APPENDIXES
FOR THE
FINAL
ENVIRONMENTAL IMPACT REPORT
FOR
ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN

EIR 90-3

Certified June 11, 1992

Resolution 92-103

CITY OF PALMDALE
708 E. PALMDALE BOULEVARD
PALMDALE CALIFORNIA 93550

APPENDIXES FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN

Prepared for

CITY OF PALMDALE
708 E. PALMDALE BOULEVARD
PALMDALE, CALIFORNIA 93550

Prepared by

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON NUMBER 2262E
SEPTEMBER 20, 1991

APPENDIXES

A: Notice of Preparation and Responses
B: Air Quality technical report
C: Preliminary Geotechnical Investigation
D: Hydrology Report
E: Biological technical report
F: Noise technical report
G: Risk Assessment Report
H: Traffic technical report
I: Archaeological technical report
J: Paleontological technical report

APPENDIX A

CITY OF PALMDALE

NOTICE OF PREPARATION

TO: _____ (Responsible Agency)

_____ (Address)

_____

FROM: City of Palmdale

708 E. Palmdale Boulevard (Address)

Palmdale, CA 93550

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report

The City of Palmdale will be the Lead Agency and will prepare an environmental impact report (EIR) for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the probable environmental effects are contained in the attached materials. A copy of the Initial Study is attached.

Due to the time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Robert J. Stanley, Associate Planner at the address shown above.

Project Title: Antelope Valley Business Park Specific Plan

Project Applicant: The Lusk Company

Date November 12, 1990 Signature James Hittleman for City of Palmdale
Title Project Manager REDN
Telephone 619-275-3732

Reference: California Administrative Code, Title 14, Sections 15082(a), 15103, 15375.

CITY OF PALMDALE

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Project Title: Antelope Valley Business Park Specific Plan

Project Applicant: The Lusk Company

Date November 12, 1990 Signature Jerry Hittleman for City of Palmdale.
Title Project Manager REDN
Telephone 619-275-3742

Reference: California Administrative Code, Title 14, Sections 15082(a), 15103, 15375.

I. PROJECT LOCATION

The project site for the Antelope Valley Business Park encompasses approximately 120 acres in the northern portion of Los Angeles County within the City of Palmdale (Figure 1). The area in which the project site is located constitutes the western portion of the "High Desert" area, and is more specifically known as Antelope Valley.

The City of Palmdale is located approximately 60 miles north of downtown Los Angeles, 50 miles west of the City of Victorville, and 10 miles south of the City of Lancaster. The City of Palmdale lies approximately 4.5 miles south-southeast of the project area. Edwards Air Force Base is located approximately 20 miles northeast of the City of Palmdale.

The major transportation route to the City of Palmdale from downtown Los Angeles is via Interstate 5 (I-5) and the Antelope Valley Freeway (State Route [SR] 14). The Antelope Valley Business Park project site is bounded on the west by Tenth Street West, and on the north by Avenue M. Antelope Valley Freeway (SR 14) is located west of the site, Avenue N to the south, and Sierra Highway is located to the east of the project site (Figure 2).

II. PROJECT SETTING

The site is presently vacant and is basically flat, sloping slightly downward towards the north. On-site elevations range from 2,525 feet to 2,560 feet mean sea level (MSL). The eastern perimeter of the site is occupied by Amargosa Creek which is subject to flooding at times of seasonal runoff. The remainder of the property, approximately 75 acres, is occupied by a moderately disturbed Joshua Tree woodland vegetation community. Although no rare or endangered species have been located on or adjacent to the site, several sensitive species are known to occur in the general vicinity.

An industrial complex exists north of the project site. Scattered industrial businesses exist to the west. Properties to the east and south of the project site are vacant and are comprised of the same Joshua Tree woodland community that exists on-site. An 80-acre area to the south has been proposed for the site of the Tenth Street west industrial center. Air Force Plant 42 is located approximately 1.25 miles east-southeast of the project area.

III. PROJECT DESCRIPTION

The Antelope Valley Business Park would be an approximately 120-acre master-planned project that will accommodate a full range of industrial, commercial, and business park uses. The land use plan for the proposed project permits a mixture of designations which are intended to respond to a wide range of demands for land uses within an integrated development. The objective of the proposed project is to create a diversified employment center within the City of Palmdale which will provide employment opportunities for people living in the Palmdale area who are presently commuting to distant employment centers. Types of permitted activities would include manufacturing and assembly, wholesale, storage and distribution, and commercial uses (i.e., professional offices, business support services, eating and drinking establishments, etc.). The current zoning for the subject property is Light Manufacturing and Industrial (Zone M-1). Upon

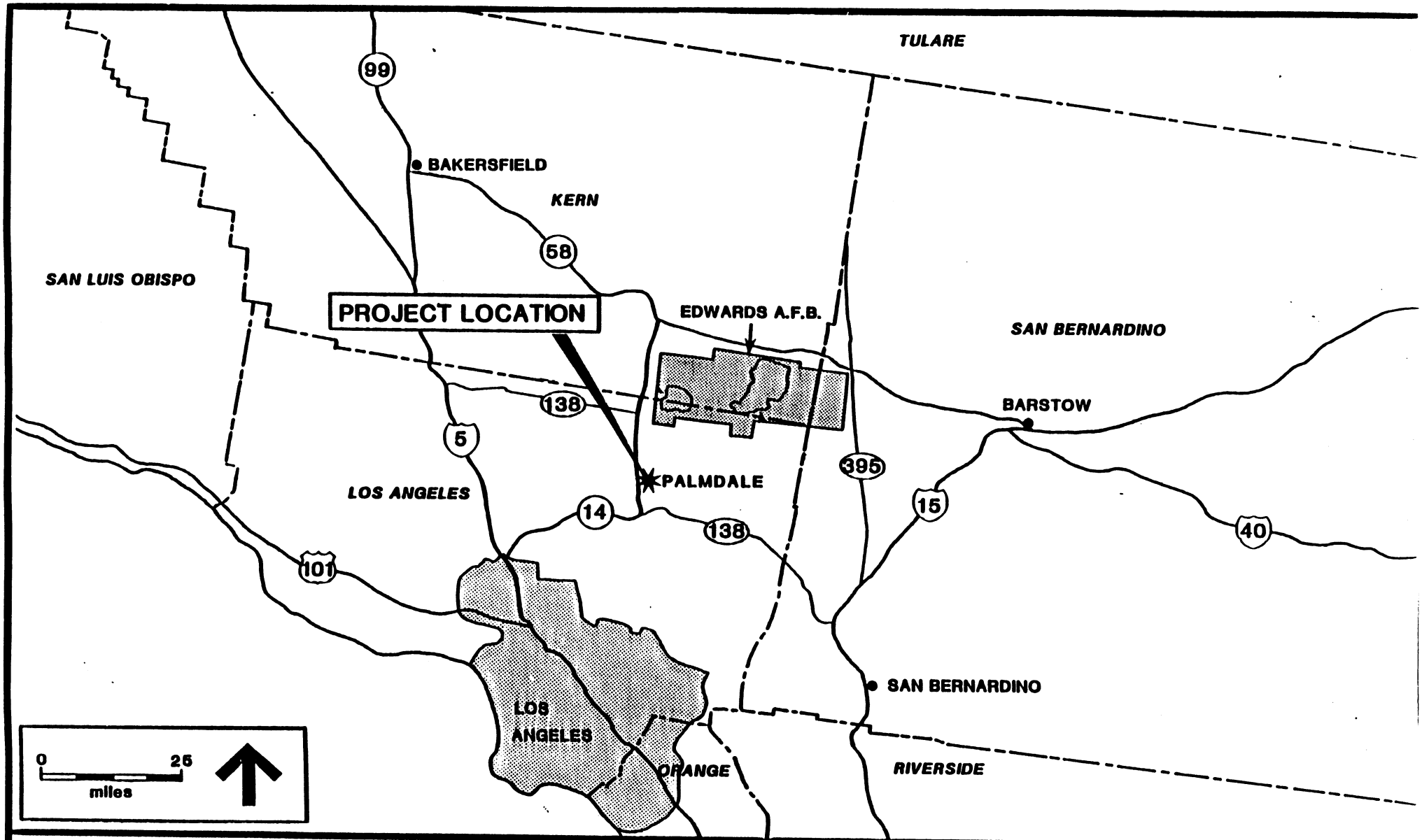


FIGURE 1. THE LOCATION OF THE PROPOSED PROJECT RELATIVE TO THE COUNTY OF LOS ANGELES

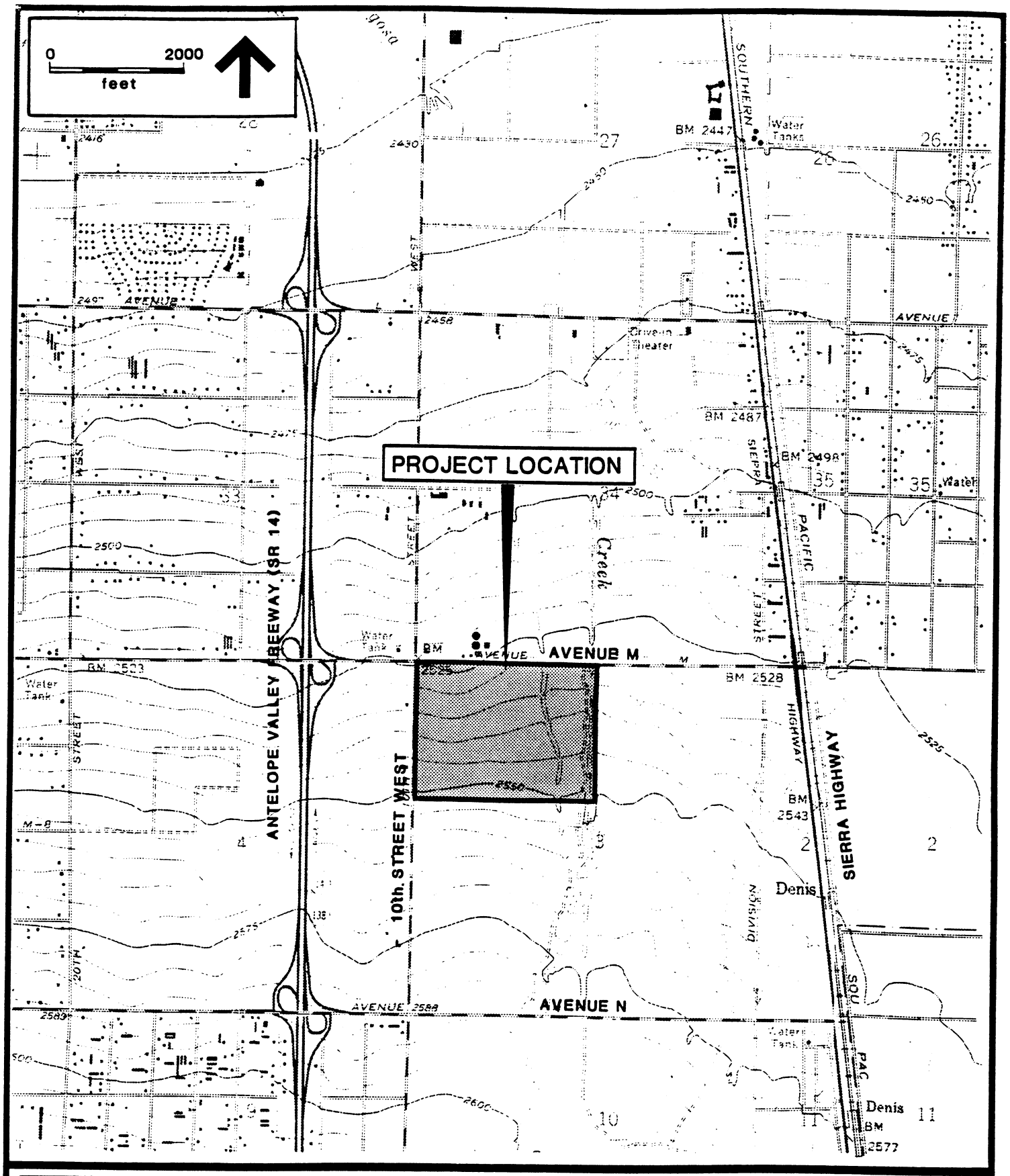


FIGURE 2. PROJECT LOCATION ON U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS, LANCASTER EAST AND LANCASTER WEST QUADRANGLES

RECON

its adoption, the Specific Plan for the project will constitute the zoning for the site.

IV. PROBABLE ENVIRONMENTAL IMPACTS

1. Air Quality

Palmdale's location in the Southeast Desert Air Basin, which is classified as a non-attainment area for ozone and particulates, makes incremental development of any type a concern for the community. A new industrial park use of the size proposed could support firms which are being heavily regulated in the South Coast Air Basin and could contribute to somewhat higher levels of point source pollutants than would ordinarily be expected from construction and vehicle-related sources for this type of project.

2. Hydrology

Amargosa Creek runs north and south along the eastern boundary of the project site. The Federal Emergency Management Agency (FEMA) flood insurance rate map for Palmdale indicates that the areas adjacent to the creek are within a 100-year flood zone and would be subject to flooding during a 100-year flood event. A City Master Plan of Drainage calls for a regional drainage facility along the east side of the site. Area surface hydrology conditions, combined with site run-off of industrial pollutant residues and the moderate erosion potential of area soils will affect surface water quality. Cumulative downstream conditions also need to be addressed.

3. Biology

The project area was identified by a previous biological study as containing a Joshua tree woodland habitat area. An additional biological study will be performed to assess the on-site potential for the occurrence of rare and endangered plant and animal species. Cumulative impacts resulting from loss of approximately 120 acres of desert vegetation will also be evaluated for significance.

4. Noise

The EIR will assess the project's potential to generate noise levels exceeding 65 dB(A) and will discuss noise impacts on the surrounding area of the project site. The EIR will also identify principal noise generators and the anticipated sensitivity of receptors within the project area.

5. Land Use

Patterns of existing land use in the project vicinity are relatively limited at the present time resulting in an extensive amount of undeveloped land in the vicinity. The site is between two rapidly urbanizing communities, adjacent to a significant arterial and near a regional freeway. Land use considerations include the pace and timing of growth in this area, the project's absorption rate as it relates to other major projects proposed in Palmdale, its compatibility with existing rural residential uses to the southwest and uses to the north in Lancaster, and the project's contribution to the area's jobs-housing balance.

6. Risk/Hazardous Materials

The site is the location of at least two areas of illegal dumping. The extent and nature of this waste material is unknown and needs to be examined as part of the EIR discussion of public health risk related to project development. Additionally, the EIR will discuss the regulatory requirements for allowing large or small generators of hazardous materials to occupy space within the project site, and any potential impacts resulting from such operations.

7. Traffic and Circulation

Considerations to be addressed include the number type and distribution of traffic generated by the proposed project, existing and anticipated condition of the surrounding streets with and without the project, and how the project relates to the existing Circulation Element of the current General Plan, and City trail and bicycle route plans.

8. Emergency Services

The projects location at the edge of the urbanizing fringe of the City of Palmdale makes provision of emergency services a concern. Existing community emergency service conditions will be evaluated using existing information available for the area. The incremental demand for additional services generated by the project will be evaluated for significance.

9. Cultural Resources

Although no cultural resources were found in previous surveys of portions of the site, the project area is located in a zone of moderately high sensitivity for such resources. The potential exists for such resources being located on previously unsurveyed parts of the site.

10. Paleontological Resources

Although the project area is not located in an area of high paleontological resource potential, a survey for paleontological resources will be conducted on the site.

11. Utilities

Existing water and wastewater disposal facilities are limited in the project area. The extent and capacity of these utilities and solid waste disposal services need to be documented to identify any significant project impacts regarding the ability to serve the site, and any growth inducing effects.

For each impact which is identified as being significant, feasible mitigation measures will be identified and mitigation monitoring programs will be outlined which comply with the procedures and policies of the City of Palmdale. For each measure, the impact will be clearly identified, its application and extent will be described, the timing of the action(s) will be specified, the monitoring procedures discussed, and the responsible enforcement and mitigation monitoring agency, department, or official will be identified, as required by Section 21081.6 of CEQA.

CEQA requires that the EIR address other project alternatives which could reduce environmental impacts be addressed, including an evaluation of a "no project" alternative.

The EIR will also contain the CEQA-mandated sections including project description, environmental setting, the relationship of local short-term uses versus long-term productivity, irreversible environmental changes, and growth inducement.

