

JOHN COYLE &



ASSOCIATES, Inc.

August 14, 2006
Project No. P022-06

TO: Mr. Keith Hess
3406 Church St.
Fortuna, CA 95540

SUBJECT: GEOLOGIC RECONNAISSANCE LETTER REPORT
Formerly Proposed Building Site on APN 518-112-02
Freshwater Lagoon Road
Orick, California

Dear Mr. Hess:

At your request we have completed our geologic reconnaissance of the Freshwater Lagoon property near Orick, California (Figure 1). The purpose of our investigation was to assess potential slope stability issues regarding the recently graded areas of the site as requested by Mr. Michael Damion of the Humboldt County Building Department. It is our understanding that it was proposed to construct a single-family residential structure at the subject property. The initial plans for development were submitted about two years ago. Some grading of the site was initiated prior to approval by the County, which resulted in a violation of the Humboldt County Zoning Regulations. It is our understanding that the property owner has decided to withdraw the plans to develop the site and wishes to clear the violation with the County. Our report has been based on a conversation with Mr. Damion. During our conversation Mr. Damion requested that we conduct a geologic reconnaissance of the site and provide mitigation regarding slope stability and erosion that might be needed relative to the violation received due to the aforementioned grading. Therefore our work was focused on potential slope stability and erosion due to the recent grading at the site.

SCOPE OF SERVICES

The scope of services we provide included the following:

ENGINEERING GEOLOGY · LANDSLIDES & SLOPE STABILITY · EARTHQUAKE & FAULT STUDIES

WATERSHED EVALUATIONS · EROSION CONTROL · FOREST & ROAD GEOLOGY

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- Review of published and unpublished geologic and soils information in our files.
- Discussions with Mr. Michael Damion, Humboldt County Building Department.
- Discussions with Mr. Keith Hess, representative of the property owner.
- Site reconnaissance mapping of the recently graded areas based on discussions with Mr. Michael Damion, including: the new segment of road accessing the site, the large cut slope at the eastern extent of the property, the formerly proposed building pad and associated fill slopes, and the existing pad at the western margin of the site and associated fill slopes.
- Preparation of this letter report and attached figures.

REGIONAL SETTING

The subject property is situated along the coast near, and upslope of, Freshwater Lagoon near Orick, California. The property is located on a hillside that is underlain by Redwood Creek Schist. The soils underlying the subject property are mapped as the Masterson (variant 2) soil series according to McLaughlin and Harradine (1965). These soils are characterized as very dark gray to light yellowish brown organic loam to gravelly clay loam that ranges from 36 to 60 inches deep.

SITE CONDITIONS

Currently the subject property is largely overgrown with shrubs, grass, and a dense stand of alders. The area in question has been surveyed and we were able to locate several survey stations about the site to help locate key areas noted in this letter report. There are no known domestic water supplies or residential structures within the immediate vicinity of the recently graded areas of the site.

The new segment of road accessing the formerly proposed building site is roughly 850 feet long (Figure 1). The majority of the road appears to be full bench construction with cut slopes up to about 7 feet in height. The cut slopes are densely vegetated with grass and shrubbery. The road surface itself is also largely overgrown with grass. No indications of concentrated flow, such as gullying, were observed on this new segment of road. We observed fill slopes associated with roughly 300 feet of the road segment. These fill slopes were generally short slopes, less than about 10 feet in length, and

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largely vegetated with shrubs and grass. No indications of instability such as ground cracks or slumping was observed in relation to the fill slopes.

In the eastern area of the formerly proposed building site we observed a large cut slope that extends uphill about 126 feet and is inclined at about 33 degrees, as shown on Figure 2. During our reconnaissance we observed schist exposed in the cut slope. The foliation of the schist dips gently into the slope, as shown on Figure 2. The slope is partially vegetated with grass and young alders. Also no indications of concentrated runoff, such as rilling, were observed on the rock cut-slope.

