Mills College
5000 MacArthur Blvd.
Oakland, CA 94613
www.mills.edu

MILLS

Ms. Barbara Jakub
Alameda County Health Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

October 17, 2013

RE: **Well Survey**
Mills College
5000 MacArthur Blvd.
Oakland, California

Dear Ms. Jakub,

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,

Linda A. Zitzner
AVP Facilities, Auxiliaries, and Campus Planning
Off: 510-430-2024
Fax: 510-430-2306
lzitzner@mills.edu

EquoLogic

Ms. Dilan Roe
Alameda County Health Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

October 17, 2013
Project 411-01.03

RE: **Well Survey Report**
Mills College
5000 MacArthur Boulevard
Oakland, California

Dear Ms. Roe,

EquoLogic, on behalf of Mills College, has prepared the following Well Survey Report. In previous correspondence, Ms. Barbara Jakub requested information regarding an irrigation well possibly shown on an "old" topographic map. No active water supply wells are currently known to exist on the campus.

TOPOGRAPHIC MAPS

Ms. Jakub was concerned with possibility that a well was shown on topographic maps on a hill top in the northeastern portion of the campus. EquoLogic obtained topographic maps covering the Mills College area dated 1959, 1968, 1973, 1980, and 1997. Copies of the Mills College portions of the topographic maps are provided as Attachment A. All maps except 1959 and 1997 show a black dot and the word "Water" located on the subject a hill top. The 1959 map has the designation "WT". The feature is not shown on the 1997 map. EquoLogic also obtained a Sanborn Insurance map for the college for 1950. The map (Attachment B) shows a water tank at the location in the black dot shown on the topographic maps. A reconnaissance of the area found no evidence of a well. It is concluded that the feature shown on historic topographic maps was a water tank not a well.

campus. The wells ranged in depth from 324 to 358 feet. One report indicated that the well was installed in 1930. The reports did not contain any specific location data.

SANBORN MAPS

Sanborn maps dated 1950 show three water supply well locations (Attachment C). Two wells are shown approximately 500 feet north of Mills Hall (Area 1). A third well is shown approximately 600 feet south of Mills Hall (Area 2). No evidence of wells was observed in either area.

GEOPHYSICAL STUDY

EquoLogic obtained the services of Southwest Geophysical, Inc. (SGI) to evaluate the locations of the three wells identified on the Sanborn map. Their report is provided as Attachment D. Traverses with a magnetometer and magnetic gradiometer indicated two anomalies near the locations of the two well shown on the Sanborn maps located in Area 1. Both locations are located adjacent to electric utility vault boxes and high voltage underground lines (see photos, Figure 3 of the SGI report).

The location of the southern well shown on the Sanborn map is now an area of dense brush adjacent to a parking lot (see photo, Figure 3 of the SGI report). Magnetic data collected at the study area indicate a large anomaly at the well location projected from the Sanborn map. In addition, the magnetometer and magnetic gradiometer had high responses which correlated with the magnetic data.

CONCLUSIONS AND RECOMMENDATIONS

EquoLogic provides the following conclusions and recommendations;

- The dot on historic topographic maps represents a water tank, not a well.
- Geophysical data indicates that three former water supply wells appear to be located on the campus.
- EquoLogic recommends performing an excavation of the Area 2 anomaly. Excavations can not be performed safely in Area 1 due to the presence of high voltage electric lines.

You can contact me at (408) 656-2505 or by email at ldooley@equologicgroup.com.

Sincerely,

Lee Dooley
Senior Hydrogeologist
CHG 183

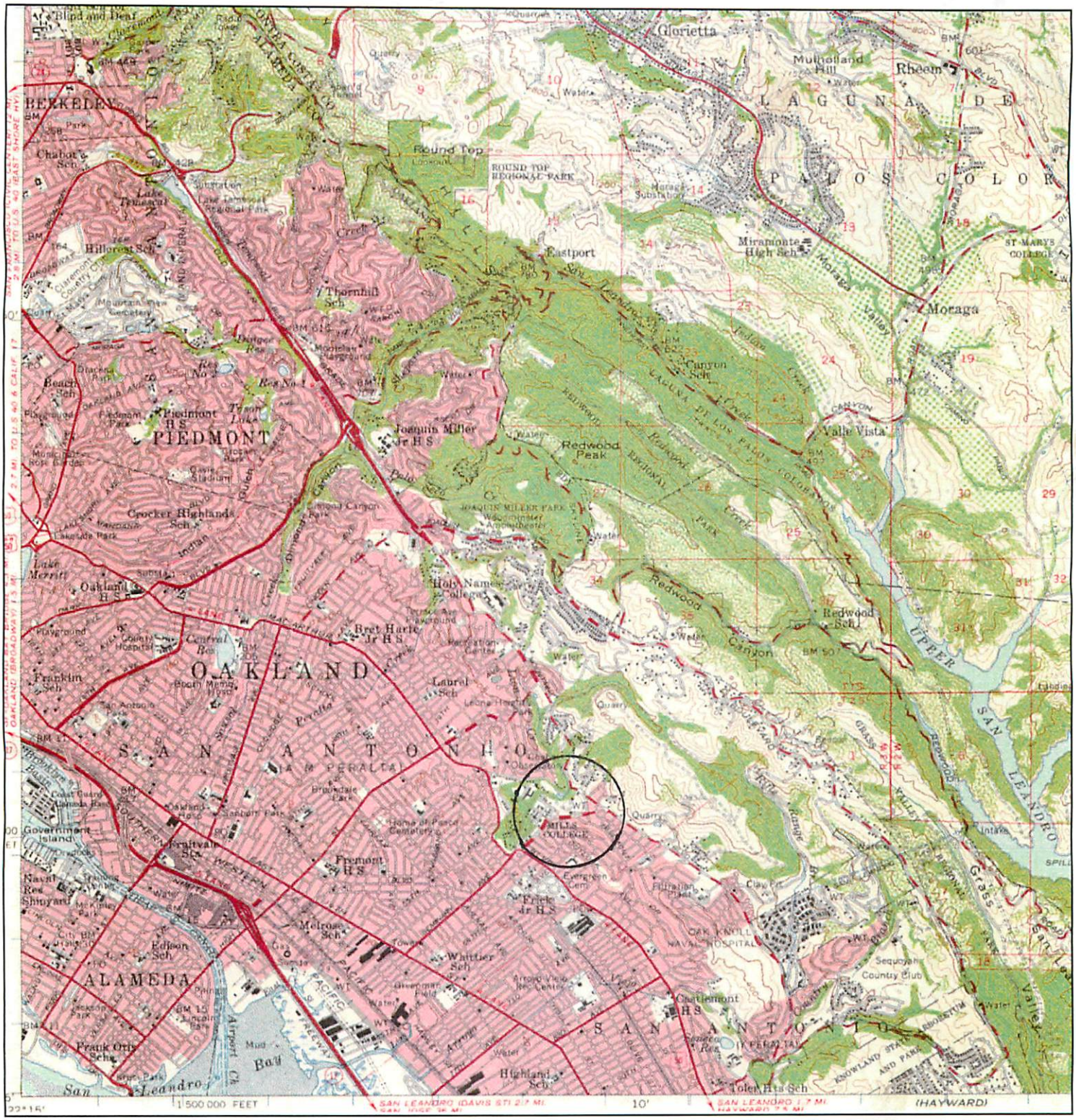
Attachments

Attachment A – Topographic Maps
Attachment B – Sanborn Maps – Water Tank
Attachment C – Sanborn Map – Wells
Attachment D – Southwest Geophysical, Inc. Report

