



2020 West El Camino Avenue, Suite 800
Sacramento, CA 95833
hcai.ca.gov



Hospital Building Safety Board Instrumentation Committee

AGENDA

October 29, 2024
10:00 a.m. – 4:00 p.m.

The Committee may not discuss or act on any matter raised during the public comment section that is not included on this agenda, except to place the matter on a future meeting agenda. (Government Code §§ 11125, 11125.7, subd. (a).)

Locations:

[2020 West El Camino Ave, Conference Room 930, Sacramento, CA 95833](#)

[355 South Grand Avenue, Conference Room 2000, Los Angeles, CA 90071](#)

[Teams Meeting Access](#); Meeting ID: 281 904 909 114; Passcode: NsU6eA

Call in: (916) 535-0978; Phone Conference ID: 137 966 432 #

- Item #1 Call to Order and Welcome
Facilitator: Farzad Naeim, PhD, SE, Esq, NAE, President, Farzad Naeim, Inc.; Committee Chair (or designee)
- Item #2 Roll Call and Meeting Advisories/Expectations
Facilitator: Veronica Yuke, Manager, HCAI; Executive Director (or designee)
- Item #3 Discussion on issues related to enhancing instrumentation to health monitoring, and status of publication and distribution of the *Seismic Instrumentation of Healthcare Facilities White Paper*
- Discussion and public input.
- Facilitator: Farzad Naeim (or designee)*
- Item #4 [Review of the Fiscal Year 2023-24 HCAI/CSMIP Hospital Instrumentation Annual Report by the California Strong Motion Instrumentation Program \(CSMIP\)](#)
- Discussion and public input
- Facilitator: Hamid Haddadi, PhD GP, Program Manager, California Strong Motion Instrumentation Program, California Geological Survey; Consulting Member (or designee)*

Item #1

Call to Order and Welcome

*Facilitator: Farzad Naeim, PhD, SE, Esq, NAE, President,
Farzad Naeim, Inc; Committee Chair (or designee)*

Item #2

Roll Call and Meeting Advisories/Expectations

Facilitator: Veronica Yuke, Executive Director (or designee)

Item #3

Discussion on issues related to enhancing instrumentation to health monitoring, and status of publication and distribution of the *Seismic Instrumentation of Healthcare Facilities* White Paper

- Discussion and public input

Facilitator: Farzad Naeim (or designee)

Item #4

Review of the Fiscal Year 2023-24 HCAI/CSMIP Hospital Instrumentation Annual Report by the California Strong Motion Instrumentation Program (CSMIP)

- Discussion and public input

Facilitator: Hamid Haddadi, PhD GP, Program Manager, California Strong Motion Instrumentation Program, California Geological Survey; Consulting Member (or designee)

HCAI/CGS
Hospital Instrumentation Annual Report
(July 1, 2023, through June 30, 2024)

Hamid Haddadi

California Strong Motion Instrumentation Program
California Geological Survey
California Department of Conservation



Outline:

1. Hospital Instrumentations Status:

- Type 1 - HCAI-Funded Regular Instrumentation of Hospitals
- Types 2 - Owner-Funded Instrumentation of New Hospitals with CSMIP Guidance and Assistance
- Types 3 - Owner-Funded Instrumentation of Retrofitted Existing Hospitals with CSMIP Guidance and Assistance

2. Strong Motion Records

3. Contract Budget Status

4. Hospital Instrumentation Upgrade under the California Statewide Strong-Motion Instrument Upgrades

5. Real Time Structural Monitoring

Hospital Instrumentation Contracts:

- HCAI/CGS Hospital Instrumentation Projects started in 1989
- Each contract covers 3 years
- 12th contract: July 7, 2023 to June 30, 2026

Regular Hospital Buildings (Type 1)

HCAI Funded - HBSB Instrumentation Committee Recommended

Candidate Buildings for Instrumentation	Type	Status
1. Fortuna – Providence Redwood Memorial Hospital	Wood, Commercial, Industrial	Hospital representative provided plans to HCAI; Instrumentation layout underway
2. Healdsburg – Healdsburg Hospital	Wood, Light Frame	Hospital representative provided plans to HCAI; Instrumentation layout underway
3. Santa Rosa – Providence Santa Rosa Memorial Hospital	Wood, Light Frame	Hospital representative provided plans to HCAI; Instrumentation layout underway
4. Hollister – Hazel Hawkins Memorial Hospital	Wood, Commercial, Industrial	Hospital representative provided plans to HCAI; Instrumentation layout underway
5. Ojai – Community Memorial Hospital	Wood, Light Frame	HCAI establishing contact with hospital representative
6. Monterey Park – Monterey Park Hospital	Wood, Light Frame	HCAI establishing contact with hospital representative
7. San Bernardino – Community Hospital	Wood, Light Frame	HCAI establishing contact with hospital representative

New Hospital Buildings (Type 2)

Base-Isolated or Alternate Method of Compliance

Owner Funded with CSMIP Assistance and Guidance

Candidate Buildings for Instrumentations

1. Loma Linda – University Medical Center Replacement Hospital
2. Los Angeles - Hollywood Presbyterian Medical Center Acute Care Services Replacement Building
3. Marina Del Rey – Cedars-Sinai Medical Center Replacement Hospital
4. La Jolla – Scripps Tower II
5. San Diego – Sharp Metropolitan Medical Center New Tower
6. Irvine – UC Irvine Medical Center New Hospital
7. Sacramento – UC Davis Health New Hospital
8. Torrance – Harbor UCLA Medical Center
9. San Jose – Kaiser Replacement Hospital

New Hospital Buildings (Type 2)

Loma Linda – University Medical Center Replacement Hospital



Type:
Steel BRB and SidePlate moment frames isolated with triple pendulum bearings and viscous dampers.

TSL: 4/26/2017

Sensor Marking: 9/6/2018

Completion Date: 1/30/2020
Staff in the field this week to upgrade communication and install mounting plates for RD sensors



Los Angeles - Hollywood Presbyterian Medical Center Acute Care Services Replacement Building



Type:
Steel moment frames with SidePlate connections

TSL: 10/26/2017

Sensor Marking: 5/6/2020

Completion Date: FY 24-25

Marina Del Rey – Cedars-Sinai Medical Center Replacement Hospital



Type:
Steel moment frames with SidePlate connections

TSL: 7/16/2021

Sensor Marking: 4/3/2024

Owner requested RFI from Kenometrics in May 2024

Completion Date: FY 24-25



New Hospital Buildings (Type 2)

La Jolla – Scripps Tower II



Type:
Steel moment frames with bolted SidePlate connections

TSL: 2/8/2022

Sensor Marking: 6/28/2023

Sensor Installation: May 2024

Completion Date: FY 24-25



San Diego – Sharp Metropolitan Medical Center New Tower



Type:
Steel moment frames with bolted SidePlate connections

TSL: 5/31/2022

Sensor Marking: TBD

Completion Date: FY 29-30

Irvine – UC Irvine Medical Center New Hospital



Type:
Steel buckling restrained braced frames

TSL: 3/9/2023

Sensor Marking: 11/30/2023

Sensor Plates sent in September 2024

Completion Date: FY 24-25



New Hospital Buildings (Type 2)

Sacramento – UC Davis Health New Hospital



Type:
Steel moment frames with SidePlate connections

TSL: 6/19/2024

Sensor Marking: TBD

Completion Date: FY 29-30



Torrance – Harbor UCLA Medical Center



Type:
Steel moment frames with SidePlate connections

TSL: 11/14/2023

Sensor Marking: TBD

Completion Date: FY 27-28

San Jose – Kaiser Replacement Hospital



Type:
Steel moment frames with SidePlate connections

TSL: TBD

Sensor Marking: TBD

Completion Date: FY 27-28



Project's Budget

Total amount of Agreement (September 5, 2023 – June 30, 2026) \$1,470,963.00

1) Budgeted for FY23-24	\$490,321.00
Expended in FY23-24	<u>(\$192,995.32)</u>
Remaining amount from FY23-24	\$297,325.68