Adjacent to the west of the cut slope is the formerly proposed building site, which is characterized a recently graded relatively flat-lying pad (Figure 2). At present the pad is overgrown with a dense stand of alders up to about 12 feet tall. A road has been graded and is located adjacent to the rock cut-slope. Schist was observed cropping out in the road surface. Along the western margin of the road and the western margin of the building pad area we observed several berms, which were oriented roughly parallel to the graded road and up to 2-feet high. The berms appeared to be composed of gravel-sized schist rock fragments, likely from grading of the road and adjacent hillside. It appears that the berms were intended to act as sediment traps for debris that might be eroded from the adjacent cut slope. We observed some sediment, up to about 2 inches deep, collecting behind the berms. A road cut, about 10 feet south of survey station CP24, revealed up to 5 feet of fill in the western margin of the graded pad. The fill consists largely of broken gravel- to cobble-sized, schist rock fragments in a fine-sandy to silty matrix. The fill slopes associated with this pad are steeply inclined at about 80 percent towards the west and are up to about 25 feet in length, as shown on Figure 2. A dense stand of alders covers the fill slope.

A road was graded westward, connecting the formerly proposed building pad with an existing flat-lying pad to the west. It appears the road was cut in order to access a lower pad, which is likely an old landing related to historic logging in the area. No water breaks were installed in this steeply-inclined road and since the time the road was graded there has been significant erosion that has resulted in an erosion gully up to about 1 ½ feet deep. In places the erosion gully has eroded down to the schist bedrock the remainder of the channel is generally characterized by a cobble-sized, rock-armored channel. The channel is partially vegetated with grass and alders.

Adjacent to the north of the aforementioned gully and road are steeply-inclined north-facing fill slopes. These fill slopes are relatively short in length, generally less than 20 feet in length and densely vegetated with alders. No indications of movement such as

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slumping or ground cracks were observed in relation to this fill slope. A skid road is located near the toe of these fill slopes. Slope inclinations along the skid road are generally less than 40 percent.

The existing pad in the western area of the subject property is partially overgrown with grass and scattered alders. An old skid road accesses the pad from the northwest and extends upslope to the east where it connects with the new road segment. An erosion gully was observed along the northern edge of the pad that extends downslope along the skid road. The gully is incised about 1 ½ feet and is characterized by a schist rock-armored channel that is also partially vegetated with grass. Along the western margin of this pad are fill slopes inclined at about 70 percent and up to about 35 feet in length. A dense stand of alders covers the fill slope. A relatively small landslide was observed in the southwestern portion of the fill roughly 20 feet downslope of the exiting western pad. Several scarps up to two feet high characterize the head of the slide. The landslide is overgrown with a dense stand of alders and shrubbery

DISCUSSION

As mentioned earlier, based on discussions with Mr. Michael Damion, the Humboldt County Building Department is concerned with slope stability issues regarding the recent grading of the subject property. In particular Mr. Damion identified concerns regarding slope stability of the new segment of road accessing the site, the large cut slope at the eastern extent of the property, the formerly proposed building pad and associated fill slopes, and the existing pad in the western area of the site and associated fill slopes. At present the areas in question are densely vegetated.

The new road segment that accesses the site appears to be largely a full-bench constructed road that is densely vegetated with grass. Cut slopes associated with this segment of road are less than 7 feet high and appear to be performing adequately. We observed similar cut slopes in the area along the older road segment to the west supporting near vertical cuts up to 12 feet in height. No indications of concentrated erosion, such as rilling, associated with the new segment of road were observed. Fill slopes associated with the new road segment are densely vegetated and appear to be performing adequately. No ground cracks or slumps were observed associated with the fill slopes. Based on our observations it is our judgment that the new road segment is functioning adequately.

The large cut slope in the eastern area of the site is essentially a rock slope that is partially vegetated with grass and alders. The potential slope stability issues that could

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affect this slope are block and wedge failures associated with bedrock structure. As mentioned earlier the foliation of the schist exposed in the slope is dipping gently into the slope. Also jointing observed in the bedrock was vertical. Based on the structural orientations observed in the cut slope the potential for block failure or wedge failures associated with this slope are low. Erosion potential for this slope is also low as the slope is largely a rock slope and is also partially vegetated. In addition, the small amount of sediment that might become entrained in erosion processes will likely be deposited on the graded pad below. Based on our observations it is our judgment that this large rock cut slope is functioning adequately.

