MONTECITO RANCH

APPENDIX L

GEOLOGICAL RECONNAISSANCE REPORTS

for the

DRAFT FINAL ENVIRONMENTAL IMPACT REPORT

SP01-001; VTM 5250RPL6; P04-045; P09-023; GPA 04-013; R04-022;
STP 08-019; ER 09-013; LOG NO. 01-09-013; SCH NO. 2002021132

APRIL 2010

APPENDIX L – GEOLOGICAL RECONNAISSANCE REPORTS INFORMATION FOR THE READER

This document consists of the Geological Reconnaissance Reports for the Montecito Ranch Project (Proposed Project or Project) and analyzes storm water-related elements associated with construction and operation of the Project. Since circulation of the Draft Environmental Impact Report (EIR) of the Proposed Project and associated technical reports, there have been some changes in Project description.

The Geological Reconnaissance Reports that circulated with the Draft EIR indicated that a 10.6-acre future school site would be located off of future Montecito Ranch Road in the vicinity of the proposed parks and wastewater reclamation facility. At this time, this use is being eliminated from the Final EIR, and hence the Geological Reconnaissance Reports. Any graphic or text references to the future school site should be ignored by the reader. Upon Project approval, the future school site will be excluded from the Project and placed into open space. This alteration in the Project description would not change the conclusion with regard to the level of significance of impacts because removal of the future school site and placement into open space would be beneficial as the Proposed Project would result in less grading during the construction period.

The above-cited revision is now included as part of the public record and will be before the Board of Supervisors during their consideration of the Project.

GEOLOGICAL RECONNAISSANCE AND REFRACTION SEISMOGRAPH INVESTIGATION PHASE I OF GEOTECHNICAL INVESTIGATION MONTECITO RANCHO, RAMONA, CALIFORNIA

PREPARED FOR:

CHEVRON LAND AND DEVELOPMENT COMPANY
C/O HUNTINGTON BEACH COMPANY
2120 Main Street, Suite 260
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PREPARED BY:

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May 1, 1989
S.E.A. 88208-01

L0501

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May 1, 1989

Chevron Land and Development Company
c/o Huntington Beach Company
2120 Main Street, Suite 260
Huntington Beach, California 92648

S.E.A. 88208-01

ATTENTION: Mr. Larry Netherton

SUBJECT: Geological Reconnaissance Refraction Seismograph Investigation
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California

Gentlemen:

As per your authorization of February 16, 1989 and our proposal of February 9, 1989, we have completed Phase I of the Geotechnical Investigation for the Montecito Ranch property. We are transmitting, herewith, a report of this investigation. The findings of this report are intended to provide preliminary information to allow for land planning in proposed development areas. Specifically, the intent of Phase I was to evaluate the possible existence of obvious soil or geologic conditions, within proposed development areas, which could significantly affect development costs.

In general, our investigation did not encounter unusual geologic conditions which would result in major unanticipated development costs. The project site is underlain by weathered granitic materials, with localized shallow deposits of alluvium and colluvium overlying the granitics. We observed numerous areas of hard rock outcroppings in the steeper slope areas; however, it is our understanding that development is not being considered for these areas.

If you have questions regarding the information contained in this report, or methods and procedures used to obtain this information, please do note hesitate to contact our Santee

L0501

office. The opportunity to be of service to you is appreciated and we look forward to working with you in the future on this project.

Respectfully submitted,

SHEPARDSON ENGINEERING ASSOCIATES, INC.

Kendall L. Sherrod, C.E.G. 949
Vice President

Rob Stroop
Staff Engineer

:slm

cc: (4) Addressee

L0501

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APPENDIX A

Seismic Traverses

GEOLOGICAL RECONNAISSANCE AND
REFRACTION SEISMOGRAPH INVESTIGATION
PHASE I OF GEOTECHNICAL INVESTIGATION
MONTECITO RANCH, RAMONA, CALIFORNIA

PROJECT DESCRIPTION AND SCOPE

This report presents the results of our Phase I geological reconnaissance and refraction seismograph investigation of the Montecito Ranch in Ramona, California. The intent of Phase I was to evaluate the possible existence of obvious soil or geologic conditions which could significantly affect development costs. Our work completed to date has consisted of geologic reconnaissance mapping and completing 47 refraction seismograph traverses. Also included was a review of available geologic literature.

DISCUSSION OF FINDINGS

Site Geology and Soil Conditions

We found the site to be underlain by weathered granitic materials, with localized shallow deposits of alluvium and colluvium overlying the granitics. Since no subsurface excavations were performed as part of this investigation, the inferred limits and depths of the various materials are based totally on surface field observations, past experience and review of available geologic literature. Plate No. 1 is a site plan showing the inferred limits of the geologic units, as well as the locations of the seismic traverses.

It appears that the majority of the area considered for development within the site will be underlain by decomposed granitic materials directly below topsoil materials. The topsoil materials appear to consist of silty sand and are expected to be on the order of 3 to 4 feet in thickness. In areas of development, the topsoils will require removal and recompaction. In their natural condition, they are potentially compressible when subjected to increased loading, especially with the addition of moisture. The decomposed granitic materials typically yield a coarse, silty sand material when excavated, and these materials, both in cut and fill, provide excellent support for structures.

Based on our experience, areas designated as "Colluvium" on the attached Plate No. 1 may require overexcavation on the order of ten feet. This need for removal and recompaction is due to

the typically porous, collapsible nature of colluvial deposits. Colluvial deposits in this environment often consist of slightly clayey, lightly cemented sand, with an abundance of "pin hole"-size voids. When these materials are subjected to increases in moisture content, the cementation breaks down and collapse results.

We suspect that the areas underlain by "Alluvium", as shown on the attached Plate No. 1, may be subject to consolidation or compression, due to low density soils and will require densification. However, our experience in the Ramona valley indicates that the maximum depth of alluvium might be on the order of eight feet. The Ramona Valley proper has only very thin deposits of alluvium and is generally underlain by decomposed granite directly below the topsoil units. We, therefore, anticipate that a tributary to the main valley, such as that containing the alluvium shown on Plate No. 1, would have even thinner deposits of alluvium.

We anticipate that perched water could be encountered at shallow depths within the alluvial areas during the winter months, especially after rainy periods. We would also anticipate that the elevation of the perched water within the alluvium would fluctuate drastically with seasons of the year and wet or dry years.

Rippability Characteristics

In general, our investigation of the rippability characteristics for the project was limited to the more subdued topographic areas, and only investigated shallow depths. This was done as per your instructions, with the understanding that only minimal cuts and fills are being considered and that the rippability information would be utilized mainly for evaluating the feasibility of underground utility installation. It is our understanding that development is not being considered for the steeper slopes within the project. Numerous areas of hard rock outcroppings were observed in these steeper slope areas, many of which would undoubtedly require blasting if excavations were attempted.

The evaluation of rippability characteristics was performed utilizing a Nimbus E100 Refraction Seismograph. All traverses were run in both the forward and reverse directions. Results of each seismic traverse are attached for your review. Also Plate No. 2 provides an explanation of the data contained on a typical seismic traverse log.

The seismographs depth of investigation is closely related to the length of the seismic traverse. Typically, the depth of investigation is approximately 1/3 the length of the traverse. Most of the traverses were 50 feet in length, therefore the typical depth of investigation would be approximately 16 feet. Traverse Nos. 16 through 31 were 100 feet in length, based on our expectation that deeper cuts would be required in the area of these traverses.

The rippability determinations, utilizing the seismic traverse information, is based on the velocity at which a shock wave travels through the subsurface materials. Velocities in the subsurface materials are subject to fluctuations, depending upon such local variations as fractures, faults, and other plains of weaknesses of any kind, weathering, degree of decomposition, brittleness and crystaline nature of the rock materials. The following descriptions of rippable conditions, marginally rippable conditions, and nonrippable conditions contain our recommendations for utilizing seismic velocities to interpret rippability.

1. Rippable Condition (Velocities of: 0 - 4,500 Ft./Sec.)

   This velocity range indicates rippable materials which may consist of decomposed granitics possessing random hardrock floaters. These materials will break down into slightly silty, well graded sand, whereas the floaters will require disposal in an area of nonstructural fill. Some areas containing numerous hardrock floaters may present utility trench problems. Further, large floaters exposed at or near finished grade may present additional problems of removal and disposal.

   Materials within the velocity range of from 3,500 to 4,000 fps are rippable with difficulty by backhoes and other light trenching equipment.

2. Marginally Rippable Condition (Velocities of: 4,500 - 5,500 Ft./Sec.)

   This range is rippable with effort by D-9 and indicates only slightly weathered granitics. This velocity range may also include numerous floaters with the possibility of extensive areas of fractured granitics. Excavations may produce material that will partially break down into a coarse, slightly silty to clean sand, but containing a high percentage of +1/4" material. Less fractured or weathered materials may be found in this velocity range that would require blasting to facilitate removal.

Materials within this velocity range are beyond the capability of backhoes and lighter trenching equipment. Difficulty of excavation would also be realized by gradalls and other heavy trenching equipment.

3. Nonrippable Condition (Velocities of: 5,500 Ft./Sec. and Greater)

This velocity range includes nonrippable material consisting primarily of fractured granitics at lower velocities, with increasing hardness at higher velocities. In its natural state, it is not desirable for building pad subgrade. Blasting will produce oversize material requiring disposal in areas of nonstructural fill.

You will note that velocities greater than 5,500 Ft./Sec. are considered nonrippable. The following Table No. 1 lists the seismic traverse numbers and approximate depths where the data suggests that nonrippable conditions may be present. Seismic traverses not listed in the following table did not, in our opinion, encounter nonrippable rock conditions within their depth of investigation.

TABLE NO. 1

15 FEET depth only

SEISMIC TRAVERSE NO.	APPROXIMATE DEPTH TO NONRIPPABLE ROCK CONDITIONS
7	17'
18	8'
28	25'
31	25'
33	15' - 24'
34	4'
35	8'
36	7'
39	8'
40	5'

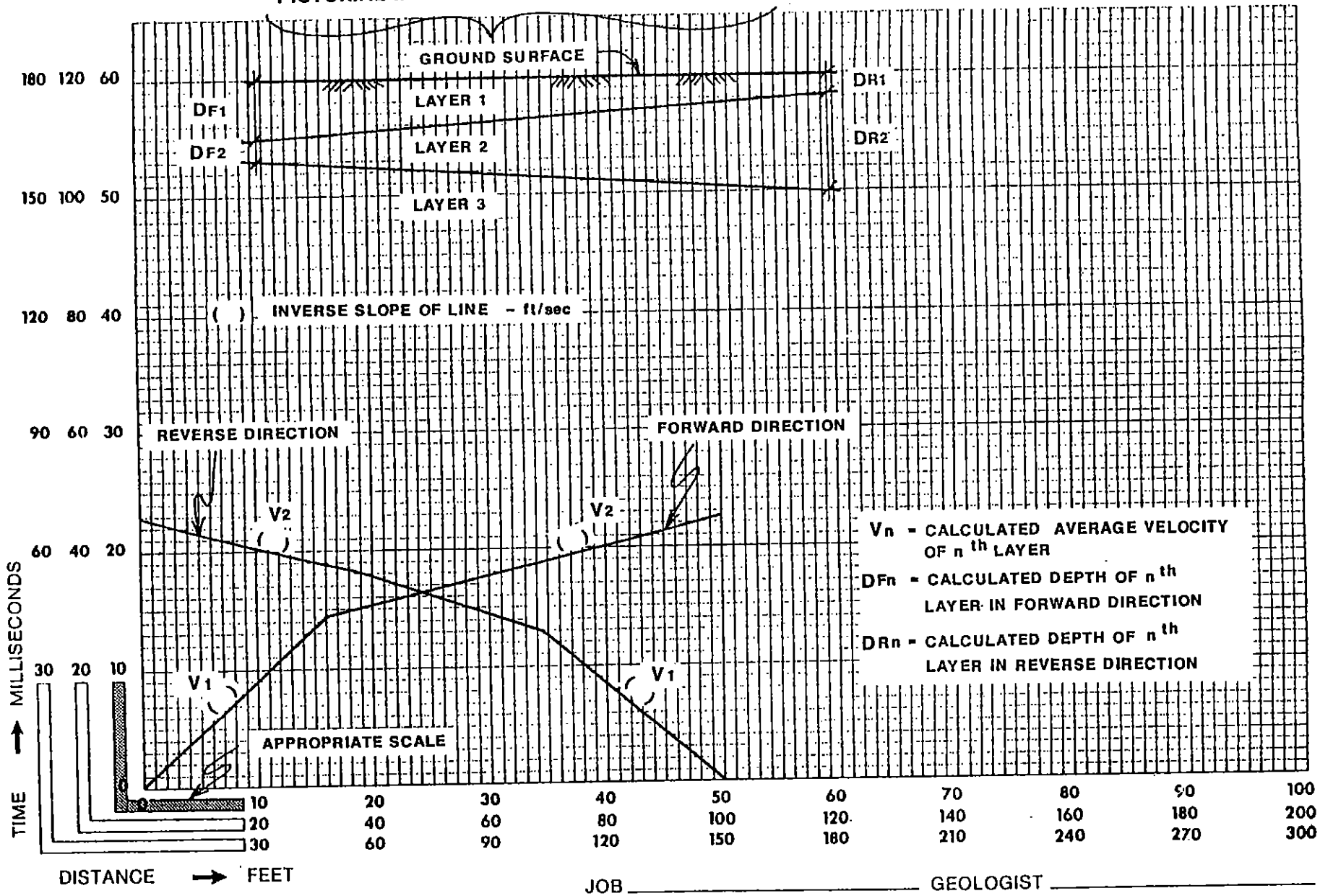
The upper limits of velocities which may ripped can be increased by the utilization of the largest and most up to date excavating equipment available, equipped with special rippers. However, our experience indicates that the 5,500 Ft./Sec. threshold for estimating nonrippable conditions is conservative and is appropriate for the planning stages of development.

LIMITATIONS

The findings of this report are valid as of the present date. However, changes in the condition of a property can occur with the passage to time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside of our control.

APPENDIX A

PICTORIAL INTERPRETION OF SEISMIC TRAVERSE



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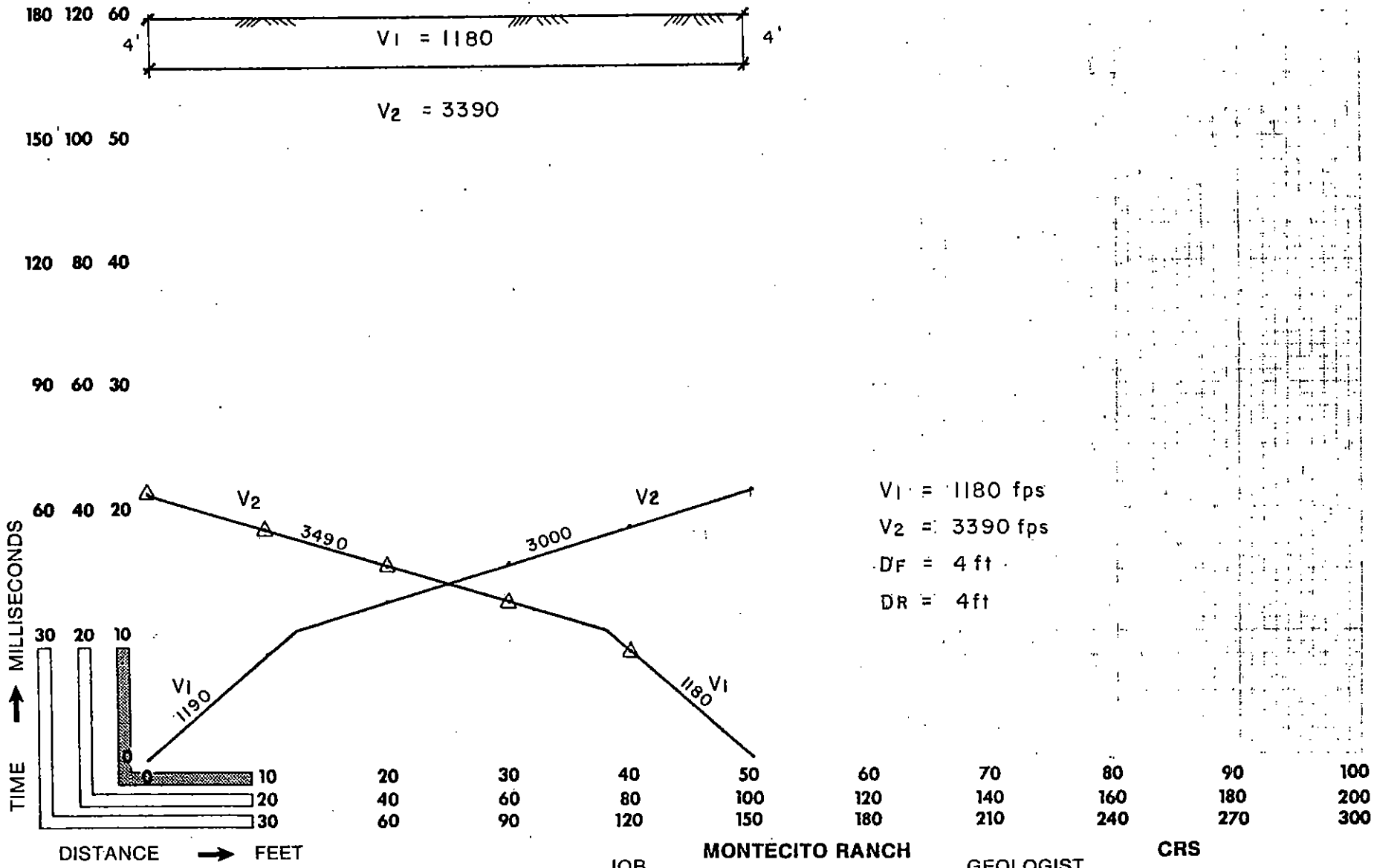
JOB _____ GEOLOGIST _____

JOB NO. _____ ELEVATION _____

TRAVERSE NO. _____ ROCK TYPE AS EXPOSED ON THE SURFACE

DIRECTION ORIENTATION OF FORWARD DIRECTION TRAVERSE QUALITY BASED ON SIGNAL GENERATION

H = V = 1"=10'-0"



V1 = 1180 fps

V2 = 3390 fps

DF = 4 ft

DR = 4ft

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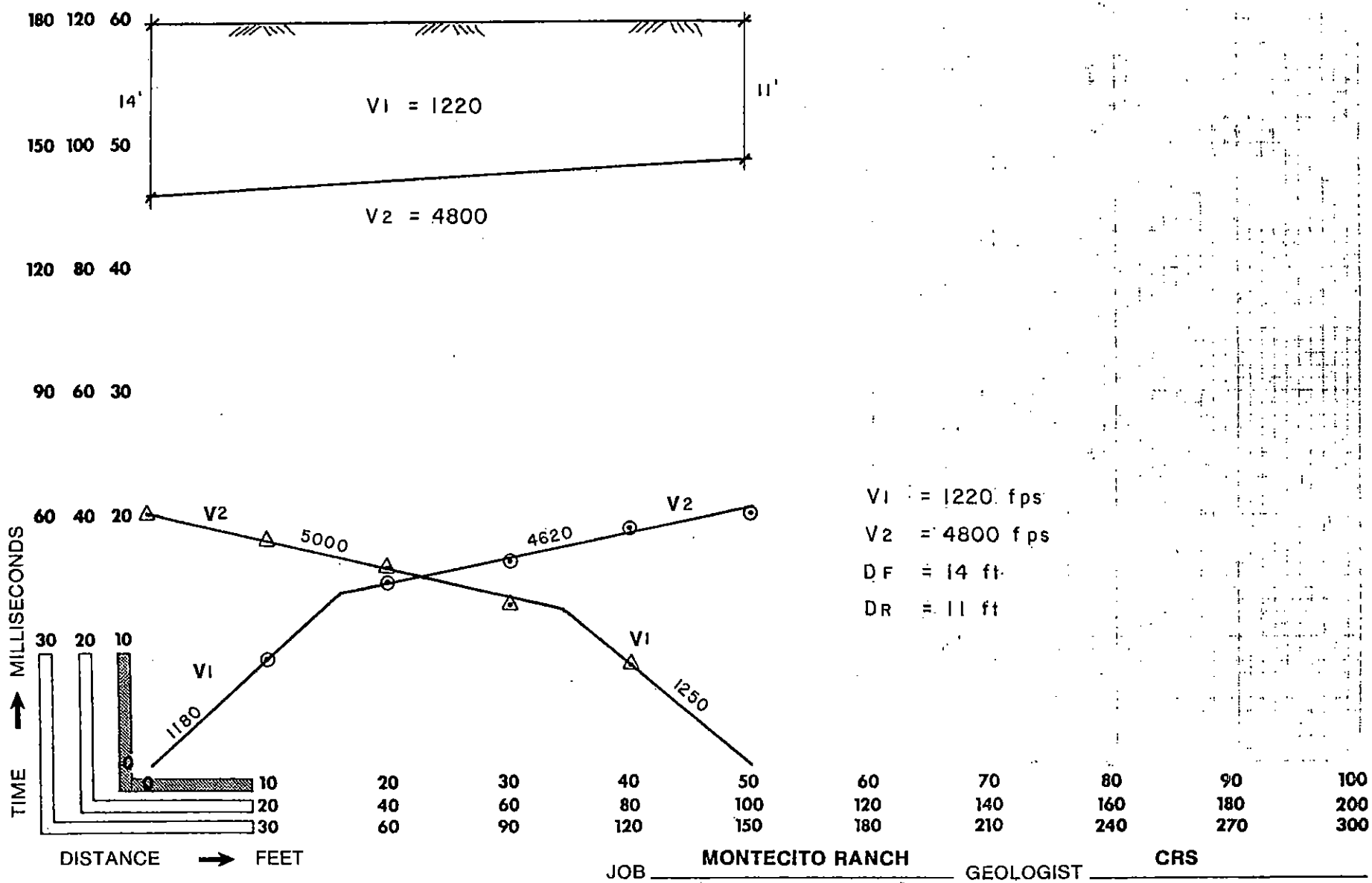
JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR- 1	ROCK TYPE	GRANTICS
DIRECTION	SW→NE	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1220 fps
V2 = 4800 fps
DF = 14 ft
DR = 11 ft

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

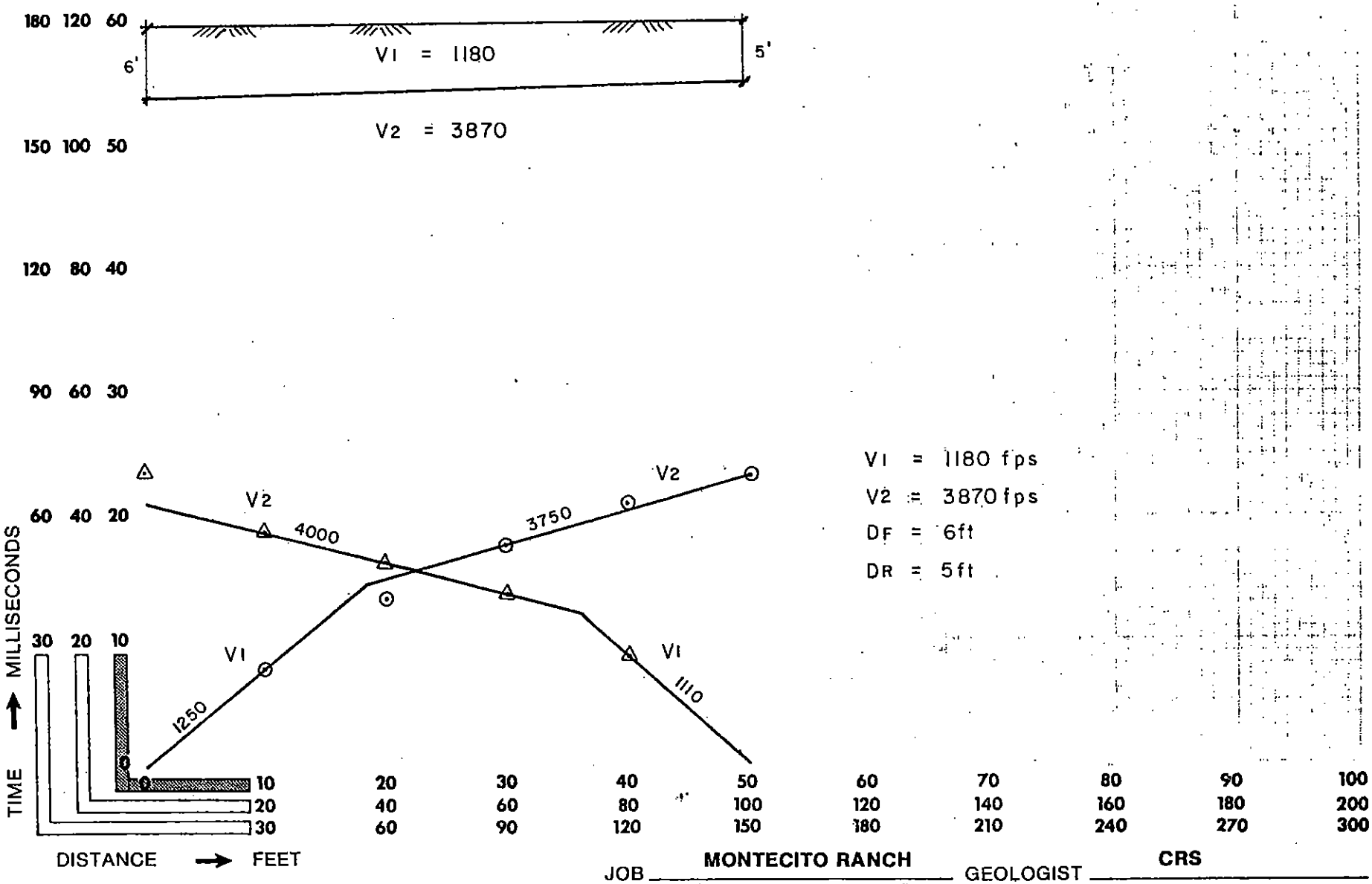
TRAVERSE NO. TR-2

ROCK TYPE GRANTICS

DIRECTION W→E

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1180 fps

V2 = 3870 fps

DF = 6ft

DR = 5ft

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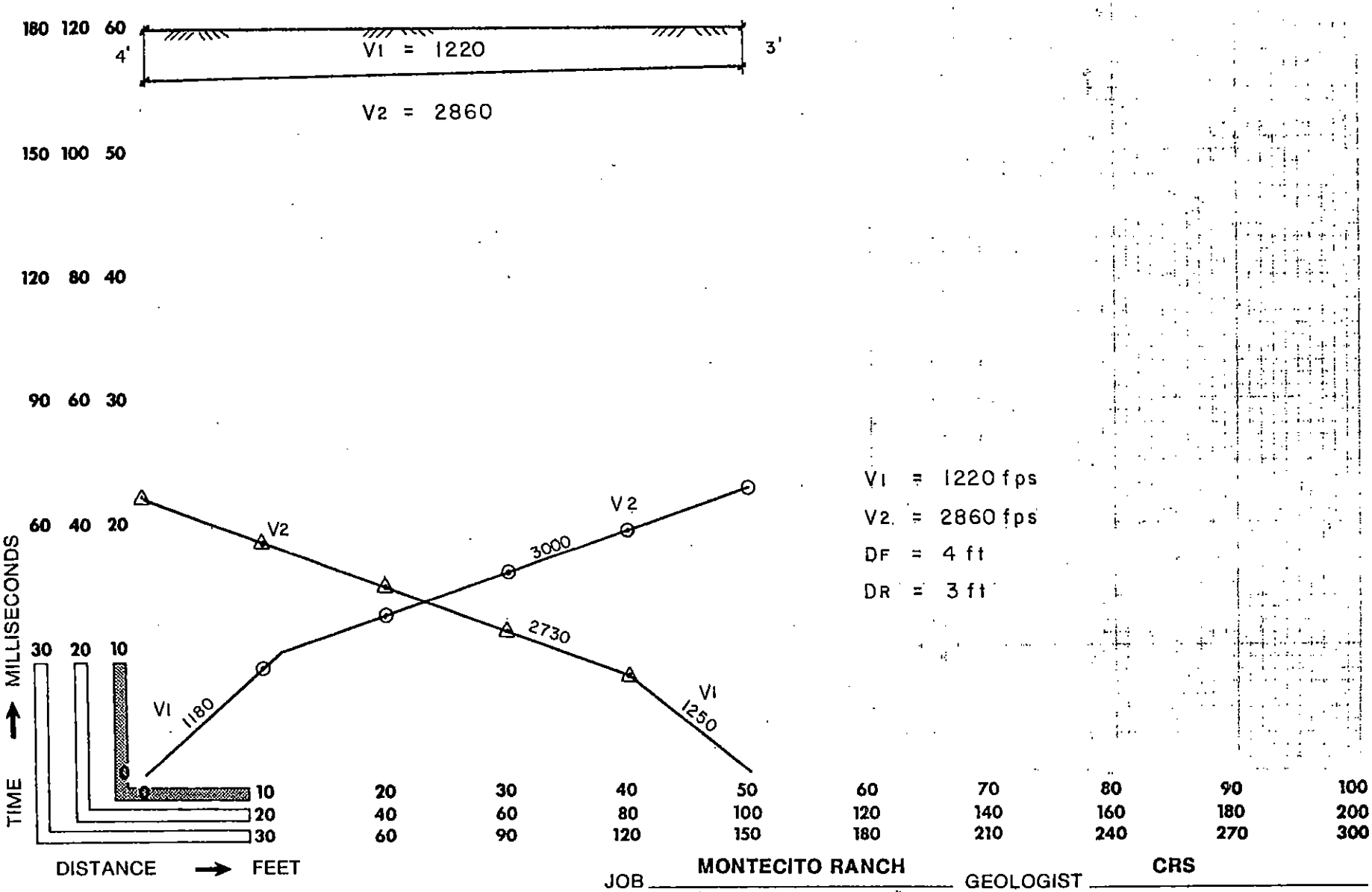
JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-3	ROCK TYPE	GRANTICS
DIRECTION	SW→NE	TRAVERSE QUALITY	FAIR to GOOD

H = V = 1"=10'-0"



V1 = 1220 fps

V2 = 2860 fps

DF = 4 ft

DR = 3 ft

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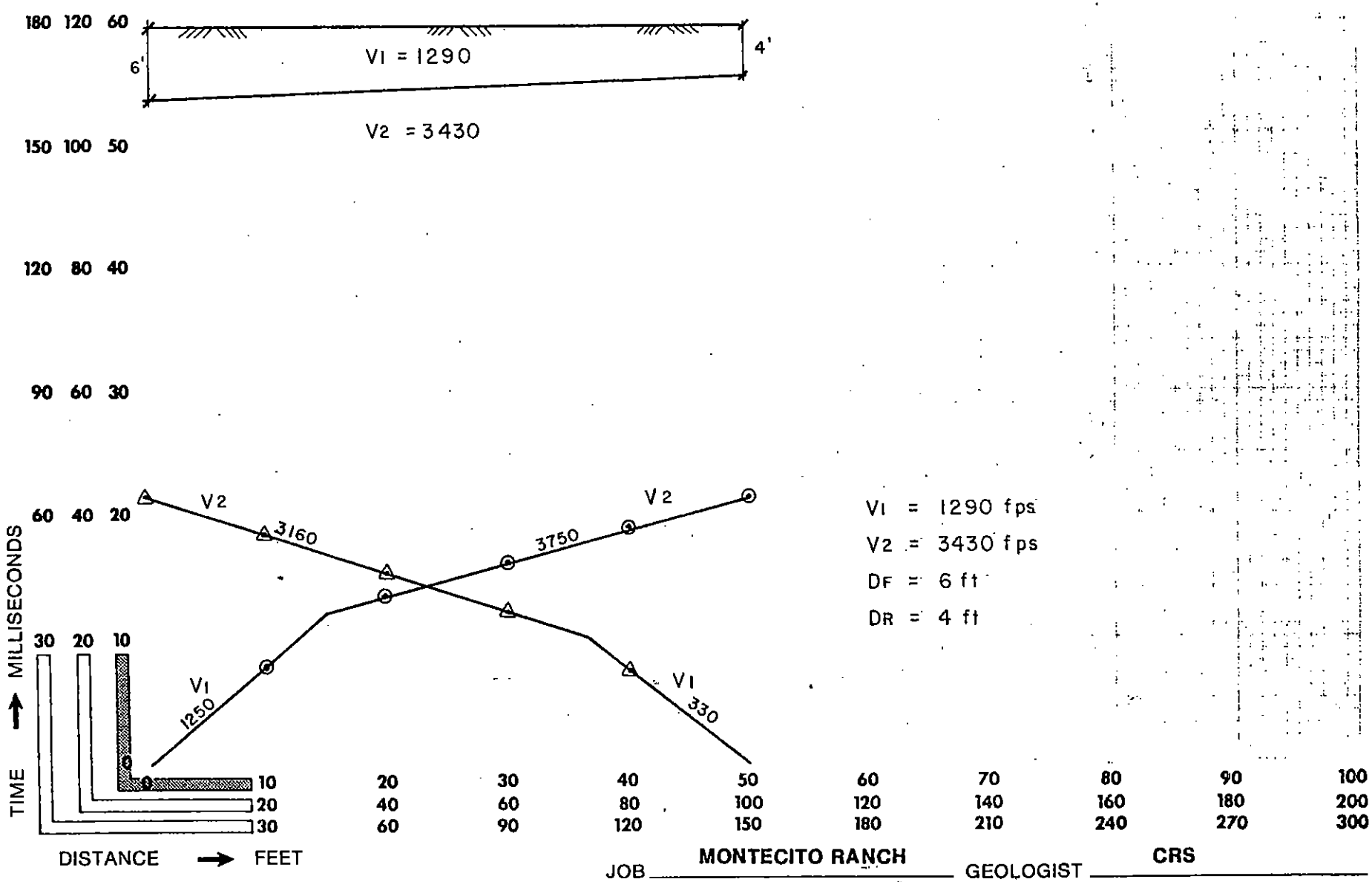
JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR- 4	ROCK TYPE	GRANTICS
DIRECTION	W→E	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1290 fps
V2 = 3430 fps
DF = 6 ft
DR = 4 ft

