Report
Preliminary Geologic
Hazards Assessment
Proposed Bakersfield College
Southwest Corner Of Highway 99
and Highway 223
(Bear Mountain Boulevard)
Bakersfield, California

BSK

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September 14, 2007

BSK JOB No. G0724411B

Kern Community College District
2100 Chester Ave.
Bakersfield, California 93301

Attn: Mr. Chris Addington

Subject: **Preliminary Geologic Hazards Assessment**
Proposed Bakersfield College
Southwest Corner of Highway 99 and Highway 223
(Bear Mountain Boulevard)
Bakersfield, California

Dear Mr. Addington.

As requested and authorized by you, we have performed a geologic hazards assessment for the Proposed Bakersfield College at the southwest corner of Highway 99 and Highway 223 in Bakersfield, California.

The accompanying report contains a description of site surface and subsurface conditions, engineering geology information and a geologic hazards evaluation for the subject project.

We appreciate the opportunity to be of service to you on this project. Should you have questions or comments regarding the contents of this report, please contact us.

Sincerely,
BSK ASSOCIATES

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Submitted to:
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PRELIMINARY GEOLOGIC HAZARDS ASSESSMENT
PROPOSED BAKERSFIELD COLLEGE
SOUTHWEST CORNER OF HIGHWAY 99 AND HIGHWAY 223 (BEAR MOUNTAIN BOULEVARD)
BAKERSFIELD, CALIFORNIA

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of the preliminary geologic hazards assessment performed by BSK Associates (BSK) at the Proposed Bakersfield College located at southwest of the intersection of Highway 99 and Highway 233 in Bakersfield, California, as shown on the Vicinity Map, Figure 1. The perimeter of the proposed development area is shown on the Topographic Map, Figure 2. BSK was provided with a conceptual land use map which did not provide actual building locations.

This report presents data from our field exploration program comprised of two exploratory borings and one CPT test hole, and laboratory tests to supplement the field data. The assessment is intended to provide a preliminary assessment regarding the geologic/seismic considerations at the site with respect to the suitability of the site for the intended use. The results of our field exploration and laboratory testing are included in Appendix A. The approximate location of our exploratory boring is shown on Figure 3, Site Plan.

1.2 PROJECT DESCRIPTION

The proposed project is in the conceptual stage which will include the new Bakersfield College with surrounding commercial and residential developments. The Site is currently 120 acres in size and utilized for farming.

1.3 PURPOSE AND SCOPE OF SERVICES

As outlined in our Proposal No. GB07-174, dated July 31, 2007, the purpose and scope of the investigation were to:

1. Explore the subsurface conditions to a depth of 50 feet, which was concluded to be significantly influenced by the proposed construction;
2. Perform field and laboratory tests to evaluate the engineering characteristics of the site soils;
3. Combine the information from the above and provide a discussion of overall surface, and subsurface soil and groundwater conditions:
4. Provide relevant engineering geology information;
5. Provide a discussion of historical seismicity and perform a seismic hazards assessment, including a probabilistic and deterministic analysis to produce an estimate of the Upper Bound Earthquake (UBE) and Design Basis Earthquake (DBE) ground motion at the site;

6. Address the site liquefaction potential;
7. Present seismic criteria per the 2001 California Building Code;

Environmental services such as a chemical analysis of soil and groundwater were not included in our scope of services.

2.0 SITE INVESTIGTION AND LABORATORY TESTING

2.1 Site Description

The Site is located south of the City of Bakersfield in the central portion of Kern County. The center of the Site coordinates are:

- Latitude 35.203317°N
- Longitude 119.4644°W

2.2 Field Investigation

Our field investigation consisted of a site surface reconnaissance and subsurface exploration. On August 29, 2007, two exploratory borings were drilled at the approximate location shown on Figure 3, Site Plan. Due to the shallow depth of groundwater (11 feet bgs) one CPT test hole was performed. The borings were drilled with a truck-mounted rig using 8-inch diameter, hollow stem auger. The borings were drilled to depth about 25 feet below the existing ground surface (bgs) and the CPT test hole was completed to a depth of 50 feet bgs.

The materials encountered in the boring were visually classified in the field, and a log was recorded in the field by an engineer from BSK. Visual classification of the materials encountered in our borings was made in general accordance with the Unified Soil Classification System (ASTM D2487). The logs of the borings and CPT data/logs are presented in Appendix A.

Samples of the subsurface soils encountered during drilling were obtained using a 2-1/2 inch inside diameter (ID), 3 inch outside diameter (OD) Modified California sampler (MC) and a 2 inch OD Standard Penetration Test (SPT) split-spoon sampler. Penetration resistance was measured by dropping a 140-pound hammer through a 30-inch free fall to drive the samplers 18 inches into the underlying soil. The number of blows required to drive the sampler the last 12 inches is recorded as the Penetration Resistance in terms of blows/foot on the logs of the borings.

Soil samples were obtained from the borings at the depths shown on the borehole logs. Relatively undisturbed samples were recovered in 6-inch long tubes inserted into the MC sampler. The sample tubes were capped at both ends to help preserve the soil at their natural moisture content. The samples retained were returned to our laboratory for further evaluation and possible testing.

2.3 Laboratory Testing

Laboratory testing of selected samples was conducted to evaluate their physical and engineering characteristics. The testing program included in-situ moisture and density, percent passing the Number 200 mesh.

The moisture content and dry density and percent passing the Number 200 mesh (percent fines) are shown on the Log of Borings presented in Appendix A.

2.4 Subsurface Conditions

The site subsurface conditions reported herein are based on data collected from our exploratory borings and CPT data, completed to a depth of 50 feet bgs, and subsequent laboratory testing performed by BSK.

The upper 10 to 15 feet generally consist of medium dense silty sand. Beneath this, an approximately 5 to 10 foot layer of sandy silt was encountered. A depths of 20 and 28 feet bgs, a 5 foot layer of stiff silty clay/clayey sand was encountered. Below this sand, silty sand and gravelly sand was encountered to a total depth explored, which was 50 feet bgs.

The soils were classified in the field during the drilling and sampling operations. The stratification lines were approximated based on observations made at the time of drilling. The actual boundaries between different soil types may be gradual and soil conditions may vary between points of exploration. For a more detailed description of the subsurface materials encountered, the log of borings presented in Appendix A should be consulted.

2.5 Groundwater

The Site is within the San Joaquin Basin Hydrologic Study Area. This includes approximately the southern two-thirds of the Great Valley. Within the Study Area, 39 groundwater basins and areas of potential storage have been identified. The boundaries of these areas are based largely on hydrologic as well as political considerations.

At the time of our field exploration in August 2007, groundwater was encountered at a depth of approximately 11 feet below ground surface in our soil borings. To ascertain groundwater levels for the area during other time periods, groundwater elevation data from the California Department of Water Resources (DWR) were obtained for the period 1950 to 2007. Water level hydrographs from wells in the vicinity Site are presented on Figure 4. The hydrographs indicate that, in the vicinity of the Site, the historical shallowest depth to groundwater was 10 feet bgs. For analysis a conservative assumed depth to groundwater, based on the historical depth of 10 feet bgs was used.

3.0 GEOLOGIC/SEISMIC HAZARDS EVALUATION

3.1 General

The following sections present background information and data leading to a determination of ground motion (peak ground acceleration) and probability of occurrence of future earthquake activity producing ground motion at the Site. A determination of ground motion is made using earthquake history of a region (seismicity); the potential for earthquake activity along one or more "controlling" earthquakes using a deterministic approach; the probability of occurrence of ground motion at the Site from a fault occurring within a pre-determined radius (in this case, 100 miles) using a probabilistic approach; and, ground motion in an area from published sources such as probabilistic seismic hazard maps produced by the California Division of Mines and Geology (CDMG).

3.2 Geologic Setting

The site is located in the Great Valley geomorphic province. The Site is located in the structural region identified by Bartow, 1991 as the San Joaquin Valley portion of the southern Sierran block. This area forms a broad syncline with deposits of marine and overlying continental sediments, Jurassic to Holocene in age. The thickness of the sediments increases to the west and reach a thickness of as much as 20,000 feet on the west side of the San Joaquin Valley syncline.

As shown on Figure 5, the Site is situated on recent alluvial fan deposits which at depth probably grades to basin deposits related to the ancestral Buena Vista/Kern Lake.

3.3 Geologic Hazards

The types of geologic and seismic hazards assessed include surface ground fault rupture, liquefaction, seismically-induced settlement, slope failure, flood hazards and inundation hazards.

3.3.1 Fault Rupture Hazard Zones in California

The purpose of the Alquist-Priolo Geologic Hazards Zones Act, as summarized in CDMG Special Publication 42 (SP 42), is to "prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture."

> As indicated by SP 42, "the State Geologist is required to delineate "earthquake fault zones" (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development 'projects' within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

The Site is not located in a Fault-Rupture Hazard Zone. The closest Fault-Rupture Hazard Zone is associated with the White Wolf Fault located approximately 6 miles southeast of the Site.

3.3.2 State of California Seismic Hazard Zones (Liquefaction and Landslides)

The Site is not currently located in a Seismic Hazard Zone specified by State of California.

3.3.3 Slope Stability and Potential for Slope Failure

The site and surrounding areas are essentially flat and the potential hazard due to landslides from adjacent properties is not applicable.

3.3.4 Flood and Inundation Hazards

An evaluation of flooding at the site includes review of potential hazards from flooding during periods of heavy precipitation and flooding due to a catastrophic dam breach from upgradient surface impoundments.

Flood Hazards
Flood Insurance Rates Maps (FIRM) published by the Federal Emergency Management Agency (FEMA) were reviewed to obtain information regarding the potential for flooding at the Site. According to the 1986 FIRM Map #0600751275B, the Site lies in Zone C, outside of the 100-year flood plain.

Inundation Hazards – Pine Flat Dam
The Site is located in the pathway of inundation from a catastrophic breach of the Lake Isabella Dam. According to the 2004 Kern Master Environmental Assessment Resource, Kern Regional Atlas, if the Lake Isabella Dam failed while at full capacity, its floodwaters would arrive near the Site within approximately twelve hours.

3.3.5 Land Subsidence
Land subsidence in California generally occurs in areas of fluid removal (petroleum and groundwater) and in arid areas due to hydrocompaction of loose near surface soils.

The Site is not located in a petroleum producing area and subsidence due to petroleum withdrawal would have minimal impact on the Site.

The Site is in an area which potentially experiences regional subsidence due to groundwater withdrawal. Subsidence, due to groundwater withdrawal from the period od 1926 to 1970, in the area of the Site has been reported in the range of 1 to 4 feet (Poland, 1984). This type of subsidence is regional and would have minimal impact on future structures.

Hydrocompaction is the consolidation of loose soil dry soils from the infiltration of water. Materials of unusually low density deposited in areas of low rainfall undergo significant compaction when they become thoroughly wetted. The Site is not located in an area which soils are known to be impacted by hydrocompaction.

4.0 SEISMIC HAZARD ASSESSMENT
The following sections present background information and data leading to a determination of ground motion (peak ground acceleration and response spectra) and probability of occurrence of future earthquake activity producing ground motion at the Site. A determination of ground motion is made using earthquake history of a region (seismicity); the potential for earthquake activity along one or more "controlling" earthquakes using a deterministic approach; and the probability of occurrence of ground motion at the Site from a fault occurring within a pre-determined radius (in this case, 100 miles) using a probabilistic approach.

4.1 Faults
The State Fault Map of California (Jennings, 1994) shows faults in the region, including the major strike-slip faults associated with the San Andreas Fault System, fault of the California Coast Ranges and faults of the eastern Sierra Nevada. Each of the active faults shown on the

fault map (see Figure 7 for the Regional Fault Map), occurring within a distance of 100 miles, has been incorporated in the analyses which follow.

The State Fault Map of California (Jennings, 1994) shows faults in the region, including the major strike-slip faults associated with the Basin and Range Extensional System, the Garlock fault and the San Andreas Fault System. Each of the active faults shown on the fault map (see Figure 7 for the Regional Fault Map), occurring within a distance of 100 miles, has been incorporated in the analyses which follow.

A database of fault parameters such as fault geometry (dip slip, strike slip or blind fault), fault length, slip rate, return interval and maximum moment magnitude was used in the seismic hazards analysis. The database includes the most current fault parameter information from the CGS and US Geologic Survey. For this analysis, a search radius of 100 miles was used. Distances to the faults are shown on Table 1.

4.2 Historical Seismicity

Table 2 provide the location, earthquake magnitude, Site to earthquake distances, dates and the resulting Site peak horizontal acceleration for the period 1800 to 1999. The table shows that the Site has experienced mean plus one sigma peak horizontal accelerations up to 0.6g from the 1952 Kern County Magnitude 7.2 earthquake. Figure 8 presents historical earthquake magnitude and locations relative to the Site.

4.3 Results of the Seismic Hazards Analysis

Deterministic Seismic Hazards Analysis Ground Motion

A Deterministic Seismic Hazards Analysis (DSHA) includes the evaluation of potentially damaging earthquake sources and deterministic selection of one or more suitable "controlling" sources and seismic events. The earthquake event magnitude for a fault is taken as the maximum value that is specific to that seismic source. Ground motion at the site is then obtained from published ground motion attenuation curves for the effects of seismic travel path using the shortest distance from the source to the site. To estimate ground motions from controlling earthquakes, a computer database of faults and attenuation relationships is used. The database includes locations and fault parameters for more than 150 faults in California and includes the most current fault data and locations. The database includes a number of attenuation relationships. The relationship selected as most appropriate for this site is from Boore et al., 1997. Table 1 lists the distance, maximum earthquake magnitude and the mean plus one sigma peak horizontal acceleration (Site ground motion) for the known active faults within 100 miles of the Site.

Probabilistic Seismic Hazards Analysis Ground Motion

The Upper Bound Earthquake (UBE) ground motion, is defined in Section 1631A.2.6 of the 2001 California Building Code (CBC) as "the motion having a 10% probability of being exceeded in a 100-year period or maximum level of motion which may ever be expected at the building site within the known geological framework." The UBE, which represents a return period of 949 years. UBE ground motion is utilized for protection against structural collapse and in liquefaction/seismic settlement analysis.

The Design Basis Earthquake (DBE) ground motion is defined in Section 1631A.2 of the 2001 CBC as "the motion having a 10% probability of being exceeded in 50 years. The return period for the DBE is 475 years. The DBE ground-motion is used for design of hospitals and public schools. It is also understood that the magnitude shall not be lower than the maximum that has occurred within historic time (DMG Note 43).