16 CGS/HCAI Stations Instruments Upgraded in FY 22-23 Under the BCP Project

(11 Hospitals + 5 Ground Response upgraded at no cost to HCAI)

Description	Completion Date	Station Type
Indio - JFK Hospital	2022-05-18	Building
Templeton - Twin Cities Hospital	2022-06-29	Building
Santa Rosa - Kaiser Hospital	2022-10-11	Building
San Jose - O'Connor Hospital	2022-12-01	Building
Los Angeles - LAC+USC Hospital D&T Bldg	2022-12-14	Building
Los Angeles - LAC+USC Hospital Grnds	2022-12-14	Ground
Los Angeles - USC Hospital	2023-02-14	Building
Newport Beach - Hoag Hospital East Tower	2023-02-14	Building
Newport Beach - Hoag Hospital	2023-02-14	Building
Stanford - University Hospital FF	2023-03-02	Ground
Los Angeles - Good Samaritan Hospital	2023-03-14	Building
San Francisco - Kaiser Hospital	2023-03-14	Building
Palmdale - Palmdale Hospital Grnds	2023-04-11	Ground
Fairfield - NorthBay Medical Center FF	2023-04-18	Ground
Oxnard - St. Johns Hospital	2023-05-30	Building
Oxnard - St Johns Hospital FF	2023-05-30	Ground



California
**Department of
 Conservation**
 California Geological Survey

20 CGS/HCAI Instrumented Stations Upgraded in FY 23-24 Under the BCP Project

(14 Hospitals + 6 Ground Response upgraded at no cost to HCAI)

Description	Completion Date	Station Type
Los Angeles - MLK Hospital	2023-07-18	Building
Santa Barbara - Cottage Hospital FF	2023-08-04	Ground
San Diego - UCSD Hospital	2023-09-19	Building
Santa Clara - Kaiser Hospital	2023-10-17	Building
Santa Clara - Homestead & Lawrence Expwy	2023-10-17	Ground
San Rafael - Marin General Hospital	2023-10-30	Building
San Rafael - Marin Hospital Grounds	2023-10-30	Ground
Stanford - University Hospital	2023-11-06	Building
Simi Valley - Simi Valley Hospital Grnds	2023-11-07	Ground
Simi Valley - Simi Valley Hospital	2023-11-07	Building
Los Angeles - LAC+USC Hospital IP Bldg	2024-01-16	Building
Los Angeles - Childrens Hospital	2024-01-16	Building
Sylmar - Olive View Hospital Grounds	2024-01-17	Ground
Gilroy - St. Louise Hospital	2024-02-13	Building
Salinas - Natividad Medical Center	2024-02-13	Building
Palm Springs - Desert Hospital	2024-03-05	Building
Crescent City - Sutter Hospital Grounds	2024-04-23	Ground
Crescent City - Sutter Hospital	2024-04-23	Building
Eureka - St. Joseph Hospital	2024-04-23	Building
Colton - San Bernardino Co. Med. Center	2024-04-23	Building
Mammoth Lakes - Mammoth Hospital	2024-07-23	Building
San Pedro - Providence Hosp FF	2024-07-30	Ground
San Pedro - Providence LCOM Hosp Bldg 1	2024-07-30	Building
San Pedro - Providence LCOM Hosp Bldg 2	2024-07-30	Building
Castro Valley - Sutter Hospital	2024-09-10	Building
Castro Valley - Sutter Hospital Grnds	2024-09-10	Ground
Moreno Valley - Riverside Co Hospital	2024-10-15	Building
Bakersfield - Kern County Hospital	2024-10-22	Building
Bakersfield - Kern County Hospital Grnds	2024-10-22	Ground

- So far **45 stations (31 Hospitals and 14 Ground Response)** have been upgraded under BCP.
- As a result, in addition to instrument upgrades, **communication type was also upgraded from Low to High for 13 stations.**

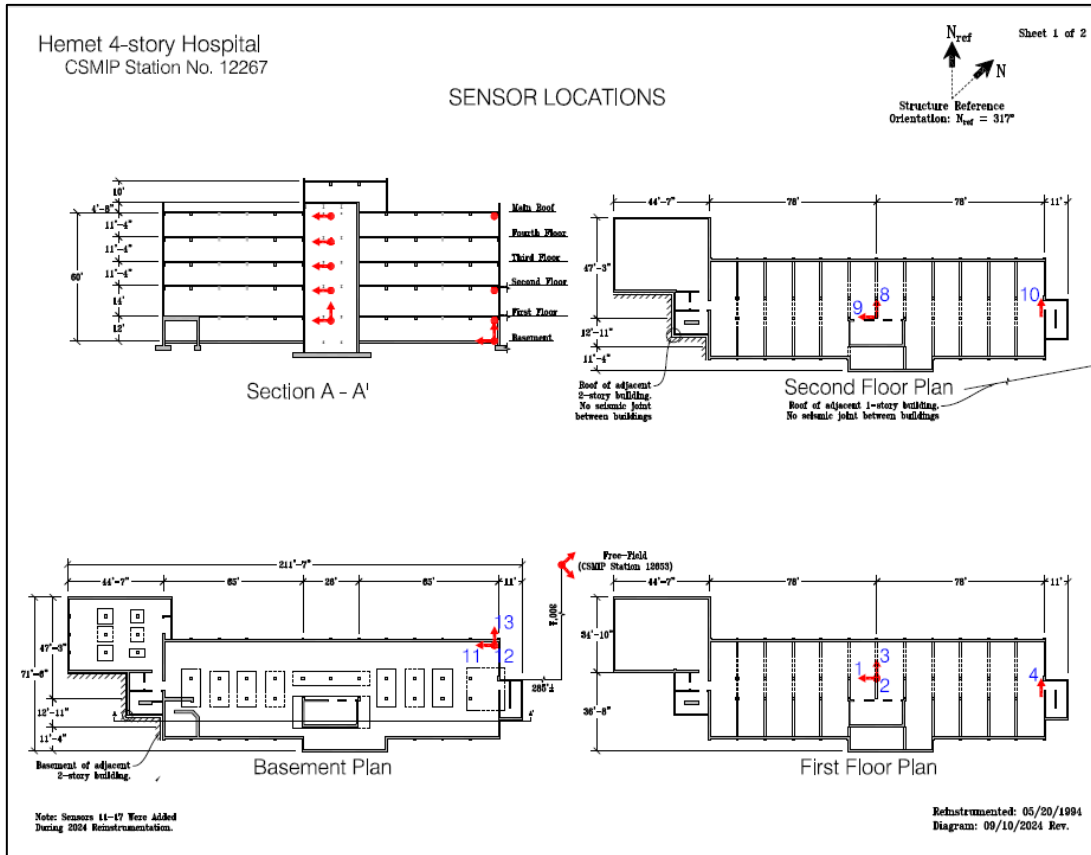


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Totally Re-instrumented Hospital Under BCP

Hemet - 4 - story Hospital

(no cost to HCAI)



