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February 3, 2014

SENT VIA EMAIL AND U.S. MAIL

Orange County Public Works/Orange County Planning
Attn: Kevin Canning, Contract Planner
300 N. Flower Street
P.O. Box 4048
Santa Ana, CA 92702-4048

Re: Esperanza Hills Project – Draft Environmental Impact Report, EIR No. 616
Comments on Geology and Soils Section 5.5 and Hazards and Hazardous Materials
Section 5.7

Dear Mr. Canning:

This firm represents Protect Our Homes and Hills, an unincorporated citizens group consisting of residents and taxpayers in the City of Yorba Linda. We submit this comment letter on the Geology and Soils (“GS”) and the Hazards and Hazardous Materials (“HHM”) chapters of the Draft Environmental Impact Report (“DEIR”) prepared for the Esperanza Hills development project (“Esperanza Hills”), with respect to one significant issue: the complete omission of data or analysis related to the possibility and probability of injury and death not related to structural collapse in the event of a major earthquake within proximity of the Whittier Fault.

The GS and HHM chapters identify the Whittier Fault Zone as representing “one of the most prominent actively seismic hazards within southern California” (see DEIR p 5-214, section 7) address and acknowledge that the proposed project “is located in a seismically active region of southern California dominated by the intersection of the northwest-trending San Andreas Fault system and the east-west trending Transverse Ranges Fault system” and

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that “two principal seismically induced hazards to the property” are “damage to structures and foundations due to strong ground shaking and surface rupture of earth materials along fault traces” (see DEIR p5-204, section 3). Further, this section acknowledges that seismic waves radiate great distances in all directions from the earthquake epicenter and that strong ground motion or shaking produced by these seismic waves is the primary cause of earthquake damage.

Possibility of Major Earthquake in Near Future

Based on data in Appendix G to the DEIR, American Geotechnical, Inc. states that estimates regarding earthquakes at magnitudes of 6.7 and 7.2 occur every 700 and 1,000-1,500 years, respectively. The report also indicates that the **last large earthquake along the Whittier fault occurred more than 1,600 years ago** (emphasis added) (see DEIR Appendix G, pp 21-22).

Citing the U. S. Geological Survey (“USGS”) “Uniform California Earthquake Rupture Forecast” (“UCERF”), the National Geographic News extrapolated that:

“California faces an almost certain risk of being rocked by a strong earthquake by 2037. USGS calculations reveal there is a 99.7 percent chance a magnitude 6.7 quake or larger will strike in the next 30 years. The odds of such an event are higher in southern California than northern California...The last time a jolt this size rattled California was the 1994 Northridge disaster, which killed 72 people, injured more than 9,000 and caused \$25 billion (U.S.) in damage” (Alicia Chang, AP Science Writer, Associated Press) (Attachment A).

Impact on Human Health and Survival

“The continued probability for the occurrence of large earthquakes, coupled with a growing population, increases the risk for earthquake-related mortality and morbidity”, as cited in a peer-reviewed and published study (“Northridge Study”) in the *Annals of Epidemiology*, focused on deaths and hospital admissions resulting directly and indirectly from the Northridge, CA earthquake in 1994 (Corinne Peek, ASA, PhD Marizen R. Ramirez, MPH, Kim Shoaf, DrPH, Hope Seligson, MS and Jess F. Kraus, PhD, “GIS Mapping of Earthquake-Related Deaths and Hospital Admissions for the 1994 Northridge, California Earthquake” *Annals of Epidemiology*, Vol. 10, No.1, January 2000;5-13) (Attachment B).

The Northridge Study is highly pertinent, as it does not deal with a remote or third-world county, but with our own local area. According to the study, the “importance of research relating seismic hazard and building damage to risk of injury has long been

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recognized in epidemiologic literature" (Peek, et.al.).

Further, it establishes that consideration of potential for injuries or fatality, directly or indirectly related to ground shaking during an earthquake and the cascade of events stemming therefrom are essential to any meaningful risk and impact analysis (emphasis added).

The Northridge Study found that:

1. Building structure alone does not suffice to address reasonable and predictable parameters for potential risk factors for injury. Housing contents and location, human behavior or reaction, victim's activity during an earthquake, human vulnerability to injury, and/or entrapment each represents significant direct injury risks.

Indirect risk factors include consequences of earthquake damage such as fires, traffic control failures and/or injuries stemming from clean-up activities.

2. Ground shaking initiates a cascade of events leading to injury and the most current hazards models predict ground motion as "a complex relationship between such factors as earthquake magnitude, epicentral distance and depth and radius of fault activity" (Peek, et.al.).

3. Earthquake-related fatalities and hospitalized injuries extended far beyond the epicenter of the earthquake and were not equally distributed around the epicenter.¹

4. Notable outcomes from the Northridge Earthquake in 1994 included the following:

(a) Injuries resulted from PGA as low as .13g [ground shaking during an earthquake is measured as Peak Ground Acceleration ("PGA") and "g" is the acceleration of gravity or strength of the gravitational field. In the 1994 Northridge 6.7 magnitude earthquake, PGA was measured at 1.7g].

(b) Total fatal and non-survivable injuries were 55;

(c) Total non-fatal hospitalized injuries were 103;

(d) Causes of injuries included falls, cutting/piercing, hit or caught by building parts or objects, motor vehicles and burns;

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(e) 89% of injuries were direct, 11% were indirect

(f) **Structural damage was noted in only 28% of injury cases (emphasis added).**

This indicates that 72% of injuries experienced as a direct or indirect result of the 1994 Northridge earthquake were not correlated to building damage.

The hazards related to the human impact of damage from a major earthquake should be anticipated based on 1) the Esperanza Hills DEIR and USGS projections regarding the active and significant nature of the Whittier fault and the potential for major earthquake activity in southern California in the near future, 2) independent evidence that epidemiologic research relating seismic hazard and building damage to risk of injury is critical and accessible and 3) the Northridge Study findings.

We believe that the critical nature of weighing earthquake impacts in terms of lives and injury rather than on brick and mortar alone reasonably demands extensive analysis as part of the EIR process.

Very truly yours,
KEVIN K. JOHNSON APLC

Kevin K. Johnson