Our probabilistic seismic hazards analysis (PSHA) was performed using the software program Frisk developed by Thomas Blake. The program calculates annual frequencies of exceedence of various ground motion levels at the site of interest. Peak ground acceleration (PGA) was determined for both the UBE and DBE hazard levels. The Boore, Joyner and Fumal (1997) attenuation relationship, which estimates the PGA based upon the shear wave velocity (Vs) was used in our analysis. An estimated Vs of 250 meters/second was used as an input parameter.

A graph of Probability of Exceedance vs. Acceleration computed from the PSHA is presented on Figure 8. This shows that the PGA from the probabilistic analysis for the DBE is approximately 0.46g, and the PGA for the UBE is approximately 0.56g.

4.4 State of California - Probabilistic Seismic Hazards Map

The California Geological Survey (CGS), in cooperation with the U.S. Geological Survey, performed a probabilistic seismic hazards study for the entire State. The information is available based on the site coordinates, on their web site. The results of Probabilistic Seismic Hazards Mapping Ground Motion Page using the Site coordinates as the input location are listed below.

Table A
California Geological Survey
Probabilistic Seismic Hazards Mapping Ground Motion
(10% in 50 year exceedance)

Ground Motion	Firm Rock	Soft Rock	Alluvium
Pga	0.351	0.362	0.397
Sa 0.2 sec	0.826	0.863	0.942
Sa 1.0 sec	0.316	0.393	0.481

4.5 2001 California Building Code

The Site is not located within 15 kilometers of a Type A fault as defined in Table 16A-U of the 2001 CBC. The Site is located approximately 9.3 kilometers from the White Wolf fault, which according to CGS 2002 California Fault Parameters - Appendix A, is a Type B fault. Based on this, Na = 1.00 and Nv=1.03.

Based upon the blow counts encounter in the soil borings and CPT values converted to "N" values the most appropriate soil profile for the Site would be Sd, described as stiff soil with a shear wave velocity between 600 and 1,200 feet per second or with standard penetration test blow counts between 15 and 50 blows per foot (bpf).

We have developed the seismic design criteria presented in Table B below to meet the provisions of Chapter 16A of the 2001 CBC.

Table B
Seismic Design Criteria

Criteria	Selected Value	Code Reference
Seismic Zone	4	Figure 16A-2 and Section 1629.4.1
Seismic Zone Factor Z	0.4	Table 16A-I
Soil Profile Type	S_d	Section 16A36 and Table 16A-J
Near-Source Factor N_a	1.00	Table 16A-S and Table 16A-U
Near-Source Factor N_v	1.03	Table 16A-T and Table 16A-U
Seismic Coefficient C_a	0.44	Table 16A-Q
Seismic Coefficient C_v	0.66	Table 16A-R

4.6 Summary of Methods to Determine Ground Motion

Following is a summary of peak ground accelerations for the Site determined by the methods described above.

Historical Seismicity: 0.6g (1952 Kern County Earthquake)
DSHA: 0.84g (For Reference Only)
PSHA: 0.46g (DBE, 10% in 50 year exceedance)
PSHA: 0.56g (UBE, 10% in 100 year exceedance)
CDMG PSHA Map: 0.4g (10% in 50 year exceedance)
California Building Code (Ca): 0.44g

4.7 Liquefaction

Liquefaction describes a condition in which a saturated, cohesionless soil loses shear strength during earthquake shocks. Ground motion from an earthquake may induce cyclic reversals of shearing strains of large amplitude. Lateral and vertical movements of the soil mass, combined with loss of bearing strength, usually result from this phenomenon. Historically, liquefaction of soils has caused severe damage to structures, berms, levees and roads. Seed and Idriss (1971) demonstrated that liquefaction potential depends on soil type, void ratio, depth to groundwater, duration of shaking and confining pressures over the potentially liquefiable soil mass. Fine, well sorted, loose sand, shallow groundwater, severe seismic ground motion and particularly long durations of ground shaking are conditions conducive for liquefaction.

Based upon the historic depth to groundwater (10 feet bgs), the relative density and fines content of the subsurface units, the site has a high potential for liquefaction. A liquefaction and seismic settlement analysis based upon the Simple Cyclic Stress Ratio and CPT data, using the computer program Shake2000, was performed.

Input parameters for the liquefaction and settlement analysis were based upon:

- CPT values converted to equivalent standard penetration rates ("N") using Robertson & Campanella method.
- Soil densities and fines content estimated from soil boring and CPT data.
- CPT data averaged to one foot intervals.
- PGA based upon the UBE event.
- Magnitude 7.2 of controlling earthquake.
- Assumed depth to groundwater of 10 feet bgs.

Figures C9 through C13 presents the results of our liquefaction seismic settlement analysis based upon data from B-1 and CPT-1.

Our preliminary analysis indicates that during an UBE event, the factor of safety against liquefaction is less than 1.3 (acceptable for schools) in some of the subsurface units.

4.8 Seismically-Induced Settlement

Settlement of the ground surface with consequential differential movement of structures is a major cause of seismic damage for buildings founded on alluvial deposits. Vibration settlement of relatively dry and loose granular deposits beneath structures can be readily induced by the horizontal components of ground shaking associated with even moderate intensity earthquakes. Silver and Seed (1971) have demonstrated that settlement of dry sands due to cyclic loading is a function of 1) the relative density of the soil; 2) the magnitude of the cyclic shear stress; and 3) the number of strain cycles.

Based on the soil conditions and an assumed groundwater depth of 10 feet, computer analyses based on the work of Tokimatsu and Seed (1987) was performed.

Our preliminary analysis indicates that with an assumed depth to groundwater of 10 feet bgs and an UBE event, total settlement may range from 2 to 3 inches. It should be noted that the analysis is preliminary and is based upon a limited number of sampling points. Additional site investigation will be needed for a complete analysis once the project is better defined.

4.9 Tsunamis and Seiches

A tsunami is a series of ocean waves generated in the ocean by an impulsive disturbance. This disturbance includes earthquakes, submarine or shoreline landslides, volcanic eruptions, and explosions. Tsunamis are not a consideration for this site since the site is so far inland from the ocean. Seiches are standing waves in larger bodies of water. No large body of water is near the site, therefore, the hazard is very low.

4.10 County Seismic Safety Element

According to the 1994 Kings County General Plan, Safety Element, the Site is not located in a seismic hazard zone located.

5.0 LIMITATIONS

The analyses submitted in this report are based upon the data obtained from the subsurface exploration performed at the locations shown on Figure 2, Site Plan.

The report does not reflect variations that may occur between points of exploration. The nature and extent of such variations may not become evident until construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK Associates has prepared this report for the exclusive use of the Kern Community College District and other members of the design team. The report has been prepared in accordance with generally accepted practices using the degree of care ordinarily exercised under similar circumstances, by reputable geotechnical engineers and geologists practicing at this time in a similar locality. No other warranty, express or implied, is made as to the professional advice provided under the terms of this agreement and included in this report.

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TABLE 1
EQFAULT DATA

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAXIMUM EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCELERATION PGA (g)
White Wolf	5.8 (9.3)	7.2	0.84
Pleito Thrust	13.7 (22.1)	7.2	0.47
San Andreas - 1857 Rupture	25.0 (40.3)	7.8	0.34
San Andreas - Carrizo	25.0 (40.3)	7.2	0.25
Garlock (West)	26.0 (41.8)	7.1	0.23
Big Pine	26.4 (42.5)	6.7	0.18
San Gabriel	34.7 (55.9)	7.0	0.17
Channel Is. Thrust (Eastern)	66.2 (106.5)	7.4	0.16
North Channel Slope	55.4 (89.1)	7.1	0.15
San Cayetano	46.3 (74.5)	6.8	0.15
San Andreas - Mojave	45.3 (72.9)	7.1	0.15
Santa Ynez (East)	43.0 (69.2)	7.0	0.15
M.Ridge-Arroyo Parida-Santa Ana	47.5 (76.4)	6.7	0.14
So. SIERRA NEVADA	62.9 (101.3)	7.1	0.14
Anacapa-Dume	72.2 (116.2)	7.3	0.14
Garlock (East)	56.4 (90.7)	7.3	0.14
Oak Ridge (Onshore)	57.0 (91.8)	6.9	0.14
Northridge (E. Oak Ridge)	57.8 (93.1)	6.9	0.13
Red Mountain	55.9 (89.9)	6.8	0.13
San Andreas - Cholame	48.5 (78.0)	6.9	0.13
Ventura - Pitas Point	58.3 (93.8)	6.8	0.13
San Juan	53.6 (86.2)	7.0	0.12
San Luis Range (S. Margin)	68.7 (110.6)	7.0	0.12
Sierra Madre	69.3 (111.6)	7.0	0.12
Santa Susana	54.8 (88.2)	6.6	0.12
Simi-Santa Rosa	59.7 (96.0)	6.7	0.12
Lenwood-Lockhart-Old Woman Sprgs	70.8 (113.9)	7.3	0.12
Sierra Madre (San Fernando)	62.2 (100.1)	6.7	0.11
Holser	54.9 (88.3)	6.5	0.11
Owens Valley	89.6 (144.2)	7.6	0.11
Oak Ridge (Blind Thrust Offshore)	72.5 (116.6)	6.9	0.11
Montalvo-Oak Ridge Trend	62.0 (99.8)	6.6	0.11
Los Alamos-W. Baseline	71.2 (114.6)	6.8	0.11
Santa Ynez (West)	60.1 (96.7)	6.9	0.11
Verdugo	69.9 (112.5)	6.7	0.10
Rinconada	84.7 (136.3)	7.3	0.10
Los Osos	81.6 (131.3)	6.8	0.10
Malibu Coast	77.6 (124.9)	6.7	0.10
Cucamonga	96.6 (155.4)	7.0	0.10
Lions Head	76.2 (122.7)	6.6	0.09
Santa Cruz Island	88.5 (142.4)	6.8	0.09
Helendale - S. Lockhardt	86.0 (138.4)	7.1	0.09
Santa Rosa Island.	95.8 (154.2)	6.9	0.09
Hosgri	97.8 (157.4)	7.3	0.09

TABLE 1
EQFAULT DATA

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAXIMUM EARTHQUAKE EVENT	
		MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCELERATION PGA (g)
Compton Thrust	92.7 (149.2)	6.8	0.09
Palos Verdes	88.9 (143.1)	7.1	0.09
Santa Monica	82.6 (133.0)	6.6	0.09
Elysian Park Thrust	89.5 (144.0)	6.7	0.09
Great Valley 14	75.9 (122.1)	6.4	0.08
Casmalia (Orcutt Frontal Fault)	80.9 (130.2)	6.5	0.08
Clamshell-Sawpit	83.3 (134.1)	6.5	0.08
Raymond	85.2 (137.1)	6.5	0.08
Hollywood	81.5 (131.1)	6.4	0.08
Gravel Hills - Harper Lake	88.2 (141.9)	6.9	0.08
Newport-Inglewood (L.A.Basin)	88.6 (142.6)	6.9	0.08
Little Lake	80.0 (128.8)	6.7	0.08
Blackwater	92.0 (148.1)	6.9	0.08
San Andreas - Parkfield Segment	81.4 (131.0)	6.7	0:08
Great Valley 13	91.0 (146.5)	6.5	0.08

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitute (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	35	119.017	7/21/1952	0	7.2	0.60	14.0 (22.6)
DMG	35	119	7/21/1952	0	6.4	0.30	14.1 (22.6)
GSP	35.149	119.104	5/28/1993	21	5.2	0.28	6.3 (10.1)
DMG	35.3	119.8	01/09/1857	0	7.9	0.28	44.8 (72.0)
DMG	35.333	118.917	8/22/1952	0	5.8	0.27	10.5 (16.9)
DMG	35.217	118.817	7/23/1952	0	5.7	0.25	11.2 (18.0)
DMG	35.184	119.099	7/1/1959	9	4.7	0.24	4.9 (7.9)
DMG	35.383	118.85	7/29/1952	0	6.1	0.24	15.5 (24.9)
T-A	34.83	118.75	11/27/1852	0	7.0	0.24	29.8 (48.0)
DMG	35	119.017	1/12/1954	0	5.9	0.23	14.0 (22.6)
DMG	35.15	119.05	11/11/1952	0	4.2	0.20	4.2 (6.7)
DMG	35	119.033	7/21/1952	0	5.6	0.20	14.1 (22.6)
MGI	35.3	119	9/4/1908	0	4.6	0.19	6.7 (10.8)
MGI	35.3	119	1/8/1903	0	4.6	0.19	6.7 (10.8)
DMG	35.1	118.967	8/25/1952	0	4.7	0.19	7.6 (12.3)
DMG	35.133	118.767	7/21/1952	0	5.5	0.18	14.8 (23.8)
DMG	34.9	118.9	10/23/1916	0	6.0	0.18	21.9 (35.3)
DMG	35.1	119	7/22/1952	0	4.3	0.16	7.2 (11.5)
DMG	35.367	118.583	7/23/1952	0	6.1	0.16	26.8 (43.2)
DMG	35.033	119.05	8/7/1952	0	4.9	0.15	11.9 (19.2)
DMG	35	118.833	7/23/1952	0	5.4	0.15	17.4 (28.0)
DMG	35.3	118.8	12/23/1905	0	5.0	0.15	13.8 (22.3)
DMG	34.8	119.1	09/05/1883	0	6.0	0.15	28.3 (45.5)
DMG	35	119	2/16/1919	0	5.0	0.14	14.1 (22.6)
DMG	35.1	119	7/24/1952	0	4.1	0.14	7.2 (11.5)
DMG	35.067	119.067	2/24/1954	0	4.5	0.14	9.9 (15.9)
DMG	34.983	118.983	5/23/1954	0	5.1	0.14	15.3 (24.6)
DMG	35.333	118.6	7/31/1952	0	5.8	0.14	25.0 (40.3)
T-A	35.33	119	01/04/1870	0	4.3	0.14	8.8 (14.1)
DMG	35.033	119.05	8/18/1952	0	4.7	0.14	11.9 (19.2)
DMG	35.217	118.817	12/15/1953	0	4.6	0.14	11.2 (18.0)
DMG	35.333	118.917	7/29/1952	0	4.5	0.14	10.5 (16.9)
DMG	35.333	118.917	7/31/1952	0	4.5	0.14	10.5 (16.9)
DMG	35	119	7/21/1952	0	4.9	0.14	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.9	0.14	14.1 (22.6)
DMG	35	118.833	7/23/1952	0	5.2	0.14	17.4 (28.0)
DMG	35.033	118.933	7/22/1952	0	4.7	0.13	12.6 (20.3)
DMG	34.95	118.867	7/21/1952	0	5.3	0.13	19.4 (31.2)
DMG	35.033	118.85	10/7/1953	0	4.9	0.13	15.0 (24.1)
DMG	35.066	119.049	1/24/1974	6.4	4.3	0.13	9.7 (15.6)
DMG	35	119.017	5/25/1953	0	4.8	0.13	14.0 (22.6)
DMG	35	119	7/22/1952	0	4.8	0.13	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.8	0.13	14.1 (22.6)
DMG	35.4	118.817	7/29/1952	0	5.1	0.13	17.6 (28.3)
DMG	35.317	118.95	9/1/1952	0	4.1	0.13	8.7 (13.9)
DMG	35.1	119.083	12/6/1934	0	4.0	0.13	8.1 (13.0)
DMG	35.1	119.083	7/24/1946	0	4.0	0.13	8.1 (13.0)
DMG	35	119	7/21/1952	0	4.7	0.12	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.7	0.12	14.1 (22.6)
DMG	34.9	120.7	11/4/1927	0	7.5	0.12	97.5 (156.9)