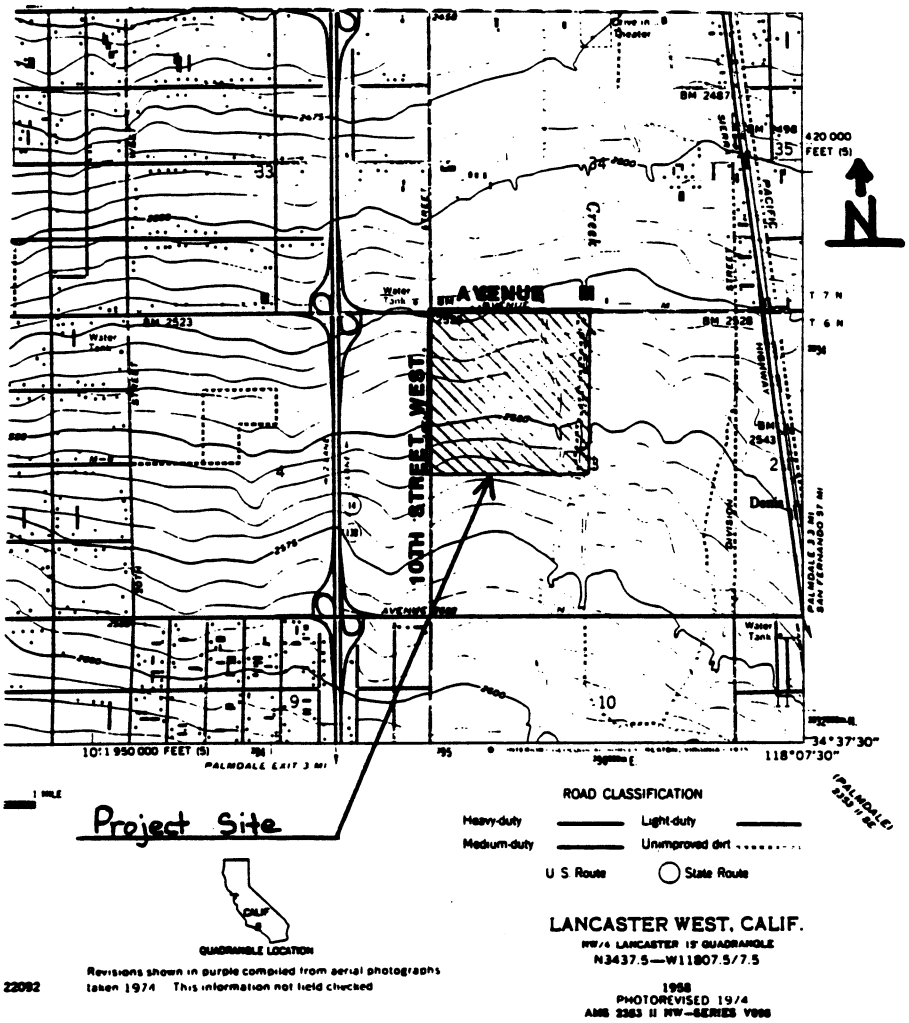
CITY OF PALMDALE

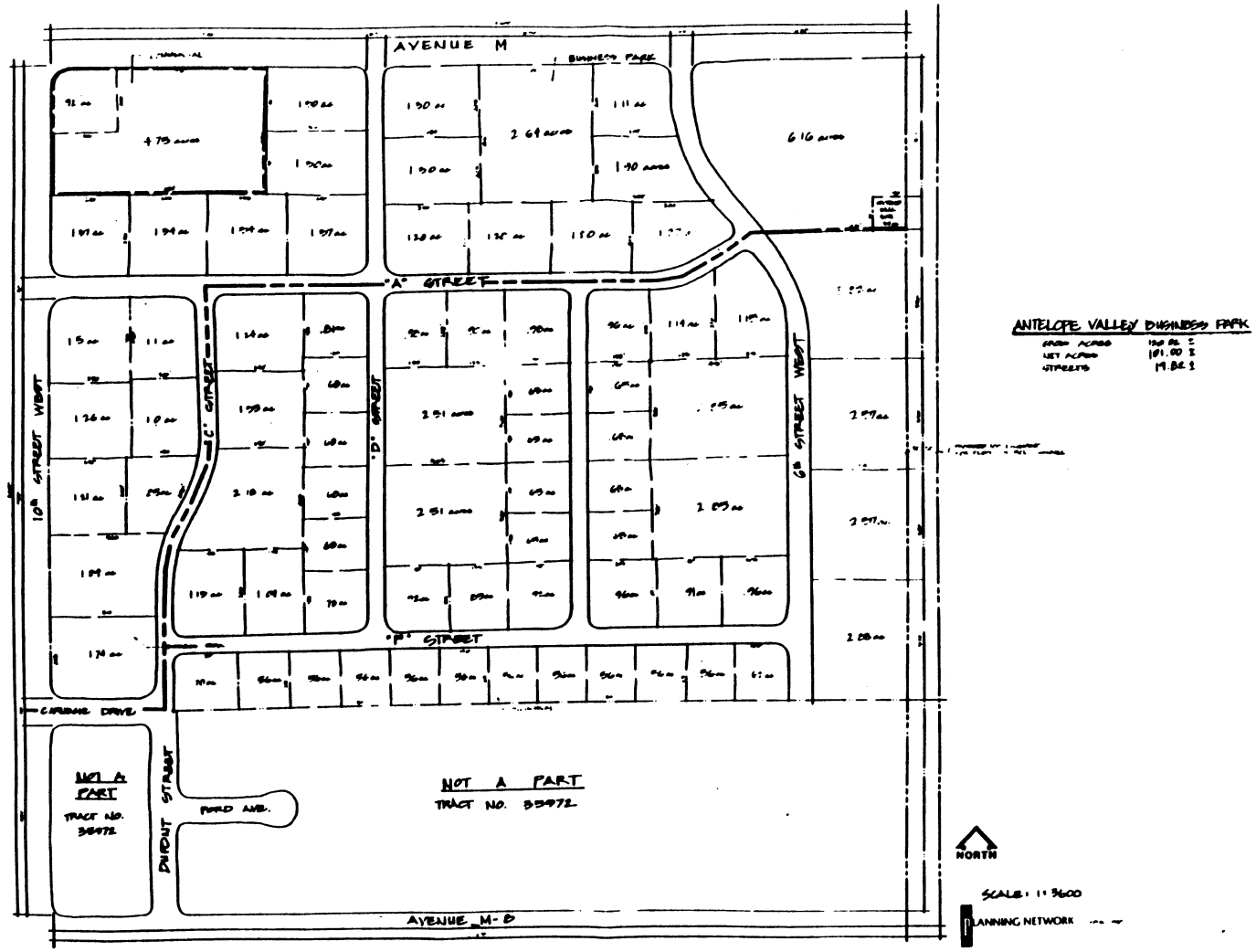
PLANNING DEPARTMENT

INITIAL STUDY

APPLICATION NO:	Antelope Valley Business Park Specific Plan
NAME OF APPLICANT:	The Lusk Company
LOCATION OF PROJECT:	Located at the southeast corner of Avenue M and 10TH Street West.
GENERAL PLAN LAND USE DESIGNATION:	Light Industrial
PROPOSED GENERAL PLAN LAND USE DESIGNATION:	Specific Plan
EXISTING ZONING:	M-A (Manufacturing Industrial Aircraft)
PROPOSED ZONING:	Specific Plan
PRESENT LAND USE:	Vacant

LOCATION MAP:




AVENUE M
BUSINESS PARK
"A" STREET
"B" STREET
"C" STREET
"D" STREET
"F" STREET
10th STREET WEST
6th STREET WEST
CARLISLE DRIVE
DUPONT STREET
FORD AVE.
AVENUE M-8
NOT A PART
TRACT NO. 35972
NOT A PART
TRACT NO. 35972
ANTELOPE VALLEY BUSINESS PARK
NORTH
SCALE: 1:3600
PLANNING NETWORK

I. Is the proposed action a "project" as defined by CEQA: (See Section VI. of the City's CEQA Guidelines. If more than one project is present in the same area, consider them as one project.) _XX_Yes ____No

II. Does the project qualify for one of the Categorical Exemptions listed in Section 6.C. of the City's CEQA Guidelines? (Where there is a reasonable possibility that the activity will have a significant effect due to special circumstances, a categorical exemption does not apply.) ____Yes _XX_No

If yes, state the exemption and provide explanation.

III. Does the project require a 30 day State Clearinghouse review? __XX_ Yes _____ No

1. South Coast Air Quality Management District as a Responsible Agency in that the following threshold levels are exceeded:

   (A) An Industrial park of more than 20 acres.
   (B) A facility attracting or generating more than 2000 motor vehicle trips per day.
   (C) A project with the potential to exceed daily emission thresholds established by AQMD.

2. State Department of Fish and Game as a Trustee Agency due the existence of a blueline stream (Amargosa Creek).

3. The project is of statewide or areawide significance including the following:

   (A) A project which would interfere with the attainment or maintenance of State or national air quality standards including:

   (1)A proposed industrial park planned to employ more than 1,000 persons, occupying more than 40 acres of land, and encompassing more than 650,000 square feet of floor area.

IV. Project Assessment

1. Project Description: A request for approval of a specific plan for a 120.82 acre parcel located at the southeast corner of 10th Street West and Avenue M. The proposed uses include: commercial; industrial and business park.

2. Describe the project site as it exists at the present time, including information on topography, and any cultural, historical or scenic aspects. Describe any existing structures on the site, and use of the structures.

   The site is a relatively flat parcel containing a total of 120.82 acres. The site is bordered on the east by the Amargosa Creek (blueline stream), on the north by the City of Lancaster and Avenue M, on the west by 10TH Street West and South by Tract 35972 (an industrial tract). The site is densely vegetated with native vegetation including Joshua Trees and creosote brush communities. There are two areas of concentrated trash dumping, one in a drainage west of Amargosa Creek (a remnant drainage channel of Amargosa Creek) and the other in the southwest corner of the property near the intersection of 10TH Street West and proposed Avenue M-4.

3. Surrounding Land Uses:

North: Existing Industrial (City of Lancaster)
East: Vacant/Amargosa Creek Channel
South: Vacant (Approved Tract 35972)
West: Existing Industrial and Vacant

4. Is the proposed project consistent with:

	Yes	No	N/A
City of Palmdale General Plan	XX		
Applicable Specific Plan			XX
City of Palmdale Zoning Ordinance	XX		
South Coast Air Quality Management Plan	XX		
Los Angeles County Areawide (208) Wastewater Management Plan	XX		

5. Are any of the following studies required:

XX Noise Study
XX Native Vegetation Preservation Plan
XX Air Quality Study
XX Hazardous Waste Study
XX Archaeological Report
XX Soil Report
XX Geology Report
XX Hydrology Report
XX Traffic Study
XX Paleontological Study
XX Biological Study

INITIAL STUDY QUESTIONNAIRE

		Yes	Maybe	No	N/A
A. Earth					
A.1.	Does the parcel contain slopes of 15% or greater?	___	___	XX	___
A.2.	Is any portion of the project site in an area of medium or high landslide risk and are there any known landslides on the subject property?	___	___	XX	___
A.3.	Is any significant modification of major landforms proposed?	___	___	XX	___
A.4.	Does the site include any unique geological features or is it in a significant resource area?	___	___	XX	___
A.5.	Is the parcel in an area of high shrink/swell potential as shown on Plate 14.6 of the Palmdale Community General Plan?	___	___	XX	___
A.6.	If the sites are in an area of soils with high erosion potential according to Plate 14.7 of the Palmdale Community Plan, will the project result in a significant increase in wind or water erosion or siltation either off or on the site beyond the construction phase?	___	___	XX	___
A.7.	Is the proposed project in an area of potential subsidence according to Exhibit 14.9 of the Palmdale Community General Plan or a special study?	XX	___	___	___
A.8.	Will the project include critical facilities such as high-rise buildings, hospitals or schools, etc.?	___	XX	___	___
A.9.	Is the site in a fault-rupture hazard zone as defined in the Alquist-Priolo Special Studies Zones Act of 1972 and as shown on the City's General Plan Land Use Map or other special study?	___	___	XX	___

	Yes	Maybe	No	N/A
A.10. Are any faults located on the project site?	___	___	XX	___
A.11. Are the fault(s) on the project site described in the geotechnical study for the site:				
a. active	___	___	___	XX
b. potentially active	___	___	___	XX
c. inactive	___	___	___	XX
B. Air				
B.1. Will the project produce significant air pollutant emissions?	XX	___	___	___
C. Water				
C.1. Does the project involve a natural drainage course, a flood control channel or facility, or the California Aqueduct according to the City's Draft Drainage Master Plan, or the U.S.G.S. topographic maps?	XX	___	___	___
C.2. Is the site in an area of flood hazard during the 100 year event as shown on the FIRM map, or other Public Works map?	XX	___	___	___
C.3. Will the project result in a significant increase in peak run-off?	___	XX	___	___
C.4. Would the project increase flood hazard off-site?	___	XX	___	___
C.5. Will the project require the construction of on or off-site drainage facilities as shown on the Master Plan of Drainage of determined by the Department of Public Works?	XX	___	___	___
D. Plant Life				
D.1. Is a significant stand of Desert Vegetation present on the site?	XX	___	___	___
D.2. Are any unique, rare or endangered species of plants present on the subject property?	___	___	XX	___

	Yes	Maybe	No	N/A
D.3. Is a Desert Vegetation (or Joshua tree) Preservation Plan required?	XX			
E. Animal Life				
E.1. Will the project result in a reduction of the numbers of any unique, rare or endangered species of animals?		XX		
E.2. Will the project result in a deterioration of any significant wildlife habitat?	XX			
E.3. Is consultation with the California Department of Fish and Game, as a trustee agency, required?	XX			
F. Noise				
F.1. If the project is residential or noise sensitive is it located:				
a. adjacent to the Freeway?				XX
b. within 200 feet of the railroad?				XX
c. adjacent to an existing or future arterial street?				XX
d. within the Plant 42 AICUZ zone?				XX
e. near any major source of industrial or other noise not covered above?				XX
F.2. Will the project generate a CNEL noise level exceeding 65dB(A) at the project boundary after construction?		XX		
F.3. Is the project site adjacent to a land use that will, or will the project generate unusual periodic concentration of human activity?	XX			
G. Light and Glare				
G.1. Would on or off-site land users be subject to light or glare that would disturb those residents?			XX	

	Yes	Maybe	No	N/A
H. Land Use				
H.1. Could the project serve to encourage development of presently undeveloped areas or increases in development intensity of already developed areas (examples include the introduction of new or expanded public utilities, new industry, commercial facilities and recreational activities)?	XX			
H.2. Are adjoining or planned land uses greatly different than that of the proposed project, so that a substantial or potentially substantial interface problem would be created?			XX	
I. Risk				
I.1. Does the proposal involve or would it be subject to a risk of an explosion or the significant release of hazardous substances (including, but not limited to, explosives, pesticides, chemicals or radioactive materials) in the event of an accident or upset condition?		XX		
I.2. Is the project in the airport potential crash zone?			XX	
I.3. Is the project within or adjacent to a high fire hazard area as defined by the Palmdale Community Plan?			XX	
J. Housing				
J.1. Will the project result in the displacement of people from the existing site?			XX	
K. Population				
K.1. If a residential project, how many new residents will the development house? (2.7 persons per unit)				

	Yes	Maybe	No	N/A
L. Schools				
L.1. What elementary school district is the project located in?				
a. Westside Union	___	___	___	XX
b. Palmdale	___	___	___	XX
c. Keppel Union	___	___	___	XX
L.2. What high school district is the project located in?				
a. Quartz Hill	___	___	___	XX
b. Palmdale	___	___	___	XX
L.3. How many students in each of the following categories are expected?				
a. Elemetary	___	___	___	XX
b. Junior High	___	___	___	XX
c. High School	___	___	___	XX

L.4. Capacity of applicable schools? (Based on the most recent report by the School District.)

Elementary N/A

Junior High N/A

High School N/A

L.5. Attendance at applicable schools? (Based upon the most recent report of the School District.)

Date of Count N/A

Elementary N/A

Junior High N/A

High School N/A

M. Transportation and Circulation

M.1. Estimated a.m. and p.m. peak hour trips: (From Institute of Transportation Engineers, Trip Generation or the applicants traffic study.)

Traffic report must clearly identify the am and pm peak hour trips.

M.2 Estimated average daily vehicle trips generated by the project: (from the Institute of Transportation Engineers, Trip Generation or applicants traffic study.)

18,484 ADT

	Yes	Maybe	No	N/A
M.3 Will the project result in traffic congestion?	XX			
M.4. Does the project require the construction of off-site roadway or signalization improvements or contribution of traffic mitigation fees?	XX			
M.5. Does circulation within the development provide an unacceptable level of safety required for the orderly flow of people and their vehicles?			XX	
M.6. Will the project create or experience access problems as designed?			XX	
M.7. Is parking adequate for the proposed project?		XX		

N. Emergency Services

N.1. Roadway distance and location of the nearest fire station: 4 miles

O. Aesthetics

O.1. Is a major ridgeline or hillside area which is visible from the valley floor involved in the project?			XX	
O.2. Will the proposal result in the creation of an aesthetically negative site open to public view or obstruction of any significant view vista?			XX	

P. Archaeological/Historical/Paleontological

P.1. Has the site inspection for paleontological, historical and archaeological resources been performed?	XX			

If yes, by Pyramid Archaeology /No Paleontological

P.2. Does the project include any resources of archaeological, paleontological, or historical significance and would the proposal result in an impact on a significant paleontological, archaeological or historical site, structure, object or building?		XX		

	Yes	Maybe	No	N/A
Q. Public Controversy				
Q.1. Is the project or action environmentally controversial in nature, or can it reasonably be expected to become controversial upon disclosure to the public?	___	XX	___	___
R. Utilities				
R.1. Are utilities adequate and available to serve the proposed project?				
a. Water Supply	___	XX	___	___
b. Electrical Supply	XX	___	___	___
c. Natural Gas	XX	___	___	___
d. Sewers	___	XX	___	___
S. Mandatory Findings of Significance				
S.1. Does the project have the potential to degrade the quality of the environment or curtail the diversity in the environment?	___	XX	___	___
S.2. Does the project have the potential to achieve short-term, to the disadvantage of long-term environmental goals?	___	XX	___	___
S.3. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.) In addition, "cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.)				
a. Traffic	XX	___	___	___
b. Water	XX	___	___	___
c. Wastewater	XX	___	___	___
d. Schools	___	XX	___	___
e. Flooding	___	XX	___	___
f. Other (Air Quality)	XX	___	___	___

	Yes	Maybe	No	N/A
S.4. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	XX	____	___	___

VIII. List below the person or persons who prepared or participated in the preparation of the Initial Study:

John T. Doughty
Robert Stanley

IX. Determination

On the basis of this initial evaluation:

____ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

____ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because of the mitigation measures described on the MITIGATED NEGATIVE DECLARATION.

XX I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

____ Subsequent use of Program EIR.

____ Use of Tiered EIR.

11/21/90
Date

Sonja I. Wilson, Senior Planner
(Environmental)

11/21/90
Date

Clyde E. Evans, Director of Planning

wp2359

INITIAL STUDY RESPONSES

ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN

EARTH

A.1.

The site area is shown as flat on the U.S.G.S. topographic map and a site inspection confirmed the absence of slopes over fifteen percent (15%) on the site. Therefore, there is no potential for a significant effect on the environment due to intrusion into slopes of over fifteen percent (15%).

A.2.

Study of Exhibit 14.5 of the Palmdale Community Plan reveals the site to be located in an area of no risk of landslides. Therefore, no potential significant effect on the environment exists due to landslides.

A.3.

A site inspection has revealed no major landforms to be present on the site. Thus, there exists no potential for a significant effect on the environment due to impacts on major landforms.

A.4.

A site inspection has revealed no significant geological resources or features. Therefore, this does not constitute the potential for a significant impact on the environment.

A.5.

The site is in an area of low shrink/swell potential according to the exhibits referenced above. Therefore, this does not constitute the potential for a significant impact on the environment.

A.6.

The site is in an area of moderate soil erosion potential according to Exhibit 14.7 of the Palmdale Community Plan. The project will include specific standard soil erosion measures required for grading plans by the Department of Public Works which will mitigate potential erosion during construction. Therefore, this does not constitute the potential for a significant impact on the environment.

A.7.

The sites are within the moderate subsidence zone according to Exhibit 14.9 of the Palmdale Community Plan. Recompaction and other standard mitigation measures required as part of grading and construction plans in conformance with the City's Ordinance and the UBC code, as revised and adopted by the City of Palmdale mitigate this to a level of insignificance. Therefore, subsidence does not constitute the potential for a significant effect on the environment.

A.8.

The project includes commercial, office and industrial uses which are not listed in the Alquist-Priolio Special Studies Zone Act of 1972 as critical facilities. However, the maximum height allowed under the plan is 50-feet which may be considered a high-rise building. In that no faults have been determined to be located on the site, the presence of these potential buildings does not pose a significant risk. Therefore, there is no potential for a significant effect on the environment due to earthquake damage to a critical facility.

A.9., 10. and 11.

The site is not in a fault-rupture hazard zone as shown on the Palmdale Community Land Use Plan. Therefore this does not constitute the potential for a significant effect on the environment.

AIR QUALITY

B.1.

The proposed project could generate a significant level of air pollution. Using the South Coast Air Quality Management District's (S.C.A.Q.M.D.) suggested threshold criteria, the project exceeds the threshold levels in at least two categories. The first category, Acreage For An Industrial Park, has a suggested threshold level of 20 acres. The proposed project would exceed the level by six times with a total project acreage of 120.82 acres . The second category, trip generation, has a suggested threshold level of 2000 trips which the project could exceed with a projected 18,484 average daily trips generated (Air Quality Analysis A.V. Business Park dated August 19, 1989, prepared by The Planning Network, Page 3). Using all the available information it has been determined that the proposed project could have a significant effect on the environment. An air quality analysis in an E.I.R. should be prepared, including proposed mitigation measures and mitigation monitoring plan. The air quality analysis should be reviewed by S.C.A.Q.M.D. Also, during construction, especially on windy days, significant dust will be generated by grading activities and will contribute to particulates which degrade air quality. Particulates can be significantly reduced by regular watering programs and prohibition of grading on very windy days. Some vehicle emissions will also be produced by construction machinery. Since the construction activities are short-term, and construction equipment is required to meet emission standards this is not expected to be a significant impact on the environment.

WATER

C.1., 2., 3., 4. and 5.