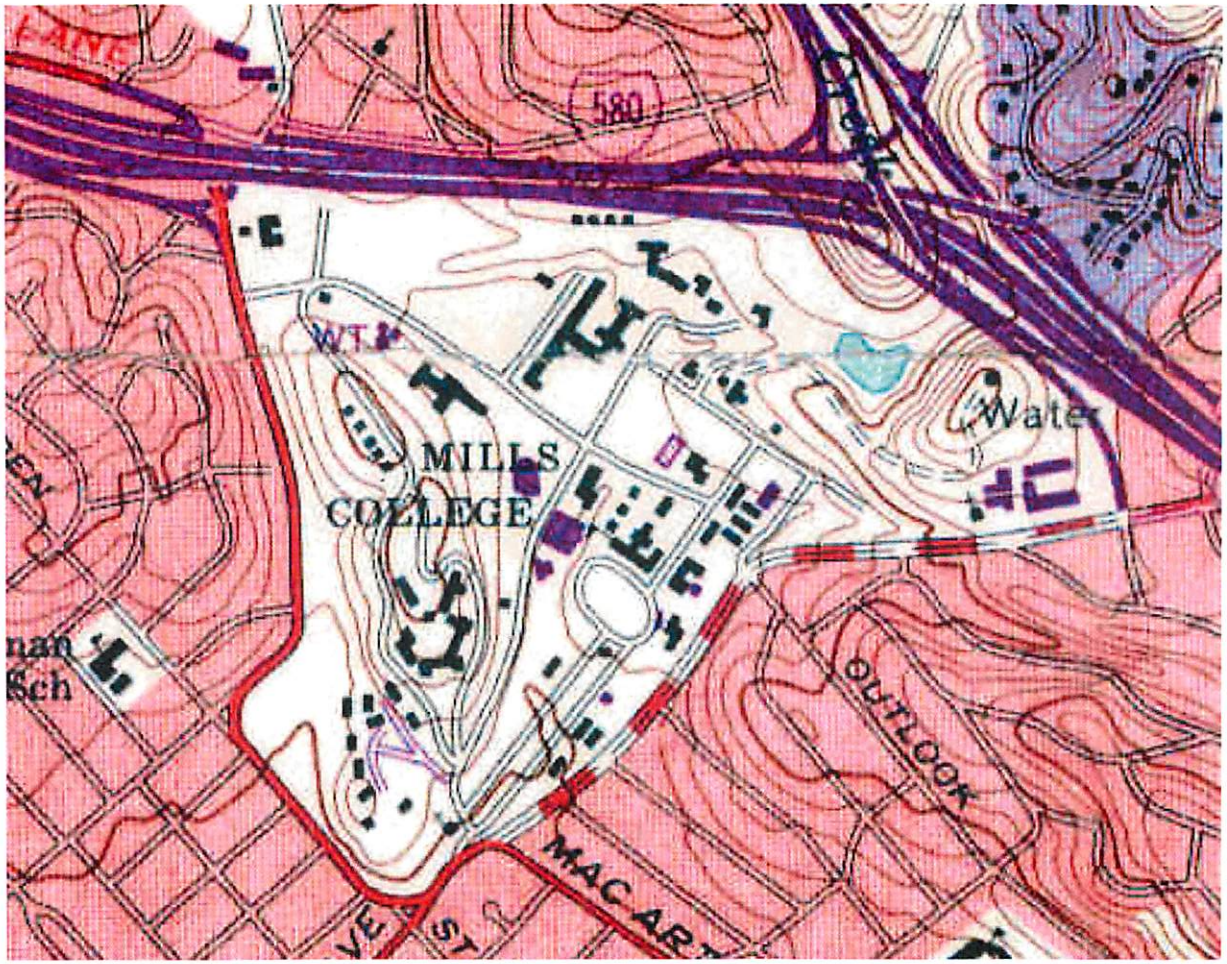
Cc: Linda Zitzner, Mills College, 5000 MacArthur Blvd., Oakland, CA 94613-1301