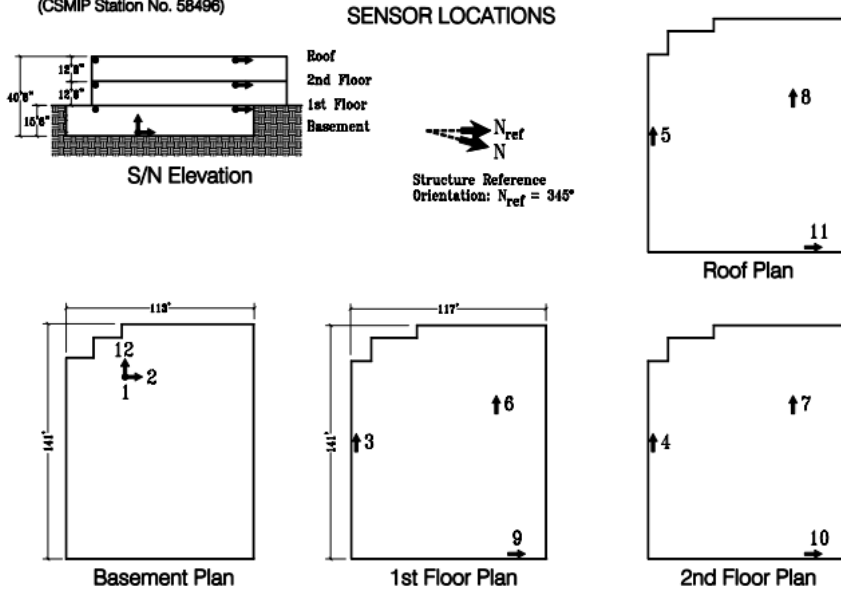
Installed 16 sensors (added 6 sensors)

Totally Re-instrumented Hospital Under BCP

Berkeley – 2-story Hospital

(no cost to HCAI)

Berkeley - 2-story Hospital
(CSMIP Station No. 58496)



12 sensors (no sensors added)
Sensor Marking: November 7, 2024

Earthquakes recorded in FY 23/24

18 earthquakes with M3.0 or larger recorded at 24 instrumented hospitals
Strong Motion Data provided through the Center for Engineering Strong Motion Data (CESMD)

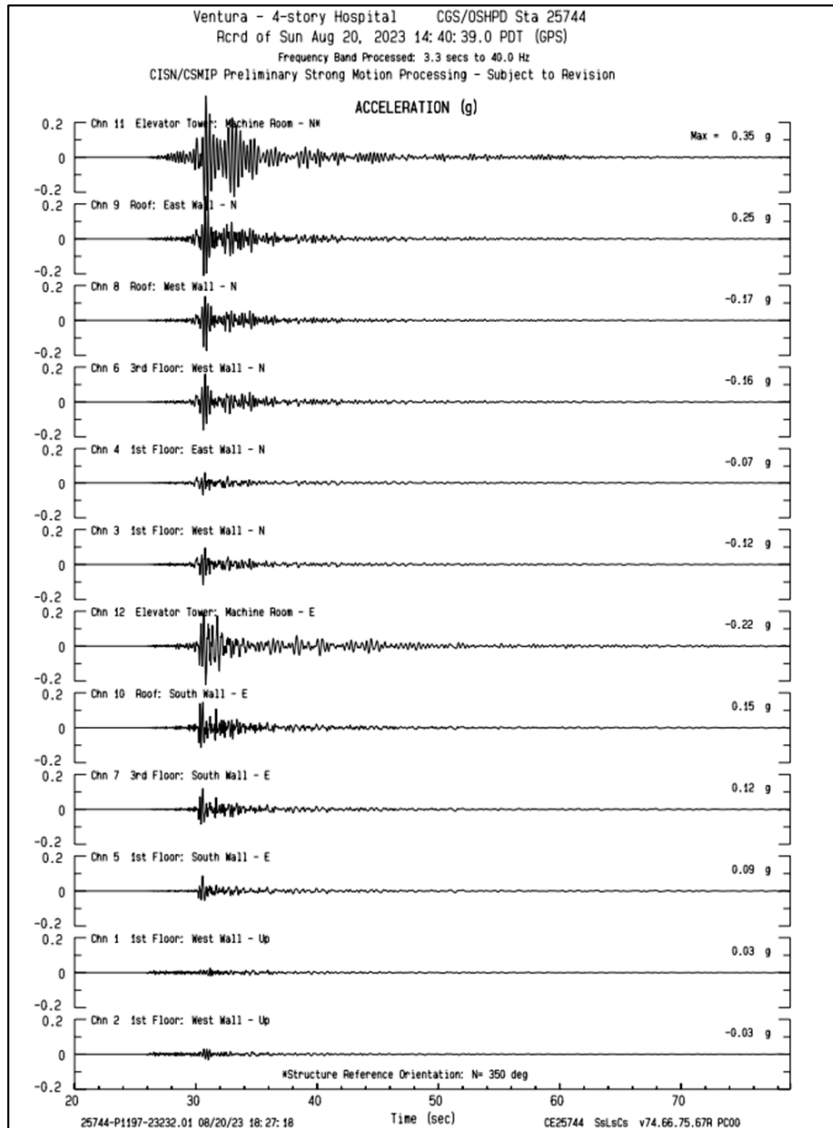
	Earthquake	Hospital	Epicentral Distance (km)	PGA (%g) Base	PGA (%g) Structure
Largest Magnitude and PGA	M5.0 Ojai Earthquake of August 20, 2023	Ventura County Hospital	16.5	11.9	35.3
Closest to Epicenter	M3.6 Newport Beach Earthquake of June 6, 2024	Newport Beach – Hoag Hospital East Tower	1.9	4.1	5.9

Earthquakes recorded so far in FY 24/25

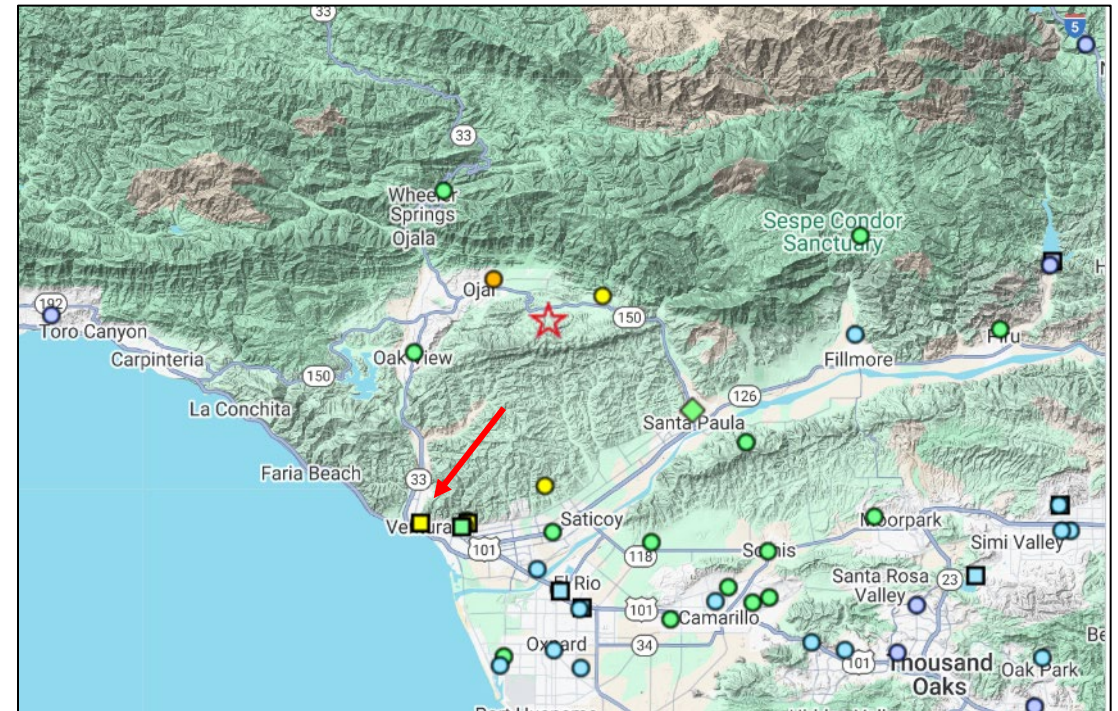
7 earthquakes with M3.0 or larger recorded at 15 hospitals (23 records obtained)

