GEOLOGIC FEASIBILITY INVESTIGATION
VICTORINE RANCH
MONTEREY, CALIFORNIA

PROJECT M1316

for

COASTAL CONSERVANCY
c/o Bestor Engineers
Monterey, California 93940

by

TERRATECH, INC.
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Gilroy, California 95020

November 1988

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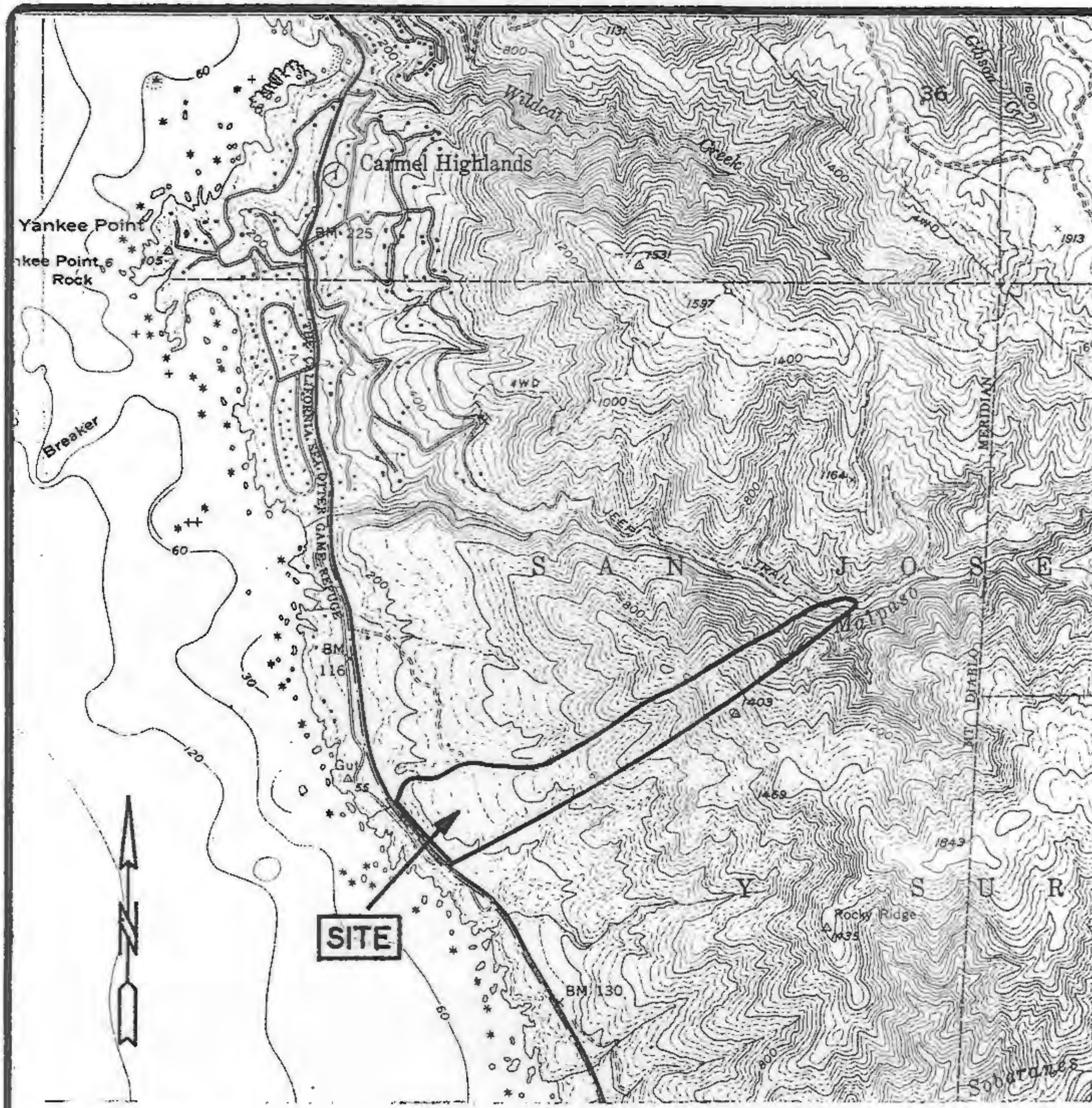

SCALE: 1"=2000'

BASE MAP: U.S.G.S. 7.5 minute Soberanes Point, Calif., Quadrangle, 1956, Photorevised 1983

NOVEMBER 1988

TERRATECH

VICINITY MAP

VICTORINE RANCH
MONTEREY COUNTY, CALIFORNIA

FIGURE 1

PROJECT M1316

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LIST OF FIGURES AND TABLES

GEOLOGIC FEASIBILITY INVESTIGATION
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INTRODUCTION

This report presents the results of our Geologic Feasibility Investigation of the 100(±) acre Victorine Ranch, which is located on the east side of Highway 1 about 6 miles south of the City of Carmel, in Monterey County, California (see Vicinity Map, Figure 1). The property is situated on the western flank of the Santa Lucia Mountains overlooking the Big Sur coastline. The present plans are to subdivide the property into several residential parcels, with part of the property being preserved as common open space. Sewage disposal will be by individual septic tanks and leach fields.

The property is presently being used for horse grazing. An unpaved, unmaintained access road enters the property near the northwestern portion of the property.

INFORMATION PROVIDED

For our study we were provided with a set of three topographic maps of the property prepared by Bestor Engineers, Inc., and entitled "Carmel Riviera on Big Sur Coast, Carmel, California" with a scale of 1"=100' and a contour interval of ~~10~~ 5 feet.

PURPOSE OF INVESTIGATION

The objective of this Geologic Feasibility Investigation has been to identify and evaluate geologic features that might affect the proposed site development. The information presented herein should be used only for project planning; further geologic study will be necessary for areas whose suitability is presently considered to be questionable. After building sites and road alignments have been finalized, site-specific geotechnical investigations will be necessary to provide design and construction parameters for the planned structures.

SCOPE OF WORK

For this Geologic Feasibility Investigation we completed the following scope of work:

1. Review of pertinent on-file geologic literature regarding the property and its environs.

2. Study of high- and low-altitude stereoscopic aerial photographs of the property and adjacent areas.

3. An aerial reconnaissance of the property, including oblique and low sun-angle photographs for geologic study.

4. Detailed geologic mapping of the property, focusing particular attention on those soil and geologic conditions that may affect the proposed development.

5. Construction of a geologic cross section through the property to evaluate subsurface structural relationships as they pertain to the proposed development.

6. Analysis of collected data and construction of a Development Feasibility Map of the property.

7. Attendance at a meeting with Mr. Carl Hooper to discuss our preliminary findings, conclusions, and recommendations.

8. Subsurface exploration of the property by advancing 15 exploration drill holes to depths of 10 and 25 feet. Ten drill holes are for percolation testing to determine leach field suitability and 5 drill holes are for evaluating depths to bedrock and ground water. Bestor Engineers, Inc. performed the percolation tests.

9. Preparation of this report presenting our preliminary findings, conclusions and recommendations regarding the geologic feasibility of the proposed development.

FINDINGS

General Site Conditions

Victorine Ranch is approximately 6,500 feet long and 650 feet wide. Vegetation on the western quarter of the property consists generally of grasses and weeds. Vegetation on the eastern three-quarters of the property, and in a prominent drainage swale along the northern property boundary, consists of dense brush and poison oak.

Geologic Factors and the Coastal Zone Ordinance

The following sections address specific geologic factors required by the County for development of properties in the Big Sur Coast Land Use Plan Area.

Cliff Erosion

A 120-foot-high cliff along the western property boundary and directly east of Highway 1 is composed of erosion-resistant granitic bedrock.

Site Topography

Elevations on the property range from 100 feet along Highway 1 at the western boundary to about 1370 feet at the ridge top located in the eastern quarter of the property. (see Figure 1).

The western quarter of the property consists of west-facing, gentle to moderate slopes with gradients ranging from about 10 to 20 percent. The 120-foot-high cliff along the western property boundary has slope gradients ranging from about 25 to 55 percent. The eastern three-quarters of the property consists of rugged mountains with slope gradients greater than 90 percent. Development is proposed for the western quarter of the property only.

Regional Geology

The property lies within the Coast Range geomorphic province of California and on the western flank of the Santa Lucia Range near the northern end of the range. The Coast Ranges lie between the Pacific Ocean and the Sacramento-San Joaquin Valley and trend northwest along the California coast for about 600 miles between Santa Barbara and the Oregon border.

The Santa Lucia Range lies within the Salinian block, which is characterized by a basement of high-grade metamorphic and granitic rocks. The oldest rocks exposed in the region are Paleozoic metamorphic rocks (schists and gneisses) of the Sur Series and younger Mesozoic granitic rocks.

A relatively thin section of younger, marine sedimentary rocks overlies the crystalline basement and makes up the near-surface bedrock of the gently sloping terraces of the Big Sur Coast that flank the Santa Lucia Range.