ATTACHMENT A
Topographic Maps

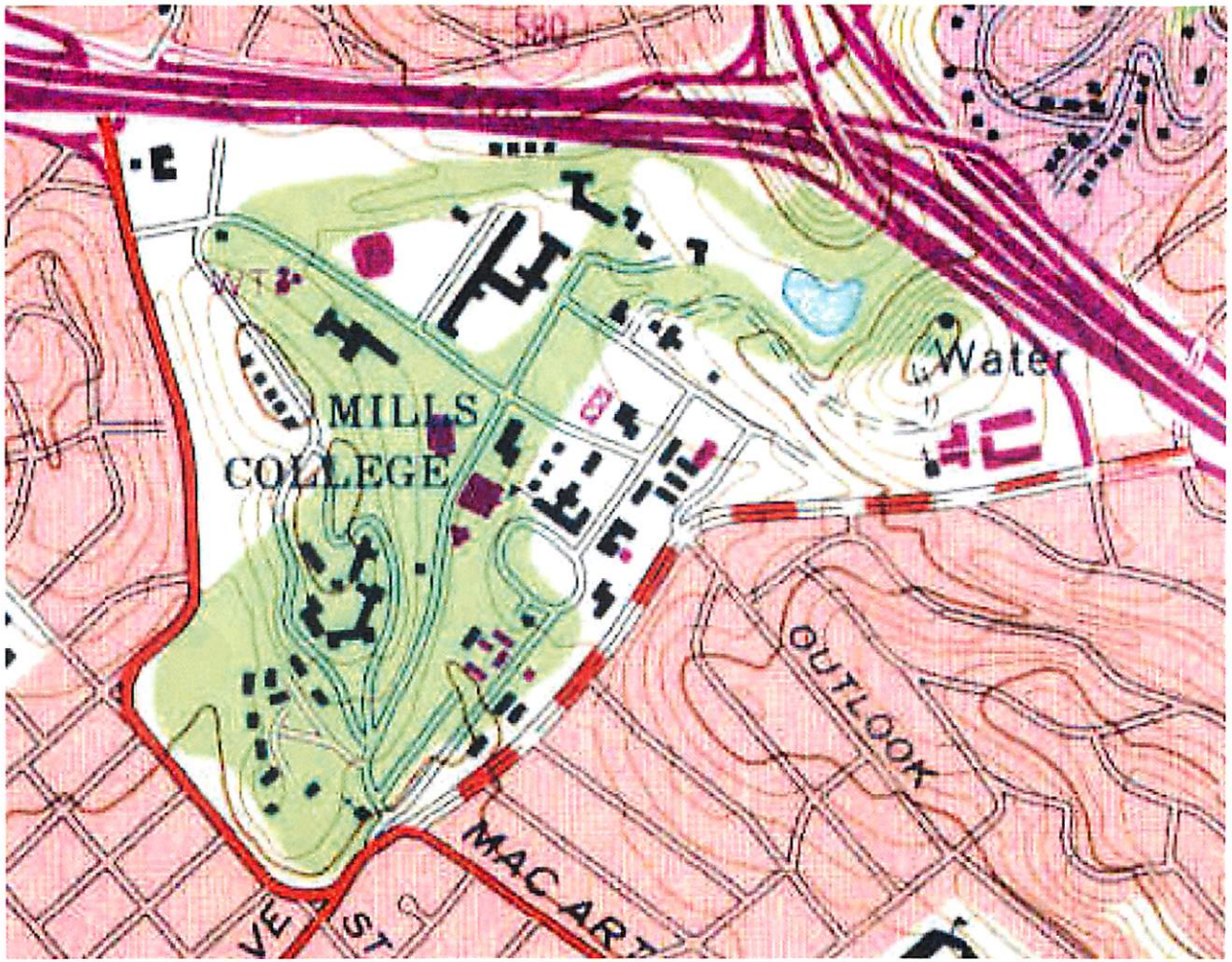
Historical Topographic Map



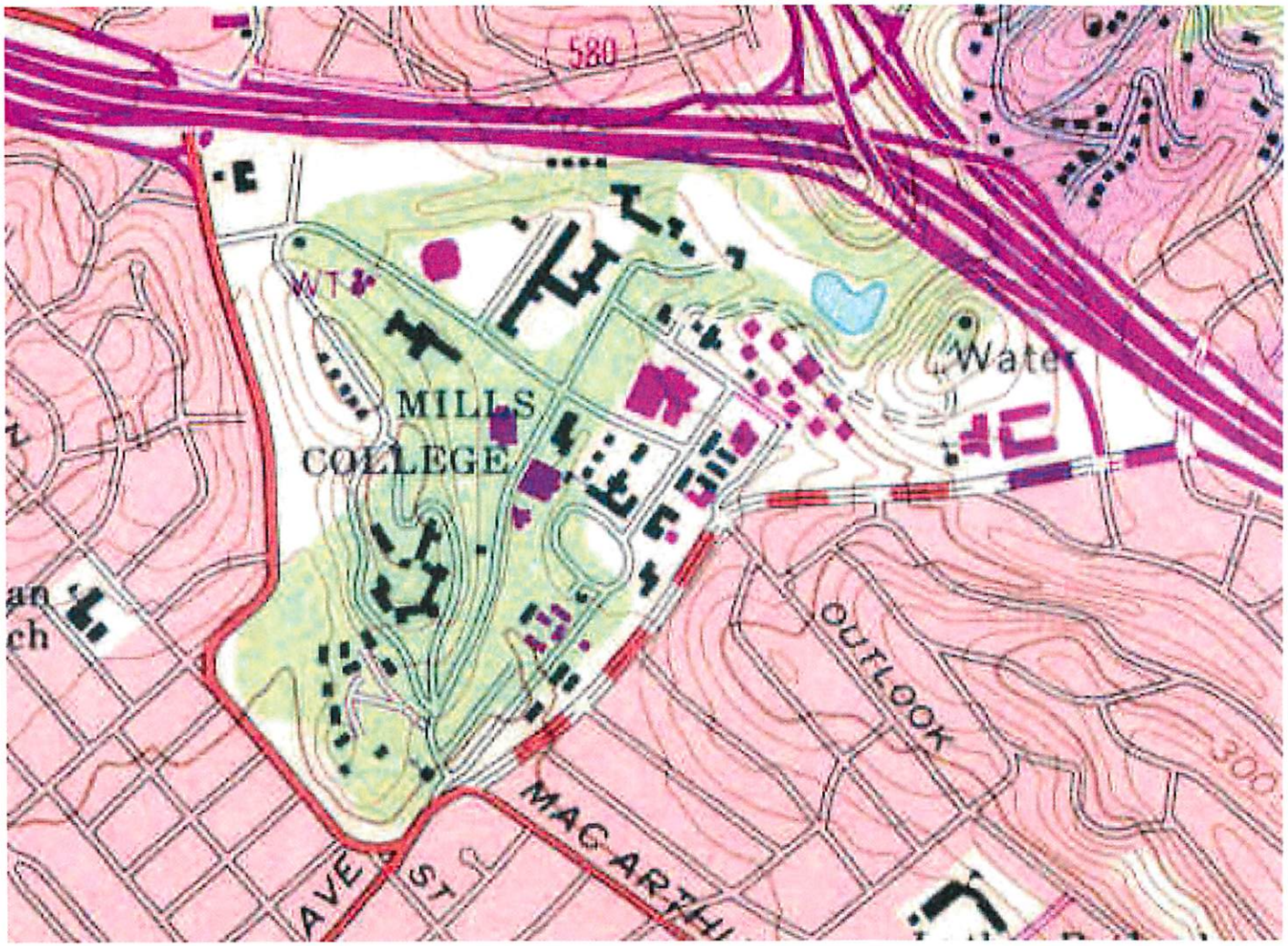
N	TARGET QUAD NAME: CONCORD MAP YEAR: 1959 SERIES: 15 SCALE: 1:62500	SITE NAME: Mills College ADDRESS: 5000 MacArthur Blvd. Oakland, CA 94613 LAT/LONG: 37.7826 / -122.1873	CLIENT: Equologic CONTACT: Lee Dooley INQUIRY#: 3556776.1 RESEARCH DATE: 03/26/2013



