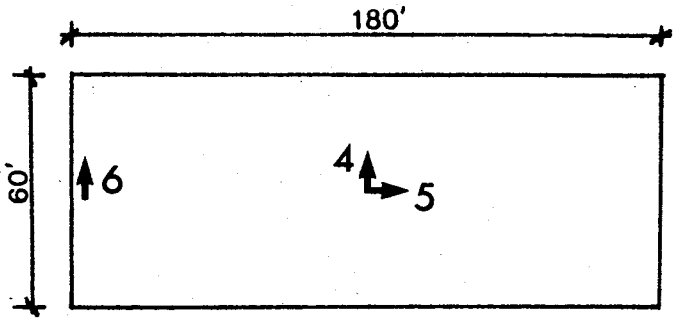
Palm Desert - Kiewit Bldg.

(CSMIP Station No. 12284)

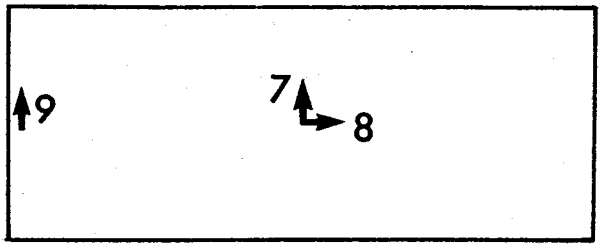
SENSOR LAYOUT



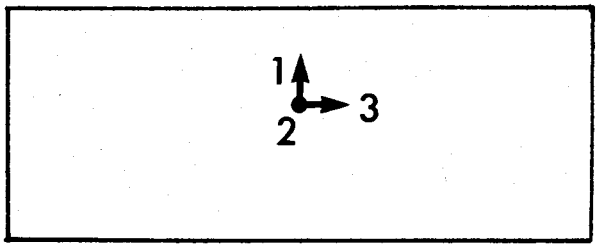
W/E Elevation



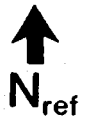
Roof Plan



2nd Floor Plan



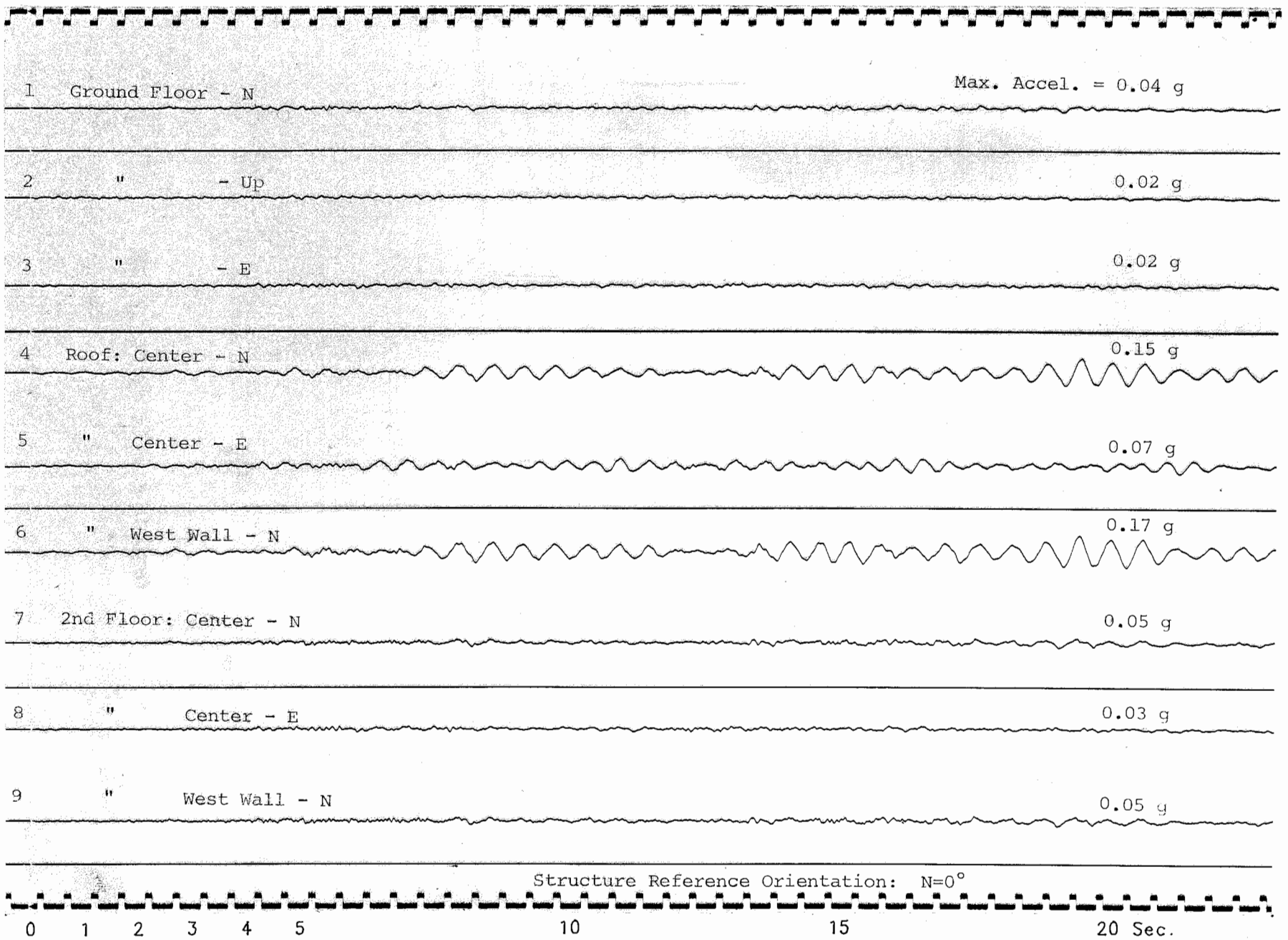
Ground Floor Plan



Structure Reference
Orientation: $N = 0^{o}$

Palm Desert – Kiewit Bldg.
(CSMIP Station No. 12284)

Record 12284-C0132-87329.01



Hemet – Valley Hospital (4-story concrete shear wall bldg.)
(CSMIP Station No. 12267)