The geologic structure of the region consists of uplifted crystalline bedrock that has weathered to a series of generally northwest-trending ridges. Uplift of the mountain ranges to their present elevation is believed to have occurred in the Pleistocene Epoch (Williams, 1970).

The Salinian block is bounded on the southwest by the inactive Sur fault and on the northeast by the active San Andreas fault (Jennings, 1975). Southwest of the Sur fault and northeast of the San Andreas fault, the basement rocks are sedimentary and metamorphic rocks of the Franciscan Complex of Jurassic to Cretaceous age (Jennings and Strand, 1958).

The active San Andreas fault skirts the northeastern boundary of Monterey County, northeast of the Salinas Valley near the center of the Coast Ranges. To the soutbeast, the fault crosses the southeastern tip of Monterey County. At its closest approach, the fault is approximately 35 miles northeast of Victorine Ranch.

The active Palo Colorado fault enters the Big Sur Coast from the ocean approximately 4.5 miles south of Victorine Ranch. This fault has been interpreted to be a southern extension of the San Gregorio fault. At its closest approach to the property, the fault is approximately 1.5 miles southwest.

Site Geology

The geologic units underlying Victorine Ranch are shown on the Geologic Map (Figure 2) and on the Geologic Cross Section (Figures 3). The 1"=100' scale map by Bestor Engineers Inc. was used as a field map. The western third of the Bestor map was used as the base for both our Geologic Map and our Development Feasibility Map (Figure 4).

Approximately 12 hours of geologic mapping was performed on July 27 and August 24, 1988, by Jim Nelson and Betsy Mathieson. On November 1, 1988, 15 exploration holes were drilled at selected locations in the western portion of the property to evaluate the suitability of surface soils for leach fields and to classify the soils. This subsurface information is presented in the appendix of this report. The earth materials encountered during drilling were used as an aid in our geologic mapping.

Ten exploration drill holes (DH-1 through DH-10) were advanced to depths of 10 feet and used for percolation tests by Bestor Engineers. Adjacent to each of the five odd-numbered drill holes (DH-1, 3, 5, 7 and 9) a deep hole was advanced to about 25 feet to explore for shallow bedrock and ground water. Granitic bedrock was encountered only in the deep hole advanced adjacent to DH-1 at a depth of 24 feet. Ground water was not encountered in any of the drill holes.

Surficial Geologic Units

Surficial geologic units on Victorine Ranch include colluvial deposits, Quaternary alluvial deposits, and Quaternary marine terrace deposits. The only artificial fill observed on the property consists of narrow wedges of bulldozed material on the downslope edges of the unpaved access road, and a small prism of fill at the lower end of a small excavation in the north-central part of the area proposed for development.

Colluvial deposits are unconsolidated mixtures of soil and fragments of weathered bedrock. On the western quarter of Victorine Ranch colluvium is derived from weathering of the underlying terrace deposits. In the mountainous eastern portion of the property colluvium is derived from weathering of the underlying granitic rocks.

Where encountered during our mapping and in our exploration drill holes, colluvium on the terrace deposits is composed of light-gray brown to orange brown sandy silt and silty sand. Except for a few inches of loose surface soil, the silty colluvium is generally firm to stiff and the sandy colluvium is dense. Colluvial deposits generally are less than 3 feet thick on the terrace deposits and are absent in the drainage swales. Because colluvium is less than about 3 feet thick these deposits are not shown on the Geologic Map or Geologic Cross Section (Figures 2 and 3).

Colluvium observed during our mapping of the mountainous eastern portion of the property is composed of fine to coarse "granitic" silty sand with granitic gravel and cobbles. Colluvium accumulates on slopes and in drainage swales. Because these deposits are situated on steep slopes and are generally loose, they are marginally stable. When colluvial deposits on the steep slopes become saturated, they are susceptible to failure in the form of debris flows.

Quaternary alluvial deposits are unconsolidated mixtures of clay, silt, sand, and gravel deposited in swales by flowing water. On Victorine Ranch these deposits are probably no more than a few feet thick. Because they are unconsolidated, Quaternary alluvial deposits erode readily when subjected to high stream flow.

Quaternary marine terrace deposits are older surficial deposits that have been isolated above the present valley floors by uplift of the Santa Lucia Range. The marine terrace deposits are present in the western quarter of the property, where they may be about 30 to 80 feet thick. Outcrops of the terrace deposits are present in erosion gullies and in the canyon walls of the prominent northern drainage swale. Where exposed at the surface and in our exploration drill holes, the terrace deposits are composed predominantly of orange brown to light-gray brown, silty sand and clayey sand layers, interbedded with sandy clay layers. Localized angular to rounded cobbles of granitic rock are present in the terrace deposits. The sand layers are medium dense to very dense, fine to medium grained, and moderately well cemented. The sandy clay layers are firm to stiff.

Bedrock Units

Granitic rock of Cretaceous(?) age underlies the entire property but is exposed only in the mountainous eastern portion of Victorine Ranch. The granitic rocks are generally buff white to light pink and coarsely crystalline. In places the granitic rocks are light gray and have a "salt-and-pepper" appearance. The rock is generally massive.

Geologic Structure

Based on our mapping, the marine terrace deposits appear to be dipping about 15 to 20 degrees westward. The homoclinal structure of these deposits is probably the result of uplift of the Santa Lucia Mountains.

During mapping in the mountainous eastern portion of the property, we observed the granitic rocks to be generally massive. On a large scale, however, the granitic rocks appear to possess a fabric that is caused by either structural or compositional changes. In the canyon walls of the western slopes of the mountain front and along the ridge crest, bands of resistant outcrops trend northwestward.

A one-mile-long photolineament also trends northwestward through the central portion of the property, east of the area proposed for development, and is evident as a relatively dark band of vegetation. The photolineament begins near Malpaso Creek to the northwest and ends near Soberanes Creek to the southeast. The photolineament appears to mark compositional differences in the granitic rock and the preferential growth of vegetation.

Landslide Potential

Features indicative of deep landsliding were not observed on Victorine Ranch. Shallow landsliding, such as debris flow activity, occurs periodically in the mountainous eastern portion of the property and in the northern drainage swale. Because homesites will be sited on the gentle slopes on the western quarter of the property, the development should not be significantly affected by debris flows. Shallow sloughing and slumping may also occur on the steep slopes during large earthquakes.

Areas where debris flows have occurred in the past, or where they may occur in the future, are potentially hazardous areas for development. Saturated soil and colluvium on steep slopes can fail and flow downhill as fast as 30 to 40 miles per hour, and structures situated in the torrent track or in the depositional area of a debris flow can be damaged or destroyed by the impact of the rapidly-moving material. In addition, ground failure at the source of the debris flow could undermine structures built on or close to the source area.

Erosion Potential

Sandy material of the Quaternary marine terrace deposits is erodible where exposed on unvegetated slopes throughout the Big Sur coastal area. However, because these deposits are relatively well cemented and situated on relatively shallow slope gradients (less than 20 percent) erosion should not significantly affect the development.

Surface and Ground Water Conditions

The main direction of drainage on the property is westward to the Pacific Ocean. The prominent northern drainage swale transports significant quantities of water and sediment during periods of intense rainfall.

No springs were observed on the property during our mapping and drilling in July, August and October.

Our geologic investigation did not include measurements of ground water depths, but we judge that during winter and early spring, ground water probably is within a few feet of the ground surface in the northern drainage swale. During drilling of the percolation holes to depths of 10 to 25 feet in the terrace area, ground water was not encountered. Ground water probably is present at significant depth in fractures in the granitic bedrock.

Seismic Considerations

Like the rest of the Carmel Valley-Northern Santa Lucia Range area, the property is expected to be subjected to "severe" ground shaking from a "maximum credible" earthquake on a nearby segment of the San Andreas fault (McCrory and others, 1977). The 1906 "San Francisco" earthquake, with a Richter magnitude of about 8, is generally considered the maximum credible earthquake for the northern portion of the San Andreas fault (Working Group on California Earthquake Probabilities, 1988), and the San Andreas is likely to produce the strongest ground shaking on the parcel within the life of the project. The estimated average recurrence interval for the maximum credible earthquake on the northern portion of the San Andreas fault is 303 years (Working Group on California Earthquake Probabilities, 1988).

The property is located in Monterey County's Seismic Hazard Zones III, V, and VI (Burkland and Associates, 1974). An approximately 1.5-mile-long, northwest trending fault has been mapped (Jennings, C.W., and Strand, R.G., 1958) directly north of the property. This unnamed fault is considered potentially active (Burkland and Associates, 1974). As a result, the northern portion of the property is in Seismic Hazard Zone V where it approaches the fault. The central mountainous portion of the property lies in Seismic Hazard Zone III. The western quarter of the property lies in Seismic Hazard Zone VI because the terrace deposits on the property are considered to possess a moderate to high ground shaking hazard (Burkland and Associates, 1974) along creek banks where ground failure is likely to occur.