The California Aqueduct is not located on or adjacent to the project site. Therefore, there is no potential for a significant impact on the environment due to project impacts on the aqueduct or aqueduct impact on the project.

The project involves the Amargosa Creek, a natural drainage course and proposed regional drainage facility. A review of the Drainage Master Plan found that a regional drainage facility (Amargosa Creek) is shown along the east boundary of the site. Further study is required to determine the impact of the project on Amargosa Creek with regard to potential increase in peak run-off as well as, increased off-site flood hazards.

It should be noted that the project is located within a 100 year flood zone and that the project could not be constructed until the regional drainage facility improvements have been completed. These issues as well as other regional and local hydrological concerns should be addressed within an E.I.R.

PLANTS

D.1.

The site consists of a total of 120.82 acres. A biological study has been prepared for a portion of the project site which determined that the site is occupied by significant Joshua tree woodland habitat. The eastern portion of the site, comprising 10 acres, occupies the Amargosa wash and flood plain habitat. Loss of Joshua trees and other desert vegetation to 120.82 acres of development would result in a significant loss of desert vegetation. A biological study which covers the entire site should be prepared. The cumulative effects of the loss of desert vegetation should also be addressed in an E.I.R.

D.2.

A biological survey has been prepared for the site area. The survey by Robb H. Fishman and David Charlton, entitled Biota Survey and Impact Assessment for the Antelope Valley Business Park and dated April and July 1989. The study identified no unique, rare or endangered species present on the site. However, a biological study which covers the entire site should be prepared as discussed above.

D.3.

The possibility of a Joshua Tree/Desert Vegetation Preservation Plan should be discussed within the biological section of an E.I.R. This should be as part of the element of D.1. above.

ANIMALS

E.1., 2. and 3.

A biological study was performed for a portion of the project area by Robb H. Fishman and David Charlton, entitled Biota Survey and Impact Assessment for the Antelope Valley Business Park and dated April and July 1989. A biological study which covers the entire site should be prepared as discussed above. The study did not identify any rare and/or endangered species on the site. However, an active coyote den was discovered on the site. Consultation with the Department of Fish and Game is required because of the existence of an active coyote den and a perennial stream (blue line stream on the site. Recommendations and requirements of the Department of Fish and Game should be incorporated into the mitigation measures of an E.I.R.

F.1.a.

The proposed project has been determined to not be noise sensitive. Therefore, there is no potential for a significant impact due to noise.

F.2.

The project could generate a noise level exceeding 65 dB(A) at the project boundary after construction. Therefore, a noise study should be prepared to determine its impacts.

F.3.

The project is of regional and areawide significance and will generate unusual periodic concentrations of human activity. This concentration of activity could have a significant impact on the surrounding area. Therefore, additional study is required to determine the potential for a significant impact on the environment.

LIGHT AND GLARE

G.1.

There is a potential for the project to produce off site light and glare. The applicant is required to provide a photometric lighting plan to the Planning Department and must meet specific criteria for reducing off-site impacts. These criteria will reduce potential impacts to a level of insignificance.

LAND USE

H.1.

The proposed project will serve to encourage development of presently undeveloped areas or increase density of already developed areas. This could constitute the potential for a significant impact on the environment which should be analyzed in an EIR.

H.2.

The adjoining land uses are compatible with the proposed project based on the review of the General Plan and other City documents. Therefore, interface problems do not constitute the potential for a significant impact on the environment.

RISK

I.1.

The proposed project includes industrial uses which may include potential sources of risk of explosion or significant release of hazardous substances. However, each individual use will be reviewed for this potential hazard and will be required to incorporate proper safety precautions in accordance with all applicable Codes. Therefore, this does not constitute the potential for a significant impact on the environment. However, an investigation should be completed to determine if hazardous materials are included in the two areas of trash dumping. If there are potential impacts they should be discussed in an EIR.

I.2.

A site inspection and review of the airport potential crash zone map revealed that the project site is outside of this area. Therefore, this does not constitute the potential for a significant impact on the environment.

I.3.

The project is not within the wildfire hazard area based on a review of the General Plan and a site inspection which found no fire prone vegetation on or adjacent to the site area. Therefore, wildfire hazard does not constitute the potential for a significant impact on the environment.

Initial Study Responses
A.V. Business Park
Specific Plan

HOUSING

J.1.

A site inspection found no residents on the project site. Therefore, there is no potential for a significant impact on the environment due to displacement of residents.

TRAFFIC

M.1,2,3, and 4.

Further study of the project should be performed in an EIR to determine the potential cumulative impacts of this and other area projects on roadways, intersections and freeway interchanges within the surrounding area. The EIR analysis should also include estimates of traffic volumes generated by the project, distribution onto area roads, level of service analysis for effected intersections and freeway interchanges and propose any appropriate mitigation measures. In response to the proposed project, Los Angeles County Department of Public Works is recommending 1,600 vehicle trips per lane be used in the intersection capacity analysis and a mid-range level of service D (v/c=0.85) be the point beyond which mitigation measures are required.

M.5. and 6.

The review of the exhibits submitted for the project by the case planner, the Traffic Engineer, and the LA County Fire Department indicate that the project has adequate circulation to provide for the safe and orderly flow of vehicles. Therefore, this does not constitute the potential for a significant impact on the environment.

M.7.

Review of the project's exhibits revealed that the parking is adequate to meet the City's Zoning Ordinance requirements for this type of project. Therefore, this does not constitute the potential for a significant impact on the environment.

EMERGENCY SERVICES

N.1.

Review of the projects location and the proximity of the nearest fire station indicates that the project can be served within acceptable time frames by the station, and the fire department has indicated that it has adequate manpower and equipment to serve the project. However, a discussion of impacts on police and fire services in the existing and cumulative conditions should be included in the EIR.

AESTHETICS

O.1. and O.2.

Review of the project's exhibits and a site inspection revealed that the site is not in a hillside area and there are no ridgelines on the project area. Therefore, there is no potential for a significant impact on the environment due to impacts on views.

Initial Study Responses
A.V. Business Park
Specific Plan

ARCHAEOLOGICAL/PALEOLONTOLOGICAL/HISTORIC RESOURCES

P.1. and 2.

A site inspection for archaeological resources was performed by Pyramid Archaeology (Bruce Love Ph.D.) on April 17, 1989 for approximately 80 acres of the total site. The site survey, entitled Cultural Resource Assessment TT44769, A.V. Business Park, found that there were no archaeological or historical resources evident on the site area. However, an EIR should include an archaeological/historic survey for the areas not previously surveyed and a paleontological survey of the entire project area since this area is identified as one of unknown potential and a survey is recommended in the City-Wide Paleontologic Assessment. The EIR should discuss any resources which are identified on the site area. A copy of the 80 acre survey report can be obtained from the Planning Department.

A paleontological survey has not been performed for the site area. Therefore, an assessment of the potential for a significant impact on the environment due to impacts on paleontological resources cannot be made. A study should be performed.

PUBLIC CONTROVERSY

Q.1.

The project may generate some public controversy in regard to its impact on infrastructure and public utilities. These issues should be discussed within the text of an E.I.R.

UTILITIES

R.1.a. and d.

A facility study should be performed to determine the cumulative effects of the project on existing and proposed water and sewer facilities.

Electrical service is available to the project site. Therefore, this does not constitute the potential for a significant impact on the environment.

Natural gas services are available to the project site. Therefore, this does not constitute the potential for a significant impact on the environment.

wp2359

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF CONSERVATION
DIVISION OF ADMINISTRATION
DIVISION OF MINES AND GEOLOGY
DIVISION OF OIL AND GAS
DIVISION OF RECYCLING

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December 26, 1990

Mr. Robert J. Stanley
City of Palmdale
708 E. Palmdale Blvd.
Palmdale, CA 93550

Dear Mr. Stanley:

Subject: Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Antelope Valley Business Park Specific Plan for the City of Palmdale, **SCH# 90011110.**

Thank you for forwarding the NOP for the above project for the City of Palmdale. According to the project description, the project will develop approximately 120-acres of flat-lying land for industrial and commercial use. The Department of Conservation's Division of Mines and Geology (DMG) has special expertise in evaluating geologic and seismic hazards, and will review the relevant information and analysis when we receive your DEIR from the State Clearinghouse.

The DEIR should include a complete description of the geologic and seismic environment. DMG Note 43, "Recommended Guidelines for Determining the Maximum Credible and the Maximum Probable Earthquakes", and DMG Note 46, "Guidelines for Geologic/Seismic Considerations in Environmental Impact Reports", are enclosed. These documents may aid in the determination of potential impacts that earthquakes on nearby active faults, and other geologic hazards may have on the project. A thorough review of past studies and reports relevant to the project area should be made, and the information used should be specifically referenced in the text. Any soils, engineering, or geological studies evaluating the adequacy of the site for development should be performed prior to the completion of the DEIR in order to allow for proper review by DMG through the California Environmental Quality Act (CEQA).

A preliminary review by DMG indicates that the geologic and seismic environment in the vicinity of the project includes active faults and potentially liquefiable and collapsible soils, as discussed below.

1. The project site is located approximately 5 miles from the San Andreas Fault Zone. The United States Geological Survey

(1988) has published a report stating that there is a 60% probability of one or more major earthquakes occurring on the southern San Andreas Fault Zone before the year 2018. Based on a planning scenario by Davis and others (1982), the project site can expect seismic ground shaking of Rossi-Forel Intensity IX (Modified Mercalli Intensity IX) from a magnitude 8.3 earthquake on the San Andreas fault. In addition, strong seismic shaking associated with an earthquake on more distant faults can be expected at the site.

Because it is likely that the site will experience strong ground shaking within the project's lifetime, it is important to consider ground motion and seismic hazards when evaluating geotechnical and structural design. Seismic hazards that need to be evaluated include potential strong ground motion at the site, liquefaction, seismic-induced settlement, and lateral spreading. The ground motion parameters that should be evaluated include peak ground acceleration, duration of strong shaking, and site amplification. Data to support the seismic analysis should be included in the DEIR. If mitigation measures are needed, they should be developed for inclusion in the DEIR so that they can be reviewed.

2. According to the Los Angeles County Safety Element (1990), the project site is located near a region containing known liquefiable soils. The Safety Element indicates that liquefaction susceptibility at the project site is unknown due to a lack of information. We recommend that a soils investigation be performed to determine the potential for liquefaction at the site. Factors to consider when evaluating liquefaction potential include subsurface soil texture and density, ground-water depth and fluctuation, and intensity and duration of strong seismic ground shaking. We recommend that this investigation be performed prior to completion of the DEIR.

3. According to Romani and Hick (1989), collapsible soils are found throughout much of the Antelope Valley Region. Collapsible soils undergo significant volume reduction when wetted, with or without loading from structures. Again, we recommend that a soils investigation be performed prior to completion of the DEIR to determine if collapsible soils exist at the site.

If you have any questions regarding these comments, please contact Roger Martin, Division of Mines and Geology Environmental

Review Project Manager, at (916) 322-2562.

Sincerely,

Dennis J. O'Bryant
Environmental Program Coordinator

DJO:RW:skk

Enclosures

cc: Roger Martin, Division of Mines and Geology
Rick Wilson, Division of Mines and Geology

REFERENCES:

Davis, J. F., Bennett, J. H., Borchardt, G. A., Kahle, J. E., Rice, S. J., and Silva, M. A., 1982, Earthquake planning scenario for a magnitude 8.3 earthquake on the San Andreas fault in southern California: California Division of Mines and Geology Special Publication 60, 128 pp.

Los Angeles County, 1990, Technical appendix to the safety element of the Los Angeles County General Plan, Hazard reduction in Los Angeles County, vol. 1: prepared for the Department of Regional Planning, County of Los Angeles by Leighton and Associates with Sedway Cooke Associates.

Romani, F., and Hicks, B. A., 1989, Collapsible soils in the Antelope Valley - California in F. H. Kulhawy (editor), Foundation Engineering: Current Principles and Practices, Volume 1: proceedings of the Geotechnical Engineering Division and the Construction Division of the American Society of Civil Engineers Congress, June 25-29, 1989, Evanston, Illinois, p. 135-142.

United States Geological Survey (Working Group on California Earthquake Probabilities), 1988, Probabilities of large earthquakes occurring in California on the San Andreas fault: U. S. Geological Survey Open-File Report 88-398, 62 pp.

RECOMMENDED GUIDELINES FOR DETERMINING THE MAXIMUM CREDIBLE AND THE MAXIMUM PROBABLE EARTHQUAKES

The following guidelines were suggested by the Geotechnical Subcommittee of the State Building Safety Board on 3 February 1975 to assist those involved in the preparation of geologic/seismic reports as required by regulations of the California Administrative Code, Title 17, Chapter 8, Safety of Construction of Hospitals. CDMG is currently using these guidelines when reviewing geologic/seismic reports.

Maximum credible earthquake

The maximum credible earthquake is the maximum earthquake that appears capable of occurring under the presently known tectonic framework. It is a rational and believable event that is in accord with all known geologic and seismologic facts. In determining the maximum credible earthquake, little regard is given to its probability of occurrence, except that its likelihood of occurring is great enough to be of concern. It is conceivable that the maximum credible earthquake might be approached more frequently in one geologic environment than in another.

The following should be considered when deriving the maximum credible earthquake:

(a) The seismic history of the vicinity and the geologic province;
(b) the length of the significant fault or faults which can affect the site within a radius of 100 kilometers; (See CDMG Preliminary Report 13);
(c) the type(s) of faults involved;
(d) the tectonic and/or structural history;
(e) the tectonic and/or structural pattern or regional setting (geologic framework);
(f) the time factor shall not be a parameter.

Maximum probable earthquake (functional-basis earthquake)

The maximum probable earthquake is the maximum earthquake that is likely to occur during a 100-year interval. It is to be regarded as a probable occurrence, not as an assured event that will occur at a specific time.

The following should be considered when deriving the "functional-basis earthquake":

(a) The regional seismicity, considering the known past seismic activity;
(b) the fault or faults within a 100 kilometer radius that may be active within the next 100 years;
(c) the types of faults considered;
(d) the seismic recurrence factor for the area and faults (when known) within the 100 kilometer radius;
(e) the mathematic probability or statistical analysis of seismic activity associated with the faults within the 100 kilometer radius (the recurrence information should be plotted graphically);
(f) the postulated magnitude shall not be lower than the maximum that has occurred within historic time.

PYA, JES, RWS 2/75

For a list of geologic maps and reports available from the California Division of Mines and Geology, write to the California Division of Mines and Geology, P.O. Box 2980, Sacramento, CA 95812, or visit our District offices in SACRAMENTO, 2815 "O" Street, (916) 445-5716; SAN FRANCISCO, Room 2022, Ferry Building, (415) 557-0633; LOS ANGELES, Room 1065, 107 South Broadway, (213) 620-3560.

CALIFORNIA DIVISION OF MINES AND GEOLOGY

CDMG NOTE 46

GUIDELINES FOR GEOLOGIC/SEISMIC CONSIDERATIONS IN ENVIRONMENTAL IMPACT REPORTS

The following guidelines were prepared by the Division of Mines and Geology with the cooperation of the State Water Resources Control Board to assist those who prepare and review environmental impact reports.

These guidelines will expedite the environmental review process by identifying the potential geologic problems and by providing a recognition of data needed for design analysis and mitigating measures. All statements should be documented by reference to material (including specific page and chart numbers) available to the public. Other statements should be considered as opinions and so stated.

1. CHECKLIST OF GEOLOGIC PROBLEMS FOR ENVIRONMENTAL IMPACT REPORTS

GEOLOGIC PROBLEMS		Could the project or geologic event cause environmental problems?			Is this conclusion documented in attached reports?	
PROBLEM	ACTIVITY CAUSING PROBLEM	NO	YES	ENVIRONMENTAL PROBLEMS	NO	YES
EARTHQUAKE DAMAGE	Fault Movement					
	Liquefaction					
	Landslides					
	Differential Compaction/ Seismic Settlement					
	Ground Rupture					
	Ground Shaking					
	Tsunami					
	Seiches					
	Flooding Due to Failure of Dams and Levees					
LOSS OF MINERAL RESOURCES	Loss of Access					
	Deposits Covered by Changed Land-Use Conditions					
	Zoning Restrictions					
WASTE DISPOSAL PROBLEMS	Change in Groundwater Level					
	Disposal of Excavated Material					
	Remediation of Waste Material					
SLOPE AND/OR FOUNDATION INSTABILITY	Landslides and Mudflows					
	Unstable Cut and/Fill Slopes					
	Collapsible and Expansive Soil					
	Aquifer/Well Stability					
EROSION, SEDIMENTATION, FLOODING	Erosion of Graded Areas					
	Attenuation of Runoff					
	Unprotected Drainage Ways					
	Increased Impervious Surfaces					
LAND SUBSIDENCE	Extraction of Groundwater, Gas, Oil, Geothermal Energy					
	Hydrocompaction, Peat Oxidation					
VOLCANIC HAZARDS	Lava Flow					
	Ash Fall					

(over)

For a list of geologic maps and reports available from the California Division of Mines and Geology, write to the California Division of Mines and Geology, P.O. Box 2980, Sacramento, CA 95812, or visit our District offices in SACRAMENTO, 2815 "O" Street, (916) 445-5716; SAN FRANCISCO, Room 2022, Ferry Building, (415) 557-0633; LOS ANGELES, Room 1065, 107 South Broadway, (213) 620-3560.

II. CHECKLIST OF GEOLOGIC REPORT ELEMENTS

REPORT ELEMENTS	YES	NO
A. General Elements Present		
Description and map of project.		
Description and map of site.		
Description and map of pertinent off-site areas.		
B. Geologic Element (refer to checklist)		
Are all the geologic problems mentioned?		
Are all the geologic problems adequately described?		
C. Mitigating Measures		
Area mitigating measures necessary?		
Is sufficient geologic information provided for the proper design of mitigating measures?		
Will the failure of mitigating measures cause an irreversible environmental impact?		
D. Alternatives		
Area alternatives necessary to reduce or prevent the irreversible environmental impact mentioned?		
Is sufficient geologic information provided for the proper consideration of alternatives?		
Are all the possible alternatives adequately described?		
E. Implementation of the Project		
Is the geologic report signed by a registered geologist?*		
Does the report provide the necessary regulations and performance criteria to implement the project?		

*Required for interpretive geologic information.

III. PUBLISHED REFERENCES (selected)

A. California Division of Mines and Geology Publications

1. Alfors, J.T., et al., 1973. Urban geology master plan for California: Bulletin 198.
2. Greensfelder, R.W., 1974. Maximum credible rock acceleration from earthquakes in California: Map Sheet 23.
3. Jennings, C.W., 1975 Fault Report 13 of California. GDM No. 1.
4. Oakeshott, G.B., 1974. San Fernando, California, earthquake of 9 February 1971: Bulletin 196.
5. Note No. 37. Guidelines to geologic/seismic reports, 1973.
6. Note No. 43. Recommended guidelines for determining the maximum credible and the maximum probable earthquakes, 1975.
7. Note No. 44. Recommended guidelines for preparing engineering geologic reports, 1975.
8. Note No. 45. Recommended guidelines for preparing mine reclamation plans, 1975.
9. Parke, D.L., Real, C.R., Toppozada, T.R., 1975. Earthquake Epicenter Map of California, showing events from 1900 through 1974.
10. Real, C.R., Toppozada, T.R., and Parke, D.L., 1978. Earthquake catalog of California, January 1, 1900-December 31, 1974 (microfiche).

