City of
**Santa Monica®**

# INSTRUCTIONS TO BIDDERS

## Pico Branch Library
## SP 2119

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## 1.0 PREPARATION OF BIDS

Bids must be submitted on the prescribed Bid Form furnished by the City, and must be filled out completely. The Bid prices must be included in both words and figures and must be written in ink or typed. In case of any discrepancy between the words and figures, the words will govern. Erasures or other changes must be noted over by the signature of the Bidder.

The Bid must state the amounts for which the Bidder proposes to supply all labor, materials, equipment, tools, transportation and services and perform all Work required by the Contract Documents. Bids shall not contain any conditions, limitations or provisions of the Work to be done. Alternative Bids will not be considered unless requested. No oral, telegraphic or telephonic Bids or Modifications shall be considered.

FAILURE TO PROVIDE THE INFORMATION REQUESTED IN THE ATTACHED BID FORM MAY RESULT IN REJECTION OF A BID AT THE DISCRETION OF THE CITY.

## 2.0 INTERPRETATION OF CONTRACT DOCUMENTS

The Contract Documents are identified in the Bid Documents. Capitalized terms are defined in the Bid Documents. All Bidders are cautioned that the successful Bidder incurs duties and obligations under all of the Contract Documents and that they should review all of the Contract Documents and should not merely examine the Drawings and Specifications in making their Bid.

Should a Bidder find discrepancies in, or omissions from, the Contract Documents, or should the Bidder be in doubt as to their meaning, the Bidder shall at once notify the City and request an interpretation or clarification. ***Requests for clarifications must be in writing and emailed to***:

**Tom Afschar, Architect**
**tom.afschar@smgov.net**

The City is not responsible for Bidder's technical difficulties with submitting requests for clarification via email. The person submitting such request will be responsible for insuring that the email was delivered and received by the City. Verbal requests for clarifications will not be considered. ***The last day to submit requests for clarification is*** **February 13, 2012**.

Should the City find that the point in question is not clearly and fully set forth in the Contract Documents, the City may issue a written Addendum, which will be sent to all Bidders of record. The City will not be responsible for any other explanation or interpretation of the Contract Documents, or for any oral instructions.

## 3.0 SUBMITTAL OF BIDS

Each Bid must be in a sealed envelope clearly marked with the number and name of the Project and the name of the Bidder. If the Bid is mailed to the City, the sealed envelope should be placed within a mailing envelope, and the mailing envelope should be marked in such a fashion as to indicate that it contains a sealed Bid. The envelope enclosing the Bid shall be sealed and addressed to the Office of the City Clerk, and delivered or mailed to the City of Santa Monica, 1685 Main Street, Room 102, Santa Monica, California, 90401. All Bids must be received by the Office of the City Clerk by the time and date specified in the Bid Documents and may be withdrawn only as specified in the Bid Documents. No Bid received after that time will be considered. Also, the envelope shall be plainly marked in the upper left-hand corner as follows:

ATTENTION: CITY CLERK ROOM 102

_____

(Bidder's Name and Address)

**Pico Branch Library – SP2119**

## 4.0 WITHDRAWAL OF BIDS

Bids may only be withdrawn in writing, addressed to the City Clerk, prior to the time specified in the Notice Inviting Bids for the opening of Bids.

## 5.0 ERRORS

The City reserves the right to reject any and all Bids. Bidders will not be released on account of errors except that the City reserves the right to waive any minor irregularity or informality in any Bid.

## 6.0 AWARD OF CONTRACT

The award of the Contract, if it be made, will be made to the Best Bidder in accordance with Santa Monica Municipal Code Section 2.24.072. The City is not required to award to the lowest bidder. The successful Bidder must be able to show that it can perform the required Work within the allotted time.

## 7.0 REJECTION OF BIDS

Bids may be rejected if they show any alteration in form, additions not called for, conditions or alternative Bids, incomplete Bids or irregularities. The City reserves the right to reject any and all Bids.

## 8.0 EXECUTION OF CONTRACT

The Bidder to whom the award is made shall execute the Contract and furnish both the Performance Bond and the Labor and Material Payment Bond along with the Certificate of Insurance required by the Contract Documents and shall deliver the same to the City Project Manager within ten (10) days after the City has mailed the Notice of Award to said Bidder that the Contract has been awarded to the Bidder.

Failure or refusal of the successful Bidder to execute the Contract and return the same to the City within said ten (10) days shall result in the forfeiture of the Bidder's cash deposit, check, or Bidder's bond to the City as liquidated damages. No Bid shall be considered binding upon the City until the execution of the Contract by the City.

## 9.0 BID GUARANTEE

Each Bid must be accompanied by cash, a certified or cashier's check made payable to the City of Santa Monica, or Bidder's bond (using the form provided in the Bid Form) for an amount equal to at least ten percent (10%) of the amount bid as a guarantee that the Bidder will enter into a contract with the City. Failure to comply with this Paragraph 9.0 will render the Bid non-responsive. If awarded the Contract, the Bid Guarantee will be retained by the City as liquidated damages if the successful Bidder fails or refuses to enter into said Contract and furnish the required Labor and Material Bond, Performance Bond, and evidence of insurance coverage. Forfeiture by the successful Bidder shall not preclude recovery of any sum over and above the Bid Guarantee, to which the City sustains damage because of default. If the successful Bidder executes the Contract and furnishes all bonds and insurance required by the Contract Documents within the time specified by the Contract Documents, any cash or check accompanying that successful Bid will be returned. Cash or checks accompanying rejected Bids will be returned within fourteen (14) Days after execution of the Contract.

## 10.0 BOND REQUIREMENTS

Within ten (10) Days after the issuance of the Notice of Award and prior to commencing Work on the Project, Contractor shall file with City good and sufficient Labor & Material Payment and Performance Bonds each in the amount of 100% of the Contract Sum. The bonds shall be signed by both Contractor and Surety and properly notarized on the City's provided forms or such other forms as required by City. Should any bond required hereunder or any surety on such bond become or be determined by City to be insufficient, it shall be replaced within ten (10) Days by a bond that fully complies with the requirements of Article 11.2 (Bond Requirements) of the City's General Conditions. No further payments to Contractor for Work performed shall be made or due until Contractor has fully complied with all the requirements.

Surety companies used by Contractor for Labor & Material Payment and Performance Bonds shall be, on the date the Contract is signed by Owner, listed in the latest published United States Treasury Department list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies (Treasury List)."

## 11.0 LICENSES

The Contractor and Subcontractors shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and Professions Code of the State of California and submit the number and classification of said licenses with the Bid Documents.

## 12.0 PREVAILING RATES OF WAGES

This Project is subject to the prevailing wage law and the Bidder should familiarize itself with Article 13 (Statutory Requirements) of the City's General Conditions.

## 13.0 SANTA MONICA LIVING WAGE ORDINANCE

The City of Santa Monica's Living Wage Ordinance, Santa Monica Municipal Code Chapter 4.65 ("Living Wage Ordinance"), requires the payment of Minimum Wage for work done on any Contract over a certain threshold to any worker who does not actually work as a manager, supervisor or confidential employee, and who is not required to possess an occupational license. The established Minimum Wage includes an annual adjustment each July 1st by an amount corresponding to the previous calendar year's change in the Consumer Price Index for Urban Wage Earners and Clerical Workers in Los Angeles, Riverside and Orange Counties.

If the Living Wage Ordinance applies to services sought pursuant to this bid, bidders are required to prepare and return a Living Wage Ordinance Certification Form, attached in the Bid Form, with their bid packet. If the bidder is selected, the bidder must maintain payroll records that include, at minimum, the full name of each employee providing services under the contract, job classification and rate of pay. Bids that fail to include this Certification Form may be considered non-responsive and excluded from further consideration.

## 14.0 SANTA MONICA OAKS INITIATIVE NOTICE

Santa Monica's voters adopted a City Charter amendment commonly known as the Oaks Initiative. It prohibits a public official from receiving specified personal benefits from a person or entity after the official votes, or otherwise takes official action, to award a "public benefit" to that person or entity. Examples of a "public benefit" include public contracts to provide goods or services worth more than $25,000 or a land use approval worth more than $25,000.

The Oaks Initiative requires the City to provide this note and information about the Initiative's requirements. An information sheet on the Oaks Initiative is attached in the Bid Form. If the Oaks Initiative applies to services sought pursuant to this bid, bidders are required to prepare and return the Oaks Initiative Disclosure Form, attached in the Bid Form, with their bid packet. You may also obtain a full copy of the Initiative's text from the City Clerk.

## 15.0 CITY POLICY ON DOING BUSINESS WITH ARIZONA FIRMS

The City Council of the City of Santa Monica adopted Resolution No. 10479 (CCS) on May 25, 2010, which requires a review of all current and likely future agreements and

contracts with Arizona-based businesses to examine the feasibility of acquiring such products and services elsewhere while the Arizona law remains in effect.

Additionally, Council directed staff to require vendors offering goods or services to the City of Santa Monica to complete and sign the attached disclosure form; this applies to all solicitations, including but not limited to, bids and proposals. Please review, sign and submit the State of Arizona Disclosure Form, attached in the Bid Form, with your bid packet prior to the closing date of bid.

## 16.0 CITY OF SANTA MONICA – DBE PROGRAM

If the project uses Federal funds that require a DBE program, the following guidelines apply.

The Santa Monica City Council has adopted a Disadvantaged Business Enterprise (DBE) Program designed to enhance the opportunities for women and disadvantaged business people to do business with the City. This program does not limit any Bidder's opportunity to bid with the City in a competitive situation.

A Disadvantaged Business Enterprise is defined as a "small business concern that is owned and controlled by one or more disadvantaged persons."

A Contractor or a Subcontractor qualifying as a Disadvantaged Business Enterprise must be one or more of the following:

a. A sole proprietorship legitimately owned by an individual who is a disadvantaged person.

b. A partnership or joint venture in which at least fifty-one percent (51%) of the beneficial ownership interest legitimately is held by disadvantaged persons.

c. A corporation or other entity, including a publicly owned business, in which at least fifty-one percent (51%) of the voting interest and fifty-one percent (51%) of the beneficial ownership interest (i.e., stock) legitimately is held by disadvantaged persons.

In addition, the City is strongly encouraging Bidders to actively seek out disadvantaged businesses to act as their Subcontractors. To document the City's efforts toward this end, the successful Bidder shall submit a list of all Subcontractors, the percent of the total contract price for which the Subcontractor will perform work, labor or services and their DBE status. In addition, any Subcontractor who indicates that their business qualifies as a DBE business shall also complete a DBE affidavit.

A complete version of the City's DBE program is available on the City's Public Works website http://www.smgov.net/departments/publicworks/.

## 17.0 BID PROTEST

Any objection by a Bidder to the procedures or processes relating to the selection of the best Bidder shall be submitted to the City, in writing, not more than seven (7) days upon receipt of the announcement of Bidder selection, non-selection, or shortlist. Failure by a Bidder to object shall constitute a final and conclusive waiver by the Bidder of its right to thereafter assert such objection at any other time or for any purpose.

Any Bidder may dispute the City's determinations made as part of the qualification process by filing a protest provided that each and all of the following are complied with:

a. The protest is in writing.

b. The protest is filed with and received by the City directed to the individual at the email address listed in Section 2.0 of the Instructions to Bidders, not more than seven (7) days following the date of issuance of the City's decision announcing the results of the Bidder selection, non-selection, or shortlist. Failure to timely file the protest shall constitute grounds for the City to deny the protest without further consideration of the grounds stated therein. Timely receipt of a protest shall not constitute grounds for postponement of the closing time for receipt of bids.

c. The protest sets forth, in detail, all grounds for the protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the protest. Any grounds not set forth in the written protest shall be deemed waived. All factual contentions must be supported by competent, admissible and credible evidence. Any protest not conforming to the foregoing shall be rejected as invalid.

d. Upon receipt of the written protest by Bidder, the City shall provide a written response within ten (10) days to the Bidder of the basis for non-selection or disqualification, including a summary of any evidence adduced by the City in support of its decision.

## 18.0 REPORTS

The following reports are attached to the Bid Documents:

**Geotechnical report dated October 8, 2010**
**Geotechnical report addendum dated October 27, 2011**

GEODESIGN INC

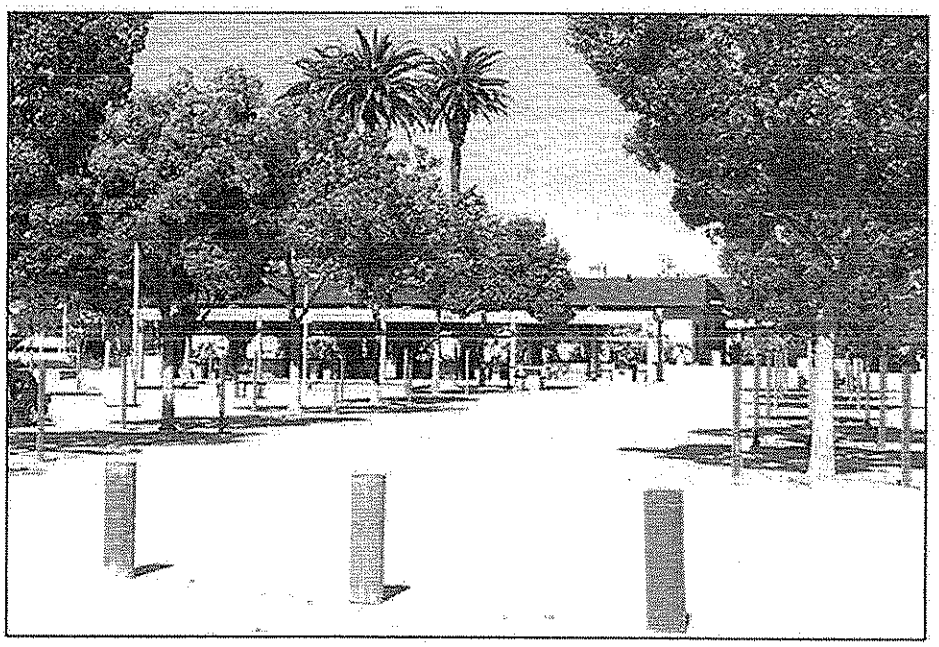
**REPORT OF GEOTECHNICAL ENGINEERING SERVICES**

Proposed Santa Monica Pico Branch Library

Virginia Avenue Park

Santa Monica, California

**Special Provisions Number 2119**



For

City of Santa Monica

October 8, 2010

GeoDesign Project: SMonica-10-01

GEODESIGN INC

October 8, 2010

City of Santa Monica
Architecture Services
1437 4th Street, Suite 300
Santa Monica, CA 90401

Attention: Mr. Michael Collins, Architect

**Report of Geotechnical Engineering Services**
Proposed Santa Monica Pico Branch Library
Virginia Avenue Park
Santa Monica, California
**Special Provisions Number 2119**
GeoDesign Project: SMonica-10-01

GeoDesign, Inc. is pleased to submit this report of our geotechnical investigation for the for the proposed Santa Monica Pico Branch Library to be constructed within Virginia Avenue Park located at the northwest corner of Pico Boulevard and Cloverfield Boulevard in Santa Monica, California.

Our services were performed in general accordance with our proposal dated April 5, 2010, addendum dated April 16, 2010, and the terms and conditions of our contract for professional services with the City of Santa Monica dated May 26, 2010.

We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

Christopher J. Zadoorian, G.E.
Principal Engineer

CJZ:SFK:kt
Attachments
Six copies submitted
Document ID: SMonica-10-01-100810-geor.doc
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ACRONYMS

## 1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed Santa Monica Pico Branch Library to be constructed within Virginia Avenue Park located at the northwest corner of Pico Boulevard and Cloverfield Boulevard in Santa Monica, California.

The proposed project consists of constructing a one-story, approximately 7,500-square-foot branch library building at grade and adjacent surface parking to accommodate 30 vehicles. The site location is shown on Figure 1. For your reference, definitions of all acronyms used in this report are attached at the end of this document.

At the time this report was prepared, the precise footprint of the library building had not been selected; however, it has been determined that the proposed building will be located within an L-shaped area south of the Thelma Terry Community Center that is the current site of the Farmer's Market.

The proposed parking area will be constructed on the east side of the park, approximately 200 feet to the east of the library building, adjacent to Cloverfield Boulevard. This proposed parking area is currently landscaped with various plants, trees, and a lawn area traversed by a meandering concrete walkway.