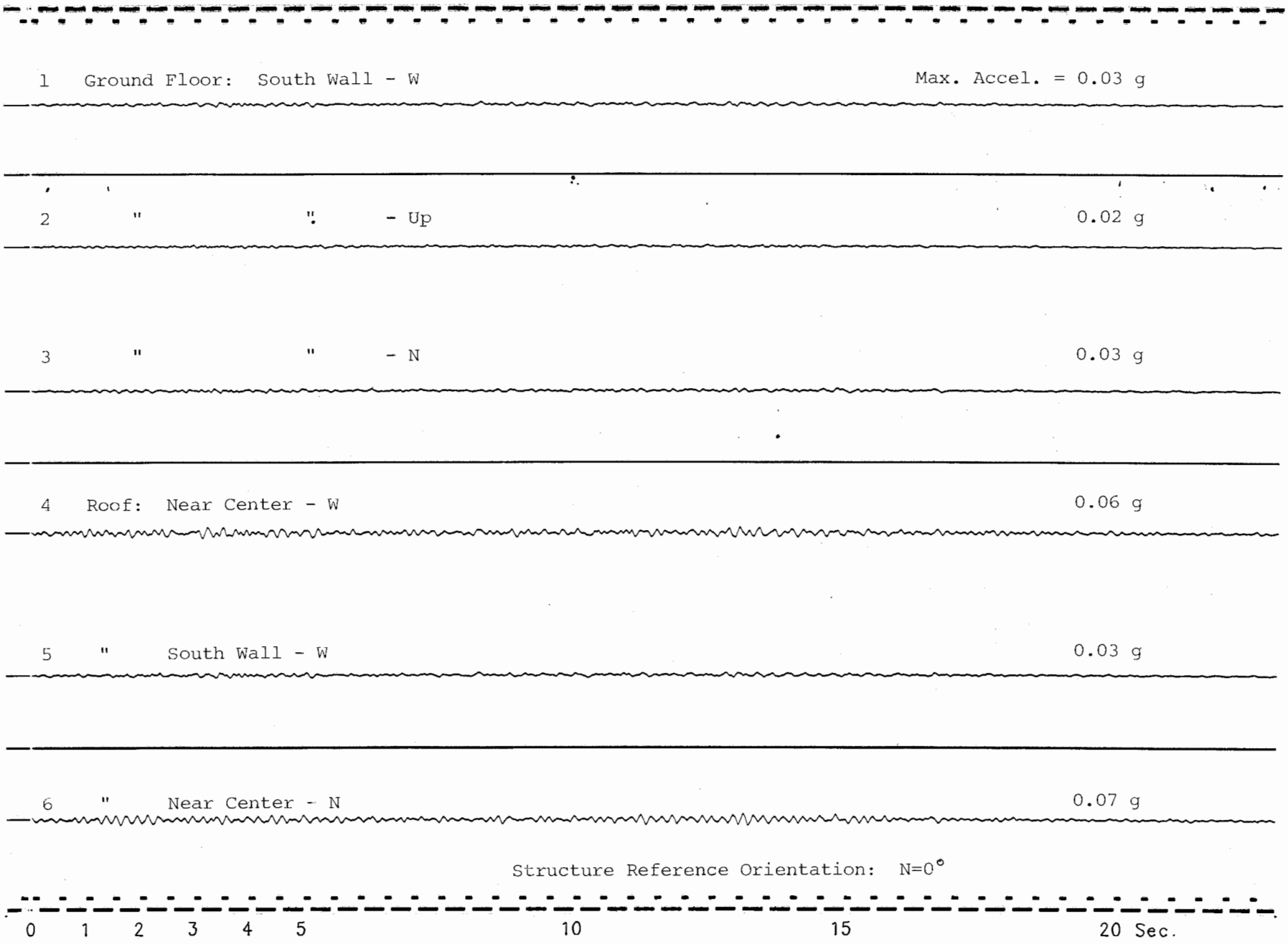
Record 12267-C0126-87337.01

1	Basement: Center - W	Max. Accel. = 0.01 g
2	" " - Up	0.02 g
3	" " - N	0.02 g
4	" East Wall - W	0.02 g
5	Roof: Center - N	0.04 g
6	" " - W	0.03 g
7	" East Wall - N	0.04 g
8	2nd Floor: Center - N	0.02 g
9	" " - W	0.02 g
10	" East Wall - N	0.02 g

Structure Reference Orientation: N=315°

0 1 2 3 4 5 10 15 20 Sec.

Hemet - City Library (1-story masonry & concrete shear wall bldg.)
(CSMIP Station No. 12266) Record 12266-C0111-87337.01