B. Other Publications

1. Allen, C.R., et al., 1965. Relationship between seismicity and geologic structure in the southern California region: Bulletin of the Seismological Society of America, v. 55, no. 4.
2. Bolt, B.A. and Miller, R.D., 1971. Seismicity of northern and central California, 1955-1968: Bulletin of the Seismological Society of America, v. 61, no. 6.
3. California Department of Water Resources, 1964. Crustal strain and fault movement investigation: Bulletin No. 116-2.
4. Coffman, J.L. and von Hake, C.A., ed., 1973. Earthquake history of the United States: U.S. Department of Commerce, Publication 41-1.
5. Hileman, J.A., et al., 1973. Seismicity of the southern California region, 1 January 1932 to 31 December 1972: California Institute of Technology, Contribution 2385. Periodical updates to this are available.

IV. PUBLIC AGENCIES WITH GEOLOGIC DATA

Source	Data Available			
	Seismicity	Geology	Ground Water	Soils
Libraries and Geology and Engineering Departments of California Universities	X	X	X	X
California Institute of Technology	X			
California Division of Mines and Geology (Sacramento, San Francisco, Los Angeles, CA)	X	X		
California Department of Water Resources (Sacramento, CA)		X		X
California Department of Transportation (District Offices)				X
County Soil & Water Conservation Districts				X
County Engineer and Departments of Building and Safety	X	X		X
County Highway Department				X
County Flood Control District				X
U.S. Geological Survey (Menlo Park, CA)		X		
U.S. Corps of Engineers (District Engineer)		X		
U.S. Bureau of Reclamation (Regional Offices)		X		
U.S. Soil Conservation Service and Forest Service				X

by lead agency
sent by SCH

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☒ **Bob Fletcher**
Air Resources Board
1102 Q Street
Sacramento, CA 95814
916/322-8267

☐ **Jeannie Blakeslee**
Calif. Waste Management Board
1020 Ninth Street, Room 300
Sacramento, CA 95814
916/327-0454

State Water Resources Control Board

☐ **Allan Patton**
State Water Resources Control Board
Division of Loans & Grants
P.O. Box 944212
Sacramento, CA 94244-2120
916/739-4414

☐ **Dave Beringer**
State Water Resources Control Board
Delta Unit
P.O. Box 2000
Sacramento, CA 95810
916/322-9870

☐ **Ed Anton**
State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95801
916/445-9552

☐ **Mike Falkenstein**
State Water Resources Control Board
Division of Water Rights
901 P Street
Sacramento, CA 95814
916/324-5636

☒ APCD/AQMD: South Coast

Regional Water Quality Control Board

☐ **NORTH COAST REGION (1)**
1440 Guerneville Rd.
Santa Rosa, CA 95401
707/576-2220 (8-590)

☐ **SAN FRANCISCO BAY REGION (2)**
1111 Jackson Street, Room 6000
Oakland, CA 94607
415/464-1255 (8-561)

☐ **CENTRAL COAST REGION (3)**
1102-A Laurel Lane
San Luis Obispo, CA 93401
805/549-3147 (8-629)

☐ **LOS ANGELES REGION (4)**
101 Center Plaza Drive
Monterey Park, CA 91754
213/266-4460 (8-640)

☐ **CENTRAL VALLEY REGION (5)**
3443 Routier Road, Suite A
Sacramento, CA 95827-3098
916/361-5600

○ **Fresno Branch Office**
3614 East Ashlan Avenue
Fresno, CA 93726
209/445-5116 (8-421)

○ **Redding Branch Office**
100 East Cypress Avenue
Redding, CA 96002
916/224-4845 (ATS 441)

☒ **LAHONTAN REGION (6)**
2092 Lake Tahoe Boulevard
P.O. Box 9428
South Lake Tahoe, CA 95731
916/544-3481

○ **Victorville Branch Office**
15428 Civic Drive, Suite 100
Victorville, CA 92392-2359
619/241-6583

☐ **COLORADO RIVER BASIN REGION (7)**
73-271 Highway 111, Suite 21
Palm Desert, CA 92260
619/346-7491

☐ **SANTA ANA REGION (8)**
6809 Indiana Avenue, Suite 200
Riverside, CA 92506
714/782-4130 (8-632)

☐ **SAN DIEGO REGION (9)**
9771 Clairemont Mesa Blvd., Suite B
San Diego, CA 92124-1331
619/265-5114 (8-636)

☐ OTHER: _____

☐ OTHER: _____

SCH

STATE OF CALIFORNIA—OFFICE OF THE GOVERNOR GEORGE DEUKMEJIAN, Governor

OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO, CA 95814

DATE: Nov 30, 1990

TO: Reviewing Agency

RE: CITY OF PALMDALE's NOP for
ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN
SCH # 90011110

Attached for your comment is the CITY OF PALMDALE's Notice of Preparation of a draft Environmental Impact Report (EIR) for the ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN.

Responsible agencies must transmit their concerns and comments on the scope and content of the EIR, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of this notice. We encourage commenting agencies to respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

ROBERT J. STANLEY
CITY OF PALMDALE
708 E. PALMDALE BOULEVARD
PALMDALE, CA 93550

with a copy to the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the review process, call Terri Lovelady at (916) 445-0613.

Sincerely,

David C. Nunenkamp
Deputy Director, Permit Assistance

Attachments

cc: Lead Agency

City of Lancaster

44933 North Fern Avenue
Lancaster, California 93534
805-723-6000

Wm. G. Pursley
Mayor
George Lee Root
Vice Mayor
Rev. Henry W. Hearns
Councilman
Arnie Rodio
Councilman
George S. Theophanis
Councilman

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DEC 20 1990

December 19, 1990

City of Palmdale
Planning Department
Attn: Robert J. Stanley
38306 9th Street East
Palmdale, California 93550

Subject: Antelope Valley Business Park Specific Plan NOP

Dear Robert:

Thank you for the opportunity to review the Notice of Preparation and Initial Study for the above referenced project.

The City of Lancaster does not have any comments at this time, but would appreciate the opportunity to review the Draft EIR when it becomes available for public review. Please submit the Draft EIR to my attention at the above noted address.

Sincerely,

Susan J. Barnett

Susan J. Barnett
Environmental Coordinator
Department of Community Development

SB

cc: Peter Beaudry, City Traffic Engineer
Ken Putnam, City Engineer

STATE OF CALIFORNIA—RESOURCES AGENCY

GEORGE DEUKMEJIAN, *Governor*

DEPARTMENT OF WATER RESOURCES

P. O. Box 6598
LOS ANGELES
90055-1598

RECEIVED
DEC 19 1990

DEC 11 1990

City of Palmdale
708 E. Palmdale Blvd.
Palmdale, CA 93550

Attention: Robert J. Stanley

Subject: Notice of Preparation of DEIR for Antelope Valley Business Park Specific Plan, on 120 Acre Master Plan Project, dated 11/90
SCH 90011110

Your referenced document has been reviewed by our Department staff. Recommendations, as they relate to water conservation and flood damage prevention, are attached.

The Department recommends that you consider implementing a comprehensive program to use reclaimed water for irrigation purposes in order to free fresh water supplies for beneficial uses that require high quality water.

For further information, you may wish to contact John Pariewski at 213-620-3951.

Thank you for the opportunity to review and comment on this report.

Sincerely,

Charles R. White

Charles R. White, Chief
Planning Branch
Southern District

Attachments

cc: Office of Planning and Research
State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

Department of Water Resources Recommendations for Water Conservation and Water Reclamation

To reduce water demand, implement the water conservation measures described here.

Required

The following State laws require water-efficient plumbing fixtures in structures:

- Health and Safety Code Section 17921.3 requires low-flush toilets and urinals in virtually all buildings as follows:

  "After January 1, 1983, all new buildings constructed in this state shall use water closets and associated flushometer valves, if any, which are water-conservation water closets as defined by American National Standards Institute Standard A112.19.2, and urinals and associated flushometer valves, if any, that use less than an average of 1-1/2 gallons per flush. Blowout water closets and associated flushometer valves are exempt from the requirements of this section."

- Title 20, California Administrative Code Section 1604(f) (Appliance Efficiency Standards) establishes efficiency standards that give the maximum flow rate of all new showerheads, lavatory faucets, and sink faucets, as specified in the standard approved by the American National Standards Institute on November 16, 1979, and known as ANSI A112.18.1M-1979.

- Title 20, California Administrative Code Section 1606(b) (Appliance Efficiency Standards) prohibits the sale of fixtures that do not comply with regulations. No new appliance may be sold or offered for sale in California that is not certified by its manufacturer to be in compliance with the provisions of the regulations establishing applicable efficiency standards.

- Title 24 of the California Administrative Code Section 2-5307(b) (California Energy Conservation Standards for New Buildings) prohibits the installation of fixtures unless the manufacturer has certified to the CEC compliance with the flow rate standards.

- Title 24, California Administrative Code Sections 2-5352(i) and (j) address pipe insulation requirements, which can reduce water used before hot water reaches equipment or fixtures. These requirements apply to steam and steam-condensate return piping and recirculating hot water piping in attics, garages, crawl spaces, or unheated spaces other than between floors or in interior walls. Insulation of water-heating systems is also required.

- Health and Safety Code Section 4047 prohibits installation of residential water softening or conditioning appliances unless certain conditions are satisfied. Included is the requirement that, in most instances, the installation of the appliance must be accompanied by water conservation devices on fixtures using softened or conditioned water.

- Government Code Section 7800 specifies that lavatories in all public facilities constructed after January 1, 1985, be equipped with self-closing faucets that limit flow of hot water.

Recommendations to be implemented where applicable

Interior:

1. Supply line pressure: Water pressure greater than 50 pounds per square inch (psi) be reduced to 50 psi or less by means of a pressure-reducing valve.

2. Drinking fountains: Drinking fountains be equipped with self-closing valves.

3. Hotel rooms: Conservation reminders be posted in rooms and restrooms.* Thermostatically controlled mixing valve be installed for bath/shower.

4. Laundry facilities: Water-conserving models of washers be used.

5. Restaurants: Water-conserving models of dishwashers be used or spray emitters that have been retrofitted for reduced flow. Drinking water be served upon request only.*

6. Ultra-low-flush toilets: 1-1/2-gallon per flush toilets be installed in all new construction.

Exterior:*

1. Landscape with low water-using plants wherever feasible.

2. Minimize use of lawn by limiting it to lawn-dependent uses, such as playing fields. When lawn is used, require warm season grasses.

3. Group plants of similar water use to reduce overirrigation of low-water-using plants.
4. Provide information to occupants regarding benefits of low-water-using landscaping and sources of additional assistance.

---

*The Department of Water Resources or local water district may aid in developing these materials or providing other information.

5. Use mulch extensively in all landscaped areas. Mulch applied on top of soil will improve the water-holding capacity of the soil by reducing evaporation and soil compaction.

6. Preserve and protect existing trees and shrubs. Established plants are often adapted to low-water-using conditions and their use saves water needed to establish replacement vegetation.

7. Install efficient irrigation systems that minimize runoff and evaporation and maximize the water that will reach the plant roots. Drip irrigation, soil moisture sensors, and automatic irrigation systems are a few methods of increasing irrigation efficiency.

8. Use pervious paving material whenever feasible to reduce surface water runoff and to aid in ground water recharge.

9. Grade slopes so that runoff of surface water is minimized.

10. Investigate the feasibility of using reclaimed waste water, stored rainwater, or grey water for irrigation.

11. Encourage cluster development, which can reduce the amount of land being converted to urban use. This will reduce the amount of impervious paving created and thereby aid in ground water recharge.

12. Preserve existing natural drainage areas and encourage the incorporation of natural drainage systems in new developments. This aids ground water recharge.

13. To aid in ground water recharge, preserve flood plains and aquifer recharge areas as open space.

Department of Water Resources
Recommendations for
Flood Damage Prevention

In flood-prone areas, flood damage prevention measures required to protect a proposed development should be based on the following guidelines:

1. It is the State's policy to conserve water; any potential loss to ground water should be mitigated.

2. All building structures should be protected against a 100-year flood.

3. In those areas not covered by a Flood Insurance Rate Map or Flood Boundary and Floodway Map, issued by the Federal Emergency Management Agency, the 100-year flood elevation and boundary should be shown in the Environmental Impact Report.

4. At least one route of ingress and egress to the development should be available during a 100-year flood.

5. The slope and foundation designs for all structures should be based on detailed soils and engineering studies, especially for hillside developments.

6. Revegetation of disturbed or newly constructed slopes should be done as soon as possible (utilizing native or low-water-using plant material).

7. The potential damage to the proposed development by mudflow should be assessed and mitigated as required.

8. Grading should be limited to dry months to minimize problems associated with sediment transport during construction.

;AN BERNARDINO COUNTY MUSEUM

)24 Orange Tree Lane • Redlands, CA 92374
14) 792-1334 • 792-0052 • 825-4825 • 825-4823

COUNTY OF SAN BERNARDINO
GENERAL SERVICES AGENCY

DR. ALLAN D. GRIESEMER
Director

December 12, 1990

Robert J. Stanley, Associate Planner
City of Palmdale
708 E. Palmdale Blvd.
Palmdale, CA 93550

re: **N.O.P. DRAFT EIR, ANTELOPE VALLEY BUSINESS PARK SPECIFIC PLAN**

As indicated in the Notice of Preparation, a paleontologic resource assessment should be completed and a paleontologic resource impact mitigation program be developed for this parcel.

Sincerely,

Dr. Allan D. Griesemer
Museums Director

ADG:RER/jr

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, 120 SO. SPRING ST.
LOS ANGELES, CA 90012
TDD (213) 620-3550

RECEIVED
DEC 17 1990

(213) 620-3163

December 12, 1990

IGR/CEQA
City of Palmdale
NOP - DEIR
Antelope Valley Business
Park Specific Plan
SCH # 90011110
Vic. LA-14-R64.68

Mr. Robert J. Stanley,
Associate Planner
City of Palmdale
708 East Palmdale Boulevard
Palmdale, CA 93550

Dear Mr. Stanley:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced project. Items which should be covered for the project include, but are not limited to:

A. Trip generation/distribution including the method used to develop the percentages and assignment.

B. ADT, AM and PM peak-hour volumes for both the existing and future (Year 2010) conditions. This should also include the Antelope Valley Freeway (SR 14), affected ramps and interchanges.

C. An analysis of future (Year 2010) conditions which include project traffic and the cumulative traffic generated for all approved developments in the area.

D. Consideration should be given to providing mitigation for congestion relief. Any mitigation proposed should be fully discussed in the document. These discussions should include, but not be limited to, the following:

* financing
* scheduling considerations
* implementation responsibilities
* monitoring

E. Consideration should be given to requiring developer contributions or fair-share funding for transportation improvements on State facilities.

We look forward to reviewing the DEIR. We expect to receive a copy from the State Clearinghouse. However, to expedite the review process, you may send two copies in advance to the undersigned at the following address:

Wilford Melton
District 7 IGR\CEQA Coordinator
Transportation Planning & Analysis Branch
120 So. Spring Street
Los Angeles, CA 90012

Thank you for this opportunity to comment. If you have any questions regarding these comments, please call me at (213) 620-3163.

Sincerely,

Wilford Melton

WILFORD MELTON
IGR\CEQA Coordinator
Transportation Planning & Analysis Branch

cc: State Clearinghouse

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063

(213) 267-2481

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

January 3, 1990

Send copy to Recon and John D. File

Sonja Wilson
Palmdale Planning Department
38306 9th Street East
Palmdale, CA 93550

Dear Ms. Wilson:

SUBJECT: ENVIRONMENTAL IMPACT REPORT -- PALMDALE (FREEWAY BUSINESS PARK SPECIFIC PLAN)

Enclosed, is a copy of the Los Angeles County Fire Department's two previous statements concerning this project. Our position on this project has not changed. In addition, we would like to add the following comments:

DESIGN AND CONSTRUCTION

The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows, and fire hydrants.

Fire flows of up to 5,000 gallons per minute at 20 pounds per square inch residual pressure for a five-hour duration will be required.

Final fire flow will be based on the size of the building, its relationship to other structures and property lines, and the type of construction used.

Additional fire life safety requirements will be addressed at building plan check.

FORESTRY DIVISION

With regards to the subject project, the Forestry Division of the Los Angeles County Fire Department has statutory responsibilities in the following areas:

1. Soil erosion (equipment, precipitation, and/or wind).

2. Unique, rare, or endangered plants (extinction and/or reduction).

3. Watershed management (wildfire).

WATERSHED MANAGEMENT CONCEPT

NATURAL WATERSHED VERSUS ARTIFICIAL WATERSHED
Impermeable surfaces (roofs, streets, driveways, patios, etc.) effect surface water percolation to th ground water aquifers. Simultaneously with the loss of percolation, these surfaces increase the quantity and velocity of run-off water. Due to the rapid movement of the water run-off as it moves through and exits from the development, the potential exists for erosion damage and debris accumulation downstream.

Detention and/or retention basin run-off water should be clean prior to its release downstream, thereby reducing or eliminating pollution of the ground water aquifer.

The above concept and its mitigation measures should be addressed in the Environmental Analysis of the EIR.

Appropriate soil erosion structures and vegetative cover must be addressed in the EIR. Species of plants that are suitable to the climate of the area should be researched. To conserve water, the concepts of xerophytic landscaping should be explored.

If you have any additional questions, please feel free to contact me at (213) 267-2481.

Very truly yours,

P. MICHAEL FREEMAN

Joseph Ferrara

BY
JOSEPH FERRARA, CHIEF, FORESTRY DIVISION
PREVENTION AND CONSERVATION BUREAU

JF:jmb

Enclosure

(213) 267-2481

December 9, 1988

Sheryl Sanderson
City of Palmdale
712 East Palmdale Boulevard
Palmdale, CA 93550

Dear Ms. Sanderson:

SUBJECT: ENVIRONMENTAL IMPACT REPORT — ANTELOPE VALLEY AUTO CENTER — (CITY OF PALMDALE)

The subject property which is located in the City of Palmdale appears to have no additional impact on this Department. Therefore, at this time we have no further comments.

Very truly yours,

EARL E. FORDHAM, ACTING FIRE CHIEF

Joseph Ferrara

BY
JOSEPH FERRARA
HEAD DEPUTY FORESTER
FORESTRY DIVISION

JF:lc

bcc: EIR #310
Y-2

SOUTHERN CALIFORNIA gas COMPANY

6520 FOOTHILL BOULEVARD • TUJUNGA, CALIFORNIA

MAILING ADDRESS: BOX 457 • TUJUNGA, CALIFORNIA 91043

December 7, 1990

RECEIVED
DEC 10 1990

City of Palmdale
708 E. Palmdale Blvd.
Palmdale, CA 93550

Attention: Robert J. Stanley

Re: Antelope Valley Business Park Specific Plan

The following is in response to your November 12, 1990 letter requesting information relative to an Environmental Impact Report on the proposed development of Antelope Valley Business Park Specific Business Park.

Within areas of interest and responsibilities of the Southern California Gas Company, we find the proposed development reasonable and acceptable.

This letter is not to be interpreted as a contractual commitment to serve the subject development, but only as an information service. Its intent is to notify you that the proposed project can be served from existing mains in the area. This can be done without a major impact on overall system capacity, service to existing customers, or the environment.

Industrial or commercial customers' loads vary with types of equipment used. The availability of natural gas service, as set forth in this letter is based upon present conditions of gas supply and regulatory policies. As a public utility, the Southern California Gas Company is under the jurisdiction of the California Public Utilities Commission. We can also be affected by actions of federal regulatory agencies. Should these agencies take any action which affects gas supply or the condition under which service is available, gas service will be provided in accordance with the revised conditions.