You provided us with survey dated August 4, 2010 prepared by JMC$^2$ for the proposed project. Based on our review of the site topography and understanding of the proposed development, graded slopes or excavations for basement walls or large grade changes are not planned. Although, minor retaining walls may be required depending on the location of the proposed building.

The project will utilize on-site infiltration of surface water as a means to limit discharge of surface water to the storm drain system.

## 2.0 PURPOSE AND SCOPE

The purpose of our services was to provide geotechnical engineering recommendations for design and construction of the proposed library and surface parking lot. All services will be performed in accordance with the CBC and the Santa Monica Municipal Code. We completed the following scope of services:

- Coordinated and managed the field investigation, including utility checks, permit applications, site access authorization, and scheduling of subcontractor and GeoDesign field staff.
- Drilled four borings to depths ranging from 10.5 to 36.5 feet BGS using hollow-stem auger drilling equipment.
- Obtained relatively undisturbed and bulk samples from the borings for laboratory testing and maintained a log of the soil conditions encountered in each boring.
- Performed infiltration testing in two borings, one at the site of the proposed library and one at the site of the proposed parking lot.

- Performed a geologic-seismic hazards evaluation.
- Performed geotechnical laboratory testing on selected samples from the borings.
- Performed corrosion testing and "R" value testing on selected samples.
- Evaluated the liquefaction potential of the soils at the site.
- Provided recommendations for allowable and ultimate bearing capacity for spread footings.
- Provided recommendations for passive and frictional resistance of the foundation soils to resist lateral loading.
- Provided recommendations for retaining wall foundations, wall design, drainage, and backfill.
- Provided recommendations for building and floor slab design.
- Provided site-specific seismic design criteria in accordance with the 2007 CBC.
- Provided recommendations for pavement design.
- Provided recommendations for grading.
- Prepared this report summarizing the results of our geotechnical evaluation.

## 3.0 SITE CONDITIONS AND GEOTECHNICAL EXPLORATIONS

### *3.1 SURFACE CONDITIONS*

The proposed library building will be constructed within an existing paved patio area south of the Thelma Terry Community Center. This area is currently used as the site of the Farmer's Market. The patio area is landscaped with a grove of trees with raised concrete planters on the north, south, and west with minor planters on the east and south. The ground surface slopes gently to the south and ranges from approximately Elevation 166 to Elevation 159.

The proposed parking lot will be constructed east of the proposed library building site adjacent to Cloverfield Boulevard. The ground surface in this area slopes gently to the southwest and ranges approximately from Elevation 167 to Elevation 165 feet.

Figure 2 shows the park and locations of the proposed library building and parking lot.

### *3.2 SUBSURFACE CONDITIONS*

We explored the site by drilling four borings (B-1 through B-4) at the locations shown on Figure 2 using limited-access, hollow-stem auger drilling equipment. The borings were drilled to depths ranging from 10.5 to 36.5 feet BGS at the locations shown Figure 2.

Borings B-1, B-2, and B-3 were drilled within the area of the proposed library building. Boring B-4 was drilled within the proposed parking lot. Infiltration tests were performed in borings B-2 and B-4, one test in each of the proposed building areas.

Fill soils were encountered in borings B-1, B-3 and B-4 and ranged in thickness from 1 to 2 feet consisting of medium dense, fine sand with silt and silty sand. The native soils underlying the fill and encountered at the surface in boring B-2 consist of predominantly medium dense, fine sand with silt to depths of 14 to 14.5 feet BGS. Below this depth, the native soils consist of medium dense, fine to medium sand. The soils become dense at a depth of approximately 10 feet BGS.

Concrete was encountered at the ground surface in borings B-1 and B-3, ranging in thickness of 3 to 4 inches. Base materials were not observed below the concrete.

Groundwater was not encountered in the borings to the depths explored. The current groundwater level in the general site vicinity is greater than 60 feet BGS and should not adversely impact the proposed development. The historical high groundwater level is at a depth of approximately 40 feet BGS or greater (CGS, 1998).

The logs of our borings are presented in Appendix A of this report.

### *3.3 LABORATORY TESTING*

Selected samples collected from our borings were tested for the following:

- In-place moisture and density
- Direct shear
- Consolidation
- Expansion (performed by AP Engineering & Testing, Inc.)
- Corrosion potential (testing performed by Schiff Associates)
- R-Value (performed by LaBelle Marvin)

Descriptions of the testing and the test results from the current investigation are presented in Appendix A.

### *3.4 INFILTRATION TESTING*

Infiltration testing was performed in borings B-2 and B-4 to provide an estimated infiltration rate to be used in design of on-site infiltration systems. The test utilized the falling-head test method that includes filling the PVC casing with water and recording the water level drop over regular time intervals. The testing methodology is described in more detail in Appendix B of this report.

Table 1 summarizes the results of our infiltration tests; supporting calculations are presented in Appendix B.

**Table 1. Summary of Infiltration Test Results**

| Test Location | Test Depth (feet BGS) | Soil Type | Minutes per Inch | | Inches per Hour | |
|---|---|---|---|---|---|---|
| | | | Average | Lowest Value | Average | Lowest Value |
| B-2 | 0 – 9.4 | SP-SM Sand with Silt | 57.48 | 60.00 | 1.04 | 1.00 |
| B-4 | 0 – 10.0 | SP-SM/SP Sand with Silt/Fine Sand | 49.06 | 53.77 | 1.22 | 1.12 |

Based on the site conditions and the results of our infiltration tests, on-site disposal of surface runoff collected at the site is feasible. However, if utilized, the specific locations of on-site infiltration should be carefully planned and kept a sufficient distance away from building foundations as discussed in the "Foundations, Floor Slabs and Pavement" section of this report.

An infiltration rate between the average and the most conservative rate is typically selected for use when designing drywell systems, retention basins, or sewage disposal systems. In this case, the average infiltration rate is 1.04 to 1.22 inches per hour for borings B-2 and B-4, respectively, and the most conservative value is 1.00 to 1.12 inches per hour for borings B-2 and B-4, respectively.

It should be noted that the infiltration rates calculated during our field investigation are based on rates determined during short duration field tests and could vary from actual long-term rates. Also, the infiltration tests were clear-water tests, and infiltration rates would be affected by silt buildup, debris, or other factors that occur at the site in the future.

## 4.0 GEOLOGIC CONDITIONS

### *4.1 GENERAL CONDITIONS*

The site is located on the Ocean Park Plain, an older Pleistocene age, slightly dissected alluvial surface along the northern boundary of Ballona Gap. The sediments underlying the Ocean Park Plain consist of Pleistocene age alluvium that generally consists of stratified sands with some beds of silt, silty sand, and fine gravel.

The active Santa Monica Fault traverses the Santa Monica Plain to the north. In the Santa Monica area, the Santa Monica Fault is mapped as two distinct traces, the South Branch and the North Branch.

The geologic conditions at the site and in the site vicinity are shown on Figure 3.

### *4.2 FAULTS*

#### 4.2.1 General

Faults in Southern California are considered active, potentially active, and inactive based on criteria developed by CGS for the Alquist-Priolo Earthquake Fault Zoning Program (Hart, 1999). By definition, an active fault is one that has had surface displacement within Holocene time (approximately the last 11,000 years). A potentially active fault is one that has demonstrated surface displacement of Quaternary age deposits (last 1.6 million years). Inactive faults have not moved in the last 1.6 million years.

The primary purpose of the Alquist-Priolo Earthquake Fault Zoning Program is to identify sites that have a potential for surface rupture due to active faults that are in close proximity. In such cases, a building setback zone is established to mitigate the potential for surface rupture.

#### 4.2.2 Santa Monica Fault Zone

The South Branch of the Santa Monica Fault is the closest active fault to the site, located approximately 0.5 mile to the north (City of Santa Monica, 2001; Dolan et al., 2000; Ziony and Jones, 1989). The Santa Monica Fault is the western segment of the Santa Monica-Hollywood Fault Zone, which trends east-west from the Santa Monica coastline on the west to the Hollywood area on the east. In the Santa Monica area, the Santa Monica Fault splays into two segments: the North Branch and the South Branch (City of Santa Monica, 2001).

Studies have indicated that the fault is active based on geomorphic evidence and fault trenching studies (Dolan, et al., 2000; Dolan and Sieh, 1992; and Crook and Proctor, 1992). The Santa Monica Fault has not yet been zoned as active under the Alquist-Priolo Earthquake Fault Zoning Act. However, the City of Santa Monica considers the fault active for planning purposes.

### 4.2.3 Blind Thrust Faults

Several deep thrust faults, commonly referred to as blind thrusts, underlie the greater Los Angeles area. These faults are not exposed at the ground surface and are typically identified at depths greater than 3 kilometers. These faults do not present a potential surface fault rupture hazard but are considered active and potential sources for future earthquakes. The closest of these blind thrusts to the site is the Northridge Thrust, located approximately 6.5 miles to the north. The Northridge Thrust underlies the majority of the San Fernando Valley and is believed to be the causative fault for the 1994 Magnitude 6.7 Northridge Earthquake.

## *4.3 LIMITED GEOLOGIC HAZARD EVALUATION*

Our limited geologic seismic hazards evaluation included a review of published and unpublished geologic maps, reports, and documents, including the City of Santa Monica public safety documents and the State of California Alquist-Priolo Earthquake Fault Zone maps and Seismic Hazard Zone maps. The results of our evaluation are presented below.

### 4.3.1 Fault Rupture

The site is not within a currently established State of California Alquist-Priolo Earthquake Fault Zone or a City of Santa Monica Hazard Management Zone for surface fault rupture hazards. Although the Santa Monica Fault is located within a mile of the site, CGS has not established an Alquist-Priolo Earthquake Fault Zone for the Santa Monica Fault due to its lack of surface definition in the urbanized Santa Monica-West Los Angeles area.

The closest Alquist-Priolo Earthquake Fault zone is located approximately 4.9 miles east of the site, established for the active Newport-Inglewood Fault Zone. Based on the available geologic data, active or potentially active faults with the potential for surface fault rupture are not known to be located directly beneath or projecting toward the site. Therefore, the potential for surface rupture due to fault plane displacement propagating to the surface at the site during the design life of the project is considered low.

### 4.3.2 Seismicity

The site is located in a seismically active area and could be subjected to strong ground shaking in the event of an earthquake. However, this hazard is common in Southern California, and the effects of strong ground shaking can be mitigated by proper engineering design and construction in conformance with current building codes and engineering practices.

### 4.3.3 Liquefaction

Liquefaction generally occurs in saturated, loose to medium dense, granular soils and in saturated, soft to moderately firm silts as a result of strong ground shaking. As the density and/or particle size of the soil increases and as the confinement (overburden pressure) increases, the potential for liquefaction decreases.

The site is not located within an area identified as having a potential for liquefaction by the Seismic Hazard Zone maps published by the CGS (CDMG, 1999) and is not located in an area of "Liquefaction Risk" identified in the City of Santa Monica's safety documents (City of Santa Monica, 2001). The historical high groundwater level in the site vicinity is at a depth greater than 40 feet BGS (CDMG, 1998), and groundwater is at a depth greater than 60 feet in the area (based on information reviewed on the State of California Geotracker website).

Considering the dense nature of the Pleistocene age deposits at the site and the depth to groundwater, the potential for soil liquefaction at the site is considered to be very low.

The site location relative to liquefaction hazard zones identified by the CGS (1999) is shown on Figure 4.

#### 4.3.4 Slope Stability

The site is relatively level and is not considered to have a potential for slope instability. Site elevations in the area of the proposed library are gently sloping to the south and range from approximately Elevation 159 to Elevation 166 over a distance of approximately 220 feet. Elevations in the area of the proposed parking lot range from approximately Elevation 165 to Elevation 167.

The site is located approximately 1.6 miles from the ocean and is not located in the area that could be affected by instability of the coastal bluffs. The topography of the site is relatively level to gently sloping and the site is not located in an area identified in the City of Santa Monica's safety documents as having a "Landslide Susceptibility Risk." There are no known landslides near the site nor is the site in the path of any known or potential landslides. In addition, CGS does not identify the site within an area identified as having a potential for seismic slope instability (CDMG, 1999). Therefore, the site is considered grossly stable and not subject to slope stability hazards.

#### 4.3.5 Tsunamis, Inundation, and Flooding

The site is located approximately 1.6 miles from the coastline at elevations ranging from approximately Elevation 159 to Elevation 167. Although located in a coastal area, the elevated nature of the site precludes tsunami hazards.

The site is not within a 100-year flood zone (FEMA, 2008) or a potential inundation area for an earthquake-induced dam failure (County of Los Angeles, 1990). Therefore, the potential for flooding at the site is considered low.

#### 4.3.6 Clay Pits

The site is not located in an area identified in the City of Santa Monica's safety documents as being located in an area of a former clay pit or landfill.

## 5.0 CONCLUSIONS

### *5.1 GENERAL*

The proposed development is feasible from a geotechnical perspective and will not adversely impact adjacent sites. The site is generally free from geologic and seismic hazards.

The expansion index test results indicate the soils are classified as having a very low potential for expansion.

Corrosion test results indicate the soils at the site are not aggressive to concrete.

### *5.2 FOUNDATIONS, FLOOR SLABS, AND PAVEMENT*

The current proposed development includes at-grade structures, and the planned foundation level in each case would be on the order of 3 feet BGS. Medium dense to dense, sandy soils are present at these depths within the proposed building area.

Consolidation testing performed on the upper native soils did not indicate sensitivity to changes in moisture content. Therefore, the proposed building foundations may be established in the medium dense to dense, native, sandy soils at the site.

Floor slabs, flatwork, and pavement may also be supported on the medium dense to dense, native soils or properly compacted fill materials as discussed in the "Floor Slabs" and "Pavement" sections of this report.

### *5.3 ON-SITE INFILTRATION*

Based on the site conditions and the results of our infiltration tests, on-site disposal of surface runoff collected at the site is feasible. However, if utilized, the specific locations of on-site infiltration should be carefully planned and kept a sufficient distance away from building foundations as discussed in the "Foundations" section of this report.

## 6.0 RECOMMENDATIONS

### *6.1 FOUNDATIONS*

#### 6.1.1 Allowable Bearing Pressure

The proposed building may be supported on spread footings established in the medium dense to dense, native soils. Spread footings established at least 2 feet below the lowest adjacent grade or top of floor slab can be designed for an allowable bearing pressure of 3,500 psf.

The recommended bearing pressure is a net value and applies to the total of dead and long-term live loads and may be increased up to one-third when considering earthquake or wind loads. The weight of the footing and overlying backfill can be neglected when calculating footing loads.

#### 6.1.2 Settlement

We estimate the total settlement for the proposed structures to be on the order of ½ inch or less and the differential settlement to be on the order of ¼ inch or less.

In combination with the potential for seismically induced settlement, the total settlement that may occur is estimated to be 1 inch or less.

### 6.1.3 Lateral Resistance

Lateral loading may be resisted using a passive pressure of 400 psf per foot of depth or footings where the concrete is placed directly against the native soils.

A coefficient of friction equal to 0.4 may be used when calculating resistance to sliding for foundations bearing on native soils.

The passive resistance and the frictional resistance may be used in combination without reduction and may also be increased by one-third when considering short-term seismic and wind loading.

### 6.1.4 Considerations for Site Infiltration

Infiltration is feasible at the site; however, we recommend that infiltration wells or linear features be located at least 50 feet from the proposed library building.

## *6.2 FLOOR SLABS*

The precise location of the library building has not been established yet, nor has the plan finish floor level. Depending on the location of the building within the current designated area, minor cuts and fills will likely be required to establish the plan finish floor level.

The soils present for floor slab support will consist of the following:

- Existing undocumented fill
- Materials that are disturbed as a result of the demolition process
- Medium dense, native soils

To provide uniform support for floor slabs, all existing fill soils and soils disturbed as a result of the required demolition should be removed and recompacted as recommended in the "Construction Considerations" section of this report. Existing native soils that are not disturbed may remain in place.

Satisfactory subgrade support for floor slabs supporting up to an estimated 500 psf areal loading on the properly compacted fill can be obtained provided the building areas are prepared as recommended.

We recommend that a capillary break section be installed beneath building floor slabs. The capillary break should consist of 4 inches of ¾-inch-minus gravel overlain by 2 inches of clean sand. A 10-mil moisture barrier should be installed on the 2-inch sand layer and the barrier should then be covered with 2 more inches of sand for protection.