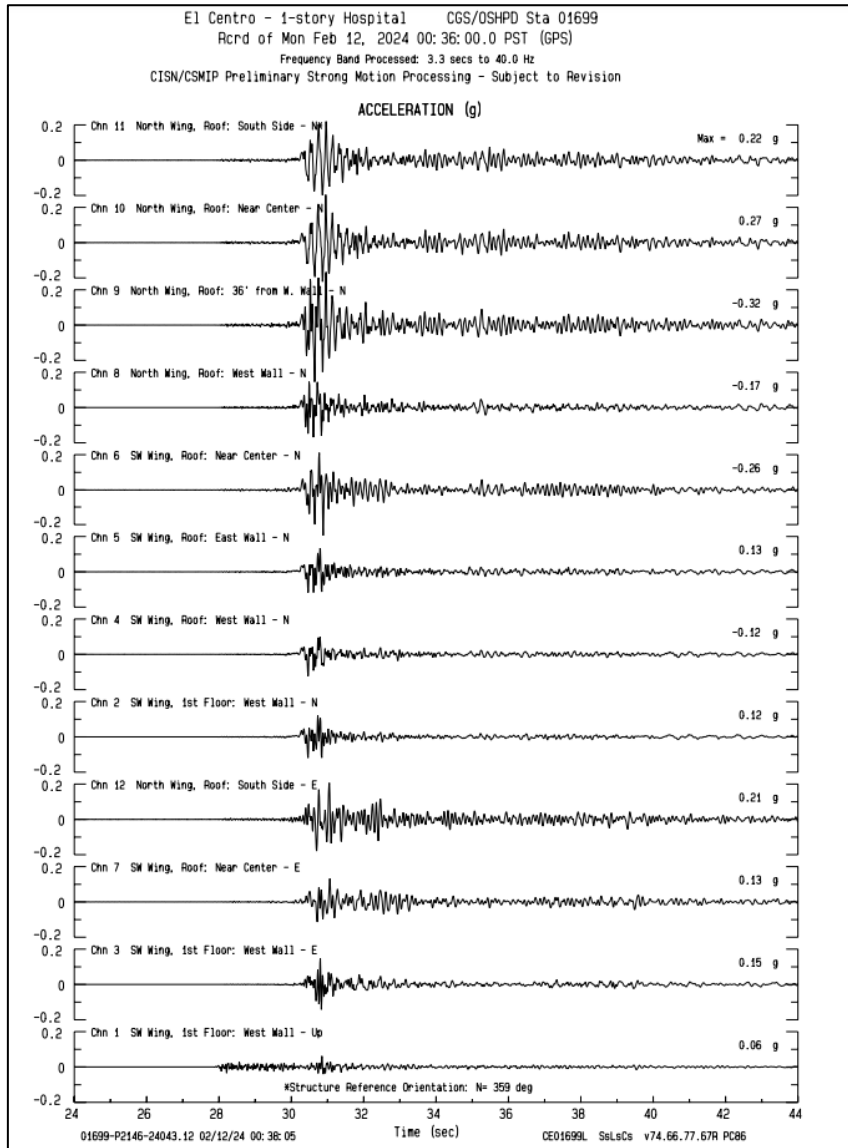
Strong Motion Data provided through the Center for Engineering Strong Motion Data (CESMD)

	Earthquake	Hospital	Epicentral Distance (km)	PGA (%g) Base	PGA (%g) Structure
Largest Magnitude and PGA	M4.4 Highland Park Earthquake of August 12, 2024	Los Angeles – 8-story Hospital	8.5	5.3	0.20

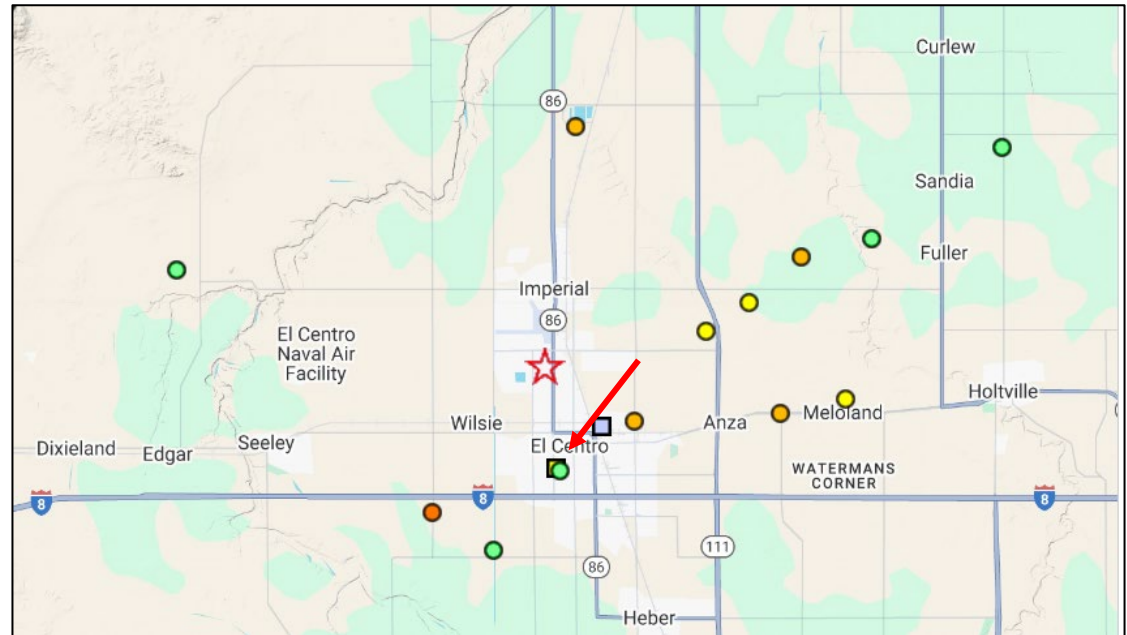


Earthquake	Hospital	Epicentral Distance (km)	PGA (%g) Base	PGA(%g) Structure
M5.0 Ojai Earthquake of August 20, 2023	Ventura County Hospital	16.5	11.9	35.3