We have developed several programs which are available, upon request, to provide assistance in selecting the most effective applications of energy conservation techniques for a particular project. If you desire further information on any of our energy conservation programs, please contact the following for assistance: Area Market Services Manager at (818) 951-2451.

Sincerely,

Santo Plescia

Santo Plescia
Planning Aide

SP/bd
cc: G. Baca

(213) 267-2481

January 18, 1988

Susan Barnett, Assistant Planner
City of Lancaster
44933 North Fern Avenue
Lancaster, CA 93534

Dear Ms. Barnett:

SUBJECT: ENVIRONMENTAL IMPACT REPORT --
ANTELOPE VALLEY AUTO MALL ASSOCIATES

Our evaluation of the impact on fire protection and paramedic service for the proposed development is based on the current level of service available within the general area. With this in mind, additional manpower and equipment may be required as the need arises.

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICE AVAILABILITY

The subject development will receive fire protection and paramedic service from the County of Los Angeles Fire Department. Fire Station #129, located at 421 West Avenue M, Lancaster, CA 93534, is the jurisdictional engine company for this property.

EQUIPMENT	DISTANCE/MILES	TIME/MINUTES	MEN
Engine 129	2.5	5	3
Engine 33	2.7	6	4
Engine 84	6.0	12	3
Truck 24	4.5	8	2
Squad 33	2.7	6	2

PROJECT IMPACT ON SERVICES

Fire protection serving the area appears to be adequate; however, limited tax revenues have created uncertainties as to whether the Fire Department will be able to continue current levels of service. Each additional development creates greater demands on existing resources. Consequently, the impact that this project will have on the adequacy of the Fire Department's level of service remains uncertain.

SOUTHERN CALIFORNIA gas COMPANY

6520 FOOTHILL BOULEVARD • TUJUNGA, CALIFORNIA

MAILING ADDRESS. BOX 457 • TUJUNGA, CALIFORNIA 91043

December 7, 1990

RECEIVED
DEC 10 1990

City of Palmdale
708 E. Palmdale Blvd.
Palmdale, CA 93550

Attention: Robert J. Stanley

Re: Antelope Valley Business Park Specific Plan

The following is in response to your November 12, 1990 letter requesting information relative to an Environmental Impact Report on the proposed development of Antelope Valley Business Park Specific Business Park.

Within areas of interest and responsibilities of the Southern California Gas Company, we find the proposed development reasonable and acceptable.

This letter is not to be interpreted as a contractual commitment to serve the subject development, but only as an information service. Its intent is to notify you that the proposed project can be served from existing mains in the area. This can be done without a major impact on overall system capacity, service to existing customers, or the environment.

Industrial or commercial customers' loads vary with types of equipment used. The availability of natural gas service, as set forth in this letter is based upon present conditions of gas supply and regulatory policies. As a public utility, the Southern California Gas Company is under the jurisdiction of the California Public Utilities Commission. We can also be affected by actions of federal regulatory agencies. Should these agencies take any action which affects gas supply or the condition under which service is available, gas service will be provided in accordance with the revised conditions.

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Sincerely,

Santo Plescia

Santo Plescia
Planning Aide

SP/bd
cc: G. Baca

WASTEWATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-4998
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (213) 699-7411, (213) 685-5217
Fax: (213) 695-6139

CHARLES W. CARRY
Chief Engineer and General Manager

RECEIVED
DEC - 6 1990

December 3, 1990

File No: 14-00.04-00

Mr. Robert Stanley
City of Palmdale
708 E. Palmdale Boulevard
Palmdale, CA 93550

Dear Mr. Stanley:

Antelope Valley Business Park Specific Plan

The County Sanitation Districts received a *Notice of Preparation of a Draft Environmental Impact Report (EIR)* for the subject project on November 29, 1990. We offer the following comments for use in the preparation of the EIR:

1. The area in question is outside the jurisdictional boundaries of the Sanitation Districts and would have to be annexed into District No. 14 before sewerage service could be provided to the proposed development. For specific information regarding the annexation procedure and fees, please contact Ms. Alma Horvath at (213) 699-7411, extension 2708.

2. The wastewater flow originating from the proposed project would discharge to a local sewer line, which is not maintained by the Sanitation Districts, for conveyance to the 10th Street West Trunk Sewer, Extension No. 2, located in 10th Street West at Avenue M. This trunk sewer has a peak capacity of 2 million gallons per day (mgd) and conveyed a peak flow of less than 1 mgd when last measured (1989).

3. The wastewater generated by the proposed project will be treated at the Lancaster Water Reclamation Plant (WRP). The Lancaster WRP currently processes an average flow of 8.2 mgd. In order to meet the current service demand, the Sanitation Districts are presently expanding the treatment capacity of the Lancaster WRP through surface aeration of the existing oxidation ponds. The Sanitation Districts will continue to incrementally expand facilities as needed to accommodate additional development, up to the allowable level addressed in the current Wastewater Facilities Plan for Los Angeles County Sanitation District No. 14, which provides for the treatment of influent wastewater flows up to 16 mgd at the Lancaster WRP.

4. Based on the proposed land use and acreage, the Districts estimate that the proposed project will generate an average wastewater flow of 182,000 gallons per day.

5. All facilities in question either have adequate capacity to handle the expected flow, or will be expanded in the future to meet the community's needs.

ANTELOPE VALLEY UNION HIGH SCHOOL DISTRICT

BOARD OF TRUSTEES

LAWRENCE W. RUCKER, PRESIDENT

E. JAROLD WRIGHT, CLERK

WILDA N. ANDREJCIK

STEVE LANDAKER

SOPHIA WAUGH

44811 SIERRA HIGHWAY, LANCASTER, CALIFORNIA 93534-3226
(805) 948-7655

ADMINISTRATION

DR. KENNETH BRUMMEL
DISTRICT SUPERINTENDENT

DR. ROBERT H. SANCHEZ
ASSISTANT SUPERINTENDENT
EDUCATIONAL SERVICES

E. MICHAEL ROSSI
ASSISTANT SUPERINTENDENT
PERSONNEL SERVICES

DARLENE HINKEL
ASSISTANT SUPERINTENDENT
BUSINESS SERVICES

RECEIVED
DEC 12 1990

December 10, 1990

RECEIVED
JAN 10 1991

Mr. Robert J. Stanley
City of Palmdale
Planning Department
38306 9th Street East
Palmdale, CA 93550

Subject: Draft E.I.R., Antelope Valley Business Park Specific Plan.

Since this project will create new employment opportunities, it must be considered growth-inducing. Any growth will affect the schools and should be addressed in the E.I.R.

Should you have any questions, please feel free to contact me.

Sincerely,

Richard J. Aitken
District Engineer

RJA:kb

Palmdale School District
[illegible]Y R. MARYOTT EDUCATION CENTER
POST OFFICE BOX [illegible]
39149 N. 10TH STREET, E.
PALMDALE, CALIFORNIA 93590
PHONE (805) 947-7191
FAX (805) 272-0515

December 3, 1990

City of Palmdale
Robert J. Stanley
Planning Department
38306 Ninth St. East
Palmdale, California 93550

RE: Antelope Valley Business Park Specific Plan

Palmdale School District sees no problem or mitigating circumstances that involve the school district costs or growth.

If you have any questions, please feel free to contact me.

Sincerely,

Nancy K. Smith

Nancy K. Smith
Assistant Superintendent
Business Services

NKS:ljm

APPENDIX B

AIR QUALITY REPORT
FOR THE
ANTELOPE VALLEY BUSINESS PARK

Prepared for

CITY OF PALMDALE
708 E. PALMDALE BOULEVARD
PALMDALE, CALIFORNIA 93550

Prepared by

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON NUMBER 2262E
SEPTEMBER 20, 1991

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I. BACKGROUND AND EXISTING CONDITIONS

A. EXISTING SITE CONDITIONS

The 120.82-acre site of the proposed Antelope Valley Business Park is approximately 4.5 miles north-northwest of the city of Palmdale, in the north-central portion of Los Angeles County. The terrain within the property boundary is basically flat, sloping slightly to the north at an average grade of approximately one percent with elevations ranging from 2,550 feet above mean sea level (MSL) in the south to 2,525 feet in the north. There are scattered industrial and commercial uses (light industrial, offices/warehouses, and a mini-mart) to the west and to the north, while the properties to the east and south are vacant, as is the site itself. An 80-acre area to the south, however, has been proposed for the site of a future industrial center. Air Force Plant 42 is located approximately 1.25 miles east-southeast of the site.

B. CLIMATE

The city of Palmdale is located in the Antelope Valley, in the southwestern portion of the Mojave Desert. It is approximately 60 miles north of downtown Los Angeles and 10 miles south of Lancaster. The valley is surrounded by mountain ranges, canyons, and mountain passes; the altitude of the City ranges from 2,450 to 2,700 feet MSL, with the surrounding mountains up to 4,000 feet above sea level. These intervening mountain ranges block cool, moist coastal air and create hot, dry summers and cold winters.

Weather conditions in this region are characteristic of a high desert climate dominated by the Pacific high pressure system. During the summer, the Pacific high is well developed to the west, and a thermal trough overlies the region. This thermal trough causes strong onshore pressure gradients between the coastal areas and the desert, and, as a result, the prevailing wind direction is from the west-southwest. Summer conditions are marked by clear skies, a great amount of sunshine, generally good air circulation through the mountain passes, and a very low relative humidity during the daytime hours. Mean maximum summer temperatures range from 90 to 100 degrees Fahrenheit, with an average of 75 to 80 degrees.

During the winter, the Pacific high retreats to the south and allows frontal systems to drift over the coastal ranges and affect the high desert region. Although these frontal systems weaken as they move from the coast into the desert (losing much of their moisture before they get to the Antelope Valley), they bring most of the rainfall that occurs in the west valley. Precipitation varies from 8 to 12 inches per year. Evaporation, even in winter, exceeds precipitation due to the desiccating winds. The mean maximum winter temperatures are usually in the mid-50s. Wide temperature variations between winter days and nights, however, are not uncommon; days with temperatures of 60 degrees Fahrenheit can be followed by nights when temperatures below 32 degrees Fahrenheit and snow have been recorded.

C. EXISTING AMBIENT AIR QUALITY

Ambient air quality is described in relation to state and federal standards that have been adopted to protect public health. These standards represent the maximum level of background pollution considered acceptable, with an adequate margin of safety. The six pollutants of primary concern for which national ambient air quality standards (NAAQS) have been established are sulfur dioxide, lead, carbon monoxide, nitrogen dioxide, ozone, and suspended particulate matter. The State of California has set more stringent limits on the six pollutants of national concern, and the California Air Resources Board (CARB) has developed additional standards (CAAQS) to include sulfates, hydrogen sulfide, vinyl chloride (chloroethylene), and visibility-reducing particles. Table 1 lists the 1989 federal and state standards for all criteria pollutants.

The site of the proposed Antelope Valley Business Park is in the Palmdale-Lancaster area (Source/Receptor Area 14), located in north-central Los Angeles County. Source/Receptor Areas are 38 distinct areas established by the South Coast Air Quality Management District (SCAQMD) based on air monitoring, geographical, and meteorological factors. Los Angeles County is divided by the San Gabriel Mountains into two air basins: the South Coast Air Basin (SCAB, containing the Santa Clarita Valley), and the Southeast Desert Air Basin (SEDAB, containing the Antelope Valley and the project area). The SEDAB is bounded by the Colorado River to the east, the crest of the San Bernardino, San Gabriel, and San Jacinto Mountains to the south and west, and the northern boundary of Kern County to the north.

The concentration of pollutants within the SEDAB is measured at 16 monitoring stations maintained by CARB and by the SCAQMD. Air quality at a particular location is a function of the type and amount of pollutants being emitted into the air locally and throughout the basin and of the dispersal rates of pollutants within the region. The major factors affecting pollutant dispersion are wind speed and direction, temperature inversions which impede air movement and can thus trap pollutants, and the local topography.

The monitoring station nearest to the project site is located at Lancaster, approximately 10 miles to the north. The San Gabriel Mountains are a major factor in the distribution of air pollution within the area. During summer afternoons, the western slopes are heated; this results in up-slope winds which pull polluted air up the mountain slopes. Since the warm Pacific breezes moving eastward towards the Lancaster-Palmdale area are blocked by the mountains, wind movement in the area is substantially less than in coastal areas; this atmospheric stability suppresses vertical dilution of pollutants. Furthermore, the Lancaster-Palmdale area receives pollution from the metropolitan Los Angeles area (in the SCAB) through the Newhall Pass. Table 2 shows the readings taken at the Lancaster station for the period 1985-1989.

Between 1985 and 1989, the state ozone standard has been exceeded in the Lancaster-Palmdale area by an annual average of 104 days, and the federal standard by an annual average of 42 days. In 1989, the area exceeded the state ozone standard during 95 days and the federal standard during 27 days, and the Lancaster monitoring station recorded a peak one-hour ozone concentration of 0.21 parts per million (ppm). The most severe ozone violations occur during moderate to high wind conditions, the same day or the day after high levels are observed throughout the Los Angeles area. The 10-micron particulate (PM-10)

Table 1.

State of California Air Resources Board Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,4,6]	Method[7]
Ozone	1 Hour	0.09 ppm (180 ug/m3)	Ultraviolet Photometry	0.12 ppm (235 ug/m3)	Same as Primary Std.	Ethylene Chemiluminescence
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m3)	Non-dispersive Infrared Spectroscopy (NDIR)	9.0 ppm (10 mg/m3)		Non-dispersive Infrared Spectroscopy (NDIR)
	1 Hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
Nitrogen Dioxide	Annual Average	-	Gas Phase Chemilumi-nescence	0.053 ppm (100 ug/m3)	Same as Primary Std.	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 ug/m3)		-		
Sulfur Dioxide	Annual Average	-	Ultraviolet Fluorescence	80 ug/m3 (0.03 ppm)	-	Pararosoaniline
	24 Hour	0.05 ppm[8] (131 ug/m3)		365 ug/m3 (0.14 ppm)	-	
	3 Hour	-		-	1300 ug/m3 (0.5 ppm)	
	1 Hour	0.25 ppm (655 ug/m3)		-	-	
Suspended Particulate Matter (PM_{10})	Annual Geometric Mean	30 ug/m3	Size Selective Inlet High Volume Sampler and Gravimetric Analysis	-	-	Inertial Separation and Gravimetric Analysis
	24 Hour	50 ug/m3		150 ug/m3	Same as Primary Standard	
	Annual Arithmetic Mean	-		50 ug/m3		
Sulfates	24 Hour	25 ug/m3	Turbidimetric Barium Sulfate	-	-	-
Lead	30 day Average	1.5 ug/m3	Atomic Absorption	-	-	Atomic Absorption
	Calendar Quarter	-		1.5 ug/m3	Same as Primary Std.	
Hydrogen Sulfide	1 Hour	0.03 ppm (42 ug/m3)	Cadmium Hydr-oxide STRactan	-	-	-
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 ug/m3)	Tedlar Bag Collection, Gas Chromatography	-	-	-
Visibility Reducing Particles[9]	8 hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with ARB Method V.		-	-	-
Applicable Only in the Lake Tahoe Air Basin						
Carbon Monoxide	8 hour	6 ppm (7 mg/m3)	NDIR	-	-	-
Visibility Reducing Particles[10]	8 hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.07 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with ARB Method V.		-	-	-

TABLE 2
SUMMARY OF AIR QUALITY DATA
FROM THE LANCASTER MONITORING STATION

	Number of Days Over Standard									
	State					Federal				
Pollutant	1985	1986	1987	1988	1989	1985	1986	1987	1988	1989
Oxidant (ozone)	106	108	105	105	95	58	47	32	44	27
Carbon monoxide	0	0	0	0	0	-	-	-	-	-
Sulfur dioxide	-	-	-	-	-	-	-	-	-	-
Nitrogen dioxide	0	0	0	0	0	-	-	-	-	-
Particulates (PM-10)	-	-	-	-	25	-	-	-	-	0

SOURCE: California Air Resources Board 1985, 1986, 1987, 1988, 1989a.

- means information was not available (no recordings at this monitoring station)

state standard was exceeded during 25 days in 1989, but there were no recorded exceedances of the federal standard. The maximum 24-hour concentration of PM-10 measured in the Lancaster area was 110 micrograms per cubic meter.

Visibility refers to the "clarity" of the atmosphere and is typically defined as the distance a person can see at a particular location and time. Visibility through the atmosphere is restricted by the absorption and scattering of light by both gases and particles. Natural phenomenon which contribute to decreased visibility include fog, precipitation, blowing sand and snow, and relative humidities greater than 70 percent. Man-made conditions which reduce visibility include the emission of combustion gases which transform in the atmosphere to form very small particles called "aerosols."

The 1989 state visibility standard notes that a violation has occurred if the amount of visibility reducing particles is such that it produces a light extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent (measured in accordance with Air Resources Board Method V). This standard is intended to limit the frequency and severity of visibility impairment due to regional haze, and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent. At the present time, instrument measurements in accordance with Method V guidelines that are consistent with the current standard are not available in most areas, and existing data is based on human observations at airports and selected weather stations. The monitoring station at Fox Airport in Lancaster reported two episodes of reduced visibility in 1989.

The SEDAB experiences improving visibility as one travels from west to east. Near the urbanized western edge of the basin, mid-day visibilities average 15 miles, while in the remote eastern desert regions, average visibilities approach 70 miles. As relative humidities are very low, water vapor in the air does not significantly influence visibility levels. Overall, in the absence of large cities or industrial complexes, the greatest contribution to visibility degradation is made by the transport of aerosols from the SCAB in the southwest and the San Joaquin Air Basin to the northwest. Visibility also changes seasonally. Minimum levels occur during the spring and summer due to increased transport of aerosols from upwind urban areas. Local sources of fugitive dust also contribute to deterioration during dry, windy summer months.

Based on information from the regional air quality monitoring network (Table 3), the CARB has designated the SEDAB as a nonattainment area for ozone and 10-micron particulates regarding both the state and federal standards, and "unclassified" for the other criteria pollutants. That is, the state standard is not exceeded, but monitoring data is insufficient to determine whether or not the area is in attainment for the federal standard. In 1989, the SEDAB experienced a peak one-hour ozone concentration of 0.23 ppm, and the state and federal standards for ozone were exceeded during a total of 176 and 111 days, respectively. The basin exceeded state and federal PM-10 standards, respectively, for a total of 63 and 9 days. The maximum 24-hour concentration of PM-10 in the basin was 712 micrograms per cubic meter (State of California 1989).

Thus, the only pollutants of concern in the vicinity of the project area, and in the SEDAB in general, are ozone and PM-10. Ozone is not an emitted pollutant, it is formed by photochemical reactions between oxides of nitrogen and reactive organic gases (which are in turn formed from the combustion of

TABLE 3
SUMMARY OF AIR QUALITY DATA
FOR THE SOUTHEAST DESERT AIR BASIN

	Number of Days Over Standard									
	State					Federal				
Pollutant	1985	1986	1987	1988	1989	1985	1986	1987	1988	1989
Oxidant (ozone)	159	161	166	188	176	111	115	101	124	111
Carbon monoxide	0	0	0	0	0	-	-	-	-	-
Sulfur dioxide	0	0	0	0	0	-	-	-	-	-
Nitrogen dioxide	0	0	0	0	0	-	-	-	-	-
Particulates (PM10)	57	54	56	56	63	6	2	3	2	9

SOURCE: California Air Resources Board 1985, 1986, 1987, 1988, 1989a.