### *6.3 PAVEMENT*

#### 6.3.1 AC Pavement

To provide uniform support for AC pavement, the upper 18 inches of soil should be removed and recompacted as recommended in "Construction Considerations" section of this report.

Testing performed on a bulk sample of the upper soils indicated an R-value of 69. Traffic loading and traffic indices were not provided; however, general information regarding the anticipated traffic loading was provided. Based on our understanding of the traffic loading, we have assumed traffic index values for primary traffic loading as outlined in Table 2.

**Table 2. Asphalt Pavement Design Sections**

| Traffic Use | Traffic Index | AC (inches) | Base Course (inches) |
|---|---|---|---|
| Parking Areas | 5 | 3 | 4 |
| Drive and Loading Dock Access Lanes | 7 | 4 | 4 |

The asphalt paving sections were determined using the California Department of Transportation design method. We can determine the recommended paving and base course thickness for other traffic indices if required. Careful inspection is recommended to confirm that the recommended thickness or greater are achieved and that proper construction procedures are followed.

The base course should conform to requirements of Section 26 of State of California Department of Transportation Standard Specifications for Public Works Construction (Green Book). The base course should be compacted to at least 95 percent.

#### 6.3.2 PCC Pavement

To provide uniform support for PCC pavement, the upper 18 inches of soil should be removed and recompacted as recommended in "Construction Considerations" section of this report.

For the design of PCC pavement, we have assumed that the concrete will have a minimum compressive strength 3,000 psi. The required paving and base thickness will depend on the expected wheel loads and volume of traffic (traffic index). Assuming that the paving subgrade will consist of the on-site or comparable soils compacted to at least 95 percent as recommended, the minimum recommended paving thickness are presented in the Table 3.

**Table 3. PCC Pavement Design Sections**

| Traffic Use | Traffic Index | PCC (inches) | Base Course (inches) |
|---|---|---|---|
| Parking Areas | 5 | 5 | 4 |
| Drive and Loading Dock Access Lanes | 7 | 6 | 4 |

We recommend that the concrete pavement be properly reinforced. In addition, dowels are recommended at joints to reduce any possible offsets. Careful inspection is recommended to

check that the recommended thickness or greater are achieved and that proper construction procedures are followed. As mentioned previously, the transition zone will be critical to the performance of concrete pavement.

The base course should conform to requirements of Section 26 of State of California Department of Transportation Standard Specifications, latest edition, or meet the specifications for untreated base as defined in Section 200-2 of the latest edition of the Standard Specifications for Public Works Construction (Green Book). The base course should be compacted to at least 95 percent.

### *6.4 RETAINING WALLS*

We anticipate that minor retaining walls on the order of 3 feet maximum retained height may be required. For structural evaluation of retaining walls, we recommend that the wall be designed to resist a triangular-shaped lateral earth pressure distribution with the maximum value equal to 30H psf, where H is the height of the wall.

Lateral loading on walls may be resisted using the passive resistance between the soils and the bottom of the footing. A passive pressure of 300 psf per foot of embedment may be used in conjunction with a coefficient of friction of 0.4.

### *6.5 SEISMIC DESIGN*

The procedure outlined in ASCE-7 is based on the MCE, which is defined as an earthquake that results in ground motions that have a 2 percent chance of being exceeded in 50 years (a 2,475-year recurrence interval). This procedure is outlined in Table 4.

**Table 4. Summary of ASCE-7 Procedure for Seismic Design**

| Step | Procedure | Reference |
|---|---|---|
| 1 | Compute Generalized Response Spectrum | ASCE 11.4.5 |
| 2 | Compute MCE Response Spectrum | ASCE 11.4.6 |
| 3 | Compute Probabilistic MCE Response Spectrum | ASCE 21.2.1 |
| 4 | Compute Median Deterministic Response Spectrum | ASCE 21.2.2 |
| 5 | Compute Deterministic MCE Response Spectrum | ASCE 21.2.2 |
| 6 | Compute Deterministic Lower Limit on MCE Response Spectrum | ASCE 21.2.2 |
| 7 | Compute Final Deterministic MCE Response Spectrum | ASCE 21.2.2 |
| 8 | Compute Site-Specific MCE Response Spectrum | ASCE 21.2.3 |
| 9 | Compute Two-Thirds of Design MCE Response Spectrum | ASCE 21.3 |
| 10 | Compute 80 Percent of Generalized Design Response Spectrum | ASCE 21.3 |
| 11 | Compute Final Design Response Spectrum | ASCE 21.3 |
| 12 | Compute Final Design Acceleration Parameters | ASCE 21.4 |

The following sections outline our analysis methodology and present the results of our study.

*STEP 1 - GENERALIZED RESPONSE SPECTRUM*

The generalized response spectrum for a site is developed by identifying the spectral ordinates at periods of 0.2 and 1 second and identifying the appropriate site class in accordance with Table 1613.5.2 of the 2006 IBC. The spectral ordinates are obtained based on the site location from maps presented in Section 1613 of the 2006 IBC, or if the site class is $S_F$, then based on a site-specific analysis.

In accordance with the data obtained from our field investigation, the soils at the site may be classified as Site Type $S_D$. This classification is based on the blow count data from our explorations at the site.

Section 11.4.5 of ASCE-7 summarizes the development of the generalized design response spectrum and the results of our analysis are for the site is presented in Table 5.

*STEP 2 - MCE RESPONSE SPECTRUM*

The MCE response spectrum is simply defined as the generalized response spectrum multiplied by 1.5. The MCE response spectral ordinates are presented in Table 5.

*STEP 3 - PROBABILISTIC MCE RESPONSE SPECTRUM*

The probabilistic MCE response spectrum is developed by performing a PSHA that takes into account faults that are a potential source of strong ground shaking at the site based on a given risk, defined as the recurrence interval. For the MCE, the recurrence interval is 2,475 years, which corresponds to ground motions that have a 2 percent probability of being exceeded in 50 years, as stated in Section 21.2.1 of ASCE-7.

Up until recently, the general practice in California to perform a PSHA has included the use of four ground motion attenuation relationships published in 2007 and 2008, collectively referred to as the NGA relationships, which are summarized below:

- Campbell-Bozorgnia (2008)
- Chiou-Youngs (2008)
- Boore-Atkinson (2008)
- Abrhamson-Silva (2008)

Based on the data collected from our borings and the prior data available, we assumed a shear wave velocity of 900 feet per second to represent the soils at the site for use in our analysis.

The resulting probabilistic MCE response spectrum is presented in Table 5.

*STEP 4 – MEDIAN DETERMINISTIC RESPONSE SPECTRUM*

The deterministic MCE response spectrum is also developed by using EZ Frisk in conjunction with the attenuation relationship and soil stiffness estimate discussed above. The deterministic approach simply considers the maximum ground acceleration that may occur at the site as a result of an earthquake. The deterministic analysis differs from the probabilistic analysis in that recurrence intervals are not considered.

The resulting median deterministic response spectrum is presented in Table 5.

***STEP 5 – DETERMINISTIC MCE RESPONSE SPECTRUM***

The deterministic MCE response spectrum is computed by taking 150 percent of the median deterministic response spectrum and is presented in Table 5.

***STEP 6 - DETERMINISTIC LOWER LIMIT ON MCE RESPONSE SPECTRUM***

The deterministic lower limit MCE response spectrum is defined in ASCE-7 Section 21.2.2 as the response spectrum that results using prescribed spectral ordinates of 1.5 and 0.6 for 0.2 and 1 second periods, respectively. The resulting deterministic lower limit on MCE response spectrum is presented in Table 5.

***STEP 7 – FINAL DETERMINISTIC MCE RESPONSE SPECTRUM***

The final deterministic MCE response spectrum is the greater of the deterministic MCE and the lower limit response spectrum as defined in ASCE-7 Section 21.2.2 and is presented in Table 5.

***STEP 8 - SITE-SPECIFIC MCE RESPONSE SPECTRUM***

As outlined in ASCE-7 Section 21.2.3, the site-specific MCE response spectrum shall be taken as the lesser of the probabilistic MCE computed in Step 3 and the final deterministic MCE computed in Step 7. The resulting site-specific MCE response spectrum is presented in Table 5.

***STEP 9 – TWO-THIRDS OF THE SITE-SPECIFIC DESIGN RESPONSE SPECTRUM***

Section 21.3 of ASCE-7 allows the site-specific MCE response spectrum computed in Step 8 to be factored by two-thirds for subsequent comparison to 80 percent of the generalized response spectrum that was computed in Step 1. Two-thirds of the site-specific MCE response spectrum is presented in Table 5.

***STEP 10 - 80 PERCENT OF THE GENERALIZED RESPONSE SPECTRUM***

Section 21.3 of ASCE-7 establishes the lower bound for design ground motions as 80 percent of the generalized response spectrum computed in Step 1. Eighty percent of the generalized response spectrum is presented in Table 5.

***STEP 11 – FINAL DESIGN RESPONSE SPECTRUM***

To develop the final design response spectrum in Step 8, the spectral ordinates computed in Steps 9 and 10 are compared. If the values computed in Step 9 are less than 80 percent of the generalized response spectrum, the value from the 80 percent response spectrum is used; otherwise, the values computed in Step 9 are used.

The resulting final design response spectrum is, therefore, a hybrid curve based on the generalized response spectrum, the probabilistic MCE response spectrum, and the deterministic MCE response spectrum. The final design response spectrum is presented in Table 5.

Table 5. Spectral Ordinates

| Period (s) | Computed Spectral Ordinate from Steps 1 through 11 (g) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Step Number | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 0.000 | 0.449 | 0.674 | 0.732 | 0.537 | 0.805 | 1.500 | 1.500 | 0.732 | 0.488 | 0.359 | 0.488 |
| 0.050 | 0.765 | 1.147 | 0.894 | 0.615 | 0.923 | 1.500 | 1.500 | 0.894 | 0.596 | 0.612 | 0.612 |
| 0.100 | 1.080 | 1.620 | 1.217 | 0.783 | 1.175 | 1.500 | 1.500 | 1.217 | 0.812 | 0.864 | 0.864 |
| 0.200 | 1.123 | 1.685 | 1.515 | 1.009 | 1.513 | 1.500 | 1.513 | 1.513 | 1.009 | 0.899 | 1.009 |
| 0.300 | 1.123 | 1.685 | 1.538 | 1.092 | 1.638 | 1.500 | 1.638 | 1.538 | 1.026 | 0.899 | 1.026 |
| 0.400 | 1.123 | 1.685 | 1.467 | 1.073 | 1.609 | 1.500 | 1.609 | 1.467 | 0.978 | 0.899 | 0.978 |
| 0.500 | 1.123 | 1.685 | 1.386 | 1.018 | 1.527 | 1.500 | 1.527 | 1.386 | 0.924 | 0.899 | 0.924 |
| 0.750 | 0.800 | 1.200 | 1.175 | 0.865 | 1.298 | 1.200 | 1.298 | 1.175 | 0.784 | 0.640 | 0.784 |
| 1.000 | 0.600 | 0.900 | 0.983 | 0.702 | 1.053 | 0.900 | 1.053 | 0.983 | 0.655 | 0.480 | 0.655 |
| 2.000 | 0.300 | 0.450 | 0.543 | 0.376 | 0.564 | 0.450 | 0.564 | 0.543 | 0.362 | 0.240 | 0.362 |
| 3.000 | 0.200 | 0.300 | 0.350 | 0.237 | 0.356 | 0.300 | 0.356 | 0.350 | 0.234 | 0.160 | 0.234 |
| 4.000 | 0.150 | 0.225 | 0.252 | 0.168 | 0.252 | 0.225 | 0.252 | 0.252 | 0.168 | 0.120 | 0.168 |

### *STEP 12 - COMPUTATION OF FINAL ACCELERATION PARAMETERS*

Computation of the final acceleration parameters is requires comparing the values computed for $S_{DS}$, $S_{D1}$, $S_{Ms}$, and $S_{M1}$ with limiting values in accordance with ACSE-7 Section 21.4. Table 6 summarizes the parameters used in Step 1 and presents the final acceleration parameters in accordance with ASCE-7, Section 21.4.

Table 6. Final Acceleration Parameters

| Parameter | Short Period ($T_s$ = 0.2 second) | 1-Second Period ($T_1$ = 1.0 second) |
|---|---|---|
| MCE Spectral Acceleration, S | 1.17 | 0.415 |
| Site Class | D | |
| Site Coefficient, $F_a$ and $F_v$ | 1.00 | 1.5 |
| Adjusted Spectral Acceleration, $S_M$ | $S_{MS}$ = 1.514 g | $S_{M1}$ = 0.983 g |
| Design Spectral Response Acceleration Parameters, $S_D$ | $S_{DS}$ = 1.009 g | $S_{D1}$ = 0.724 g |

## *6.6 SITE PREPARATION*

Site preparation includes tasks to be performed prior to placement of new fill material to achieve the planned site grades. For the proposed development, the geotechnical site work will include removal and re-compaction of near-surface soils as previously recommended in this report.

The removal and re-compaction should extend at least 18 inches below the bottom of pavement and other flatwork sections. All areas to receive new fill should be scarified to a depth of 6 inches and compacted in accordance with the requirements outlined in the "Compaction" section of this report.

Earthwork should be planned and executed to minimize subgrade disturbance. Soil that has been disturbed during site preparation or soft or loose zones that are identified during probing should be removed from beneath proposed foundations or slabs on grade.

Our representative should observe the removal, replacement, and compaction work and perform field density testing to confirm the required degree of compaction was obtained.

## *6.7 CONSTRUCTION CONSIDERATIONS*

### 6.7.1 General

If not carefully executed, site preparation and footing excavation can result in the presence of unsuitable (disturbed and/or excessively soft) soil conditions that may require additional effort to mitigate or, in more extreme cases (if not detected), could result in significant costs to repair damage to flatwork or structures.

### 6.7.2 Compaction

All granular fill materials should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557. Cohesive fill materials should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D 1557. Field density testing should be performed by our representative to confirm the compaction of the fill soils. Fill materials should be placed in loose lifts not exceeding 8 inches in thickness, properly moisture conditioned, and mechanically compacted to the minimum required density. For granular fills, compaction may be achieved using heavy equipment and vibration.

### 6.7.3 Site Drainage

Adequate site drainage should be maintained at all times. Site drainage should be collected and routed to suitable discharge points.

## *6.8 FILL MATERIALS*

Fill materials should be free of organic matter and other deleterious materials and, in general, should consist of particles no larger than 3 inches in largest dimension. Existing asphalt pavement and base materials generated from on-site demolition can be used for structural fill, although the percentage of such materials should be limited to less than 5 percent of the fill content. The on-site native, granular soils are suitable for use in the required fills provided that particles larger than 3 inches in largest dimension are removed. The following sections provide recommendations for the re-use of on-site materials in compacted fills and for the use of imported materials in required fills.

### 6.8.1 On-Site Native Soils

The on-site native soils are suitable for use in the required fills provided that particles larger than 3 inches in largest dimension are removed.

### 6.8.2 Imported Granular Material

If necessary, imported granular material should be pit- or quarry-run rock, crushed rock, or crushed gravel and sand that is well graded and has less than 5 percent by dry weight passing the U.S. Standard No. 200 Sieve. The percentage of fines can be increased to 12 percent if the fill is placed during dry weather and provided the fill material is properly moisture conditioned to achieve the required compaction. Imported fill materials should have a sand equivalent of at least 35 percent.

## 7.0 OBSERVATION OF CONSTRUCTION

Geotechnical testing and observation during construction is considered to be a continuing part of the geotechnical consultation. In order to confirm that the recommendations presented herein remain applicable, our representative should be present at the site to provide appropriate observation and testing. As satisfactory earthwork and the foundation performance depend to a large degree on the quality of construction, it is essential that qualified personnel be present to perform the required geotechnical testing and inspection.

The presence of an experienced representative at the site during construction provides value and benefits to the project and can often result in schedule and cost savings for the owner by approaching the geotechnical testing and inspection responsibilities in a proactive and team-oriented manner.

## 8.0 LIMITATIONS

We have prepared this revised report for use by the City of Santa Monica and members of their design and construction team for the proposed development. The data and report can be used for estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

Soil explorations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary.