INDEX TO STRONG-MOTION RECORDS

Superstition Hills Earthquake of November 23, 1987

Station	Page	Station	Page
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	Structural-Response Records		
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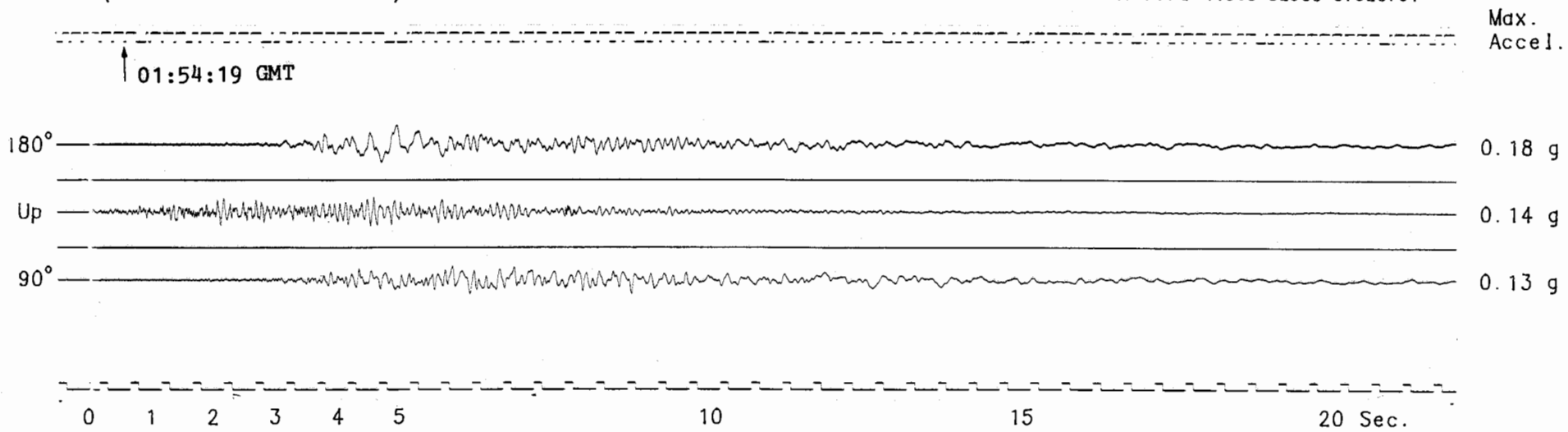
