State of California — Business, Transportation and Housing Agency

Memorandum

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To: **GARRETT DAMRATH**, Senior Planner
D07 Office of Environmental

Date: May 11, 2010

File: 07-LA-710
EA 07-2159F0
P.M. 22.47/24.22

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South - 1

Subject: **REQUEST FOR TECHNICAL STUDY – LA-710**

The information contained within this report is intended for use in compiling an Environmental Document. As requested, this memorandum addresses and summarizes the geotechnical elements that may interact with the I-5/SR-710 Interchange and any modification that would affect State Route 710 from Washington Boulevard to SR-60. According to the information provided by your office there are two alternatives proposed for the project along the same alignment.

SITE GEOLOGY

The area within the project limits have been mapped as surficial sediments (Qa) consisting mainly of alluvial gravel, sand and clay deposits with some cobbles. The northern portion of the project will encounter Older Surficial Sediments (Qoa) consisting of remnants of older weakly consolidated alluvial deposits of gravel, sand and silt (Dibblee, 1991). Figure 1.

SEISMICITY

The project is located in a seismically active area. The geologic processes which have caused earthquakes in the past can be expected to continue. Seismic events which are likely to produce the greatest bedrock accelerations could be a moderate event on Puente Hills Blind Thrust Fault System and/or a large event on a distant earthquake fault.

An earthquake fault is considered by the State of California to be active if geologic evidence indicates that movement on the fault has occurred in the last 11,000 years, and potentially active if movement is demonstrated to have occurred in the last 2 million years.

Seismic Phenomena

Ground Shaking

Ground shaking is the primary cause of structural damage during an earthquake; the magnitude, duration and vibration frequency characteristics will vary greatly, depending upon the particular causative fault and its distance from the project.

Using the 2009 ARS on-line tool prepared by Caltrans, the Puente Hills Blind Thrust System is the closest (1.54 miles) to the southern portion of the project site (Washington Boulevard) with a Maximum Magnitude (M_{max}) of 7.3 along this fault system.

Using the same 2009 ARS on-line tool prepared by Caltrans, the Upper Elysian Park Blind Thrust is the closest (1.99 miles) to the northern portion of the project site (SR-60 Pomona Freeway) with a Maximum Magnitude (M_{max}) of 6.4 along this fault system.

Deterministic site parameters obtained using the EQFAULT-Version 3.0 (T. Blake, 2004) computer program for the deterministic prediction of peak acceleration from digitized California Fault System indicates that the Maximum Earthquake Magnitude (M_W) expected at the site could be of 6.8 and the largest maximum-earthquake site acceleration according with this program is 0.37g.

Ground Rupture

An analysis of fault rupture hazard for a particular fault requires that the fault be located exactly, and it's potential for rupture to be known, if only approximately.

There are no known earthquake faults crossing the project. The closest earthquake fault zone under the auspices of the Alquist-Priolo Earthquake Fault Zoning Act is the East Montebello Fault Zone and is located 4.85 miles northeast of the project.

Based on the review of several geologic/seismologic reports, it is our opinion that the potential for ground rupture in non-existing to very low at the site.

Liquefaction

Liquefaction exists when fine silts and sands are located below the water table. The water can also be perched ground water. Liquefaction has been documented to affect soils to ± 15 m. (50 feet) deep, during prolonged periods of ground shaking.

A 1999 Seismic Hazard Map – Los Angeles Quadrangle issued by the Department of Conservation – California Geological Survey shows that there is not a potential for liquefaction within the project limits. We concur with these findings. Figure 2

During the last two major earthquakes in the Southern California area (1971 San Fernando – M_m = 6.62 and 1994 Northridge – M_m = 6.7) liquefaction did not occur within the limits of this project. In addition, based on a regional study conducted by the U.S. Geological Survey (1985), the relative liquefaction susceptibility along these project limits is considered to be low to very low.

There is an entire array of engineering methods to mitigate this earthquake phenomenon. Pending upon reviewing the results of the proposed final subsurface exploration the appropriate engineering solution will be determined (if necessary).

GROUNDWATER

Groundwater was not encountered during the 1954 boring explorations for the existing overcrossing structure at Washington Undercrossing to a depth of approximately 45 feet below ground surface and for the 1956 boring exploration at Whittier Structure to a depth of approximately 50 feet below ground surface. Groundwater levels observed in water wells within the limits of the project maintained by Los Angeles County Public Works indicate the depth to the groundwater table varies through the project limits.

Additional boring exploration will be required to evaluate the groundwater conditions through the limits of the project. However, it is anticipated that the construction of this project will not have an impacted on groundwater.