- means information was not available (no recordings).

fuels and the evaporation of organic solvents), and atmospheric oxygen. Since the reaction rate depends on the intensity of sunlight, peak ozone concentrations generally occur during the middle of the day. Ozone is much more reactive than normal atmospheric oxygen, and it is this reactivity which accounts for its damaging effects on materials, plants, and health in general. High ozone levels irritate the eyes, nose, and throat; may cause chest pains; and reduce the ability to breathe (particularly during vigorous physical activity). These health problems are particularly acute in children and in the elderly. Ten-micron particulates are suspended particles that can be emitted directly as by-products of fuel combustion, through wear (abrasion) of tires and brake linings, or through wind erosion of soils. Particles of this size can enter the lungs, carrying with them carcinogens and other toxic compounds; the particles may, thus, interfere with breathing and may cause cancer.

D. REGULATORY FRAMEWORK

1. Federal Regulations

The federal Clean Air Act of 1970, amended in 1977, was enacted for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In order to achieve this goal, the act called for the establishment of standards to identify and measure ambient air quality, the performance of new stationary sources, and the emissions of hazardous air pollutants; as well as for the organization of air quality agencies or commissions for the support of implementation and control plans, and of programs for inspection, monitoring, and federal enforcement (U.S. Bureau of National Affairs 1973).

The NAAQS were promulgated by the Environmental Protection Agency (EPA) in 1971. As previously stated, the standards represent the maximum level of background pollution considered acceptable (with an adequate margin of safety) to protect the public health and welfare. NAAQS are divided into two levels, primary and secondary: primary standards are those which are designed, as indicated by medical evidence, to protect human health; secondary standards, sometimes more stringent, are designed to protect vegetation, materials, and "aesthetics."

In promulgating the NAAQS (for sulfur dioxide (SOx), lead, carbon monoxide (CO), nitrogen dioxide (NOx), ozone, and suspended particulate matter), the EPA allowed the states the option to develop different (more strict) standards. In those instances where state and federal standards differ, both must be complied with; nevertheless, if stricter state standards are met, federal requirements will also be met. Several regions throughout the U.S., however, have repeatedly failed to maintain high air quality standards; recent (1990) congressional amendments to the Act will require new and more stringent controls in order to ensure healthy living conditions for future generations.

Federal regulations require a New Source Review (NSR) application for proposed new sources that, after accounting for air pollution control equipment, could emit specified pollutants beyond certain thresholds. Section 182 (d) of the federal Clean Air Act of 1990 has established lower NSR threshold limits, illustrating the increased restrictions imposed by the new act. Responsibility for implementing most of the federal review has been delegated by the EPA to the state and local agencies. As specified in Section 182 (a)(2)(c),

these agencies must amend their programs for enforcement within two years of the passage date of the 1990 Clean Air Act.

2. State Legislation

a. AB 2595. Assembly Bill 2595 (the California Clean Air Act) became effective on January 1, 1989. The act imposes additional responsibilities on all air quality management districts throughout the state, and broadens their authority as well. It allows for the establishment of a permit fee structure that affects area-wide sources based on the quantities of emissions produced, and requires that districts implement regulations to reduce emissions from mobile sources through the adoption and enforcement of transportation control measures. Transportation control measures are defined in the act as "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions." Explicit authority for adoption and implementation of transportation controls has been given to the districts; they, however, may delegate this authority to local agencies.

For the purposes of the California Clean Air Act, the CARB has designated nonattainment areas as "moderate," "serious," or "severe." Areas or districts which can meet air quality standards by 1994 will be classified as "moderate," whereas they will be classified as "serious" if standards cannot be met until 1997. If the standards cannot be met until after 1997, the areas in question will be classified as "severe." Given the SEDAB's status regarding the ozone and PM-10 standards, and the fact that the Air Quality Management Plan (AQMP) does not provide for attainment prior to 1997, the area has been classified as "severe" (Scheibel, CARB, 11/02/90). Even though the 1990 federal Clean Air Act has altered attainment deadlines and varied the deadlines for different pollutants, it is unlikely that the classification of the SCAQMD will be improved.

All nonattainment districts or areas are required to prepare, by July 1991, local air plans designed to demonstrate attainment of the state standards as soon as possible and to achieve, beginning on January 1, 1988, at least a five percent annual average reduction in district-wide emissions of nonattainment pollutants or their precursors from the actual emissions recorded in 1987. The SEDAB is a nonattainment area for ozone and PM-10, and this means that the basin would have to show reductions of not just those two pollutants, but of their precursors as well: oxides of nitrogen, reactive organic compounds, and oxides of sulfur. This emission reduction goal applies to all sources (State of California 1990a).

The requirements for nonattainment areas appear in several sections of the state Clean Air Act, all within the Health and Safety Code [H&SC Section 40918 (a)(3)]. Plans for "moderate" areas include (1) reasonably available transportation control measures, (2) the development of an indirect source control program, (3) public education programs to promote actions designed to reduce emissions, (4) an implementation schedule, (5) identification and agreements from implementing agencies, and (6) monitoring and compliance procedures.

Plans for "serious" areas will include all of the above, plus transportation control measures to "substantially reduce the rate of increase in passenger vehicle trips and miles traveled per trip." For "severe" areas, the same substantial reductions required of "serious" areas must be achieved, *plus* "an average of 1.5 or more persons per passenger vehicle must be achieved during weekday commute hours by 1999, with no net increase in vehicle emissions after 1997." Thus, in major urban areas, this bill will result in greatly enhanced efforts to modify transportation habits and to reduce reliance on the single-occupant vehicle (State of California 1990a).

b. Section 15125 (b) of the California Environmental Quality Act (CEQA) Guidelines. Section 15125 (b) of the CEQA Guidelines contains specific reference to the need to evaluate any inconsistencies between the proposed project and the applicable general and regional plans (State of California 1990b). Implementation of the proposed project would be in accord with the Draft City of Palmdale General Plan existing and proposed land use designation of light industrial for the site. Construction of the proposed project would be accompanied by existing and new development in this part of the city of Palmdale. However, since this growth is planned, it is in accord with the existing and draft general plan's and would not occur until the necessary infrastructure and supporting services are provided. Thus, since development in the area is consistent with land use assumptions and no significant growth-related impacts are associated with the proposed project (with the exception of impacts to utilities and emergency services), the project is consistent with the South Coast AQMP, the applicable air quality management plan for the region.

3. The South Coast Air Quality Management District (SCAQMD)

a. Air Quality Management Plan. The project site is located within the SEDAB portion of Los Angeles County. This portion of the SEDAB is under the jurisdiction of the SCAQMD, the air quality regulatory agency for the entire SCAB. The SCAQMD was established pursuant to the adoption, in 1976, of the Lewis Air Quality Act by the California State legislature. The District is responsible for the management of air quality in an area that encompasses more than 13,600 square miles, and which includes the non-desert portions of San Bernardino County as well as the counties of Los Angeles, Orange, and Riverside. The Lewis Act also required that a planning process be put into place, such program being aimed at producing an AQMP which would be reviewed every two years and modified, as appropriate, in order to achieve attainment of air quality standards established by both federal (NAAQS) and state (CAAQS) governments.

The first AQMP, in 1979, focused on building a data base, establishing conformity of projections with other regional plans being prepared by the Southern California Association of Governments (SCAG), and emphasizing control measures which had been targeted by the EPA and the CARB as having high priority for implementation. The 1979 plan also requested an extension to submit a revision, in 1982, for ozone and carbon monoxide.

The 1982 AQMP revision concentrated on short-term implementation, as well as committing to a continuing planning process. It soon became clear that the region could not meet the 1987 attainment deadlines; the 1982 AQMP, therefore, put forward a 20-year program for said attainment, organized around specific strategies and control measures. Because the 1982 AQMP could

not demonstrate attainment by 1987, a federal court ordered the EPA to disapprove the 1982 plan.

A new AQMP was prepared by the SCAQMD and the SCAG in 1988 and adopted on March 17, 1989. The plan, hereafter referred to as the "1989 AQMP" as per Resolution No. 89-13 of the South Coast Air Quality Management District Board, thus became the governing document for air pollution regulation in the SCAB (in terms of current regulatory strategies and standards). Its purpose is to set forth a comprehensive control plan or strategy to lead the SCAB into compliance with all federal and state ambient air quality standards at the earliest possible date, but in any case, by no later than the end of the year 2007. It will accomplish this goal through a three-tiered approach calling for full implementation of known control and management practices, significant advancements of current technology and vigorous regulatory intervention, and the development of technological breakthroughs. A revised 1991 AQMP was adopted by the District in July of this year. The final text of the new plan, however, has not yet been made available to the public; thus, the provisions of this new plan cannot be discussed or included in this EIR.

b. Rules and Regulations. The SCAQMD also operates under a set of Rules and Regulations applicable to all stationary (nonvehicular) sources of air pollution. Altogether there are 17 regulations covering over 200 rules and over 50 New Source Performance Standards, plus a National Emission Standard for Hazardous Air Pollutants. More specifically, Regulation II discusses Permits, Regulation IV discusses Prohibitions, Regulation IX gives the Standards of Performance for New Sources, and Regulation XI lists the Source Specific Standards. Air pollution that is generated by cars and most other vehicles is the responsibility of the CARB, although the district regulates motor vehicle usage and encourages alternate modes of transportation through Regulation XV, Rule 1503 (amended May 17, 1990).

The following "general" rulings are pertinent to the discussion of the air quality issue associated with the proposed action:

1) Rule 402, Regulation IV ("Nuisance" rule). This is a general provision intended to prohibit emissions ". . . which may cause injury, detriment, nuisance, or annoyance to the public, . . . or which may cause injury or damage to business or property."

2) Rule 403, Regulation IV ("Fugitive Dust"). This rule restricts emissions of fugitive dust from transport, handling, construction, or storage activities. Dust emissions must be kept to a minimum during earth-moving activities. Dust is not to be visible in the atmosphere beyond the property line; particulate matter must not exceed 100 micrograms per cubic meter when determined as the difference between upwind and downwind samples collected at the property line for at least five hours, and every reasonable precaution must be taken to prevent its deposit upon public roadways as a direct result of operations.

3) Rule 431.2, Regulation IV ("Sulfur Content of Liquid Fuels"). This rule limits the sulfur content of all diesel fuels burnt, purchased, sold, or offered for sale in the SCAQMD to not more than 0.05 percent by weight. Thus, emissions from all diesel-powered construction equipment will be regulated by the provisions of this Rule.

4) Rules 475 (Regulation IV) and 1135 (Regulation XI). These rules pertain to the emissions associated with supplying the energy needs of the facilities in the business park, since they control the emission of combustion contaminants from equipment used to generate electric power.

5) Rules 1108, 1108.1, and 1120 (Regulation XI). These rules pertain to the application of asphalt that might occur during the paving of parking lots/internal streets within the business park.

6) Rule 1113 (Regulation XI). This rule is intended to control volatile organic compound (VOC) emissions from architectural coating operations which may take place during and after construction of the business park facilities. The equipment used would be controlled by the provisions of Regulation IX, Subpart SS "Standard of Performance for Industrial Surface Coating: Large Appliances."

7) Rules 1501 through 1504 (Regulation XV). These rules describe the actions employers of 100 or more individuals at any work site must take to reduce work-related trips in single-occupancy vehicles between 6 a.m. and 10 a.m., Monday through Friday. By June 30, 1991, employers are required to submit to the district a trip reduction plan (TRP) designed to reduce solo driving while increasing average vehicle ridership (AVR). The AVR target for the Lancaster-Palmdale area is 1.3 employees per vehicle driven to the work site.

Depending on the land uses on-site, the following "source-specific" rulings may apply:

1) Rule 219 (Regulation II). This rule lists the equipment and/or facilities for which Permits to Construct (as per Rule 201) and Permits to Operate (as per Rule 203) are *not* required. Most of the land uses allowed at the site of the proposed Antelope Valley Business park (as listed in the Specific Plan of October 4, 1990) would incorporate equipment included in this Rule; that is, no permits would be required. The exceptions are: "major automotive and light truck repair" (which may include an automotive paint shop using a "spray booth"); "automotive service station"; printing facilities for multi-copying and blue-printing listed under "business support services" (which may utilize large printing presses); eating establishments (which may include char-broilers); "custom manufacturing and assembly" (which may include the fabrication of furniture and art objects); and "convenience services" (which may include laundering and dry cleaning). All these activities would require Permits to Construct and to Operate (Marshall, SCAQMD, 11/5/90), and would be controlled by the provisions of the rules discussed below. As stated in Rule 212(a), "the Executive Officer shall deny a permit to construct or a permit to operate . . . unless the applicant shows that the equipment . . . may be expected to operate without emitting air contaminants in violation of Sections 41700, 41701, or 44300 (et seq.) of the State Health and Safety Code or of [District] rules."

2) Rules 461 and 463 (Regulation IV). Rule 461, applicable to gasoline/service stations, is intended to control gasoline vapor emissions from gasoline transfer and dispensing operations by equipping all gasoline pumps with vapor recovery systems. Rule 463 addresses the storage of *all* organic liquids, including crude oils, distillates, and fuels.

3) Rules 1102 and 1102.1 (Regulation XI). Rule 1102 applies to the operation of dry cleaning equipment which uses petroleum-based solvents. Rule 1102.1 applies to the operation of dry cleaning facilities engaged in the cleaning of fabrics or leather using one or more washes in perchloroethylene solvent, extracting excess solvent by spinning, and drying by tumbling in an airstream. The rules would apply to any dry cleaning operation or facility on site. Rules 442 and 463 would also be applicable.

4) Rules 1122 and 1151 (Regulation XI). Rule 1151 is applicable to coating operations of passenger cars, small- and medium-size trucks and vans, and motorcycles. Facilities with coating operations considered within the scope of this rule include autobody repair/paint shops and custom-made car fabrication facilities such as those listed under the designation "major automotive and light truck repair." Furthermore, activities at the major repair/paint shop would also be regulated by the provisions of Rule 1122 ("Solvent Cleaners [Degreasers]") and of Regulation IX, Subpart MM ("Standards of Performance for Automobile and Light-Duty Truck Surface Coating Operations"). Rule 463, discussed above, could also apply.

5) Rule 1130 (Regulation XI) and Rule 442 (Regulation IV). Rule 1130 controls reactive organic gases emissions from the graphic art industry, some aspect of which could be found on-site as a "business support activity" (multi-copying, printing, etc). The graphic arts industry (letterpress, lithography, flexography, rotogravure, and screen printing) involves the printing of highly solvent inks onto either porous or non-porous substrates, rapid solvent evaporation, and emission of solvent-laden exhaust from the system. The Rule requires the use of a low-solvent technology or operation of highly efficient exhaust control systems in order to control reactive hydrocarbons from the exhausts. Rule 442 addresses the usage of solvents and the discharge into the atmosphere of vapors generated by the use of such solvents. Lastly, the provisions of Rule 463 ("Storage of Organic Liquids") and of Regulation IX, Subpart QQ ("Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing") would also apply.

6) Rules 1136 and 1145 (Regulation XI). These rules control VOC emissions from wood, plastic, rubber, and glass coatings and would be applicable to any furniture and/or art objects manufacturing facility within the business park.

4. The Regional Growth Management Plan

In February 1989, the SCAG adopted the Regional Growth Management Plan (RGMP). The basic strategy of the RGMP is the redirection of projected growth trends to increase both the housing available in job-rich areas and the future employment available in housing-rich areas. Under such conditions, with the right number (or balance) of housing and employment opportunities, most people living in a balanced area can work there instead of having to commute

long distances. To implement the plan, subregional goals, expressed as "performance goal ratios," are established for the year 2010.

Technically, a subregion is balanced if it had an employment-to-housing ratio of 1.27 in 1984 and if it has a projected employment-to-housing ratio of 1.22 for the year 2010 (the regional average). Job-rich subregions have ratios which are greater than the regional average, while housing-rich subregions have ratios which are lower. Transportation modeling shows that the "job/housing balance ratio" is the most influential determinant of improvements to the transportation network, and reduction in vehicle miles traveled, commute time, traffic congestion, and air polluting emissions. The policies of the RGMP are thus consistent with those of the AQMP (SCAG 1989).

The City of Palmdale is in the North Los Angeles County Subregion. As described in the RGMP, "the 2010 housing forecast for this subregion is 222,600 units, which is an addition of 176,500 units over the 1984 level. The employment forecast of 160,800 units represents 128,100 added jobs between 1984 and 2010. The 'job/housing balance ratio' of 0.71 in 1984 improves to 0.72 in tne year 2010. The balance performance ratio, computed by dividing added jobs by added dwelling units from 1984 to 2010 is 0.73." This ratio is the performance goal that will be used to evaluate progress towards attainment of the "jobs/housing balance" in the subregion that includes Palmdale (SCAG 1989).

In 1987, the City of Palmdale had a population of approximately 33,103 inhabitants, with 13,984 residential units and 10,000 jobs (Minjares, SCAG, 1/17/91). Palmdale's 1987 "job/housing balance ratio," therefore, was 0.71--below the regional average, but very close to the North Los Angeles subregional ratio. It should be noted, however, that the RGMP, as adopted, set subregional goals only. SCAG is presently working on developing job/housing goals for cities and census tracts.

II. ENVIRONMENTAL CONSEQUENCES

The construction and operation of the proposed Antelope Valley Business Park facilities could result in significant impacts to ambient air quality. Using the SCAQMD suggested threshold criteria to decide whether or not to analyze and mitigate a project's air quality impacts given in the Air Quality Handbook for Preparing Environmental Impact Reports (SCAQMD 1987), the project, as proposed, exceeds the threshold levels in at least two categories. The first category, "Threshold Levels for Land Uses," lists a suggested threshold level of 20 acres for an industrial park. With a size of 120.82 acres, the proposed project would exceed this level by six times. The second category, "Trip Attraction or Generation" suggests a threshold of 2,000 motor trips per day. It is estimated that the business park would generate approximately 18,850 average daily trips (ADT), thereby exceeding the trip generation threshold.

Short-term emissions would be associated with on-site construction activities. The long-term impacts would include emissions from the vehicular traffic generated by the project, from "point source" tenant activities, and from the generation of the electricity required to supply the energy needs of the business park. The long-term impacts could have a cumulative effect on the region's air quality, because of the basin's nonattainment status for ozone and PM-10.

A. SHORT-TERM, CONSTRUCTION-RELATED EMISSIONS

Short-term, construction-related air quality impacts would result in emissions of carbon monoxide, sulfur oxides, nitrogen oxides, hydrocarbons (or reactive organic gases), and particulate matter. Emissions of the above pollutants would be generated by three sources: (a) exhaust from heavy-duty/ earth-moving equipment used for site preparation and major hauling operations to remove excavated material or to bring in supplies, (b) earth-moving activities which create so-called fugitive dust, and (c) construction workers' commuting trips to and from the sites.

1. Emissions from Heavy-Duty/Earth-Moving Equipment and Major Haul Operations

The type of construction equipment required for open trenching and building construction may include dozers, rollers, backhoes, loaders, paving equipment, and miscellaneous cranes, gasoline- or diesel-powered delivery trucks, jacking equipment, welding machines, pile drivers, etc. Hauling operations during the construction period would involve the trucking in of supplies and the removal of construction debris. Trucking back and forth over the construction site to water the area for dust control may also be included in this category. Heavy-duty construction equipment is usually diesel-powered. In general, emissions from diesel-powered equipment contain more NOx, SOx, and particulate matter (and less CO and VOC) than emissions from gasoline-powered engines. Table 4 lists emission rates for some of these machines.