Active and potentially active off-site faults within a 35-mile radius are listed in Table 1, with their distances from the property.

TABLE 1 - Active and Potentially Active Faults Within a 35-mile Radius of the Property

	DISTANCE FROM VICTORINE RANCH
ACTIVE FAULTS	
Palo Colorado-San Gregorio	4-1/2 miles to the southeast
San Andreas	35 miles to the northeast
POTENTIALLY ACTIVE FAULTS	
Unnamed	(directly north)
Cypress Point	5 miles to the north
Navy	6-1/2 miles to the northeast
Tularcitos	7 miles to the northeast
Seaside	9-1/2 miles to the north
Ord Terrace	10-1/2 miles to the north
Monterey Bay	10-1/2 miles to the north
Chupines	12 miles to the northeast
Harper Canyon	13 miles to the northeast
Reliz-Rinconada	16-1/2 miles to the northeast
Zayante-Vergeles	30 miles to the northeast

CONCLUSIONS

In our opinion, the property is geologically suitable for the proposed development. The proposed access roads and building sites probably will not be significantly affected by ongoing geologic processes other than erosion of sandy soils and intense ground shaking from earthquakes generated on the nearby active and potentially active faults. Debris flows will continue to occur intermittently on most of the steep slopes on the eastern three-quarters of the property.

Because no faults are known to cross the property, surface faulting does not pose a constraint to the development.

Effect of Proposed Development

The proposed development will probably have a minimal impact on slope stability on the property. Because the sandy materials on the property are generally not susceptible to deep landsliding, and layers of low permeability appear to be discontinuous, leach fields sited in accordance with County requirements and normal application of landscape water should not decrease slope stability. Because of the stabilizing effect of roots, landscaping should improve slope stability and reduce erosion.

Mitigation of Erosion Hazard

Erosion potential can be minimized by proper geotechnical engineering, design, and construction practices. The following, or equivalent, measures should be taken to minimize erosion: (1) roadways and building pads should be graded to promote drainage, (2) the ground surface above each cut slope and each fill slope should be graded to drain water away from the top of the slope, (3) an earth berm may be constructed along the top of each slope to prevent surface water from flowing onto the slope, and (4) each slope should be planted with erosion-resistant vegetation.

Evaluation of Development Areas

The geologic data compiled during our research and field work and presented on our Geologic Map were evaluated with respect to the proposed development plan. Using geologic and geotechnical criteria, we have established three categories of development feasibility <u>for structures such as houses and water tanks</u>, and each area of the property has been assigned to one of these three categories. Category I indicates the absence of unusual geologic and geotechnical problems; areas in this category can probably be developed in a normal, relatively straightforward manner. Category III indicates the presence of geologic and geotechnical problems of such severity that development of structures should be considered infeasible for those areas in this category. Category II is intermediate in severity, and areas in this category require further study to address unresolved geologic and geotechnical problems. The definitions of the categories and the criteria used in their determination are presented as follows:

Development Feasibility Category I. Development of structures is feasible in these areas, although standard geotechnical investigations must be anticipated. Areas assigned to Category I are:

1. underlain by granitic rock (gr), or Quaternary marine terrace deposits (Qm), and
2. outside other areas considered to be potentially affected by geologic hazards, and
3. located on slopes with gradients less than about 30 percent.

Development Feasibility Category II. Development of structures probably is not feasible in these areas. Major geologic and geotechnical problems will require a significant amount of field investigation and/or special engineering design work, and it is not certain at this point that the problems can be overcome. Areas assigned to Category II are:

1. within the depositional area of debris flows, or
2. close to a gully that may carry occasional or seasonal flow, or
3. located on, or directly above, steep slopes, with gradients between 30 and 50 percent.

Development Feasibility Category III. Development of structures is not feasible in these areas because major geologic and geotechnical problems are present and probably cannot be overcome, even at great expense. Areas assigned to Category III are:

1. close to a stream channel that periodically carries significant flow, or
2. located on, or directly above, very steep slopes, with gradients greater than 50 percent.

RECOMMENDATIONS

We anticipate that development can be accomplished in most areas presently planned for development using conventional geotechnical practices, although some localized areas may require special consideration.

Specific geotechnical recommendations cannot be developed at this preliminary planning stage, but it appears that conventional types of building foundations will be appropriate for most areas of the site considered for development and that grading and trench backfill recommendations for most areas of the site will be conventional and relatively straightforward.

LIMITATIONS

Our report and general conclusions have been provided in accordance with the principles and practices generally employed by the engineering geologic profession. They have been based upon data obtained from field geologic mapping, interpretation of aerial photographs and study of geologic literature.

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AERIAL PHOTOGRAPHS

Date	Agency	Type	Roll & Frame	Scale
8/18/49	U.S.D.A.	black & white	ABG-18F-49, 50 & 51	1:20,000
5/22/54	U.S.G.S.	black & white	GS-YH 5-7 & 8	1:37,400
2/3/67	Calif. Dept. Fish & Game	black & white	51-1-74 & 75	1:12,000
5/17/70	Calif. Dept. Fish & Game	black & white	76-4-168 & 169	1:12,000
11/22/72	U.S.G.S	color	GS-VDDI 1-3 & 4	1:40,000
10/14/74	U.S.G.S.	color	1-SFB 13-194	1:36,000
10/5/76	Calif. Dept. of Nav. & Ocean Devel.	black & white	DNOD-AFU-C 33	1:12,000
6/24/80	Army Corps of Engineers	black &	CCL 4-8 & 9	1:24,000
4/13/85	W.A.C. Corp.	black & white	WAC-85CA 14-126, 127, 128	1:31,680

APPENDIX

EXPLORATION DRILL HOLE LOG

HOLE No. 1

PROJECT VICTORINE RANCH — DATE 11/1/88 — LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. — HOLE DIA. 6" — SAMPLER —

GROUNDWATER DEPTH INITIAL -- FINAL — HOLE ELEV. 225'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN. (tsf)	TORVANE (tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED SHEAR STRENGTH (psf)
SANDY SILT; light grey, dry, very stiff;	ML	1											
drilling hard on cobble at 2 feet		2											
		3											
SILTY SAND; orange, dry, dense to very dense;	SM	4											
		5											
		6											
CLAYEY SAND; light grey-brown, damp, dense; micaceous	SC	7											
		8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 2

PROJECT VICTORINE RANCH | DATE 11/1/88 | LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. | HOLE DIA. 6" | SAMPLER —

GROUNDWATER DEPTH INITIAL — | FINAL — | HOLE ELEV. 250'

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN. (tsf)	TORVANE (tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED SHEAR STRENGTH (psf)
SANDY SILT; light grey-brown, dry, stiff; fine sand	ML	1											
		2											
SILTY SAND; light orange-brown, dry to damp, medium dense to dense; fine to medium sand; micaceous	SM	3											
		4											
		5											
		6											
		7											
		8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 3

PROJECT VICTORINE RANCH | DATE 11/1/88 | LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. | HOLE DIA. 6" | SAMPLER —

GROUNDWATER DEPTH INITIAL -- | FINAL --- | HOLE ELEV. 300±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SANDY SILT; light grey-brown, dry, stiff;	ML	1											
		2											
CLAY WITH SAND; light orange, damp, stiff;	CI	3											
		4											
SILTY SAND; light brown, damp, medium dense;	SM	5											
		6											
CLAY WITH SAND; light orange-brown, damp, stiff;	CI	7											
		8											
		9											
SILTY SAND TO CLAYEY SAND; light brown, damp, dense;	SM/SC	10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 4

PROJECT VICTORINE RANCH DATE 11/1/88 LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. HOLE DIA. 6" SAMPLER —

GROUNDWATER DEPTH INITIAL — FINAL — HOLE ELEV. 325±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SANDY SILT; grey-brown, dry to damp, stiff; fine sand;	ML	1											
		2											
SILTY SAND; orange-brown, dry to damp, dense;	SM	3											
		4											
		5											
hard drilling through cobbles at 6 feet		6											
		7											
		8											
		9											
SANDY LEAN CLAY; medium brown, damp, firm to stiff;	CL	10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 5

PROJECT VICTORINE RANCH DATE 11/1/88 LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. HOLE DIA. 6" SAMPLER --

GROUNDWATER DEPTH INITIAL -- FINAL -- HOLE ELEV. 355'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SANDY SILT; light grey-brown, dry, firm to stiff; fine sand;	ML	1											
		2											
		3											
CLAY; light brown, damp, firm to stiff;	CI	4											
		5											
		6											
		7											
SILTY SAND; orange-brown, damp, dense; fine sand	SM	8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 6

PROJECT VICTORINE RANCH | DATE 11/1/88 | LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. | HOLE DIA. 6" | SAMPLER —