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitute (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
PAS	34.943	118.743	6/10/1988	6.8	5.4	0.12	23.6 (38.0)
DMG	35.045	119.004	3/23/1956	12.1	4.3	0.12	10.9 (17.6)
DMG	35.315	118.516	7/25/1952	11.2	5.7	0.12	29.2 (46.9)
DMG	35.067	119.033	7/23/1952	0	4.1	0.12	9.5 (15.2)
DMG	35.067	119.033	7/27/1952	0	4.1	0.12	9.5 (15.2)
DMG	34.941	118.987	11/15/1961	10.7	5.0	0.12	18.2 (29.2)
DMG	35.333	118.917	8/7/1952	0	4.2	0.12	10.5 (16.9)
DMG	35	119	7/21/1952	0	4.6	0.12	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.6	0.12	14.1 (22.6)
DMG	35	119.033	7/21/1952	0	4.6	0.12	14.1 (22.6)
DMG	35.317	118.494	7/25/1952	5.5	5.7	0.12	30.4 (48.9)
DMG	35.183	119.174	6/4/1956	14.3	4.0	0.12	9.1 (14.6)
DMG	34.932	118.976	3/1/1963	13.9	5.0	0.12	18.9 (30.3)
DMG	35.05	119.133	8/6/1953	0	4.4	0.12	12.5 (20.1)
DMG	35	119.083	11/7/1952	0	4.6	0.11	14.5 (23.4)
DMG	35.183	118.65	7/21/1952	0	5.1	0.11	20.6 (33.2)
DMG	35.033	119.1	1/13/1954	0	4.4	0.11	12.7 (20.4)
DMG	35.033	119.1	2/7/1954	0	4.4	0.11	12.7 (20.4)
DMG	35.067	118.983	8/4/1952	0	4.0	0.11	9.6 (15.4)
DMG	35.067	118.883	8/17/1952	0	4.3	0.11	12.0 (19.3)
DMG	34.9	118.95	8/1/1952	0	5.1	0.11	21.3 (34.2)
DMG	35.067	118.933	7/23/1952	0	4.1	0.11	10.5 (16.9)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	3/13/1929	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119.033	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119.033	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119.033	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119.033	7/21/1952	0	4.5	0.11	14.1 (22.6)
DMG	35	119.05	9/12/1952	0	4.5	0.11	14.2 (22.8)
DMG	34.967	119	9/2/1952	0	4.7	0.11	16.3 (26.3)
T-A	34.92	118.92	05/23/1857	0	5.0	0.11	20.3 (32.6)
T-A	34.92	118.92	01/20/1857	0	5.0	0.11	20.3 (32.6)
DMG	34.867	118.933	9/21/1941	0	5.2	0.11	23.7 (38.1)
PAS	35.046	119.001	6/5/1975	9	4.1	0.11	10.9 (17.5)
DMG	35.05	119.167	12/14/1950	0	4.4	0.11	13.6 (21.9)
PAS	35.018	119.141	11/10/1981	3.1	4.5	0.11	14.6 (23.6)
DMG	35.083	118.75	7/22/1952	0	4.7	0.11	17.1 (27.5)
DMG	34.2	119.8	12/21/1812	0	7.0	0.11	82.4 (132.5)
DMG	35.067	118.883	8/14/1952	0	4.2	0.11	12.0 (19.3)
DMG	35.017	119.05	8/5/1953	0	4.3	0.11	13.0 (20.9)
PAS	35	119.103	5/13/1975	19.1	4.5	0.11	14.9 (24.0)
DMG	34	119	09/24/1827	0	7.0	0.11	83.1 (133.7)
DMG	35.35	118.967	2/4/1954	0	4.0	0.11	10.5 (16.9)
DMG	35	119	7/23/1952	0	4.4	0.11	14.1 (22.6)

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitude (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	35	119	7/21/1952	0	4.4	0.11	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.4	0.11	14.1 (22.6)
DMG	34.983	119.033	7/21/1952	0	4.5	0.11	15.2 (24.5)
DMG	35.15	118.633	1/27/1954	0	5.0	0.10	21.9 (35.2)
DMG	35.05	119.133	5/23/1953	0	4.2	0.10	12.5 (20.1)
PAS	35.035	119.137	6/16/1978	1.8	4.3	0.10	13.5 (21.7)
DMG	35.033	119	7/22/1952	0	4.1	0.10	11.8 (19.0)
DMG	35.033	119.05	7/27/1952	0	4.1	0.10	11.9 (19.2)
DMG	35.133	118.767	7/25/1952	0	4.4	0.10	14.8 (23.8)
DMG	35.05	118.95	11/14/1952	0	4.0	0.10	11.2 (18.0)
DMG	35.05	118.95	8/17/1952	0	4.0	0.10	11.2 (18.0)
DMG	35.05	119.233	8/19/1952	0	4.5	0.10	16.2 (26.1)
GSP	34.213	118.537	1/17/1994	18	6.7	0.10	73.6 (118.4)
DMG	35.05	118.9	9/25/1952	0	4.1	0.10	12.4 (20.0)
DMG	35.15	118.683	8/13/1952	0	4.7	0.10	19.1 (30.7)
DMG	35.033	119.1	1/12/1954	0	4.1	0.10	12.7 (20.4)
PAS	35.452	118.899	2/8/1985	11.1	4.6	0.10	18.4 (29.6)
DMG	35.133	118.7	9/2/1952	0	4.6	0.10	18.4 (29.6)
DMG	35.017	118.983	8/17/1952	0	4.1	0.10	13.0 (20.9)
DMG	35.033	118.917	7/23/1952	0	4.1	0.10	13.0 (20.9)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.2	0.10	14.1 (22.6)
DMG	34.7	119	10/23/1916	0	5.5	0.10	34.8 (55.9)
DMG	34.37	117.65	12/08/1812	0	7.0	0.10	96.4 (155.2)
DMG	34.411	118.401	2/9/1971	8.4	6.4	0.09	64.8 (104.3)
DMG	35.183	118.6	7/29/1952	0	4.9	0.09	23.4 (37.7)
DMG	35.033	119.1	9/2/1953	0	4.0	0.09	12.7 (20.4)
DMG	35.367	118.883	9/12/1953	0	4.1	0.09	13.5 (21.8)
DMG	35.233	118.533	7/21/1952	0	5.1	0.09	27.3 (43.9)
GSP	35.37	118.85	12/18/1990	6	4.2	0.09	14.8 (23.8)
DMG	35.083	119.233	3/3/1956	0	4.2	0.09	14.8 (23.9)
DMG	35.083	118.75	7/26/1952	0	4.4	0.09	17.1 (27.5)
DMG	35	118.733	4/29/1953	0	4.7	0.09	21.2 (34.2)
DMG	35	119	8/10/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/22/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/22/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/22/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	119	7/21/1952	0	4.1	0.09	14.1 (22.6)
DMG	35	118.833	12/1/1952	0	4.4	0.09	17.4 (28.0)
DMG	34.983	118.9	7/24/1952	0	4.3	0.09	16.5 (26.6)
DMG	34.933	119.067	2/10/1954	0	4.5	0.09	18.9 (30.4)
DMG	35.367	118.583	7/23/1952	0	5.0	0.09	26.8 (43.2)
DMG	35.725	118.055	3/15/1946	22	6.3	0.09	64.9 (104.4)

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitude (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	35.5	118.7	1/6/1905	0	5.0	0.09	27.1 (43.6)
DMG	35.333	118.733	8/5/1952	0	4.4	0.09	18.2 (29.3)
PAS	35.012	119.179	11/10/1981	9.4	4.2	0.09	16.1 (26.0)
DMG	35	119	7/21/1952	0	4.0	0.09	14.1 (22.6)
DMG	35	119	1/25/1919	0	4.0	0.09	14.1 (22.6)
DMG	35	119	7/25/1952	0	4.0	0.09	14.1 (22.6)
DMG	35.75	120.25	3/10/1922	0	6.5	0.09	79.0 (127.2)
DMG	34.95	118.95	10/16/1952	0	4.3	0.08	17.9 (28.7)
DMG	34.911	118.973	2/23/1939	10	4.5	0.08	20.3 (32.7)
DMG	35.067	118.767	7/22/1952	0	4.2	0.08	16.9 (27.1)
DMG	34.903	119.038	5/8/1939	10	4.5	0.08	20.8 (33.4)
PAS	35.297	119.346	5/6/1985	24.4	4.4	0.08	19.8 (31.8)
DMG	35.6	118.8	6/30/1926	0	5.0	0.08	29.9 (48.2)
DMG	35.311	118.499	7/25/1952	2.8	5.0	0.08	30.0 (48.3)
DMG	35.367	118.833	3/17/1935	0	4.0	0.08	15.3 (24.5)
DMG	35.183	118.6	7/26/1952	0	4.6	0.08	23.4 (37.7)
DMG	35.283	118.55	7/23/1952	0	4.8	0.08	26.8 (43.1)
DMG	35.383	118.85	10/13/1952	0	4.0	0.08	15.5 (24.9)
DMG	34.967	118.95	7/30/1952	0	4.1	0.08	16.7 (26.9)
DMG	34.928	118.97	1/15/1955	9.1	4.3	0.08	19.2 (30.9)
DMG	34.885	119.002	2/23/1939	10	4.5	0.08	22.0 (35.4)
DMG	35.395	118.62	8/8/1955	4.1	4.7	0.08	25.9 (41.7)
DMG	35.333	119.25	1/20/1941	0	4.0	0.08	16.0 (25.7)
DMG	34.983	118.9	3/23/1953	0	4.0	0.08	16.6 (26.6)
DMG	34.95	119.017	11/11/1952	0	4.1	0.08	17.5 (28.1)
T-A	34.92	118.92	08/29/1857	0	4.3	0.08	20.3 (32.6)
DMG	35.2	118.633	7/22/1952	0	4.4	0.08	21.5 (34.7)
DMG	35.283	118.55	7/23/1952	0	4.7	0.08	26.8 (43.1)
DMG	35.367	118.583	7/23/1952	0	4.7	0.08	26.8 (43.2)
DMG	35.316	118.487	9/15/1952	4.2	4.9	0.08	30.8 (49.5)
DMG	34.3	119.8	6/29/1925	0	6.3	0.08	76.6 (123.3)
DMG	34.967	118.95	11/27/1952	0	4.0	0.08	16.7 (26.9)
PAS	35.372	118.774	12/15/1987	3.2	4.1	0.08	17.9 (28.8)
DMG	35.233	118.6	7/22/1952	0	4.5	0.08	23.5 (37.8)
GSP	35.21	118.066	7/11/1992	10	5.7	0.08	53.5 (86.1)
DMG	35.083	118.75	7/26/1952	0	4.0	0.07	17.1 (27.5)
DMG	34.9	119.05	7/22/1952	0	4.3	0.07	21.0 (33.8)
DMG	34.3	118.6	04/04/1893	0	6.0	0.07	66.7 (107.3)
DMG	35	118.733	8/23/1952	0	4.3	0.07	21.2 (34.2)
DMG	35.383	118.567	7/23/1952	0	4.7	0.07	28.1 (45.3)
DMG	35.283	118.583	7/31/1952	0	4.5	0.07	25.0 (40.2)
DMG	35.333	118.6	7/23/1952	0	4.5	0.07	25.0 (40.3)
DMG	35.333	118.6	7/23/1952	0	4.5	0.07	25.0 (40.3)
DMG	35.367	118.583	7/23/1952	0	4.6	0.07	26.8 (43.2)
DMG	34.945	118.968	3/4/1963	8.5	4.0	0.07	18.0 (29.0)
DMG	35.5	118.967	9/29/1948	0	4.2	0.07	20.7 (33.2)
MGI	35.2	119.5	12/1/1920	0	4.6	0.07	27.4 (44.0)
DMG	34.367	119.583	7/1/1941	0	5.9	0.07	66.1 (106.4)
DMG	35.217	118.667	9/14/1952	0	4.1	0.07	19.6 (31.6)
MGI	34.6	120.4	8/1/1902	0	6.3	0.07	88.8 (142.9)
MGI	34.6	120.4	7/28/1902	0	6.3	0.07	88.8 (142.9)
DMG	35.379	118.668	11/21/1955	5.3	4.3	0.07	23.0 (37.0)