The grading plan for the project site has not been prepared yet, and the *exact* number and type of equipment that would be needed on-site during construction activities cannot be determined at this time. Furthermore, it is difficult to quantify emissions from construction activities because the type of activity and the type of equipment used may differ from day to day. The items and the emissions listed in Table 5, however, are considered representative of the mix of equipment which may be reasonably found on a site during the peak construction period. Due to the temporary nature of construction activities, the emissions are not considered significant. Nevertheless, given the nonattainment status of the air basin, steps should be taken to minimize emissions of pollutants that contribute to ozone formation. Applicable control measures are listed below, under Mitigation.

2. Emissions of Fugitive Dust

Actual construction of the facilities would involve soil disturbance (grading) and excavation for sewer and water pipelines (boring and trenching) and for building foundations. On-site movement of the heavy-duty construction equipment will also generate fugitive dust. Material spilled onto paved roads would be ground and suspended by traffic, and the surface of unpaved (haul) roads would be abraded and become airborne with the passage of vehicles.

Fugitive dust emissions may be calculated using a basic emission factor of 1.2 tons per acre-month of grading activity (or 110 pounds per acre-day). Approximately 120 acres would be disturbed during site development; grading will occur in two phases over a four-month period. Thus, approximately 4.8 tons of fugitive dust could be generated by grading activity. An effective watering program (that is, at least twice a day with complete coverage of the

TABLE 4
EXHAUST EMISSIONS RATES
FROM HEAVY-DUTY AND EARTH-MOVING EQUIPMENT
(in pounds per day)

Equipment	Number	Average Hours/Day of Operation	Emissions NO_x	CO	PM_{10}	VOC	SO_2
Front-end loader	1	8	13.01	3.24	1.27	0.94	1.34
Crawler tractor	1	8	28.92	7.23	3.02	1.62	3.73
Roller	1	8	22.24	10.01	1.47	1.65	1.88
Backhoe	1	8	11.20	6.88	1.20	1.64	0.80
Utility truck	1	8	11.16	2.40	1.00	0.56	1.36
12,000-gal. tanker	1	8	51.02	14.27	3.13	2.32	5.57
Dump truck	1	8	15.31	4.28	0.94	0.69	1.67
TOTAL			152.86	48.31	12.03	9.42	16.35

SOURCE: Radian Corporation 1988.

TABLE 5
TOTAL ESTIMATED EXHAUST EMISSIONS
FROM AVERAGE MIX OF ON-SITE HEAVY-DUTY EQUIPMENT
(in pounds per day)

Equipment	Number	Average Hours/Day of Operation	Emissions NO_x	CO	PM_{10}	VOC	SO_2
Front-end loader	2	8	26.02	6.48	2.54	1.88	2.68
Crawler tractor	4	4	57.84	14.46	6.04	3.24	7.46
Roller	1	8	22.24	10.01	1.47	1.65	1.88
Backhoe	2	4	11.20	6.88	1.20	1.64	0.80
Utility truck	2	8	22.32	4.80	2.00	1.12	2.72
12,000-gal. tanker	2	4	51.02	14.27	3.13	2.32	5.57
Dump truck	4	4	30.62	8.56	1.88	1.38	3.34
Forklift	1	3	5.07	2.02	0.42	0.09	0.43
Diesel generator	1	8	13.52	5.40	1.11	0.25	1.14
TOTAL			239.85	72.88	19.79	13.57	26.02

SOURCES: Radian Corporation 1988 and EPA AP-42 1985.

site) is estimated to reduce dust emissions by up to 50 percent (EPA:Sec.11.2.4-1 1985). These emissions, however, do not represent a significant impact because they would occur during a relatively short time. Nevertheless, given the nonattainment status of the air basin, steps should be taken to minimize particulate emissions. The project will be required to comply with dust control measures as stipulated by District's Rules 402 and 403. Other applicable controls are listed below, under Mitigation Measures.

3. Construction Workers' Commuting Trips

The emissions from construction workers' vehicles may be calculated by applying EMFAC 7PC emission factors to estimated vehicle miles of travel (VMT) over the course of the construction period. The emission factors listed in Table 6 are based on a 50/50 percent distribution of hot and cold starts, with speeds ranging from 35 to 50 mph, and at a temperature of 50 degrees Fahrenheit (mean minimum January temperature for the Antelope Valley area, which would represent a worst-case scenario because the lower the ambient temperature the greater the amount of pollutants emitted during the "cold start"). The vehicle mix was assumed to be 82.8 percent autos, 16.3 percent light trucks, and 0.9 percent motorcycles. EMFAC 7PC default values were not used because the vehicle fleet mix would have contained 7.7 percent heavy-duty and 4.3 percent medium-size trucks, which are not commuter vehicles. Thus, these heavy-duty and medium-size trucks (representing 12 percent of the default mix) were eliminated from the vehicle fleet, and the percentage of automobiles and of light pick-up trucks increased instead (from 72.2 percent and 14.3 percent, respectively).

It is estimated that a crew of approximately 75 persons would be needed for the construction of the proposed business park, which is scheduled to begin in early 1992. An auto occupancy of 1.0 may be assumed (a worst-case scenario) for an average round-trip travel distance of 20 miles per day. This assumption on the round-trip distance is based on information contained in Appendix D (Air Quality Analysis) of the Antelope Valley Specific Plan, which uses an estimated trip distance of 10 miles one-way for local travel (Planning Network 1990).

The emissions resulting from these commuting trips are shown in Table 7. The temporary nature of the construction activities and the fact that the vehicles are subject to exhaust controls required by both the EPA and the CARB (which would limit any emissions to relatively small volumes) would reduce these emissions to levels below significance.

B. LONG-TERM, OPERATION-RELATED EMISSIONS

The proposed project involves the development of approximately 120 acres for commercial, industrial, and business park activities with emphasis on manufacturing, research and development, and office-based uses with supporting commercial uses. As reported in the Fiscal Impact Report prepared for this project by Ultra-Research, Inc., specific types of uses planned on site are as follows:

- Industrial - manufacturing, research and development, warehousing and distribution, and various multi-tenant industrial uses.

TABLE 6
EMFAC 7PC EMISSION FACTORS FOR CONSTRUCTION WORKERS' COMMUTE (YEAR 1992)

	Grams per Mile		
Speed	TOG	CO	NOx
35 mph	2.02	23.60	1.34
40 mph	1.73	18.94	1.35
45 mph	1.50	15.24	1.38
50 mph	1.35	12.30	1.44

Idle Emission Factors:

Total Organic Gases = 0.13 gram/minute
Carbon Monoxide = 1.37 grams/minute
Nitrogen Oxides = 0.08 gram/minute

Vehicle Mix: 82.8% autos, 16.3% light trucks, and 0.9% motorcycles

Percent VMT Hot/Cold = 50/50. Temp: 50o F

TABLE 7
TOTAL ESTIMATED EMISSIONS FROM CONSTRUCTION WORKERS' COMMUTE (YEAR 1992)

	Pounds per Day		
Speed	TOG	CO	NOx
35 mph	6.66	77.88	4.42
40 mph	5.71	62.50	4.45
45 mph	4.95	50.29	4.55
50 mph	4.45	40.59	4.75

Number of vehicles: 75
Round-trip distance: 20 miles

- Commercial - primarily retail sales services that support business operations such as administrative and professional offices, business supply retail and services, business support services, fast food sales, and personal services. A service station is among the planned uses, but no manor restaurant and/or bar type facility is planned.

- Business park - primarily light industrial, research and development, and office-based firms.

Thus, permitted land uses on-site could include administrative and professional offices; business support and repair services (car rental agencies, automotive and light truck repair shops, a gas station, maintenance and custodial services, etc.); convenience stores (food mini-markets, laundromats, beauty/barber shops, and other personal services); fast-food establishments; and manufacturing, assembly, storage/warehousing, and retail/wholesaling facilities. Some of these land uses could qualify as "point sources" (that is, non-vehicular sources of air pollutants) as discussed below. Additionally, once operational in the year 1996, the on-site land uses could generate a total of 24,408 vehicular trip ends per day, or 12,204 daily round trips (Crenshaw Traffic Engineering 1991).

1. <u>Emissions from Vehicular Travel</u>

The 24,408 vehicular trip ends associated with the employees' commuting trips and with the customers' visits to the facilities on-site would generate reactive organic gases, carbon monoxide, nitrogen oxides, and particulate matter. Exhaust emissions associated with such trips may be calculated with the EMFAC 7PC factors for the year 1996 shown in Table 8. These factors are again based on a 50/50 percent distribution of hot and cold starts, with speeds ranging from 35 to 50 mph, and at a temperature of 50 degrees Fahrenheit (mean minimum January temperature for the Antelope Valley). The vehicle mix was again assumed to be 82.8 percent autos, 16.3 percent light trucks, and 0.9 percent motorcycles.

The estimated emissions from the vehicular travel are shown in Table 9. Assuming a round-trip commuting distance of 20 miles and an auto occupancy of 1.0 (a worst-case scenario), the calculated emissions are very high. They would represent a potentially significant impact given the nonattainment status of the SEDAB, and of the Palmdale area in particular.

It must be noted, however, that the proposed project, by providing employment opportunities in a "job-poor" area, could reduce the dependency of Palmdale area residents on longer work-related commutes. Although the project does not compel shorter commutes nor does it guarantee a 100 percent shift in jobs, shorter commutes would reduce exhaust emissions from mobile sources and partially mitigate impacts associated with such sources. Thus, even though emissions will still be generated in a non-attainment area, the project would contribute to the improvement of the jobs/housing situation in the area and contribute to the SCAQMD's plans for attainment of ambient air quality standards in the region.

TABLE 8
EMFAC 7PC EMISSION FACTORS FOR VEHICULAR TRAVEL (YEAR 1996)

Speed	Grams per Mile TOG	CO	NOx
35 mph	1.74	21.71	1.19
40 mph	1.50	17.45	1.19
45 mph	1.30	14.07	1.21
50 mph	1.16	11.38	1.25

Idle Emission Factors:

Total Organic Gases = 0.10 gram/minute
Carbon Monoxide = 1.24 grams/minute
Nitrogen Oxides = 0.07 gram/minute

Vehicle Mix: 82.8% autos, 16.3% light trucks, and 0.9% motorcycles

Percent VMT Hot/Cold = 50/50. Temp: 50° F

TABLE 9
TOTAL ESTIMATED EMISSIONS FROM VEHICULAR TRAVEL (YEAR 1996)

Speed	Pounds per Day TOG	CO	NOx
35 mph	934.3	11,658	639.0
40 mph	805.5	9,370	639.0
45 mph	698.1	7,555	649.7
50 mph	622.9	6,111	671.2

Round trips per day: 12,204
Round-trip distance: 20 miles

2. Emissions from Tenant Activities

The proposed project is still in the Specific Plan stage, and it is not known at this time exactly what type of land uses would be on-site. Based on the planned land uses listed in the Specific Plan, however, potential permitted "point sources" on-site could include an automotive paint shop, a gas station, and dry cleaning, eating, and printing establishments. Those point sources would be the source of reactive organic gases and of particulates, but it is anticipated that, as stated in Rule 212, the design or controls required prior to the issuance of permits to construct and to operate would reduce the emissions, and their impacts, to levels below significance.

4. Emissions Associated with the Generation of Electrical Energy

Using information contained in the Draft EIR prepared for Phase III of the Lancaster Business Park (SCH No. 89010281), a facility similar to the proposed Antelope Valley Business Park, the energy requirements of the proposed project may be calculated (City of Lancaster 1990:6-105). It is estimated that the net electrical energy required to operate the business park would be 10.66 million kilowatt-hours (KWH) per year. Applying SCAQMD emission factors for power generation given in the Air Quality Handbook (SCAQMD 1987), it is estimated that emissions produced in the SEDAB by the generation of electricity to supply the power needs of the proposed project would be approximately:

2,130 pounds per year of CO
12,260 pounds per year of NOx
1,280 pounds per year of SOx
430 pounds per year of particulates
110 pounds per year of reactive organic gases

These emissions associated with supplying electricity to the business park would contribute to the total regional pollution burden. However, the provisions of Rules 475 and 1135 would help mitigate the magnitude of this impact.

5. Emissions Associated with Natural Gas Consumption

Information contained in the DEIR for the Lancaster Business Park (City of Lancaster 1990:6-105) may also be utilized to calculate the natural gas requirements of the proposed project. It is estimated that the business park would consume approximately 19.66 million cubic feet of gas per year. Even though natural gas is considered to be a relatively "clean" fuel, some emissions can occur from the combustion reaction. Applying the EPA emission factors for commercial and home heating (EPA:Sec.1.4 1985), it is estimated that the business park would generate approximately:

393 pounds per year of CO
2,359 pounds per year of NOx
12 pounds per year of SOx
3 pounds per year of particulates
104 pounds per year of reactive organic gases

These emissions would also contribute to the total regional pollution burden. A summary of all long-term emissions is given in Table 10. It must be realized that these are estimates only, and that they should not be considered as absolute predictions for future emissions.

C. REGIONAL GROWTH

One of the most difficult aspects of life in southern California is being able to drive on roads and freeways within a reasonable amount of time and with a minimum of stress and frustration. Analysis of mobility patterns indicate that the existing congestion of the freeways and arterial networks in southern California is not only a function of increases in population and employment, it is also related to the unbalanced distribution of jobs and housing within the region. As more and more people have no choice but to travel longer distances in order to get to work, congestion worsens, and so does air quality.

The "jobs/housing balance" is not a new concept. It has long been recognized that there are benefits of balancing the number and types of jobs with the amount and cost of housing as one way of reducing commute distances and emissions of air pollutants. The proposed project, by providing employment opportunities in a "job-poor" area, could reduce the dependency of Palmdale area residents on longer commutes.

D. CUMULATIVE IMPACTS

The SEDAB is currently a nonattainment area for ozone and PM-10. Furthermore, since it is not anticipated that attainment status would be achieved before 1997, the area has been classified as "severe" by CARB. Existing land uses within the immediate vicinity of the proposed project include scattered industrial and commercial facilities (light industrial, offices/ warehouses, and a mini-mart) to the west and to the north. Air Force Plant 42 is located approximately 1.25 miles east-southeast of the site. The properties to the east and south are vacant, but an 80-acre area to the south has been proposed for the site of a future industrial center. In spite of the absence of large industrial complexes, the emissions from the proposed Antelope Valley Business Park, when added to the emissions from the other land uses in the area, would have a potentially significant and adverse impact on the region's air quality. That is because, given the nonattainment status of the basin, *any* amount of particulates, reactive hydrocarbons, or nitrogen oxides emitted in the SEDAB would affect the region's ability to meet federal and state standards for ozone and for PM-10. The project's contribution to improve the jobs/housing balance in the region, however, may be considered an overriding benefit of the project should the City wish to adopt such a position with regard to commercial development in the region.

III. MITIGATION MEASURES

A. FOR SHORT-TERM, CONSTRUCTION-RELATED EMISSIONS

1. As stipulated by SCAQMD Rule 431.2, all heavy-duty construction equipment shall be fueled with low-sulfur fuel. To further reduce emissions, equipment shall be operated according to the manufacturers' instructions (with the fuel injection timing

TABLE 10
SUMMARY OF LONG-TERM
EMISSIONS FROM THE PROPOSED PROJECT
(tons per year)

Emission Source	Reactive Organic Gases	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates
Motor vehicles*	170.5	2,127.6	116.62	-	1.13**
Gas consumption	0.052	0.2	1.18	0.006	0.0015
Power generation	0.05	1.1	6.13	0.6	0.21
TOTAL	170.6	2128.9	123.93	0.606	1.3415

* Based on a minimum average speed of 35 mph (includes employees and visitor trips)

** From tire wear only

\- Negligible emissions

retarded to the recommended level for reduced NOx emissions, but which will not result in excessive visible smoke emissions), be subject to periodic maintenance/tune-ups, and be turned off when not in use in order to avoid idle emissions.

2. Emissions of dust and particulates shall be minimized to avoid a public nuisance. Measures which may be used by the develper or contractor on-site include:

   a. Do not remove the on-site vegetative cover until it is required for construction activities, and revegetate any unpaved areas as soon as possible after completion of construction.

   b. Minimize dust emissions by the application of water or other dust suppression techniques (chemical bonding, biodegradable oils, etc.) to working surfaces during dry weather conditions. An effective watering program (that is, at least twice a day with complete coverage of the working area) is estimated to reduce dust emissions by up to 50 percent. Chemical stabilizers are most useful when applied to completed cuts and fills.

   c. Dust emissions can be reduced further by restricting heavy-duty equipment to dust-controlled routes and limiting the speed of on-site vehicles. A speed limit of 10 miles per hour is recommended.

   d. Suspend construction activities during smog alerts (inversion episodes), and stop all grading activities during periods of high wind.

3. To reduce emissions from construction workers' commute trips, carpooling should be promoted through coordination with Commuter Transportation Services, Inc., or any other carpool matching service.

B. FOR LONG-TERM, OPERATION-RELATED EMISSIONS

Measures to reduce the long-term air quality impacts identified above are implicit in the provisions of the 1989 South Coast AQMP. The City of Palmdale is committed to implementing emission controls and regional mobility/land use policies designed to reduce emissions from stationary and transportation sources and achieve attainment status within the district. The proposed project is consistent with all regional plans; thus, in addition to being subject to all of the district's applicable Rules and Regulations discussed in Section I.D.3.d above, the Antelope Valley Business Park would have to include in its design plan all the applicable, reasonably available, and feasible air quality control measures contained in the 1989 AQMP.

The AQMP's Tier-One control measures that are applicable to the proposed project, which can be implemented in the next five years through the proposed development plans, and which would reduce to levels below significance

long-term emissions from mobile sources in general or from the permitted sources on.site include the following:

1. AQMP Measures No. 1.a and 1.b: "Alternative Work Weeks and "Flextime/Establishment of Telecommunication Programs" to reduce roadway congestion and emissions of reactive organic gases (ROG), NOx, and CO.

2. AQMP Measures No. 2.a through 2.d: Establishment of "Mode Shift Strategies" (Employer Rideshare and Transit Incentives, Parking Management Programs, Vanpool Purchase Incentives, and Merchant Transportation Incentives) to encourage the use of alternative transportation modes and reduce emissions of ROG, NOx, and CO.

3. AQMP Measure No. A-10: "Further ROG Emission Reductions from Graphic Art Operations," applicable if graphic arts are included in the "business support facilities" on-site. This measure would not result in direct emission reductions, but should improve enforcement of and compliance with Rule 1130.

4. AQMP Measure No. A-16: "Further ROG Emission Reductions from Perchloroethylene Dry Cleaning Operations" applicable to any dry cleaning facility located on-site. This measure would require replacement of transfer systems with "closed/ventless" dry-to-dry equipment and eliminate the exemption which allows facilities which use less than 230 gallons per year of solvent to operate without control equipment.

5. AQMP Measure No. B-2: "Control of ROG Emissions from Gasoline Transfer: Improved Installation and Repair of Phase-II Vapor Recovery Systems" applicable to any on-site gas/service station.

6. AQMP Measure No. C-3: "Control of ROG and Particulate Emissions from Commercial Charbroiling" applicable to eating establishments. This measure proposes the use of exhaust control technologies and changes in grill design, which may reduce emission of pollutants and also reduce fire hazards while saving energy.

7. AQMP Measure No. 3.a: "Truck Dispatching, Rescheduling, and Rerouting" to reduce truck-related emissions (ROG, NOx, and CO) and traffic congestion caused by the presence of heavy-duty, slow-moving delivery trucks in the traffic stream.