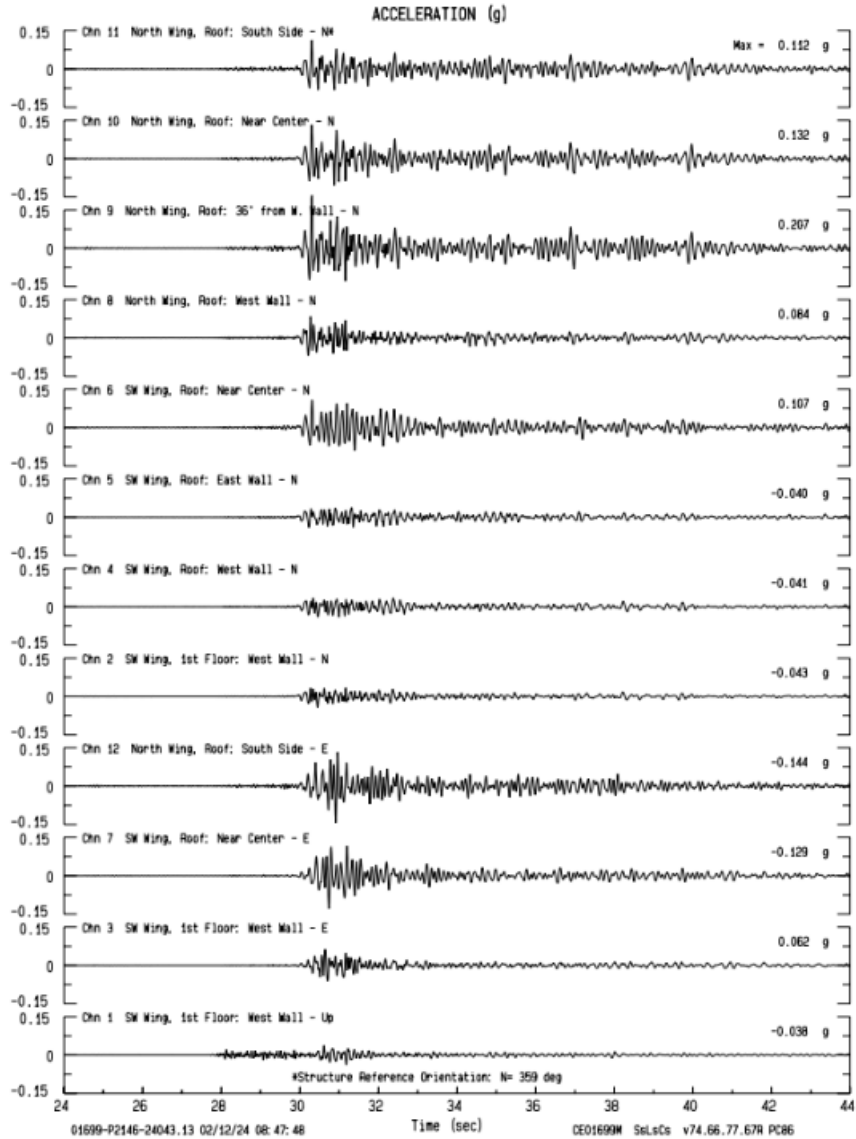




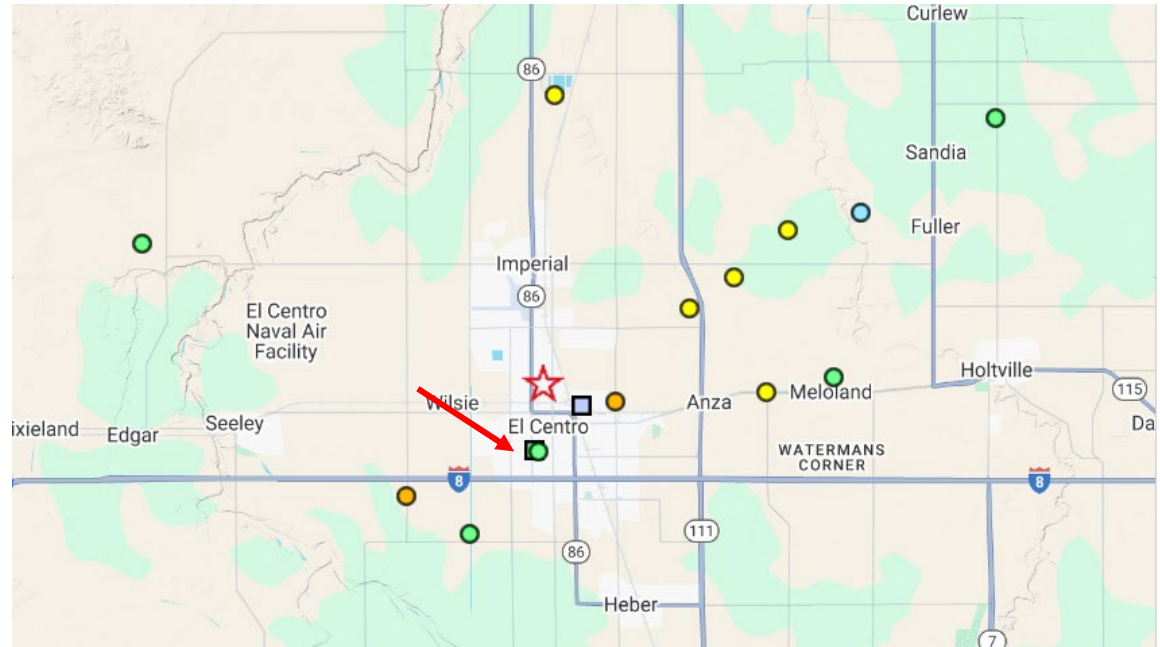
Earthquake	Hospital	Epicentra 1 Distance (km)	PGA (%g) Base	PGA(%g) Structure
M4.8 El Centro Earthquake of February 12, 2024	El Centro – 1-story Hospital	3.7	15.0	32.2