The conclusions and recommendations presented in this report are based on the current site development plan and structural information provided to us by the project team. If design changes are made, we should be retained to review our conclusions and recommendations and to provide a written evaluation or modification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our revised report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with that degree of skill and care ordinarily exercised by reputable geotechnical consultants practicing in this area at the time this revised report was prepared. No warranty or other conditions, expressed or implied, should be understood.

◆ ◆ ◆

We appreciate the opportunity to be of service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.

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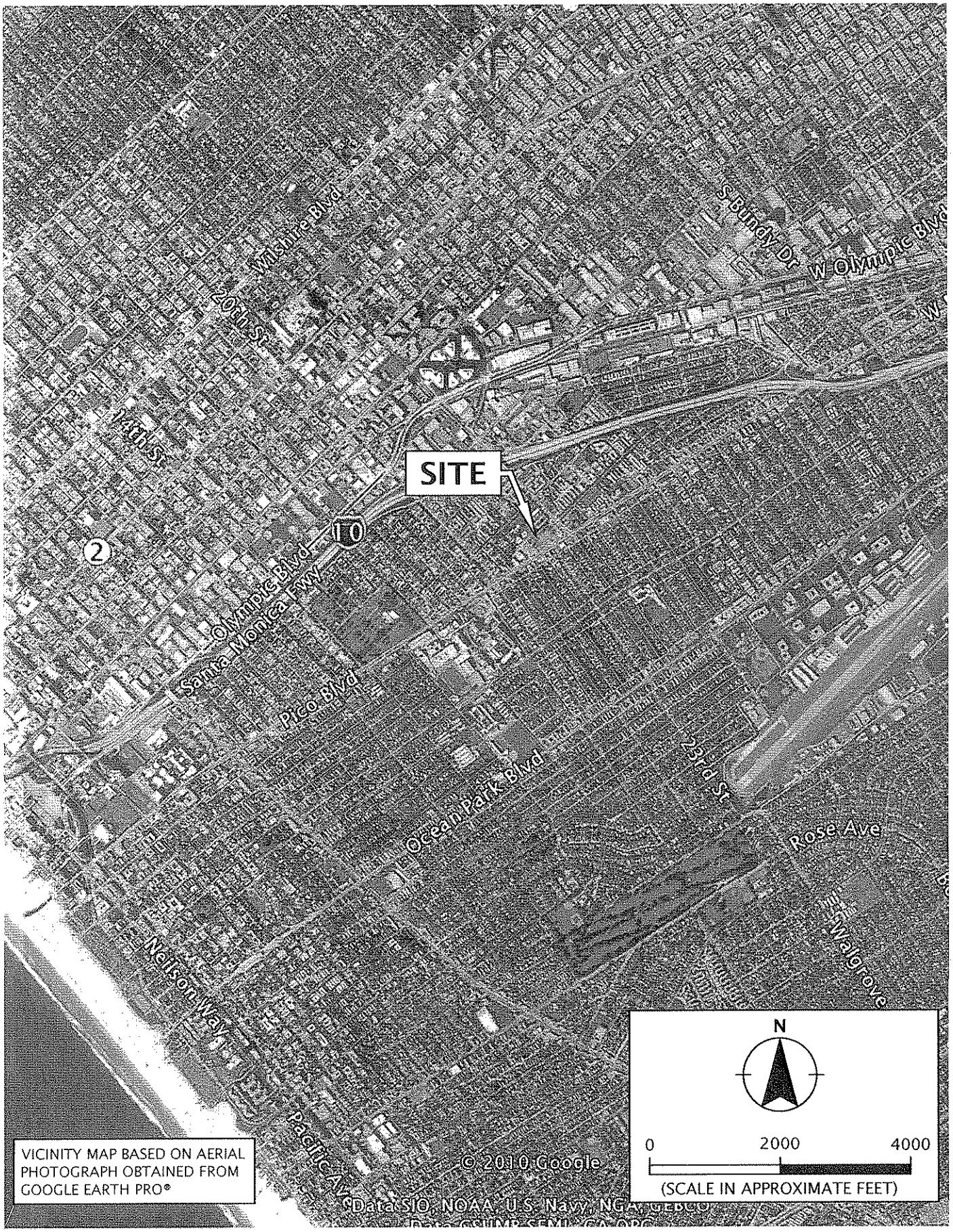
# FIGURES

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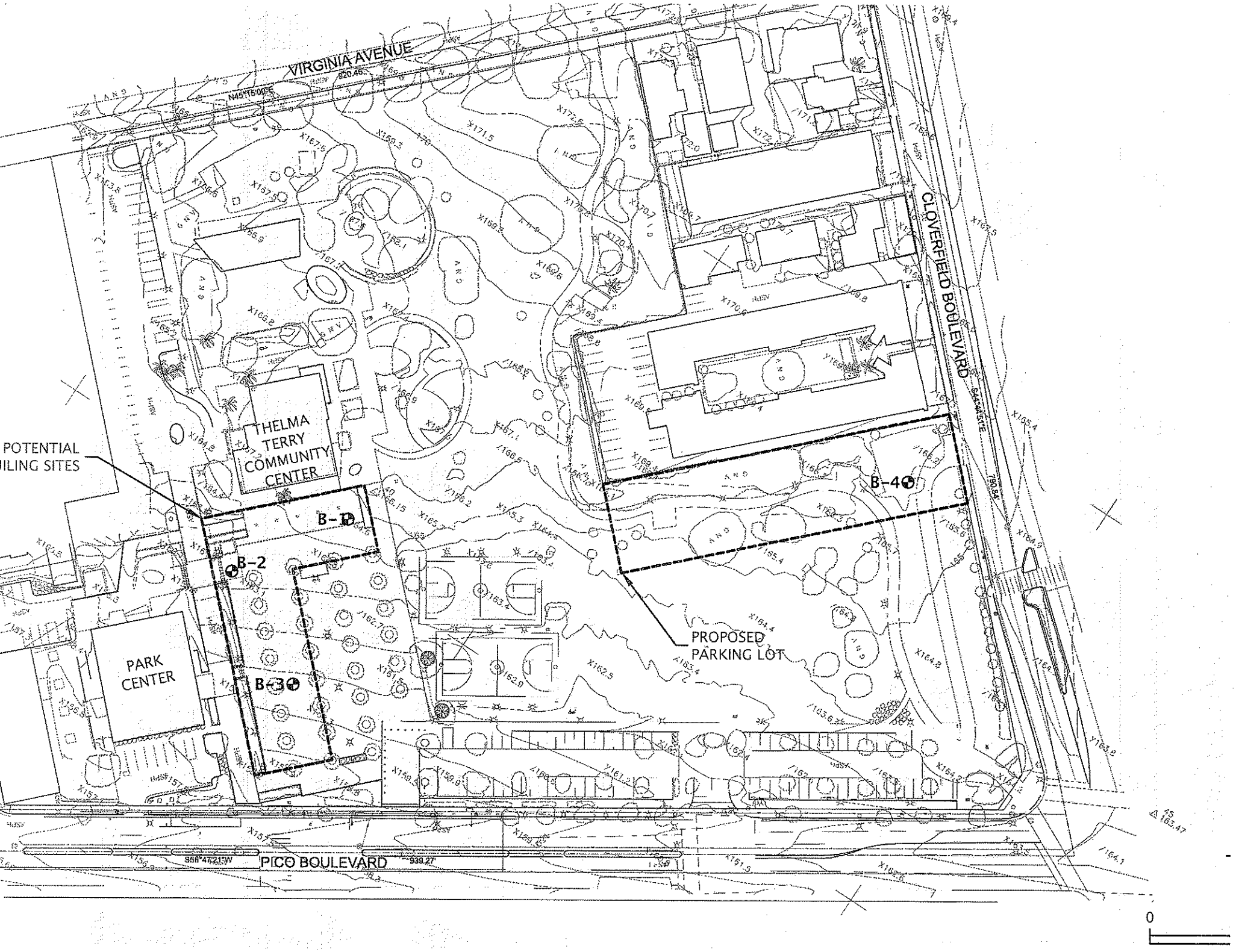
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PICO BOULEVARD
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PARK CENTER
POTENTIAL BUILING SITES
PROPOSED PARKING LOT
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B-3
B-4
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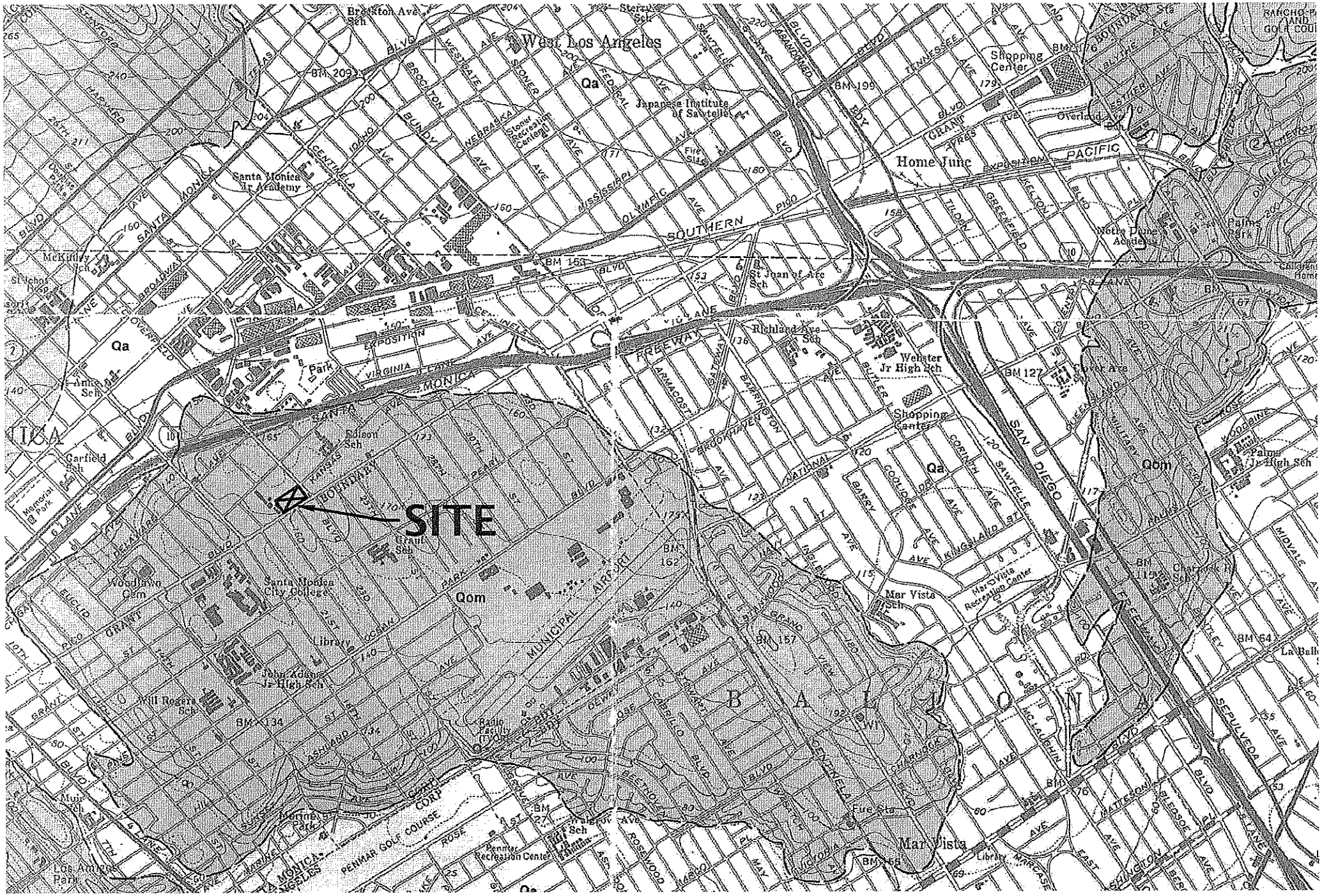
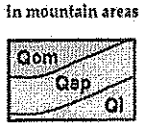
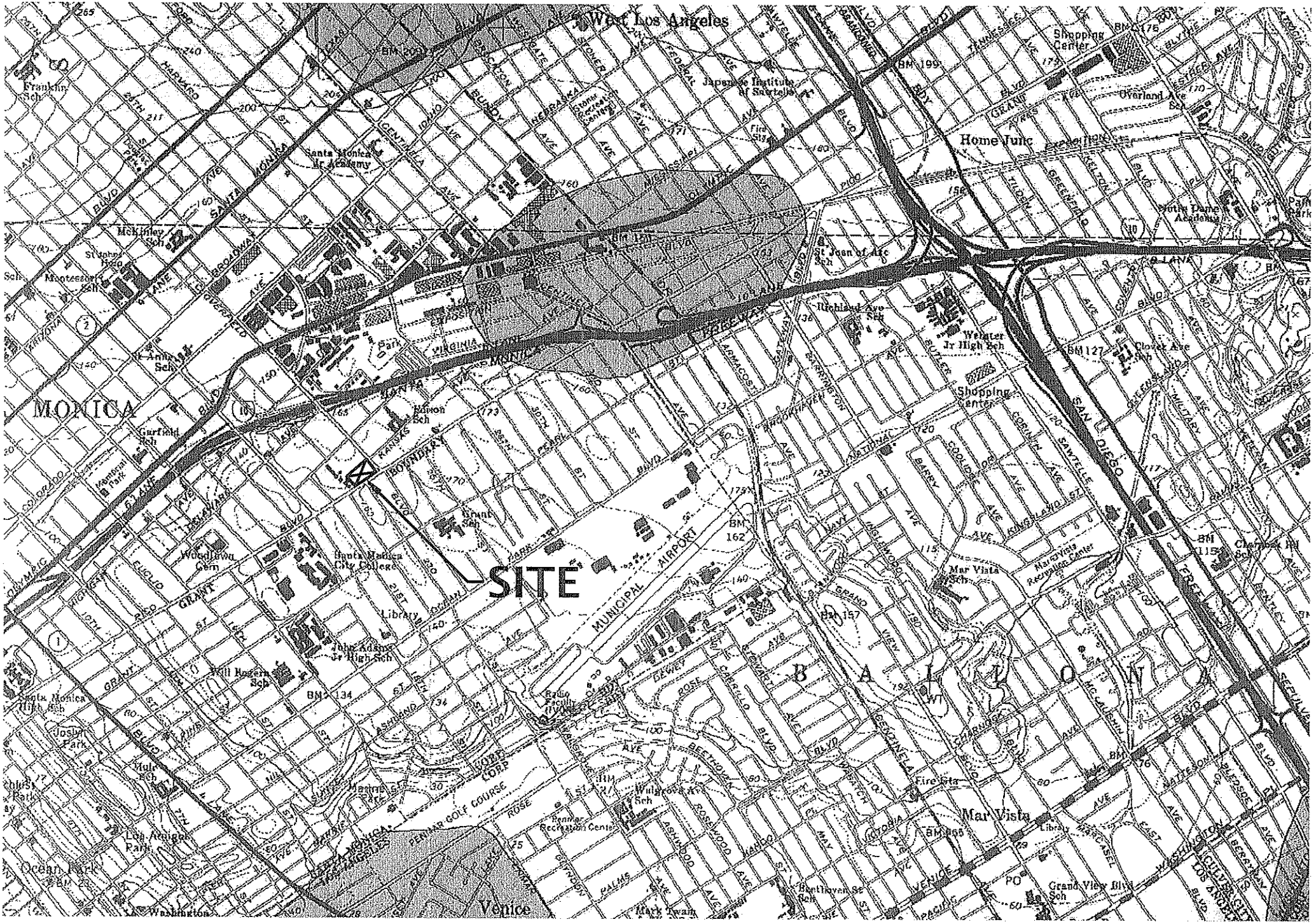