GROUNDWATER DEPTH INITIAL — | FINAL — | HOLE ELEV. 395'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN. (tsf)	TORVANE (tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED SHEAR STRENGTH (psf)
SANDY SILT; light grey-brown, dry, firm to stiff;	ML	1											
		2											
		3											
SILTY SAND; tan, damp, medium dense; fine to medium sand	SM	4											
		5											
		6											
		7											
CLAY WITH SAND; light orange-brown, damp, stiff; fine to medium sand	CI	8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 7

PROJECT VICTORINE RANCH — DATE 11/1/88 — LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. — HOLE DIA. 6" — SAMPLER —

GROUNDWATER DEPTH INITIAL -- — FINAL -- — HOLE ELEV. 445'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SILTY SAND; light brown, dry, dense;	SM	1											
		2											
		3											
SANDY CLAY; light brown, damp, stiff; fine to medium sand	CI	4											
		5											
		6											
		7											
		8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 8

PROJECT VICTORINE RANCH | DATE 11/1/88 | LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. | HOLE DIA. 6" | SAMPLER —

GROUNDWATER DEPTH INITIAL — | FINAL — | HOLE ELEV. 485'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SILTY SAND; light orange-brown, dry to damp, dense; fine sand	SM	1											
		2											
		3											
		4											
		5											
CLAYEY SAND; light brown, damp, dense;	SC	6											
		7											
		8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 9

PROJECT VICTORINE RANCH — DATE 11/1/88 — LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt. — HOLE DIA. 6" — SAMPLER —

GROUNDWATER DEPTH INITIAL — FINAL — — HOLE ELEV. 360'±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN. (tsf)	TORVANE (tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED SHEAR STRENGTH (psf)
SILTY SAND; light grey-brown, dry, dense; fine sand	SM												
		1											
		2											
		3											
SILTY SAND; light orange, damp, dense to very dense; fine to medium sand	SM												
		4											
		5											
		6											
		7											
		8											
CLAYEY SAND; dark orange-brown, damp, dense to very dense;	SC												
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED													
		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

EXPLORATION DRILL HOLE LOG

HOLE No. 10

PROJECT VICTORINE RANCH   DATE 11/1/88   LOGGED BY JLN

DRILL RIG CME 850-Cont. Flt.   HOLE DIA. 6"   SAMPLER —

GROUNDWATER DEPTH INITIAL —   FINAL —   HOLE ELEV. 330±

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN.(tsf)	TORVANE(tsf)		LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN(%)	UNCONFINED SHEAR STRENGTH(psf)
SANDY SILT; light grey-brown, dry, stiff; fine sand	ML	1											
		2											
		3											
		4											
SILTY SAND; orange-brown, damp, dense; fine to medium sand	SM	5											
		6											
		7											
		8											
		9											
		10											
BOTTOM OF HOLE AT 10 FEET NO GROUND WATER ENCOUNTERED		11											
		12											
		13											
		14											
		15											
		16											
		17											
		18											
		19											
		20											

FIGURES

7891 WESTWOOD DRIVE, SUITE 101 GILROY, CALIFORNIA 95020 (408) 842-0236

DEVELOPMENT FEASIBILITY MAP

VICTORINE RANCH

MONTEREY COUNTY, CALIFORNIA

Development Feasibility Category I. Development of structures is feasible in these areas, although standard geotechnical investigations must be anticipated. Areas assigned to Category I are:

1. underlain by granitic rock (gr), or Quaternary marine terrace deposits (Qm), and
2. outside other areas considered to be potentially affected by geologic hazards, and
3. located on moderately gentle slopes, with gradients less than about 30 percent.

Development Feasibility Category II. Development of structures probably is not feasible in these areas. Major geologic and geotechnical problems will require a significant amount of field investigation and/or special engineering design work, and it is not certain at this point that the problems can be overcome. Areas assigned to Category II are:

1. within the depositional area of debris flows, or
2. close to a gully that may carry occasional or seasonal flow, or
3. located on, or directly above, steep slopes, with gradients between 30 and 50 percent.

Development Feasibility Category III. Development of structures is not feasible in these areas because major geologic and geotechnical problems are present and probably cannot be overcome, even at great expense. Areas assigned to Category III are:

1. close to a stream channel that periodically carries significant flow, or
2. located on, or directly above, very steep slopes, with gradients greater than 50 percent.

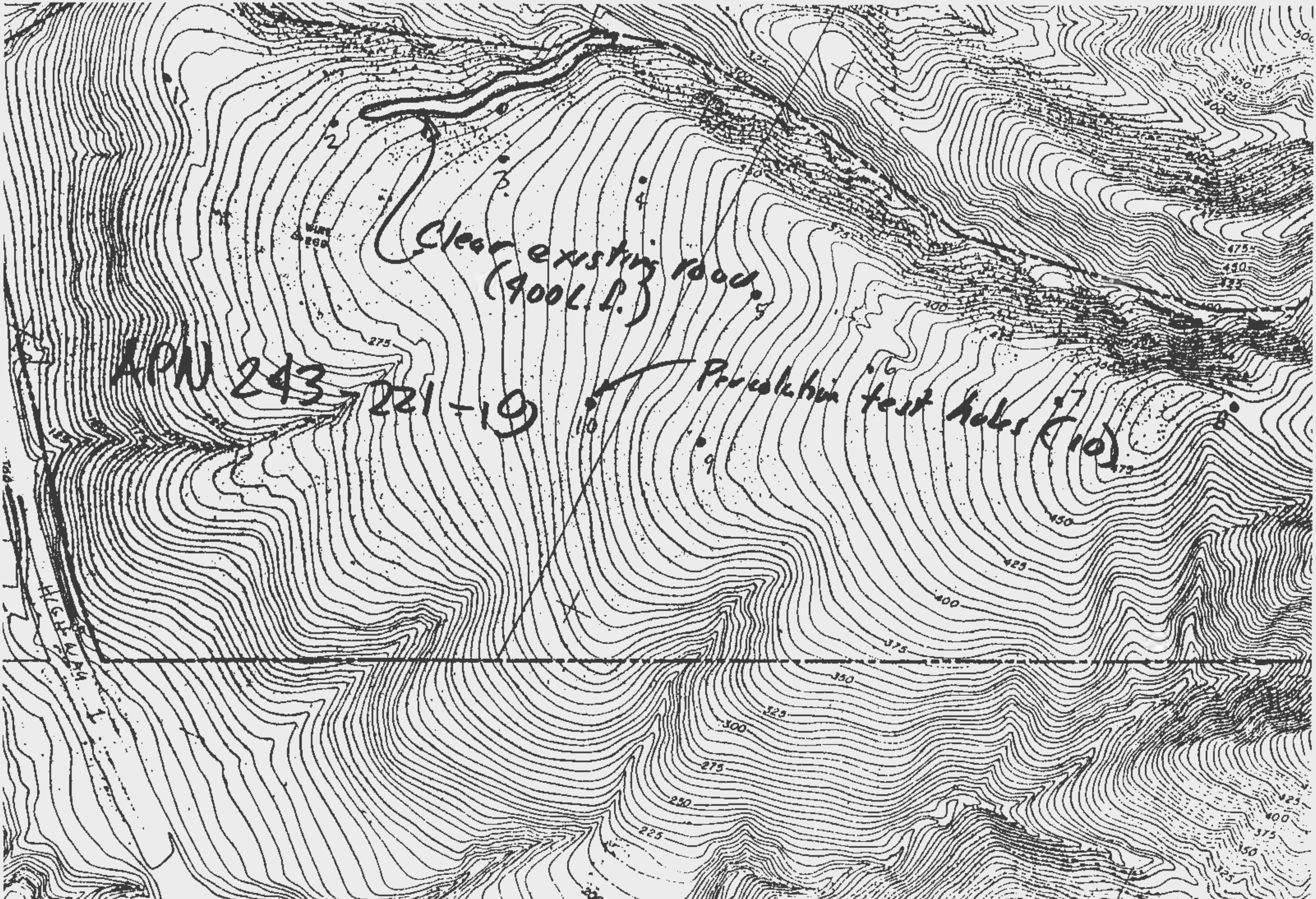
APPENDIX C
PERCOLATION TESTS

Holes were drilled in early November, 1988 at ten potential building sites, 8 along the northerly side, 2 near the southerly ridge line. The attached map and test results show that the upper test holes (6, 7 & 8) were not acceptable, the mid area test holes (4, 5 & 9) were acceptable, but at low rates, and the lower holes (1, 2 & 3) were acceptable with moderate rates. Hole 10 was unacceptable, partially due to caving. Subsequent redrilling and retesting will probably prove it to be acceptable. Test holes 6 and 7 might also be improved by redrilling.