Slope stability issues related to the recently graded pad adjacent to the large cut slope in the eastern are of the site are centered on the fill slopes along the western margin of the pad (See Figure 2). These fill slopes are currently inclined at inclinations from 45 to 80 percent and are densely vegetated. The slopes inclined at 45 percent are at an inclination less than the accepted UBC standard of 2 to 1 (H:V) and therefore the potential for slope instability on those slopes is low. The steeper slopes, inclined at about 80 percent, are about 25 feet in length. To the west of these steeper fill slopes, slope inclinations become gentler as they approach an existing skid road. The skid road, in this area, is inclined at about 25 percent and is densely vegetated. At present these steeper fill slopes appear to be performing adequately as no indication of instability such as ground cracks were observed. Based on our observations it is our judgment that the fill slopes associated with the western margin of the recently graded pad are functioning adequately. However, if materials in the fill prism were to fail it would be small in volume and debris would likely end up on the gently-inclined and densely-vegetated skid-road surface roughly 40 feet downslope.

Fill compaction tests for the fill slopes of the recently graded pad in the eastern area of the site were completed by SHN in July of 2006. The site map showing the location of these tests is very simplified and it is not possible to be certain where the tests were taken. The results of the test indicated that the fill in the areas tested was compacted to 81 percent relative compaction. However, the tests were taken in the upper 12 inches of the fill and therefore do not characterize the entire fill prism.

The erosion gully between the recently graded building pad at the eastern portion of the site and the existing pad in the western portion of the site is characterized by a rock armored channel and grassy vegetation. Sediment from this channel has collected downslope on the existing flat-lying pad in the western area of the site. The rock-armor and grassy vegetation in the channel suggest that erosion processes in this channel are low. Both the vegetation and rock in the channel are acting as a natural remediation

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that has reduced the erosion potential of the gully. Based on our observations the erosion gully appears to be more or less stabilized.

The fill slope adjacent to the north of the aforementioned road and gully are densely vegetated and show no indications of slope instability such as slumping or ground cracks. Based on our observations it is our judgment that this fill slope is functioning adequately. However, if materials in the fill prism were to fail it would be small in volume and debris would likely end up on the gently-inclined and densely-vegetated skid-road surface adjacent to the north.

Slope stability issues related to the existing pad located in the western area of the site are centered on the fill slopes along the western margin of that pad (See Figure 2). These fill slopes are currently inclined at inclinations around 70 percent and are densely vegetated with alders. The majority of the fill slope appears to be functioning adequately. However, as noted earlier we observed a relatively small landslide in the southwestern portion of the fill. This landslide is densely vegetated with alders up to about 13 feet high as well as shrubs and grass suggesting that the slide probably has not moved in recent years. The vegetation provides a significant amount of root strength, interception, and evapotranspiration which help to reduce the potential for renewed movement. The topography downslope of the landslide is characterized by densely-vegetated, gently-inclined slopes. If this landslide were to reactivate debris would likely come to rest on the gently-inclined slopes below.

Fill compaction tests for the existing pad in the western area of the site were also completed by SHIN in July of 2006. The site map showing the location of these tests indicates the areas tested were the relatively flat-lying areas along the eastern portion of the pad. The results of the test indicated that the earth materials in the existing pad, in the areas tested, were compacted to 88 percent relative compaction. However, these tests were also taken in the upper 12 inches of the fill and therefore do not characterize the entire fill prism.

The erosion gully observed along the northern margin of the existing pad is similar to the aforementioned gully. This gully is also characterized by a rock-armored channel and is largely vegetated with grass. The rock-armored channel and grassy vegetation suggest that erosion processes in this channel are low. Both the vegetation and rock in the channel are acting as a natural remediation that has reduced the erosion potential of the gully. Based on our observations the erosion gully appears to be more or less stabilized.