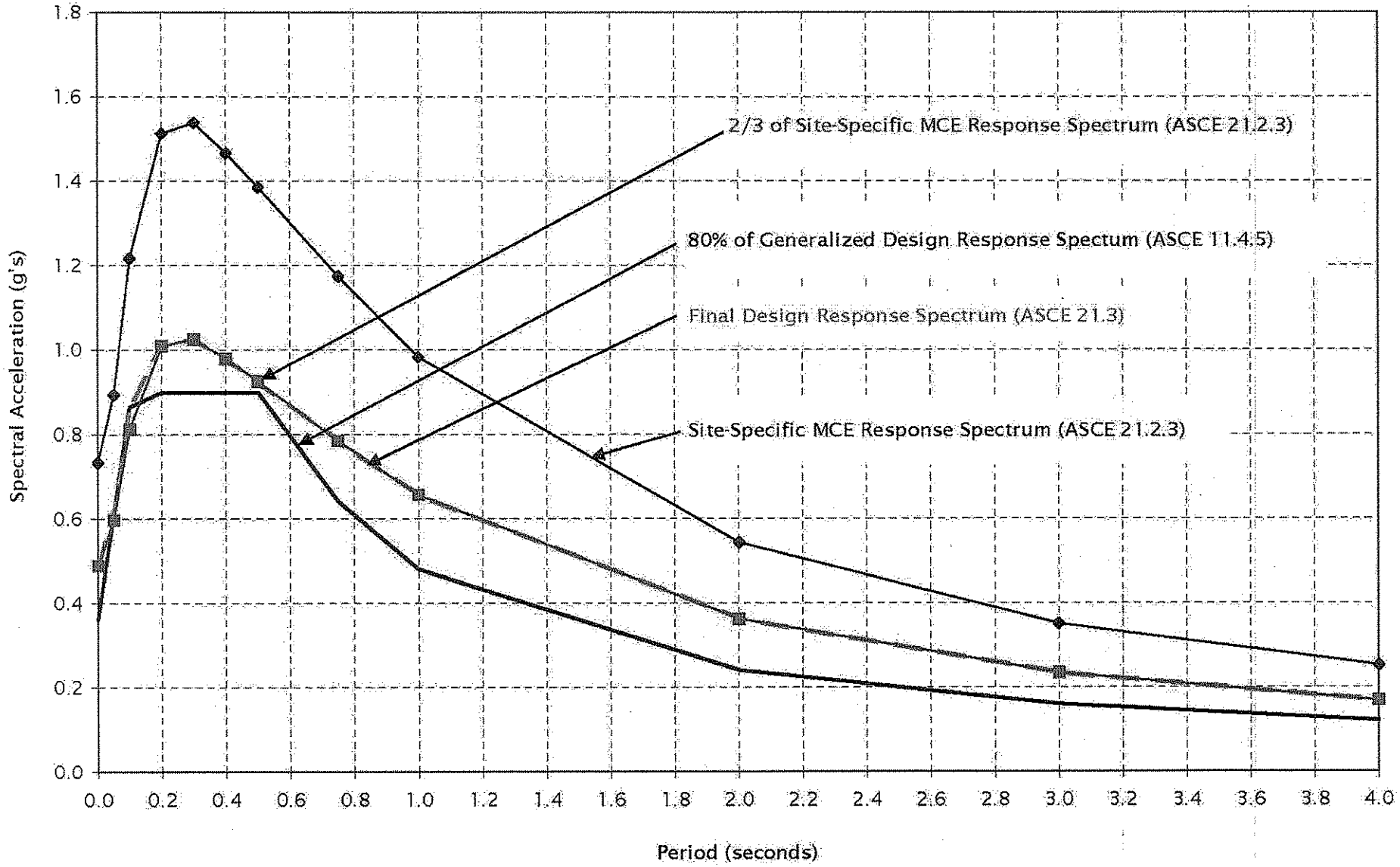

—UNCONFORMITY—
in mountain areas






PLANATION

ed Investigation:




| | | | |
|---|---|---|---|
| GEODESIGN INC<br>2121 Towne Centre Place - Suite 130<br>Anaheim CA 92806<br>Off 714.634.3701 Fax 714.634.3711 | SMONICA-10-01 | FINAL DESIGN RESPONSE SPECTRUM | |
| | OCTOBER 2010 | PROPOSED PICO BRANCH LIBRARY<br>SANTA MONICA, CA | FIGURE 5 |

# APPENDIX A

## APPENDIX A

## FIELD EXPLORATIONS

### *GENERAL*

We explored subsurface conditions at the site of the proposed library and the proposed parking lot by drilling four borings (B-1 through B-4) to depths of 10.5 to 36.5 feet BGS at the approximate location shown on Figure 2. JDK Drilling of Orange, California, drilled the borings using a limited access drill rig equipped for hollow-stem auger drilling methods on July 22, 2010.

The locations of the explorations were determined in the field by measuring from surveyed existing site features. This information should be considered accurate only to the degree implied by the methods used.

A member of our geotechnical staff observed and logged the explorations. We obtained representative samples of the various soils encountered in the explorations for geotechnical laboratory testing. Classifications and sampling intervals are shown on the exploration logs included in this appendix.

### *SOIL SAMPLING*

Samples were obtained from the explorations using a modified California split-spoon sampler in general accordance with guidelines presented in ASTM D 3550. The split-spoon samplers were driven into the soil with a 140-pound hammer free-falling 30 inches. The samplers were driven a total distance of 18 inches or to refusal as indicated on the exploration logs. The number of blows required to drive the sampler the final 12 inches is recorded on the exploration logs included in this appendix, unless otherwise noted.

In addition, SPTs were performed in the explorations in general accordance with ASTM D 1586. The 2-inch-diameter, split-spoon sampler was driven into the soil with a 140-pound hammer free-falling 30 inches. The samplers were driven a total distance of 18 inches or to refusal. The number of blows required to drive the sampler the final 12 inches is recorded on the exploration logs included in this appendix.

### *SOIL CLASSIFICATION*

The soil samples were classified in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are included in this appendix. The exploration logs indicates the depths at which the soils or their characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications and sampling intervals are presented on the exploration logs included in this appendix.

## LABORATORY TESTING

### *CLASSIFICATION*

The soil samples were classified in the laboratory to confirm field classifications. If those classifications differed from the field classifications, the laboratory classifications are presented on the exploration logs.

### *MOISTURE CONTENT*

We tested the natural moisture content of selected samples obtained from the exploration in general accordance with ASTM D 2216. The natural moisture content is a ratio of the weight of the water to soil in a test sample and is expressed as a percentage. The moisture contents are presented on the exploration logs included in this appendix.

### *DRY DENSITY*

We tested selected soil samples to determine the in situ dry density. The tests were performed in general accordance with ASTM D 2937. The dry density is defined as the ratio of the dry weight of the soil sample to the volume of that sample. The dry density typically is expressed in units of pcf. The dry densities are presented on the exploration logs included in this appendix.

### *MAXIMUM DENSITY AND OPTIMUM MOISTURE CONTENT DETERMINATIONS*

Maximum dry density and optimum moisture content were determined in accordance with ASTM D 1557 on the bulk sample collected from boring B-1. The result of the test is presented on Figure A-5 in this appendix.

### *CONSOLIDATION TESTING*

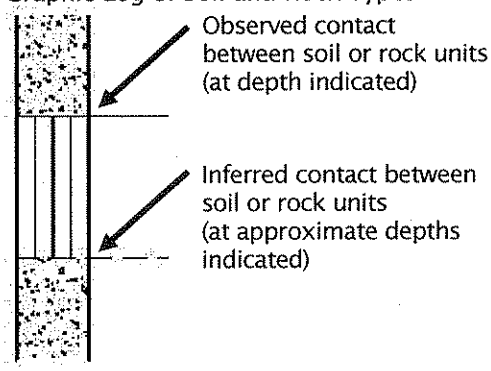
We performed one consolidation test in general accordance with ASTM D 2435 on relatively undisturbed samples obtained from the explorations. The tests measure the volume change of a soil sample under predetermined loads. The results of the consolidation tests are presented on Figure A-6 in this appendix.

### *STRENGTH TESTING*

Direct shear tests were completed on three undisturbed soil samples obtained from the explorations. The tests were conducted in general accordance with ASTM D 3080. The results of the direct shear tests are presented on Figure A-7 in this appendix.

| SYMBOL | SAMPLING DESCRIPTION |
|---|---|
| | Location of sample obtained in general accordance with ASTM D 1586 Standard Penetration Test with recovery |
| | Location of sample obtained using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D 1587 with recovery |
| | Location of sample obtained using Dames & Moore sampler and 300-pound hammer or pushed with recovery |
| | Location of sample obtained using Dames & Moore or 3-inch-O.D. split-spoon sampler and 140-pound hammer or pushed with recovery |
| | Location of grab sample |
| | Rock coring interval |
| | Water level during drilling |
| | Water level taken on date shown |

Graphic Log of Soil and Rock Types




## GEOTECHNICAL TESTING EXPLANATIONS

| | | | |
|---|---|---|---|
| ATT | Atterberg Limits | P | Pushed Sample |
| CBR | California Bearing Ratio | PP | Pocket Penetrometer |
| CON | Consolidation | P200 | Percent Passing U.S. Standard No. 200 Sieve |
| DD | Dry Density | RES | Resilient Modulus |
| DS | Direct Shear | SIEV | Sieve Gradation |
| HYD | Hydrometer Gradation | TOR | Torvane |
| MC | Moisture Content | UC | Unconfined Compressive Strength |
| MD | Moisture-Density Relationship | VS | Vane Shear |
| OC | Organic Content | kPa | Kilopascal |

## ENVIRONMENTAL TESTING EXPLANATIONS

| | | | |
|---|---|---|---|
| CA | Sample Submitted for Chemical Analysis | ND | Not Detected |
| P | Pushed Sample | NS | No Visible Sheen |
| PID | Photoionization Detector Headspace Analysis | SS | Slight Sheen |
| ppm | Parts per Million | MS | Moderate Sheen |
| | | HS | Heavy Sheen |

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EXPLORATION KEY

TABLE A-1

## RELATIVE DENSITY - COARSE-GRAINED SOILS

| Relative Density | Standard Penetration Resistance | Dames & Moore Sampler (140-pound hammer) | Dames & Moore Sampler (300-pound hammer) |
|---|---|---|---|
| Very Loose | 0 – 4 | 0 - 11 | 0 - 4 |
| Loose | 4 – 10 | 11 - 26 | 4 - 10 |
| Medium Dense | 10 – 30 | 26 - 74 | 10 - 30 |
| Dense | 30 – 50 | 74 - 120 | 30 - 47 |
| Very Dense | More than 50 | More than 120 | More than 47 |

## CONSISTENCY - FINE-GRAINED SOILS

| Consistency | Standard Penetration Resistance | Dames & Moore Sampler (140-pound hammer) | Dames & Moore Sampler (300-pound hammer) | Unconfined Compressive Strength (tsf) |
|---|---|---|---|---|
| Very Soft | Less than 2 | Less than 3 | Less than 2 | Less than 0.25 |
| Soft | 2 - 4 | 3 – 6 | 2 - 5 | 0.25 - 0.50 |
| Medium Stiff | 4 - 8 | 6 – 12 | 5 - 9 | 0.50 - 1.0 |
| Stiff | 8 - 15 | 12 – 25 | 9 - 19 | 1.0 - 2.0 |
| Very Stiff | 15 - 30 | 25 – 65 | 19 – 31 | 2.0 - 4.0 |
| Hard | More than 30 | More than 65 | More than 31 | More than 4.0 |

| PRIMARY SOIL DIVISIONS | | | GROUP SYMBOL | GROUP NAME |
|---|---|---|---|---|
| COARSE-GRAINED SOILS (more than 50% retained on No. 200 sieve) | GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve) | CLEAN GRAVELS (< 5% fines) | GW or GP | GRAVEL |
| | | GRAVEL WITH FINES (≥ 5% and ≤ 12% fines) | GW-GM or GP-GM | GRAVEL with silt |
| | | | GW-GC or GP-GC | GRAVEL with clay |
| | | GRAVELS WITH FINES (> 12% fines) | GM | silty GRAVEL |
| | | | GC | clayey GRAVEL |
| | | | GC-GM | silty, clayey GRAVEL |
| | SAND (50% or more of coarse fraction passing No. 4 sieve) | CLEAN SANDS (<5% fines) | SW or SP | SAND |
| | | SANDS WITH FINES (≥ 5% and ≤ 12% fines) | SW-SM or SP-SM | SAND with silt |
| | | | SW-SC or SP-SC | SAND with clay |
| | | SANDS WITH FINES (> 12% fines) | SM | silty SAND |
| | | | SC | clayey SAND |
| | | | SC-SM | silty, clayey SAND |
| FINE-GRAINED SOILS (50% or more passing No. 200 sieve) | SILT AND CLAY | Liquid limit less than 50 | ML | SILT |
| | | | CL | CLAY |
| | | | CL-ML | silty CLAY |
| | | | OL | ORGANIC SILT or ORGANIC CLAY |
| | | Liquid limit 50 or greater | MH | SILT |
| | | | CH | CLAY |
| | | | OH | ORGANIC SILT or ORGANIC CLAY |
| HIGHLY ORGANIC SOILS | | | PT | PEAT |

## MOISTURE CLASSIFICATION

| Term | Field Test |
|---|---|
| dry | very low moisture, dry to touch |
| moist | damp, without visible moisture |
| wet | visible free water, usually saturated |

## ADDITIONAL CONSTITUENTS

Secondary granular components or other materials such as organics, man-made debris, etc.

| Percent | Silt and Clay In: Fine-Grained Soils | Silt and Clay In: Coarse-Grained Soils | Percent | Sand and Gravel In: Fine-Grained Soils | Sand and Gravel In: Coarse-Grained Soils |
|---|---|---|---|---|---|
| < 5 | trace | trace | < 5 | trace | trace |
| 5 – 12 | minor | with | 5 – 15 | minor | minor |
| > 12 | some | silty/clayey | 15 – 30 | with | with |
| | | | > 30 | sandy/gravelly | sandy/gravelly |

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SOIL CLASSIFICATION SYSTEM

TABLE A-2

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 0.0 | | ASPHALT CONCRETE (4 inches). | 167.0 / 166.7 / 0.3 | | | | Hand augered to 5.0 feet. |
| | | Medium dense, light brown, fine SAND with silt (SP-SM); moist - **FILL.** | 165.0 / 2.0 | | | | |
| 2.5 | | Medium dense, red-brown, fine SAND with silt (SP-SM); moist. | | | | | |
| 5.0 | | | | DD DS | | ● 36-50/3" ▲ | Sample on large root - could be inflated blow count. DD = 117 pcf |
| 7.5 | | | | | | | |
| 10.0 | | becomes dense, fine to medium at 10.0 feet | | DD | | ● 78 ▲ | DD = 108 pcf |
| 12.5 | | | | | | | |
| | | Very dense, red-brown, fine to medium SAND (SP), minor silt; moist. | 152.5 / 14.5 | | | | |
| 15.0 | | | | DD | | ● 26-50/5" ▲ | DD = 97 pcf |
| 17.5 | | | | | | | |
| 20.0 | | | | DD | | ● 28-50/4" ▲ | DD = 98 pcf |
| 22.5 | | | | | | | |
| 25.0 | | becomes yellow-brown, fine to coarse at 25.0 feet | | DD | | ● 37-50/3" ▲ | DD = 100 pcf |
| 27.5 | | | | | | | |
| | | Very dense, yellow-brown, fine SAND with silt (SP-SM); moist. | 138.0 / 29.0 | | | | |
| 30.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hollow-stem auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-1**

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**FIGURE A-1**

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 30.0 | | (continued from previous page) | | DD | | ● 27-50/6" ▲ | DD = 88 pcf |
| 32.5 | | | | | | | |
| 35.0 | | | | DD | | ● 37-50/6" ▲ | DD = 88 pcf |
| | | **Exploration completed at a depth of 36.5 feet.** | 130.5 / 36.5 | | | | |
| 37.5 | | **Groundwater seepage not observed to the depth explored.** | | | | | |
| 40.0 | | **Caving not observed.** | | | | | |
| 42.5 | | | | | | | |
| 45.0 | | | | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hollow-stem auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-1**
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**FIGURE A-1**

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 0.0 | | Medium dense, red-brown, fine SAND with silt (SP-SM); moist. | 165.0 | | | | |
| 2.5 | | | | DD DS | | ● 38 ▲ | DD = 118 pcf |
| 5.0 | | becomes dense at 5.0 feet | | DD CON | | ● 67 ▲ | DD = 121 pcf |
| 7.5 | | | | | | | |
| 10.0 | | | | DD | | ● 79 ▲ | DD = 111 pcf |
| | | Dense, red-brown, medium to coarse SAND with silt (SP-SM); moist. | 154.8 / 10.3 | | | | |
| | | **Exploration completed at a depth of 10.5 feet.** | 154.5 / 10.5 | | | | |
| 12.5 | | **Groundwater seepage not observed to the depth explored.** | | | | | |
| 15.0 | | **Caving not observed.** | | | | | |
| 17.5 | | | | | | | |
| 20.0 | | | | | | | |
| 22.5 | | | | | | | |
| 25.0 | | | | | | | |
| 27.5 | | | | | | | |
| 30.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hollow-stem auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-2**