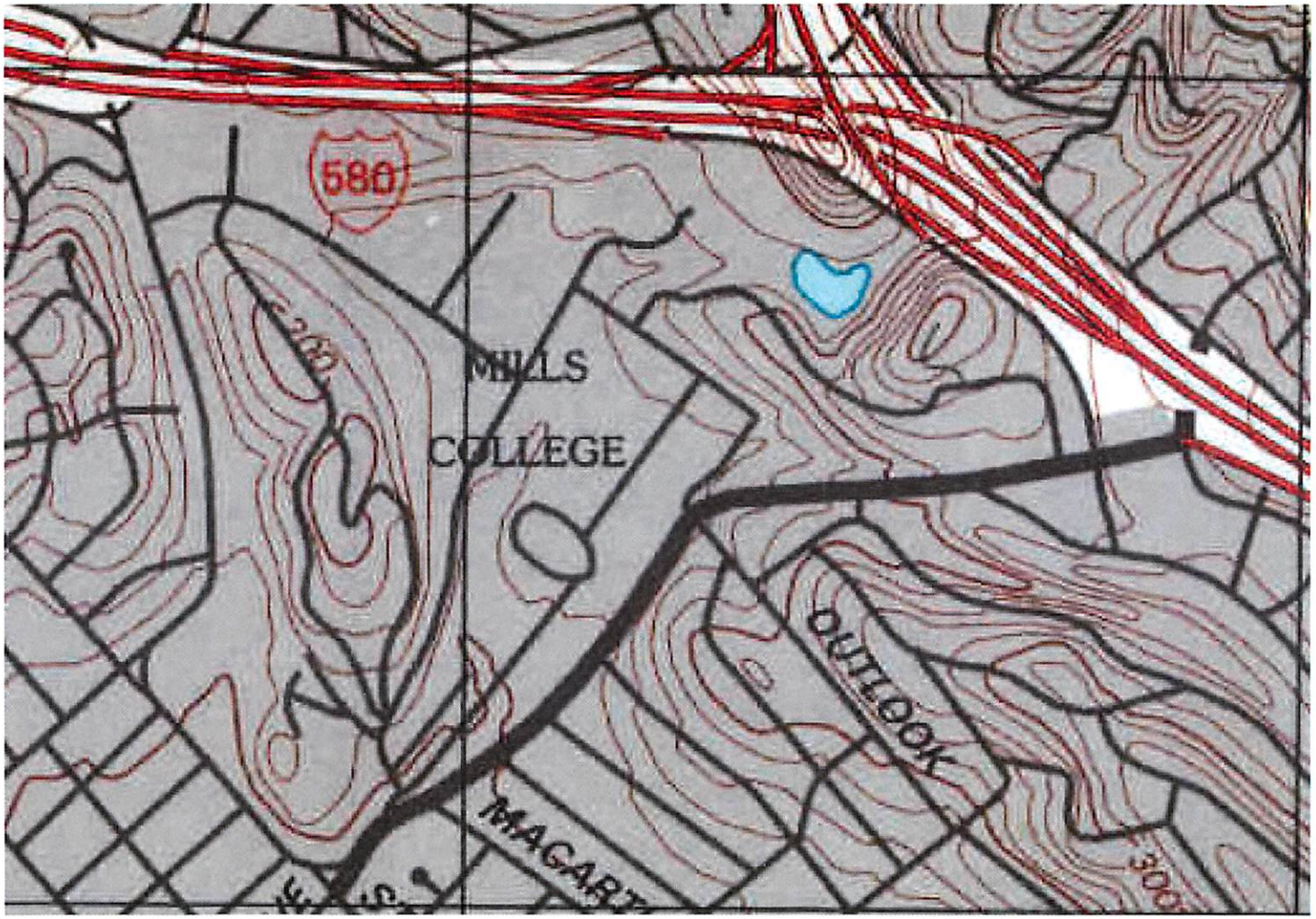
1968



1973



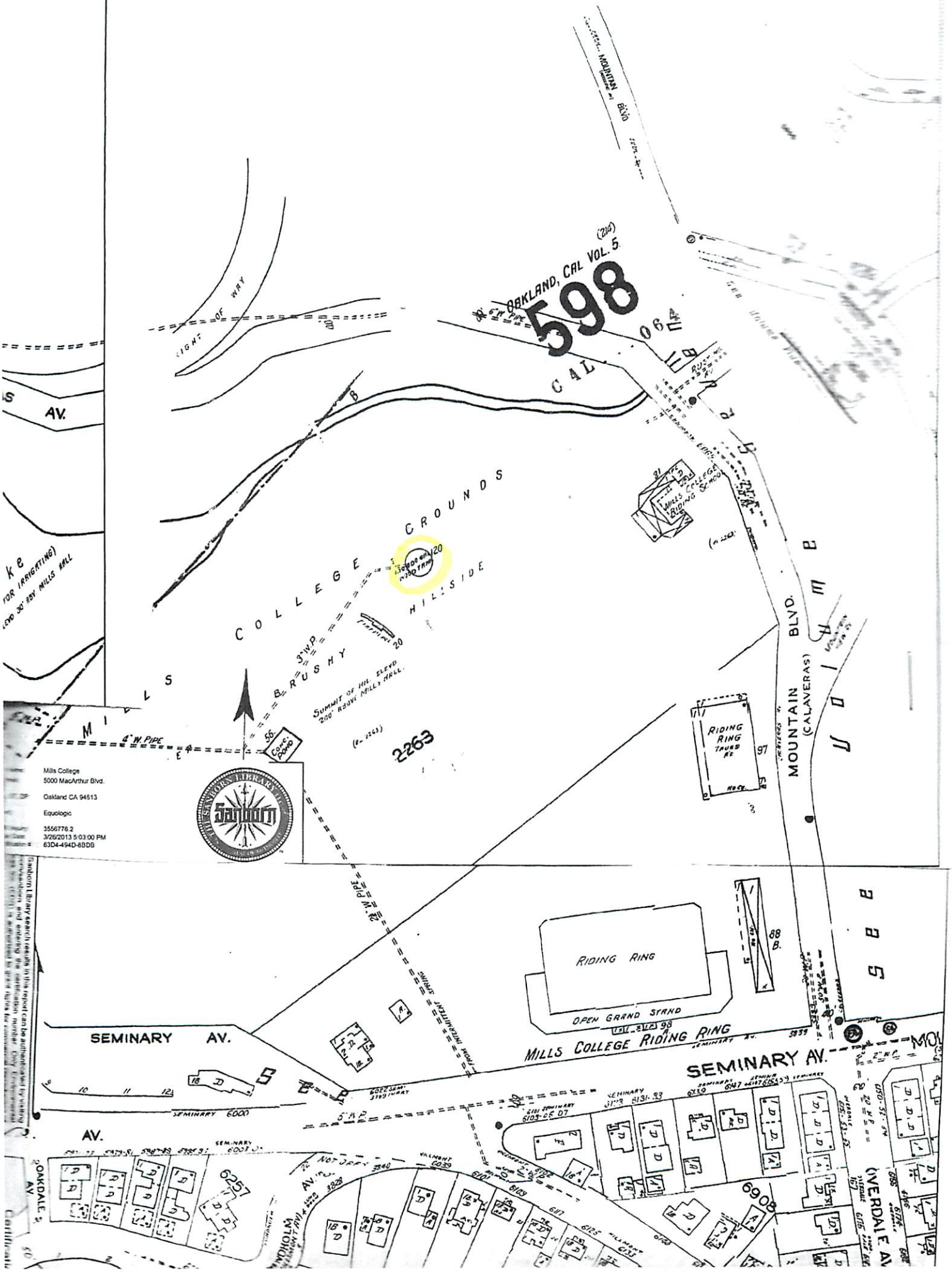
1980



1997

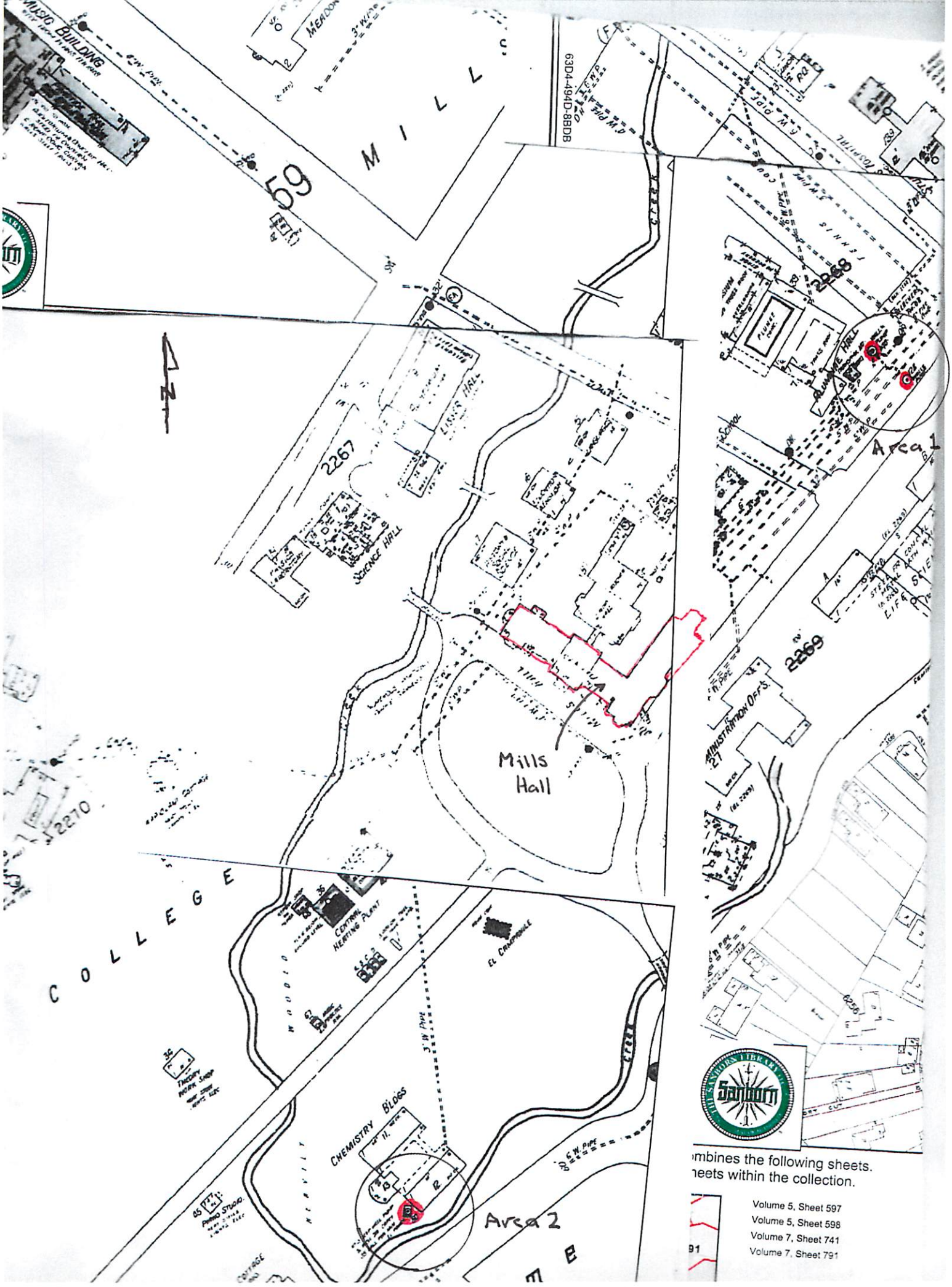
ATTACHMENT B

Sanborn Map – Water Tank


OAKLAND, CAL VOL. 5.
598
COLLEGE GROUNDS
MILLS COLLEGE RIDING RING
SEMINARY AV.
MOUNTAIN BLVD. (CALAVERAS)
RIDING RING
OPEN GRAND STAND
2263
Mills College
5000 MacArthur Blvd.
Oakland CA 94613
Equologic
3556776.2
3/26/2013 5:03:00 PM
63D4-494D-8BDB
Sanborn

ATTACHMENT C

Sanborn Map – Wells


MUSIC BUILDING
MEADOW
MILL
59
63D4-494D-8BDB
2268
2267
LEWIS HALL
SCIENCE HALL
Area 1
2269
ADMINISTRATION OFFS.
Mills Hall
2270
COLLEGE
CENTRAL HEATING PLANT
EL CAMPANILE
CHEMISTRY BLDGS
Area 2
Sanborn
mbines the following sheets.
heets within the collection.
Volume 5, Sheet 597
Volume 5, Sheet 598
Volume 7, Sheet 741
Volume 7, Sheet 791

ATTACHMENT D

Southwest Geophysical, Inc. Report

GEOPHYSICAL SURVEY
MILLS UNIVERSITY
OAKLAND, CALIFORNIA

PREPARED FOR:
EquoLogic
1095 Branham Lane #204
San Jose, CA 95136

PREPARED BY:
Southwest Geophysics, Inc.
8057 Raytheon Road, Suite 9
San Diego, CA 92111

August 27, 2013
Project No. 113329

SOUTHWEST GEOPHYSICS, INC.

YOUR SUBSURFACE SOLUTION

August 27, 2013
Project No. 113329

Mr. Lee Dooley
EquoLogic
1095 Branham Lane #204
San Jose, CA 95136

Subject: Geophysical Survey
Mills University
Oakland, California

Dear Mr. Dooley:

In accordance with your authorization we performed a geophysical survey pertaining to portions of Mills University located in Oakland, California. The purpose of our evaluation was to assess the presence of abandoned water wells in two separate survey areas. Our services were conducted on August 16, 2013. This data report presents the survey methodology, equipment used, analysis, and results.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.

Aaron T. Puente
Senior Staff Geologist/Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

ATP/PFL/pfl
Distribution: Addressee (electronic)

8057 Raytheon Road, Suite 9 • San Diego • California 92111 • Telephone 858-527-0849 • Fax 858-225-0114

TABLE OF CONTENTS

1. INTRODUCTION