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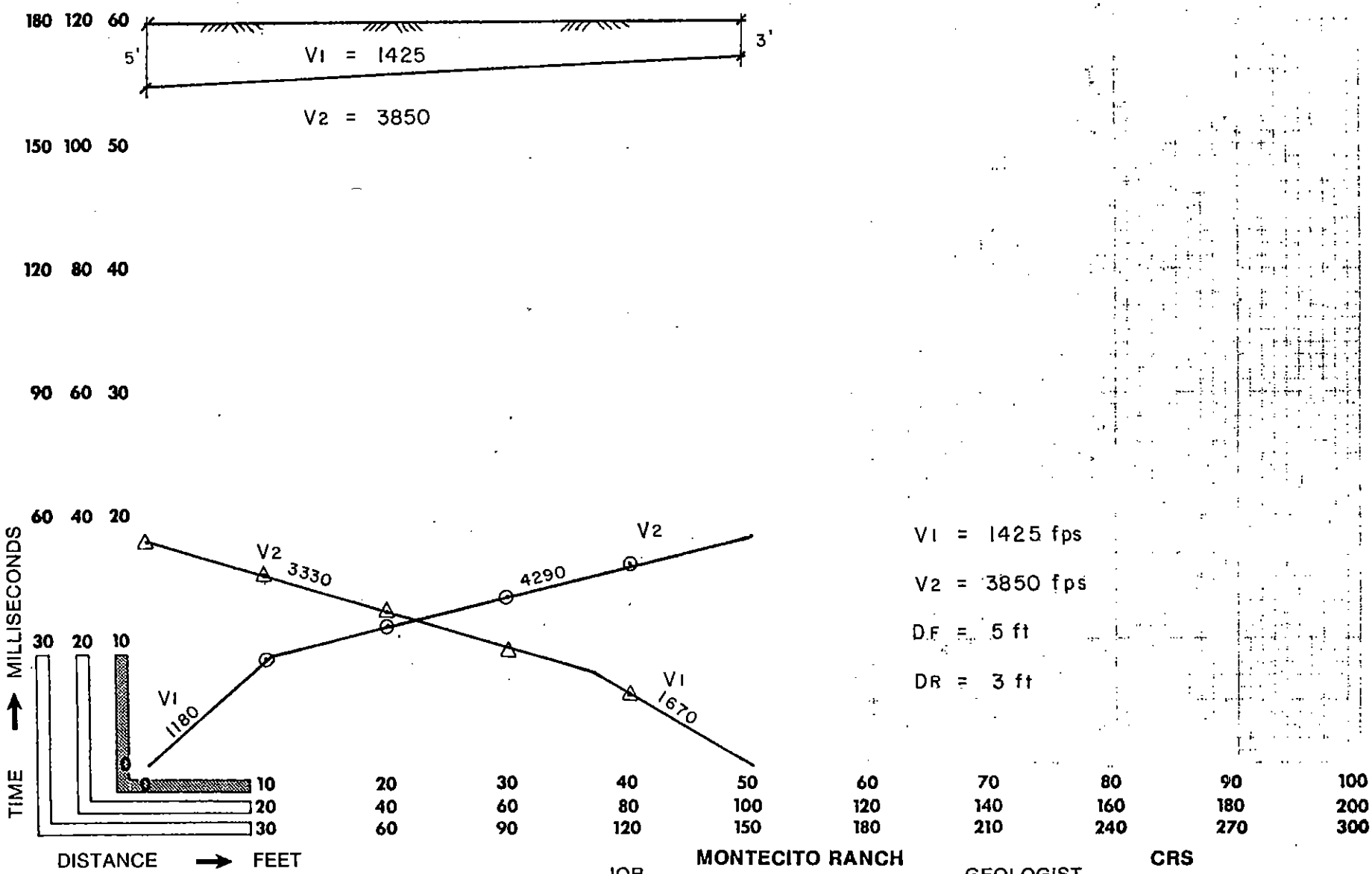
JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-5	ROCK TYPE	GRANTICS
DIRECTION	W→E	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1425 fps

V2 = 3850 fps

DF = 5 ft

DR = 3 ft

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JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

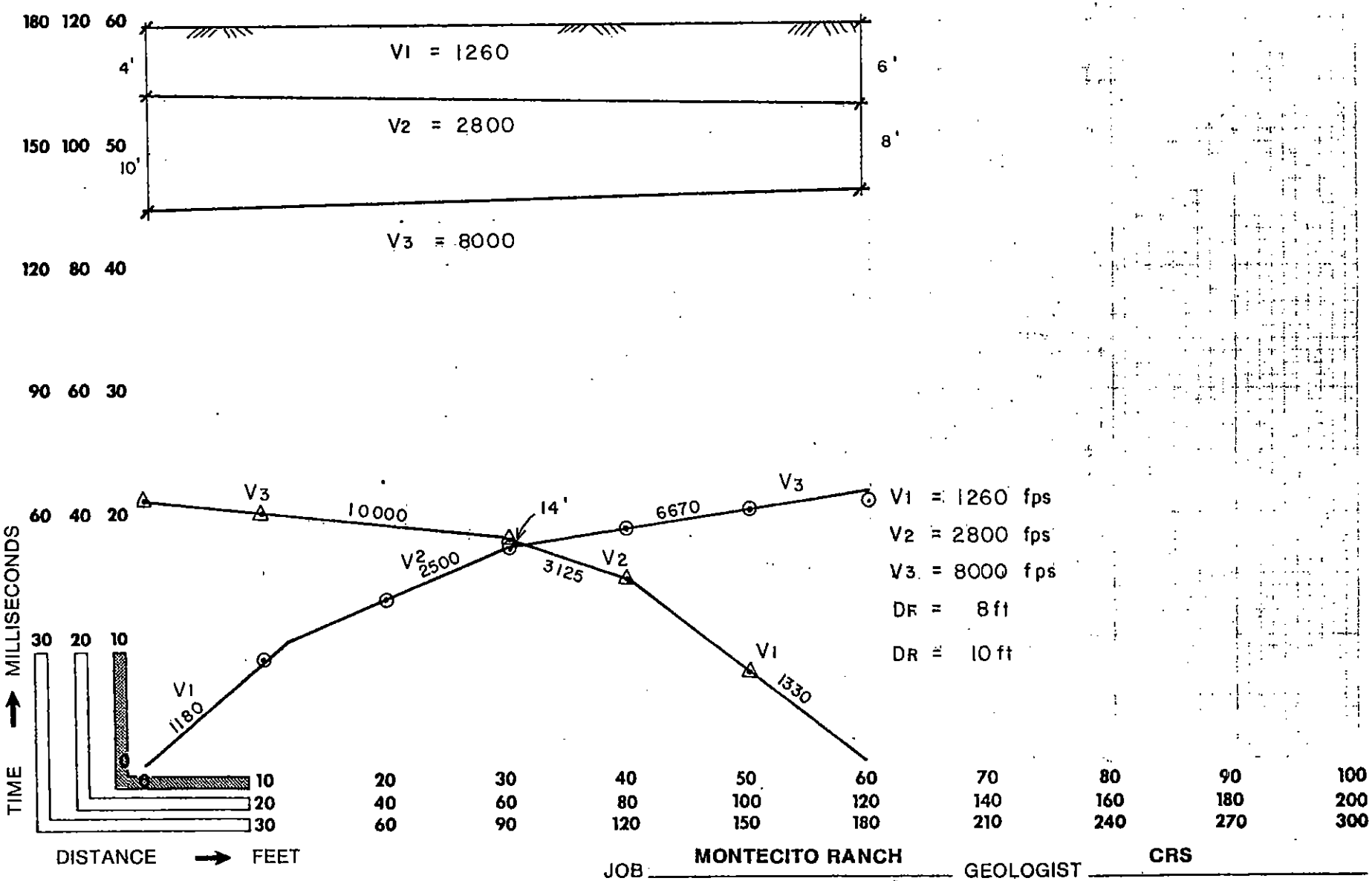
TRAVERSE NO. TR- 6

ROCK TYPE GRANTICS

DIRECTION SW→NE

TRAVERSE QUALITY FAIR to GOOD

H = V = 1"=10'-0"



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JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

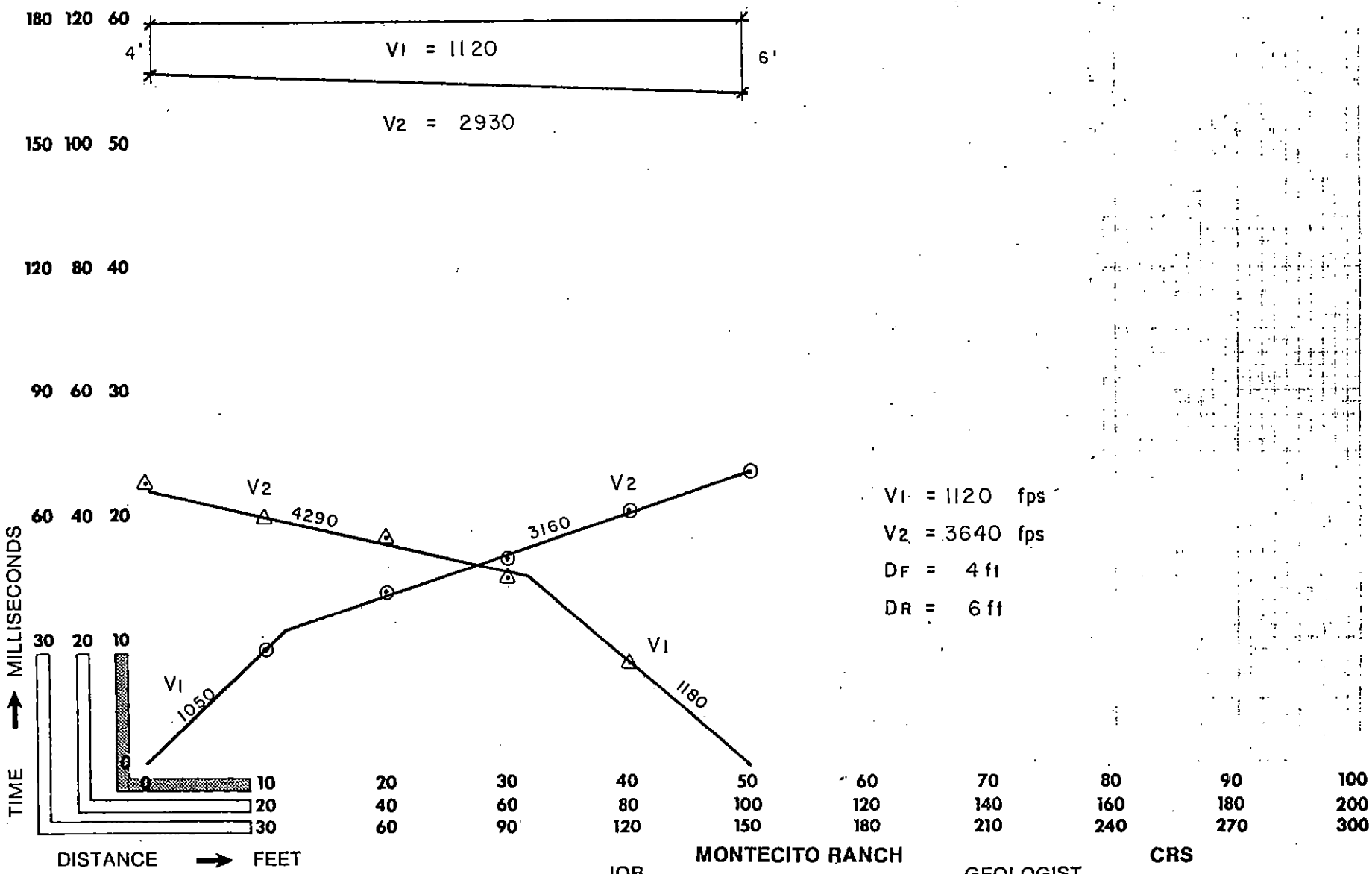
TRAVERSE NO. TR-7

ROCK TYPE GRANTICS

DIRECTION NW→SE

TRAVERSE QUALITY FAIR to GOOD

H = V = 1"=10'-0"



V1 = 1120 fps

V2 = 3640 fps

DF = 4 ft

DR = 6 ft

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JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

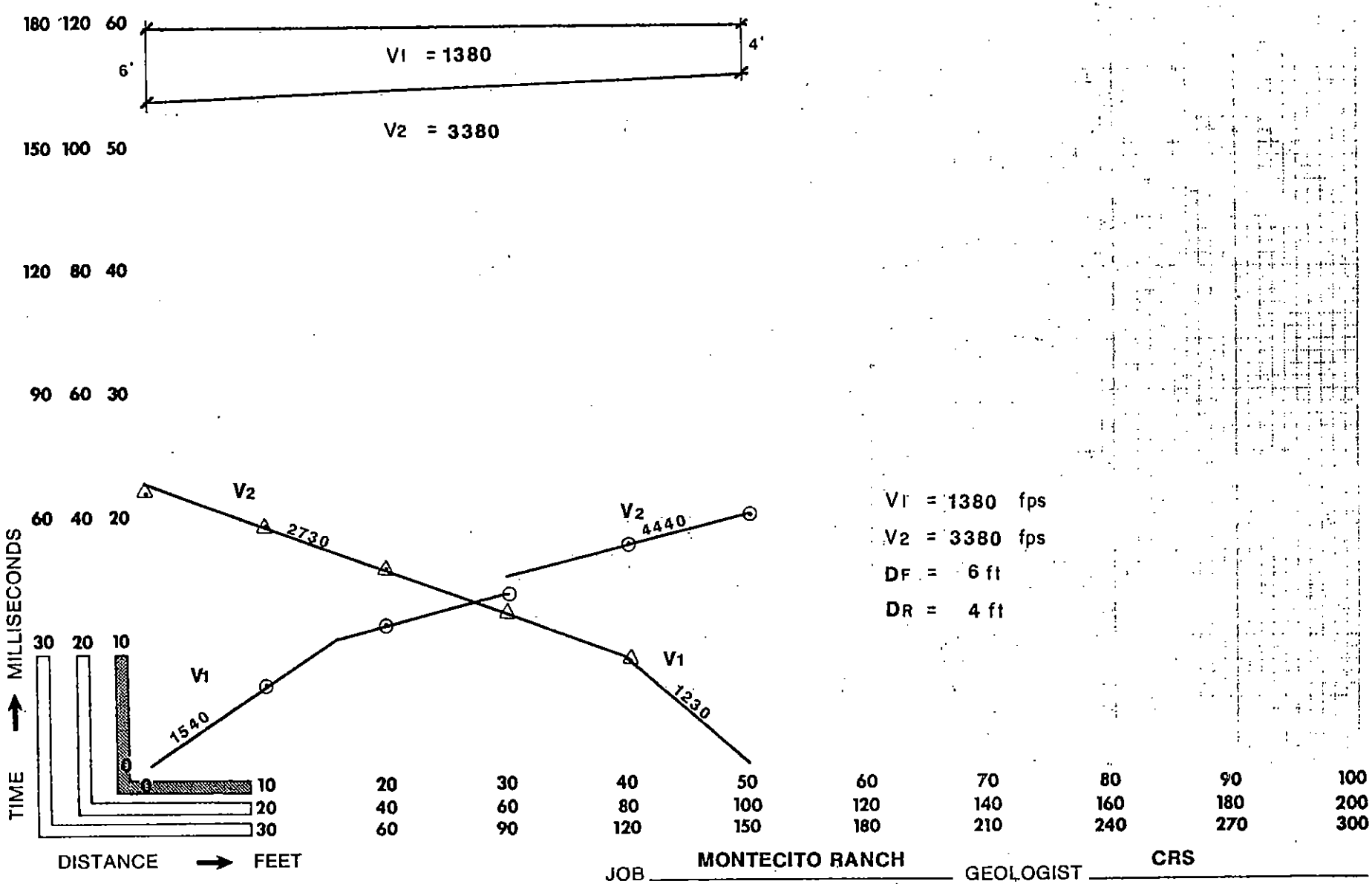
TRAVERSE NO. TR- 9

ROCK TYPE GRANTICS

DIRECTION SW→NE

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1380 fps

V2 = 3380 fps

DF = 6 ft

DR = 4 ft

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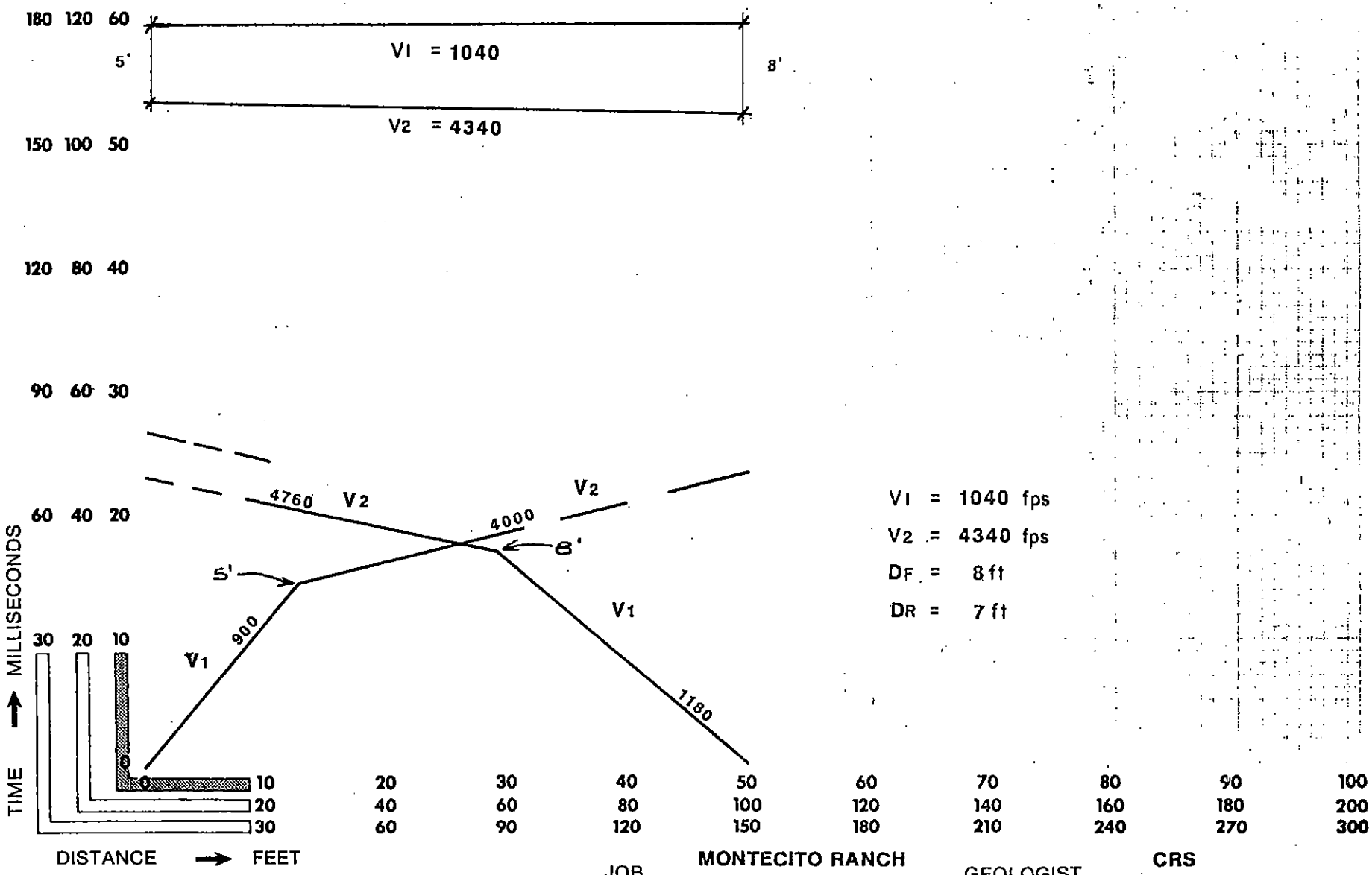
JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-10	ROCK TYPE	GRANTICS
DIRECTION	NW→SE(308°)	TRAVERSE QUALITY	FAIR to GOOD

H = V = 1"=10'-0"



VI = 1040 fps

V2 = 4340 fps

DF = 8 ft

DR = 7 ft

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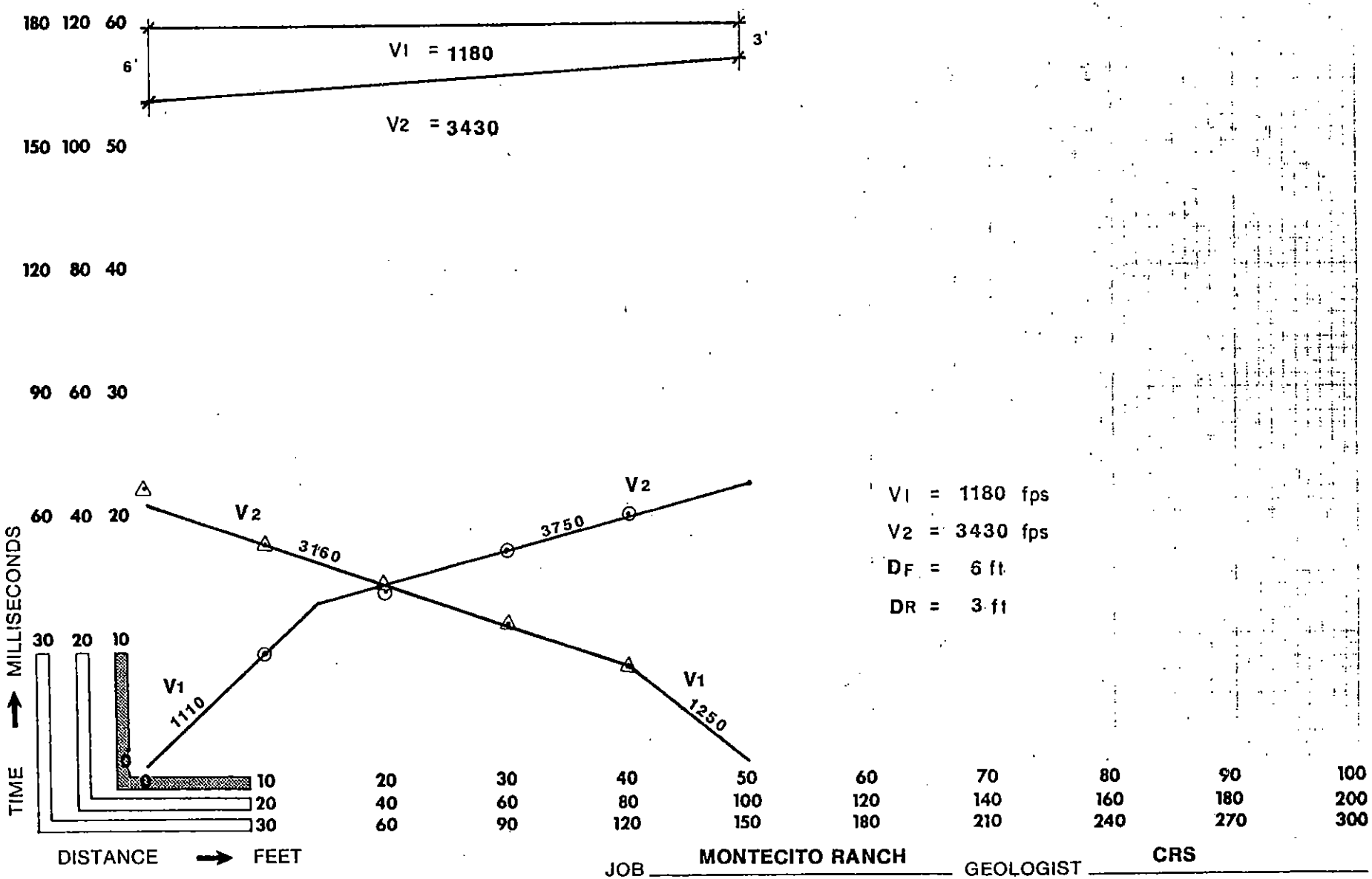
SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-11	ROCK TYPE	GRANTICS
DIRECTION	N→S(180°)	TRAVERSE QUALITY	POOR

H = V = 1"=10'-0"



V1 = 1180 fps

V2 = 3430 fps

DF = 6 ft

DR = 3 ft

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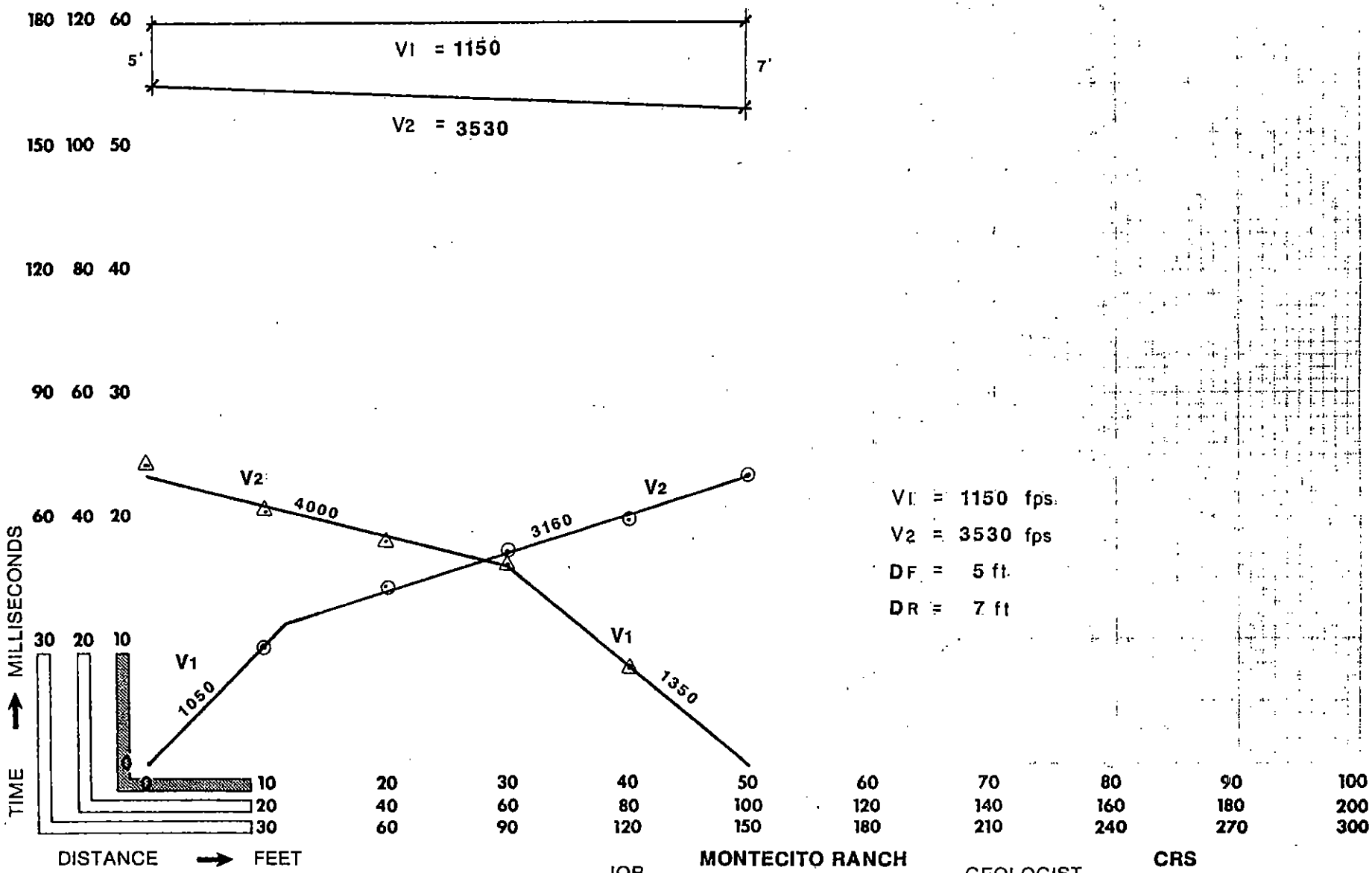
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-12	ROCK TYPE	GRANTICS
DIRECTION	S→N(0°)	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1150 fps
V2 = 3530 fps
DF = 5 ft
DR = 7 ft

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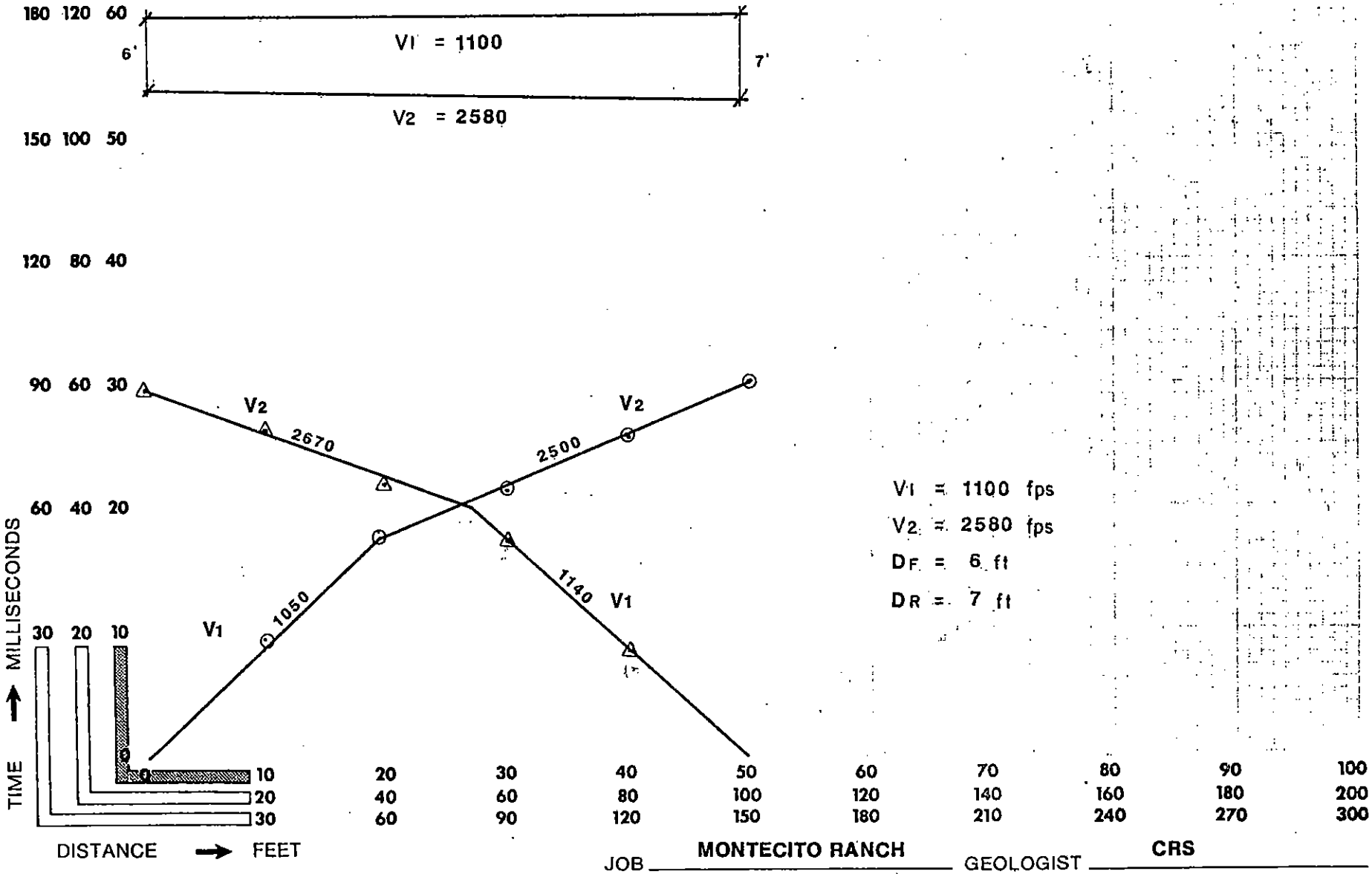
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-13	ROCK TYPE	GRANTICS
DIRECTION	E→W(275°)	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1100 fps