Although test holes 6 and 7 had unacceptably low perc rates of 0.5 and 0.3 inches per hour, a homesite could be proposed (Lot 4 as shown on Tentative Map) based on either acceptable retesting or use of a deeded remote drainfield site (as shown on Lot 2). Since this site has marginal visual problems, the cost of retesting is not warranted at this time.

CLH/dr/1936C

W. O. 4769



Nov 1988 1" = 200' : PERCOLATION TEST HOLE LOCATIONS - VICTORINE RANCH Bestor W.O. 4769

DATE: 9 NOV 1988

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-221-19

Test Hole I.D. 1 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 9.2' Depth to Ground Water: — Length of Test - 4 hr

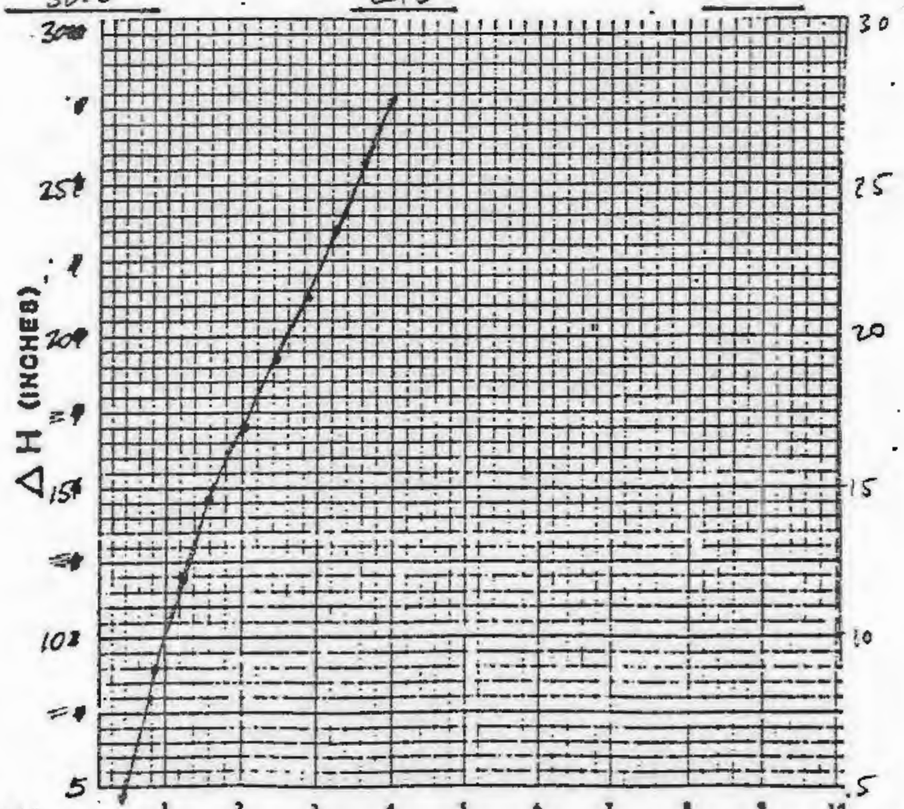
Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV 88

Health Department Representative Witnessing Test: ________

Percolation Rate: 5.5 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	10.8		0			
#2 Reading	15.6	Inches @ T:	24	minutes		12.0
#3 Reading	19.8	Inches @ T:	50	minutes		9.7
#4 Reading	22.8	Inches @ T:	73	minutes		7.8
#5 Reading	25.4	Inches @ T:	96	minutes		6.8
#6 Reading	27.8	Inches @ T:	121	minutes		5.8
#7 Reading	30.0	Inches @ T:	146	minutes		5.3
#8 Reading	32.0	Inches @ T:	171	minutes		4.8
#9 Reading	34.3	Inches @ T:	194	minutes		6.0
#10 Reading	36.5	Inches @ T:	217	minutes		5.7
#11 Reading	36.6		240			5.5



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EH/228

DATE: 9 NOV 1988

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-221-19

Test Hole I.D. 2 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 8.8 Depth to Ground Water: — Length of Test 4 hr

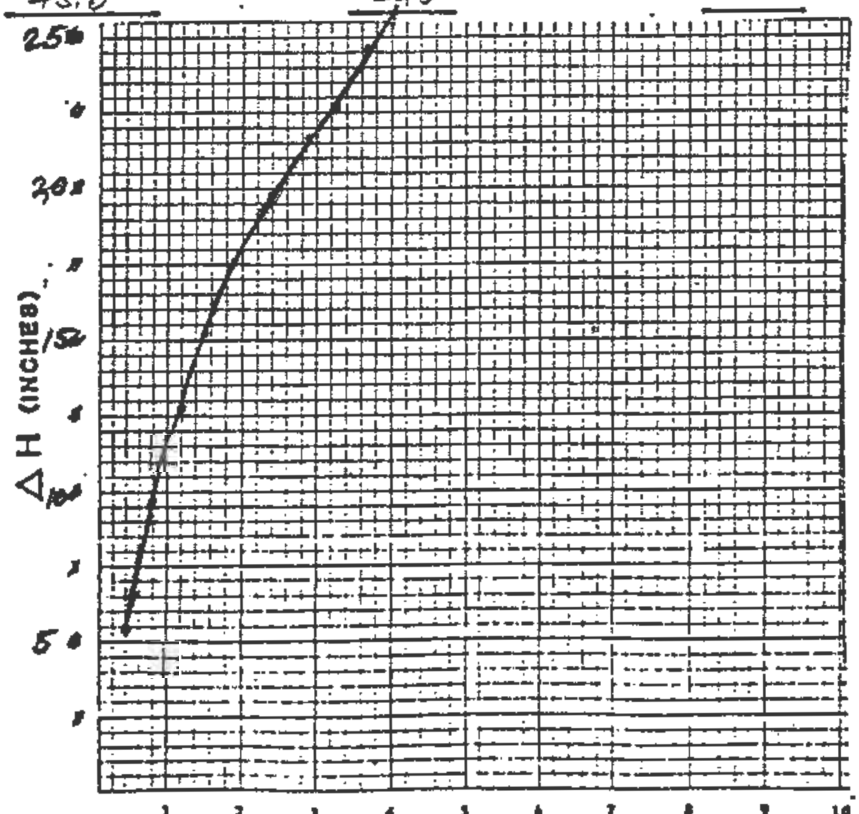
Date of Drilling: 1NOV88 Date of Presoak: 3NOV88 Date of Perc. Test 4NOV88

Health Department Representative Witnessing Test: ______

Percolation Rate: 2.9 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE		T		RATE MIN/IN	RATE IN/HR
#1 Reading	18.6		0			
#2 Reading	24.0	Inches @ T:	24	minutes		13.5
#3 Reading	28.2	Inches @ T:	49	minutes		10.1
#4 Reading	31.2	Inches @ T:	72	minutes		7.8
#5 Reading	33.8	Inches @ T:	92	minutes		7.8
#6 Reading	36.2	Inches @ T:	117	minutes		5.8
#7 Reading	38.4	Inches @ T:	144	minutes		4.9
#8 Reading	40.2	Inches @ T:	170	minutes		4.2
#9 Reading	41.5	Inches @ T:	194	minutes		3.3
#10 Reading	42.7	Inches @ T:	217	minutes		3.1
#11 Reading	43.8		240			2.9



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EH/228

DATE: 9 NOV 88

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-221-19

Test Hole I.D. 3 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 7.8 Depth to Ground Water: — Length of Test - 4 hr

Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV 88

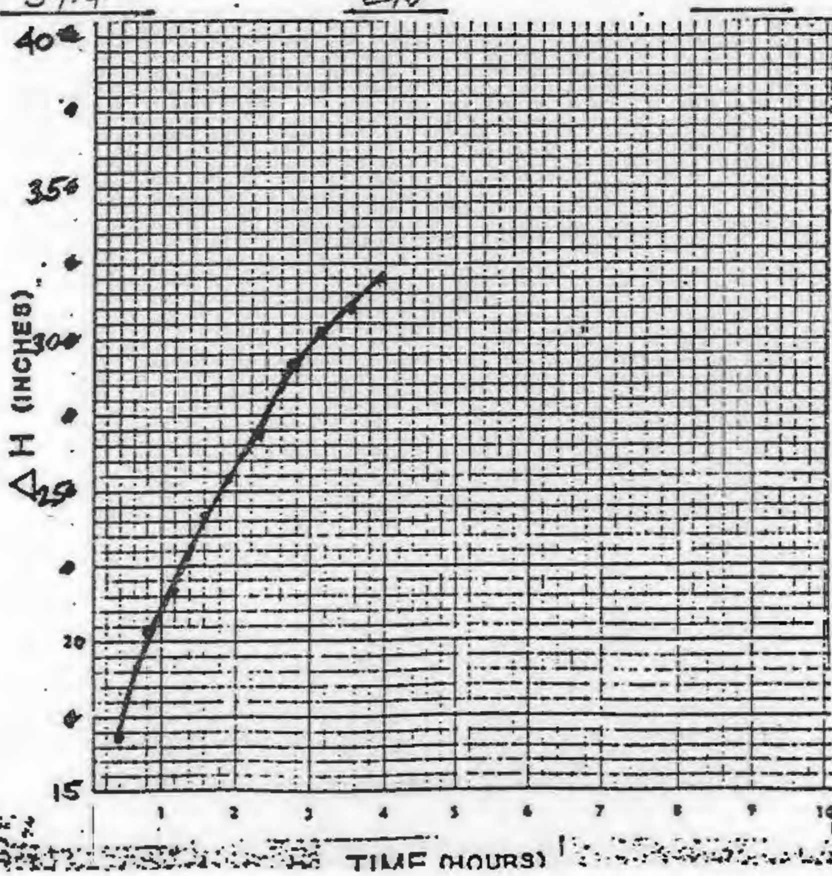
Health Department Representative Witnessing Test: ____________