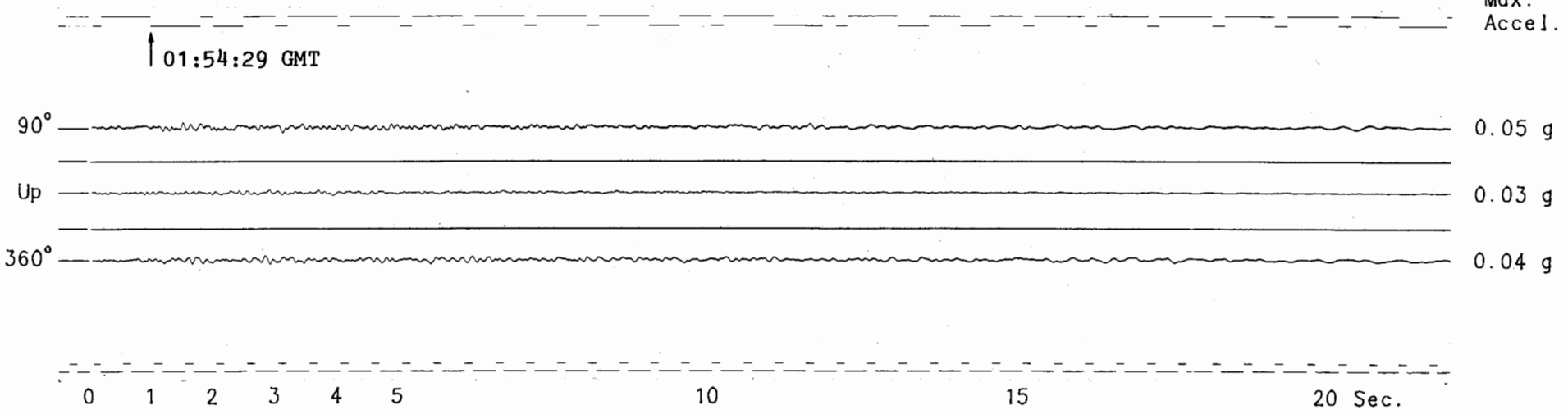
Westmorland – Fire Station
(CSMIP Station No. 11369)

Record 11369-S2588-87328.01



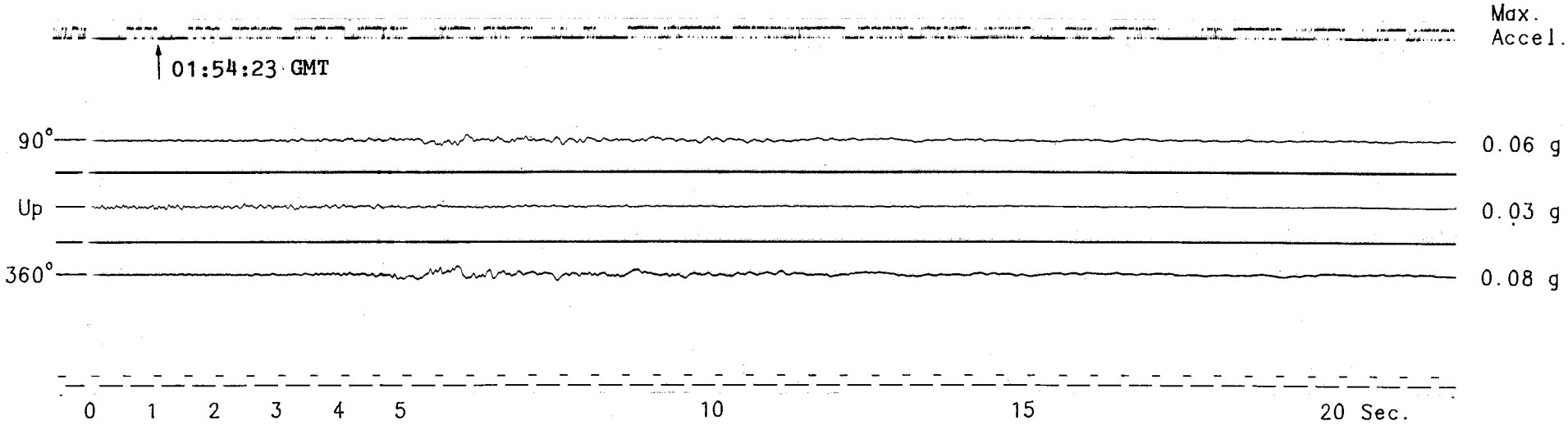
El Centro – Imperial County Center FF
(CSMIP Station No. 01335)