V2 = 2580 fps

DF = 6 ft

DR = 7 ft

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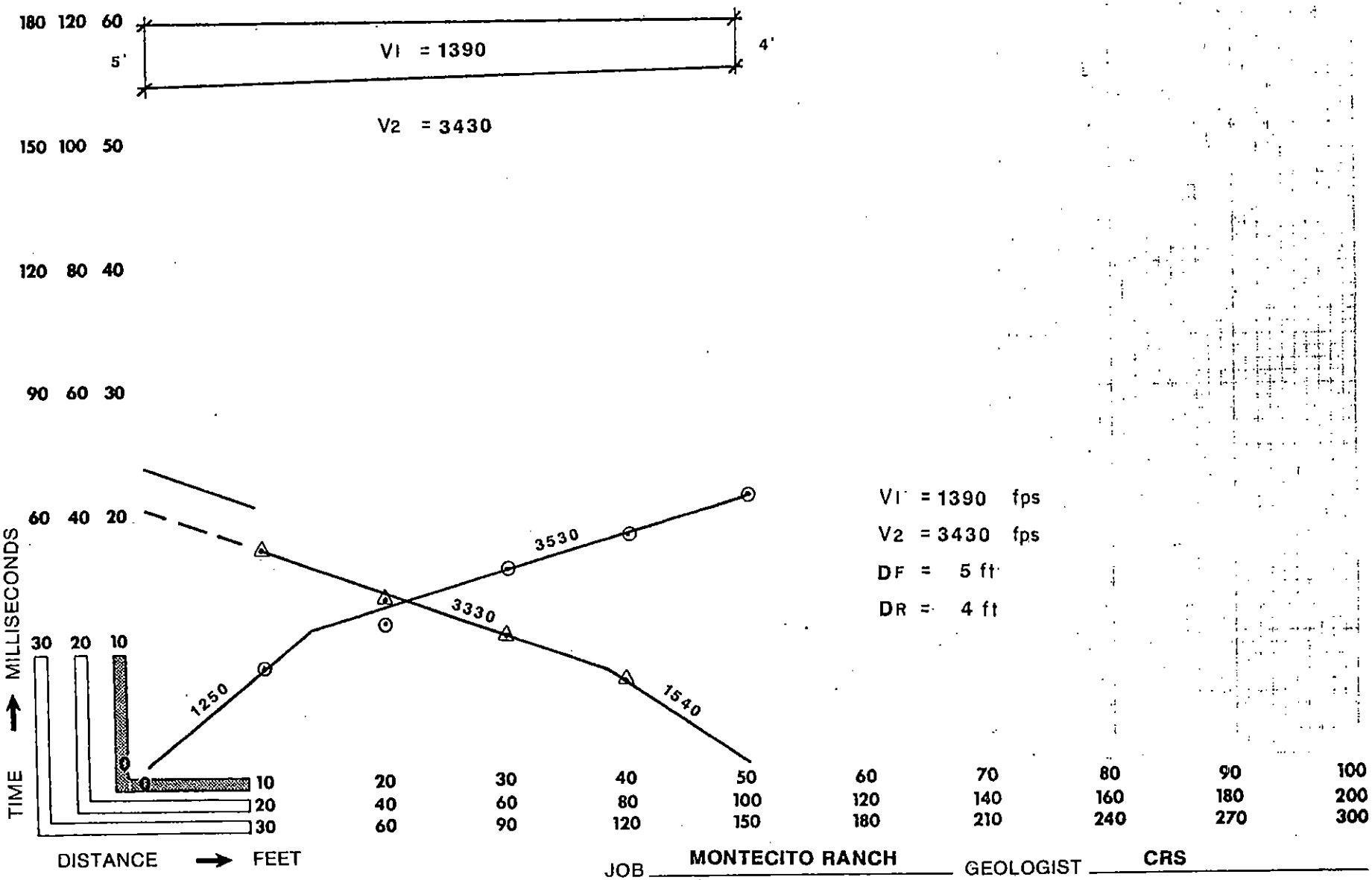
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-14	ROCK TYPE	GRANTICS
DIRECTION	N→S(6°)	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1390 fps

V2 = 3430 fps

DF = 5 ft

DR = 4 ft

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

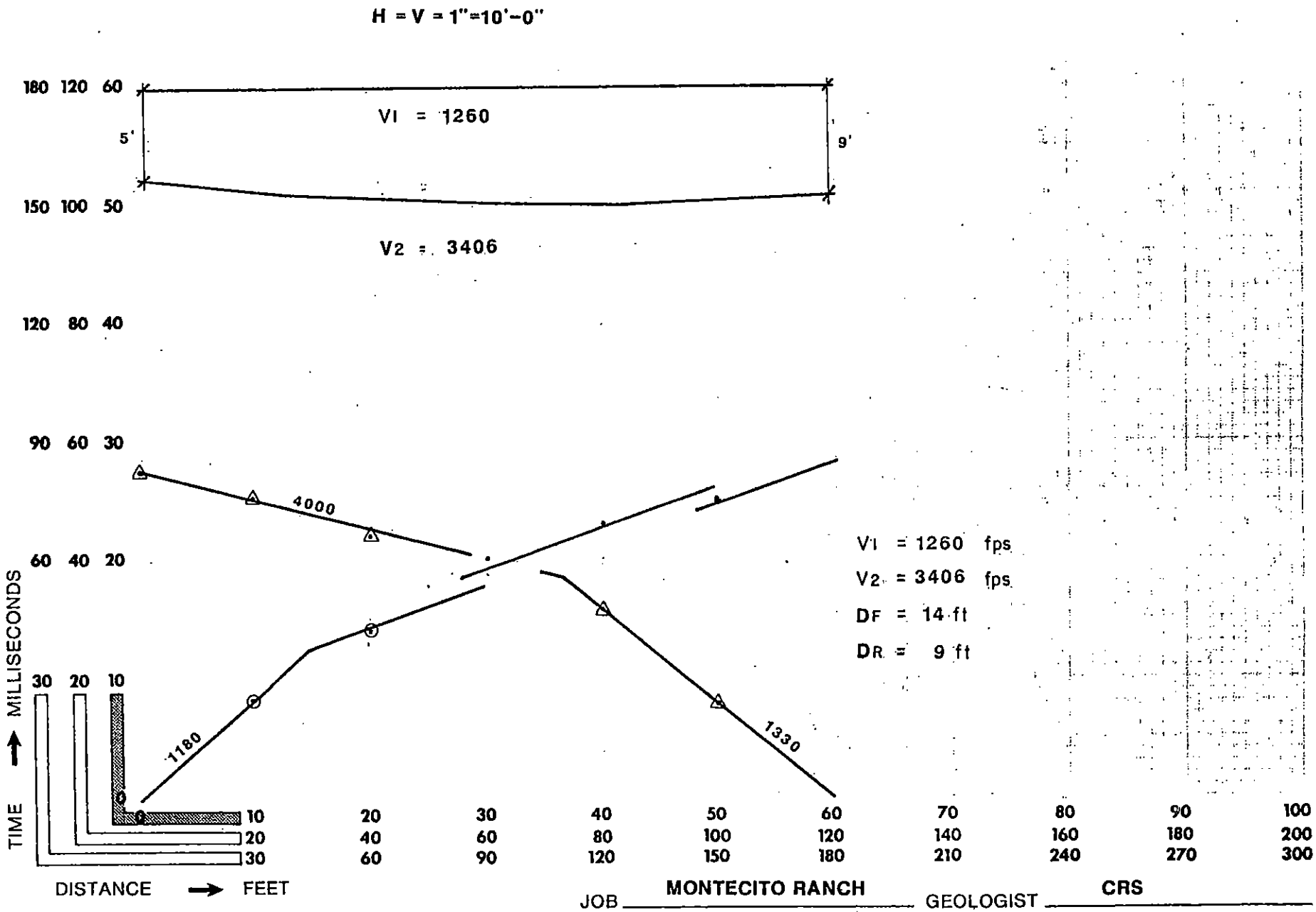
ELEVATION

TRAVERSE NO. TR-15

ROCK TYPE GRANTICS

DIRECTION NW→SE(114°)

TRAVERSE QUALITY FAIR to GOOD



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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

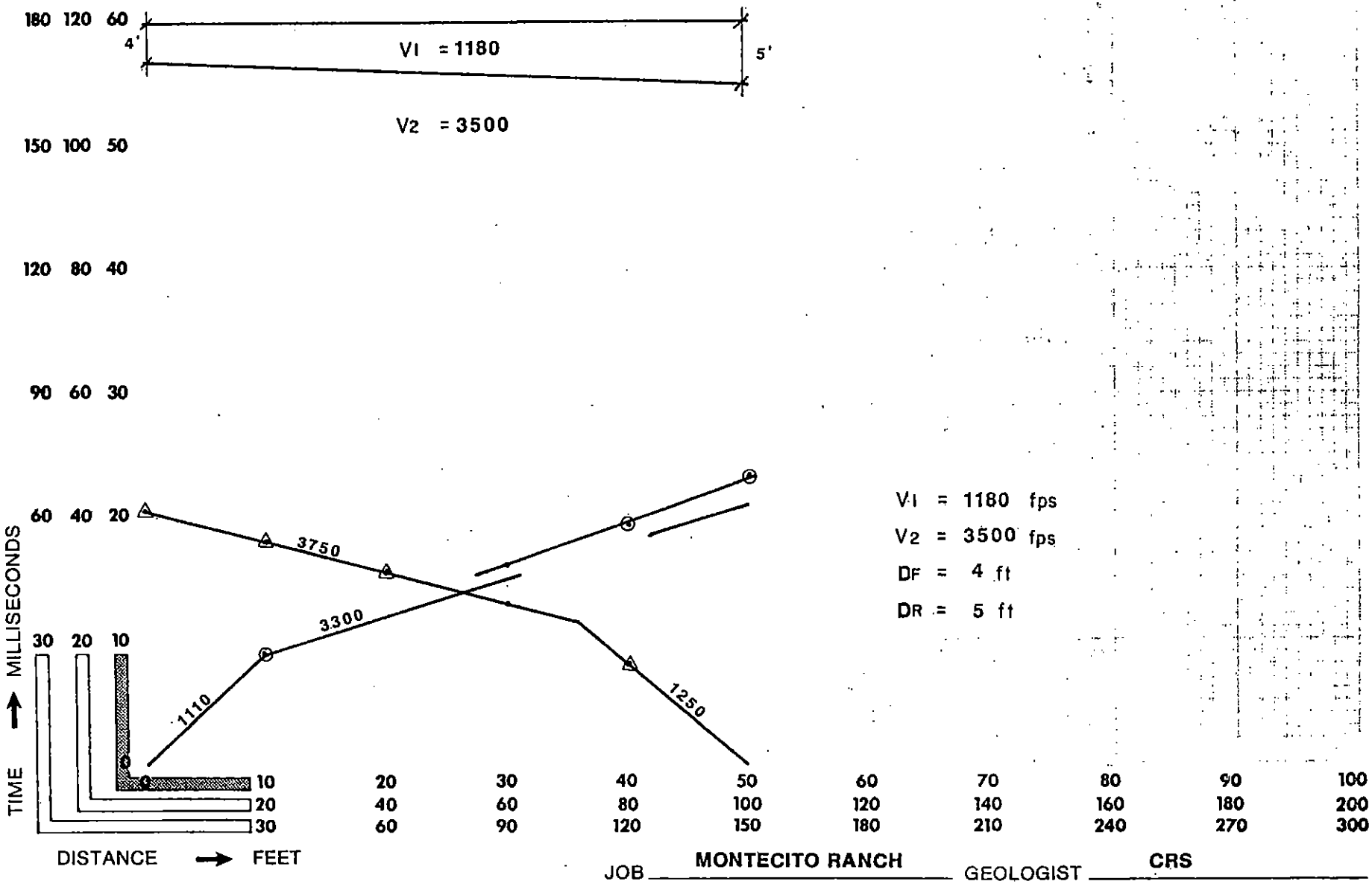
TRAVERSE NO. TR-16

ROCK TYPE GRANTICS

DIRECTION E→W (276°)

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1180 fps

V2 = 3500 fps

DF = 4 ft

DR = 5 ft

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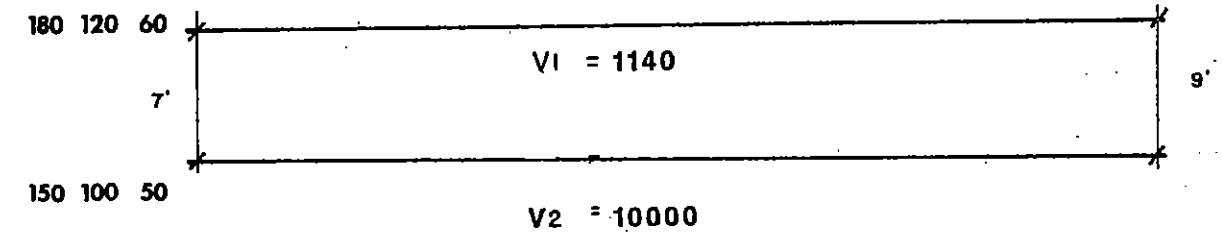
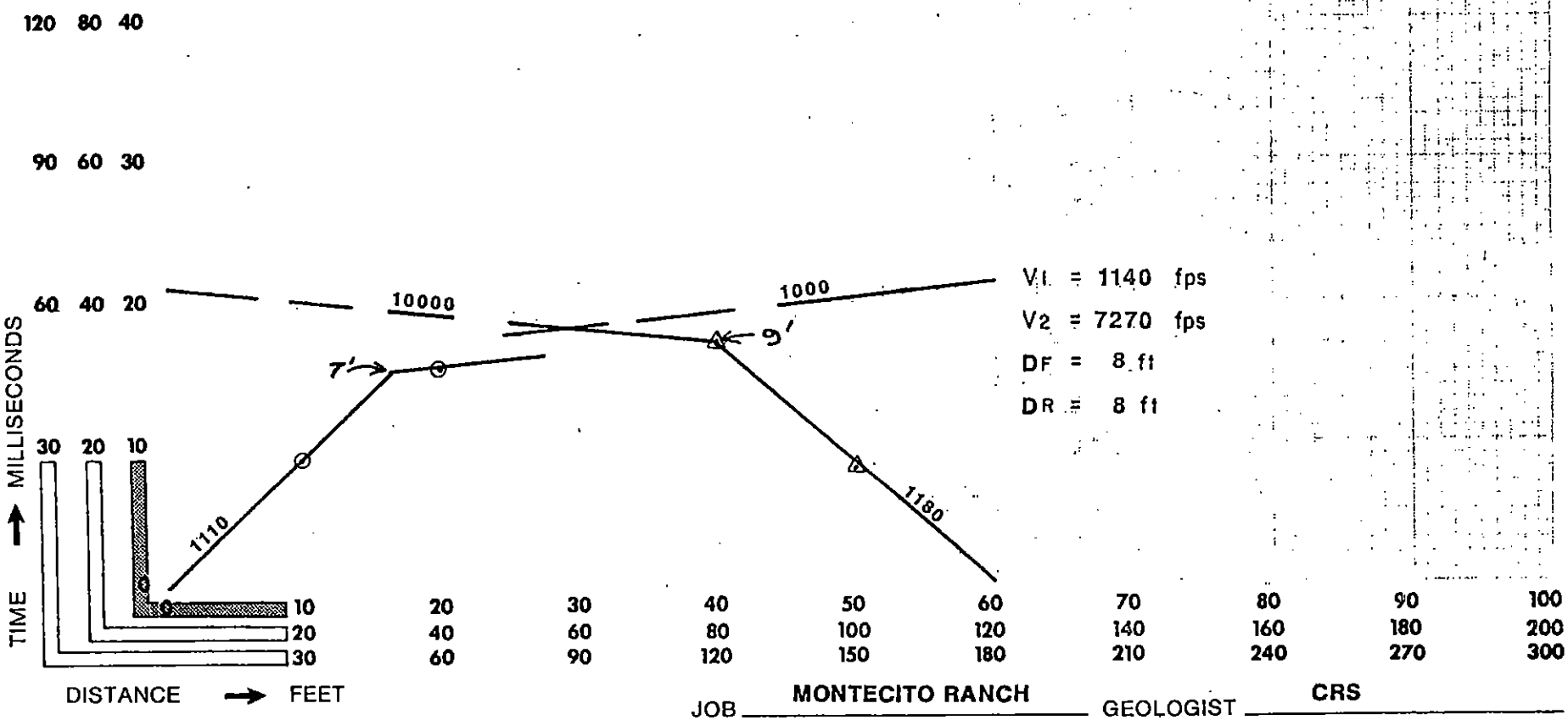
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR- 17	ROCK TYPE	GRANTICS
DIRECTION	SW→NE(27°)	TRAVERSE QUALITY	FAIR

H = V = 1"=10'-0"





VI = 1140 fps
V2 = 7270 fps
DF = 8 ft
DR = 8 ft

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ENGINEERING GEOLOGY DIVISION

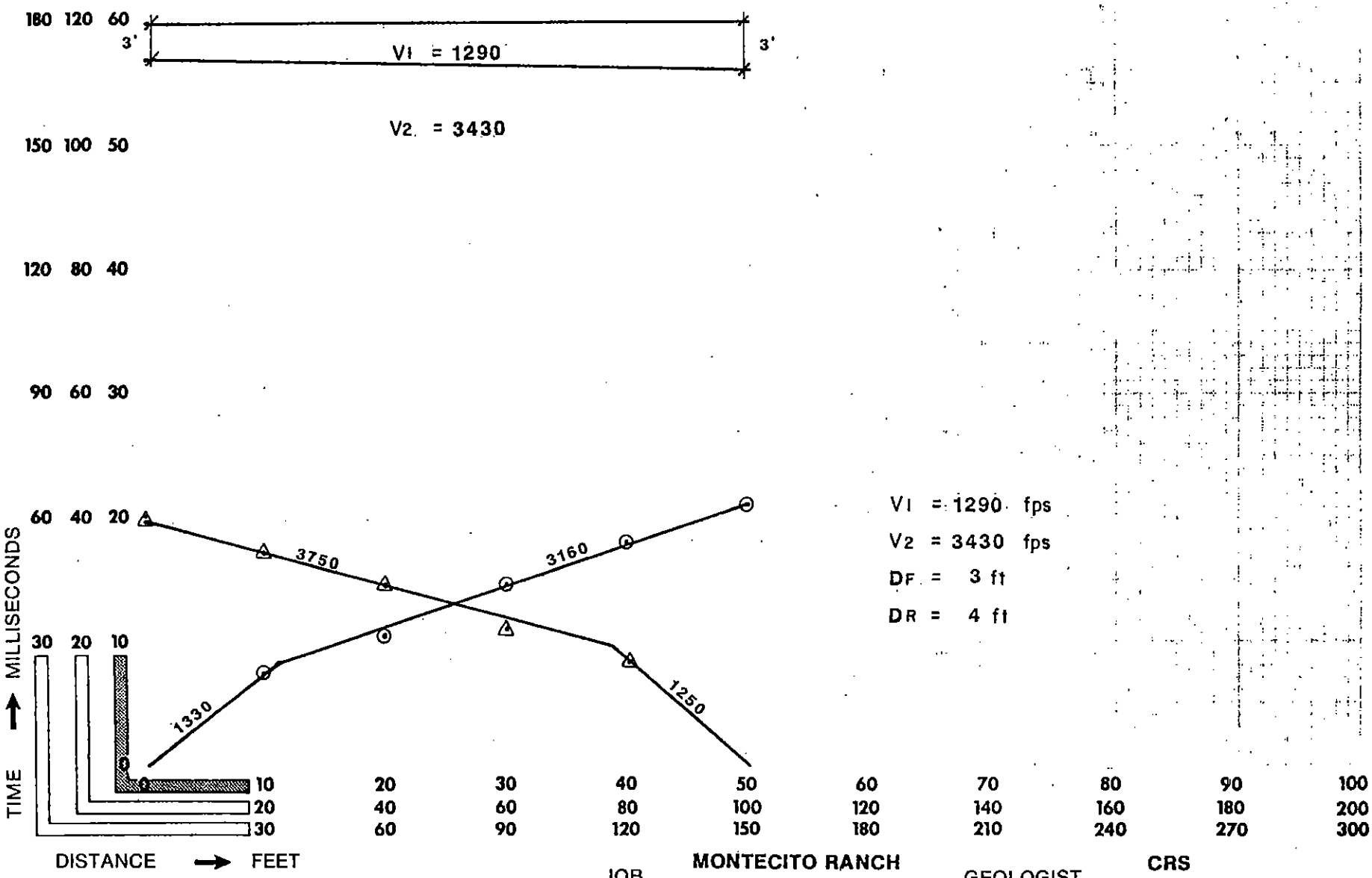
JOB MONTECITO RANCH GEOLOGIST CRS

JOB NO. 88208-01 ELEVATION

TRAVERSE NO. TR-18 ROCK TYPE GRANTICS

DIRECTION E→S(306°) TRAVERSE QUALITY FAIR to GOOD

H = V = 1"=10'-0"



V1 = 1290 fps

V2 = 3430 fps

DF = 3 ft

DR = 4 ft

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

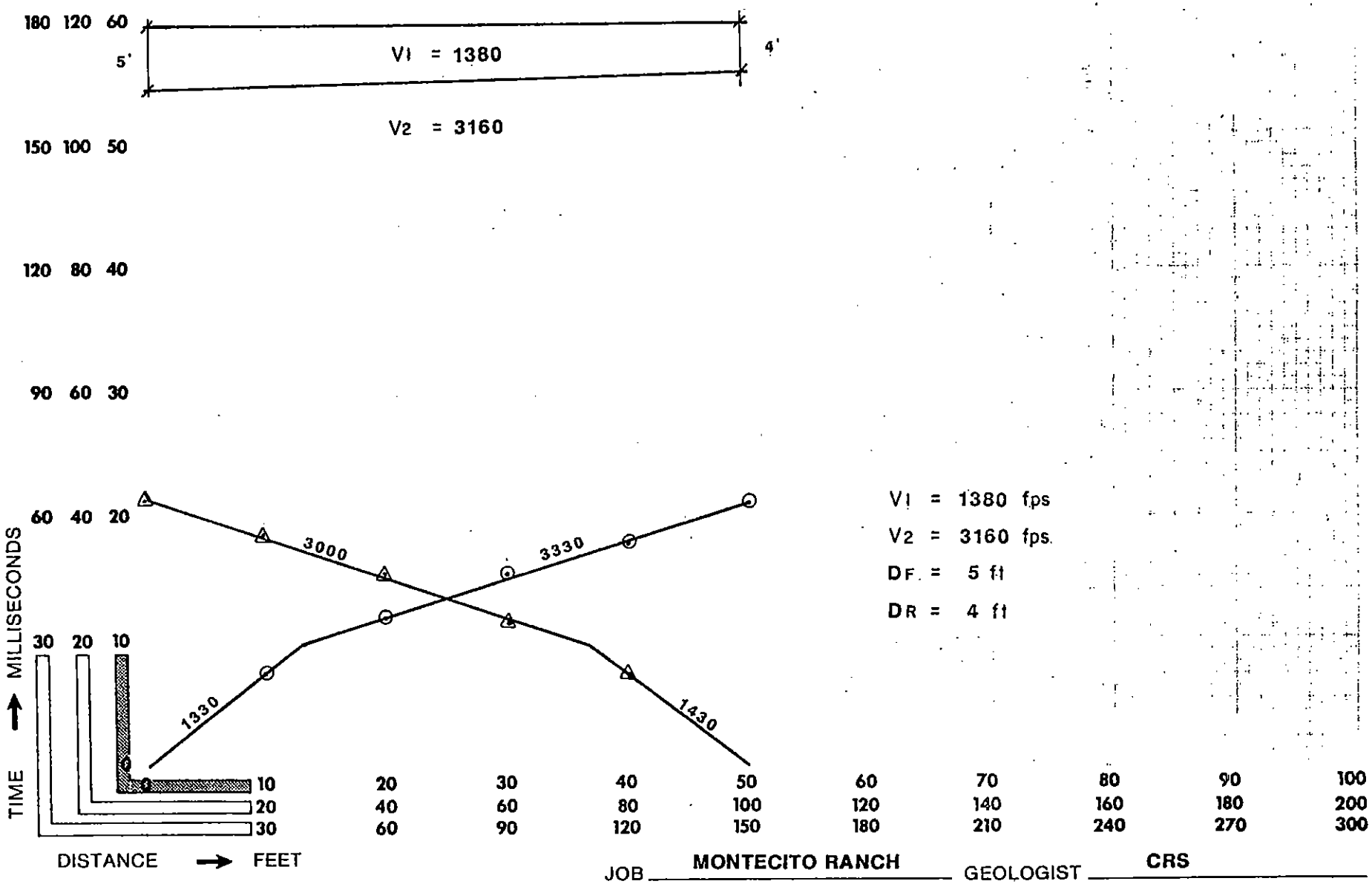
TRAVERSE NO. TR-19

ROCK TYPE GRANTICS

DIRECTION SE→NW(317°)

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1380 fps

V2 = 3160 fps.

DF. = 5 ft

DR = 4 ft

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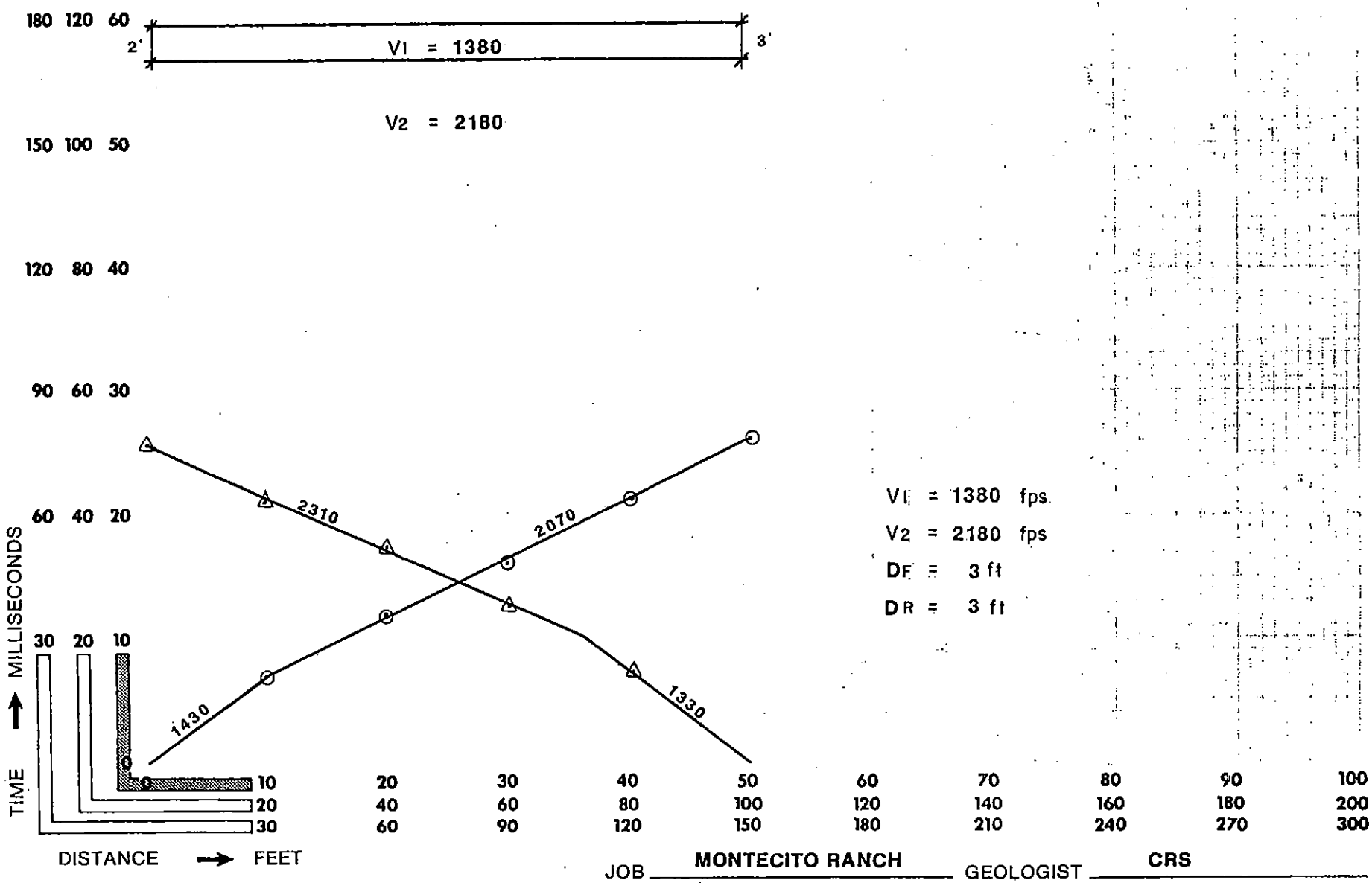
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-20	ROCK TYPE	GRANTICS
DIRECTION	W→E (92°)	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1380 fps
V2 = 2180 fps
DF = 3 ft
DR = 3 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

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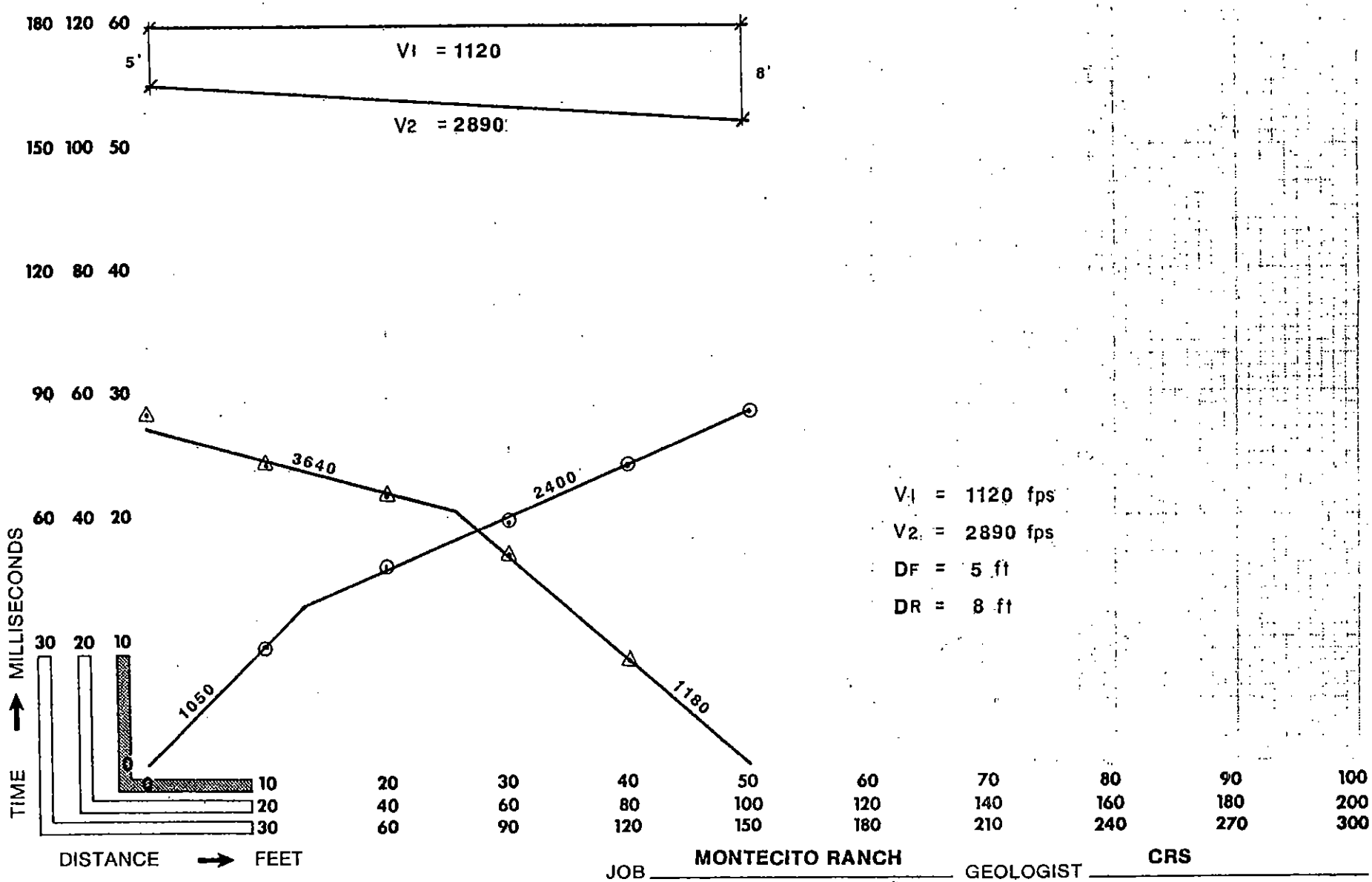
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-21	ROCK TYPE	GRANTICS
DIRECTION	W→E(90°)	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1120 fps