Percolation Rate: 2.3 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	8.4		0			
#2 Reading	25.2	Inches @ T:	24	minutes		42
#3 Reading	28.8	Inches @ T:	48	minutes		9
#4 Reading	30.0	Inches @ T:	72	minutes		3
#5 Reading	32.4	Inches @ T:	96	minutes		6
#6 Reading	33.8	Inches @ T:	117	minutes		3.5
#7 Reading	35.3	Inches @ T:	143	minutes		3.5
#8 Reading	36.6	Inches @ T:	167	minutes		5.8
#9 Reading	37.6	Inches @ T:	191	minutes		2.5
#10 Reading	38.4	Inches @ T:	215	minutes		2.0
#11 Reading	39.4		240			2.4

2.3 (average of last three rates)



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EH/228

DATE: 9 NOV. 88

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-221-19

Test Hole I.D. 4 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 7.5' Depth to Ground Water: —— Length of Test - 4 hr

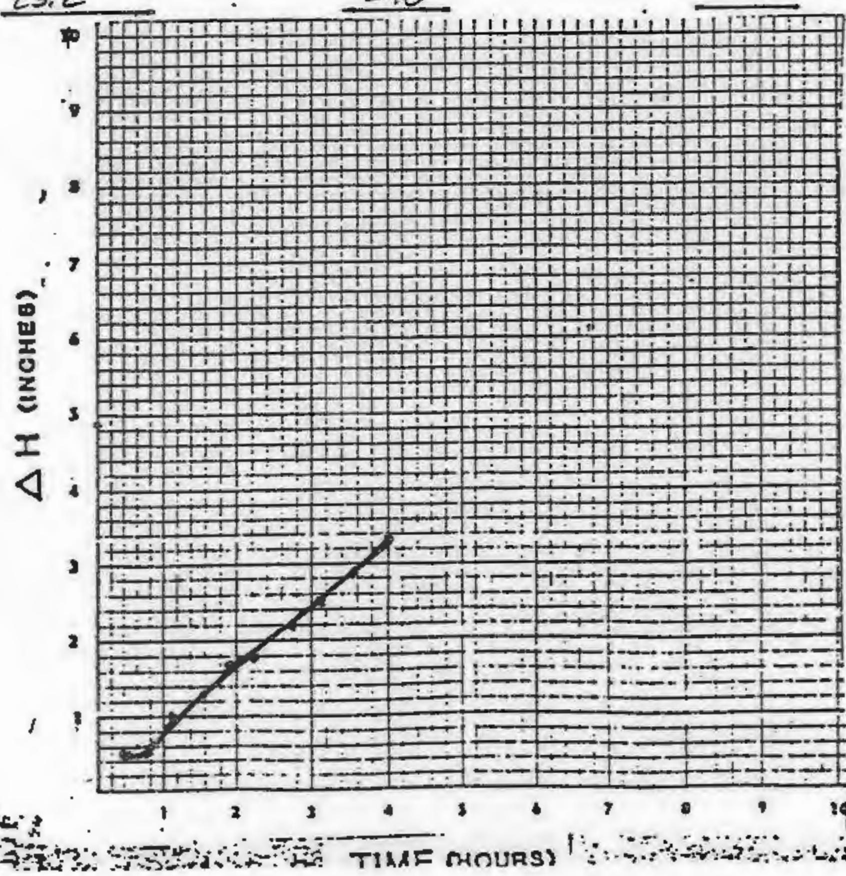
Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV 88

Health Department Representative Witnessing Test: ______

Percolation Rate: 1.0 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	19.9		ϕ			
#2 Reading	20.4	Inches @ T:	24	minutes		1.3
#3 Reading	20.4	Inches @ T:	48	minutes		ϕ
#4 Reading	20.9	Inches @ T:	71	minutes		1.3
#5 Reading	21.2	Inches @ T:	96	minutes		0.72
#6 Reading	21.6	Inches @ T:	117	minutes		1.14
#7 Reading	21.6	Inches @ T:	143	minutes		ϕ
#8 Reading	22.1	Inches @ T:	168	minutes		1.2
#9 Reading	22.4	Inches @ T:	190	minutes		0.8
#10 Reading	22.8	Inches @ T:	215	minutes		1.0
#11 Reading	23.2		240			1.0



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EH/228

DATE: 9 NOV. 88

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-211-17

Test Hole I.D. 5 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: (mud: 4.4) 8.2 Depth to Ground Water: ——— Length of Test - 4 hr

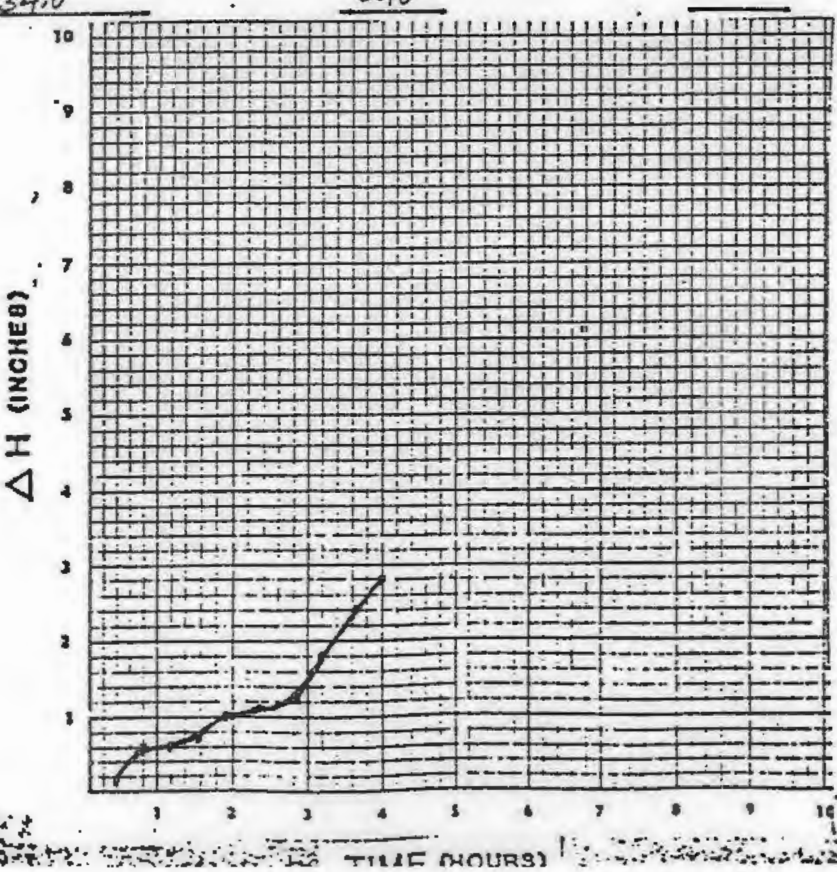
Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV 88

Health Department Representative Witnessing Test: ______

Percolation Rate: 1.2 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	31.2		Ø			0.5
#2 Reading	31.4	Inches @ T:	24	minutes		1.0
#3 Reading	31.8	Inches @ T:	48	minutes		Ø
#4 Reading	31.8	Inches @ T:	72	minutes		0.3
#5 Reading	31.9	Inches @ T:	96	minutes		0.8
#6 Reading	32.2	Inches @ T:	118	minutes		0.2
#7 Reading	32.3	Inches @ T:	143	minutes		0.2
#8 Reading	32.4	Inches @ T:	170	minutes		1.6
#9 Reading	33.0	Inches @ T:	192	minutes		1.4
#10 Reading	33.6	Inches @ T:	217	minutes		1.0
#11 Reading	34.0		240			



RP:krf

EH/228

DATE: 9 NOV 1988

PERCOLATION TEST DATA FORM

Job Name VICTORILIE RANCH APN# 243-211-17

Test Hole I.D. 6 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 3.3 Depth to Ground Water: —— Length of Test 4 hr