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitute (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	34.867	119.017	7/21/1952	0	4.3	0.07	23.2 (37.4)
DMG	35.283	118.55	8/1/1952	0	4.5	0.07	26.8 (43.1)
DMG	35.314	118.482	8/30/1952	5.5	4.7	0.07	31.0 (49.9)
DMG	35.299	118.435	7/25/1952	-1.4	4.8	0.07	33.4 (53.7)
DMG	34.411	118.401	2/9/1971	8	5.8	0.07	64.8 (104.3)
DMG	34.411	118.401	2/9/1971	8	5.8	0.07	64.8 (104.3)
MGI	34.1	118.1	07/11/1855	0	6.3	0.07	92.2 (148.4)
DMG	35.3	118.667	8/13/1952	0	4.1	0.07	20.7 (33.3)
DMG	34.883	119.033	8/20/1952	0	4.2	0.07	22.1 (35.6)
DMG	35.083	118.583	7/22/1952	0	4.4	0.07	25.8 (41.4)
DMG	35.3	118.533	7/21/1952	0	4.5	0.07	28.0 (45.0)
DMG	34.5	119.5	6/29/1926	0	5.5	0.07	55.8 (89.8)
DMG	34.922	119.103	1/9/1963	8.7	4.0	0.07	20.0 (32.3)
DMG	35.283	118.55	7/22/1952	0	4.4	0.07	26.8 (43.1)
DMG	35.133	118.517	7/22/1952	0	4.5	0.07	28.5 (45.9)
PAS	35.27	119.402	9/26/1980	5	4.1	0.06	22.3 (35.9)
DMG	35.433	118.7	5/1/1954	0	4.2	0.06	23.8 (38.3)
DMG	35.233	118.533	7/29/1952	0	4.4	0.06	27.3 (43.9)
GSB	35.761	117.639	9/20/1995	5	6.1	0.06	86.4 (139.1)
DMG	35.241	118.56	7/21/1952	5.8	4.3	0.06	25.8 (41.5)
DMG	35.4	118.583	7/24/1952	0	4.4	0.06	27.9 (44.8)
GSB	34.379	118.711	1/19/1994	14	5.5	0.06	59.5 (95.7)
GSP	34.326	118.698	1/17/1994	9	5.6	0.06	63.2 (101.7)
DMG	35.45	119.25	1/23/1935	0	4.0	0.06	21.6 (34.7)
DMG	35.321	118.494	2/11/1955	14.7	4.5	0.06	30.5 (49.0)
DMG	34.065	119.035	2/21/1973	8	5.9	0.06	78.6 (126.5)
DMG	35.8	120.33	6/8/1934	0	6.0	0.06	84.6 (136.2)
DMG	35.417	119.3	6/4/1941	0	4.0	0.06	21.8 (35.1)
DMG	35.4	118.633	10/2/1952	0	4.2	0.06	25.4 (40.9)
DMG	35.283	118.55	7/26/1952	0	4.3	0.06	26.8 (43.1)
DMG	35.367	118.583	9/16/1952	0	4.3	0.06	26.8 (43.2)
DMG	35.454	118.605	2/7/1964	-2	4.4	0.06	28.9 (46.4)
T-A	34.42	119.82	00/00/1862	0	5.7	0.06	70.8 (113.9)
DMG	35.351	118.527	8/11/1952	-2	4.4	0.06	29.3 (47.2)
DMG	34.784	118.902	7/27/1972	8	4.4	0.06	29.6 (47.7)
DMG	35.3	118.5	2/19/1953	0	4.4	0.06	29.8 (47.9)
DMG	35.335	118.474	7/23/1952	6.6	4.5	0.06	31.8 (51.2)
DMG	35.34	118.473	7/24/1952	2.1	4.5	0.06	32.0 (51.4)
DMG	34.867	118.867	7/22/1952	0	4.1	0.06	24.7 (39.7)
DMG	35.465	118.668	2/7/1964	0	4.2	0.06	26.6 (42.8)
DMG	35.314	118.53	7/26/1952	6.8	4.3	0.06	28.4 (45.7)
DMG	35.25	118.483	7/23/1952	0	4.4	0.06	30.2 (48.5)
DMG	35.289	118.411	8/10/1952	4	4.6	0.06	34.6 (55.6)
DMG	35.183	118.6	7/26/1952	0	4.0	0.06	23.4 (37.7)
DMG	35.233	118.6	1/10/1953	0	4.0	0.06	23.5 (37.8)
DMG	35.1	118.617	9/26/1952	0	4.0	0.06	23.6 (37.9)
DMG	35.283	118.55	7/31/1952	0	4.2	0.06	26.8 (43.1)
DMG	35.367	118.583	7/23/1952	0	4.2	0.06	26.8 (43.2)
DMG	35.367	118.583	7/27/1952	0	4.2	0.06	26.8 (43.2)
DMG	35.233	118.533	7/22/1952	0	4.2	0.06	27.3 (43.9)
DMG	35.233	118.533	7/24/1952	0	4.2	0.06	27.3 (43.9)
DMG	35.303	118.481	9/4/1952	5.8	4.4	0.06	30.9 (49.7)

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TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitute (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	35.367	118.5	6/20/1953	0	4.4	0.06	31.1 (50.1)
DMG	35.294	118.401	8/13/1952	14.5	4.6	0.06	35.2 (56.6)
DMG	35.338	118.523	8/6/1952	12.6	4.3	0.06	29.2 (47.1)
DMG	35.316	118.514	7/24/1952	5.4	4.3	0.06	29.3 (47.1)
DMG	35.067	118.617	7/23/1952	0	4.0	0.06	24.4 (39.2)
DMG	34.843	119.026	3/7/1939	10	4.0	0.06	24.9 (40.0)
DMG	35.358	118.616	8/24/1955	7.2	4.0	0.06	24.9 (40.0)
DMG	35.383	118.6	9/5/1953	0	4.1	0.06	26.5 (42.6)
DMG	35.239	118.518	7/21/1952	-2	4.2	0.06	28.1 (45.3)
DMG	35.133	118.517	7/28/1952	0	4.2	0.06	28.5 (45.9)
DMG	35.333	118.6	8/10/1952	0	4.0	0.06	25.0 (40.3)
DMG	35.333	118.6	9/16/1952	0	4.0	0.06	25.0 (40.3)
DMG	35.432	118.664	9/30/1964	7.4	4.0	0.06	25.3 (40.7)
DMG	34.835	118.988	11/29/1936	10	4.0	0.06	25.5 (41.0)
DMG	35.233	118.533	7/30/1952	0	4.1	0.06	27.3 (43.9)
DMG	35.32	118.518	7/27/1952	6.5	4.2	0.06	29.1 (46.9)
DMG	35.313	118.489	10/20/1952	14	4.3	0.06	30.6 (49.2)
DMG	35.194	118.465	7/22/1952	3.7	4.3	0.06	31.0 (49.9)
DMG	34.617	119.083	2/26/1950	0	4.7	0.06	40.7 (65.4)
DMG	35.083	118.583	8/4/1952	0	4.0	0.05	25.8 (41.4)
DMG	35.4	118.583	7/25/1952	0	4.1	0.05	27.9 (44.8)
DMG	35.367	118.533	7/23/1952	0	4.2	0.05	29.4 (47.3)
DMG	35.305	118.507	8/9/1952	0	4.2	0.05	29.5 (47.4)
MGI	34	119	12/14/1912	0	5.7	0.05	83.1 (133.7)
MGI	34.8	120.4	12/12/1902	0	5.7	0.05	83.1 (133.8)
PAS	36.151	120.049	8/4/1985	6	5.8	0.05	87.4 (140.7)
PAS	34.061	118.079	10/1/1987	9.5	5.9	0.05	95.1 (153.1)
MGI	35.3	120.7	12/7/1906	0	5.9	0.05	95.2 (153.3)
DMG	35.235	118.548	3/3/1973	8	4.0	0.05	26.4 (42.5)
DMG	35.3	118.533	7/21/1952	0	4.1	0.05	28.0 (45.0)
DMG	35.229	118.513	6/28/1957	1.6	4.1	0.05	28.4 (45.6)
DMG	35.133	118.517	8/14/1952	0	4.1	0.05	28.5 (45.9)
DMG	35.25	118.483	7/23/1952	0	4.2	0.05	30.2 (48.5)
DMG	35.267	118.45	7/21/1952	0	4.3	0.05	32.2 (51.7)
DMG	35.063	118.423	8/26/1952	0	4.4	0.05	34.8 (56.0)
DMG	35.454	118.476	11/23/1953	5.9	4.4	0.05	34.9 (56.2)
GSP	35.453	118.431	5/6/1997	6	4.5	0.05	37.1 (59.8)
GSP	34.377	118.698	1/18/1994	11	5.2	0.05	59.8 (96.3)
DMG	35.715	118.074	3/15/1946	0	5.3	0.05	63.6 (102.4)
DMG	34.411	118.401	2/9/1971	8	5.3	0.05	64.8 (104.3)
DMG	35.714	117.977	3/15/1946	0	5.4	0.05	68.2 (109.7)
DMG	35.333	118.567	8/8/1952	0	4.0	0.05	26.8 (43.1)
DMG	35.367	118.583	7/23/1952	0	4.0	0.05	26.8 (43.2)
DMG	35.367	118.583	7/28/1952	0	4.0	0.05	26.8 (43.2)
DMG	35.233	118.533	3/17/1953	0	4.0	0.05	27.3 (43.9)
DMG	35.199	118.531	9/1/1961	4.5	4.0	0.05	27.3 (43.9)
DMG	35.2	119.5	6/9/1928	0	4.0	0.05	27.4 (44.0)
DMG	35.356	118.538	7/19/1955	6.4	4.1	0.05	28.9 (46.5)
DMG	35.321	118.54	7/24/1952	9.5	4.0	0.05	28.0 (45.0)
DMG	35.3	118.533	7/30/1952	0	4.0	0.05	28.0 (45.0)
DMG	35.3	118.533	9/2/1952	0	4.0	0.05	28.0 (45.0)
DMG	34.841	119.24	1/11/1958	10.8	4.0	0.05	28.1 (45.2)

TABLE 2
Historic Earthquakes Within 100 Miles of the Site
Ground Motion Greater Than 0.05g

File Code	Latitude (North)	Longitute (West)	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Distance mi (km)
DMG	35.289	118.46	7/26/1952	10.8	4.2	0.05	31.8 (51.2)
DMG	35.778	118.049	1/28/1961	5.5	5.3	0.05	67.2 (108.2)
DMG	35.337	118.537	8/30/1952	3.5	4.0	0.05	28.5 (45.8)
DMG	35.133	118.517	7/23/1952	0	4.0	0.05	28.5 (45.9)
DMG	35.333	118.533	8/1/1952	0	4.0	0.05	28.6 (46.0)
DMG	35.117	118.481	5/1/1953	2.4	4.1	0.05	30.7 (49.4)
DMG	34.5	119.5	8/5/1930	0	5.0	0.05	55.8 (89.8)
GSP	34.369	118.672	4/26/1997	16	5.1	0.05	60.8 (97.8)
DMG	34.1	119.4	05/19/1893	0	5.5	0.05	79.3 (127.5)
PAS	35.095	118.519	6/22/1981	5	4.0	0.05	29.0 (46.6)
DMG	35.308	118.516	7/31/1952	7.3	4.0	0.05	29.0 (46.7)
DMG	35.29	118.47	7/24/1952	14.1	4.1	0.05	31.3 (50.4)
DMG	35.3	118.432	7/23/1952	14.5	4.2	0.05	33.5 (54.0)
GSP	34.378	118.618	1/19/1994	11	5.1	0.05	61.3 (98.6)
DMG	35.751	118.029	3/15/1946	0	5.2	0.05	67.1 (108.0)
DMG	34.7	120.3	7/31/1902	0	5.5	0.05	80.6 (129.7)
DMG	34.7	120.3	1/12/1915	0	5.5	0.05	80.6 (129.7)
T-A	35.25	120.67	12/17/1852	0	5.7	0.05	93.4 (150.3)
T-A	35.25	120.67	00/00/1830	0	5.7	0.05	93.4 (150.3)
DMG	35.33	118.507	5/29/1968	3.1	4.0	0.05	29.9 (48.2)
DMG	35.345	118.507	7/23/1952	10.4	4.0	0.05	30.3 (48.7)
DMG	35.336	118.472	7/23/1952	19.7	4.1	0.05	31.9 (51.4)
DMG	35.346	118.465	12/25/1952	4.6	4.1	0.05	32.5 (52.3)
GSP	34.394	118.669	6/26/1995	13	5.0	0.05	59.2 (95.3)
GSB	34.301	118.565	1/17/1994	9	5.2	0.05	67.3 (108.3)
DMG	35.747	117.908	3/18/1946	4.4	5.3	0.05	72.7 (117.0)
GSP	34.231	118.475	3/20/1994	13	5.3	0.05	73.8 (118.7)
DMG	35.324	118.486	1/20/1953	7.2	4.0	0.05	31.0 (49.8)
DMG	35.303	118.473	8/1/1952	4.2	4.0	0.05	31.3 (50.4)
T-A	34.5	119.67	06/01/1893	0	5.0	0.05	61.1 (98.4)
DMG	36.08	118.82	5/29/1915	0	5.0	0.05	61.5 (99.0)
DMG	35.753	117.986	3/15/1946	0	5.2	0.05	69.2 (111.3)
DMG	34.308	118.454	2/9/1971	6.2	5.2	0.05	69.5 (111.9)
MGI	35.17	120.75	12/1/1916	0	5.7	0.05	97.9 (157.6)
DMG	35.36	118.438	8/3/1952	7	4.1	0.05	34.3 (55.1)
DMG	34.586	118.613	2/7/1956	2.6	4.6	0.05	48.3 (77.7)
DMG	35.745	118.039	3/16/1946	0	5.1	0.05	66.4 (106.9)
GSP	34.305	118.579	1/29/1994	1	5.1	0.05	66.8 (107.4)
MGI	34.3	119.8	7/3/1925	0	5.3	0.05	76.6 (123.3)
MGI	34.3	119.8	7/3/1925	0	5.3	0.05	76.6 (123.3)
GSP	35.776	117.662	8/17/1995	5	5.4	0.05	85.7 (137.9)