V2 = 2890 fps

DF = 5 ft

DR = 8 ft

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

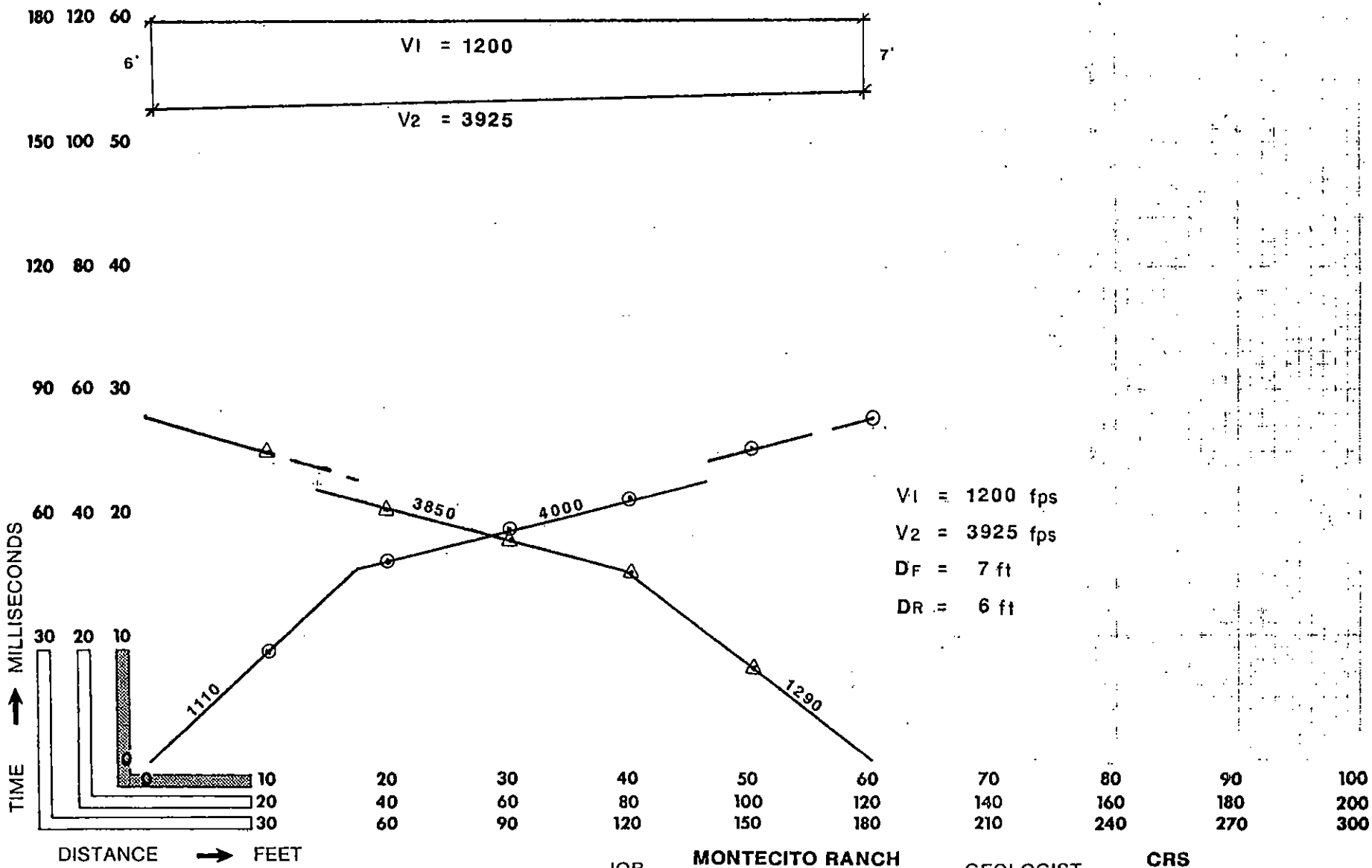
TRAVERSE NO. TR-22

ROCK TYPE GRANTICS

DIRECTION SE→NW(299°)

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

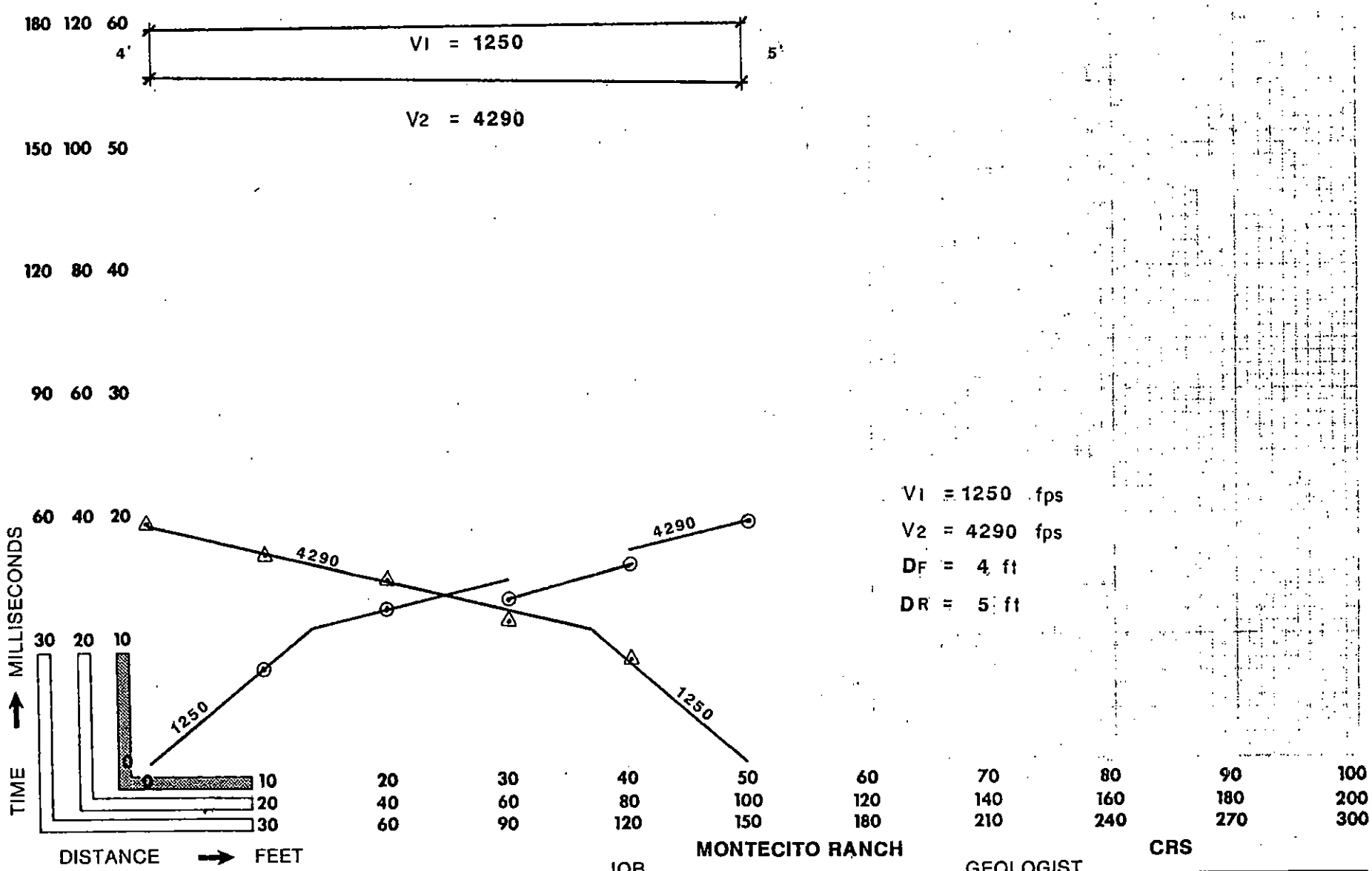
TRAVERSE NO. TR-23

ROCK TYPE GRANTICS

DIRECTION W→E(91°)

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1250 fps

V2 = 4290 fps

DF = 4 ft

DR = 5 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

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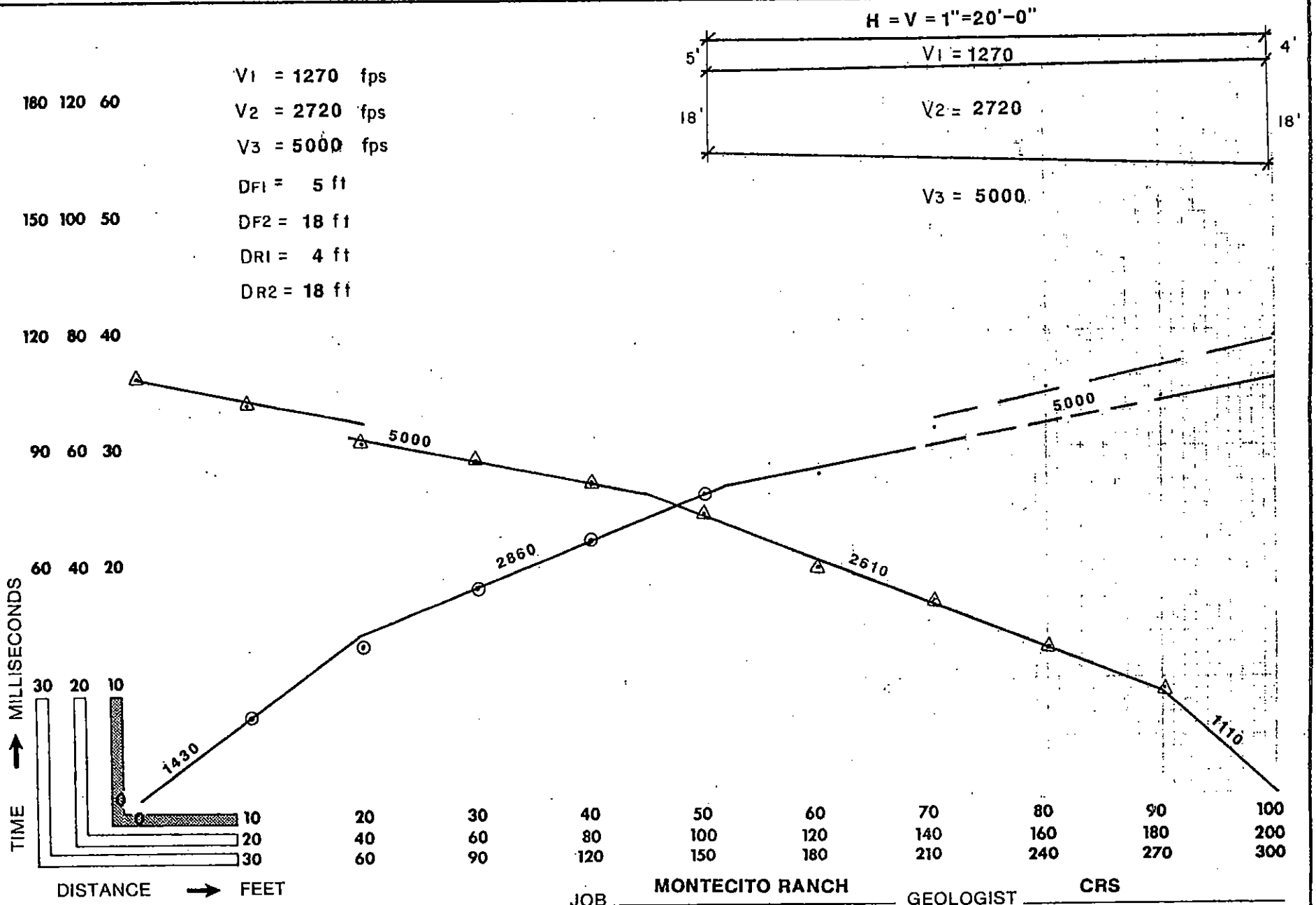
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-24	ROCK TYPE	GRANTICS
DIRECTION	W→E(80°)	TRAVERSE QUALITY	



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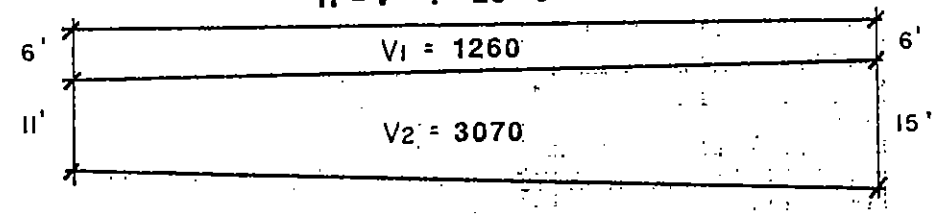
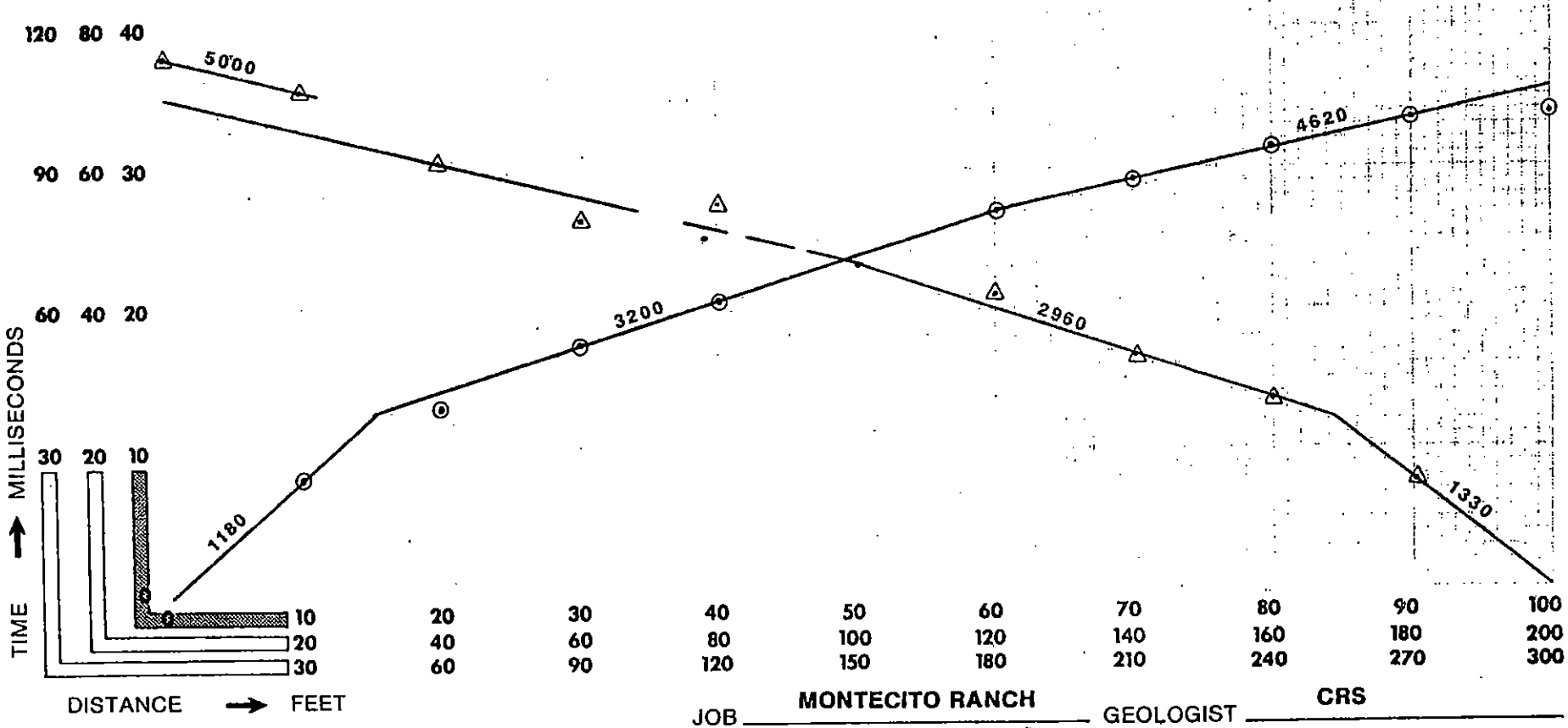
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-26	ROCK TYPE	GRANTICS
DIRECTION	NW→SE	TRAVERSE QUALITY	FAIR to GOOD

H = V = 1"=20'-0"



V1 = 1260 fps
V2 = 3070 fps
V3 = 4800 fps
DR1 = 6 ft
DF2 = 11 ft
DR1 = 5 ft
DR2 = 15 ft



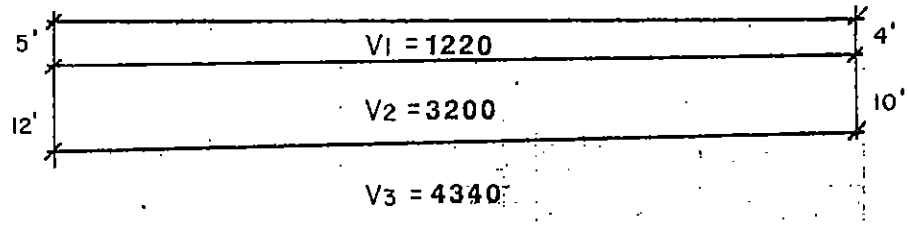
SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-27	ROCK TYPE	GRANTICS
DIRECTION	NE→SW	TRAVERSE QUALITY	FAIR

H = V = 1"=20'-0"



V_1 = 1220 fps

V_2 = 3200 fps

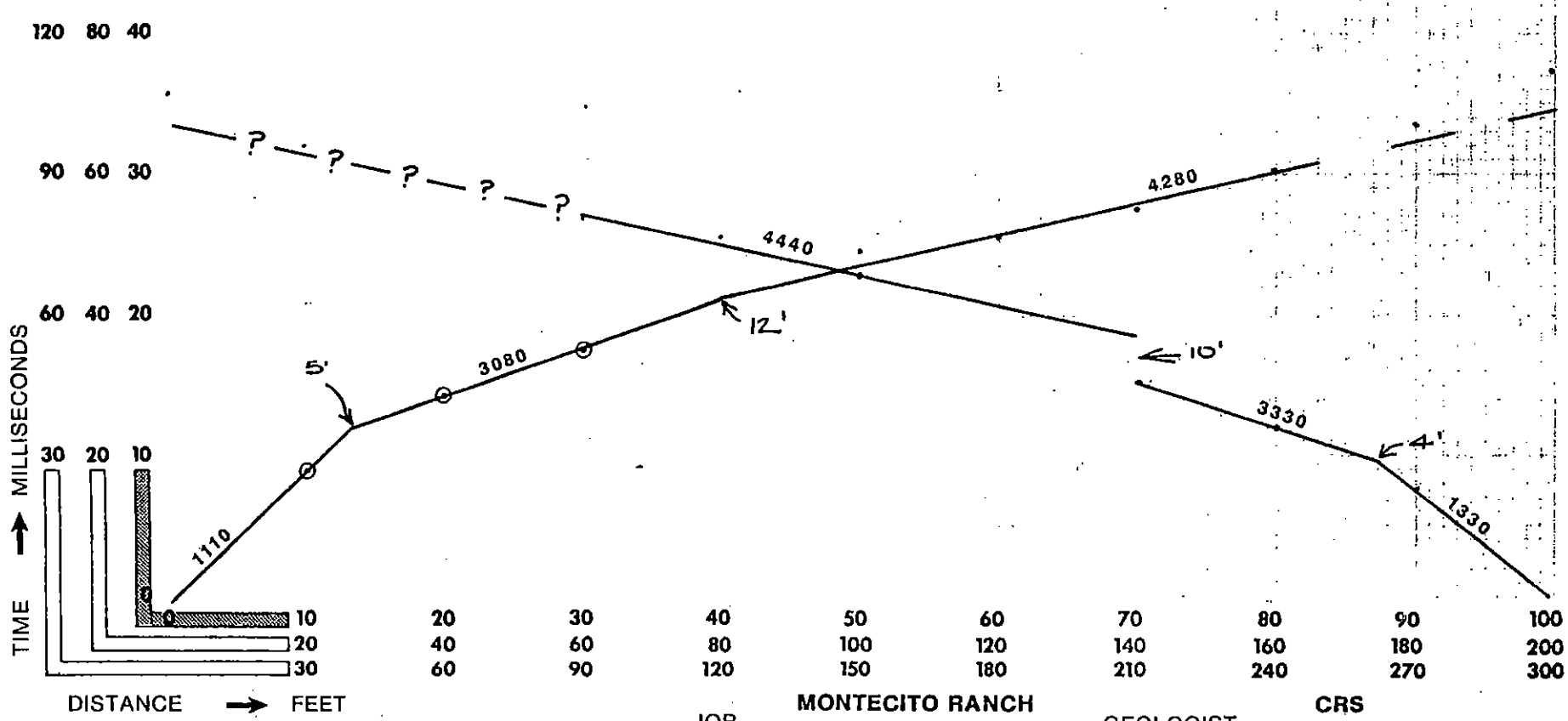
V_3 = 4340 fps

D_{F1} = 5 ft

D_{F2} = 10 ft

D_{R1} = 4 ft

D_{R2} = 19 ft



SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

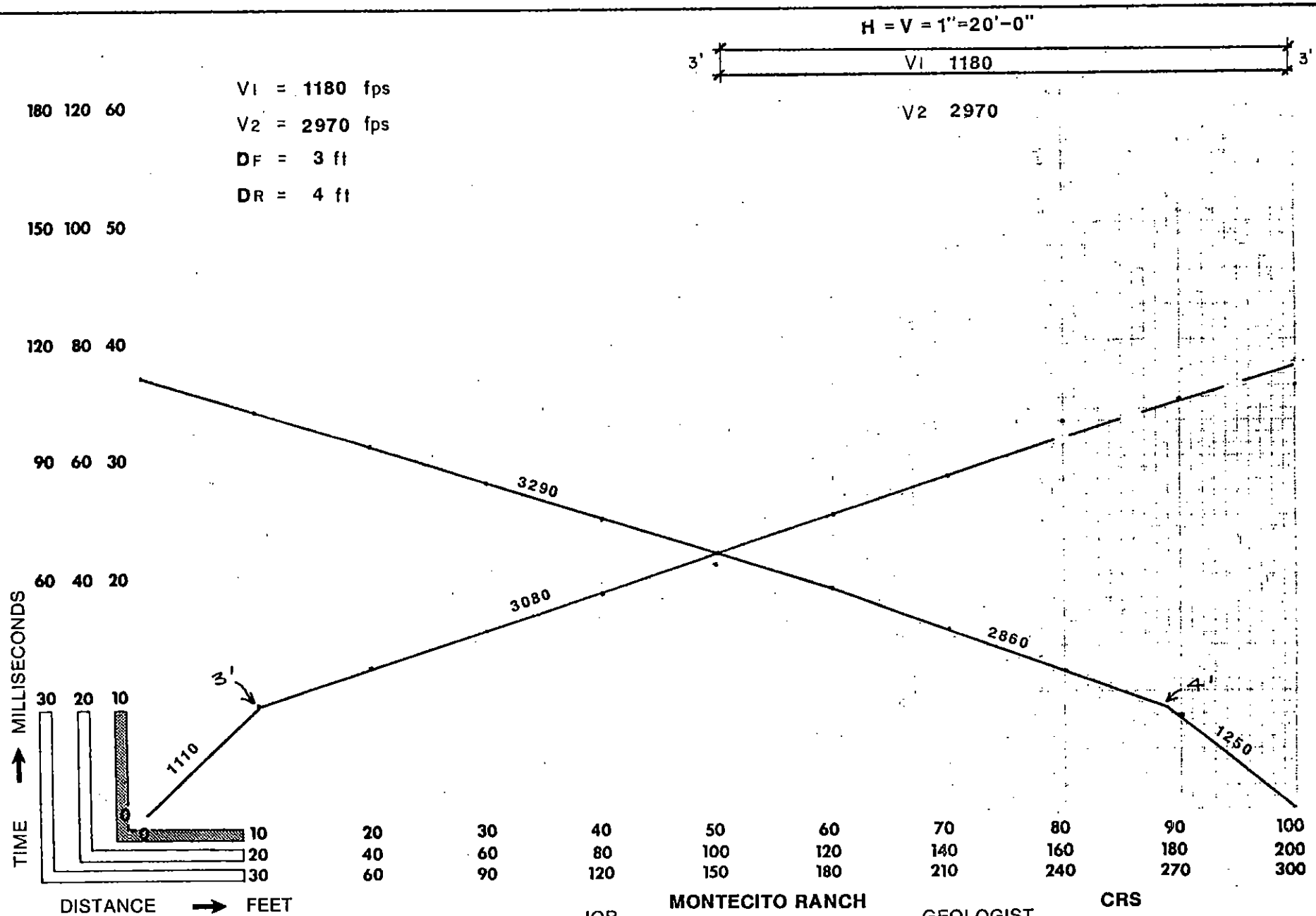
ELEVATION

TRAVERSE NO. TR-29

ROCK TYPE GRANTICS

DIRECTION SW→NE

TRAVERSE QUALITY POOR to FAIR

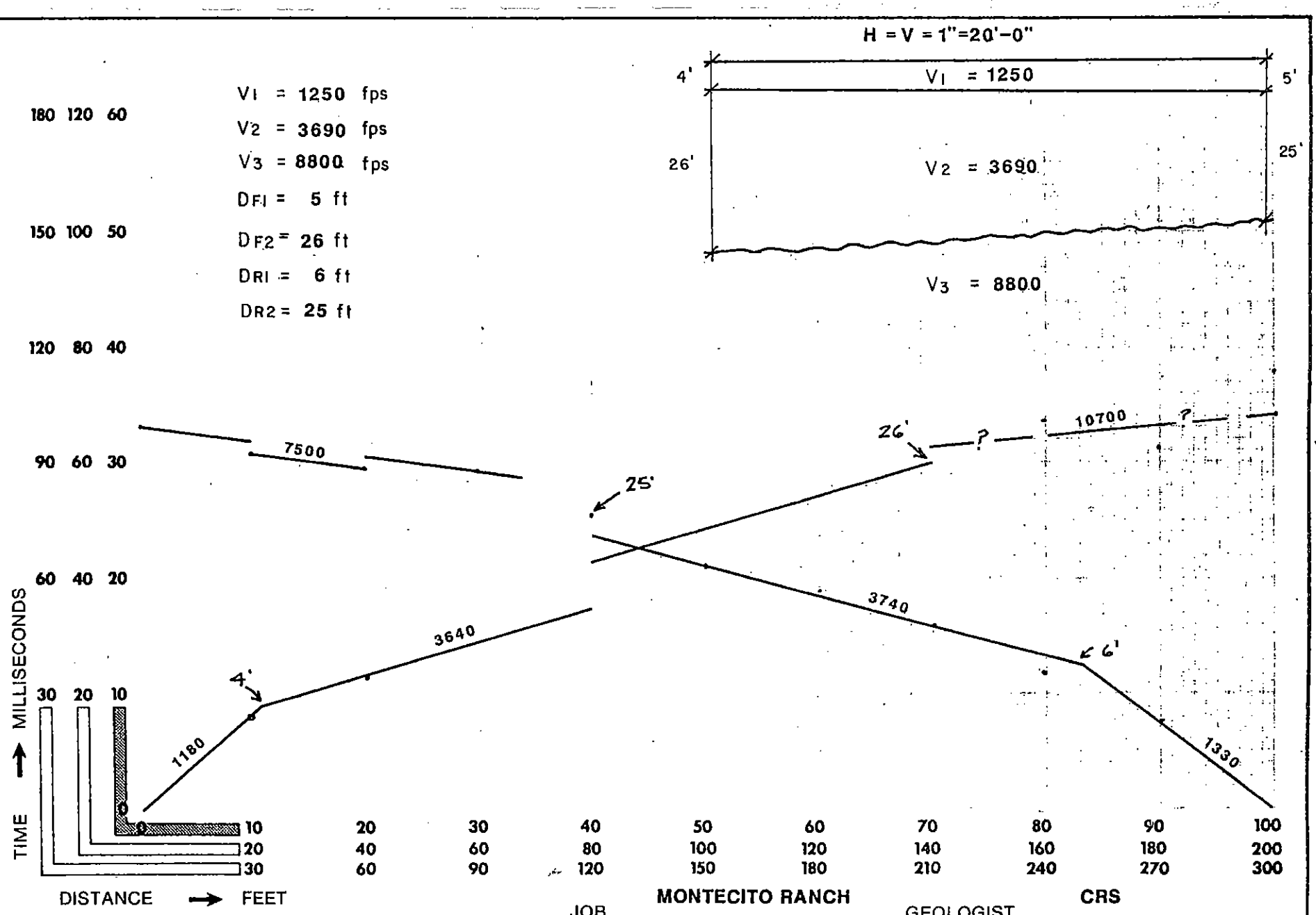


SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-30	ROCK TYPE	GRANTICS
DIRECTION	SW→NE	TRAVERSE QUALITY	GOOD



SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

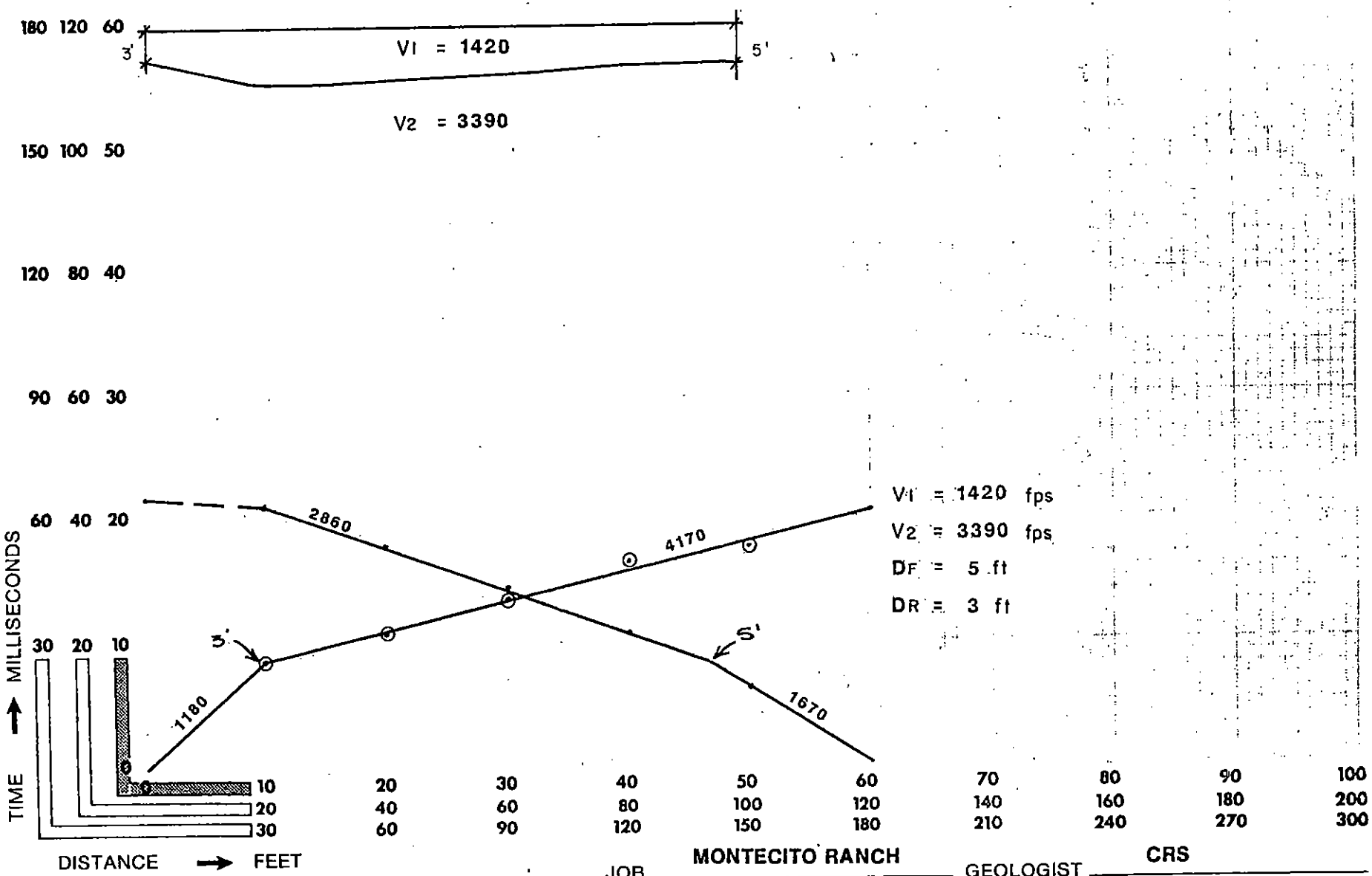
TRAVERSE NO. TR-31

ROCK TYPE GRANTICS

DIRECTION NE→SW

TRAVERSE QUALITY POOR

H = V = 1"=10'-0"



SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

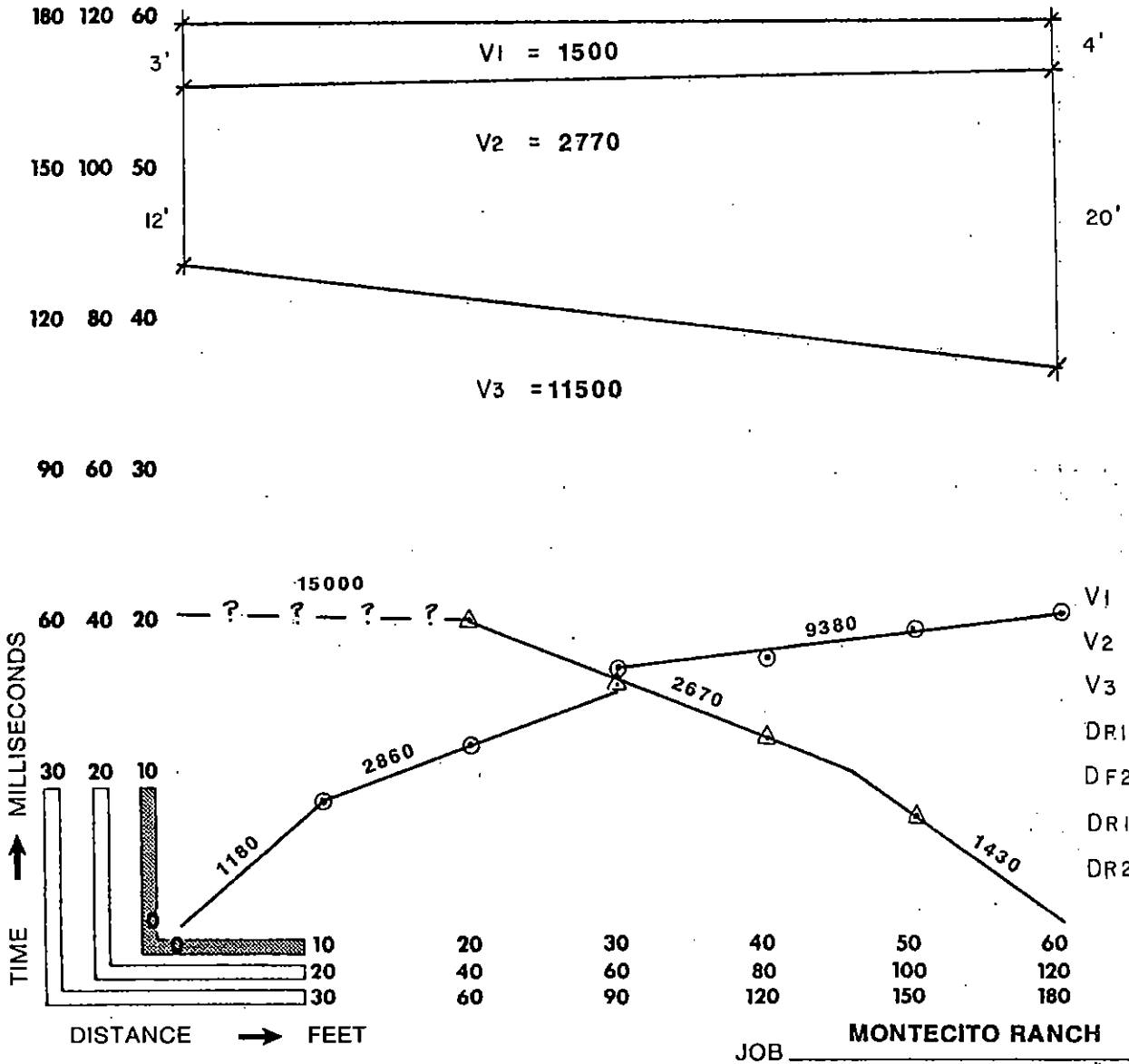
TRAVERSE NO. TR-32

ROCK TYPE GRANTICS

DIRECTION N→S

TRAVERSE QUALITY FAIR to GOOD

H = V = 1"=10'-0"



V1 = 1500 fps
V2 = 2770 fps
V3 = 11500 fps
DR1 = 3 ft
DF2 = 12 ft
DR1 4 ft
DR2 20 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

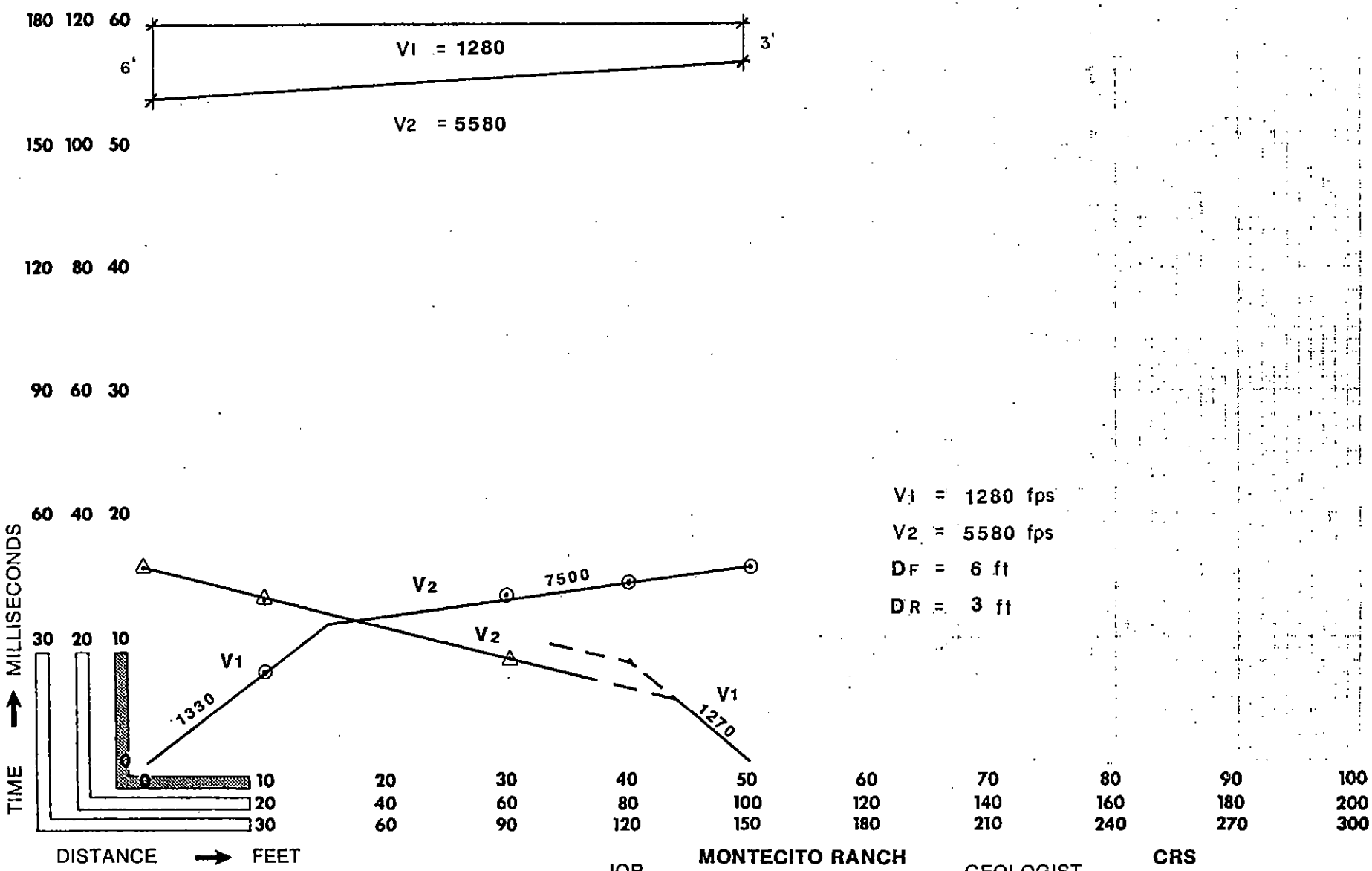
TRAVERSE NO. TR-33

ROCK TYPE GRANTICS

DIRECTION SE→NW

TRAVERSE QUALITY POOR to FAIR

H = V = 1"=10'-0"



V1 = 1280 fps

V2 = 5580 fps

DF = 6 ft

DR = 3 ft

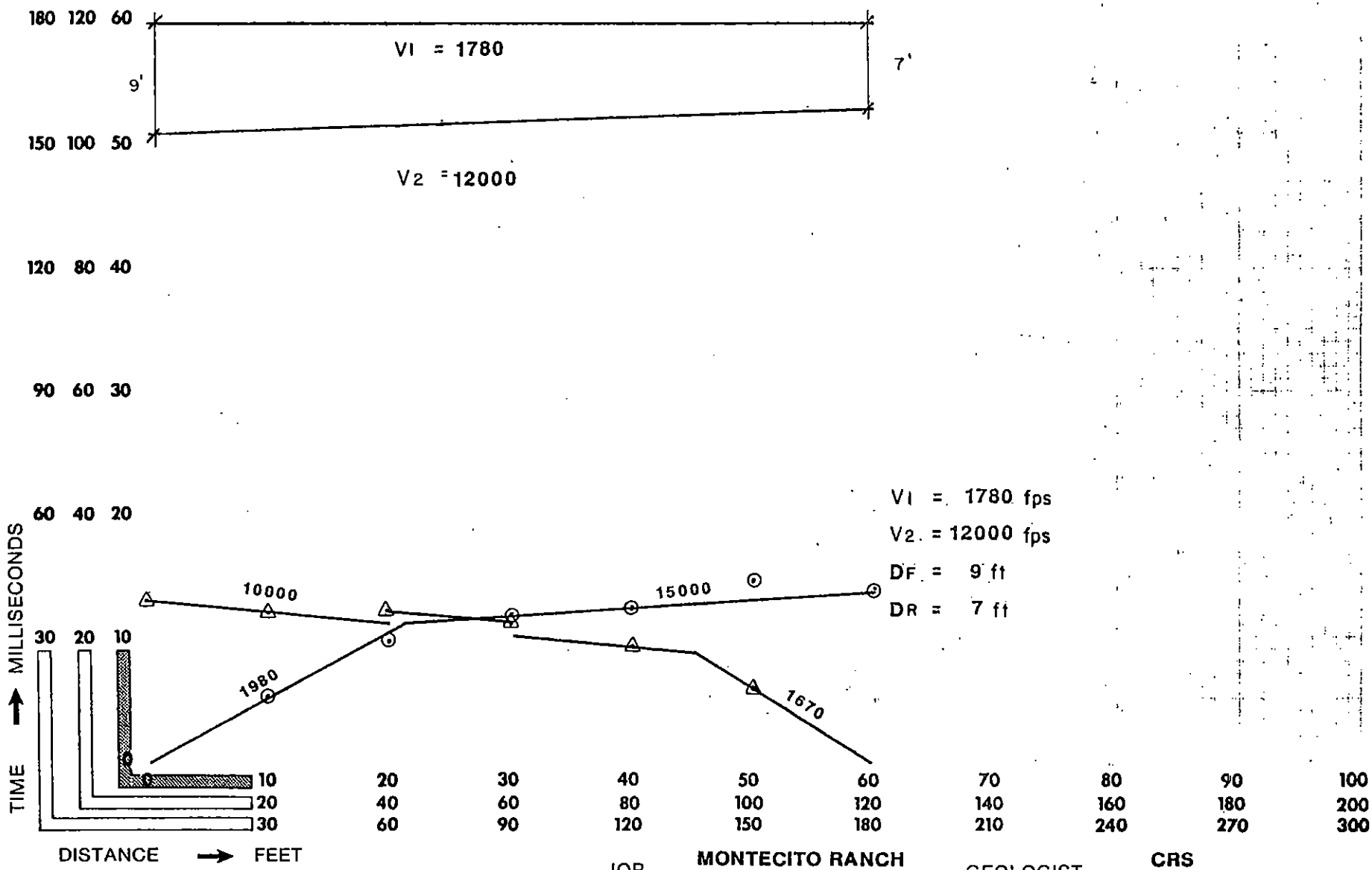
SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-34	ROCK TYPE	GRANTICS
DIRECTION	N→S	TRAVERSE QUALITY	FAIR to GOOD

H = V = 1"=10'-0"



V1 = 1780 fps

V2 = 12000 fps

DF = 9 ft

DR = 7 ft

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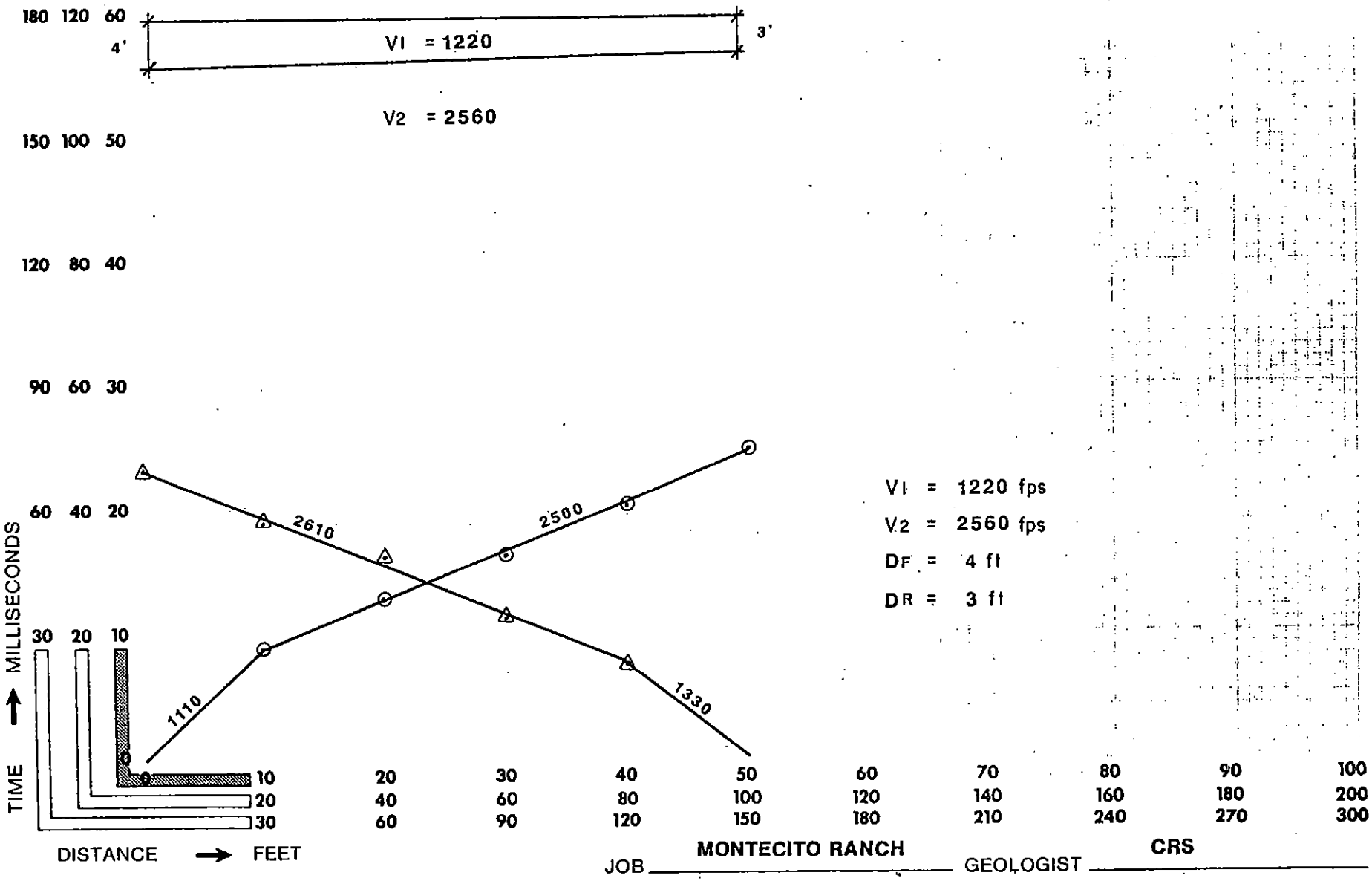
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-35	ROCK TYPE	GRANTICS
DIRECTION	N→S	TRAVERSE QUALITY	FAIR to GOOD

H = V = 1"=10'-0"



VI = 1220 fps

V2 = 2560 fps

DF = 4 ft

DR = 3 ft

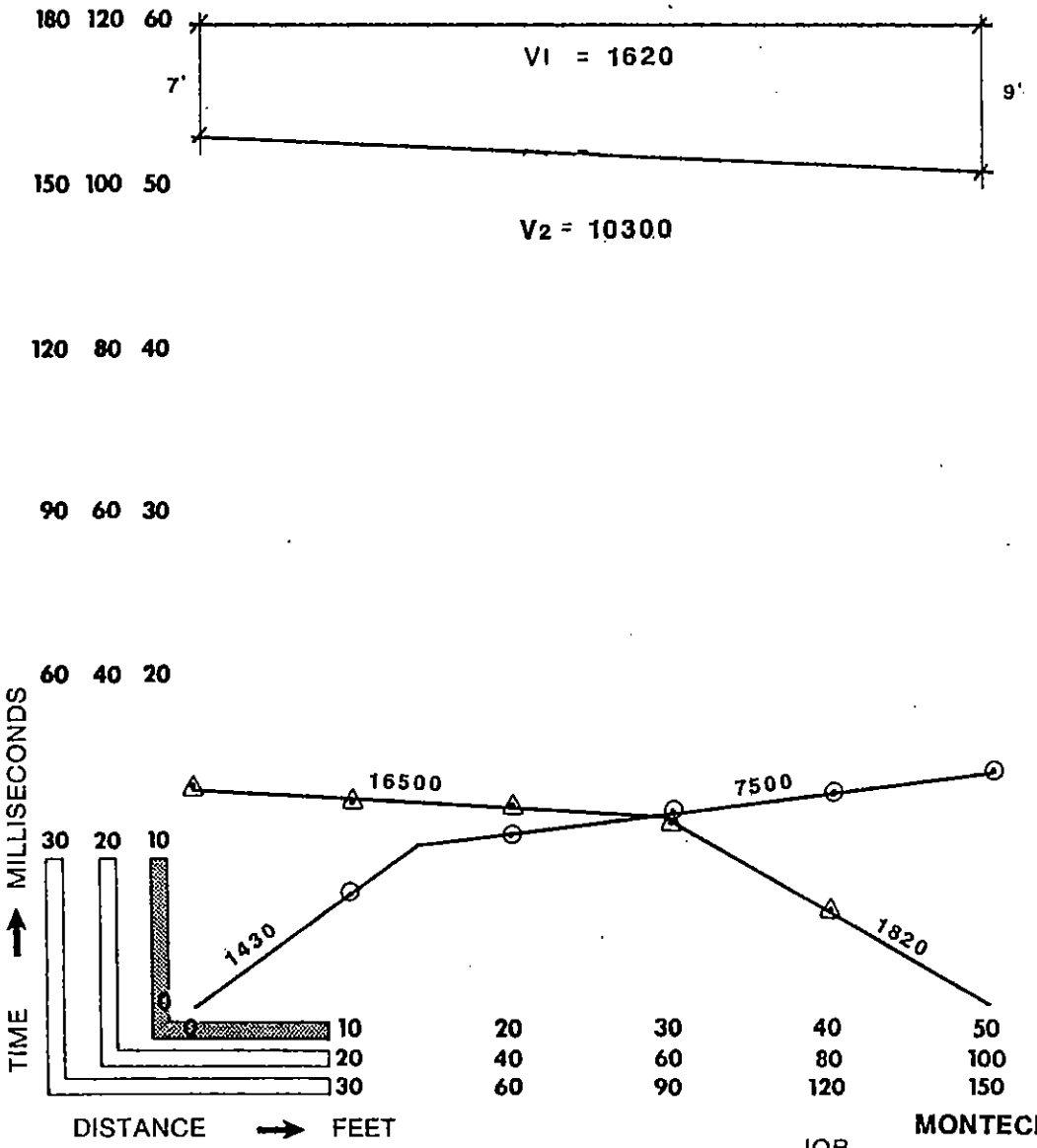
SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-38	ROCK TYPE	GRANTICS
DIRECTION	E→W	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1620 fps

V2 = 10300 fps

DF = 7 ft

DR = 9 ft

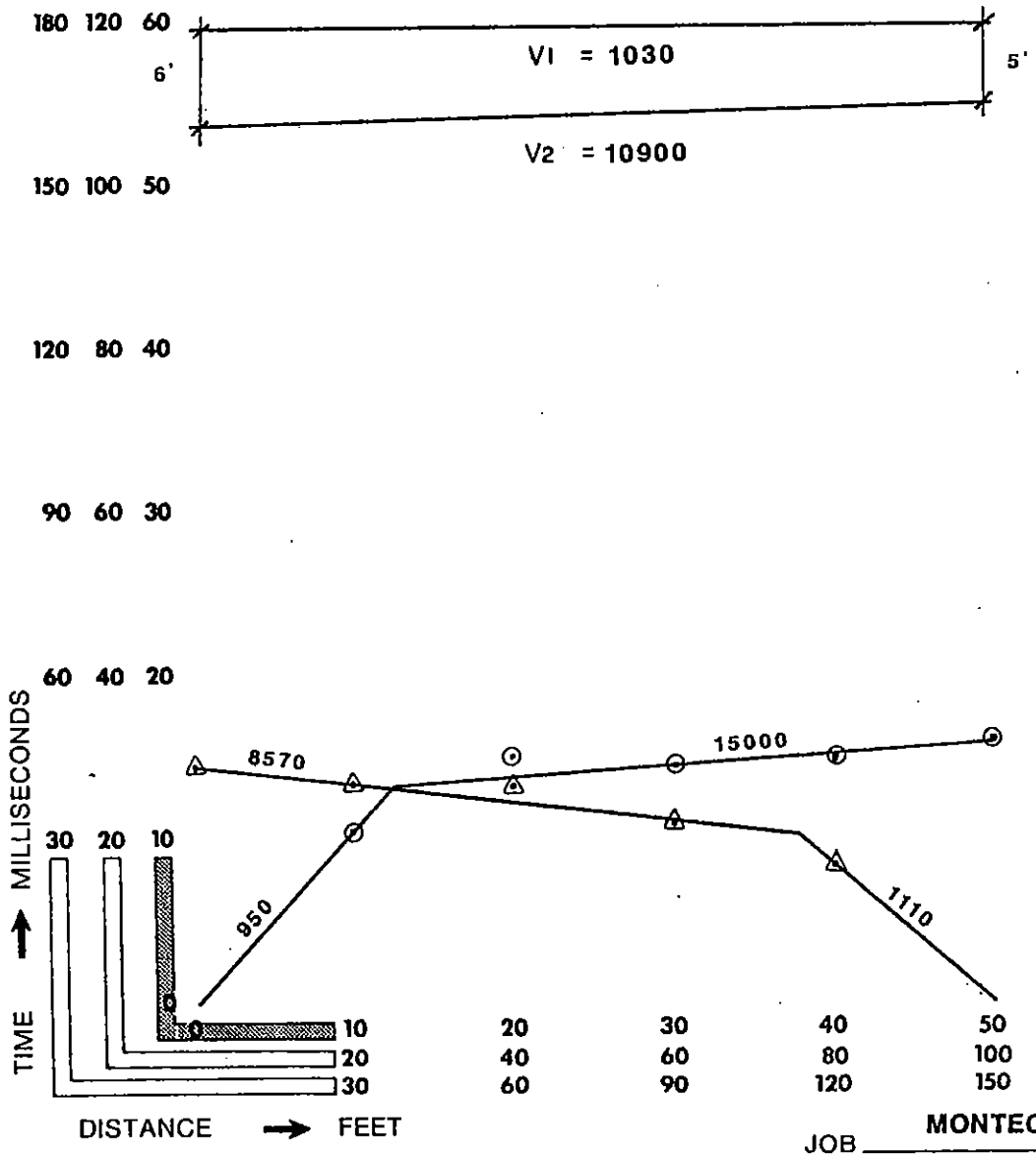
SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-39	ROCK TYPE	GRANTICS
DIRECTION	E→W	TRAVERSE QUALITY	GOOD

H = V = 1"=10'-0"



V1 = 1030 fps

V2 = 10900 fps

DF = 6 ft

DR = 5 ft

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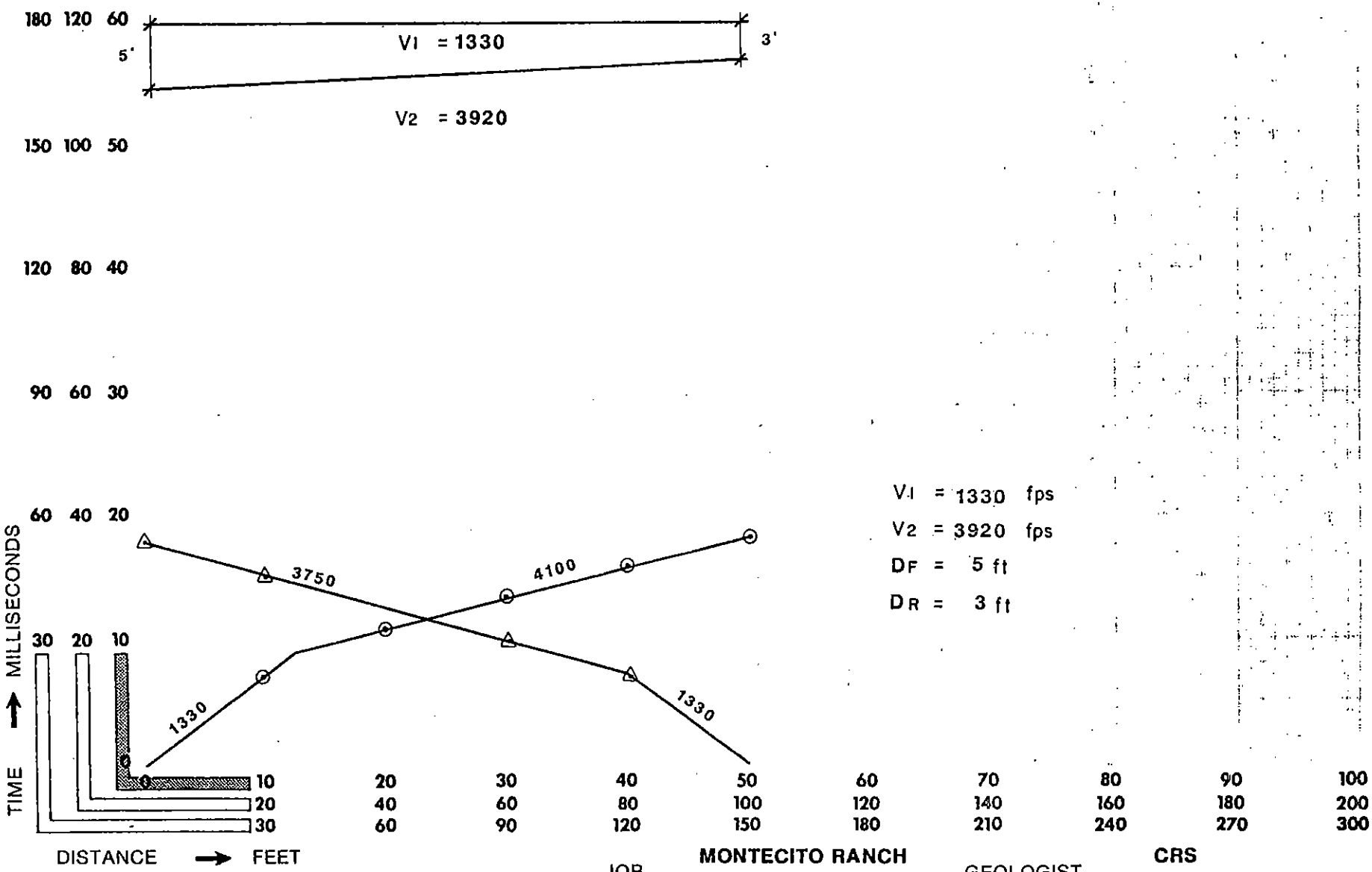
ENGINEERING GEOLOGY DIVISION

JOB	MONTECITO RANCH	GEOLOGIST	CRS
JOB NO.	88208-01	ELEVATION	
TRAVERSE NO.	TR-40	ROCK TYPE	GRANTICS
DIRECTION	S→N	TRAVERSE QUALITY	FAIR

H = V = 1"=10'-0"



V1 = 1330 fps

V2 = 3920 fps

DF = 5 ft

DR = 3 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

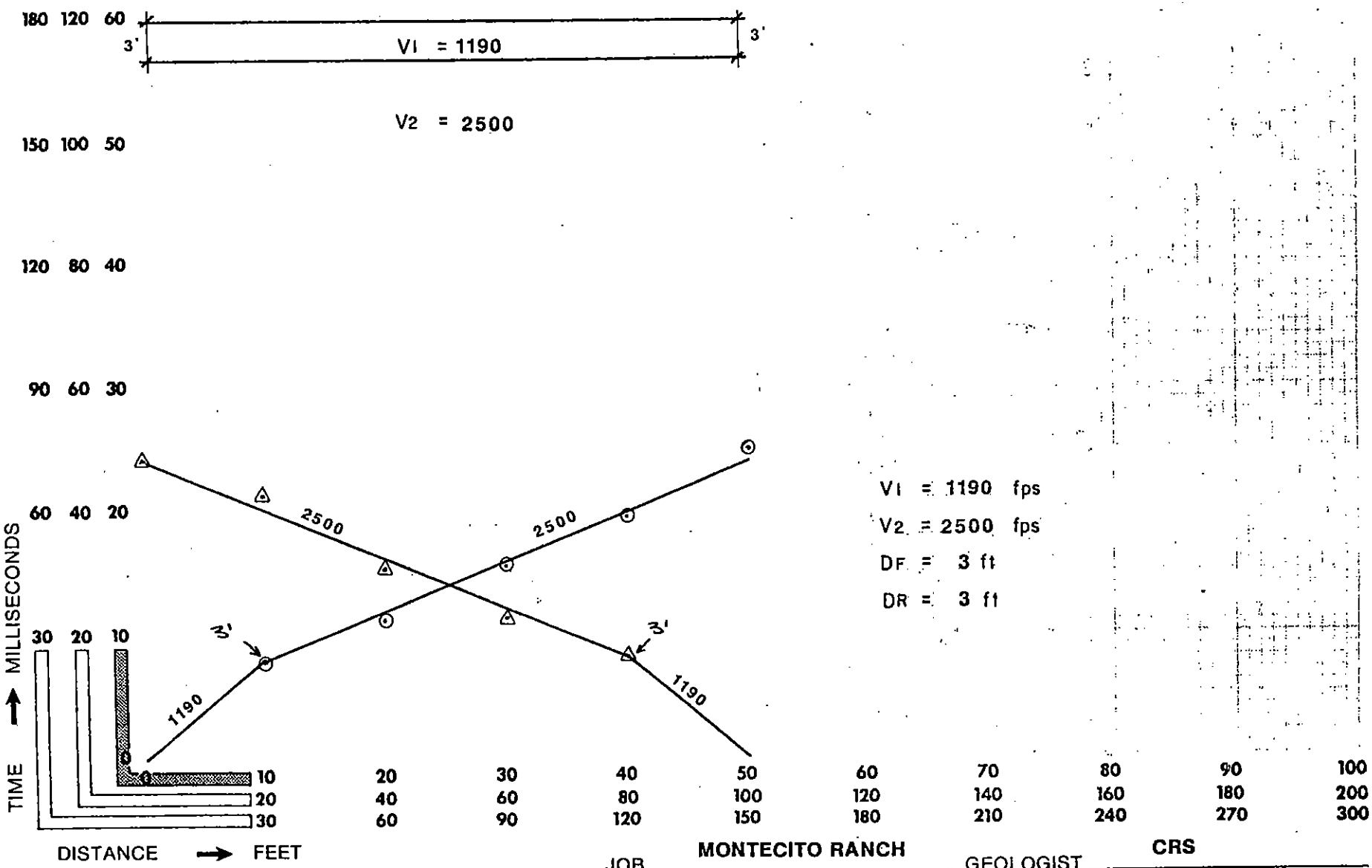
TRAVERSE NO. TR-41

ROCK TYPE GRANTICS

DIRECTION E→W

TRAVERSE QUALITY GOOD

H = V = 1"=10'-0"