In accordance with your authorization we performed a geophysical survey pertaining to portions of Mills University located in Oakland, California (Figures 1a and 1b). The purpose of our evaluation was to assess the presence of abandoned water wells in two separate survey areas. Our services were conducted on August 16, 2013. This data report presents the survey methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of a geophysical survey at the subject site. Our survey included the use of a Geometrics G-858 cesium vapor magnetometer, Schonstedt GA-52 magnetic gradiometer, Fisher M-Scope TW-6 pipe and cable locator, RD8000 line tracer and GSSI SIR 3000 GPR unit using a 400 MHz transducer.
- Compilation and analysis of the data collected.
- Preparation of this report presenting our findings, conclusions and recommendations.

3. SITE AND PROJECT DESCRIPTION

The study areas included portions of two parking lots along Wetmore Road (Figure 1a). Area 1 is located along the northwest side of Wetmore Road and just southwest of Post Road. Survey Area 2 is located along the southeast side of Wetmore Road and just west of Mauritania Avenue (Figure 1b). The two survey areas, which were delineated by your office, are generally located along the southeast portion of the University.

Based on our discussions with you it is our understanding that two water wells once occupied Area 1 and one water well once occupied Area 2. Specifics regarding their precise location and removal, if performed, reportedly are not available.

4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our evaluation included the use of a Geometrics G-858 cesium vapor magnetometer, GSSI SIR 3000 GPR, Schonstedt, model GA-52C magnetic gradiometer, Fisher M-Scope TW-6 pipe and

cable locator, and RD8000 line tracer. These instruments provide real-time results, and facilitate the delineation of subsurface features.

The Geometrics G-858 cesium vapor magnetometer measures the strength of the earth's magnetic field and the superposed magnetic field of ferromagnetic materials in its vicinity. The precision of the instrument is approximately $1/10^{th}$ gamma. The earth's field strength is roughly 48,400 gammas at this latitude. The earth's magnetic field is inclined in the direction of the north magnetic pole. Because of this inclination, a buried ferromagnetic object generally is expressed as a paired anomaly with a positive (above background) slightly to the south and a negative slightly in the direction of magnetic north, whereas a long vertical ferromagnetic object (i.e., well) would generally be expressed as a positive (monopole).