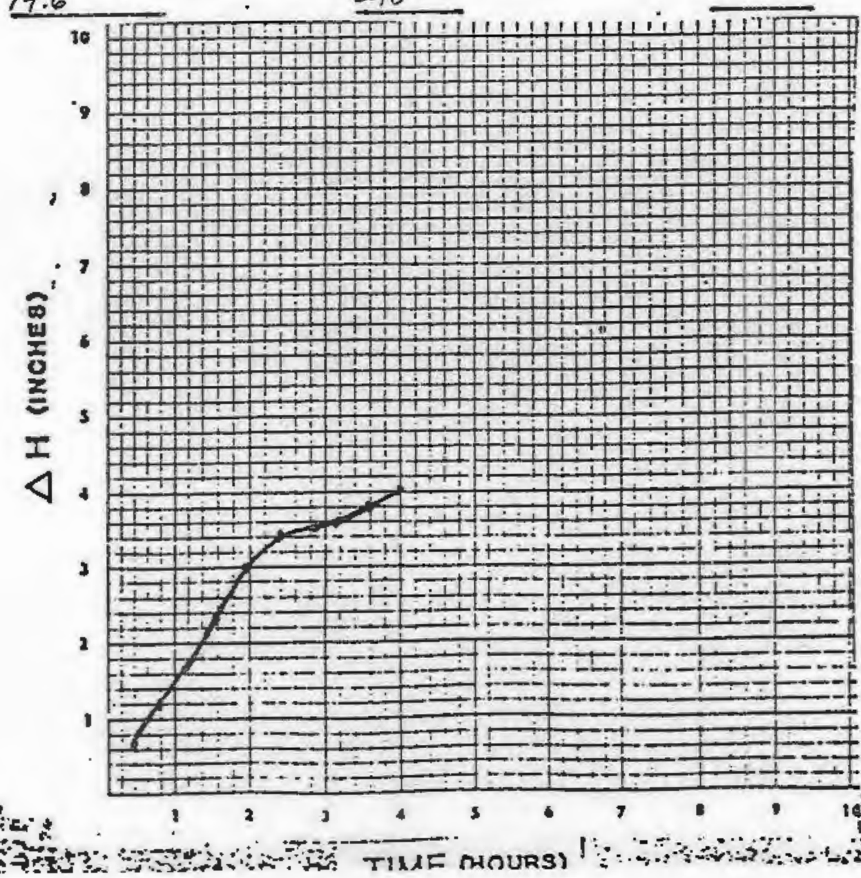
Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV 88

Health Department Representative Witnessing Test: ____________

Percolation Rate: 0.5 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	15.6		∅			
#2 Reading	16.3	Inches @ T:	24	minutes		1.8
#3 Reading	16.8	Inches @ T:	48	minutes		1.3
#4 Reading	17.3	Inches @ T:	72	minutes		1.3
#5 Reading	17.9	Inches @ T:	96	minutes		1.5
#6 Reading	18.6	Inches @ T:	119	minutes		1.8
#7 Reading	19.0	Inches @ T:	144	minutes		1.0
#8 Reading	19.1	Inches @ T:	170	minutes		0.2
#9 Reading	19.2	Inches @ T:	191	minutes		0.3
#10 Reading	19.4	Inches @ T:	216	minutes		0.5
#11 Reading	19.6		240			0.5



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EH/228

DATE: 9 NOV. 1988

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-211-17

Test Hole I.D. 7 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: (mod 6.3) 8.4 Depth to Ground Water: ____ Length of Test 4 hr

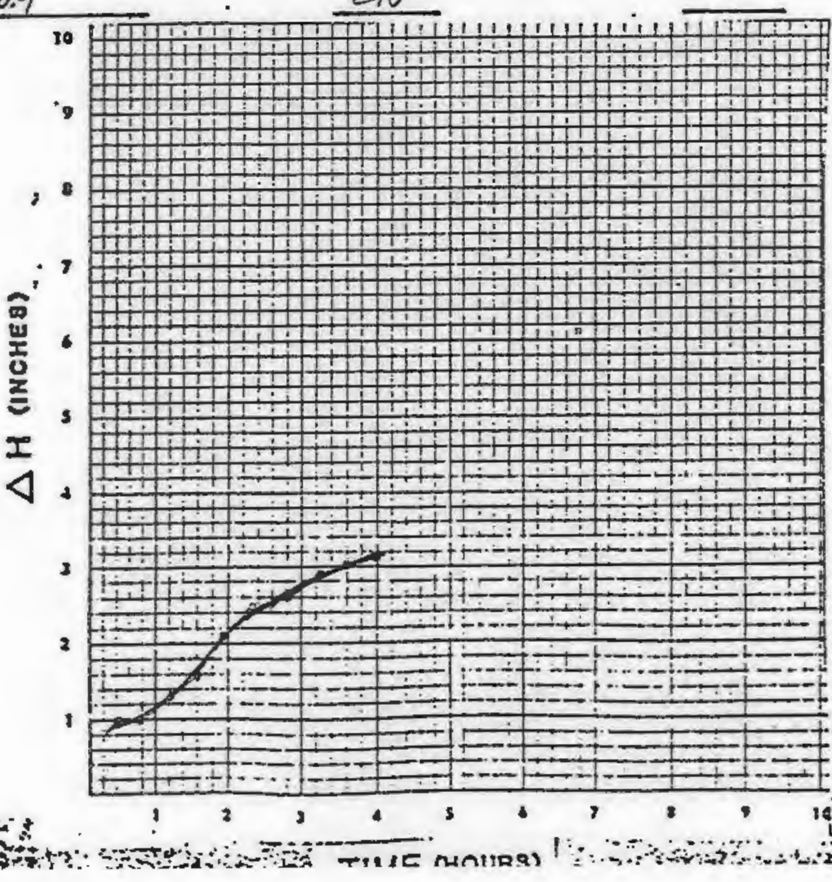
Date of Drilling: 1 NOV. 88 Date of Presoak: 3. NOV. 88 Date of Perc. Test 4 NOV. 88

Health Department Representative Witnessing Test: ____

Percolation Rate: 0.3 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	7.8		∅			2.5
#2 Reading	8.8	Inches @ T:	24	minutes		1.3
#3 Reading	8.8	Inches @ T:	48	minutes		∅
#4 Reading	9.1	Inches @ T:	72	minutes		0.8
#5 Reading	9.5	Inches @ T:	96	minutes		1.0
#6 Reading	9.8	Inches @ T:	119	minutes		0.8
#7 Reading	10.2	Inches @ T:	144	minutes		1.0
#8 Reading	10.4	Inches @ T:	169	minutes		1.0
#9 Reading	10.7	Inches @ T:	193	minutes		0.8
#10 Reading	10.8	Inches @ T:	216	minutes		0.3
#11 Reading	10.9		240			0.3



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EH/228

DATE: 9 NOV. 1988

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-211-17

Test Hole I.D. 8 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: (mod 6.3) 7.6 Depth to Ground Water: —— Length of Test 4 hr

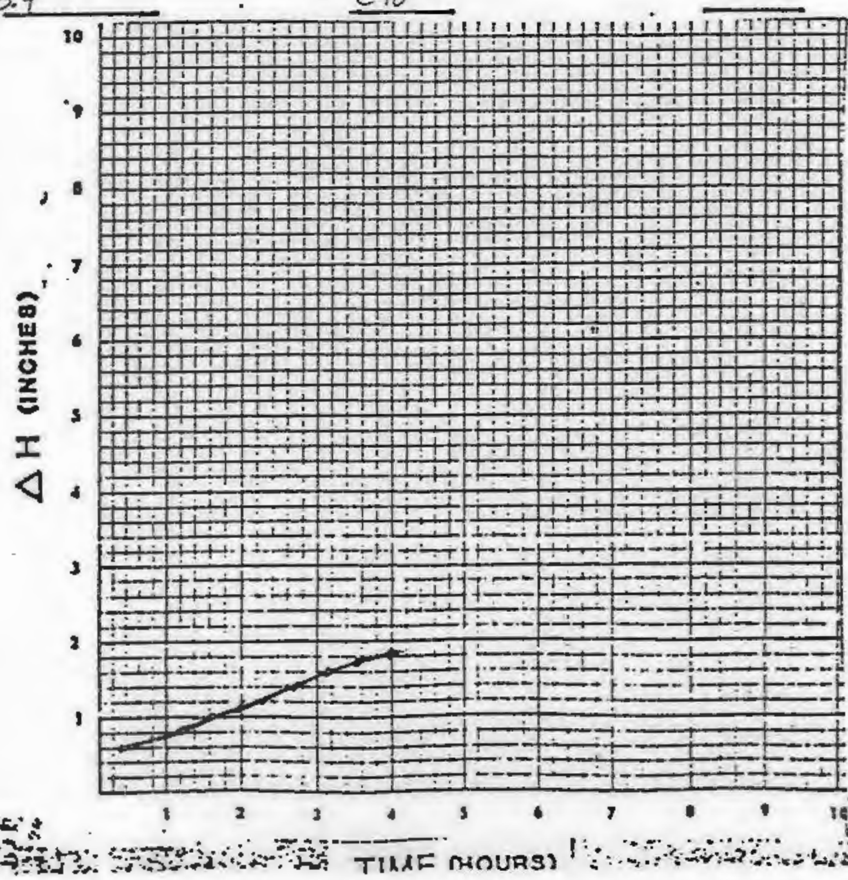
Date of Drilling: 1 NOV. 88 Date of Presoak: 3 NOV. 88 Date of Perc. Test 4 NOV. 88