Record 01335-S2761-87329.01



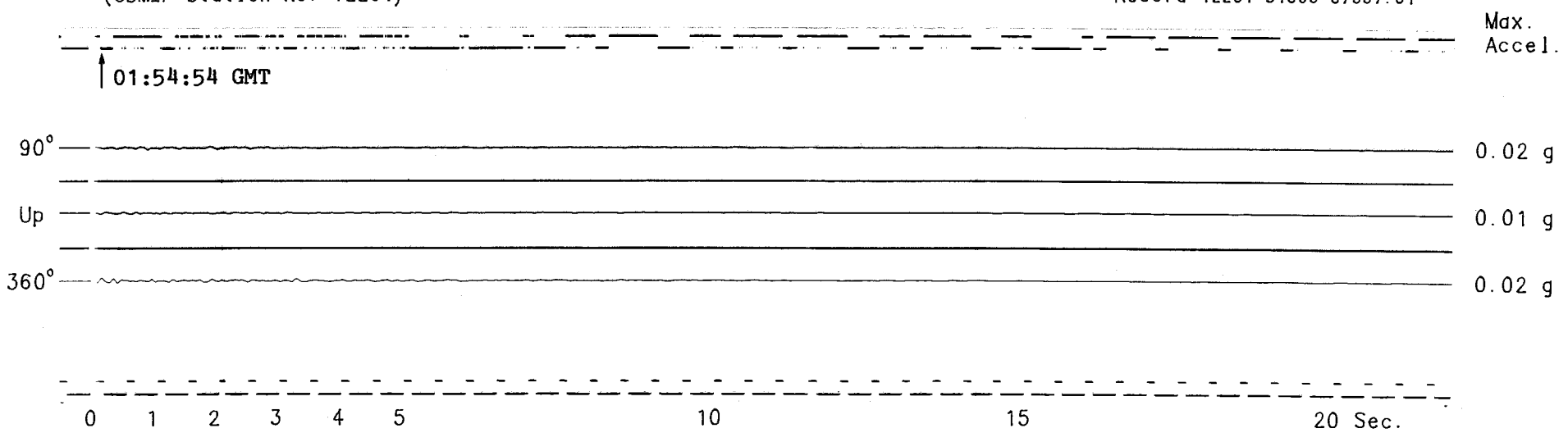
Niland – Fire Station
(CSMIP Station No. 11023)