The GPR instrument beams energy into the ground from its transducer/antenna, in the form of electromagnetic waves. A portion of this energy is reflected back to the antenna at boundaries in the subsurface across which there are an electrical contrast. The recorder continuously makes a record of the reflected energy as the antenna is moved across the ground surface. The greater the electrical contrast, the higher the amplitude of the returned energy. The EM wave travels at a velocity unique to the material properties of the ground being studied, and when these velocities are known, or closely estimated from ground conductivity values and other information, two-way travel times can be converted to depth. Penetration into the ground and resolution of the GPR images produced are a function of ground electrical conductivity and dielectric constant. Images tend to be graphic, even at considerable depth, in sandy soils, but penetration and resolution may be limited in more conductive clayey moist ground.

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not in close proximity to a magnetic object, that is, only in the earth's field, the instrument emits an audible signal at a low frequency. When the instrument passes over buried iron or steel objects, so that the field is significantly different at the two sensors, the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors.

The M-Scope TW-6 device energizes the ground by producing an alternating primary magnetic field with alternating current (AC) in the transmitting coil. If conducting materials are within the area of influence of the primary field, alternating eddy currents are induced to flow in the conductors. A receiving coil senses the secondary magnetic field produced by these eddy currents, and outputs an audio response. The strength of the secondary field is a function of the conductivity of the object, say a pipe, tank or cluster of drums, its size, and its depth and position relative to the instrument's two coils. Conductive objects, to a depth of approximately 10 feet are sensed. Also the device is somewhat focused, that is, it is more sensitive to conductors below (and above) the instrument, than to conductors off to the side.

Where risers are present, the RD8000 utility locator transmitter can be connected to the object, and a current is impressed on the conductor pipe or cable. The receiver unit is tuned to this same frequency, and it is used to trace the pipe's surface projection away from the riser. In addition, the instrument may be used in the passive mode, whereby radio and 60 Hz electromagnetic signals produced by communication and live electric lines are detected.

5. SURVEY METHODOLOGY

Our evaluation of the site primarily included the collection of magnetic (MAG) data using the cesium vapor magnetometer. The MAG data were collected in conjunction with a Trimble Pro XRS Global Positioning System (GPS) for spatial control in Area 2, with measurements collected at 0.1 second intervals along traverses spaced roughly 5 feet apart. MAG data were also evaluated in Area 1, however, due to the many metal surface features (i.e. manhole covers, vault lids, vehicles, and a transformer), the instrument response was monitored in real time and anomalies were marked on the ground surface with paint and stake chasers. Collected MAG data was downloaded to a portable computer in the field for preliminary analysis and then plotted on site maps.

The M-scope and magnetic gradiometer were also used in reconnaissance mode in both areas in order to further evaluate features detected with the magnetometer. The GPR, M-Scope, and line

tracer were also used to further evaluate candidate anomalies as well as the presence of detectable underground utilities/piping. Detected anomalies and utilities were marked on the ground surface with paint and the candidate anomalies were mapped (Figures 2a and 2b).

6. RESULTS, CONCLUSIONS AND RECOMMENDATIONS

The primary purpose of our evaluation was to evaluate the presence of former water wells in the two study areas. Our study included the use of a magnetometer, EM61, GPR, magnetic gradiometer, M-scope, and line tracer. The results of our survey are summarized below.

Area 1: As directed by you, we evaluated a large diameter pipe flange that was located inside of an unidentified manhole. An attempt to trace this line was not conclusive and appears to suggest that the pipe is non metallic in nature. Further evaluation of the Sanborn Maps provided by you indicated two water wells at the site, one northwest and one southeast of this unidentified manhole. Traverses with the magnetometer and magnetic gradiometer indicate two anomalies near the locations indicated on the Sanborn Maps (Figures 2a and 3)

Area 2: Evaluation of the Sanborn Maps provided by your office indicated that the former water well was located in an area of dense brush southeast of the parking lot. Magnetic data collected at the study area indicate a large anomaly in this area (Figures 2b and 3). In addition, the M-scope and magnetic gradiometer have high responses which correlate with the magnetic data. Additional magnetic responses in the study area appear to be the effect of street lights and sign posts.

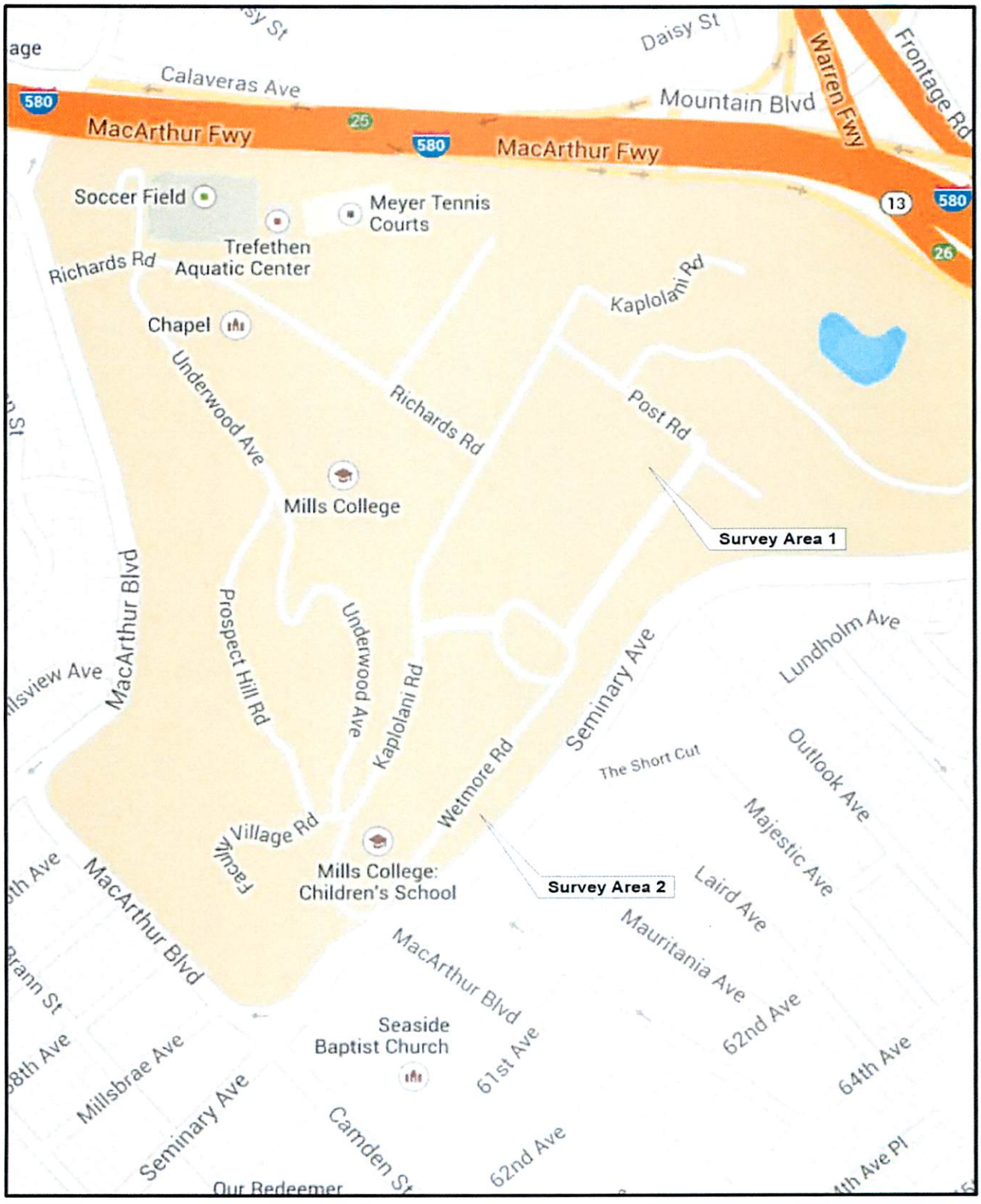
In order to further assess the features described above, we recommend that more direct methods be used. Such methods may include the excavation of exploratory trenches/test pits and/or borings.