V1 = 1190 fps

V2 = 2500 fps

DF = 3 ft

DR = 3 ft

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST CRS

JOB NO. 88208-01

ELEVATION

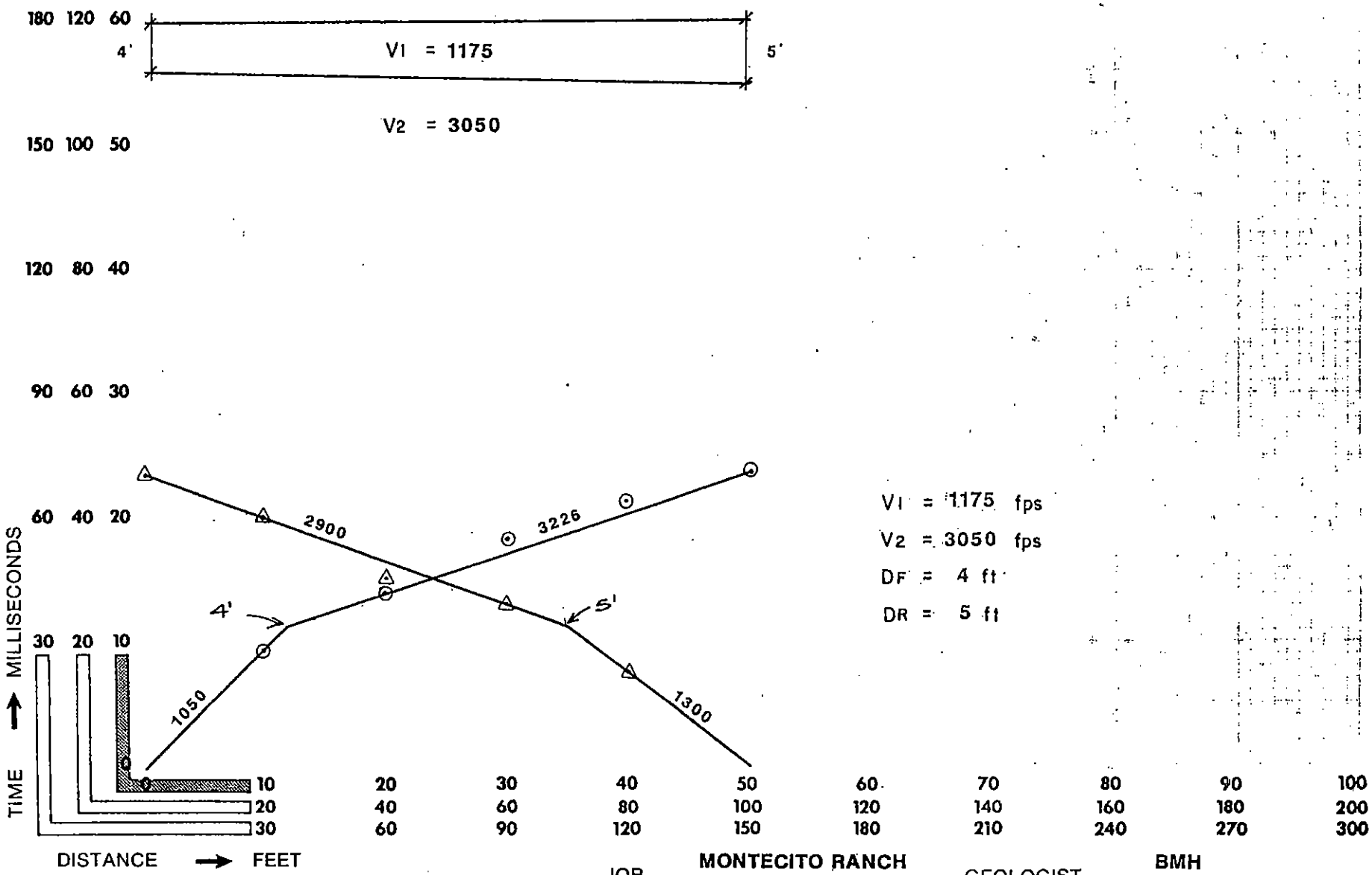
TRAVERSE NO. TR-42

ROCK TYPE GRANTICS

DIRECTION WEST→

TRAVERSE QUALITY

H = V = 1"=10'-0"



V1 = 1175 fps

V2 = 3050 fps

DF = 4 ft

DR = 5 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST BMH

JOB NO. 88208-01

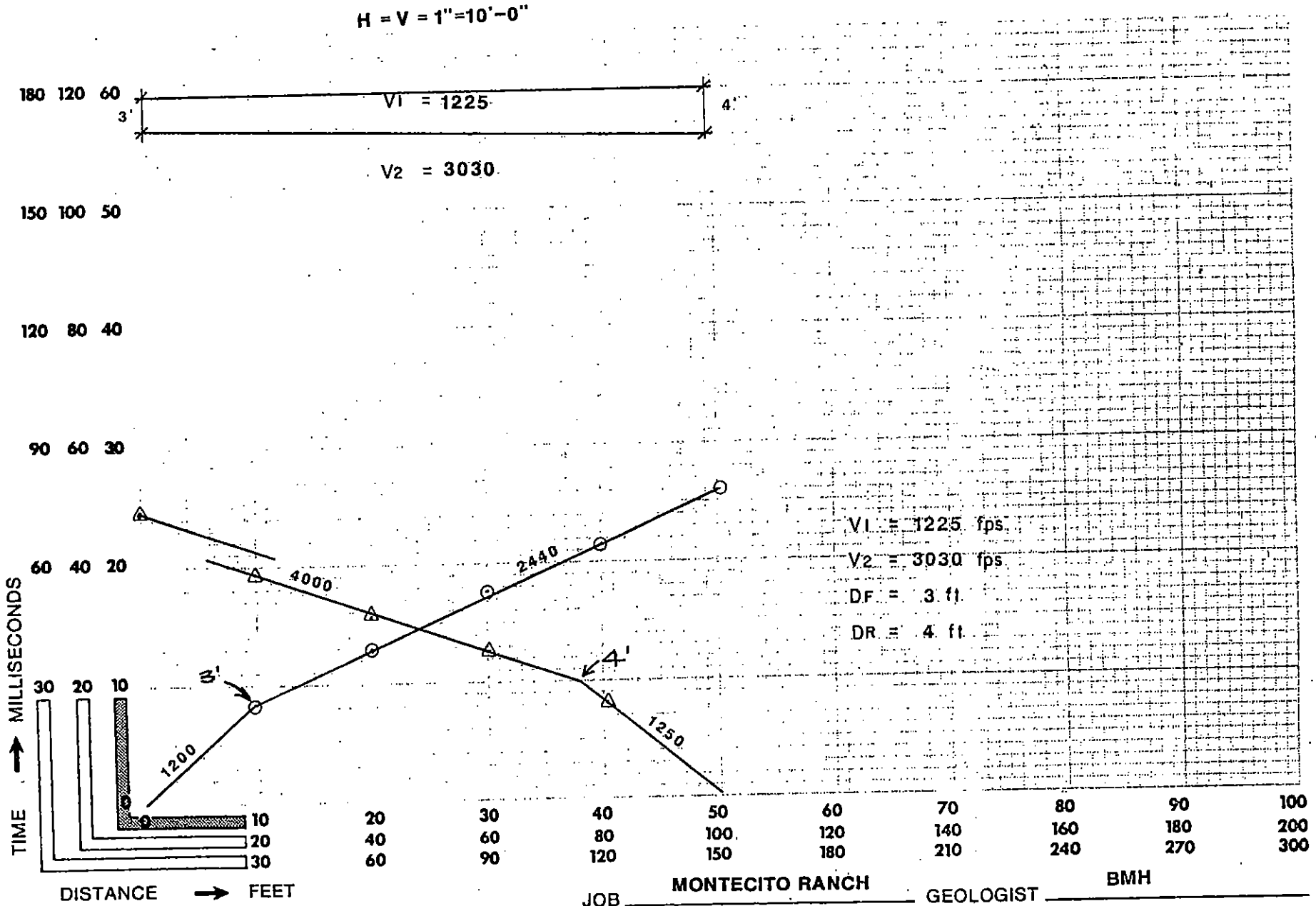
ELEVATION

TRAVERSE NO. TR-44

ROCK TYPE GRANTICS

DIRECTION WEST→

TRAVERSE QUALITY



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SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST BMH

JOB NO. 88208-01

ELEVATION

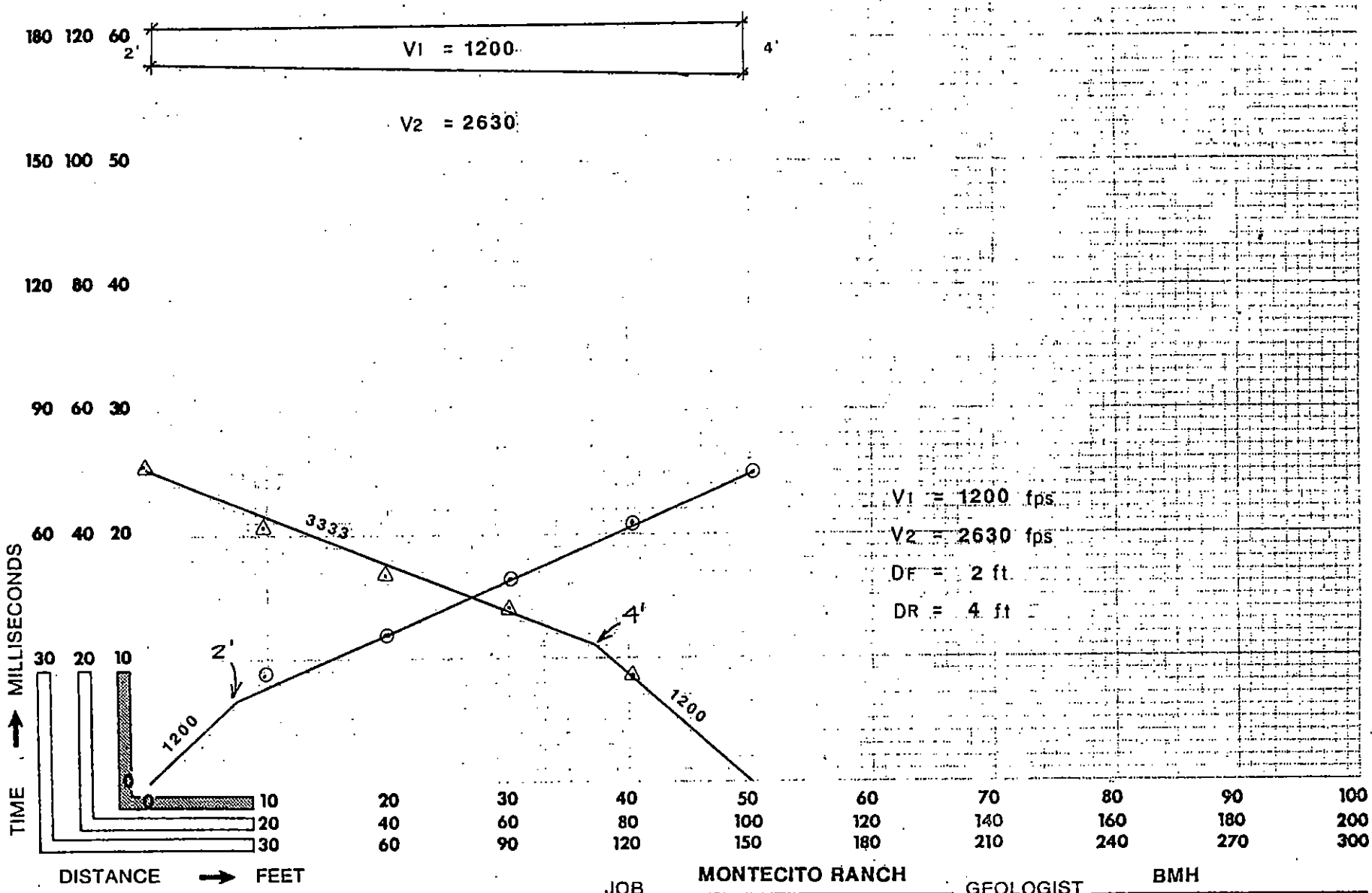
TRAVERSE NO. TR-45

ROCK TYPE GRANTICS

DIRECTION NE→

TRAVERSE QUALITY

H = V = 1"=10'-0"



V1 = 1200 fps

V2 = 2630 fps

DF = 2 ft

DR = 4 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

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ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST BMH

JOB NO. 88208-01

ELEVATION

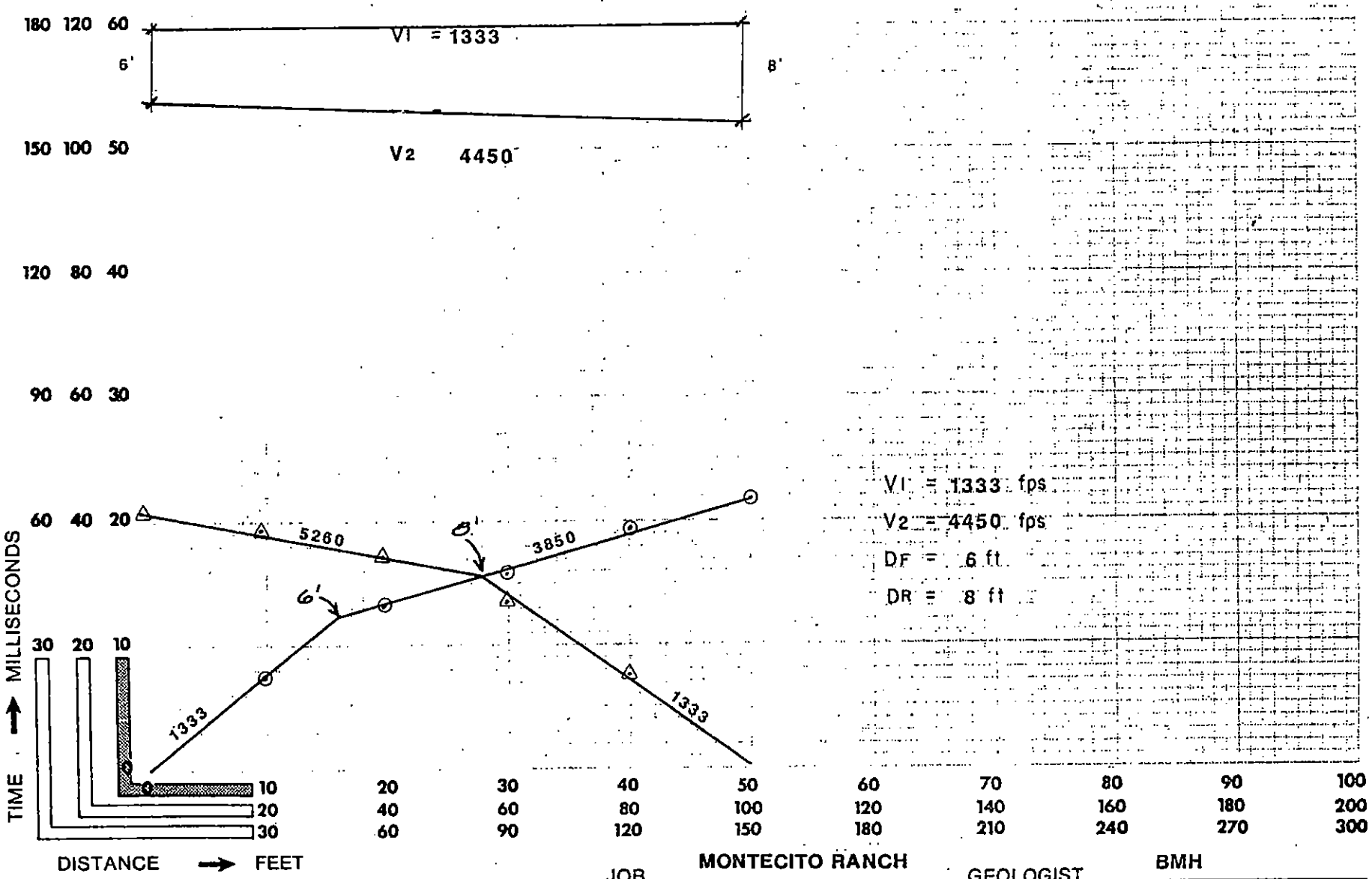
TRAVERSE NO. TR-46

ROCK TYPE GRANTICS

DIRECTION WEST→

TRAVERSE QUALITY

H = V = 1"=10'-0"



V1 = 1333 fps

V2 = 4450 fps

DF = 6 ft

DR = 8 ft

SHEPARDSON ENGINEERING ASSOCIATES, INC.

SEA

ENGINEERING GEOLOGY DIVISION

JOB MONTECITO RANCH

GEOLOGIST BMH

JOB NO. 88208-01

ELEVATION

TRAVERSE NO. TR-47

ROCK TYPE GRANTICS

DIRECTION WEST→

TRAVERSE QUALITY

GEOCON
INCORPORATED

GEOTECHNICAL CONSULTANTS

SOIL AND GEOLOGIC RECONNAISSANCE

FOR

MONTECITO RANCH

SAN DIEGO COUNTY, CALIFORNIA

PREPARED FOR

CHEVRON LAND AND DEVELOPMENT COMPANY

SAN DIEGO, CALIFORNIA

PREPARED BY

GEOCON INCORPORATED

SAN DIEGO, CALIFORNIA

MAY 1991

6960 Flanders Drive ■ San Diego, California 92121-2974 ■ Telephone (858) 558-6900 ■ Fax (858) 558-6159

GEOCON
INCORPORATED

GEOTECHNICAL CONSULTANTS

File No. 04699-42-01
May 6, 1991

Chevron Land and Development Company
1660 Hotel Circle North, Suite 620
San Diego, California 92108

Attention: Mr. John V. Bragg, Jr.

Subject: MONTECITO RANCH
SAN DIEGO COUNTY, CALIFORNIA
SOIL AND GEOLOGIC RECONNAISSANCE

Gentlemen:

In accordance with your authorization and our proposal dated February 22, 1991, we have performed a soil and geologic reconnaissance of the subject project. The accompanying report presents the findings from our study and our conclusions and recommendations relative to the geotechnical engineering aspects of future land development.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Scott L. Hardman
RCE 45765

George C. Copenhaver, Jr.
CEG 86

REGISTERED PROFESSIONAL ENGINEER
SCOTT L HARDMAN
NO. 45765
EXP 12-31-94
CIVIL
STATE OF CALIFORNIA

REGISTERED GEOLOGIST
GEORGE C. COPENHAVER, JR.
NO. 86
CERTIFIED ENGINEERING GEOLOGIST
6-30-92
STATE OF CALIFORNIA

GCC:SLH:dmc

(4) addressee
(2) Rick Engineering Company
Attention: Mr. Steve McPartland
(2) Turrini and Brink Planning Consultants
Attention: Mr. Frank Greco

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File No. 04699-42-01
May 6, 1991

SOIL AND GEOLOGIC RECONNAISSANCE

PURPOSE AND SCOPE

The purpose of this soil and geologic reconnaissance is to provide preliminary geotechnical information to facilitate initial land use studies and an environmental impact study. It is understood that, as conceptual land use plans are developed, more detailed geotechnical studies will be performed.

The scope of our services consisted of field mapping by a project geologist and a review of geotechnical reports and information relative to the site. In particular, the following reports, maps and photographs were reviewed.

1. USDA Aerial Stereo photographs (1953), Flight Nos. AXN-5M-185 and 186.
2. Weber, F. Harold Jr., *Geology and Mineral Resources of San Diego County, California,* California Division of Mines and Geology, 1963.
3. Rogers, *Geologic Map of California, Santa Ana Sheet,* California Division of Mines and Geology, 1965.
4. Jennings, C. W., *Fault Map of California,* California Division of Mines and Geology, 1975.
5. Merifield, *NASA Technical Report 76-1,* 1976.
6. *Draft Environmental Impact Report for the Cagney Properties GPA PAA 20-86, 87-03,* Recon, May 20, 1987.
7. *Geologic Reconnaissance and Refraction Seismograph Investigation, Phase I of Geotechnical Investigation, Montecito Ranch, Ramona, California,* Shepardson Engineering Associates Incorporated, dated May 1, 1989.

FIELD WORK

The field work consisted of geologic mapping on April 25 and 26, 1991, by a project geologist. Field observations were enhanced by analysis of the referenced 1953 stereoscopic aerial photographs. All mapping was performed on a one inch equals 200 feet topographic base map of Montecito Ranch provided by Rick Engineering Company (Figure 2, pocket).

SOIL AND GEOLOGIC CONDITIONS

Four geologic formations and four surficial material types were observed at the site. The geologic formations include the Bedford Canyon Formation, San Marcos Gabbro, Green Valley Tonalite, and Woodson Mountain Granodiorite. The surficial materials consist of fill, topsoil, alluvium, and slopewash (or colluvium) deposits. Each of the soil and geologic conditions encountered is discussed below in order of decreasing age. The estimated areal extent of each geologic formation and surficial soil unit (with the exception of topsoil) is shown on the Geologic Reconnaissance Map, Figure 2.

Geologic Formations

Bedford Canyon Formation (Ju). Jurassic-age metasedimentary rocks were found as remnant pendants and inclusions in limited areas within the central portion of the site. This area is near the intrusive contact between gabbroic and tonalitic rocks (Figure 2). Resistant quartzites and siliceous dikes were noted in this area. Where excavations are planned in

these materials, it should be anticipated that "knobs" and "floaters" of oversize nonrippable bedrock are likely to be encountered at shallow depths and that such material will require special handling and placement as recommended hereinafter.

San Marcos Gabbro (Kbi). Basic intrusive igneous rocks, tentatively correlated to the Cretaceous-aged San Marcos Gabbro, underlie a portion of the central-western property, comprising most of an outlying circular hill (see Figure 2). These variably weathered igneous rocks are considered to be older than the surrounding Woodson Mountain Granodiorite (Kgr) and Green Valley Tonalite which underlie the majority of the site. Portions of these dark-colored rocks are nearly black pyroxenite. Resistant boulders exposed on the steep, southern facing crest of the circular hill pose a potential rockfall hazard to development which might be planned down slope (see Figure 2). Gabbroic rocks exposed in gullies and outcrops are variably fractured and weathered to reddish-brown, clayey-silty, coarse sands that may exhibit expansive characteristics. Excavations exceeding approximately 5 feet in depth into less weathered and fractured portions of the gabbroic rock will likely require blasting.

Green Valley Tonalite (Kgt). Cretaceous-aged tonalite occurs over a majority of the northern and eastern portions of the site. It is typically comprised of gray, medium to coarse, crystalline, biotite-rich quartz-diorite, or tonalite. The rock exhibits rounded boulder-outcrops with rectilinear fracture or joint patterns. Similar to the above-described

San Marcos Gabbro, excavations exceeding approximately 5 feet in depth into less weathered and fractured portions of the rock, will likely require blasting. Loose boulders on steep slopes may also pose a potential for rockfalls in certain areas (see Figure 2).

Woodson Mountain Granodiorite (Kgw). This Cretaceous-aged intrusive rock occupies the south-central and southwest portions of the site and is characterized by outcrops of light gray, resistant boulders and solid "knobs" of bedrock. This is typically the least fractured and weathered bedrock unit on the property, and is likely to exhibit nonrippable conditions in excavations at shallow depths. Localized areas, especially on the steeper south-facing slopes of the central ridge, may also pose a potential for rockfalls (Figure 2).

Surficial Materials

Slopewash (Qsw). Colluvial materials and residual soils occupy relatively widespread areas of more gentle slopes and valley margins across the entire site (Figure 2). Estimated thickness of these deposits, based on eroded gullies and previous seismic studies (see Reference 7), varies from approximately 3 to 10 feet. Generally, these soils consist of poorly consolidated, clayey or silty, coarse sands. Such materials typically exhibit either potentially high expansion or compressibility characteristics.

Alluvium (Qal). Soils of alluvial original occur at the base of canyons or valleys throughout the site, but are especially prevalent within the southwestern portions adjacent to the Santa Maria Valley (see Figure 2). The alluvial deposits are often difficult to distinguish from slopewash soils, and typically consist of poorly consolidated clayey or silty sands. Development within these areas will require remedial grading as recommended in the concluding sections of this report.

Topsoil (Unmapped). Topsoil blankets the majority of the site to depths estimated to range from 1 to 3 feet. Such materials typically consist of relatively loose, silty sands with variably sized rock fragments derived from the underlying units. Due to the unconsolidated nature of the topsoils, they will also require remedial grading in areas of proposed development, as recommended hereinafter.

Fill Soils (Qaf). Fill soils observed on the property are primarily associated with previous ranch-related activity such as embankments for livestock ponds, or gravel roads. Several such embankments are shown on Figure 2, and it is assumed that such undocumented fill soils are not suitable in their present condition for support of structures or additional fill. Remedial grading measures suggested for these soils are outlined in the *Conclusions and Recommendations* section of this report.

Geologic Structure

The major geologic structures within the property limits are intersecting systems of thoroughgoing fractures, or ancient faults. Examination of stereoscopic aerial photographs, and a review of published literature and maps, indicates a major northwest-to-southeast and northeast-to-southwest-trending linear system of fractures, or possibly ancient faults. Only the strongly developed fracture zones were mapped (see Figure 2); the mapped fracture zones correspond to low-lying valleys, canyons, saddles and vegetation contrasts. These structures extend beneath the surficial deposits, but do not appear to break or displace them. On the basis of these observations and review of other investigations of faulting in this region, we conclude these faults are inactive (see Reference 5).

Groundwater - Springs

Surface groundwater was noted in the steep, oak-forested canyon in the northern central portion of the site (see Figure 2). A succession of spring-seeps was observed between approximate elevations 1,350 feet MSL and 1,550 feet MSL in this drainage. This canyon may drain aquifers developed within the above-described fracture systems that converge a short distance to the south. Groundwater from the major fracture systems may seep along cross-fractures into this drainage. Because of the network of fractures in proximity to natural structural and topographic catch-basins, a substantial groundwater resource may exist, which could possibly be developed for on-site use. Please note that the potential

existence of a developable groundwater resource is conjectured, based on the limited scope of this study. Additional studies would be required to confirm the existence and potential capacity of the groundwater resource.

GEOLOGIC HAZARDS

Faulting and Seismicity

It is our opinion, based on the site reconnaissance and a review of published geologic maps and reports, that the site is not located on any known active or potentially active fault trace. The Rose Canyon Fault, located approximately 25 miles southwest of the site, is currently the subject of research to determine the potential for seismic activity. The results of ongoing research indicate movement has occurred along the Rose Canyon Fault during the Holocene Epoch and the California Division of Mines and Geology is currently acting to include this fault with an Alquist-Priolo Special Studies Zone.

Regional active faults include the Elsinore Fault zone and San Jacinto Fault zone which lie approximately 12 and 30 miles to the northeast, respectively. In the event of a major earthquake on these or other faults in the Southern California region, the site could be subjected to moderate to severe ground shaking; with respect to this hazard, this site is comparable to others in the general vicinity with similar geologic setting.

Landslides

Based on review of the referenced reports, maps and photographs, and the performance of a site reconnaissance, no evidence of landslides were observed at the site.

Soil Liquefaction Potential

Soil liquefaction is generally limited to granular soils located below the water table which are in a relatively loose, unconsolidated condition at the time of a large, nearby earthquake. Loose deposits such as alluvium and slopewash beneath areas to be developed are recommended to be removed and densified, and subdrains installed where required to preclude the build-up of a shallow groundwater condition. Therefore, the risk of seismically-induced soil liquefaction at this site is considered remote.

Rockfall Potential

Portions of the subdued topography considered favorable for development are downslope from potential rockfall areas (Geologic Map, Figure 2). These potential rock fall areas exist both on and off site. Future studies should address the potential for rockfall, after development plans are formulated. Where rockfall potential is considered to be a significant risk, typical mitigative measures consist of loose rock removal, rock pinning, rock grouting, or constructing protective devices, such as earth berms or fences.

CONCLUSIONS AND RECOMMENDATIONS

General

1. No significant soil or geologic conditions were observed or are known to exist which would preclude development of the property as presently conceptualized.

2. Groundwater resources may be available within an extensive network of fractures and joints that cross the site.

3. The potential for rockfall in the more gentler sloping areas which are anticipated for development will be a consideration.

Mineral Resources

4. Review of the referenced reports and maps indicates that there are no known mineral resources of economic significance located on the property. Decomposed granodiorite encountered during grading could be suitable as select trench backfill materials. Oversized rock generated during grading could be used for rip-rap purposes.

Grading

5. In areas considered for development, compressible surficial soils including fills, topsoils, alluvial soils, and loose slopewash or colluvial materials will require removal and recompaction.

6. For preliminary design purposes, it is recommended that proposed cut and fill slopes be planned no steeper than 2:1 (horizontal:vertical). Safe, allowable slope heights will generally be limited by the shear strength characteristics of the particular soil or rock conditions present. Where cut slopes in hard rock are planned, the stability of the slope is likely to be controlled by the orientation of major rock joints, shears, and fractures. Areas where high cut slopes are planned should be investigated in detail to evaluate the potential impact of the local geology on the stability of the slopes.

7. Excavation within the intrusive crystalline bedrock units will likely require heavy ripping and blasting. Special handling of the excavated rock and placement of oversized materials should be anticipated.

Foundations

8. In general, the prevailing soil conditions in either a dense undisturbed or properly compacted condition are suitable for the support of structures with conventional spread or strip foundations. The table on the next page presents the typical design criteria and foundation categories for preliminary design purposes, based on an allowable soil bearing pressure of 2,000 psf.

FOUNDATION RECOMMENDATIONS BY CATEGORY

Foundation Category	Minimum Footing Depth	Continuous Footing Reinforcement	Interior Slab Reinforcement
I	12 Inches	One No. 4 bar top and bottom	6 x 6 - 10/10 welded wire mesh at slab mid-point
II	18 Inches	Two No. 4 bars top and bottom	No. 3 bars at 24 inches on center, both directions
III	24 Inches	Two No. 4 bars top and bottom	No. 3 bars at 18 inches on center, both directions

CATEGORY CRITERIA

Category I: Maximum fill thickness is less than 20 feet and Expansion Index is less than 50.

Category II: Maximum fill thickness is less than 50 feet and Expansion Index is less than 90.

Category III: Fill thickness exceeds 50 feet, or variation in fill thickness exceeds 10 feet, or Expansion Index exceeds 90, but is less than 130.

Notes:

1. All footings should have a minimum width of 12 inches.
2. Footing depth measured from lowest adjacent finish grade.
3. All concrete slabs should be at least four inches thick.
4. All interior concrete slabs should be underlain by at least 4 inches of clean sand (or crushed rock).
5. All slabs expected to receive moisture sensitive floor coverings or used to store moisture sensitive materials should be underlain by a visqueen moisture barrier covered with at least 2 inches of the clean sand recommended in No. 4 above.

Drainage and Maintenance

9. Providing and maintaining proper surface drainage is imperative to provide soil stability and reduce erosion. All graded pads should have drainage swales which direct storm or irrigation runoff away from structures or the top of the slopes to controlled drainage facilities.

10. No storm or irrigation water should be allowed to discharge over the top of cut or fill slopes.

Future Studies

11. As development plans become available, the project geotechnical engineer should be consulted to provide information relative to the anticipated geotechnical impacts.