CONCLUSIONS

Since the time of the grading that resulted in a violation of Humboldt County Zoning Regulations at the subject property there has been significant growth of vegetation, which have resulted in natural remediation measures that have reduced the potential for erosion and slope stability at the subject property. Mitigation of the recently graded slopes at the site would likely result in a greater potential for erosion. Mitigation of the slopes would likely require the use of large equipment. The use of large equipment would result in the removal of significant amounts of vegetation leaving the bare slopes that would be subject to erosion. At present significant amounts of vegetation at the site act as a natural filter strip. As for slope stability, the cut and fill slopes at the site appear to be performing adequately. As noted above if the fill slopes were to fail it would likely be small in volume and come to rest on the gently-inclined densely-vegetated areas down slope. Also the potential for sediment delivery due to slope instability is low due to the lack of watercourses in the area and the significant amount of vegetation in the area that acts as a natural filter strip. Based on our observations and past work on the north coast, the potential for slope instability and erosion at the site is, in our opinion, low.

RECOMMENDATIONS

The following recommendations are presented as guidelines for future use or potential development of the site.

1. Upon sale of this property the potential buyers shall be notified of this report.
2. Upon further development of this site, the recently graded cut and fill slopes addressed in this report shall be addressed by the project engineer and should be brought up to UBC standards. In particular the fill slopes tested by SHN are below compaction standards and should be addressed by the project engineer as pertinent to future development of the site.
3. Upon further development of this site, the two erosion gullies observed at the site shall be addressed by the project geologist/engineer such that they do not adversely impact any proposed building sites.
4. Upon further development of this site, the small landslide nested in the existing pad shall be addressed by the project geologist so that the slide does not adversely impact any proposed building sites.

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LIMITATIONS

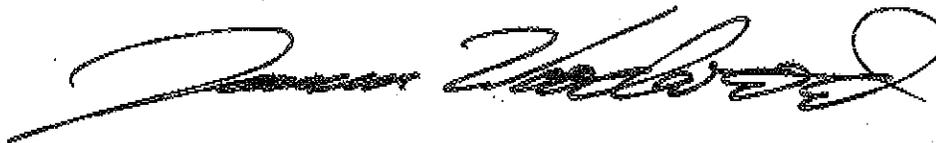
We have completed our work in accordance with generally accepted professional geology and forest geology practices for the nature and conditions of the work done in the same, or in similar, localities at the time the work was performed. It is intended for the exclusive use of Mr. Keith Hess for specific application to the referenced property. We make no other warranty, express or implied.

This report has been prepared, under the scope of work outlined above and based on a conversation with Mr. Michael Damion of the Humboldt County Building Department. The purpose of this report was to address the recently graded areas that resulted in a violation of the Humboldt County Zoning Regulations. Our Site Map was compiled using the 50-scale site plan map provided by Mr. Keith Hess and dated May 28, 2004. In the event that any new information pertaining to changes in plans is formulated, our conclusions and recommendations shall not be considered valid unless the changes are reviewed and the conclusion in this report modified or verified in writing by a representative of JOHN COYLE & ASSOCIATES, INC.

It has been our pleasure to be of service; if you have any questions please call.

Respectfully submitted,

JOHN COYLE & ASSOCIATES, INC.



Jason S. Woodward
Professional Geologist, PG # 8118

ATTACHMENTS

- Figure 1 General Site Location Map
- Figure 2 Sketch Map of Formerly Proposed Building Site

John Coyle & Associates, Inc.