It should be noted that the presence of existing structures and surface objects (i.e., reinforced concrete, structures, vehicles, fencing, etc.) potentially limited the survey. Where obstructions were present subsurface data could not be collected. Moreover, EM/magnetic responses produced by metal surface objects can potentially obscure subsurface features. In addition, GPR penetration was on the order of 2 to 3 feet below the ground surface; therefore, objects and/or features below this depth would not have been detected.

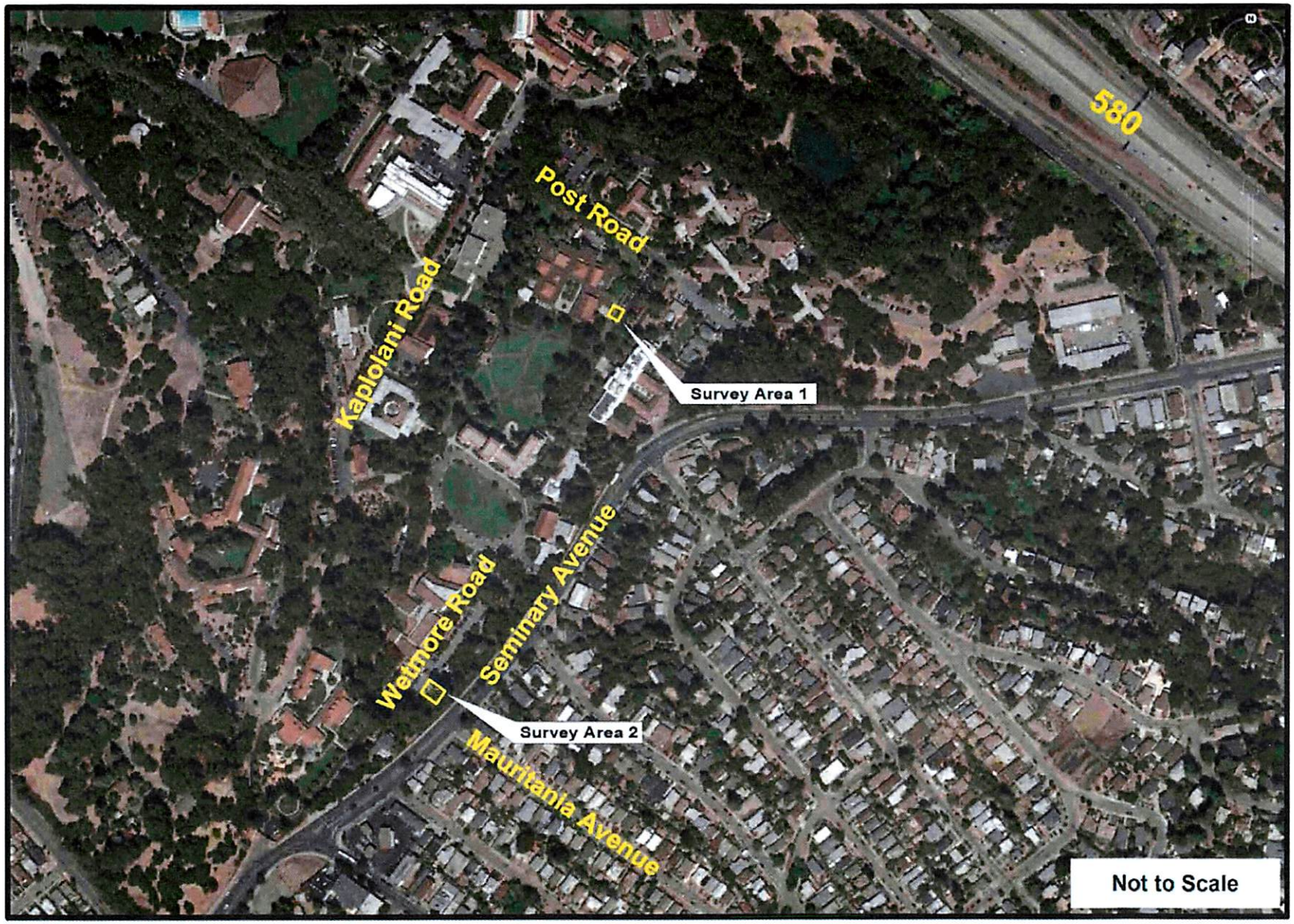
7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, Inc. should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.



SITE LOCATION MAP	N	Mills University Oakland, California	SOUTHWEST GEOPHYSICS INC.
		Project No.: 113329 / Date: 08/13	Figure 1a