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**FIGURE A-2**

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 0.0 | | ASPHALT CONCRETE (3 to 4 inches). | 162.0 / 161.7 / 0.3 | | | | |
| | | Medium dense, light brown, silty SAND (SM); moist - **FILL.** | 160.0 / 2.0 | | | | |
| 2.5 | | Dense, red-brown, fine SAND with silt (SP-SM); moist. | | | | | |
| 5.0 | | | | DD DS | | ● ▲ 62 | DD = 102 pcf |
| 7.5 | | | | | | | |
| 10.0 | | trace clay at 10.0 feet | | DD | | ● ▲ 71 | DD = 107 pcf |
| 12.5 | | | | | | | |
| | | Very dense, red-brown, fine to medium SAND (SP), minor silt; moist. | 148.0 / 14.0 | | | | |
| 15.0 | | | | DD | | ● ▲ 27-50/6" | DD = 104 pcf |
| 17.5 | | | | | | | |
| 20.0 | | trace silt at 20.0 feet | | DD | | ● ▲ 67 | DD = 100 pcf |
| 22.5 | | | | | | | |
| 25.0 | | | | DD | | ● ▲ 35-50/6" | DD = 96 pcf |
| 27.5 | | | | | | | |
| 30.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hollow-stem auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-3**

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**FIGURE A-3**

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 30.0 | | minor silt at 30.0 feet | | | | 27-50/6" | |
| 32.5 | | | | | | | |
| 35.0 | | | | | | 50/6" | |
| | | **Exploration completed at a depth of 36.5 feet.** | 125.5 / 36.5 | | | | |
| 37.5 | | **Groundwater seepage not observed to the depth explored.** | | | | | |
| 40.0 | | **Caving not observed.** | | | | | |
| 42.5 | | | | | | | |
| 45.0 | | | | | | | |
| 47.5 | | | | | | | |
| 50.0 | | | | | | | |
| 52.5 | | | | | | | |
| 55.0 | | | | | | | |
| 57.5 | | | | | | | |
| 60.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hollow-stem auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-3**
(continued)

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**FIGURE A-3**

| DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | ELEVATION / DEPTH | TESTING | SAMPLE | ▲ BLOW COUNT ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0 – 50 – 100) | INSTALLATION AND COMMENTS |
|---|---|---|---|---|---|---|---|
| 0.0 | | LAWN (driving turf with reinforcing grid, 3 inches). | 168.0 / 167.7 / 0.3 | | | | |
| | | Medium dense, light-brown, silty SAND (SM); moist - **FILL.** | 167.0 / 1.0 | | | | |
| 2.5 | | Dense, brown, fine to medium SAND with silt (SP-SM); moist. | | | | 28-50/4" | |
| | | | 163.5 / 4.5 | | | | |
| 5.0 | | Dense, red-brown, fine SAND (SP), minor silt; moist. | | | | 56 | |
| 7.5 | | | | | | | |
| 10.0 | | becomes very dense, fine to medium at 10.0 feet | | | | 45-50/6" | |
| | | | 156.5 / 11.5 | | | | |
| 12.5 | | **Exploration completed at a depth of 11.5 feet.** | | | | | |
| | | **Groundwater seepage not observed to the depth explored.** | | | | | |
| 15.0 | | **Caving not observed.** | | | | | |
| 17.5 | | | | | | | |
| 20.0 | | | | | | | |
| 22.5 | | | | | | | |
| 25.0 | | | | | | | |
| 27.5 | | | | | | | |
| 30.0 | | | | | | | |

DRILLED BY: JDK Drilling, Inc. LOGGED BY: SFK COMPLETED: 07/22/10

BORING METHOD: hand-auger (see report text) BORING BIT DIAMETER: 7-inch

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**BORING B-4**

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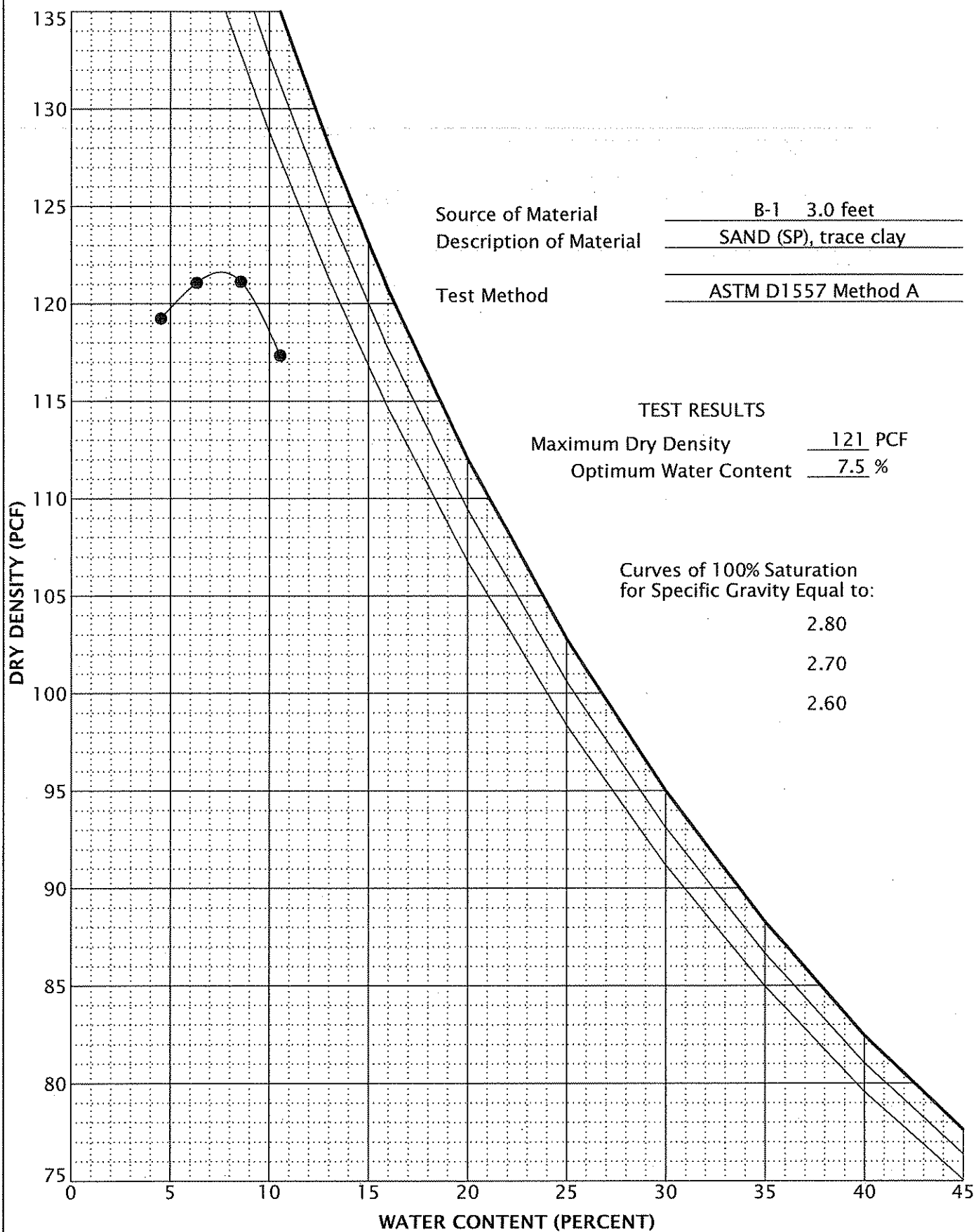
**FIGURE A-4**




COMPACTION TEST SMONICA-10-01-B1_4.GPJ GEODESIGN.GDT PRINT DATE: 10/5/10:KT

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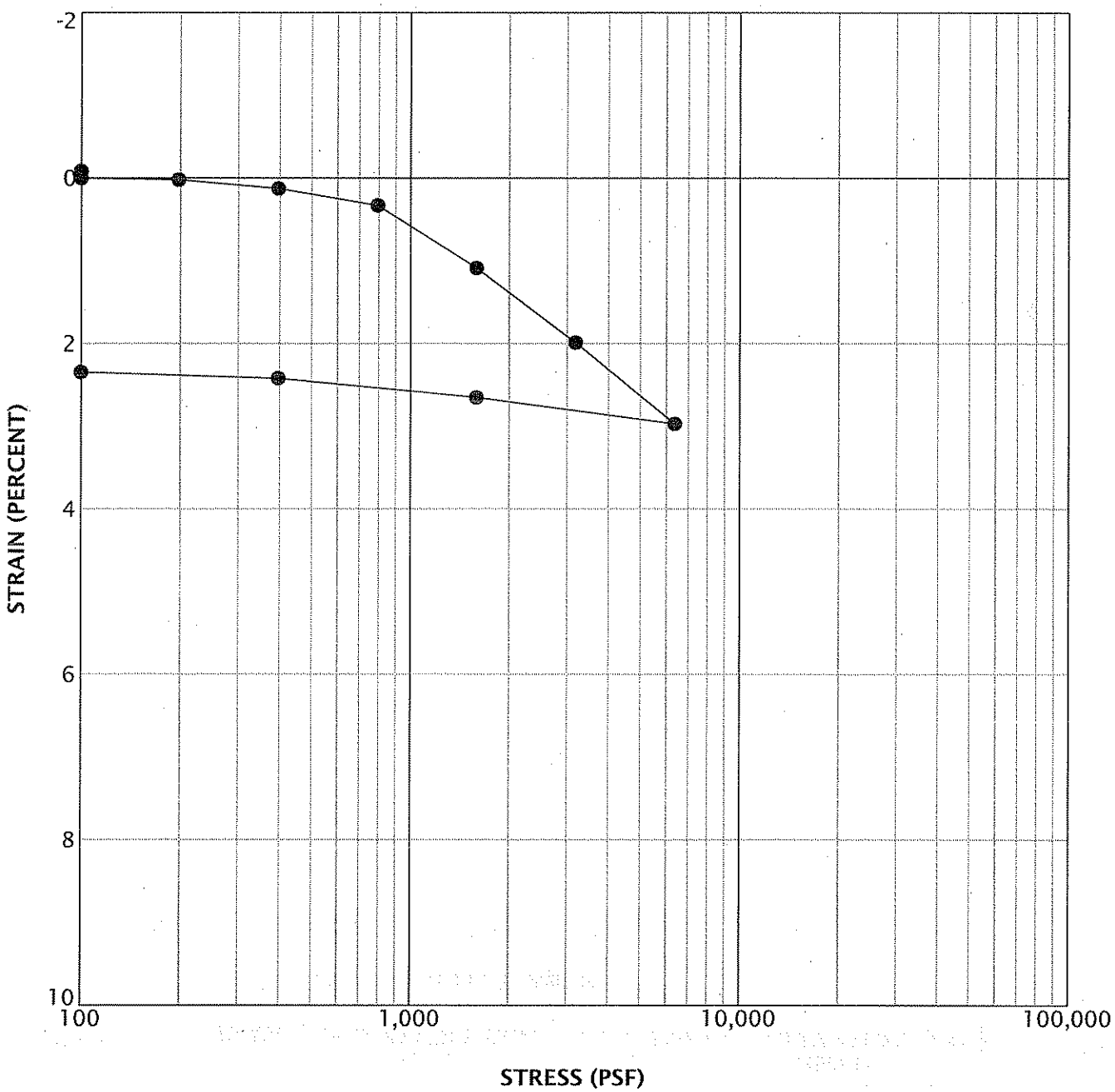
| | | |
|---|---|---|
| SMONICA-10-01 | MOISTURE-DENSITY RELATIONSHIP | |
| OCTOBER 2010 | PROPOSED PICO BRANCH LIBRARY<br>SANTA MONICA, CA | FIGURE A-5 |




| KEY | EXPLORATION NUMBER | SAMPLE DEPTH (FEET) | MOISTURE CONTENT (PERCENT) | DRY DENSITY (PCF) |
|---|---|---|---|---|
| ● | B-2 | 5.0 | 8 | 121 |
| | | | | |
| | | | | |

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**CONSOLIDATION TEST RESULTS**

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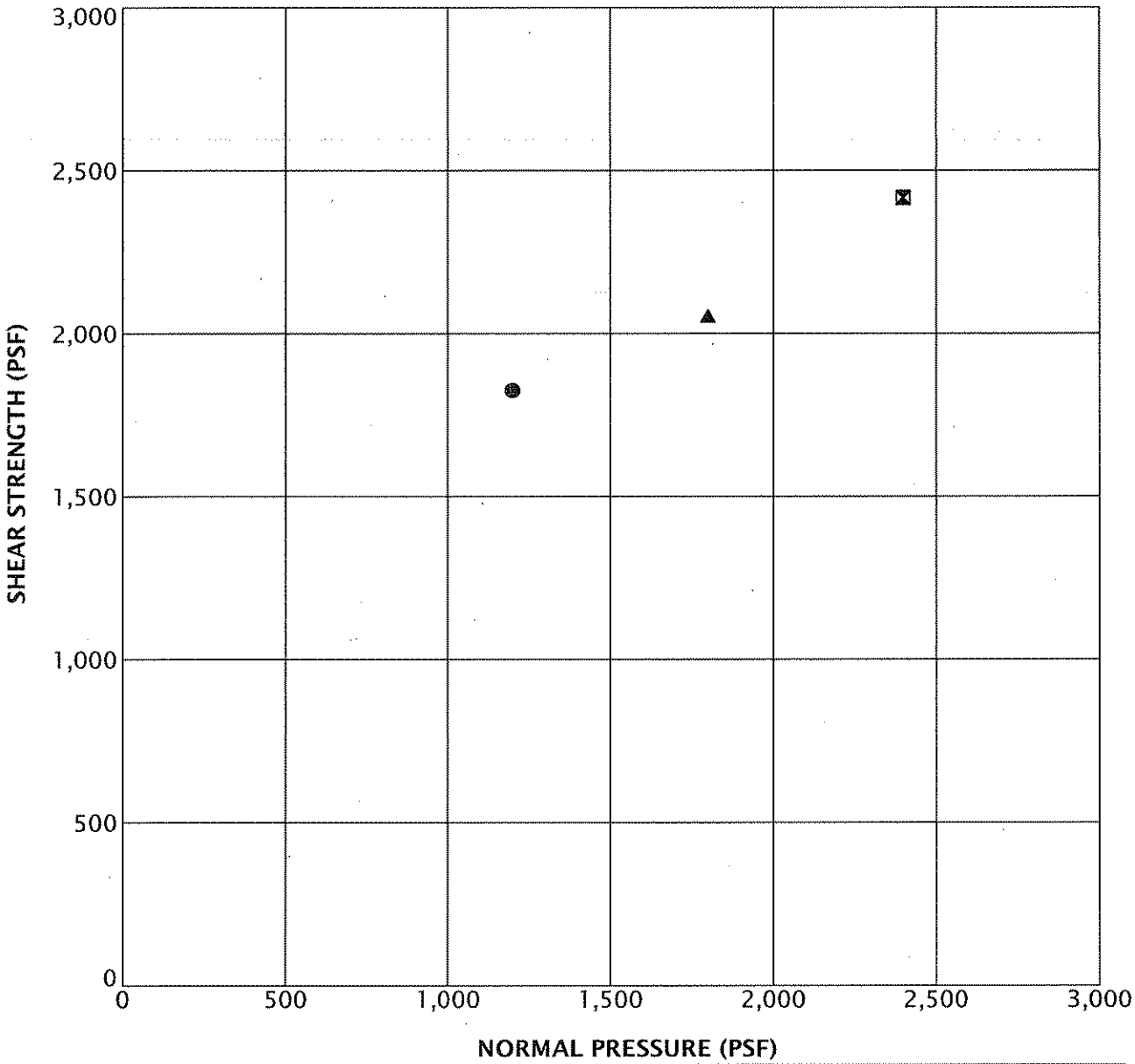
**FIGURE A-6**