SLOPE STABILITY

It is anticipated this project will involve the construction of some fill slope embankments and/or placement of additional fills in some areas. However, final recommendations will be presented after this office reviews the final project plans. We anticipate the proposed project will be designed and constructed in conformance with Section 19 of the latest Caltrans Standard Specifications.

EROSION

There will be no change in the existing rate of erosion as a result of the project. Construction activities that could expose soils to temporary erosion, however, this temporary erosion could be reduced by implementing NPDES and BMPs during project construction.

ECONOMIC RESOURCES

There are no known natural resources that will be affected by the project.

CONCLUSIONS

Once an alternative is selected we highly recommend that a detailed geological/geotechnical investigation be conducted to determine the design parameters for this proposed project.

There are no geological or geotechnical conditions that would preclude the construction of the proposed project. If you have any questions and/or further assistance is required please contact me at (213) 620-2556.

Gustavo Ortega, C.E.G., C.HG.
Special Geological Studies
Office of Geotechnical Design South-1
Attachments/cc. JEhsan – OGDS-1 Sacramento

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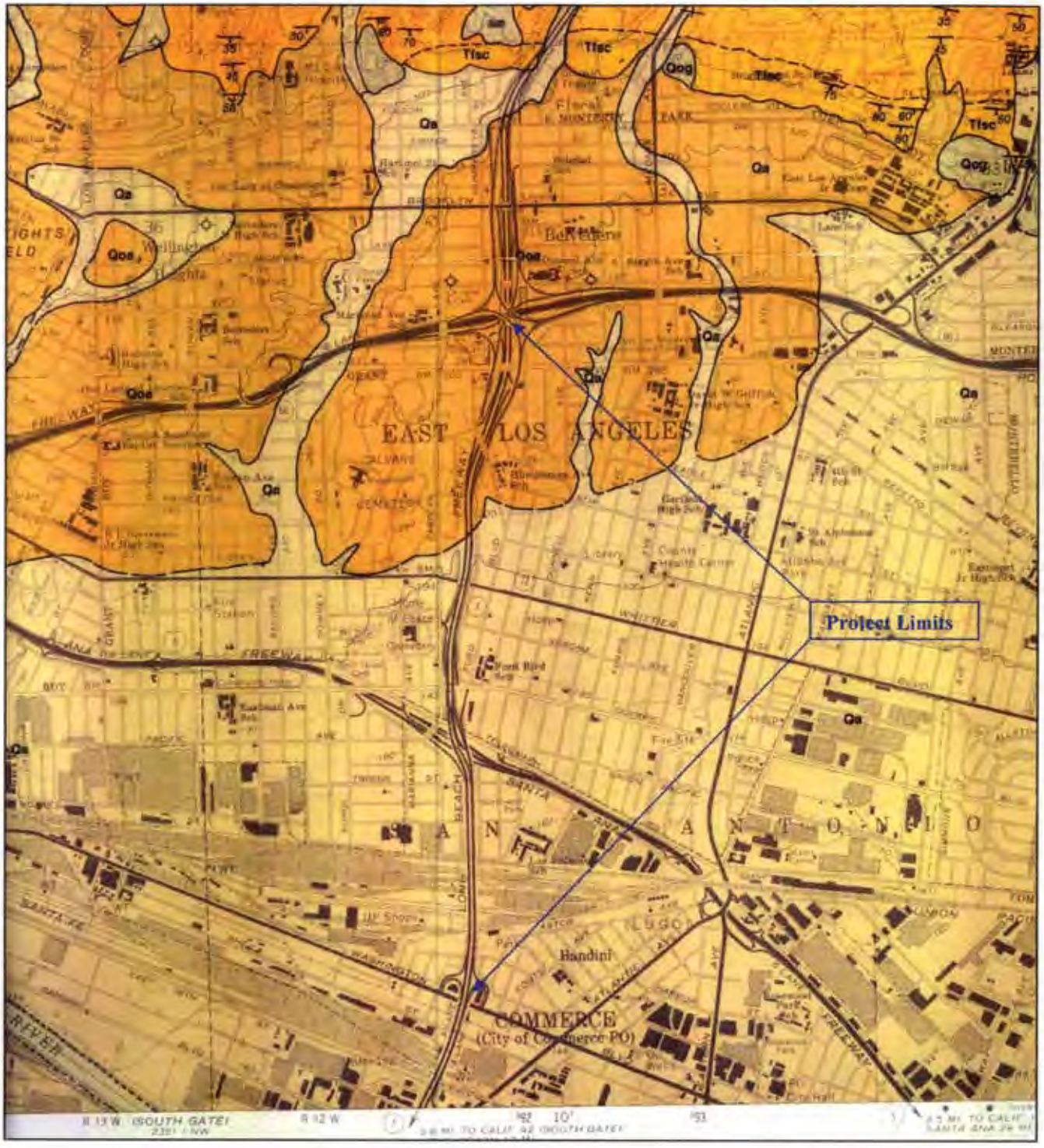
FIGURES



GEOLOGIC MAP

(Taken from T.W. Dibblee, Jr., 1989)

Qa — Alluvium; unconsolidated floodplain deposits of silt, sand and gravel.