SITE MAP

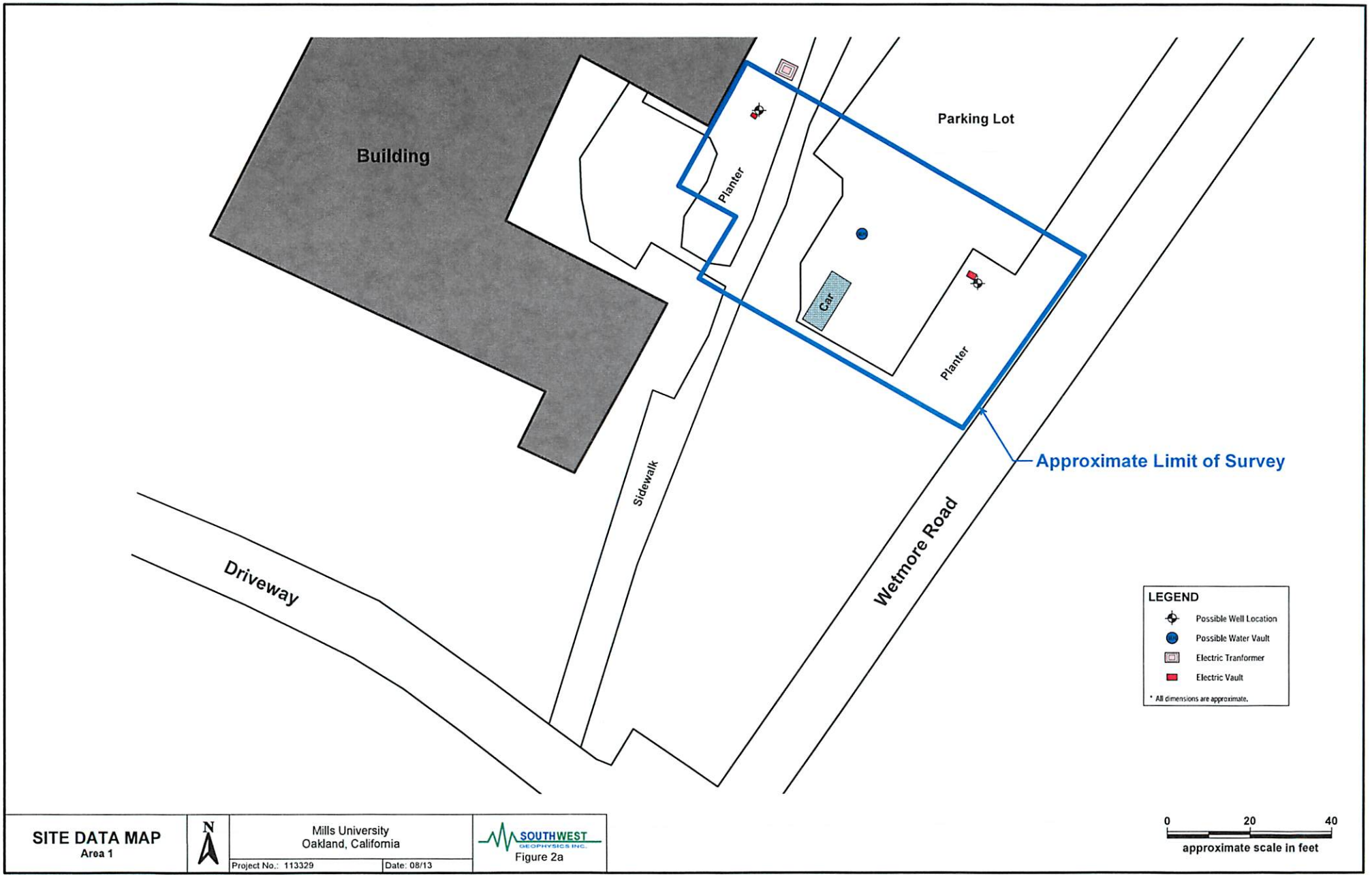
N

Mills University
Oakland, California

Project No.: 113329 | Date: 08/13

SOUTHWEST GEOPHYSICS INC.

Figure 1b



SITE DATA MAP
Area 1

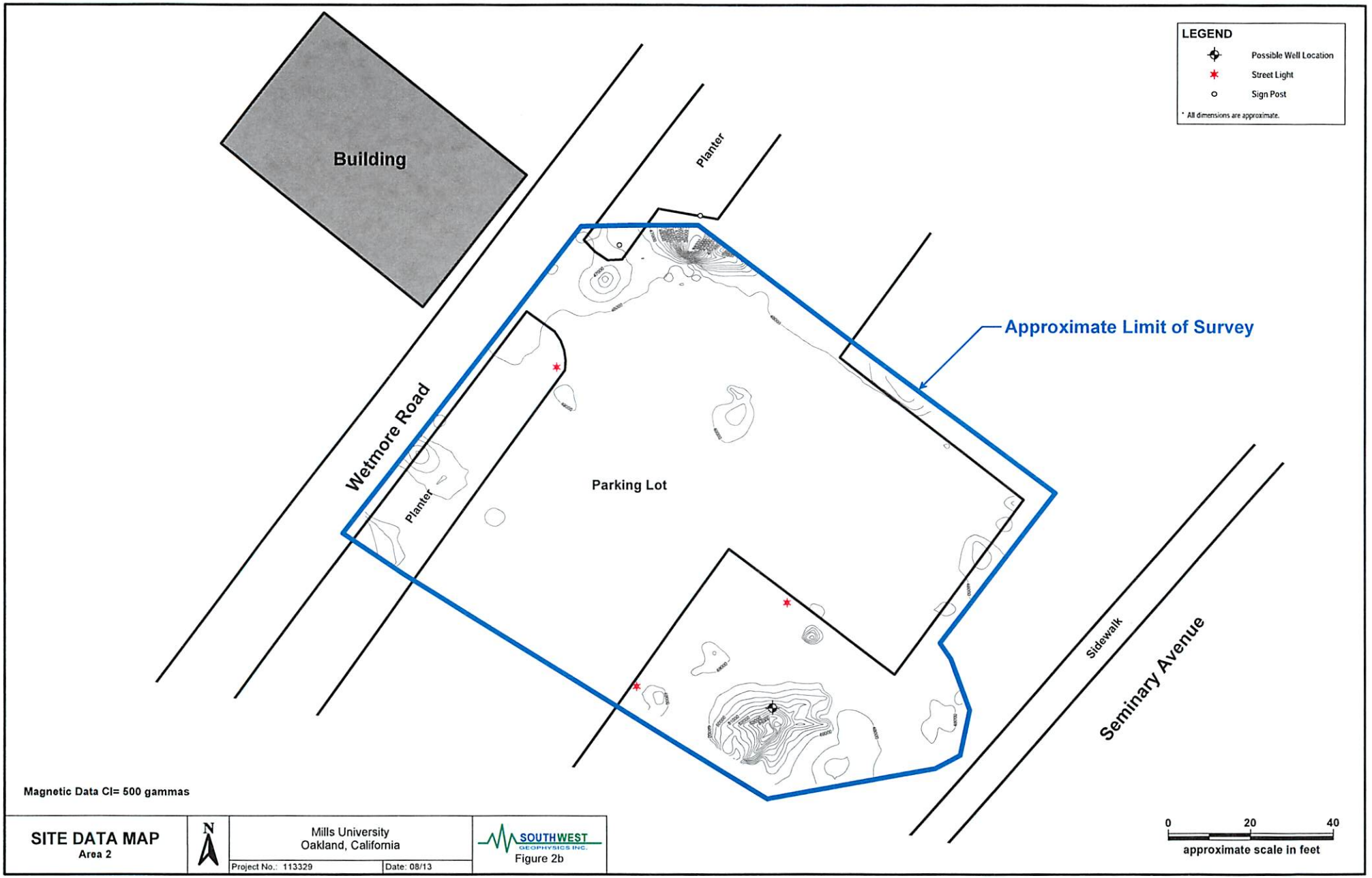
N

Mills University
Oakland, California

Project No.: 113329 | Date: 08/13

SOUTHWEST GEOPHYSICS INC.

Figure 2a


LEGEND
Possible Well Location
Street Light
Sign Post
* All dimensions are approximate.
Building
Planter
Approximate Limit of Survey
Wetmore Road
Parking Lot
Planter
Sidewalk
Seminary Avenue
Magnetic Data CI= 500 gammas
SITE DATA MAP
Area 2
N
Mills University
Oakland, California
Project No.: 113329
Date: 08/13
SOUTHWEST GEOPHYSICS INC.
Figure 2b
0
20
40
approximate scale in feet

SITE PHOTOGRAPHS

Mills University
Oakland, California

Project No.: 113329 | Date: 08/13

SOUTHWEST GEOPHYSICS INC.

Figure 3