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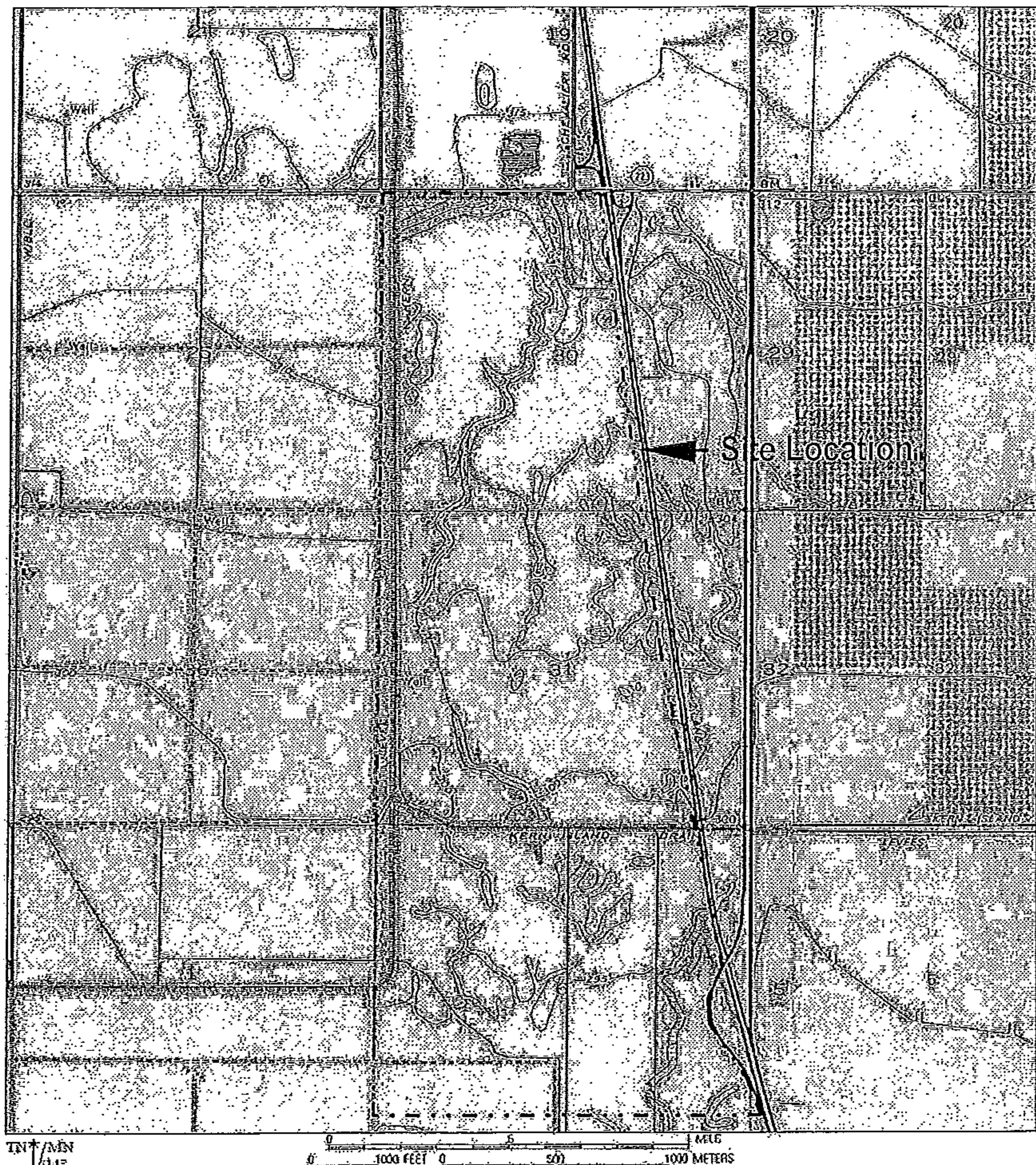
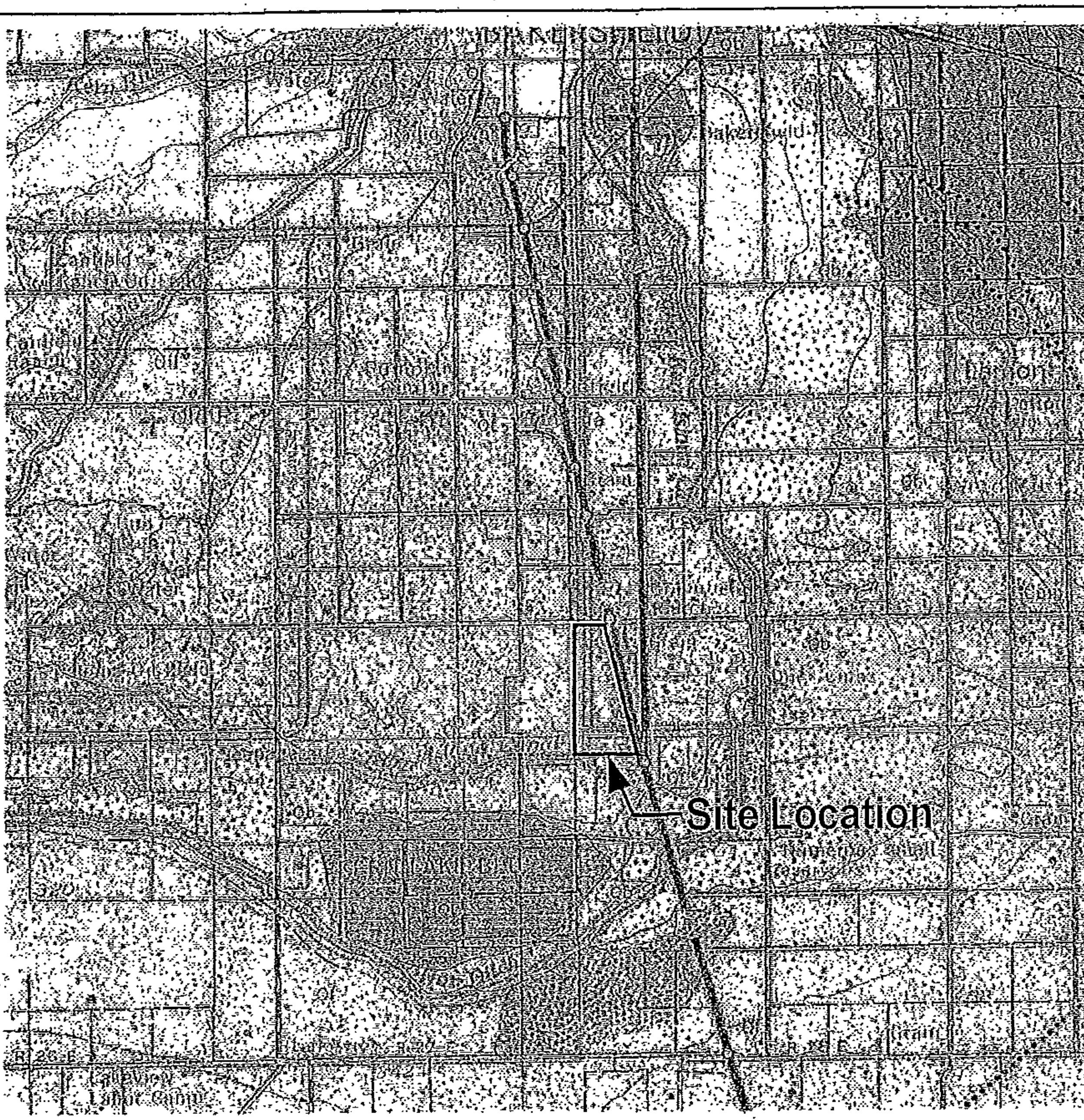
Preliminary Geologic Hazards Assessment Proposed Bakersfield College Southwest Corner of Highway 99 and Highway 223 Bakersfield, California	BSK Job No. G0724411B Vicinity Map Figure 1



Map created with TOPO!® ©2001 National Geographic (www.nationalgeographic.com/topo)

Preliminary Geologic Hazards Assessment Proposed Bakersfield College Southwest Corner of Highway 99 and Highway 223 Bakersfield, California	BSK Job No. G0724411B Topographic Map Figure 2

BSK



LEGEND

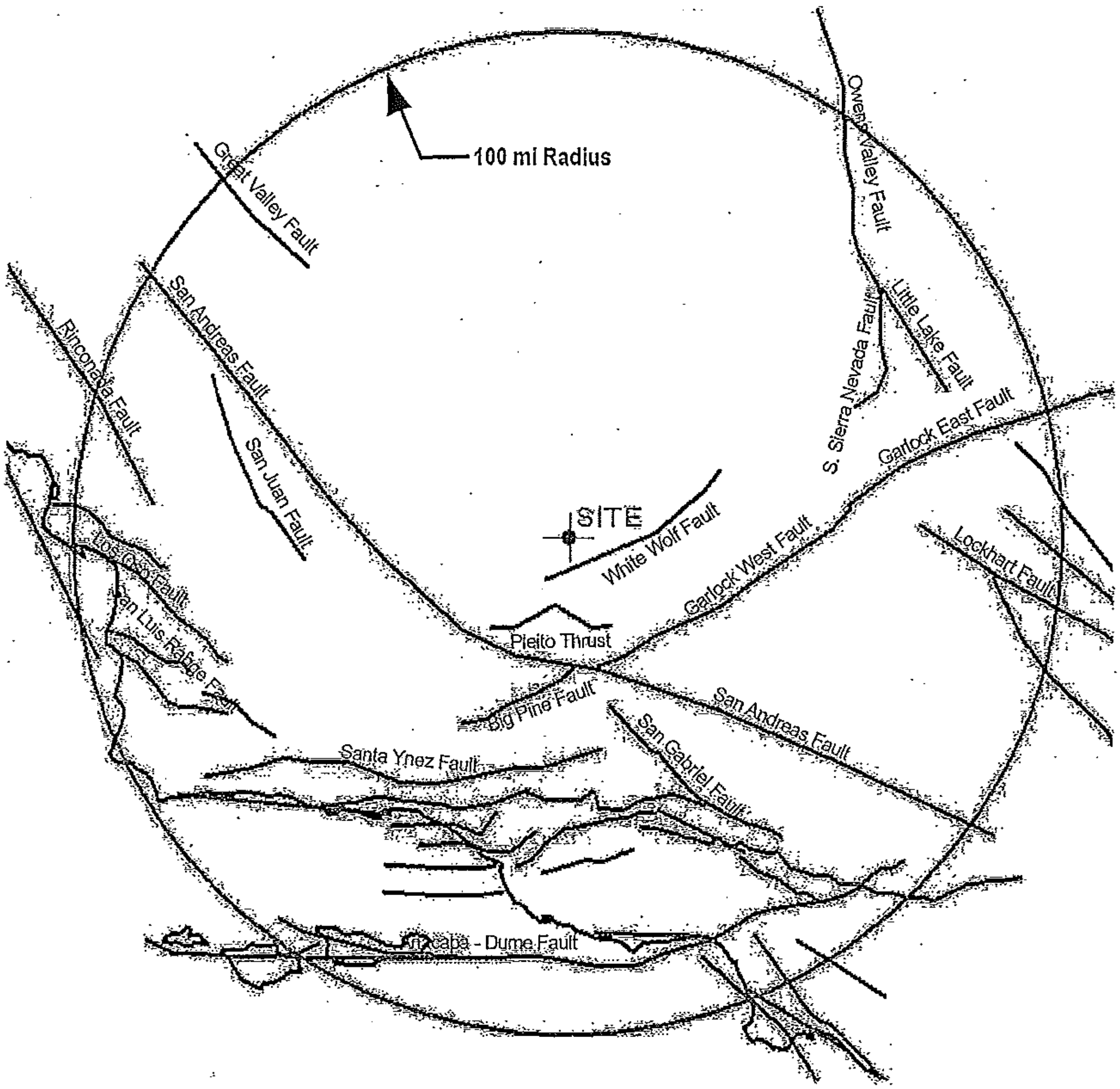
Qf - Recent Fan Deposits
Qb - Recent Basin Deposits
Qc - Pleistocene nonmarine
QP - Plio-Pleistocene nonmarine

0 2 4
Approximate Scale in Miles

Source: Geologic Map of California, Bakersfield Sheet, 1964

Preliminary Geologic Hazards Assessment Proposed Bakersfield College Southwest Corner of Highway 99 and Highway 223 Bakersfield, California	BSK Job No. G0724411B Geologic Map Figure C5

BSK



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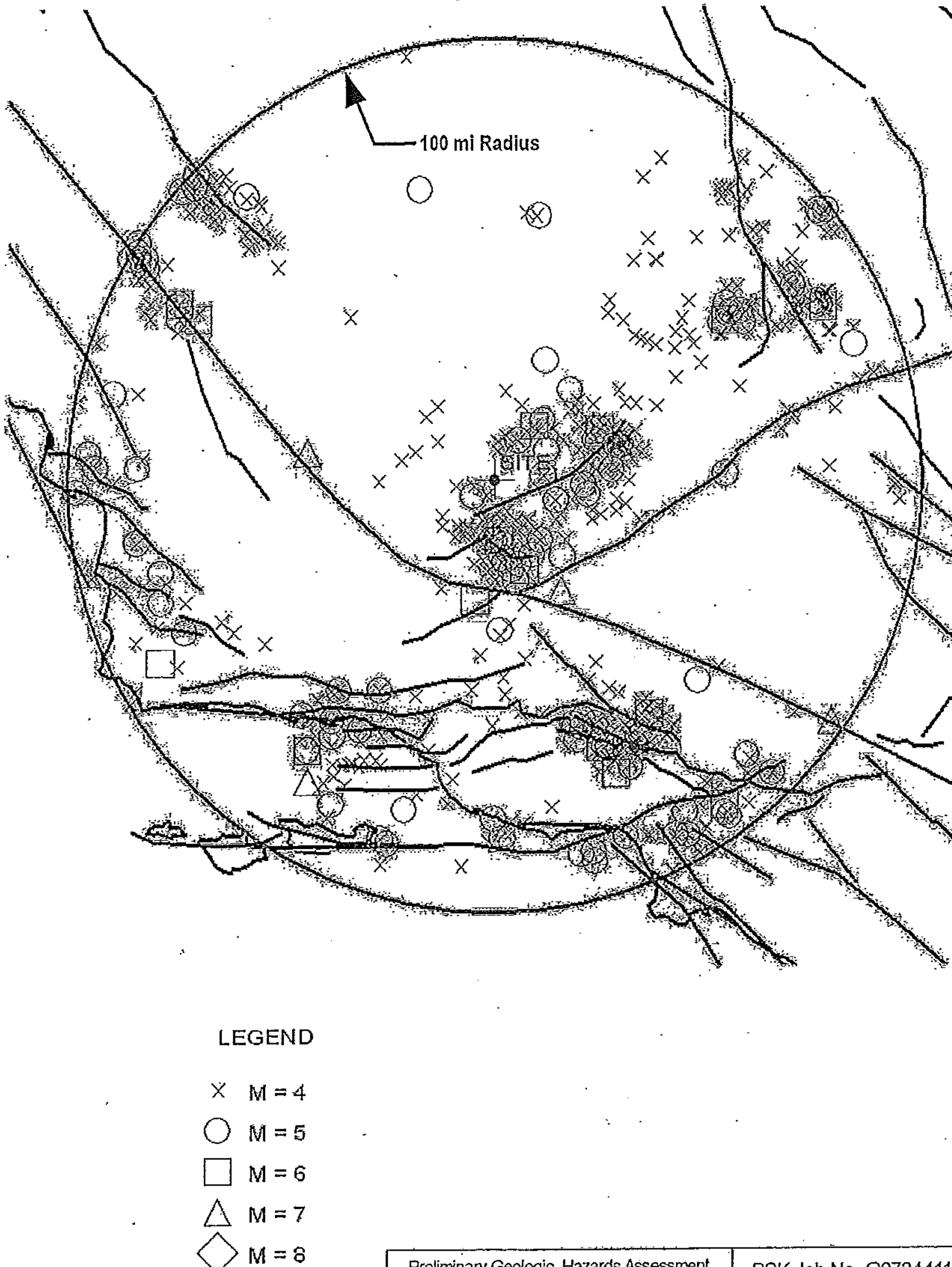
Preliminary Geologic Hazards Assessment Proposed Bakersfield College Southwest Corner of Highway 99 and Highway 223 Bakersfield, California	BSK Job No. G0724411B Regional Fault Map Figure 6