Qoa — Older Surficial Sediments; remnants of older weakly consolidated alluvial deposits of gravel, sand and Silt.

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Scale 1:24 000

Figure 1

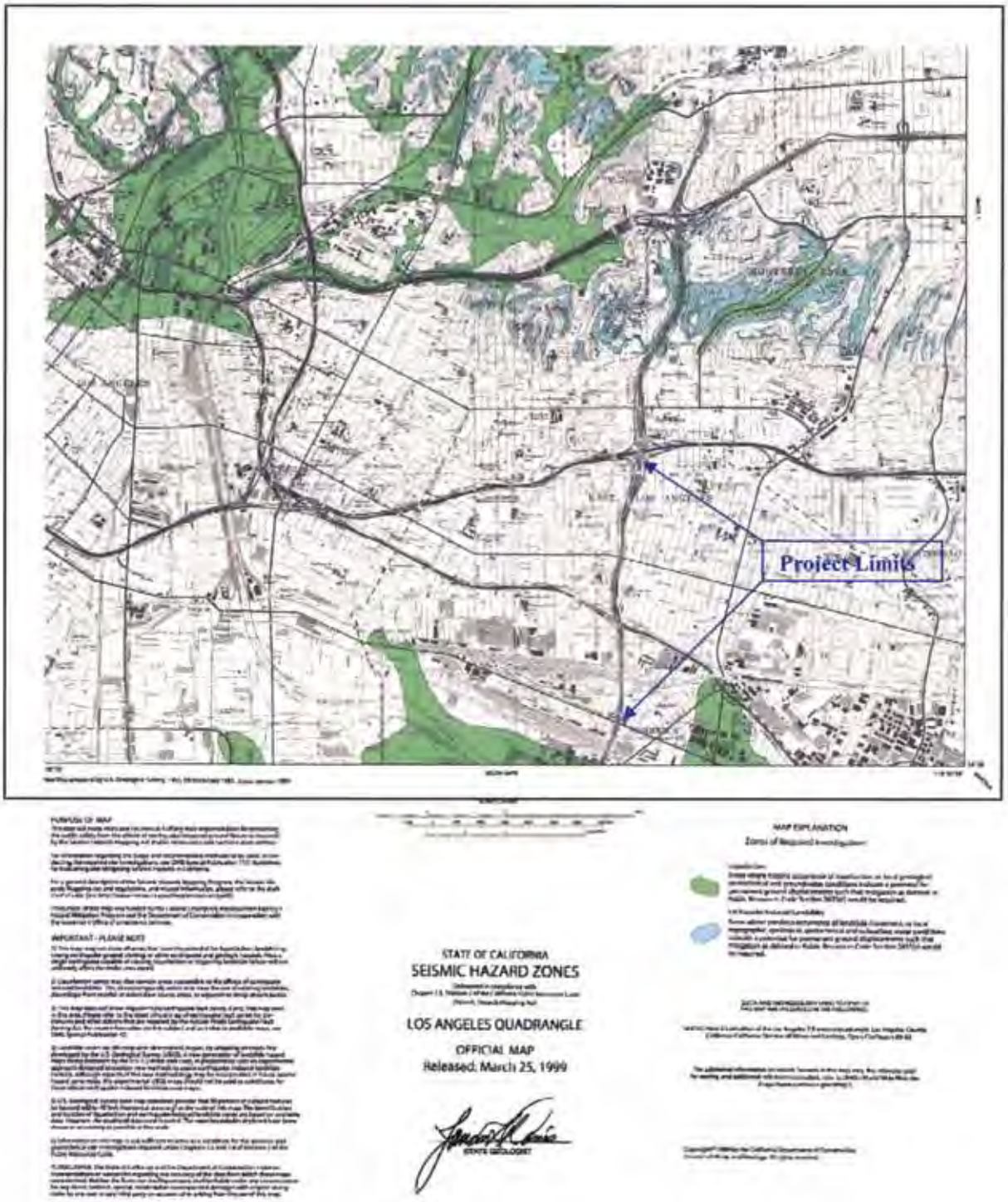
Project Limits
STATE OF CALIFORNIA
SEISMIC HAZARD ZONES
LOS ANGELES QUADRANGLE
OFFICIAL MAP
Released: March 25, 1999
STATE GEOLOGIST
MAP EXPLANATION

Figure 2