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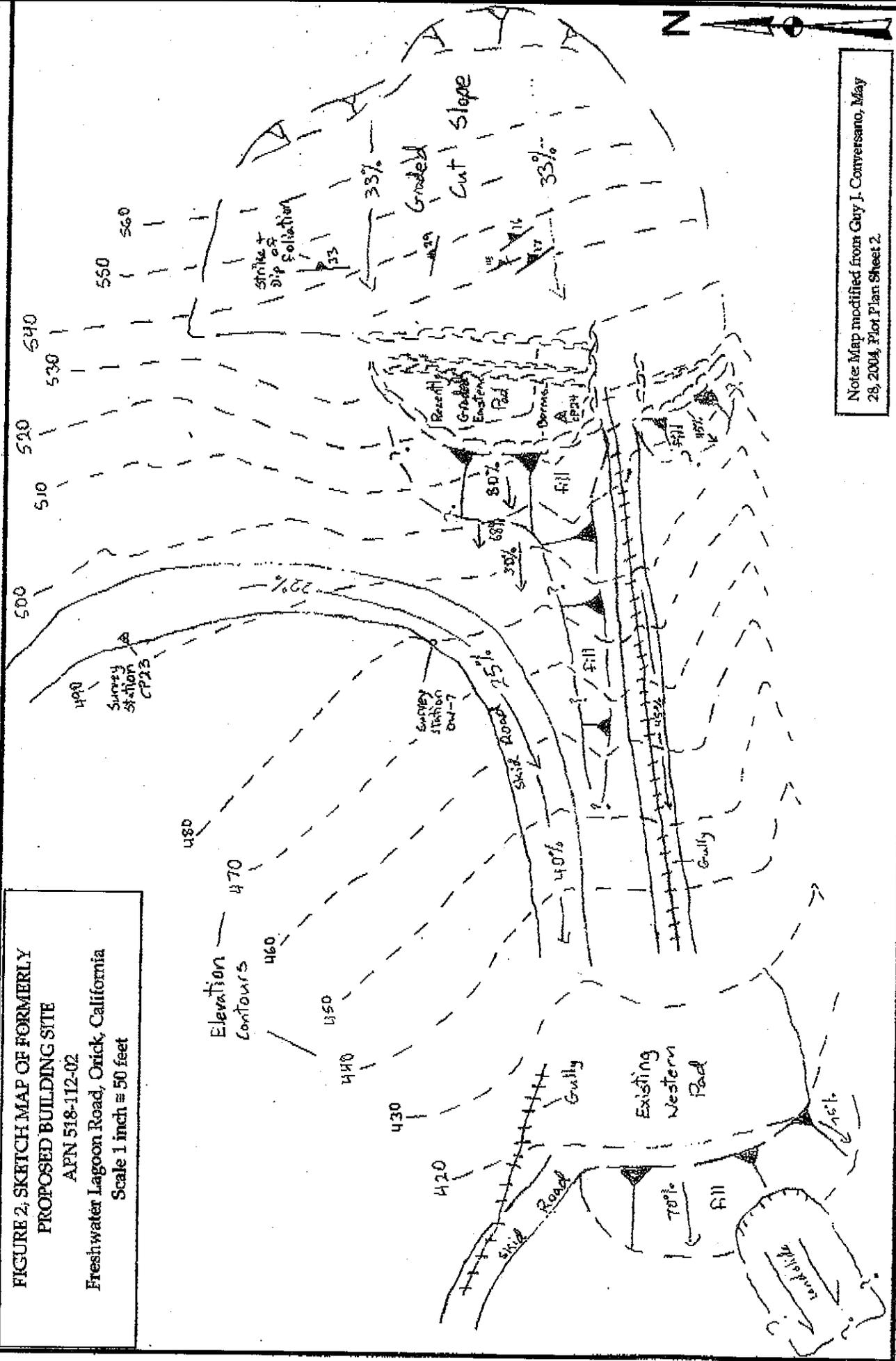
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REFERENCES

- McLaughlin, J., and Harradine, F., 1965, Soils of Western Humboldt County, California: The Department of Soils and Plant Nutrition U.C. Davis and the County of Humboldt, November 1965.
- Ristau, D., 1979, Geologic Map of the Orick 15 minute Quadrangle, Humboldt County, California: Unpublished mapping prepared for the California Department of Forestry, Region 1 Geology Group, April 1979, Scale 1:62,500.
- SHN, 2006, Nuclear Compaction Test Data, Freshwater Lagoon, Humboldt County, California: Unpublished lab data for Mr. Keith Hess, Job No. 006112, dated May 16, 2006, 1 Laboratory data sheet and accompanying sketch map of site.
- Young, C., 2003, Complaint regarding alleged grading and fill, Assessor's parcel number 518-112-000 and 519-322-022-000, Humboldt County, California: Humboldt County Planning Division, Memo to Phillip and Nancy Nessel dated September 29, 2003.

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FIGURE 2. SKETCH MAP OF FORMERLY
PROPOSED BUILDING SITE
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Freshwater Lagoon Road, Orick, California
Scale 1 inch = 50 feet



Note: Map modified from Guy J. Conversano, May 28, 2004, Plot Plan Sheet 2.