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Preliminary Geologic Hazards Assessment Proposed Bakersfield College Southwest Corner of Highway 99 and Highway 223 Bakersfield, California	BSK Job No. G0724411B Earthquake Epicenter Map Figure 7

PROBABILITY OF EXCEEDANCE

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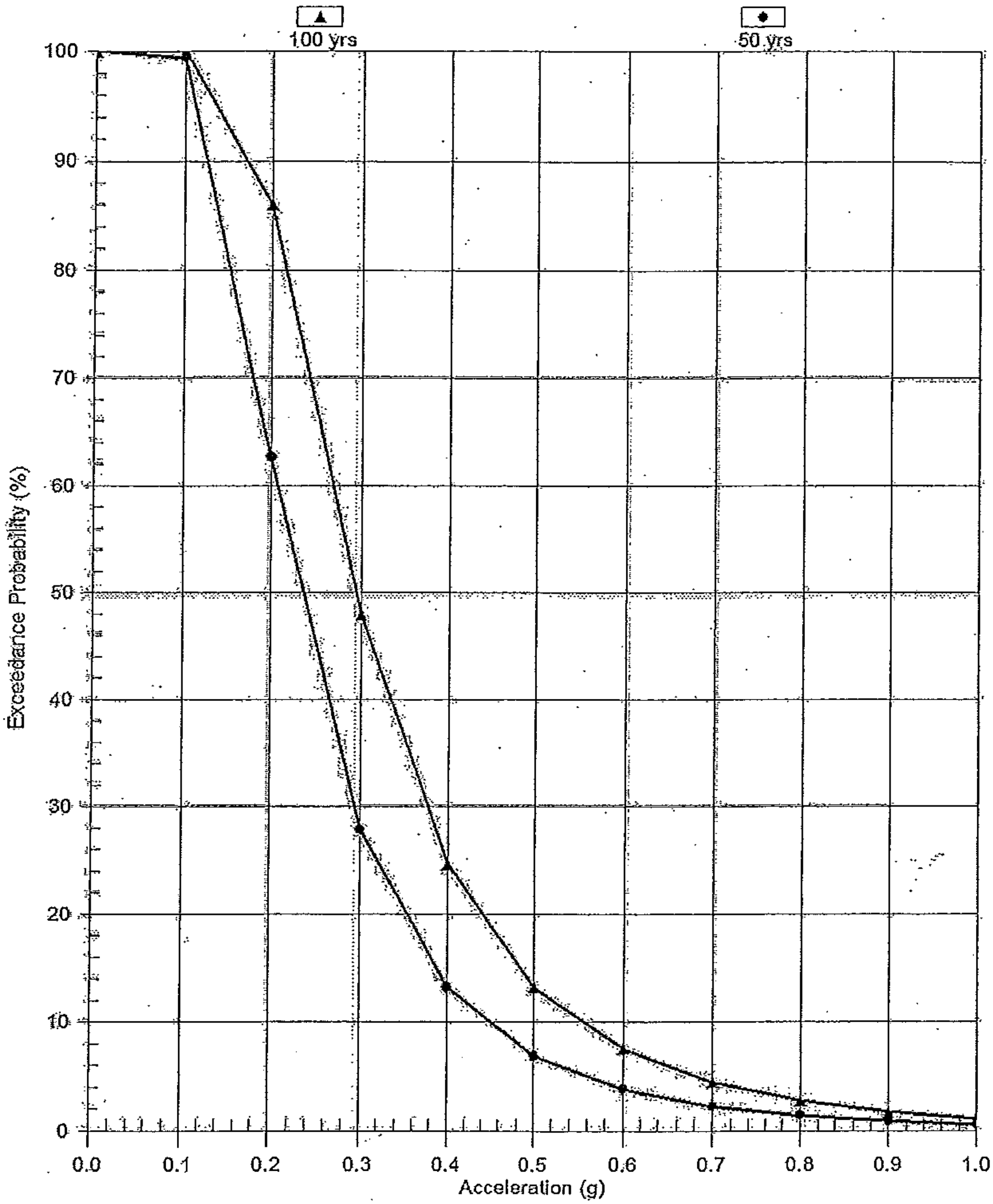

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Preliminary Geologic Hazards Assessment
Proposed Bakersfield College
Southwest Corner of Highway 99
and Highway 223
Bakersfield, California

BSK Job No. G0724411B
Probability of Exceedance
Figure 8

West Kern CC
CPT-1 and B-1
Liquefaction Analysis

SPT No.	Depth (ft)	N field	Energy Factor	Rod Factor	Sampler Factor	Borehole Factor	Total Stress (psf)	Effective Stress (psf)	Cn	N1,60	Fines Content (%)	N1,60,cs	Ksigma	Alpha	Kalpha	CRR	CSR	Safety Factor
1	.5	12	1	1	1	1	60.5	60.5	1.7	20.4	12	22.4	1	---	---	---	.364	---
2	1.5	18	1	1	1	1	181.5	181.5	1.7	30.6	12	32.6	1	---	---	---	.364	---
3	2.5	24	1	1	1	1	302.5	302.5	1.7	40.8	12	42.8	1	---	---	---	.364	---
4	3.5	26	1	1	1	1	423.5	423.5	1.59	41.3	12	43.3	1	---	---	---	.362	---
5	4.5	24	1	1	1	1	544.5	544.5	1.53	36.7	12	38.7	1	---	---	---	.361	---
6	5.5	23	1	1	1	1	664	664	1.47	33.8	12	35.8	1	---	---	---	.36	---
7	6.5	11	1	1	1	1	782	782	1.58	17.3	12	19.3	1	---	---	---	.359	---
8	7.5	15	1	1	1	1	901.5	901.5	1.43	21.4	12	23.4	1	---	---	---	.358	---
9	8.5	13	1	1	1	1	1022.5	1022.5	1.39	18	12	20	1	---	---	---	.357	---
10	9.5	13	1	1	1	1	1143.5	1143.5	1.33	17.2	12	19.2	1	---	---	---	.355	---
11	10.5	16	1	1	1	1	1264.5	1233.3	1.26	20.1	35	25.6	1	---	---	.329	.363	.9
12	11.5	20	1	1	1	1	1385.5	1291.9	1.22	24.4	35	29.9	1	---	---	.518	.378	1.37
13	12.5	18	1	1	1	1	1506.5	1350.5	1.21	21.7	35	27.2	1	---	---	.382	.392	.97
14	13.5	19	1	1	1	1	1626	1407.6	1.18	22.4	35	27.9	1	---	---	.41	.404	1.01
15	14.5	13	1	1	1	1	1744	1463.2	1.19	15.4	35	20.9	1	---	---	.235	.415	.56
16	15.5	14	1	1	1	1	1862	1518.8	1.16	16.2	35	21.7	1	---	---	.247	.425	.58
17	16.5	16	1	1	1	1	1980	1574.4	1.14	18.2	54	23.8	1	---	---	---*	.435	---
18	17.5	15	1	1	1	1	2099.5	1631.5	1.12	16.8	54	22.4	1	---	---	---*	.443	---
19	18.5	19	1	1	1	1	2220.5	1690.1	1.1	20.9	54	26.5	1	---	---	---*	.45	---
20	19.5	17	1	1	1	1	2341.5	1748.7	1.09	18.5	54	24.1	1	---	---	---*	.457	---
21	20.5	26	1	1	1	1	2464	1808.8	1.06	27.5	78	33	1	---	---	---*	.463	---
22	21.5	30	1	1	1	1	2588	1870.39	1.04	31.2	78	36.7	1	---	---	---*	.468	---
23	22.5	17	1	1	1	1	2712	1932	1.04	17.6	78	23.1	1	---	---	---*	.472	---
24	23.5	20	1	1	1	1	2836	1993.6	1.02	20.4	78	25.9	1	---	---	---*	.476	---
25	24.5	24	1	1	1	1	2960	2055.2	1.01	24.2	78	29.7	1	---	---	---*	.48	---
26	25.5	21	1	1	1	1	3081	2113.8	1	21	14	23.9	1	---	---	.287	.483	.59
27	26.5	20	1	1	1	1	3200.5	2170.89	.98	19.6	9	20.3	.99	---	---	.224	.486	.46
28	27.5	27	1	1	1	1	3323	2231	.97	26.1	2	26.1	.99	---	---	.341	.488	.69
29	28.5	24	1	1	1	1	3445.5	2291.1	.96	23	7	23.1	.98	---	---	.266	.49	.54
30	29.5	11	1	1	1	1	3563.5	2346.7	.94	10.3	83	15.8	.98	---	---	---*	.492	---
31	30.5	5	1	1	1	1	3678.5	2399.29	.92	4.6	100	10	.98	---	---	---*	.494	---
32	31.5	6	1	1	1	1	3793.5	2451.89	.91	5.4	100	10.8	.98	---	---	---*	.496	---
33	32.5	8	1	1	1	1	3908.5	2504.5	.9	7.2	100	12.6	.98	---	---	---*	.497	---
34	33.5	9	1	1	1	1	4023.5	2557.1	.89	8	92	13.5	.98	---	---	---*	.499	---
35	34.5	25	1	1	1	1	4138.5	2609.7	.91	22.7	28	27.9	.96	---	---	---*	.5	---
36	35.5	29	1	1	1	1	4258	2666.79	.91	26.3	8	26.6	.95	---	---	.342	.5	.68
37	36.5	33	1	1	1	1	4382	2728.4	.91	30	3	30	.94	---	---	.493	.5	.98
38	37.5	34	1	1	1	1	4506	2790	.9	30.6	4	30.6	.94	---	---	.534	.5	1.06
39	38.5	44	1	1	1	1	4630	2851.6	.91	40	1	40	.91	---	---	NL	.499	---
40	39.5	45	1	1	1	1	4755.5	2914.7	.91	40.9	1	40.9	.9	---	---	NL	.499	---
41	40.5	45	1	1	1	1	4882.5	2979.29	.9	40.5	1	40.5	.89	---	---	NL	.498	---
42	41.5	53	1	1	1	1	5009.5	3043.9	.9	47.6	2	47.6	.89	---	---	NL	.497	---
43	42.5	47	1	1	1	1	5136.5	3108.5	.89	41.8	1	41.8	.88	---	---	NL	.496	---
44	43.5	46	1	1	1	1	5263.5	3173.1	.88	40.4	1	40.4	.88	---	---	NL	.494	---
45	44.5	48	1	1	1	1	5390.5	3237.7	.88	42.2	1	42.2	.87	---	---	NL	.493	---
46	45.5	60	1	1	1	1	5516	3300.8	.88	52.8	3	52.8	.86	---	---	NL	.492	---

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Figure 9

West Kern CC

CPT-1 and B-1

Liquefaction Analysis

SPT No.	Depth (ft)	N field	Energy Factor	Rod Factor	Sampler Factor	Borehole Factor	Total Stress (psf)	Effective Stress (psf)	Cn	N1,60	Fines Content (%)	N1,60,cs	Ksigma	Alpha	Kalpha	CRR	CSR	Safety Factor
47	46.5	48	1	1	1	1	5640	3362.4	.87	41.7	3	41.7	.86	---	---	NL	.491	- - -
48	47.5	57	1	1	1	1	5764	3424	.88	50.1	4	50.1	.85	---	---	NL	.49	- - -
49	48.5	46	1	1	1	1	5888	3485.6	.86	39.5	4	39.5	.85	---	---	NL	.488	- - -
50	49.5	38	1	1	1	1	6012	3547.2	.83	31.5	5	31.5	.88	---	---	.568	.486	1.16

Notes:

CSR analysis using Seed & Idriss (1971) and Idriss (1999) for Mw: 7.2
CSR File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CSR
CRR using SPT Data and Idriss & Boulanger (2004) Method
CRR File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CRR
Earthquake used in CSR Analysis: pga=0.56g, Mw=7.2
Earthquake Magnitude for CRR Analysis: 7.2
Peak Ground Acceleration for CSR Analysis (g, from User): .56
Magnitude Scaling Factor (MSF): 1.082
Depth to Water Table for CRR Analysis (ft): 10
Depth to Water Table for Cn Calculation (ft): 10
Depth to Base Layer for CSR Analysis (ft): 49.5
MSF Option: I.M. Idriss (1999)
Cn Option: Idriss & Boulanger (2003)
Ksigma Option: Idriss & Boulanger (2003)
SPT Energy Ratio: Other energy ratio: 1
**effective stress computed using Depth to Water Table for CRR Analysis
*value modified by user