Record 11023–S2550–87328.01



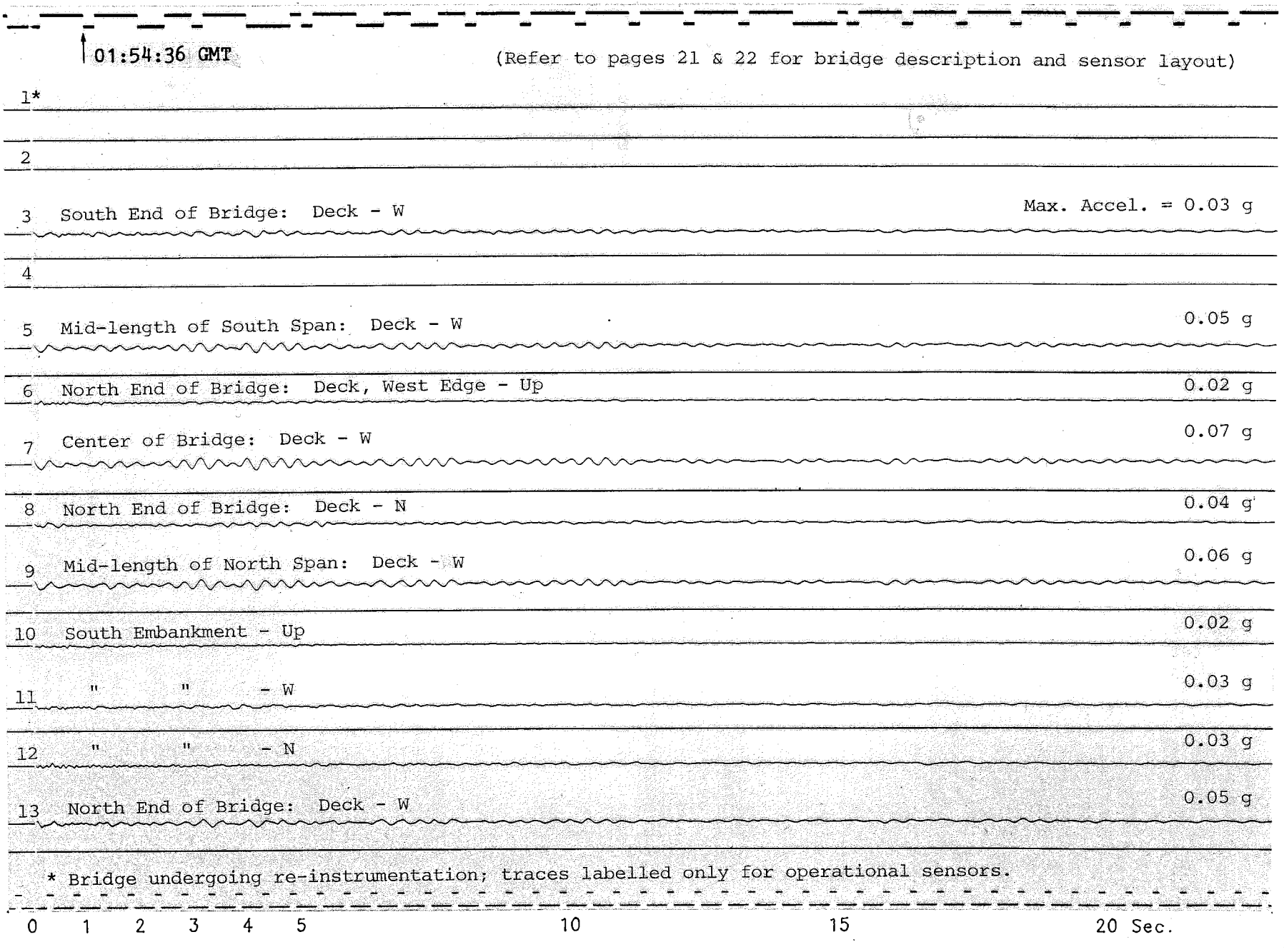
San Jacinto – Soboba
(CSMIP Station No. 12204)

Record 12204–S1863–87337.01



El Centro – Hwy 8/Meloland Overpass (Channels 1 – 13)
(CSMIP Station No. 01336)

Record 01336-C0164-87329.05



El Centro – Hwy 8/Meloland Overpass (Channels 14 – 26)
(CSMIP Station No. 01336)

Record 01336–C0165–87329.06

01:54:36 GMT

16	Mid-length of South Span: Deck, West Edge - Up	Max. Accel. = 0.07 g
17	Center of Bridge: Deck, West Edge - Up	0.05 g
18		
19	South End of Bridge: Deck, West Edge - Up	0.03 g
20	Mid-length of North Span: Deck, West Edge - Up	0.05 g
21		
22		
23	North Embankment - Up	0.02 g
25	" " - N	0.02 g
26	" " - W	0.03 g

Structure Reference Orientation: N=0°

0 1 2 3 4 5 10 15 20 Sec.

Indio – Riverside County Admin. Bldg.
(CSMIP Station No. 12493)

Record 12493–C0125–87329.01

01:54:39 GMT

(Refer to pages 25 & 26 for building description and sensor layout)

		Max. Accel.
1	Basement: Center – Up	0.01 g
2	" : Center – E	0.01 g
3	2nd Floor: Center – E	0.02 g
4	Roof: Center – E	0.05 g
5	Basement: Center – N	0.01 g
6	2nd Floor: Center – N	0.03 g
7	Roof: Center – N	0.08 g
8	2nd Floor: West End – N	0.04 g
9	Roof: West End – N	0.12 g
10	2nd Floor: West Wall – Up	0.01 g

Structure Reference Orientation: N=0°

0 1 2 3 4 5 10 15 20 Sec.