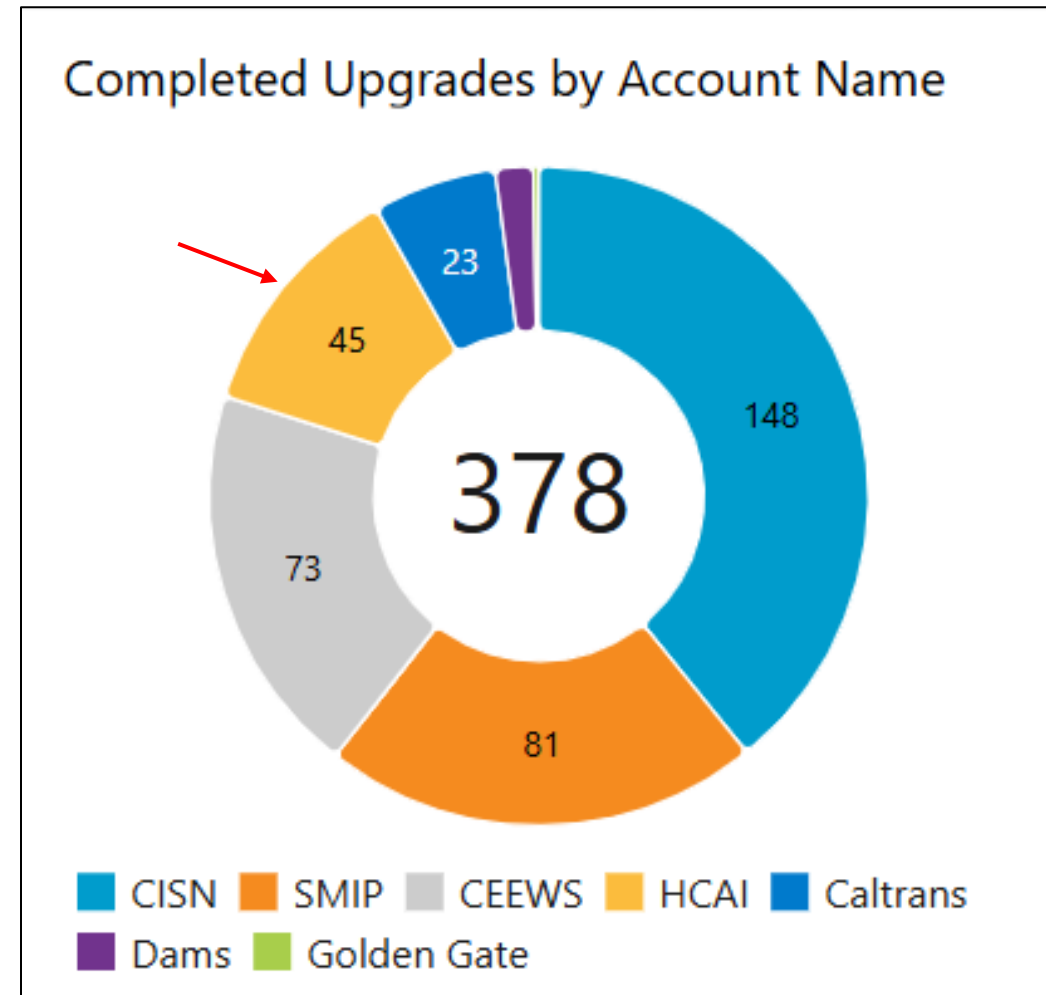
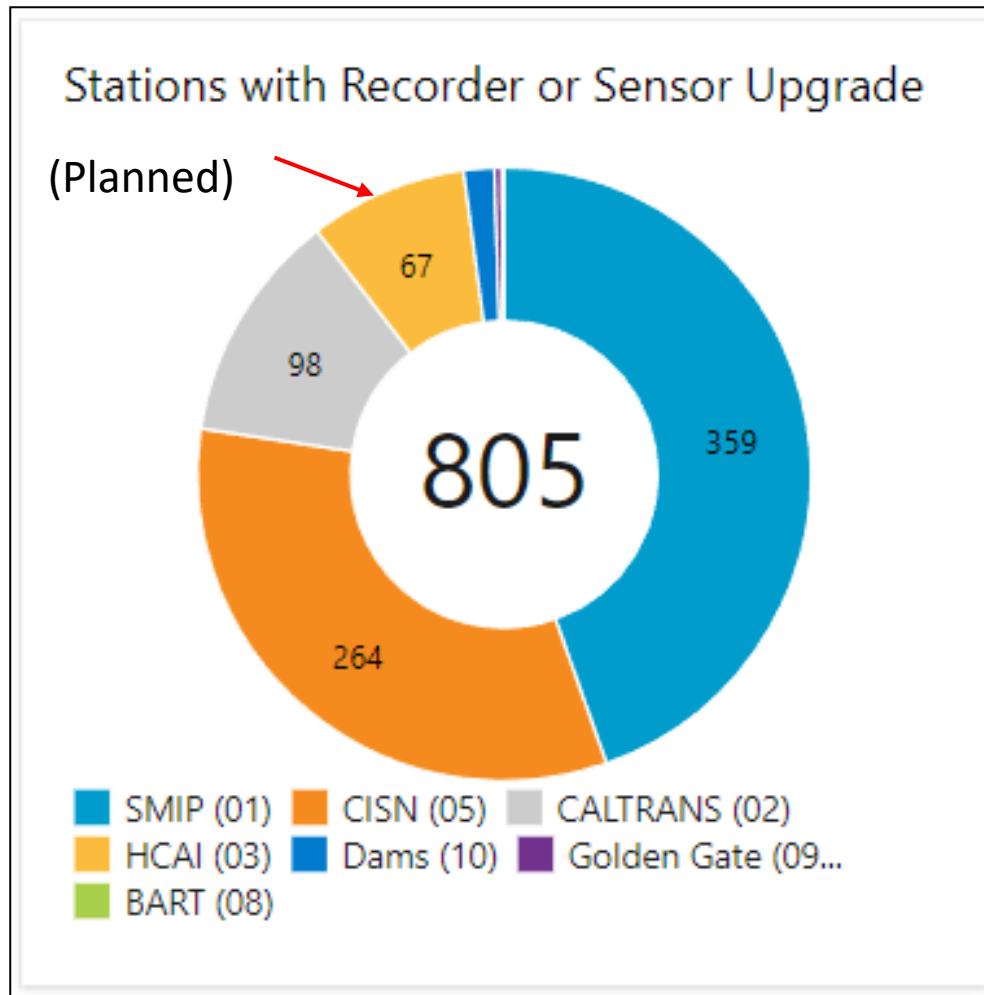
El Centro - 1-story Hospital CGS/DSHPD Sta 01699
 Rcrd of Mon Feb 12, 2024 00:42:23.0 PST (GPS)
 Frequency Band Processed: 3.3 secs to 40.0 Hz
 CIGN/CSMP Preliminary Strong Motion Processing - Subject to Revision



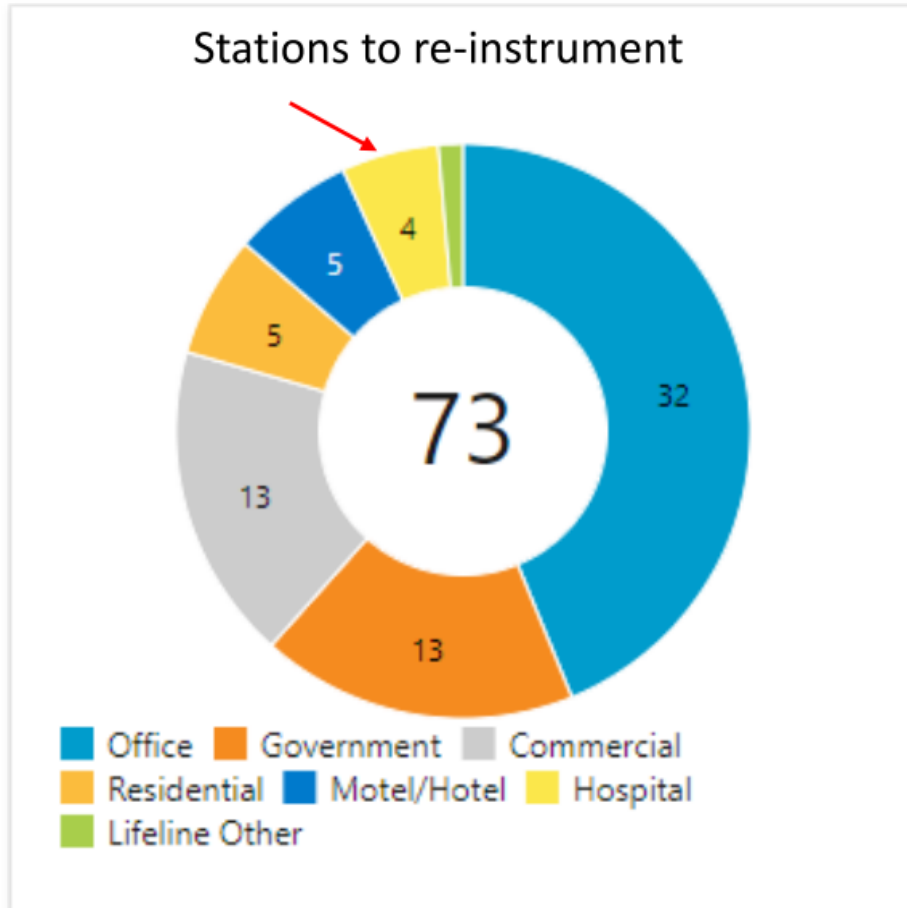
Earthquake	Hospital	Epicentra 1 Distance (km)	PGA (%g) Base	PGA(%g) Structure
M4.6 El Centro Earthquake of February 12, 2024	El Centro – 1-story Hospital	2.6	6.3	20.7