G0724411B
Figure 10

West Kern CC
CPT-1 and B-1
Seismic Induced Settlement Analysis

SPT No.	Depth (ft)	Thickness (ft)	Soil Type	(N)1	(N1)60,cs	N(1,J)	CSR M=7.5	FSL	Ecyc (%)	Evol (%)	Settlement (in)
1	.5	1		22.4	—	—	.336	—	8.3122E-03	.0145	.001
2	1.5	1		32.6	—	—	.336	—	1.6773E-02	.0162	.001
3	2.5	1		42.8	—	—	.336	—	2.2482E-02	.0144	.001
4	3.5	1		43.3	—	—	.334	—	2.6902E-02	.0173	.002
5	4.5	1		38.7	—	—	.333	—	3.1911E-02	.022	.002
6	5.5	1		35.8	—	—	.332	—	3.7948E-02	.0307	.003
7	6.5	1		19.3	—	—	.331	—	7.7277E-02	.1634	.019
8	7.5	1		23.4	—	—	.33	—	7.0548E-02	.1167	.014
9	8.5	1		20	—	—	.329	—	8.6190E-02	.174	.02
10	9.5	1		19.2	—	—	.328	—	9.2418E-02	.1968	.023
11	10.5	1		—	25.6	21.32	.335	.9		1.174	.14
12	11.5	1		—	29.9	24.9	.349	1.37		.225	.026
13	12.5	1		—	27.2	22.65	.362	.97		.836	.1
14	13.5	1		—	27.9	23.24	.373	1.01		.691	.082
15	14.5	1		—	20.9	17.4	.383	.56		2.426	.291
16	15.5	1		—	21.7	18.07	.392	.58		2.357	.282
17	16.5	1		—	—	—	—	NFSL		—	0
18	17.5	1		—	—	—	—	NFSL		—	0
19	18.5	1		—	—	—	—	NFSL		—	0
20	19.5	1		—	—	—	—	NFSL		—	0
21	20.5	1		—	—	—	—	NFSL		—	0
22	21.5	1		—	—	—	—	NFSL		—	0
23	22.5	1		—	—	—	—	NFSL		—	0
24	23.5	1		—	—	—	—	NFSL		—	0
25	24.5	1		—	—	—	—	NFSL		—	0
26	25.5	1		—	23.9	19.9	.446	.59		2.168	.26
27	26.5	1		—	20.3	16.9	.449	.46		2.478	.297
28	27.5	1		—	26.1	21.74	.451	.69		1.894	.227
29	28.5	1		—	23.1	19.24	.452	.54		2.236	.268
30	29.5	1		—	—	—	—	NFSL		—	0
31	30.5	1		—	—	—	—	NFSL		—	0
32	31.5	1		—	—	—	—	NFSL		—	0
33	32.5	1		—	—	—	—	NFSL		—	0
34	33.5	1		—	—	—	—	NFSL		—	0
35	34.5	1		—	—	—	—	NFSL		—	0
36	35.5	1		—	26.6	22.15	.462	.68		1.854	.222
37	36.5	1		—	30	24.99	.462	.98		.694	.083
38	37.5	1		—	30.6	25.48	.462	1.06		.492	.059
39	38.5	1		—	—	—	—	NFSL		—	0
40	39.5	1		—	—	—	—	NFSL		—	0
41	40.5	1		—	—	—	—	NFSL		—	0
42	41.5	1		—	—	—	—	NFSL		—	0
43	42.5	1		—	—	—	—	NFSL		—	0
44	43.5	1		—	—	—	—	NFSL		—	0
45	44.5	1		—	—	—	—	NFSL		—	0
46	45.5	1		—	—	—	—	NFSL		—	0
47	46.5	1		—	—	—	—	NFSL		—	0
48	47.5	1		—	—	—	—	NFSL		—	0
49	48.5	1		—	—	—	—	NFSL		—	0
50	49.5	.5		—	31.5	26.23	.449	1.16		.351	.021
									Total Settlement (in):		2.444

Notes:

CSR analysis using Seed & Idriss (1971) and Idriss (1999) for Mw: 7.2
CSR analysis on File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CSR
Earthquake used in CSR Analysis: pga=0.56g, Mw=7.2
CRR File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CRR
CRR - SPT Data & Seed et.al. Method in NCEER Workshop
CRR results on File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CRR
Depth to Water Table for CRR Analysis (ft): 10
Settlement of Dry Sands: Tokimatsu & Seed (1987)
Settlement of Saturated Sands: Ishihara & Yoshimine (1992)

G0724411B
Figure 11

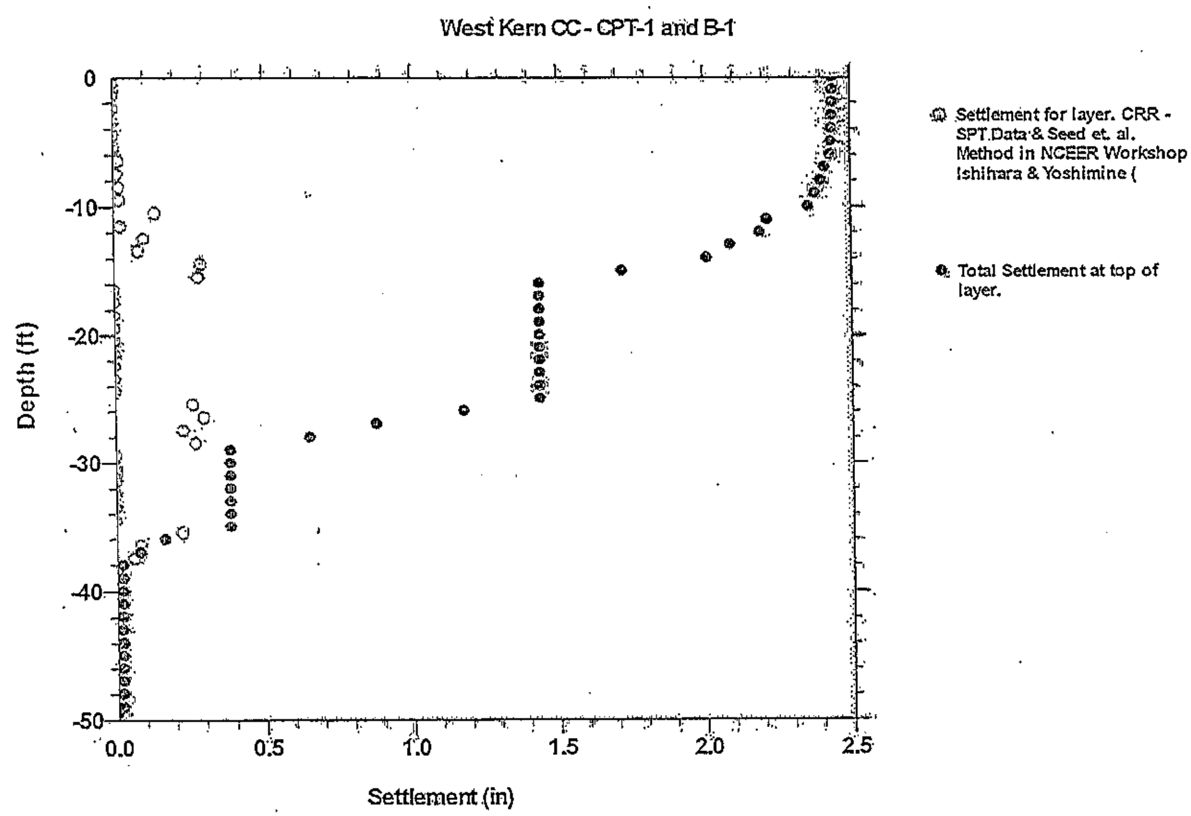

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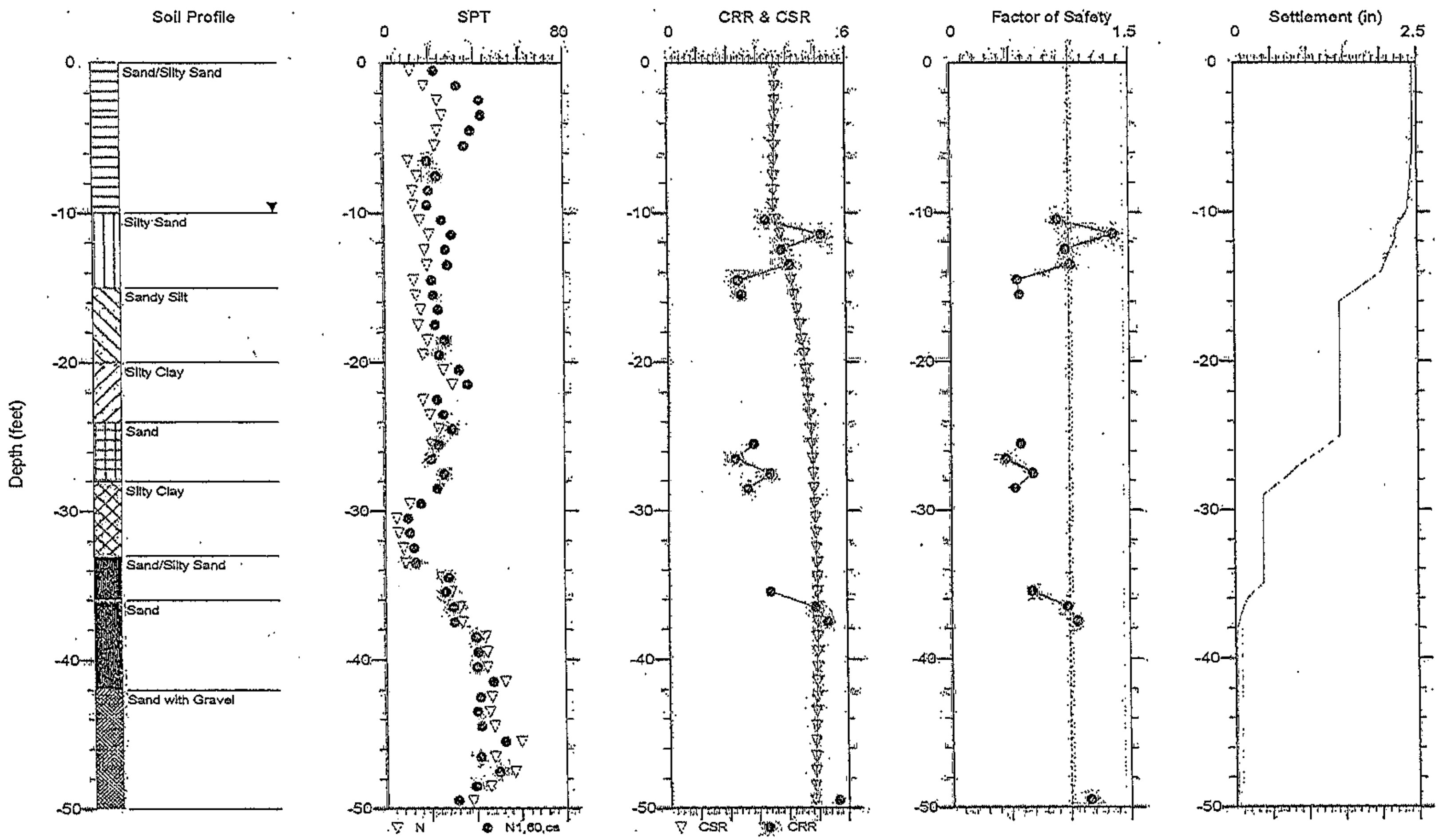
Figure 12

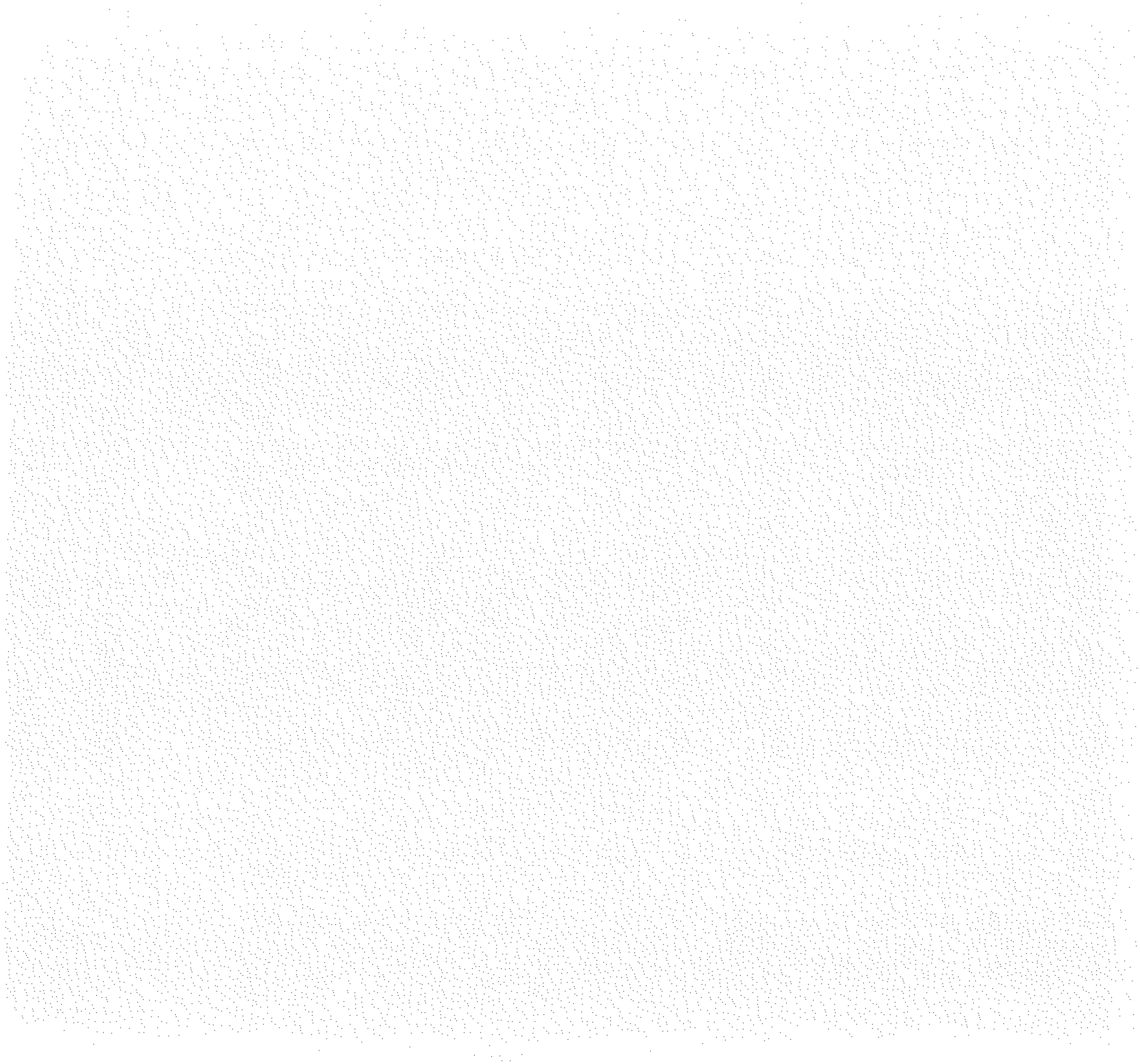
West Kern CC
CPT-1 and B-1
Liquefaction Analysis



Notes:
CSR analysis using Seed & Idriss (1971) and Idriss (1999) for Mw=7.2
CSR File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CSR
CRR using SPT Data and Idriss & Boulanger (2004) Method
CRR File: E:\Geotech\G0724411B - West Kern Com College\cpt-1-cfines.CRR
Earthquake used in CSR Analysis: pga=0.56g, Mw=7.2
Earthquake Magnitude for CRR Analysis: 7.2
Peak Ground Acceleration for CSR Analysis (g, from User): .56
Magnitude Scaling Factor (MSF): 1.082
Depth to Water Table for CRR Analysis (ft): 10

Depth to Water Table for Cn Calculation (ft): 10
Depth to Base Layer for CSR Analysis (ft): 49.5
MSF Option: I.M. Idriss (1999)
Cn Option: Idriss & Boulanger (2003)
Kalpha Option: No Kalpha Used
Ksigma Option: Idriss & Boulanger (2003)
SPT Energy Ratio: Other energy ratio: 1
Settlement Method: Tokimatsu & Seed (1987) & Ishihara & Yoshimine (1992)
**effective stress computed using Depth to Water Table for CRR Analysis

G0724411B
Figure 13



APPENDIX "A"
BORING LOGS
CPT DATA

LOG OF BORING B-1

BSK JOB NO: G07-244-11B
FIGURE NO: A1
SHEET 1 of 1

DATE: 8/29/07
LOGGED BY: On Man Lau
WATER LEVEL: 11 Feet
GROUND ELEVATION:
EQUIPMENT: BK-81, 8" HSA

DEPTH, FT.	DRY DENSITY, PCF	MOISTURE, %	OVM READING PPM	BLOWS/FOOT	TYPE OF SAMPLER	U.S.C.S.	SYMBOLS	DESCRIPTION	REMARKS
						SP-SM		SAND/SILTY SAND: brown; fine grained; moist.	
				15					
5	108	6		17					12% fines at 5 ft
10				10		SM		SILTY SAND: brown; fine grained; moist.	∇
				12					35% fines at 12 ft
15				15		ML		SANDY SILT: brown; very moist.	54% fines at 15 ft
20	99	30		30		CL		SILTY CLAY: brown; wet.	78% fines at 20 ft
25						SP		SAND: light brown; fine grained.	Boring Terminated at 26 Feet

The described soil conditions may not be representative of those at different locations and times.