12. Prior to the finalization of the tentative map(s) for the property, a detailed soil and geologic investigation should be performed. In addition, a hydrogeologic study addressing the proposed plan would provide information relative to the presence and potential capacity of the postulated groundwater resource on-site.

File No. 04699-42-01
May 6, 1991

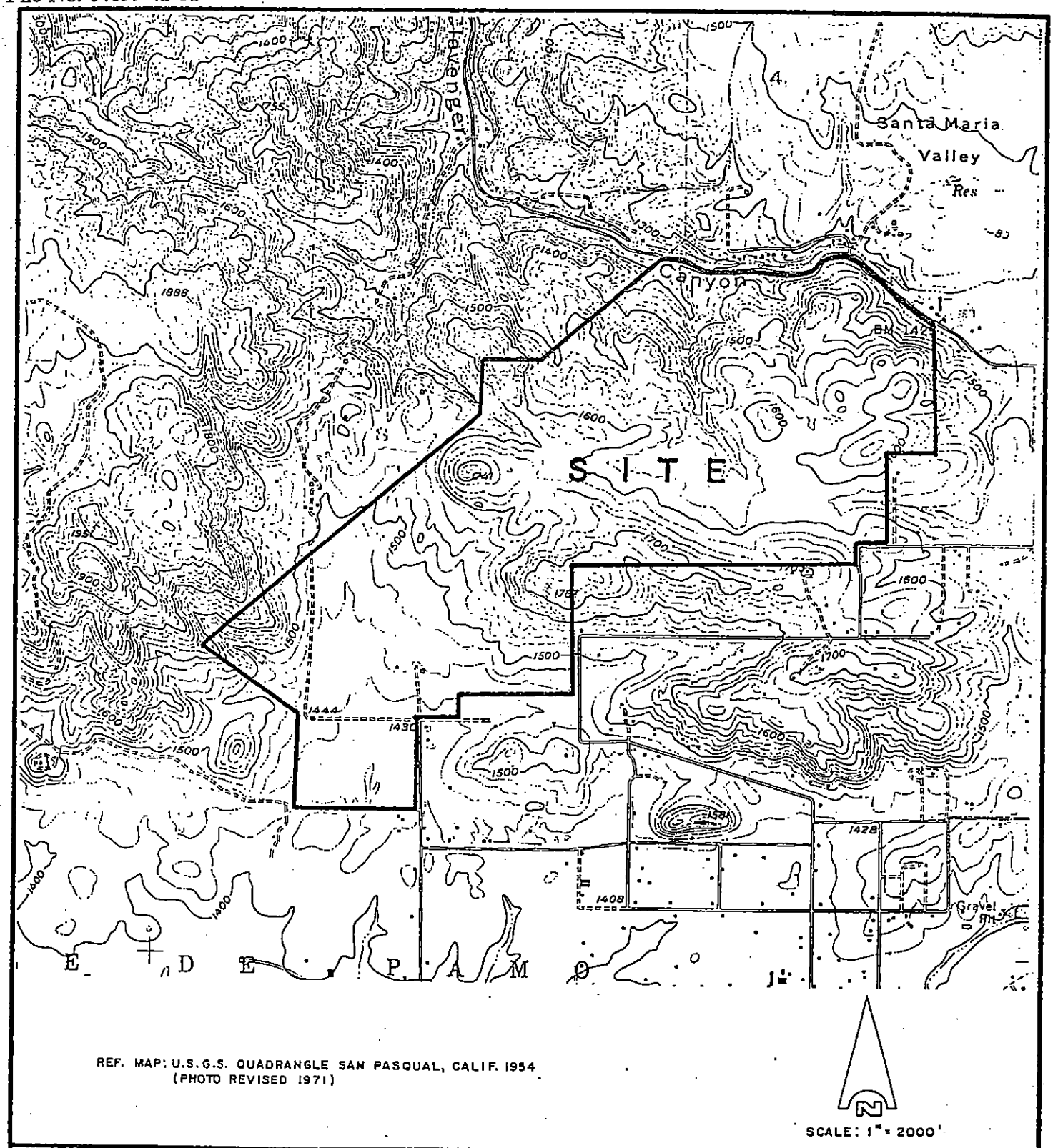
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, resulting from legislation or the broadening of knowledge in the fields of geology or geotechnical engineering. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

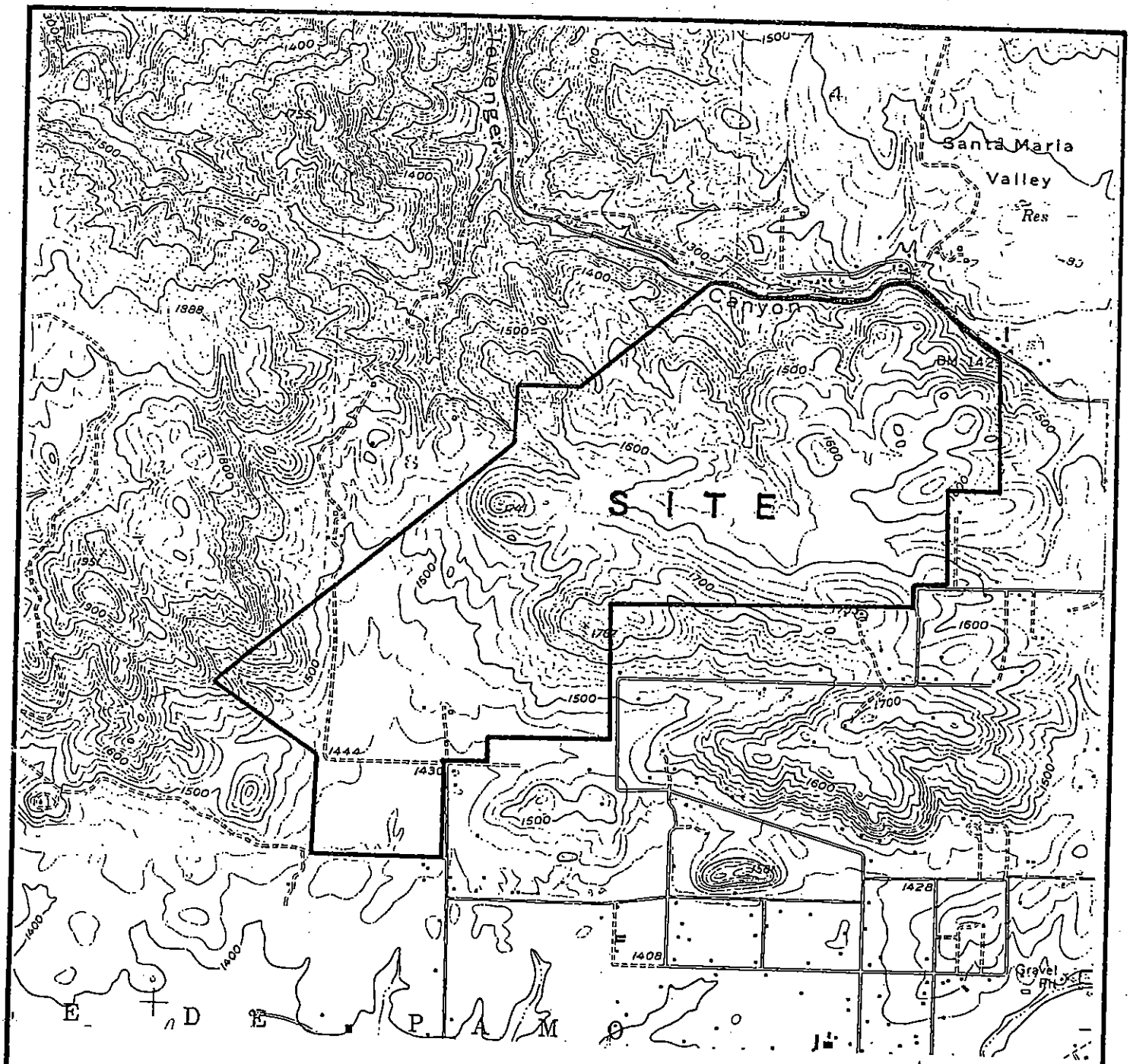
File No. 04699-42-01



VICINITY MAP

MONTECITO RANCH
SAN DIEGO COUNTY, CALIFORNIA

Figure 1



REF. MAP: U.S.G.S. QUADRANGLE SAN PASQUAL, CALIF. 1954
(PHOTO REVISED 1971)

SCALE: 1" = 2000'

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AUG 29 2002

August 26, 2002

S.E.A. 201135-02

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

ATTENTION: Mr. David Davis
Project Manager

SUBJECT: Geological Reconnaissance Report
Proposed Montecito Ranch, TM 5250
"2-Acre" and "Cluster" Concept Tentative Maps
Montecito Ranch Road
Ramona, California

References:

1) *Geological Reconnaissance and Refraction Seismograph Investigation*
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California
Dated 5/2/89

2) *Soil and Geologic Reconnaissance for Montecito Ranch*
San Diego County, CA
Dated 5/6/91

3) *Environmental Analysis Form*
County of San Diego
SP 01-001, TM 5250
Log #01-09-013
Dated 2/28/02

Dear Mr. Davis:

In accordance with our proposal of August 19, 2002, we are pleased to present our Report of Geological Reconnaissance of the subject property. The intent of this report is to characterize onsite rock type and distribution, discuss potential erodibility of natural soils, and on a reconnaissance level, comment on rock excavation characteristics, as well as seismicity and the generalized nature of potential mineral resources and geologic features of special interest. We understand that this report is to be included as a section in the environmental impact report to be prepared by Helix Environmental Planning, Inc.

Please contact the undersigned if there are any questions regarding the contents of this report. We appreciate the opportunity to be of continued service.

Respectfully submitted,

SHEPARDSON ENGINEERING ASSOCIATES, INC.

Bryan Miller-Hicks, CEG 1323
Project Geologist

cc: (4) Addressee
(1) Helix Environmental

Enclosures

GEOLOGICAL RECONNAISSANCE REPORT
PROPOSED MONTECITO RANCH, TM 5250
2-ACRE AND CLUSTER CONCEPT TENTATIVE MAPS
MONTECITO RANCH ROAD
RAMONA, CALIFORNIA

August 26, 2002 S.E.A. 201135-02

1.0 PURPOSE AND SCOPE

This report is a geologic reconnaissance report of the subject property, TM 5250, located between Montecito Road and San Pasqual Valley Road in Ramona, California. The purpose of this report is to provide geologic input and information to be included in an environmental impact report which will address, in part, comments from the County of San Diego in their environmental analysis scoping letter, dated February 28, 2002. Our report includes the following topics:

1) General geology and rock types
2) Regional faults and seismicity
3) Erosion potential of natural and graded slopes
4) Other geologic hazards

2.0 SITE DESCRIPTION

The 935 acre parcel is to be subdivided into 417 single-family residential lots according to Tract 5250 Replacement 2, which is informally called the "2-acre" option. This option will require extensive grading. The second alternative is informally called a "cluster concept" and consists of 344 single-family lots. The "2-acre" option is currently the plan under active consideration. The second "cluster" concept is currently an alternative development plan. Generally speaking, all issues discussed below apply to both concept development plans.

Topographically, the site is hilly, ranging from elevation approximately 1410 msl to 1730 msl. The site is characterized by a number of granitic knobs and ridges with intervening valleys, and a few meadow-like features. The valleys and flatter areas may be underlain by alluvial/colluvial soils, while the knobs and ridges are underlain by decomposed granite or harder bedrock at shallow depths. The 112-acre concept grading plan indicates cut slopes up to 80 feet in height, specifically along the improvement for Montecito Ranch Road, and fill slopes as high as 40 feet. The "cluster" concept indicates cut slopes as high as 50 feet, with fill depths on the order of 30 feet.

3.0 GEOLOGY AND SOILS

Geocon, Inc. accomplished surficial geologic mapping and report on their findings in a report entitled "Montecito Ranch Soil and Geologic Reconnaissance", dated May 6, 1991. Their geologists mapped four geologic formations and four surficial material types at the site. Geologic formations include the Jurassic Age Bedford Canyon Formation; Cretaceous San Marcos Gabbro; Green Valley Tonolite; and Woodson Mountain Granodiorite. These rocks are all crystalline, intrusive rocks which have undergone various degrees of weathering and decomposition. Our seismic traverses (see Reference 1) indicate that some blasting may be required during grading and excavation at depths ranging from -5 to -25 feet.

Surficial materials, overlying formational bedrock, include slopewash or colluvium, occupying gentle slopes and flatter areas. These soils are primarily silty sands. Deeper soils, primarily in the westerly one-third of the property, may be potentially compressible. A detailed investigation will indicate depths of compressible soils. Mitigation of potential compressibility will involve removal and recompaction of these materials during mass grading operations.

4.0 GEOLOGIC HAZARDS

4.1 Faulting and Seismicity

Based on the investigations completed to date, it is our opinion that no faults pass through the project site. The nearest active fault zone is the Elsinore-Julian Fault Zone, which lies approximately 14 miles northeast of the site. We estimate that the maximum probable earthquake expected to occur on the Elsinore-Julian Fault would be magnitude 7.1. Such an event could result in a peak horizontal bedrock acceleration of .15 g. at the site.

Another active regional fault is the Earthquake Valley Fault, some 21miles to the east. A maximum probable event of 6.5 is estimated at a probable peak bedrock acceleration of .08 g.

With respect to potential hazard from moderate to severe ground shaking, the site would not be substantially different from that experienced by surrounding properties. As noted in the County letter, the project is not located in a hazard zone identified by the Alquist-Priolo Earthquake Fault Zoning Act.

4.2 Landslides

There were no natural landslides noted during our reconnaissance in 1992 and Geocon also did not note any evidence of landslides at this site. We would not expect to find deep-seated rotational type landslides in a this type of geologic setting. However, undetected planes of weakness, such as weathering along fractures, can potentially cause slope failures in cut slopes. All cut slopes would be thoroughly inspected by an engineering geologist during grading and construction.

4.3 Liquefaction

Due to the shallow depth of soils encountered at the site, and the depth to bedrock, liquefaction is not a hazard risk at this site. Soil liquefaction is a phenomenon confined to fine granular soils with a narrow range of gradation underneath a water table, which react during severe ground shaking from an earthquake. We do not anticipate that these deep, loose and saturated deposits exist on site. Low density, potentially compressible colluvium in development areas will be removed and recompacted. The risk of seismically induced soil liquefaction is considered minimal at the site.

4.4 Rock Fall Potential

There are numerous boulder outcrops and hard rock ledges distributed throughout the project. Generally, these boulders can be considered stable and would not be likely to move downslope in the event of earthquake shaking. Should loose boulders be encountered during site development, they can be removed or specifically evaluated for stabilization and mitigation measures. If necessary, rock bolting or other rock stabilization measures can be recommended. Other measures may include pinning, grouting, or construction of berms or fences.

4.5 Soil erosion characteristics

The Unified Soil Classification description of the predominant soil type on the project is silty sand. The Soil Conservation Survey of the San Diego area indicates a number of soils mapped onsite, which have a moderate to severe erosion potential.

Decomposed Granite, when excavated and placed as structural fill without landscaping, is more susceptible to erosion than in its natural state. The process of excavating and recompacting the Decomposed Granite destroys some of the natural cohesion present in its undisturbed state. Based on our experience, we consider the erosion characteristics of undisturbed Decomposed Granite material, left exposed in cut slopes, as slight. We do, however, consider the erosion characteristics of remolded decomposed granite material and fill slopes as moderate. We, therefore recommend that a vegetative ground cover be established as quickly as possible in order to minimize potential erosion and exposed slopes. Experience shows that fill slopes constructed in

Decomposed Granite function very well with respect to erosion if properly landscaped and maintained. In addition, installation of a geotextile fabric designed for slope protection can mitigate potential erosion where necessary.

As for topsoil and colluvial soils exposed during grading, if used in compacted fill, the potential for erosion of these slopes falls under the same mitigation measures as described above. Properly placed at a fill slope angle of 2:1 or less steep, and properly vegetated, these slopes should not be severely eroded.

During grading the BMP, or Best Management Practices, will be followed to limit and mitigate erosion of soils from an actively graded area. Other measures, such as the installation of subdrains, the installation of drainage swales over cut slopes and at the toes of high fill slopes, and the installation of a system of storm drains and catch basins serve to mitigate erosion from the property.

4.6 Expansive Soils

In our investigations to date we have not encountered significantly expansive soils onsite. A detailed investigation based on the accepted grading plan will entail the collection of numerous soil samples to be tested for their potential expansion characteristics.

Remedial measures to mitigate the effects of expansive soil include burial of these soils beneath deep fills, mixing of these soils with less expansive soils, and careful observation and testing to ensure that no expansive soils are placed within 3 feet or so of finish grade of any residential pad. This includes expansive soils within the fills, as well as expansive soils exposed on cut pads.

5.0 UNIQUE GEOLOGIC FEATURES

As stated in the County letter, no rock outcroppings were identified as unique geological features on the National Resources Inventory. At this point, it is difficult to judge the visual or scientific significance of any of the outcrops. Obviously, outcrops will be modified or removed during grading of the 2-acre plan. However, some of the boulders and slab rock derived from some of these outcrops may be saved for homeowner landscaping or common areas, or sold to be placed elsewhere. Generally, hard solid outcrops on the highest site elevations will be preserved and will not be graded.

6.0 MINERAL RESOURCES

As stated in the County letter, even though the project is located in a mineral resource area, no past or present mining activities had been identified on site that would indicate the presence of significant mineral resources. Our observations and reports indicated no significant mineral resources, as does Geocon's.

7.0 PRELIMINARY SLOPE DESIGN CRITERIA

Based on our past experience with soil conditions such as are encountered on the project site, it is our opinion that cut and fill slopes inclined at a ratio of 2 units to 1 unit vertical (2:1) will be considered stable for the proposed slope heights.

8.0 CONCLUSIONS

In our opinion, the results of this geologic reconnaissance indicate that the project site is generally suitable for the proposed custom lot residential development. Detailed geotechnical recommendations, specific to proposed site roadway and residential pad grading, will be presented at a later date subsequent to a detailed geotechnical investigation.

GEOLOGICAL RECONNAISSANCE REPORT
PROPOSED MONTECITO RANCH, TM 5250- RPL 2
417 LOT SUBDIVISION
MONTECITO RANCH ROAD
RAMONA, CALIFORNIA

Prepared for:

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

S.E.A. 201135-02
April 13, 2004

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April 13, 2004

S.E.A. 201135-02

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

ATTENTION: Mr. David Davis
Project Manager

SUBJECT: Geological Reconnaissance Report
Proposed Montecito Ranch, TM 5250- RPL 2
417 Lot Subdivision
Montecito Ranch Road
Ramona, California

References:

1) *Geological Reconnaissance and Refraction Seismograph Investigation*
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California
Dated 5/2/89

2) *Soil and Geologic Reconnaissance for Montecito Ranch*
San Diego County, CA
Dated 5/6/91

3) *Environmental Analysis Form*
County of San Diego
SP 01-001, TM 5250
Log #01-09-013
Dated 2/28/02

Dear Mr. Davis:

In accordance with our your recent request, we are pleased to present our Report of Geological Reconnaissance of the proposed Montecito Ranch, TM 5250-RPL 2. The intent of this report is to characterize onsite rock type and distribution, discuss potential erodibility of natural soils, and on a reconnaissance level, comment on rock excavation characteristics, as well as seismicity and the generalized nature of potential mineral resources and geologic features of special interest. We understand that this report is to be included as a section in the environmental impact report to be prepared by Helix Environmental Planning, Inc.

GEOLOGICAL RECONNAISSANCE REPORT
PROPOSED MONTECITO RANCH, TM 5250- RPL 2
417 LOT SUBDIVISION
MONTECITO RANCH ROAD
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417 LOT SUBDIVISION
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April 13, 2004

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Dated 2/28/02

Dear Mr. Davis:

In accordance with our your recent request, we are pleased to present our Report of Geological Reconnaissance of the proposed Montecito Ranch, TM 5250-RPL 2. The intent of this report is to characterize onsite rock type and distribution, discuss potential erodibility of natural soils, and on a reconnaissance level, comment on rock excavation characteristics, as well as seismicity and the generalized nature of potential mineral resources and geologic features of special interest. We understand that this report is to be included as a section in the environmental impact report to be prepared by Helix Environmental Planning, Inc.

GEOLOGICAL RECONNAISSANCE REPORT
PROPOSED MONTECITO RANCH, TM 5250- RPL 2
430 LOT SUBDIVISION
MONTECITO RANCH ROAD
RAMONA, CALIFORNIA

Prepared for:

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

S.E.A. 201135-02
April 13, 2004

SHEPARDSON
ENGINEERING ASSOCIATES INC.

10035 Prospect Avenue, Suite 101 ▪ Santee, CA 92071-4398

SHEPARDSON
ENGINEERING ASSOCIATES INC.

Geotechnical Consultants:
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April 13, 2004

S.E.A. 201135-02

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

ATTENTION: Mr. David Davis
Project Manager

SUBJECT: Geological Reconnaissance Report
Proposed Montecito Ranch, TM 5250- RPL 2
430 Lot Subdivision
Montecito Ranch Road
Ramona, California

References:

1) *Geological Reconnaissance and Refraction Seismograph Investigation*
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California
Dated 5/2/89

2) *Soil and Geologic Reconnaissance for Montecito Ranch*
San Diego County, CA
Dated 5/6/91

3) *Environmental Analysis Form*
County of San Diego
SP 01-001, TM 5250
Log #01-09-013
Dated 2/28/02

Dear Mr. Davis:

In accordance with our your recent request, we are pleased to present our Report of Geological Reconnaissance of the proposed Montecito Ranch, TM 5250-RPL 2. The intent of this report is to characterize onsite rock type and distribution, discuss potential erodibility of natural soils, and on a reconnaissance level, comment on rock excavation characteristics, as well as seismicity and the generalized nature of potential mineral resources and geologic features of special interest. We understand that this report is to be included as a section in the environmental impact report to be prepared by Helix Environmental Planning, Inc.

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June 30, 2004 S.E.A. 201135-02

Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

ATTENTION: Mr. David Davis
Project Manager

SUBJECT: Geological Reconnaissance Report
Offsite Road Improvements
Proposed Montecito Ranch, TM 5250-RPL 2
Ramona, California

References:

1) *Geological Reconnaissance and Refraction Seismograph Investigation*
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California
Dated 5/2/89

2) *Soil and Geologic Reconnaissance for Montecito Ranch*
San Diego County, CA
Dated 5/6/91

3) *Geological Reconnaissance Report*
Proposed Montecito Ranch, TM 5250- RPL 2
Montecito Ranch Road
Ramona, California

Dear Mr. Davis:

In accordance with your recent request, we are pleased to herein submit our report of geological reconnaissance for the proposed offsite road improvements to be completed in conjunction with the proposed Montecito Ranch development. This report is based on a brief reconnaissance, a review of the improvement plans produced by Stevens-Cresto Engineering, our experience in the area, and work we have completed on the Montecito Ranch project. No additional field investigation, excavations or sampling were done for this report.

We understand that improvements will be made to the following road alignments: Montecito Road, from Main Street north to its junction with Montecito Way; Montecito Way, north to the project; Pine Street, from Main Street north to Ash Street; and Ash Street west to Alice Street. We understand that the improvements will consist of grade improvements, shoulder widening, and the widening of a bridge on Montecito Road across Santa Maria Creek.

MONTECITO ROAD/MONTECITO WAY ALIGNMENTS

A segment of Montecito Road between Main Street and Montecito Way will be improved. This segment is approximately 9000 feet in length. Generally, the road drops very gradually in elevation, from about 1420 at Main Street to about 1400 at its intersection with Montecito Way. There is an existing approximately 100-foot long vehicular bridge crossing Santa Maria Creek, starting about 1600 feet from Main Street. Other than at the creek crossing, the terrain within the right of way is fairly uniform, with minor dips and rises. Road and shoulder widening will result in additional cuts being made along several existing cut banks. The bridge at the creek crossing will be widened by approximately 14 feet.

The Montecito Way improvement section is approximately 4000 feet long, and rises approximately 31 feet from its intersection with Montecito Road to its northern end, at the entrance to the proposed development. Very minor dips and rises occur along this alignment.

PINE STREET/ASH STREET ALIGNMENTS

A segment of Pine Street between Main Street and Ash Street will be improved. The length of the alignment is approximately 6200 feet. Elevations rise from 1420 feet at Main Street, to approximately 1550 at Ash Street. The topography along this alignment section is rolling, with a number of dips and rises of several feet. Pine Street crosses Santa Maria Street via a 400-foot long bridge. There are no plans to replace this bridge.

Our observations of the terrain and existing road cuts indicate that the road bed and slopes are underlain by granitic materials, with a variable cover of colluvial soils. Road and shoulder widening along Pine and Ash Streets will result in additional cuts being made along several existing cut banks.

1.0 GEOLOGIC HAZARDS

1.1 Faulting and Seismicity

Based on the investigations completed to date, it is our opinion that no faults pass through the project site. The nearest active fault zone is the Elsinore-Julian Fault Zone, which lies approximately 14 miles northeast of the site. We estimate that the maximum probable earthquake expected to occur on the Elsinore-Julian Fault would be magnitude 7.1. Such an event could result in a peak horizontal bedrock acceleration of .15 g. at the site.

Another active regional fault is the Earthquake Valley Fault, some 21miles to the east. A maximum probable event of 6.5 is estimated at a probable peak bedrock acceleration of .08 g.

With respect to potential hazard from moderate to severe ground shaking, the site would not be substantially different from that experienced by surrounding properties. The offsite improvements are not located in a hazard zone identified by the Alquist-Priolo Earthquake Fault Zoning Act.

1.2 Landslides

There were no natural landslides noted during our reconnaissance in 1992 and Geocon also did not note any evidence of landslides at this site. We would not expect to find deep-seated rotational type landslides in a this type of geologic setting. However, undetected planes of weakness, such as weathering along fractures, can potentially cause slope failures in cut slopes. All cut slopes should be thoroughly inspected by an engineering geologist during grading and construction.

1.3 Liquefaction

Due to the shallow depth of soils encountered at the site, and the depth to bedrock, liquefaction is not a hazard risk at this site. Soil liquefaction is a phenomenon confined to fine granular soils with a narrow range of gradation underneath a water table, which react during severe ground shaking from an earthquake. We do not anticipate that these deep, loose and saturated deposits exist on site. Low density, potentially compressible colluvium in development areas will be removed and recompacted. The risk of seismically induced soil liquefaction is considered minimal at the site.

1.4 Soil erosion characteristics

The Unified Soil Classification description of the predominant soil type on the project is silty sand. The Soil Conservation Survey of the San Diego area indicates a number of soils mapped along the offsite road alignments, which have a moderate to severe erosion potential.

Decomposed Granite, when excavated and placed as structural fill without landscaping, is more susceptible to erosion than in its natural state. The process of excavating and recompacting the Decomposed Granite destroys some of the natural cohesion present in its undisturbed state. Based on our experience, we consider the erosion characteristics of undisturbed Decomposed Granite material, left exposed in cut slopes, as slight. We do, however, consider the erosion characteristics of remolded decomposed granite material and fill slopes as moderate. We, therefore recommend that a vegetative ground cover be established as quickly as possible in order to minimize potential erosion and exposed slopes. Experience shows that fill slopes constructed in

Decomposed Granite functions very well with respect to erosion if properly landscaped and maintained. In addition, installation of a geotextile fabric designed for slope protection can mitigate potential erosion where necessary.

As for topsoil and colluvial soils exposed during grading, if used in compacted fill, the potential for erosion of these slopes falls under the same mitigation measures as described above. Properly placed at a fill slope angle of 2:1 or less steep, and properly vegetated, these slopes should not be severely eroded.

During grading the BMP, or Best Management Practices, will be followed to limit and mitigate erosion of soils from an actively graded area. Other measures, such as the installation of subdrains, the installation of drainage swales over cut slopes and at the toes of high fill slopes, and the installation of a system of storm drains and catch basins serve to mitigate erosion from the property.

1.5 Expansive Soils

In our investigations to date we have not encountered significantly expansive soils onsite. A detailed investigation based on the accepted grading plan will entail the collection of numerous soil samples to be tested for their potential expansion characteristics.

Remedial measures to mitigate the effects of expansive soil include burial of these soils beneath deep fills, mixing of these soils with less expansive soils, and careful observation and testing to ensure that no expansive soils are placed within 3 feet or so of finish grade of any residential pad. This includes expansive soils within the fills, as well as expansive soils exposed on cut pads.

2.0 UNIQUE GEOLOGIC FEATURES

No rock outcroppings were identified as unique geological features on the National Resources Inventory. At this point, it is difficult to judge the visual or scientific significance of any outcrops along the road alignments. It is possible that a few outcrops will be modified or removed during offsite grading.

3.0 MINERAL RESOURCES

Even though the project is located in a mineral resource area, no past or present mining activities have been identified in the offsite areas that would indicate the presence of significant mineral resources.

4.0 PRELIMINARY SLOPE DESIGN CRITERIA

Based on our past experience with soil conditions such as are encountered on the project site, it is our opinion that cut and fill slopes inclined at a ratio of 2 units to 1 unit vertical (2:1) will be considered stable for the proposed slope heights.

5.0 PRELIMINARY PAVEMENT RECOMMENDATIONS

In areas where pavement is to be replaced, pavement sections appropriate to the projected road use and traffic indices should be designed and constructed. They should be based on a sampling and laboratory testing program, which can be accomplished at a later date.

6.0 CONCLUSIONS

In our opinion, the results of this geologic reconnaissance indicate that the proposed offsite grading is geotechnically feasible. Detailed geotechnical recommendations, specific to proposed offsite roadway grading, can be presented at a later date subsequent to a detailed geotechnical investigation, if required.

Please do not hesitate to contact the undersigned if you have any questions.

Respectfully submitted,

SHEPARDSON ENGINEERING ASSOCIATES, INC.

Bryan Miller-Hicks, CEG
Project Geologist

cc: (3) Addressee

REGISTERED GEOLOGIST
BRYAN MILLER-HICKS
exp 5/05
No. 1323
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

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August 4, 2005 S.E.A. 201135-02

Mr. David Davis
Montecito Ranch, LLC
402 W. Broadway, Suite 2175
San Diego, CA 92101-3542

SUBJECT: Addendum to Geotechnical Reconnaissance Report
Proposed Montecito Ranch
TM 5250-RPL 3

References

1) *Geological Reconnaissance Report*
Offsite Road Improvements
Proposed Montecito Ranch, TM 5250-RPL 2
Ramona, California
By Shepardson Engineering Associates, Inc.
Dated June 30, 2004

2) *Geological Reconnaissance and Refraction Seismograph Investigation*
Phase I of Geotechnical Investigation
Montecito Ranch
Ramona, California
By Shepardson Engineering Associates, Inc.
Dated 5/2/89

3) *Soil and Geologic Reconnaissance for Montecito Ranch*
San Diego County, CA
By Geocon
Dated 5/6/91

4) *Geological Reconnaissance Report*
Proposed Montecito Ranch, TM 5250- RPL 2
Montecito Ranch Road
Ramona, California
By Shepardson Engineering Associates, Inc.
Dated April 13, 2004

Dear Mr. Davis:

In accordance with your request, we have reviewed the latest replacement tentative map for TM 5250 in order to evaluate the changes relative to anticipated geotechnical conditions within the project. Our review of the Replacement Map No. 3 indicates that the majority of the proposed development area remains as it

was when our Reconnaissance Report for Replacement Map No. 2 was prepared, with the exception of the addition of the extension of Montecito Way from Highway 67 to the existing Montecito Road. This proposed extension of Montecito Way will involve approximately 8,100 feet of new roadway. Grading for the roadway will include relatively minor cuts and fills on the order of 8 feet maximum, with the exception of slightly deeper fills for bridge approaches. The new extension will require the construction of two bridges.

Based on our experience in this area, we anticipate that the roadway and bridge construction will encounter moderately dense, silty sand to sandy clay alluvial soils to depths on the order of 10 feet where dense decomposed granite materials should be encountered. We anticipate that only minor removal and recompaction would be required along the roadway alignment in order to provide suitable support for the proposed roadway. In the bridge areas we anticipate that bridge supports could be founded on spread footings founded in the relatively shallow decomposed granite materials. We do not anticipate that the geotechnical conditions along the proposed roadway alignment will have any significant adverse effects on the roadway construction. Prior to final design, a site-specific geotechnical investigation will be required to determine the engineering characteristics of the soils in the area along the proposed alignment.

The findings and conclusions contained in our June 30, 2004 report for off-site improvements are applicable to the additional off-site improvements shown on the TM 5250-RPL-3 plans.

If you have any questions regarding the information in this letter, please do not hesitate to contact me.

Respectfully submitted,

SHEPARDSON ENGINEERING ASSOCIATES, INC.