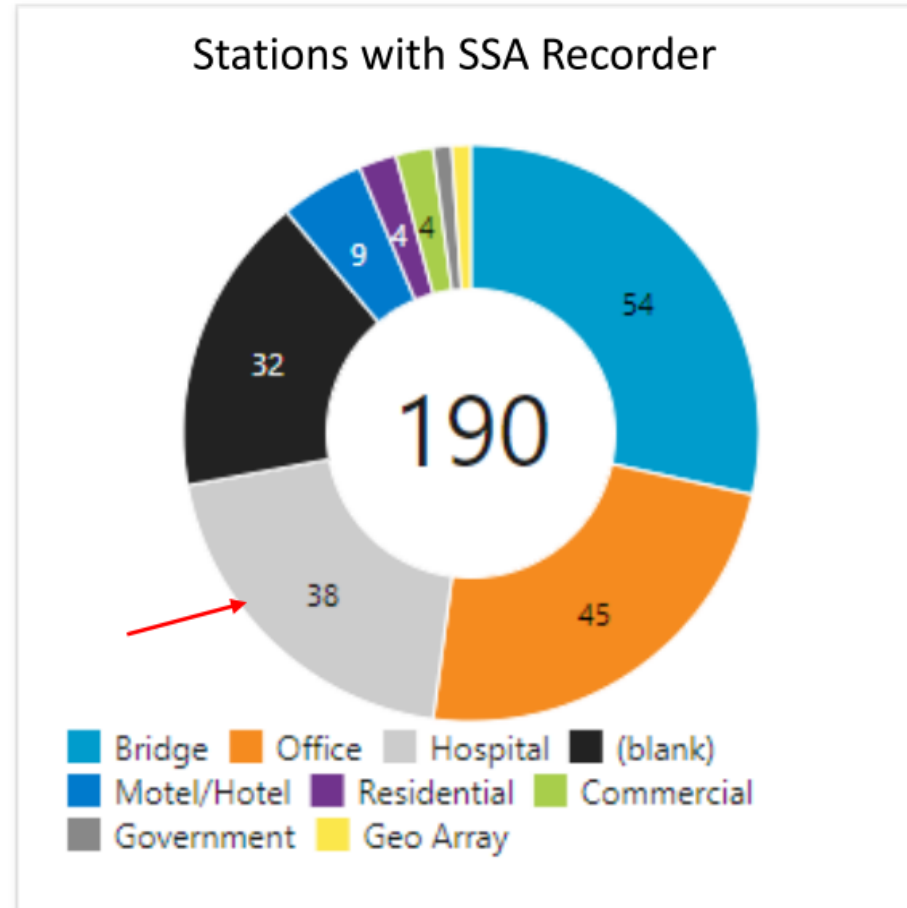
Statewide Strong Motion Instrumentation Upgrade (Phase I – KMI)



Statewide Strong Motion Instrumentation Upgrade



2 HCAI supported hospitals are completed



SSA recorders at all 38 HCAI supported stations have been upgraded

Real-Time Structural Monitoring

- CSMIP Real-Time Data Center
- Pilot Project: Real-Time Monitoring of Hospitals

Santa Rosa – Kaiser Hospital



Lancaster - Antelope Valley Hospital



New development on Data Acquisition and Monitoring Platforms

- Real Time System: Earthworm and AQMS
 - Currently 21 Ground Response stations of HCAI hospitals operate in real time.
- Antelope: Near Real Time Structural Monitoring Platform

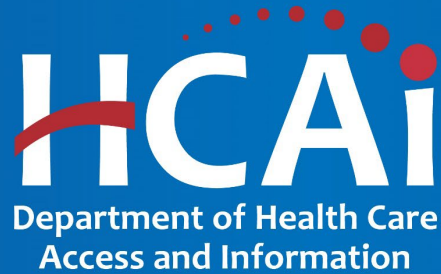
Thank you!

Item #5

Annual update to the Committee regarding CSMIP

- Discussion and public input

Facilitators: Erol Kalkan, Senior Seismologist, HCAI (or designees)



California Strong Motion Instrumentation Program (CSMIP)

HCAI Briefing

HBSB Instrumentation Committee

October 29, 2024

Hospital Instrumentation Requirements

Owner Paid Instrumentation

CBC Required Instrumentation

- New Hospital Buildings
- Buildings approved thru the Alternate Means of Compliance for the Lateral Force Resisting System, Seismic isolation and Damping systems

HCAI Paid Instrumentation

HCAI Required Instrumentation (HSSA)

- HBSB Recommendation for Instrumentation (Goal is 1 / year)
- HCAI is enforcing HBSB Recommendation



Criteria for HBSB Building Instrumentation Selection

- Proximity to fault capable of generating earthquake $M > 6.5$ and sites with high probability of seismic events
- Non-standard structural systems
- Adjacent to other buildings with pounding probability
- Buildings with irregularities
- Tall interstory heights
- Seismically retrofitted buildings (VSI) & HAZUS / SPC-4D
- Soil type (soft soils)
- Lack of instrumented buildings in the geographic area

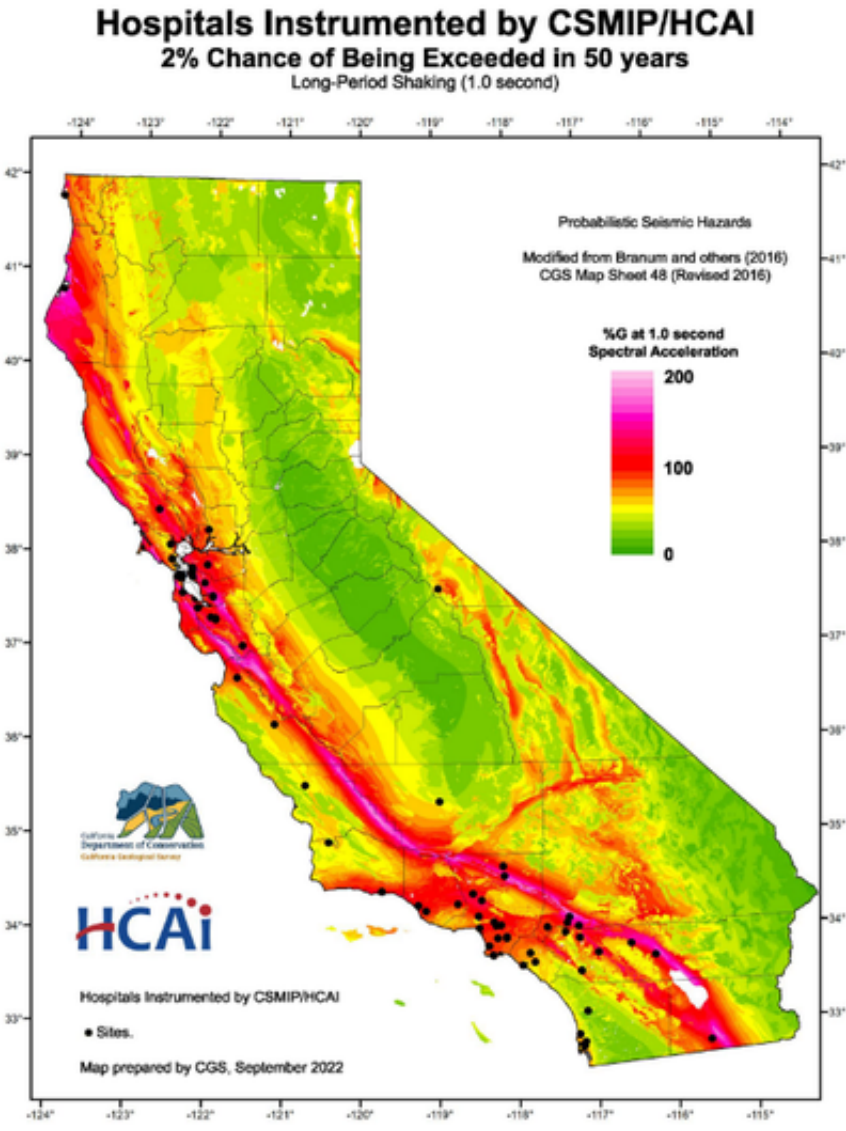


Lateral Seismic Resisting Systems in Hospitals, Instrumentation reqd. by Owner

- Structures with Passive Energy Dissipation Systems
- Structures with Seismic Isolation Systems
- Other structures of conventional Lateral Force Resisting Systems with alternate methods of compliance.
- Structures with lateral system not listed in ASCE 7 Table 12.2-1

