



- Board of Directors  
*Communications and Legislation Committee*

4/9/2013 Board Meeting

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**8-5**

## **Subject**

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Support, in concept, SB 135 (Padilla, D – Pacoima) - Earthquake Early Warning System

## **Executive Summary**

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Senate Bill 135 (SB 135) was introduced by California Senator Alex Padilla on January 28, 2013 ([Attachment 1](#)). SB 135 proposes to add Section 8587.8 to the Government Code which would require the State Office of Emergency Services (OES) to develop a comprehensive statewide earthquake early warning system in California. The statewide earthquake early warning system would be the result of collaboration between OES, California Institute of Technology (Caltech), California Geological Survey, University of California Berkeley, United States Geological Survey (USGS), and others.

## **Details**

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### **Background**

According to USGS, California is second only to Alaska as the most seismically active state in the union. Major earthquakes in recent California history include the 1906 San Francisco earthquake (magnitude 7.8), 1971 San Fernando earthquake (magnitude 6.7), 1989 Loma Prieta earthquake near San Francisco (magnitude 6.9), and 1994 Northridge earthquake (magnitude 6.7). During each of these earthquakes, significant loss of life and property damage occurred. For example, the Northridge earthquake resulted in 61 deaths and an estimated \$13 billion to \$32 billion in property damage. The Uniform California Earthquake Rupture Forecast released in 2008 predicted a 99.7 percent likelihood of a magnitude 6.7 or larger earthquake in California in the next 30 years. A 2013 study published by Caltech and the Japan Agency for Marine-Earth Science and Technology discovered that a statewide California earthquake involving both the Los Angeles and San Francisco metropolitan areas may be possible.

To date, Japan, Taiwan, Mexico, Turkey, Romania, Italy, and China either have or are working on earthquake early warning systems. The Japanese early warning system successfully detected the disastrous 9.0 magnitude Tōhoku earthquake in 2011 and broadcasted an alert on public television and radio. An earthquake early warning system works through the detection of faster "P" waves (compression waves) that precede the major shaking brought on by the slower and more destructive "S" waves (shear waves). Therefore, the effective detection and processing of P-wave information may provide critical advanced notice prior to the onset of major shaking. The warning program's reliability hinges on the number and location of the P-wave sensors, preferably near active fault zones.

SB 135 proposes that various agencies develop a comprehensive California-wide earthquake early warning system. The concept behind the bill is to provide a brief warning prior to the shaking of a devastating earthquake. While not preventing structural damage, an effective earthquake early warning system would disseminate earthquake information in support of public safety, emergency response, and loss mitigation. It should be noted that the effectiveness of an earthquake early warning system is predicated on many factors, such as the distance between the earthquake's epicenter and the sensors, and the distance between the sensors and the population

center. The greater the distance from the epicenter, the more time population centers would have to prepare. The system would provide little to no warning for a city next to the epicenter of an earthquake.

SB 135 does not include a funding mechanism for implementation of the early warning system. On January 28, 2013, Senator Alex Padilla stated in his press release that the initial cost estimate to develop the system was \$80 million. Both the federal and California state budgets have limited funding available for full development and deployment of an early warning system.

The California Utility Emergency Association (CUEA), of which Metropolitan is a member, has not yet taken a position on this bill. According to CUEA, some additional review and discussion is needed to answer the following questions:

- How much lead time will an earthquake early warning actually provide?
- What is the real world experience with earthquake early warning systems?
- What will it cost (different numbers have been suggested), and how will it be funded?

### **Impacts/Effects on Metropolitan**

In California, various agencies operate an early prototype of an earthquake early warning system. On March 11, 2013, Caltech scientists in Pasadena were successfully alerted 30 seconds in advance of minor shaking caused by a 4.7-magnitude earthquake in Anza, California, approximately 140 miles away. By expanding this existing network and processing data from an array of sensors located throughout the state, a fully developed earthquake early warning system may effectively detect the strength and progression of earthquakes and alert the public within seconds, sometimes up to 60 seconds, before potentially damaging ground shaking is felt.

Potential benefits to Metropolitan from an earthquake early warning system include providing Metropolitan's employees with a warning such that automatic or personal protective actions can be taken (e.g., stopping elevators, seeking cover, or alerting control rooms) before the shaking starts. Currently, Metropolitan is partnering with USGS to place earthquake sensors at all of its dams, as well as at select locations throughout the service area (e.g., Headquarters building at Union Station, the Badlands Tunnel on the Inland Feeder, the Julian Hinds Pumping Plant along the Colorado River Aqueduct, and the bridge where the Upper Feeder crosses the Santa Ana River). This longstanding cooperation would make the transition to the early warning system much easier since the partnership has already been developed. Metropolitan may be able to support the statewide earthquake early warning system through continued in-kind contributions by allowing the earthquake sensors to be placed on Metropolitan property.

### **Summary**

Despite uncertainties over project funding and specifics regarding implementation, staff supports the concept of an earthquake early warning system. Additional research would be needed before such a system is ready for full deployment. An early warning system would benefit Metropolitan and its member agencies by potentially protecting personnel and enabling them to respond faster to the aftereffects of an earthquake.

### **Policy**

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Metropolitan Water District Administrative Code Section 9100: Objectives –

The District's policy with respect to management of risks of loss shall have as its objectives, to the extent physically and financially practicable:

- (a) the establishment and maintenance of a suitable work and service environment in which District personnel and the public can enjoy safety and security in the course of their daily pursuits;
- (b) the security and preservation of District assets and service capabilities from loss, destruction, or depletion.