Kendall L. Sherrod, CEG
Senior Geologist/Vice President

cc: (4) Addressee

GEOLOGICAL RECONNAISSANCE REPORT
PROPOSED WASTEWATER RECLAMATION FACILITY
WATER BOOSTER PUMP STATION AND
STORAGE RESERVOIR SITE
MONTECITO RANCH PROJECT
TM 5250-RPL2
RAMONA, CALIFORNIA

Prepared for:

Montecito Ranch, LLC
402 W. Broadway, Ste. 2175
San Diego, CA 92101-3542

S.E.A. 201135-04
November 1, 2006

SHEPARDSON
ENGINEERING ASSOCIATES INC.
10035 Prospect Avenue, Suite 101 ▪ Santee, CA 92071

SHEPARDSON
ENGINEERING ASSOCIATES INC.

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November 1, 2006 S.E.A. 201135-04

Montecito Ranch, LLC
402 W. Broadway, Ste. 2175
San Diego, CA 92101-3542

ATTENTION: Mr. David Davis

SUBJECT: Geological Reconnaissance Report
Proposed Wastewater Reclamation Facility
Water Booster Pump Station and
Storage Reservoir Site
Montecito Ranch Project
TM 5250-RPL2
Ramona, California

Dear Mr. Davis:

In accordance with your request, we have reviewed available geotechnical literature and have performed an on-site reconnaissance of the subject sites in order to prepare this preliminary evaluation of the anticipated geotechnical conditions which will be encountered, as part of the construction for each of these facilities. Previous geological assessments for the property and other proposed facilities have been conducted by our office for the overall site. A reference list of previous reports used in the preparation of this report is provided at the rear of this report. Based on our research, it appears that the proposed locations of these facilities are suitable from a geotechnical standpoint.

1. INTRODUCTION

This current study included a review of all previous documentation, a review of the current project plans, and a field reconnaissance by our principal geologist. We have also consulted with Helix Environmental Planning, Inc., and Stevens-Cresto Engineering, the project Civil Engineers. The Montecito Ranch project is a planned residential development of 417 single-family homes over a total area of 935 acres. The project also includes a charter school site, historical park, community park, wastewater treatment/disposal facility, and open space. A vicinity map for the project is provided as Plate A1. An overall site plan for the project is provided as Plate A2.

2. PROPOSED ABOVE GROUND WATER TANK

The proposed water tank site is located on a ridge top east of the proposed Montecito Ranch project, at an elevation of approximately 1800 feet. A Site Plan showing the water tank/access road location is shown as Plate No. A5. The site of the reservoir is underlain by granitic rock materials, known locally as the Woodson Mountain Granodiorite. Numerous boulder outcrops are present at the site, and it is likely that some hard rock materials will be encountered during the grading for the reservoir pad. Geophysical surveys to assess the rock excavation characteristics, including the possibility of blasting, can be conducted during the comprehensive geotechnical investigation in advance of final project design. The conceptual grading plan indicates that the pad for the reservoir will be constructed by a daylight cut. In other words there will be no fill utilized to construct the pad. It would appear that a cut pad in these dense, rocky type materials should provide excellent support for the proposed reservoir.

In addition to the tank pad, approximately 3,000 feet of access road construction will be required. This access road will begin near the existing eastern terminus of Montecito Way at an elevation of approximately 1,445 feet and, more or less, traversing along a northwesterly trending ridge until it reaches the reservoir site. The eastern 400 to 500 feet of the roadway will be constructed in colluvial or alluvial material, which may require some removal and recompaction in order to achieve the necessary support for the roadway. The remainder of the road will be constructed in mostly weathered granitic materials with a few areas where hard rock, principally in the form of surface boulders, will be encountered. Due to the apparently minimal cuts required for the construction of the proposed access road, we would anticipate that the excavations could most likely be made utilizing heavy duty grading equipment, and that any blasting required for the roadway would be minimal.

3. WATER RECLAMATION PLANT

The current plan is that all waste water collection, treatment and disposal will be facilitated within the boundaries of the project. The total projected average sewage flow is 0.11 mgd. The site of the proposed water reclamation plant will lie along the east side of the proposed extension of Montecito Way, approximately 300 feet north of the existing northern pavement terminus. A Site Plan for the facility is shown on Plate A3. All treatment processes will be located in concrete tanks. Reclaimed water will receive tertiary level treatment. The tertiary effluent will be disposed via spray irrigation. Wet weather storage will be provided via basins designed for 84 days of wet weather storage when spray disposal fields are unavailable.

It has been estimated that 123 acre-feet per year of reclaimed water will be generated. The design has identified a minimum of 41 acres of irrigation area based on a 3 acre-foot/acre/year application rate. This equates to an infiltration rate of approximately 0.1 inch-per day. The proposed irrigation areas include a 16.9 acre spray disposal field within the treatment plant site. Additional reclaimed water will be used for irrigation of public areas such as school landscaping, parks, manufactured, slopes, streetscapes, and planting areas within the reclamation plant. This additional area is estimated to be approximately 50 acres. Based on our experience in the area, including the geotechnical studies for the spray irrigation fields operated by the Ramona Water District to the west, this infiltration rate appears feasible for the onsite soils and other proposed irrigated areas in the area.

As part of a prior study, we placed one observation boring in the general area of the proposed reclamation plant. We found that the site is underlain by shallow topsoil/colluvial deposits on the order of 3 to 5 feet in thickness, which consist of clayey to silty sand materials. Beneath that we found decomposed granite material. The proposed northerly trending alignment of Montecito Way through this area makes a swing around towards the east, apparently avoiding an existing outcropping of a slab of granite. Based on this observation, it's possible that hard rock materials could also underlie portions of this site at relatively shallow depths. A detailed geotechnical survey should be conducted at the time of the project design to better define the limits of the shallow rock.

The preliminary plans for the tertiary treated effluent for the water reclamation facility include several storage ponds. We anticipate that if these storage ponds are constructed in the native soils, then some infiltration of water through the bottoms should be anticipated. Also, because of the relatively shallow depth of the decomposed granite materials, which are dense and have a relatively low permeability, we anticipate that during the wet weather months, perched water will probably accumulate within the upper soil materials, below ,and adjacent to, the storage ponds. Evapotranspiration and downward seepage will eventually remove this perched water after the end of the rainy season..

The topsoil materials are likely to be slightly expansive and will probably require some removal and recompaction in order to provide proper foundation support for any major structures to be constructed as part of the water reclamation facilities.

4. WATER BOOSTER PUMP STATION

The proposed location of the water booster pump station is at the northwest quadrant of the intersection of Montecito Road and Montecito Way. See Plate A4 for a plan showing the pump station location. The site is essentially flat. Our brief site reconnaissance indicates that the exposed topsoils, which had recently been tilled, consisted of a clayey sand to sandy clay type material. Such materials are typical for the alluvial/colluvial materials within the Ramona Valley area. We expect that these sandy/clayey materials probably extend down to depths on the order of 8 to 10 ft., where weathered bedrock or, possibly, hard bedrock would be encountered. Numerous hard bedrock outcrops were observed a few hundred feet to the east at slightly lower elevations. It should be anticipated that removal and recompaction of the existing surface materials to depths on the order of 3 to 4 feet may be required for the above ground structures associated with the booster pump station.

It appears that any significant grading associated with the site would consist of pipeline trenching, excavations for any underground facilities, and the previously described removal and recompaction requirements. Because of the clayey nature of the surrounding soils, this site is probably less likely to be subject to conditions of temporary perched groundwater during the rainy months.

5. SUMMARY

Based on our understanding of the proposed facilities and the existing geotechnical conditions, it does not appear that significantly adverse geotechnical conditions exist at the proposed sites. Obviously, detailed investigations will be required at each of the sites prior to final design.

If there are any questions regarding the above information, please do not hesitate to contact the undersigned.

Respectfully submitted,

SHEPARDSON ENGINEERING ASSOCIATES, INC.

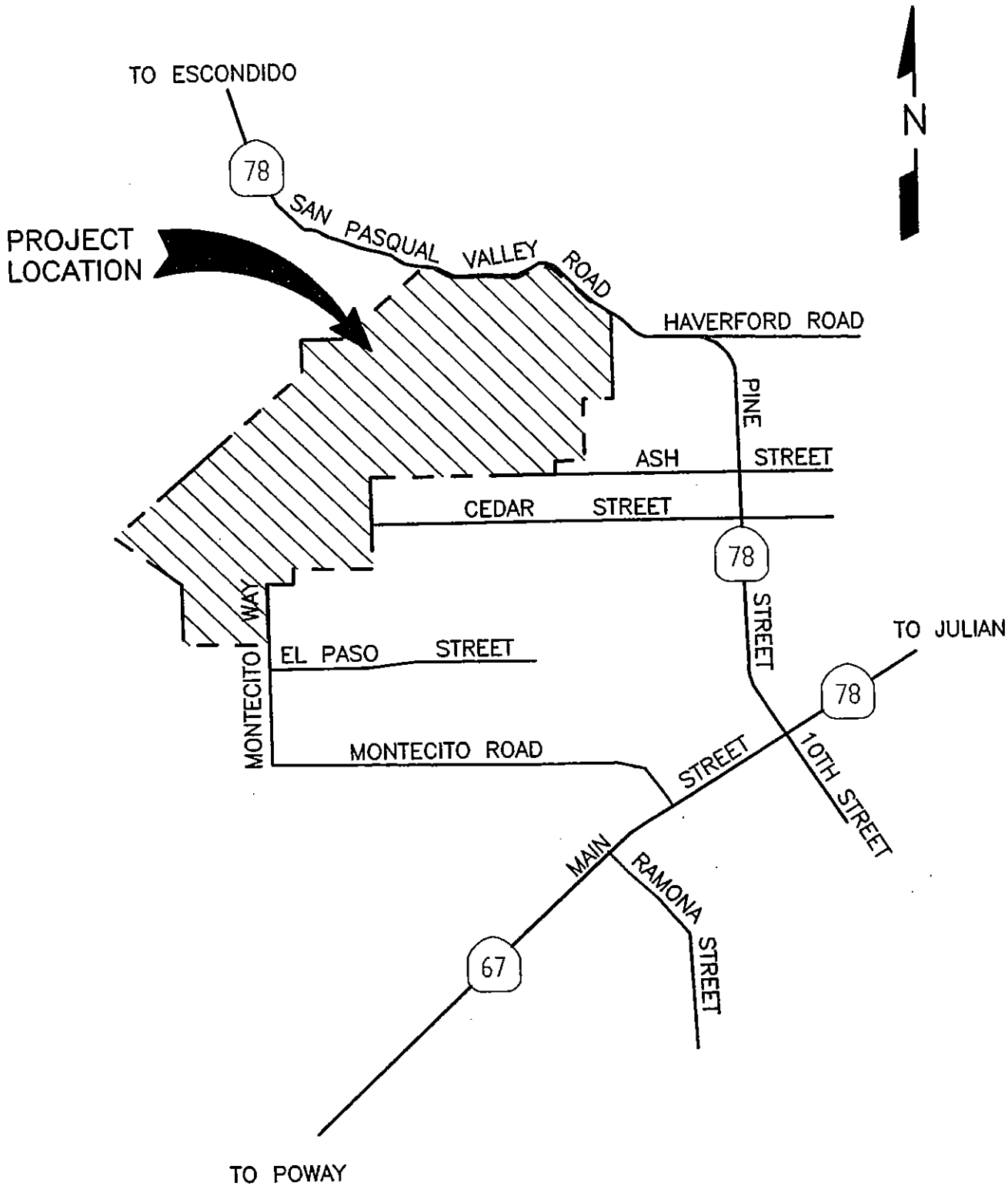
William E. Ellis, RCE/GE
Senior Geotechnical Engineer/Vice President

REGISTERED PROFESSIONAL ENGINEER
WILLIAM E. ELLIS
No. 293
Exp. 9-30-07
GEOTECHNICAL
STATE OF CALIFORNIA

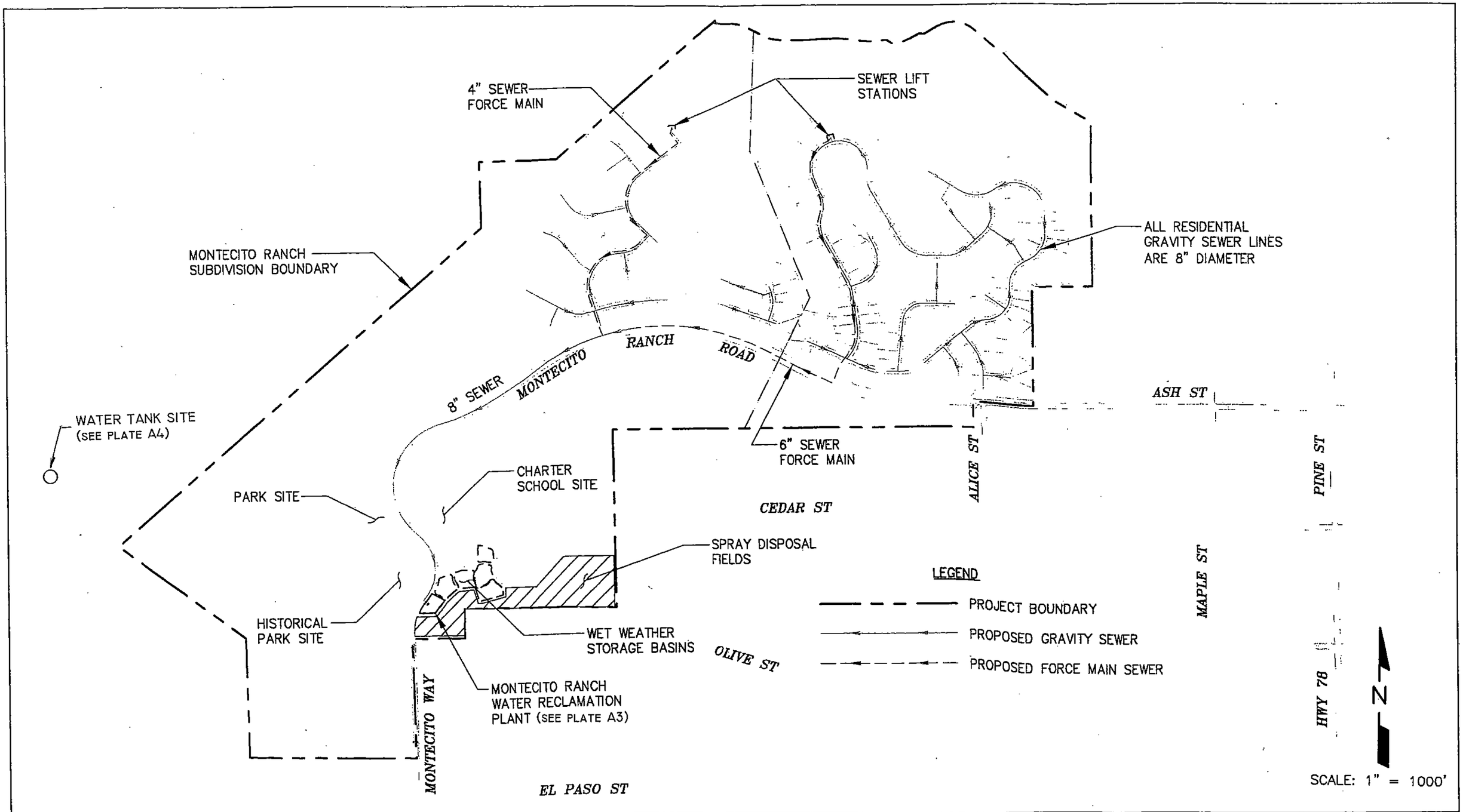
Kendall L. Sherrod, CEG
Vice President

cc: (3) Addressee
(4) Helix Environmental

Enclosures

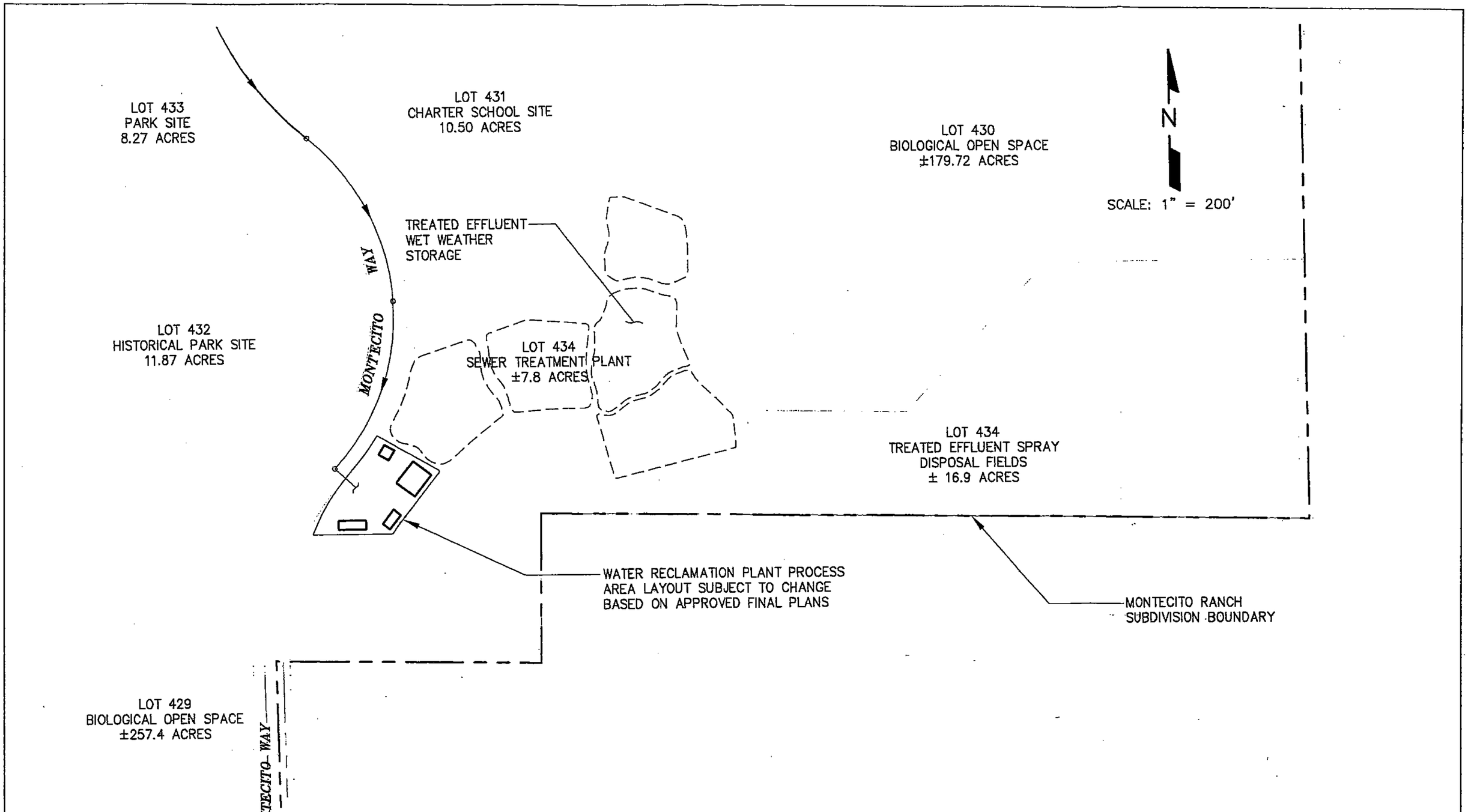


SHEPARDSON ENGINEERING ASSOCIATES INC. Geotechnical Consultants: Engineers -Geologist	Date: October, 2006	Project No: 20135.04	Plate
	Vicinity Map *Montecito Ranch* *T M 5250 - RPL 5* *Ramona, California*		***A1***



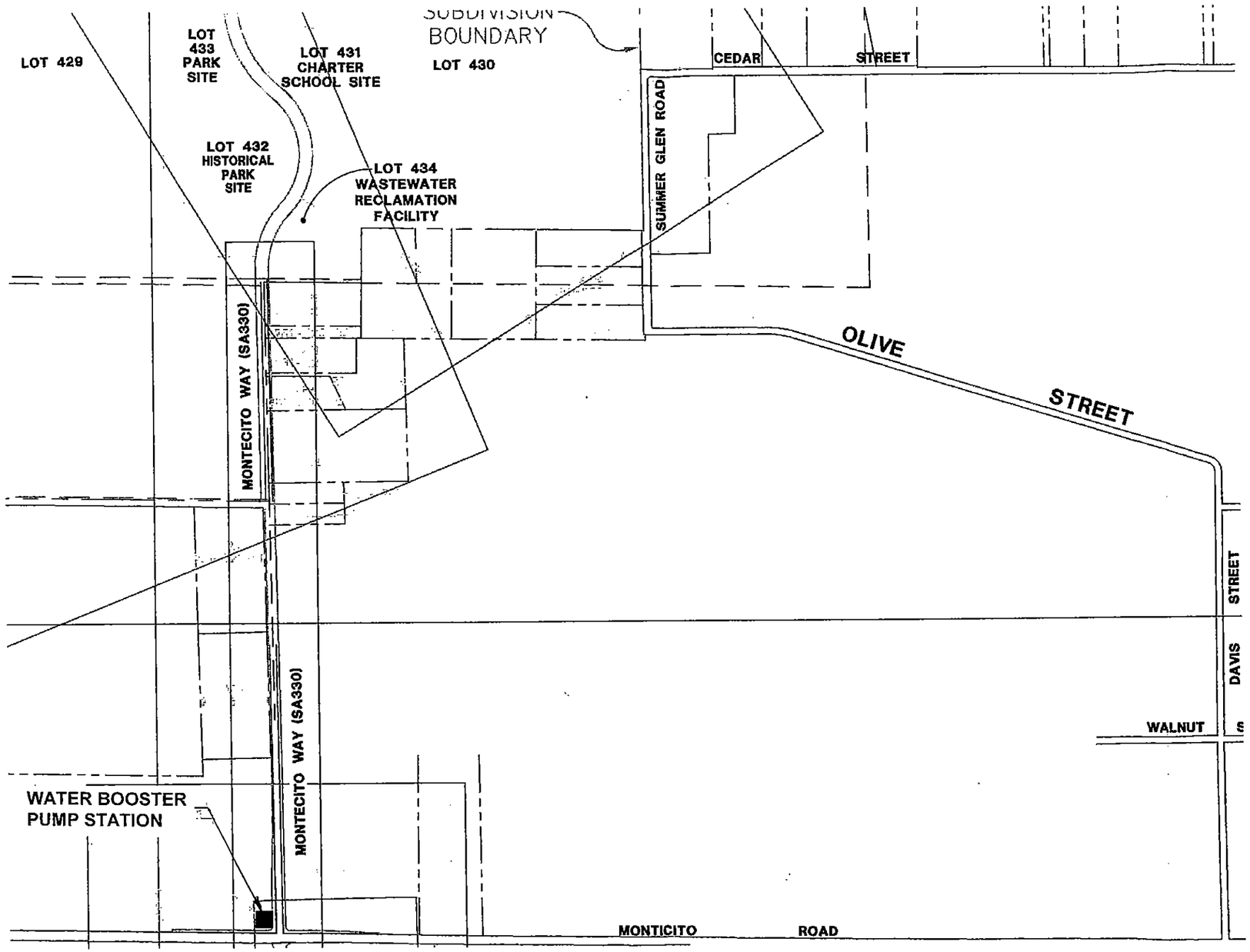
SHEPARDSON ENGINEERING ASSOCIATES INC.
Geotechnical Consultants: Engineers - Geologists

Date: August, 2006	Project No: 201135.04	Plate
PROJECT SITE PLAN ***Montecito Ranch - TM 5250- RPL5*** ***Ramona, California***		**A2**



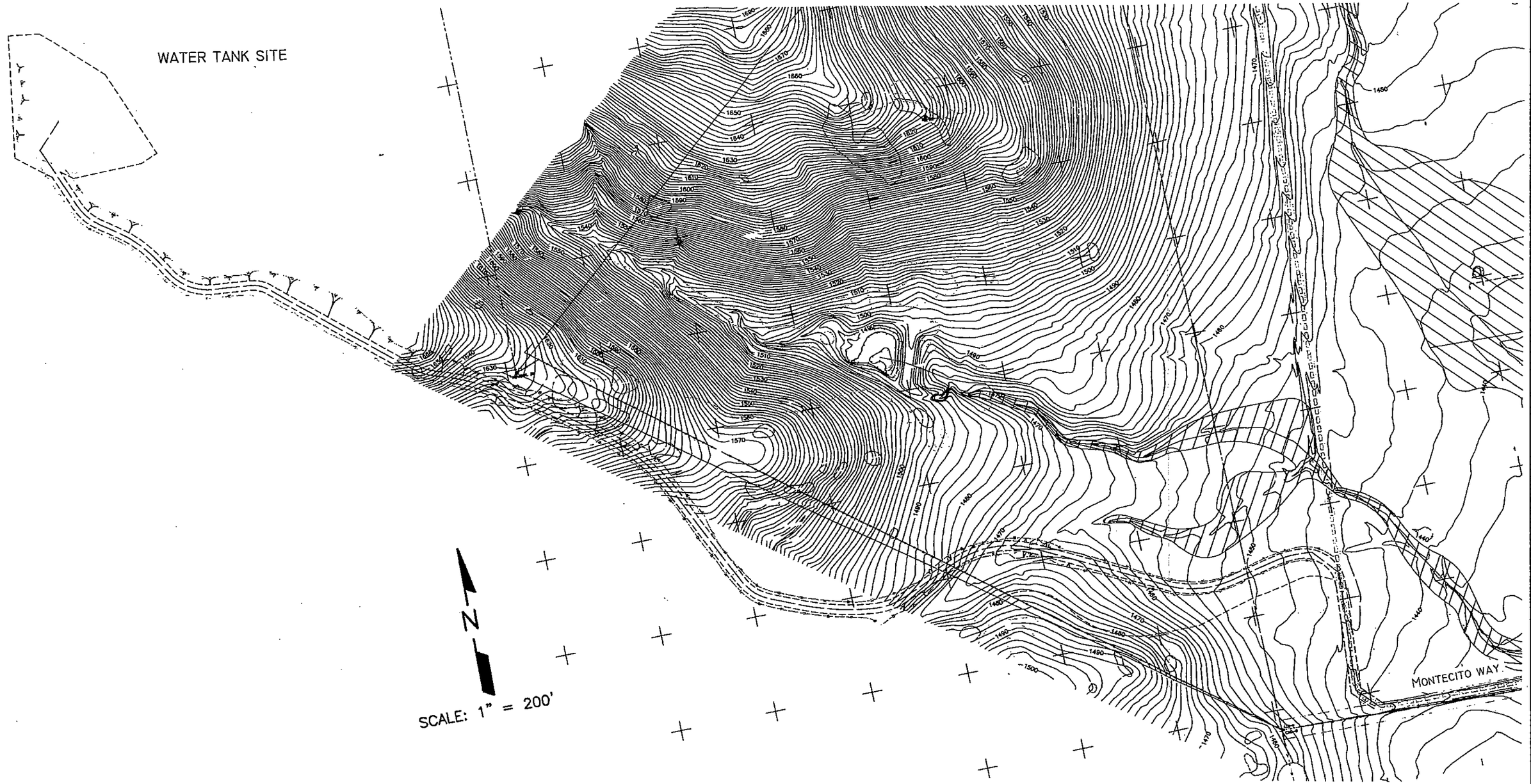
SHEPARDSON
ENGINEERING ASSOCIATES INC.
Geotechnical Consultants:
Engineers - Geologists

Date: August, 2006	Project No: 201135.04	Plate
Water Reclamation Facility ***Montecito Ranch - TM 5250- RPL5*** ***Ramona, California***		***A3***



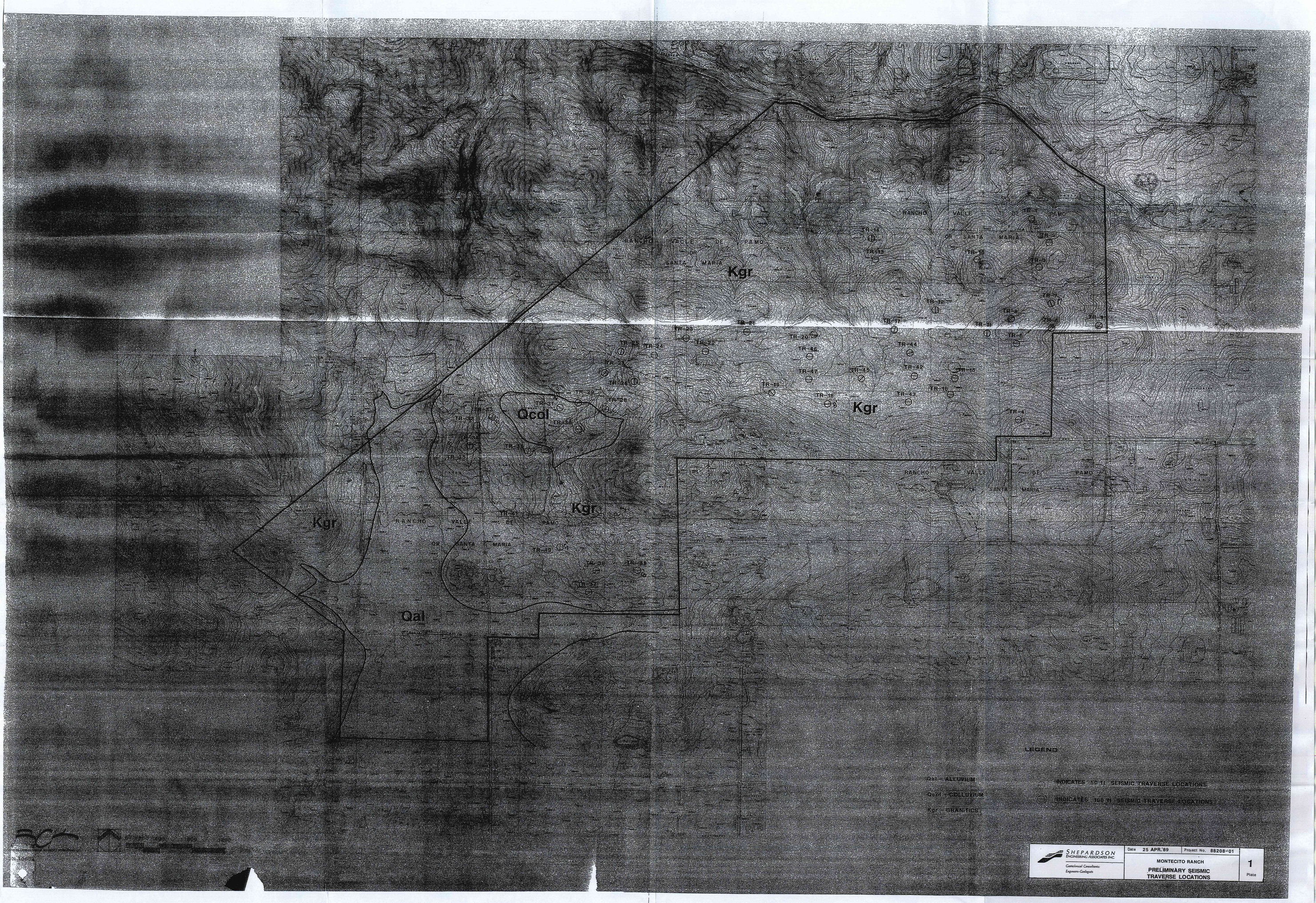
SHEPARDSON
ENGINEERING ASSOCIATES INC.
Geotechnical Consultants:
Engineers - Geologists

Date: August, 2006	Project No: 201135.04	Plate
Water Booster Pump Station ***Montecito Ranch - TM 5250- RPL5*** ***Ramona, California***		***A4***



SHEPARDSON
ENGINEERING ASSOCIATES INC.
Geotechnical Consultants:
Engineers - Geologists

Date: August, 2006	Project No: 201135.04	Plate
Water Tank Site ***Montecito Ranch - TM 5250- RPL5*** ***Ramona, California***		***A5***


Kgr
Qcol
Qal
RANCHO VALLE DE PAMO
OR SANTA MARIA
LEGEND
Qal - ALLUVIUM
Qcol - COLLUVIUM
Kgr - GRANITICS
INDICATES 50 ft SEISMIC TRAVERSE LOCATIONS
INDICATES 100 ft SEISMIC TRAVERSE LOCATIONS
SHEPARDSON ENGINEERING ASSOCIATES INC.
Geotechnical Consultants:
Engineers-Geologists
Date 25 APR.'89
Project No. 88208-01
MONTECITO RANCH
PRELIMINARY SEISMIC TRAVERSE LOCATIONS
1
Plate

MONTECITO RANCH