Hospitals

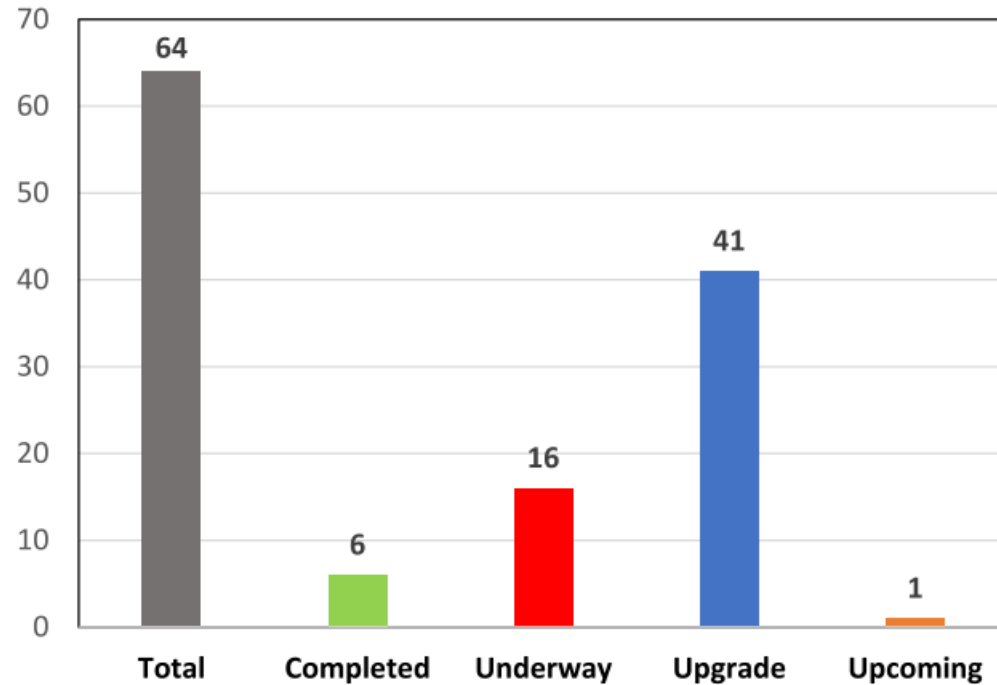
Most hospital buildings are close to active faults and are in regions of high or very high seismic hazard.



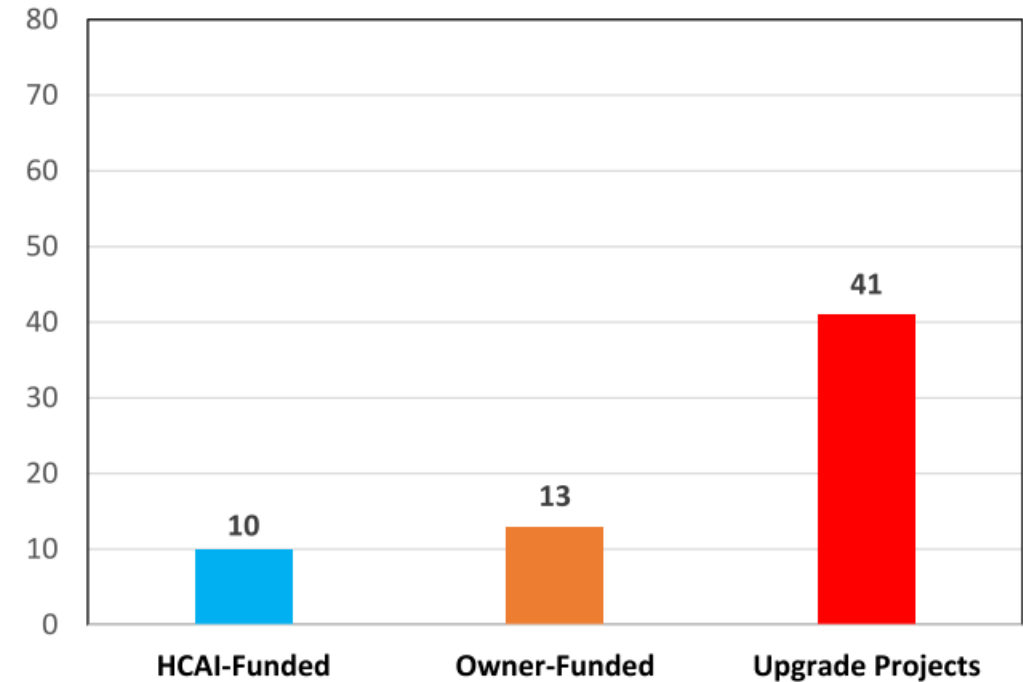
85 Hospitals are instrumented by HCAI/CSMIP

Summary (FY20 – FY30)

Instrumentation Projects (FY20-30)



Instrumentation Projects (FY20-30)



HCAI-Funded instrumentation projects were recommended by the HBSB Instrumentation Committee

HCAI-Funded Instrumentation Projects Underway (wood-framed bldgs.)

1. Fortuna – Providence Redwood Memorial Hospital (24 chs., comp.: FY25)
2. Healdsburg – Healdsburg Hospital (12 chs., comp.: FY25)
3. Santa Rosa – Providence Santa Rosa Memorial Hospital (16 chs., comp.: FY25)
4. Hollister – Hazel Hawkins Memorial Hospital (9 chs., comp.: FY25)



HCAI-Funded Instrumentation Projects Underway (wood-framed bldgs.)

5. Ojai – Community Memorial Hospital (TBD, comp.: FY25-26)
6. Monterey Park – Monterey Park Hospital (TBD, comp.: FY25-26)
7. San Bernardino – Community Hospital (TBD, comp.: FY25-26)



Owner-Funded Instrumentation Projects Underway

1. Loma Linda – University Medical Center (42 chs. + FF; comp.: FY24-25)
2. Los Angeles – Hollywood Presbyterian MC (16 chs.; comp.: FY24-25)
3. Marina Del Rey – Cedars-Sinai Medical Center (24 chs. + FF; comp.: FY24-25)



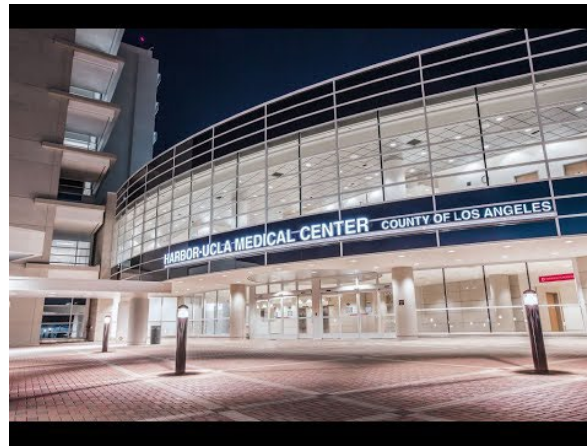
Owner-Funded Instrumentation Projects Underway

4. La Jolla – Scripps Tower II (18 chs.; comp.: FY24-25)
5. San Diego – Sharp Metropolitan MC New Tower (18 chs. + FF; comp.: FY29-30)
6. Irvine – UC Irvine Medical Center New Hospital (15 chs. + FF; comp.: FY24-25)



Owner-Funded Instrumentation Projects Underway

7. Sacramento – UC Davis Health New Hospital (47 chs. + FF; comp.: FY29-30)
8. Torrance – Harbor UCLA Medical Center (23 chs. + FF; comp.: FY27-28)
9. San Jose – Kaiser Replacement Hospital (28 chs. + FF; comp.: FY27-28)



Item #6

Status of Committee activities, and planning tasks and objectives for 2025 and beyond

- Discussion and public input

Facilitator: Farzad Naeim (or designee)

Item #7

Comments from the Public/Committee Members on Issues not on this Agenda

The Committee will receive comments from the Public/Committee Members. Matters raised at this time may be taken under consideration for placement on a subsequent agenda.

Facilitator: Farzad Naeim (or designee)

Item #8 Adjournment

No future Instrumentation Committee meetings scheduled at this time.