## California Environmental Quality Act (CEQA)

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CEQA determination for Option #1:

The proposed action is not defined as a project under CEQA because it involves continuing administrative activities, such as general policy and procedure making (Section 15378(b)(2) of the State CEQA Guidelines). In addition, where it can be seen with certainty that there is no possibility that the proposed action in question may have a significant effect on the environment, the proposed action is not subject to CEQA (Section 15061(b)(3) of the State CEQA Guidelines).

The CEQA determination is: Determine that the proposed action is not subject to CEQA pursuant to Sections 15378(b)(2) and 15061(b)(3) of the State CEQA Guidelines.

CEQA determination for Option #2:

None required

## Board Options

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### Option #1

Adopt the CEQA determination and authorize the General Manager to express Metropolitan's support, in concept, for SB 135, as introduced January 28, 2013.

**Fiscal Impact:** Uncertain at this time.

**Business Analysis:** SB 135, in concept, may allow Metropolitan to better protect its employees and physical assets from the effects of a devastating earthquake.

### Option #2

Take no position on SB 135.

**Fiscal Impact:** Uncertain at this time.

**Business Analysis:** By expressing no support, in concept, for SB 135, an earthquake early warning system may not be developed.

## Staff Recommendation

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Option #1

	4/3/2013
Linda Waade Deputy General Manager, External Affairs	Date
	4/3/2013
Jeffrey Kightlinger General Manager	Date

## Attachment 1 – Senate Bill 135

Ref# ea12624009

**SENATE BILL****No. 135**

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**Introduced by Senator Padilla**January 28, 2013

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An act to add Section 8587.8 to the Government Code, relating to earthquake safety.

## LEGISLATIVE COUNSEL'S DIGEST

SB 135, as introduced, Padilla. Earthquake early warning system.

There is in state government, pursuant to the Governor's Reorganization Plan No. 2, operative July 1, 2013, the Office of Emergency Services. Existing law requires the office to develop and distribute an educational pamphlet for use by kindergarten, any of grades 1 to 12, inclusive, and community college personnel to identify and mitigate the risks posed by nonstructural earthquake hazards.

This bill would require the office, in collaboration with various entities, including the United States Geological Survey, to develop a comprehensive statewide earthquake early warning system in California.

Vote: majority. Appropriation: no. Fiscal committee: yes.  
State-mandated local program: no.

*The people of the State of California do enact as follows:*

- 1 SECTION 1. The Legislature finds and declares the following:
- 2 (a) According to the United States Geological Survey, California
- 3 is one of the most seismically active states, second only to Alaska.
- 4 (b) California has experienced dozens of disastrous earthquakes,
- 5 which have caused loss of life, injury, and economic loss. Some
- 6 of the most significant earthquakes in California's history include:

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- 1 (1) The 1906 San Francisco earthquake, which, at a magnitude  
2 of 7.8, resulted in an estimated 3,000 deaths and over \$500 million  
3 in property losses.
- 4 (2) The 1971 San Fernando earthquake, which, at a magnitude  
5 of 6.7, resulted in at least 65 deaths and caused property damage  
6 of over \$500 million.
- 7 (3) The 1989 Loma Prieta earthquake, which, at a magnitude  
8 of 6.9, rocked the bay area and caused 63 fatalities and over \$6  
9 billion in property damage.
- 10 (4) The 1994 Northridge earthquake, which, at a magnitude of  
11 6.7, claimed the lives of 60 people and caused estimated property  
12 damage of between \$13 and \$32 billion.
- 13 (c) About 90 percent of the world's earthquakes and over 80  
14 percent of the world's largest earthquakes occur along the  
15 Circum-Pacific Belt, also known as the Pacific Ring of Fire. The  
16 Pacific Ring of Fire includes the very active San Andreas Fault  
17 Zone in California.
- 18 (d) The Uniform California Earthquake Rupture Forecast  
19 (UCERF) released in 2008 predicted a 99.7 percent likelihood of  
20 a magnitude 6.7 or larger earthquake in California in the next 30  
21 years.
- 22 (e) A 2013 study published by the Caltech and the Japan Agency  
23 for Marine-Earth Science and Technology discovered that a  
24 statewide California earthquake involving both the Los Angeles  
25 and San Francisco metropolitan areas may be possible.
- 26 (f) Japan, Taiwan, Mexico, Turkey, Romania, Italy, and China  
27 either have or are working on earthquake early warning systems  
28 that are capable of saving lives and helping to mitigate loss.
- 29 (g) The Office of Emergency Services, Caltech, California  
30 Geological Survey, University of California at Berkeley, United  
31 States Geological Survey, and others have been conducting  
32 earthquake early warning research and development in California.  
33 They operate the California Integrated Seismic Network, which  
34 has a demonstration earthquake early warning capability.
- 35 (h) By building upon the California Integrated Seismic Network  
36 and processing data from an array of sensors throughout the state,  
37 a fully developed earthquake early warning system would  
38 effectively detect some strength and progression of earthquakes  
39 and alert the public within seconds, sometimes up to 60 seconds,  
40 before potentially damaging ground shaking is felt.

— 3 —

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1 (i) An earthquake early warning system should disseminate  
2 earthquake information in support of public safety, emergency  
3 response, and loss mitigation.

4 SEC. 2. Section 8587.8 is added to the Government Code, to  
5 read:

6 8587.8. The Office of Emergency Services, in collaboration  
7 with the California Institute of Technology (Caltech), the California  
8 Geological Survey, the University of California Berkeley, the  
9 United States Geological Survey, and others, shall develop a  
10 comprehensive statewide earthquake early warning system in  
11 California.

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