CONSOL_STRAIN_100K SMONICA-10-01-B1_4.GPJ GEODESIGN.GDT PRINT DATE: 10/5/10:KT




| KEY | EXPLORATION NUMBER | SAMPLE DEPTH (FEET) | MOISTURE CONTENT (PERCENT) | DRY DENSITY (PCF) | SOAKED |
|---|---|---|---|---|---|
| ● | B-1 | 5.0 | 8 | 117 | YES |
| ⊠ | B-2 | 2.5 | 10 | 118 | YES |
| ▲ | B-3 | 5.0 | 6 | 102 | YES |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |

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2121 S Towne Centre Place - Suite 130
Anaheim CA 92806
Off 714.634.3701 Fax 714.634.3711

SMONICA-10-01

OCTOBER 2010

**DIRECT SHEAR TEST RESULTS**

PROPOSED PICO BRANCH LIBRARY
SANTA MONICA, CA

**FIGURE A-7**

DIRECT_SHEAR_FAIL_ENV_NO BOX SMONICA-10-01-B1_4.GPJ GEODESIGN.GDT PRINT DATE: 10/5/10:KT

| SAMPLE INFORMATION | | | MOISTURE CONTENT (PERCENT) | DRY DENSITY (PCF) | SIEVE | | | ATTERBERG LIMITS | | |
|---|---|---|---|---|---|---|---|---|---|---|
| EXPLORATION NUMBER | SAMPLE DEPTH (FEET) | ELEVATION (FEET) | | | GRAVEL (PERCENT) | SAND (PERCENT) | P200 (PERCENT) | LIQUID LIMIT (PERCENT) | PLASTIC LIMIT (PERCENT) | PLASTICITY INDEX (PERCENT) |
| B-1 | 5.0 | 162.0 | 8 | 117 | | | | | | |
| B-1 | 10.0 | 157.0 | 7 | 108 | | | | | | |
| B-1 | 15.0 | 152.0 | 7 | 97 | | | | | | |
| B-1 | 20.0 | 147.0 | 7 | 98 | | | | | | |
| B-1 | 25.0 | 142.0 | 8 | 100 | | | | | | |
| B-1 | 30.0 | 137.0 | 12 | 88 | | | | | | |
| B-1 | 35.0 | 132.0 | 7 | 88 | | | | | | |
| B-2 | 2.5 | 162.5 | 10 | 118 | | | | | | |
| B-2 | 5.0 | 160.0 | 8 | 121 | | | | | | |
| B-2 | 9.5 | 155.5 | 6 | 111 | | | | | | |
| B-3 | 5.0 | 157.0 | 6 | 102 | | | | | | |
| B-3 | 10.0 | 152.0 | 9 | 107 | | | | | | |
| B-3 | 15.0 | 147.0 | 12 | 104 | | | | | | |
| B-3 | 20.0 | 142.0 | 4 | 100 | | | | | | |
| B-3 | 25.0 | 137.0 | 3 | 96 | | | | | | |



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SMONICA-10-01

OCTOBER 2010

**SUMMARY OF LABORATORY DATA**

PROPOSED PICO BRANCH LIBRARY
SANTA MONICA, CA

**FIGURE A-8**

AP Engineering & Testing, Inc.

# EXPANSION INDEX TEST RESULTS

ASTM D 4829

Client Name: GeoDesign Inc.
Project Name: Smonica-10-1
Project No.: Smonica-10-1

AP Job No.: 10-0848
Date: 08/19/10

| Boring No. | Sample No. | Depth (ft) | Soil Description | Molded Dry Density (pcf) | Molded Moisture Content (%) | Init. Degree Saturation (%) | Measured Expansion Index | Corrected Expansion Index |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| B-1 | - | 2-5 | Strong Brown Silty Sand | 111.7 | 8.7 | 46.1 | 0 | 0 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## ASTM EXPANSION CLASSIFICATION

| Expansion Index | Classification |
|---|---|
| 0-20 | V. Low |
| 21-50 | Low |
| 51-90 | Medium |
| 91-130 | High |
| >130 | V. High |

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# TRANSMITTAL LETTER

**DATE:** August 18, 2010

**ATTENTION:** **Chris Zadoorian**

**TO:** GeoDesign, Inc.
2121 South Towne Center Place, #130
Anaheim, CA 92806

**SUBJECT:** Laboratory Test Data
Pico Branch Library
Your #smonica-10-1, SA #10-0830LAB

**COMMENTS:** Enclosed are the results for the subject project.

Leo Solis
Laboratory Manager

431 West Baseline Road · Claremont, CA 91711
Phone: 909.626.0967 · Fax: 909.626.3316

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# Table 1 - Laboratory Tests on Soil Sample(s)

***GeoDesign, Inc.***
***Pico Branch Library***
***Your #smonica-10-1, SA #10-0830LAB***
***9-Aug-10***

| | | | |
|---|---|---|---|
| **Sample ID** | | | B-1<br>@ 2-4'<br>Silty Sand |
| **Resistivity** | | **Units** | |
| as-received | | ohm-cm | 15,200 |
| saturated | | ohm-cm | 4,400 |
| **pH** | | | 8.1 |
| **Electrical Conductivity** | | mS/cm | 0.06 |
| **Chemical Analyses** | | | |
| **Cations** | | | |
| calcium | $Ca^{2+}$ | mg/kg | 31 |
| magnesium | $Mg^{2+}$ | mg/kg | 8.1 |
| sodium | $Na^{1+}$ | mg/kg | 53 |
| potassium | $K^{1+}$ | mg/kg | 2.2 |
| **Anions** | | | |
| carbonate | $CO_3^{2-}$ | mg/kg | ND |
| bicarbonate | $HCO_3^{1-}$ | mg/kg | 92 |
| flouride | $F^{1-}$ | mg/kg | 3.4 |
| chloride | $Cl^{1-}$ | mg/kg | 13 |
| sulfate | $SO_4^{2-}$ | mg/kg | 33 |
| phosphate | $PO_4^{3-}$ | mg/kg | 11 |
| **Other Tests** | | | |
| ammonium | $NH_4^{1+}$ | mg/kg | ND |
| nitrate | $NO_3^{1-}$ | mg/kg | 1.1 |
| sulfide | $S^{2-}$ | qual | na |
| Redox | | mV | na |

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.626.0967 · Fax: 909.626.3316

• ANALYSIS
• DESIGN

LaBelle • Marvin
PROFESSIONAL PAVEMENT ENGINEERING
A CALIFORNIA CORPORATION

• SOILS, ASPHALT
TECHNOLOGY

August 12, 2010

*Mr. Chris Zadoorian*
GeoDesign, Inc.
2121 S. Towne Centre Place Suite 130
Anaheim, California 92806

Project No. 37103

Dear Mr. Zadoorian:

Laboratory testing of the bulk soil sample submitted to our laboratory on 8/6/10 has been completed. Results are tabulated herein and R-Value Data Sheets are transmitted herewith. Any untested portion of the sample will be retained for a period of 60 days prior to disposal.

| Smonica-10-01 | B-4 @ 1'-3' |
|---|---|
| R-Value (CA 301) | 69 by Exudation |

The opportunity to be of service is appreciated and should you have any questions, kindly call.

Very truly yours,

REGISTERED PROFESSIONAL ENGINEER
STEVEN R. MARVIN
NO. 30659
EXP. 3/31/12
CIVIL
STATE OF CALIFORNIA

*Steven R. Marvin*
*RCE 30659*

SRM:mm
Enclosures

2700 S. GRAND AVENUE • SANTA ANA, CA 92705-5404 • (714) 546-3468 • FAX (714) 546-5841
INFO@LABELLEMARVIN.COM

# R - VALUE DATA SHEET

Smonica-10-01

PROJECT NUMBER 37103 BORING NUMBER: B-4 @ 1'-3'

SAMPLE DESCRIPTION: Brown Silty Sand

| Item | SPECIMEN | | |
|---|---|---|---|
| | a | b | c |
| Mold Number | 1 | 2 | 3 |
| Water added, grams | 56 | 36 | 44 |
| Initial Test Water, % | 9.6 | 7.9 | 8.6 |
| Compact Gage Pressure,psi | 65 | 315 | 210 |
| Exudation Pressure, psi | 212 | 793 | 366 |
| Height Sample, Inches | 2.66 | 2.58 | 2.63 |
| Gross Weight Mold, grams | 3172 | 3130 | 3164 |
| Tare Weight Mold, grams | 1965 | 1969 | 1977 |
| Sample Wet Weight, grams | 1207 | 1161 | 1187 |
| Expansion, Inches x 10exp-4 | 0 | 9 | 3 |
| Stability 2,000 lbs (160psi) | 22 / 42 | 13 / 24 | 15 / 29 |
| Turns Displacement | 5.06 | 4.73 | 4.97 |
| R-Value Uncorrected | 58 | 75 | 69 |
| R-Value Corrected | 62 | 76 | 72 |
| Dry Density, pcf | 125.4 | 126.4 | 126.0 |
| | DESIGN CALCULATION DATA | | |
| Traffic Index Assumed: | 4.0 | 4.0 | 4.0 |
| G.E. by Stability | 0.39 | 0.25 | 0.29 |
| G. E. by Expansion | 0.00 | 0.30 | 0.10 |

**Equilibrium R-Value** **69** by EXUDATION

Examined & Checked: 8 /10/ 10

Gf = 1.25

REMARKS: Partial Free Drainage.

REGISTERED PROFESSIONAL ENGINEER STEVEN R. MARVIN C 30659 EXP. 3/31/12 CIVIL STATE OF CALIFORNIA

Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.

LaBelle • Marvin

# R-VALUE GRAPHICAL PRESENTATION

PROJECT NO. 37103

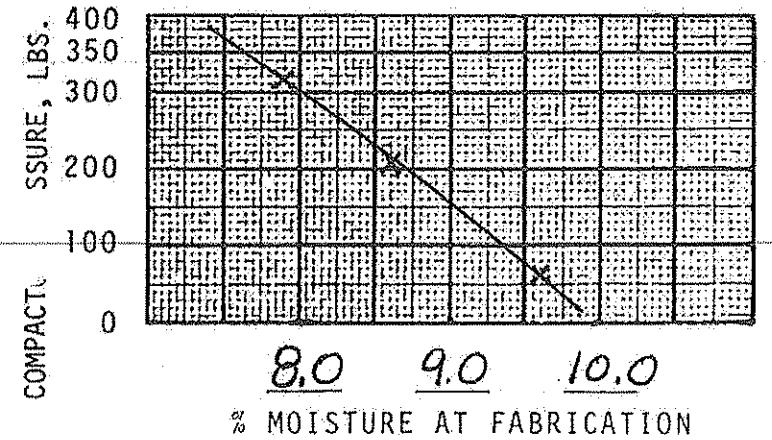
BORING NO. Smonica-10-01 B-4 @ 1'-3'

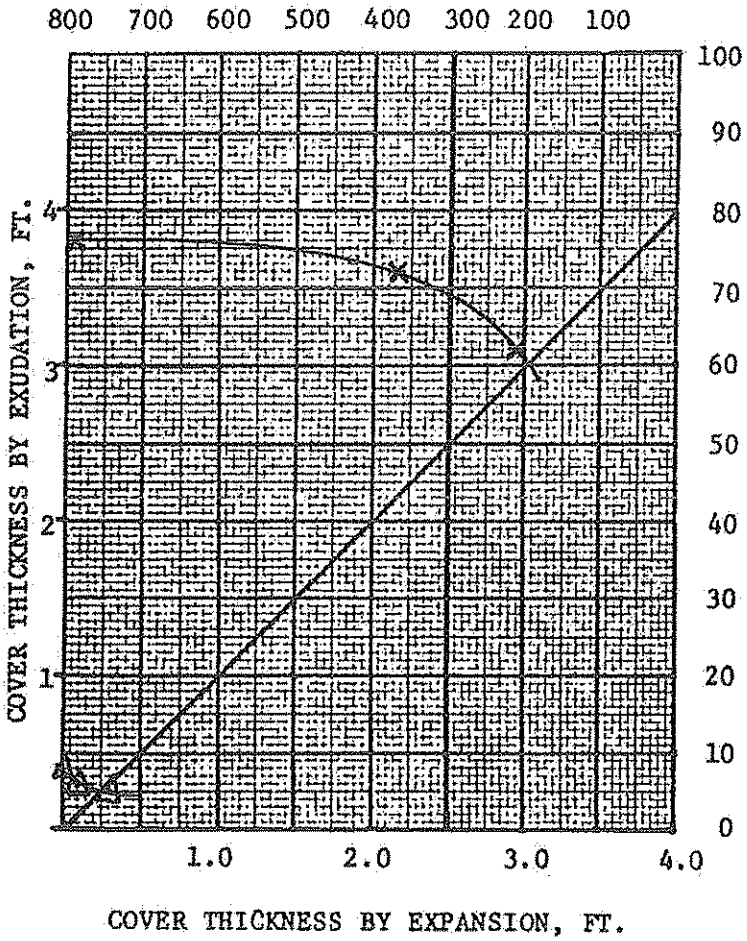
DATE 8/10/10

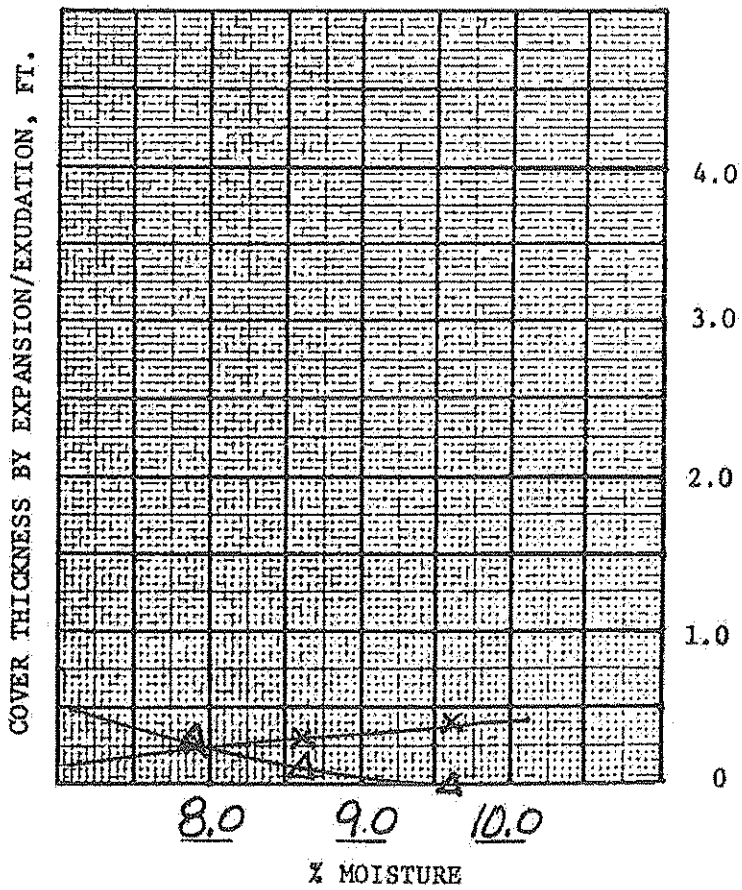
TRAFFIC INDEX Assumed 4.0

R-VALUE BY EXUDATION 69

R-VALUE BY EXPANSION –




R-VALUE vs. EXUD. PRES. — T by EXUDATION

EXUD. T vs. EXPAN. T — T by EXPANSION

REMARKS Gf=1.25

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PROFESSIONAL PAVEMENT ENGINEERING

# APPENDIX B

## APPENDIX B

## INFILTRATION TESTING

Infiltration testing was performed using the falling-head test method. This method includes filling the PVC casing with water and recording the water level drop over regular time intervals.

Prior to performing the actual infiltration test, "pre-soaking" was performed. Pre-soaking consists of filling the PVC casing with water to the ground surface and allowing the water to infiltrate into the soils. Testing is usually performed the day after the pre-soaking. However, if the soils are predominantly sand, then testing can be performed the same day.

The depth of the testing in the borings was set at a maximum depth of 10 feet BGS in the borings and was intended to evaluate the permeability of the upper granular materials. The screened interval was 0 to 10 feet BGS in boring B-2 and 0 to 9.4 feet in boring B-4.

After completion of the infiltration test, the PVC pipe was removed and the holes were backfilled with native soil to the ground surface.

### *TESTING METHODOLOGY*

To start the pre-soak, the hole was filled with clear water to the ground surface and water level readings were taken at time intervals of every 30 minutes. The water level was refilled to the ground surface after each reading. In each of four consecutive readings (two hours) in boring B-2, the water seepage was consistent and did not vary more than 10 percent. As a result of this condition, testing was initiated after the fourth reading (two hours) in boring B-2.