Health Department Representative Witnessing Test: ______________

Percolation Rate: 0.3 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 reading	6.6		ϕ			1.5
#2 Reading	7.2	Inches @ T:	24	minutes		0.3
#3 Reading	7.3	Inches @ T:	48	minutes		0.3
#4 Reading	7.4	Inches @ T:	72	minutes		0.5
#5 Reading	7.6	Inches @ T:	95	minutes		0.3
#6 Reading	7.7	Inches @ T:	118	minutes		0.2
#7 Reading	7.8	Inches @ T:	143	minutes		0.5
#8 Reading	8.0	Inches @ T:	169	minutes		0.5
#9 Reading	8.2	Inches @ T:	193	minutes		0.3
#10 Reading	8.3	Inches @ T:	216	minutes		0.3
#11 Reading	8.4		240			



RP:krf

EH/228

DATE: 9 NOV. 1988

PERCOLATION TEST DATA FORM

Job Name VICTORINE RANCH APN# 243-211-17

Test Hole I.D. 9 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 4.5 Depth to Ground Water: — Length of Test 4 hr

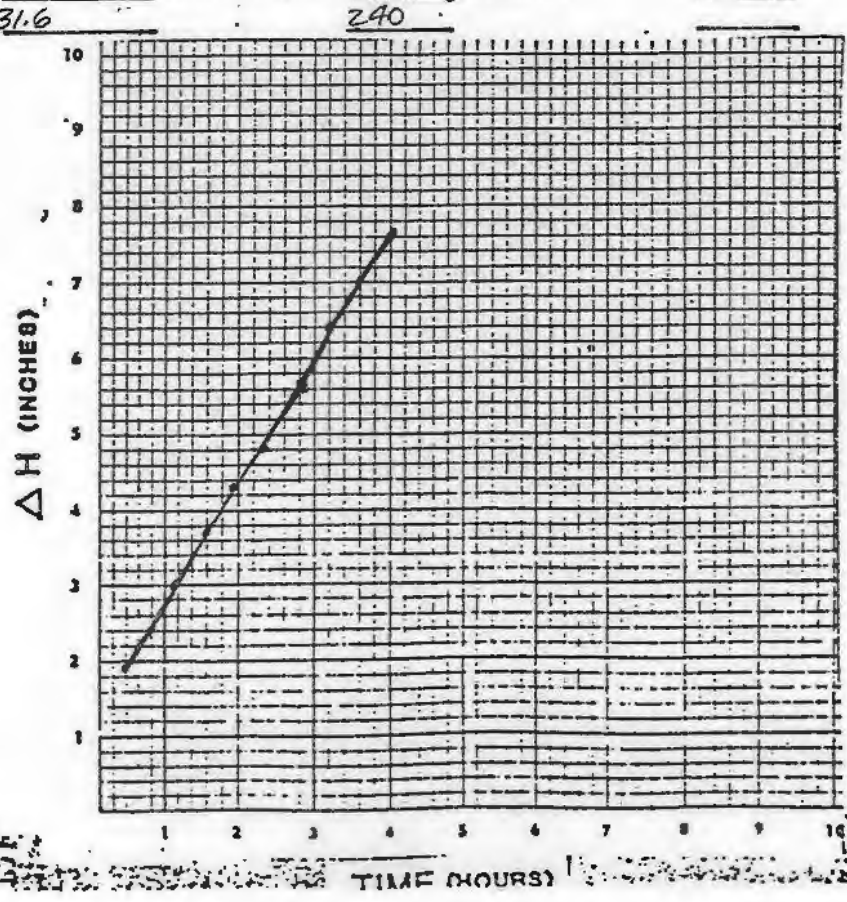
Date of Drilling: 1 NOV 88 Date of Presoak: 3 NOV 88 Date of Perc. Test 4 NOV. 88

Health Department Representative Witnessing Test: ______

Percolation Rate: 1.5 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	24		ϕ			
#2 Reading	25.9	Inches @ T:	24	minutes		4.8
#3 Reading	26.4	Inches @ T:	48	minutes		1.3
#4 Reading	27.0	Inches @ T:	71	minutes		1.6
#5 Reading	27.7	Inches @ T:	96	minutes		1.7
#6 Reading	28.3	Inches @ T:	117	minutes		1.7
#7 Reading	28.8	Inches @ T:	142	minutes		1.2
#8 Reading	29.6	Inches @ T:	170	minutes		1.7
#9 Reading	30.4	Inches @ T:	192	minutes		2.2
#10 Reading	31.0	Inches @ T:	216	minutes		1.5
#11 Reading	31.6		240			1.5



RP:krf

EH/228

DATE: 9 NOV 1988

PERCOLATION TEST DATA FORM

Job Name VICTORVILLE RANCH APN# 243-211-17

Test Hole I.D. 10 Test Performed by: G.P.

TEST HOLE INFORMATION

Depth: 7' Depth to Ground Water: —— Length of Test 4 hr

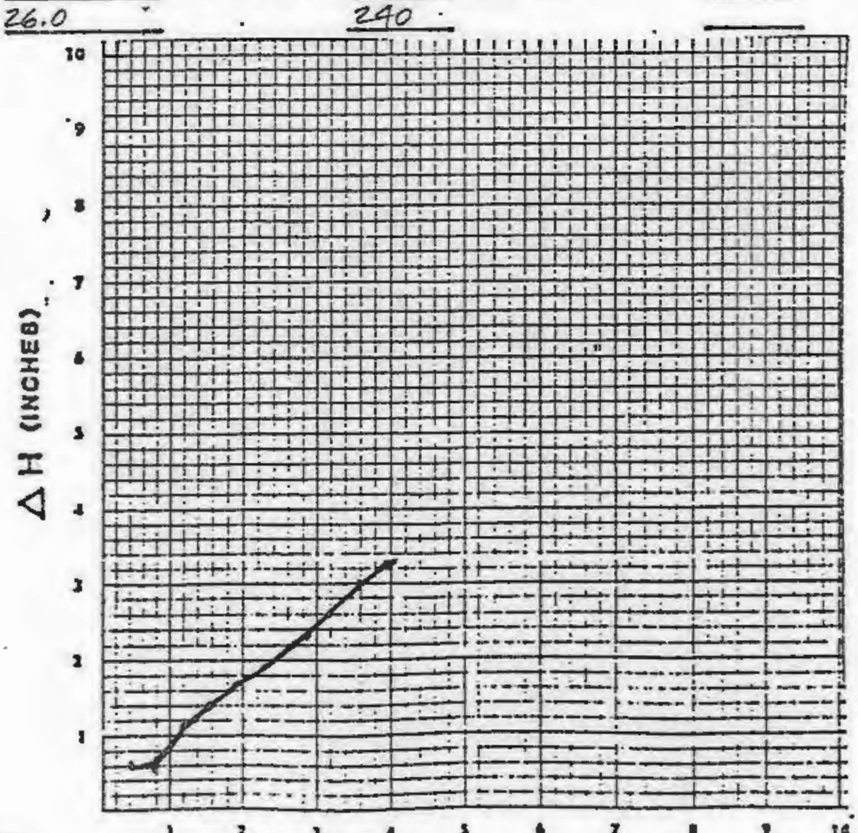
Date of Drilling: 1 NOV. 88 Date of Presoak: 3 NOV. 88 Date of Perc. Test 4 NOV. 88

Health Department Representative Witnessing Test: ______

Percolation Rate: 0.8 in./hr.

PERCOLATION TEST DATA

	DEPTH OF HOLE				RATE MIN/IN	RATE IN/HR
#1 Reading	22.8		ϕ			
#2 Reading	23.4	Inches @ T:	24	minutes		4.0
#3 Reading	23.4	Inches @ T:	48	minutes		ϕ
#4 Reading	23.9	Inches @ T:	72	minutes		1.3
#5 Reading	24.2	Inches @ T:	96	minutes		0.8
#6 Reading	24.5	Inches @ T:	118	minutes		0.8
#7 Reading	24.7	Inches @ T:	142	minutes		0.5
#8 Reading	25.1	Inches @ T:	170	minutes		0.9
#9 Reading	25.4	Inches @ T:	192	minutes		0.8
#10 Reading	25.8	Inches @ T:	216	minutes		1.0
#11 Reading	26.0		240			0.5



RP:krf

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