BSK

LOG OF BORING B-2

BSK JOB NO: G07-244-11B
FIGURE NO: A2
SHEET 1 of 1

DATE: 8/29/07
LOGGED BY: On Man Lau
WATER LEVEL: 17 Feet
GROUND ELEVATION:
EQUIPMENT: BK-81, 8" HSA

DEPTH, FT.	DRY DENSITY, PCF	MOISTURE, %	OVM READING PPM	BLOWS/FOOT	TYPE OF SAMPLER	U.S.C.S.	SYMBOLS	DESCRIPTION	REMARKS
0						SM		SILTY SAND: brown; fine grained; moist.	
				10					
5				12					
10				10		ML		SANDY SILT: brown; moist.	
15				15					∇
20				17		SC		CLAYEY SAND: brown; fine grained; wet.	
25				20		SP		SAND: light brown; fine grained.	Boring Terminated at 26 Feet

The described soil conditions may not be representative of those at different locations and times.

BSK

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

120 Acre College Site
Bear Mountain Blvd. & Highway 99
Bakersfield, CA
September 6, 2007

Prepared for:

Mr. On-Man Lau
BSK & Associates
117 V-Street
Bakersfield, CA 93304
Office (661) 327-0671 / Fax (661) 324-4218

Prepared by:

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289

TABLE OF CONTENTS

SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the 120 Acre College Site project located at Bear Mountain Blvd. & Highway 99 in Bakersfield, California.. The work was performed by Kehoe Testing & Engineering (KTE) on September 6, 2007. The scope of work was performed as directed by BSK & Associates personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at one location to determine the soil lithology. The groundwater measurements were taken in the open CPT hole approximately 10 minutes after completion of CPT. The following TABLE 2.1 summarizes the CPT soundings performed:

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	50	Hole open to 1 ft (dry)

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by KTE using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone and recorded the following parameters at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed
- Pore Pressure Dissipation (at selected depths)

The above parameters were recorded and viewed in real time using a portable computer and stored on a diskette for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the CPT Classification Chart (Robertson, 1986) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

Output from the interpretation program CPTINT provides averaged CPT data over one-foot intervals. The CPTINT output includes Soil Classification Zones, SPT N Values and Undrained Shear Strength (Su). A summary of the equations used for the tabulated parameters is provided in the CPTINT Correlation Table in the Appendix.

The interpretation of soils encountered on this project was carried out using correlations developed by Robertson et al, 1986. It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgment and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

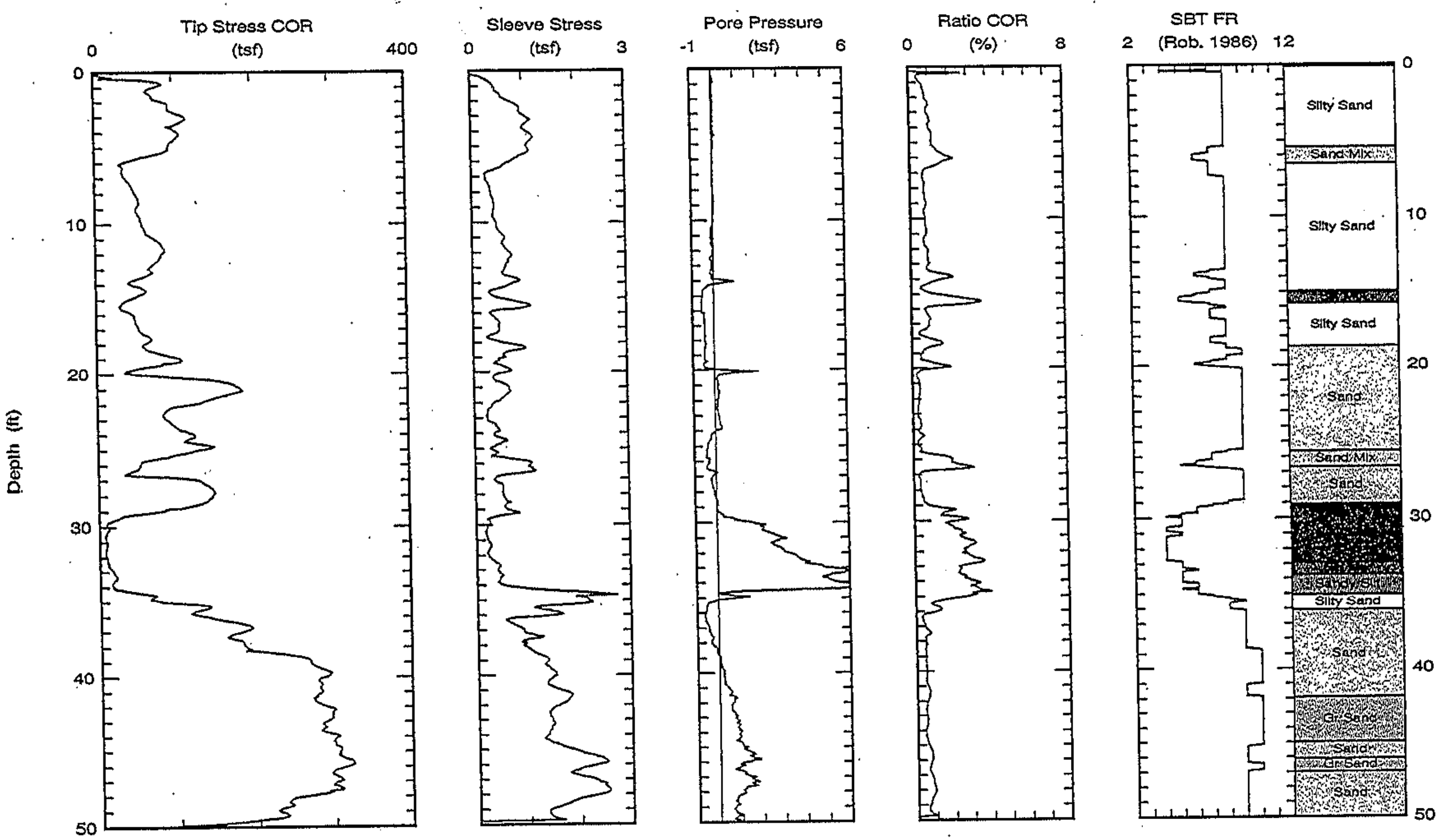
KEHOE TESTING & ENGINEERING

Steven P. Kehoe
President

09/13/07-ch-8-7739

APPENDIX

Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 skehoe@msn.com	CPT Data 30 ton rig	Date: 06/Sep/2007 Test ID: CPT-1 Project: Bakersfield
	Customer: BSK & Assoc. Job Site: 120 Acre-College Site	

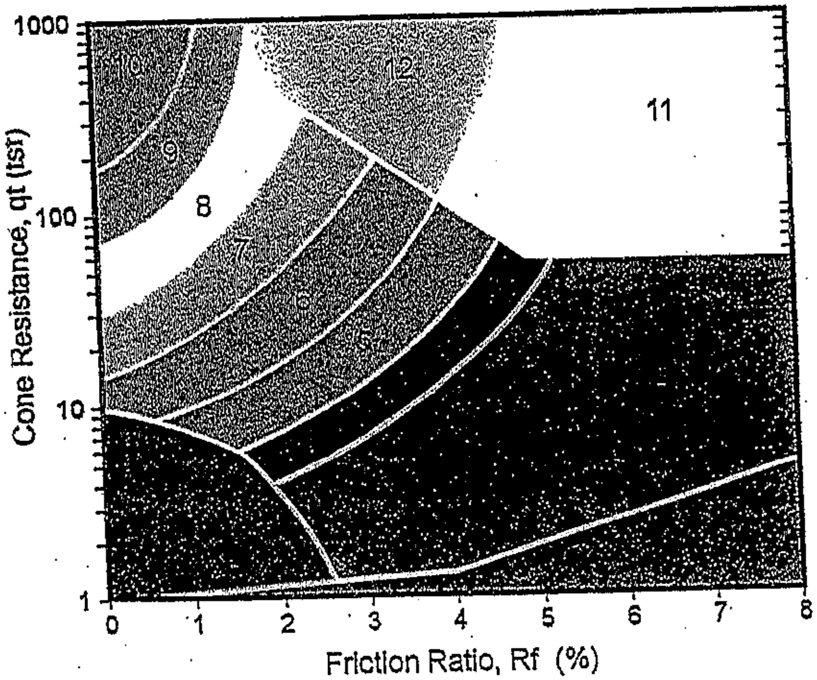


Maximum depth: 50.12 (ft)

KTE
KEHOE TESTING & ENGINEERING

CPT Classification Chart

(after Robertson and Campanella, 1988)



Zone	q_t / N	Soil Behavior Type	UCSCS
1	2	sensitive fine grained	OL-OH
2	1	organic material	Pt-OH
3	1	clay	CH
4	1.5	silty clay to clay	CL-CH
5	2	clayey silt to silty clay	ML-CL
6	2.5	sandy silt to clayey silt	MH-ML
7	3	silty sand to sandy silt	SM-ML
8	4	sand to silty sand	SP-SM
9	5	sand	SP
10	6	gravelly sand to sand	SW-SP
11	1	very stiff fine grained *	CL-MH
12	2	sand to clayey sand *	SP-SC

* overconsolidated or cemented

'UT FILE: c:\temp\CPT-1.CSV

Depth (feet)	Qc(avg) (TSF)	Fs(avg) (TSF)	Rf (%)	Rf Zone (zone #)	Spt N (blow/ft)	Spt N1 (blow/ft)	Su (TSF)
0.500	48.358	0.242	0.500	8	12	18	9E9
1.500	73.173	0.553	0.755	8	18	27	9E9
2.500	98.400	0.909	0.924	8	24	36	9E9
3.500	107.138	1.065	0.994	8	26	39	9E9
4.500	101.379	1.137	1.121	8	24	36	9E9
5.500	72.109	1.003	1.391	7	23	35	9E9
6.500	35.218	0.475	1.350	7	11	17	9E9
7.500	46.145	0.323	0.699	7	15	23	9E9
8.500	54.570	0.409	0.749	8	13	20	9E9
9.500	56.000	0.425	0.760	8	13	20	9E9
10.500	65.018	0.525	0.808	8	16	22	9E9
11.500	84.518	0.633	0.749	8	20	26	9E9
12.500	76.700	0.703	0.916	8	18	22	9E9
13.500	58.473	0.715	1.224	7	19	22	9E9
14.500	55.264	0.485	0.878	8	13	14	9E9
15.500	36.282	0.784	2.166	6	14	14	9E9
16.500	50.973	0.455	0.895	7	16	16	9E9
17.500	63.527	0.417	0.658	8	15	14	9E9
18.500	77.464	0.764	0.987	8	19	17	9E9
19.500	71.809	0.555	0.775	8	17	15	9E9
20.500	137.609	0.493	0.358	9	26	22	9E9
21.500	156.517	0.589	0.376	9	30	24	9E9
22.500	89.600	0.283	0.315	9	17	13	9E9
23.500	103.064	0.388	0.377	9	20	15	9E9
24.500	127.782	0.465	0.364	9	24	17	9E9
25.500	86.073	0.564	0.656	8	21	15	9E9
26.500	61.842	0.899	1.455	7	20	14	9E9
27.500	141.891	0.491	0.346	9	27	18	9E9
28.500	124.242	0.583	0.470	9	24	15	9E9
29.500	29.125	0.453	1.548	6	11	7	9E9
30.500	9.200	0.202	2.094	5	5	3	0.516
31.500	8.267	0.246	2.788	4	6	4	0.458
32.500	11.236	0.367	3.058	4	8	5	0.667
33.500	17.283	0.453	2.475	5	9	5	1.083
34.500	51.345	1.700	3.270	5	25	14	3.324
35.500	122.517	1.650	1.347	8	29	16	9E9
36.500	173.858	0.827	0.476	9	33	18	9E9
37.500	175.250	1.000	0.571	9	34	18	9E9
38.500	232.258	1.144	0.493	9	44	23	9E9
39.500	282.975	1.403	0.496	10	45	24	9E9
40.500	282.038	1.434	0.508	10	45	23	9E9
41.499	277.892	1.736	0.624	9	53	27	9E9
42.499	295.908	1.427	0.482	10	47	24	9E9
43.499	289.054	1.414	0.489	10	46	23	9E9
44.499	301.775	1.462	0.484	10	48	24	9E9
45.499	313.446	2.243	0.715	9	60	30	9E9
46.499	302.133	1.992	0.659	10	48	24	9E9
47.499	295.585	2.444	0.826	9	57	29	9E9
48.499	239.542	1.856	0.774	9	46	23	9E9
49.499	198.369	1.101	0.554	9	38	19	9E9