In boring B-4, the water seepage rate was more variable than in boring B-2. Seepage rates during the pres-oak varied as much as 30 percent. Although the rates were variable, we continued with the test due to the inability to leave the test hole open overnight in the park that is accessible to the public.

We measured and recorded the drop in water level every 30 minutes for a minimum of 300 minutes (five hours), refilling the hole to the surface with clear water between each reading. After several hours of consistent readings (eight timed intervals) defined as having less than 10 percent variance, the tests were considered complete.

# INFILTRATION TEST CALCULATIONS

| | | |
|---|---|---|
| **Boring Number:** | **B-2** | |
| **Diameter of Hole:** | **0.5833** | |
| **Hours Pre-Soak:** | **2.00** | |
| **Time Pre-Soak Initiated:** | **9:00** | |
| **Depth of Bottom (Below Grade):** | **9.40** | **feet** |
| **Name of Tester:** | **Susan Kirkgard** | |
| **Date Tested:** | **7/22/2010** | |
| **Method to Prevent Caving:** | **Gravel Packing** | **(none)** |

**PreSoak**

| t-intial | t-final | delta t (hours | d-bottom (feet) | d-initial | d-final | delta d=F | Lave | D (feet) | Q (gal/sf/day) | seepage mpi | in/hour |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:00 | 9:30 | 0.50 | 9.40 | 0.00 | 2.31 | 2.31 | 8.25 | 0.5833 | 2.94 | 61.19 | 0.98 |
| 9:30 | 10:00 | 0.50 | 9.40 | 0.00 | 2.19 | 2.19 | 8.31 | 0.5833 | 2.77 | 65.01 | 0.92 |
| 10:00 | 10:30 | 0.50 | 9.40 | 0.00 | 2.29 | 2.29 | 8.26 | 0.5833 | 2.91 | 61.80 | 0.97 |
| 10:30 | 11:00 | 0.50 | 9.40 | 0.00 | 2.32 | 2.32 | 8.24 | 0.5833 | 2.96 | 60.89 | 0.99 |

| t-intial | t-final | delta t (hours | d-bottom (feet) | d-initial | d-final | delta d=F | Lave | D (feet) | Q (gal/sf/day) | seepage mpi | in/hour |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11:00 | 11:30 | 0.5 | 9.40 | 0.00 | 2.39 | 2.39 | 8.21 | 0.5833 | 3.06 | 58.86 | 1.02 |
| 11:30 | 12:00 | 0.5 | 9.40 | 0.00 | 2.41 | 2.41 | 8.20 | 0.5833 | 3.09 | 58.30 | 1.03 |
| 12:00 | 12:30 | 0.5 | 9.40 | 0.00 | 2.35 | 2.35 | 8.23 | 0.5833 | 3.00 | 60.00 | 1.00 |
| 12:30 | 13:00 | 0.5 | 9.40 | 0.00 | 2.40 | 2.40 | 8.20 | 0.5833 | 3.07 | 58.57 | 1.02 |
| 13:00 | 13:30 | 0.5 | 9.40 | 0.00 | 2.52 | 2.52 | 8.14 | 0.5833 | 3.25 | 55.38 | 1.08 |
| 13:30 | 14:00 | 0.5 | 9.40 | 0.00 | 2.62 | 2.62 | 8.09 | 0.5833 | 3.40 | 52.94 | 1.13 |
| 14:00 | 14:30 | 0.5 | 9.40 | 0.00 | 2.45 | 2.45 | 8.18 | 0.5833 | 3.15 | 57.20 | 1.05 |
| 14:30 | 15:00 | 0.5 | 9.40 | 0.00 | 2.42 | 2.42 | 8.19 | 0.5833 | 3.10 | 58.02 | 1.03 |
| 15:00 | 15:30 | 0.5 | 9.40 | 0.00 | 2.45 | 2.45 | 8.18 | 0.5833 | 3.15 | 57.20 | 1.05 |
| 15:30 | 16:00 | 0.5 | 9.40 | 0.00 | 2.41 | 2.41 | 8.20 | 0.5833 | 3.09 | 58.30 | 1.03 |
| | | | | | | | | | **AVERAGE** | **57.48** | 1.04 |

## INFILTRATION TEST CALCULATIONS

| | |
|---|---|
| Boring Number: | B-4 |
| Diameter of Hole: | 0.5833 |
| Hours Pre-Soak: | 2.00 |
| Time Pre-Soak Initiated: | 12:15 |
| Depth of Bottom (Below Grade): | 10.00 |
| Name of Tester: | Susan Kirkgard |
| Date Tested: | 7/22/2010 |
| Method to Prevent Caving: | Gravel Packing (none) |

PreSoak

| t-intial | t-final | delta t (hours) | d-bottom (feet) | d-initial | d-final | delta d=F | Lave | D (feet) | Q (gal/sf/day) | seepage mpi | in/hour |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:15 | 12:45 | 0.50 | 10.00 | 0.00 | 3.05 | 3.05 | 8.48 | 0.5833 | 3.78 | 47.64 | 1.26 |
| 12:45 | 13:15 | 0.50 | 10.00 | 0.00 | 3.00 | 3.00 | 8.50 | 0.5833 | 3.71 | 48.57 | 1.24 |
| 13:15 | 13:45 | 0.50 | 10.00 | 0.00 | 3.55 | 3.55 | 8.23 | 0.5833 | 4.53 | 39.72 | 1.51 |
| 13:45 | 14:15 | 0.50 | 10.00 | 0.00 | 2.62 | 2.62 | 8.69 | 0.5833 | 3.17 | 56.86 | 1.06 |

| t-intial | t-final | delta t (hours) | d-bottom (feet) | d-initial | d-final | delta d=F | Lave | D (feet) | Q (gal/sf/day) | seepage mpi | in/hour |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14:15 | 14:45 | 0.50 | 10.00 | 0.00 | 2.95 | 2.95 | 8.53 | 0.5833 | 3.63 | 49.54 | 1.21 |
| 14:45 | 15:15 | 0.50 | 10.00 | 0.00 | 3.08 | 3.08 | 8.46 | 0.5833 | 3.82 | 47.09 | 1.27 |
| 15:15 | 15:45 | 0.50 | 10.00 | 0.00 | 3.09 | 3.09 | 8.46 | 0.5833 | 3.84 | 46.91 | 1.28 |
| 15:45 | 16:15 | 0.50 | 10.00 | 0.00 | 3.39 | 3.39 | 8.31 | 0.5833 | 4.29 | 42.00 | 1.43 |
| 16:15 | 16:45 | 0.50 | 10.00 | 0.00 | 3.20 | 3.20 | 8.40 | 0.5833 | 4.00 | 45.00 | 1.33 |
| 16:45 | 17:15 | 0.50 | 10.00 | 0.00 | 2.96 | 2.96 | 8.52 | 0.5833 | 3.65 | 49.35 | 1.22 |
| 17:15 | 17:45 | 0.50 | 10.00 | 0.00 | 2.75 | 2.75 | 8.63 | 0.5833 | 3.35 | 53.77 | 1.12 |
| 17:45 | 18:15 | 0.50 | 10.00 | 0.00 | 2.80 | 2.80 | 8.60 | 0.5833 | 3.42 | 52.66 | 1.14 |
| 18:15 | 18:45 | 0.50 | 10.00 | 0.00 | 2.85 | 2.85 | 8.58 | 0.5833 | 3.49 | 51.58 | 1.16 |
| 18:45 | 19:15 | 0.50 | 10.00 | 0.00 | 2.80 | 2.80 | 8.60 | 0.5833 | 3.42 | 52.66 | 1.14 |
| | | | | | | | | | **AVERAGE** | **49.06** | **1.22** |

# ACRONYMS

## ACRONYMS

| | |
|---|---|
| AC | asphalt concrete |
| ASCE | American Society of Civil Engineers |
| ASTM | American Society for Testing and Materials |
| BGS | below ground surface |
| CBC | California Building Code |
| CDMG | California Division of Mines and Geology |
| CGS | California Geological Survey |
| g | gravitational acceleration (32.2 feet/second$^2$) |
| IBC | International Building Code |
| MCE | maximum considered earthquake |
| NGA | next generation attenuation |
| PCC | portland concrete cement |
| pcf | pounds per cubic foot |
| psf | pounds per square foot |
| PSHA | Probabilistic Seismic Hazard Assessment |
| psi | pounds per square inch |
| PVC | polyvinyl chloride |
| SPT | Standard Penetration Test |

GEODESIGN INC

# Addendum Transmittal



| | | | |
|---|---|---|---|
| To: | Tom Afschar, AIA, CASp | From: | Susan Kirkgard and Chris Zadoorian |
| Company: | City of Santa Monica Architecture Services | Date: | October 27, 2011 |
| Address: | 1437 4th Street, Suite 300<br>Santa Monica, CA 90401 | | |

| | |
|---|---|
| cc: | n/a |

| | |
|---|---|
| GDI Project: | SMonica-10-01 |
| RE: | Proposed Santa Monica Pico Branch Library |

| Original File Name | Date | Document Title |
|---|---|---|
| SMonica-10-01-100810-geor.doc | 10/8/10 | Report of Geotechnical Engineering Services; proposed Santa Monica Pico Branch Library; Virginia Avenue Park; Santa Monica, California; Special Provisions Number 2119 |

| Addendum Number | Date | Description |
|---|---|---|
| 1 | 10/27/11 | Geotechnical Recommendations for Temporary Excavations (attached) |

kt
Attachments
Six copies submitted
Document ID: SMonica-10-01-102711-geoat-1.doc
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GEODESIGN INC

October 27, 2011

City of Santa Monica
Architecture Services
1437 4th Street, Suite 300
Santa Monica, CA 90401

Attention: Mr. Tom Afschar, AIA, CASp

**Addendum 1**
**Geotechnical Recommendations for Temporary Excavations**
Proposed Santa Monica Pico Branch Library
Virginia Avenue Park
Santa Monica, California
GeoDesign Project: SMonica-10-01

## INTRODUCTION

We performed a geotechnical investigation for the proposed Santa Monica Pico Branch Library to be constructed within Virginia Avenue Park located at the northwest corner of Pico Boulevard and Cloverfield Boulevard in Santa Monica, California. The results of our investigation were submitted in a report dated October 8, 2010.

The proposed project consists of constructing a 7,500-square-foot, at-grade branch library building and adjacent surface parking to accommodate 30 vehicles.

At the time our report was prepared, the exact library building footprint was not determined. Since that time, the proposed library building footprint has been established to be immediately east of the existing Thelma Terry Community Center Building as shown on the attached Figure 1.

As a result, foundation excavations for the proposed library building will undermine the existing foundations. You have furnished us with sketches prepared by Thorton-Tomasetti that depict the existing conditions and we anticipate that the proposed library foundation bottom will be approximately 1 to 2 feet below the bottom of the existing community center building foundation.

This addendum presents recommendations for the temporary excavations necessary to construct the foundation for the proposed library along the west side.

## RECOMMENDATIONS FOR TEMPORARY EXCAVATIONS - SLOT CUTTING

One method for constructing the temporary excavation for the new library foundation is slot cutting. Slot cutting refers to sequencing an excavation for continuous footings.

To accomplish the slot cutting, the library building foundation should be divided up into 5-foot-long sections and each three consecutive sections should be labeled A, B, and C as shown on Figure 1.

The excavation may be conducted sequentially, first by excavation of slot A sections. Upon completion of the Section A excavations, the foundation should be constructed in the slot A sections.

The process should then be repeated for slot B sections, and then again for slot C sections to complete the foundation construction.

♦ ♦ ♦

It is our pleasure to provide continued geotechnical consultation services for the proposed Santa Monica Pico Branch Library. Please contact us with any questions or comments regarding this addendum.

Sincerely,

GeoDesign, Inc.

Susan F. Kirkgard, C.E.G.
Associate Geologist

REGISTERED GEOLOGIST
SUSAN FRANZEN KIRKGARD
No. 1754
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Christopher J. Zadoorian, G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER JOHN ZADOORIAN
No. 2493
10/27/11
GEOTECHNICAL
STATE OF CALIFORNIA

SFK:CJZ:kt
Attachment
Six copies submitted
Document ID: SMonica-10-01-102711-geoa-1.doc
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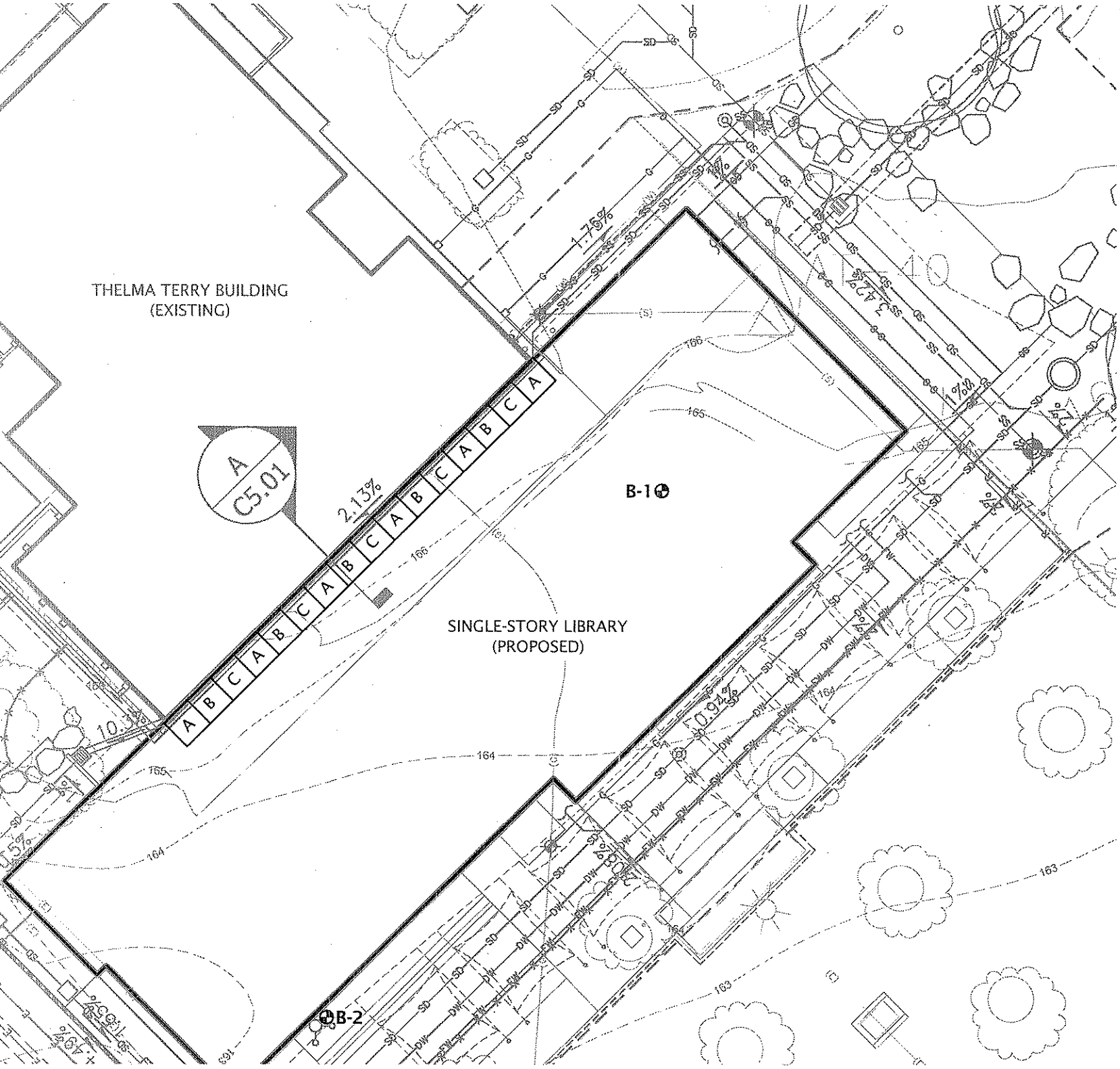
# FIGURES




**CONSTRUCT**

1. EXCAVA
2. CONSTR SLOT A S
3. EXCAVA
4. CONSTR SLOT B S
5. EXCAVA
6. CONSTR SLOT C S

0