Other applicable mitigation measures include:

1. Adherence to Transportation Management Plans as dictated by SCAQMD Regulation XV (Rule 1503) and to any mitigation measures proposed in the traffic study to reduce congestion.

2. Project design plans could include mass transit accommodations such as bus turn-out lanes, and bus shelters/benches.

3. Tenant activities could distribute promotional/educational material (obtained from the City) describing ways to reduce energy consumption, and also advertising the availability of public transit, bicycle routes, and so on to encourage the use of mass transit in the area.

4. The project shall contribute to the Commuter Transportation Services, Inc., the City's Air Quality Impact Mitigation Program, and Park-N-Ride monetary fund.

5. In order to comply with the provisions of the SCAQMD energy conservation programs, the building plans could incorporate such features as energy efficient lighting for internal streets, and design elements that reduce the demand for gas and electricity.

At this time, the CARB has classified the SEDAB as a "severe" nonattainment area, given the basin's status regarding the ozone and PM-10 standards and the fact that the 1989 AQMP does not provide for attainment prior to 1997. Even though the 1990 federal Clean Air Act has altered attainment deadlines and varied the deadlines for different pollutants, it is unlikely that the classification of the SCAQMD will be improved. The California Clean Air Act requirements for "severe" areas are listed in Section 40918 (a)(3) of the Health and Safety Code and are discussed in Section D.2.a. of that report. Those requirements may be complied with through the implementation of the mitigation measures listed above, which include reasonably available transportation control measures and a public education campaign. Additionally, Rule 1503 (Regulation XV) includes plans for the control of mobile sources, implementation schedules, monitoring and compliance procedures, and a means of reducing single-occupancy in commuter vehicles.

IV. RESIDUAL IMPACTS

Implementation of the proposed action is anticipated to have a significant cumulative impact upon local and regional air quality. This impact, which will not be reduced to levels below significance by the mitigation measures listed above, will be primarily due to increased emissions from mobile sources. Nevertheless, it must be noted that, by providing employment in the community, the project will reduce the need for longer commutes. Overall, this reduction in the number of miles travelled would be a contribution to the SCAQMD's plans for attainment of ambient air quality standards in the region.

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VIII. GLOSSARY

AAQS: Ambient Air Quality Standards. Emission limitations that protect the quality of the surrounding air.

Air pollution: The presence in the outdoor atmosphere of one or more contaminants in quantities, of characteristics, and of duration, such as to be injurious to human, plant, or animal life or to property, or which unreasonable interferes with the comfortable enjoyment of life and property.

Air Quality Standards: The maximum limits or concentrations of pollutants permitted in air, usually expressed in terms of a maximum allowable concentration averaged over a specified interval. United States standards are based on estimates of maximum concentrations which, with an allowance for safety, present no hazard to human health or the environment.

Area source: Stationary and mobile sources which individually do not qualify as a point source and are too small and numerous to be maintained separately in the inventory.

AQMP: Air Quality Management Plan.

ARB: Air Resources Board.

"Authority to Construct": Written permit pursuant to Rule 201, Regulation II of the SCAQMD which must be obtained from the District prior to the construction, alteration, or replacement of any article, machine, or equipment which may emit air contaminants or affect in any way the emission of those contaminants.

Carbon monoxide (CO): Colorless, odorless, toxic gas produced by the incomplete burning of the carbon in fossil fuels.

CEQA: California Environmental Quality Act. Policies enacted in 1970, and subsequently amended, for the purpose of maintaining a quality environment for the people of California now and in the future.

Clean Air Act: The Federal law regulating air quality. When last amended, in 1977, it required that each state revise its implementation plan in order to provide for the attainment of the National Ambient Air Quality Standards (NAAQS) as early as possible, but no later than December 31, 1987. It also called for the states to protect areas where the air was still relatively clean.

Control strategies: A combination of limiting measures designed to achieve the aggregate reduction of emissions.

Criteria pollutant: One of six air pollutants for which a National Ambient Air Quality Standard has been established by the Environmental Protection Agency based on specific health criteria: sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter (smaller than 10 microns in diameter, or PM10), and lead.

EIR: Environmental Impact Report. Document in which the impacts of any state or local, public, or private project action which may have a significant environmental effect are evaluated prior to project construction or implementation, as required by the California Environmental Quality Act.

Emission inventory: The compilation of the quantities of air pollutants from all sources in a defined area entering the air in a given time period, which is typically one year.

Emission standard: The maximum amount of a specified pollutant permitted in airborne discharges.

EPA: Environmental Protection Agency.

Fugitive emissions: Emissions to the atmosphere from pumps, valves, flanges, seals, and other process points not vented through a stack. Also includes emissions from sources such as ponds, landfills, etc.

Fugitive dust: Any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack.

Hydrocarbons (HC): Gases which represent unburned and wasted fuel. They come from incomplete combustion of gasoline and from evaporation of petroleum fuels.

Indirect source: As defined in Section 110(a) of the federal Clean Air Act, it is "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract mobile sources of pollution".

Inversion: A thermal gradient created by warm air situated above cold air. An inversion suppresses turbulent mixing and, thus, limits the upward dispersion of polluted air.

Lead agency: The public agency principally responsible for carrying out or approving a project which may have a significant effect upon the environment.

Mobile source: A moving vehicle (airplanes, automobiles, trucks, trains, ships, and farm and construction equipment) that emits pollutants.

Nitrogen oxides (NOx): Poisonous and highly reactive gases produced when fuel is burned at high temperatures causing nitrogen in the air to combine with oxygen.

Nonattainment area: A geographic area designated by the Environmental Protection Agency where violation of at least one National Ambient Air Quality Standard occurs.

Ozone: Colorless, toxic gas formed by a complex series of chemical and photo-chemical reactions of reactive organic gases, principally hydrocarbons, with the oxides of nitrogen.

"Permit to Operate": Written permit pursuant to Rule 203, Regulation II of the SCAQMD which must be obtained from the District before the article, machine, or contrivance subject to an "authority to construct" is put into operation.

Photochemical smog: The atmospheric condition that results when reactive organic gases and nitrogen oxides emitted into the atmosphere react in the presence of sunlight to form other pollutants.

Point source: As defined in Title 40 (Part 51, Subpart A) of the Clean Air Act, it is "any stationary source causing emissions in excess of 100 tons per year of any pollutant for which there is a national standard in a region containing an area whose 1970 'urban place' population, as defined by the U.S. Bureau of Census, was equal to, or greater than, one million (or, if the 1970 'urban place' population was less than one million, causing emissions in excess of 25 tons per year).

Reactive organic gas (ROG): An organic gas (hydrocarbon and related compounds) which undergoes photochemical reactions along with other compounds in the air to form other pollutants, primarily ozone.

SCAB: South Coast Air Basin. One of the fourteen regions into which the state of California is divided for the purpose of monitoring air quality. The SCAB includes the counties of Los Angeles, and Orange; the western half of Riverside County; and the non-desert portion of San Bernardino County.

SCAQMD: The air quality regulatory agency for the entire South Coast Air Basin, also has jurisdiction over the SEDAB.

SEDAB: Southeast Desert air Basin. One of the fourteen regions into which the state of California is divided for the purpose of monitoring air quality. The SEDAB includes the eastern halves of San Diego, Riverside, and Kern counties; northeastern Los Angeles County; and northeastern San Bernardino County.

Significant environmental impact: As defined by CEQA, Chapter 3, Article 1, Section 15002 (g), it is "a substantial *adverse* change in the physical conditions which exist in the area affected by the proposed project."

Sulfur dioxide (SO2): Corrosive and poisonous gas produced mainly from the burning of fuel containing sulfur.

Vehicle miles traveled (VMT): The sum of distances traveled by all motor vehicles in a specified region. This sum is used in computing the emission inventory for motor vehicles.

APPENDIX C

PRELIMINARY GEOTECHNICAL INVESTIGATION
Antelope Valley Business Park
Tract 44769
Southeast Corner of 10th Street West and Avenue M
Palmdale, California

for

The Lusk Company
Tri-Counties Division

W.O. 3473-VN August 27, 1990

GeoSoils, Inc.

GeoSoils, Inc.

Geotechnical Engineering • Engineering Geology

6634 Valjean Avenue • Van Nuys, California 91406 • (818) 785-2158 • FAX (818) 785-1548

August 27, 1990
W.O. 3473-VN

The Lusk Company
Tri-Counties Division
15350 Sherman Way, Suite 490
Van Nuys, California 91406

PRELIMINARY GEOTECHNICAL INVESTIGATION
ANTELOPE VALLEY BUSINESS PARK, TRACT 44769
SOUTHEAST CORNER OF 10TH STREET WEST AND AVENUE M
PALMDALE, CALIFORNIA

INTRODUCTION

As requested, GeoSoils, Inc., has performed a preliminary geotechnical investigation of the subject property. The purpose of the investigation was to evaluate the near-surface geologic and soil conditions with respect to proposed commercial development of the site.

Our investigation was performed with the goal of providing additional preliminary geotechnical data with which to assess the recommendations given in previous reports by Buena Engineers (see References).

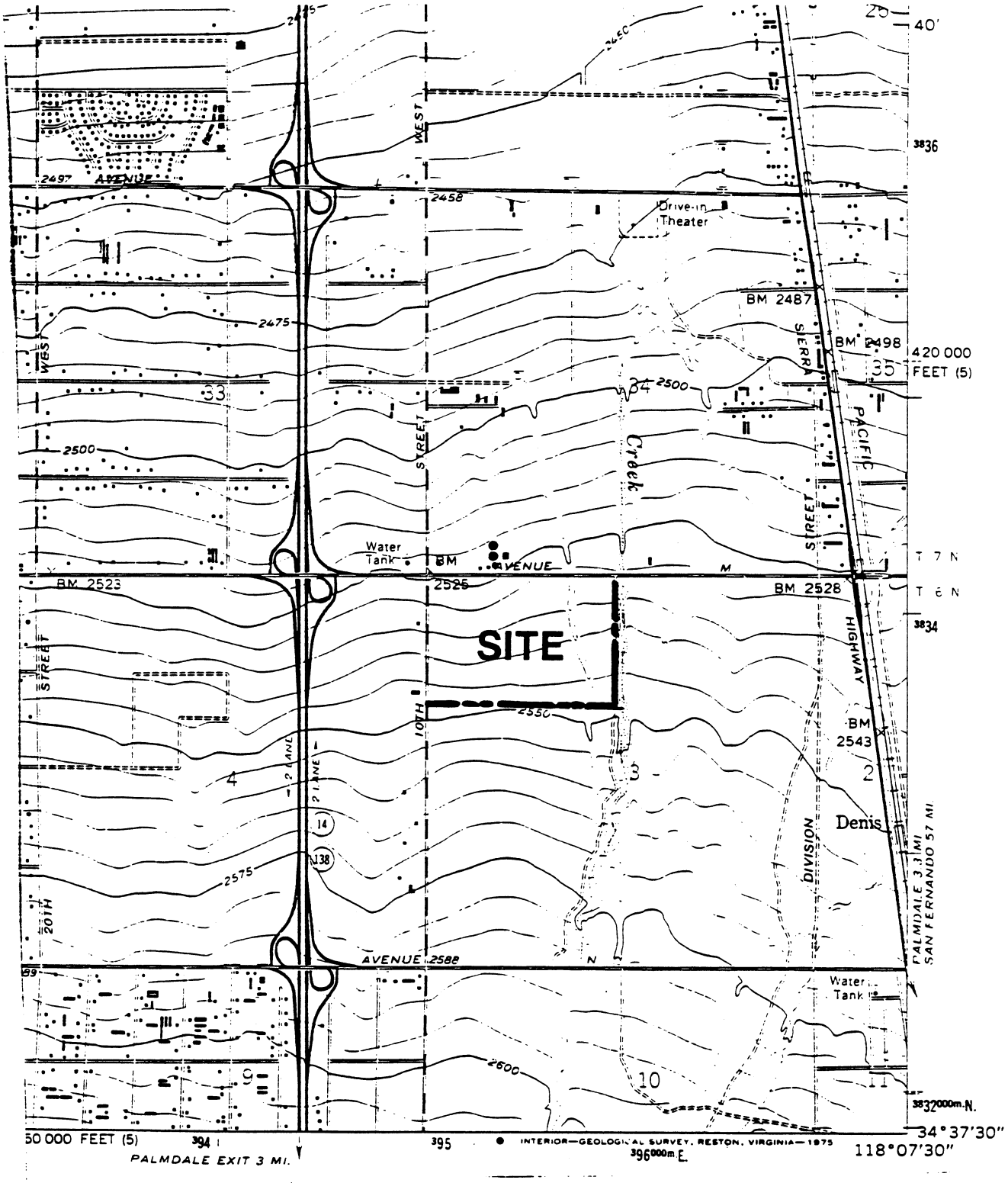
Our investigation included research of available pertinent published and non-published geologic literature and maps, review of United States Department of Agriculture aerial photos and

aerial photos in the Whittier College Fairchild collection, excavation and sampling of 7 exploratory borings to a maximum depth of 55 feet, laboratory testing of selected samples, engineering analysis, and preparation of this report. In addition to GeoSoils, Inc., borings, Buena Engineers drilled 9 borings in 1982 and 15 borings in 1988. Included in this report are preliminary grading recommendations, as well as discussions and recommendations concerning issues raised by Slosson and Associates during their second party review of Buena Engineer's geotechnical report of the property.

The approximate locations of the borings are shown on Plate 1. Logs of GeoSoils, Inc., borings are presented on Plates A-1 through A-9. Laboratory test results are presented in Appendix A. Buena Engineer's 1988 boring logs and laboratory test results are presented in Appendix B and their 1982 boring logs and laboratory test results are presented in Appendix C.

SITE DESCRIPTION

The site is located at the southeast corner of the intersection of 10th Street West and Avenue M in Palmdale, California. The Antelope Valley Freeway (Highway 14) is to the west and Sierra Highway is to the east. The site is roughly rectangular in shape and contains approximately 120 acres (see Vicinity Map, Figure 1).



NOTE: MODIFIED FROM U.S.G.S. LANCASTER WEST QUAD SCALE 1:24,000

GeoSoils, Inc.

VICINITY MAP
PROPOSED BUSINESS PARK
AVENUE M AND 10th STREET PALMDALE
THE LUSK COMPANY

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FIGURE 1

Topographically, the site slopes very gently northward at one to two percent grades. Drainage is predominantly by sheetflow to the north and northeast, eventually flowing to Amargosa Creek to the east.

The site is presently vacant and largely in its natural state. Small amounts of the fill generated during grading of 10th Street West and Avenue M, occur along the north and west perimeters of the site. Vegetation consist of creosote, sagebrush, common Joshua trees, and local grasses.

Rubbish has been dumped into the drainage courses along the eastern portion of the site. This rubbish appears to be predominantly discarded household trash which should be collected and disposed of off-site. No other areas of dumped and/or buried rubbish or fill were obvious on the available aerial photos reviewed in the Whittier College Fairchild collection or the U.S.D.A. photos.

PROPOSED DEVELOPMENT

Proposed development would create a business park of approximately 71 nearly level, 0.5 to 7.2 acre building pads for construction of one and two-story wood frame, concrete block, and/or concrete tilt-up structures (see Plate 1). Exact development plans have not been completed at this time. It is tentatively proposed to

construct access streets in the first phase of site development and grade building sites on an individual basis.

Grading recommendations in this report should be applicable, whether or not the grading is performed at one time, or in the tentatively proposed phases. According to the Design Engineer, Cushman and Associates, both cuts and fills will be four feet or less.

It is our understanding that the existing Amargosa Creek to the east will be channelized as part of a flood control master plan for the region.

WATER

Surface Water

Surface water is limited largely to seasonal precipitation falling directly on site; however, during periods of high intensity rainfall, water may sheetflow across the site from areas off-site to the south.

A nearly north-south trending drainage, labeled "Amargosa Creek" on the 1974 photorevised U.S. Geological Survey topographic map of the Lancaster West Quad, parallels the eastern border of the site. This channel is suspiciously straight in the north-south direction. This channel was dry at the time of our investigation.

Aerial photos from the Whittier College Fairchild collection were reviewed to evaluate possible past drainage patterns of Amargosa Creek. Flight C-300, Frames C-17, 18 and C-349-352 (1928) indicate that the Amargosa drainage has an aggrading divergent braded stream pattern. These photos clearly show past channels; one of which trends northwesterly across the eastern portion of the site. Because the drainage area is gently sloping to nearly level, sediment eventually accumulates in the channel (i.e., aggradation) to the point where it is more efficient for drainage to flow along an alternate course, thereby causing the divergent braided pattern apparent in the photos.

The predominant direction of the Amargosa drainage appears to be northeasterly. The 1928 photos show a farm south of the subject site situated across the main Amargosa drainage. It appears that construction of the farm may have diverted drainage around the western edge of the farm, and then to the north. The straight drainage channel adjacent to the east side of the subject site appears to be an artificially dug channel to direct the flow which may have been diverted around the farm.

Review of photos from Flight C-6500, flown in June 1940, indicate that drainage in the straight north-south channel is more deeply entrenched than was apparent in the 1928 photos, indicating higher erosion rates downstream from the farm site. The cause for the

increased erosion downstream (north of the farm) could be, a) increase in runoff water (i.e., heavy rains of 1934 and 1938), or b) desilting upstream, thereby, increasing sediment transport capacity downstream. A possible increase in surface water runoff could be attributed to the heavy rains of 1934 and 1938.- According to available data, the source area for Amargosa Creek received six to eight inches of rainfall between February 27 and March 4, 1938 (Troxell, 1942). It is interesting to note that three farm buildings apparent in the 1928 photos are absent from the 1940 photos and the farm appears to be abandoned.

As indicated by Slosson and Associates, the National Flood Insurance Program Flood Insurance Rate Map, prepared by Los Angeles County Flood Control District, shows a good portion of the subject property to be located in flood zone AO (depth one foot to three feet, averaging one foot). Also, Slosson and Associates, indicated that the consultant should comment on whether a future flood could pose any problem with foundation performance.

As previously mentioned, Amargosa Creek is to be channelized as part of a flood control plan in the region. Surface water runoff control should be designed by the Project Civil Engineer, taking into account all available data for regional drainage. If properly designed, future flooding potential should be low. However, if site flooding did occur, it is our opinion that the

duration would be relatively short. Desert floods rarely persist over several hours in duration, and more commonly only minutes. The potential for hydroconsolidation in the remote possibility of flooding after site development and proper surface drainage improvements should be negligible since the foundation will be constructed on compacted fill over pre-saturated alluvial bottoms recommended further in this report. The potential for erosion of the foundation bearing soils should be low because of the short duration expected in the unlikely event of a flood. Also, it is anticipated that parking lot asphalt and walkway pavement adjacent to buildings would protect against soil erosion to some degree. It is our opinion that in the event of a flood, the greatest damage would be to the interior content of the buildings and silting, with minimal adverse impact to the foundations.

Ground Water

Ground water was not encountered in any of the GeoSoils, Inc., exploratory borings (maximum depth 55 feet). Water was also not encountered in exploratory borings by Buena Engineers. Regional ground water data indicate that the ground water table is over 240 feet below the site (Kunkel, 1962).

The site is underlain by the Lancaster Subunit aquifer. The recharge area for the aquifer is presumably to the south near the northern perimeter of the San Gabriel Mountains (Duell, 1987). In

the 1880's water wells drilled to depths of 200 to 500 feet in certain areas of the Antelope Valley yielded flowing water (i.e., artesian wells) suitable for irrigation (Kunkel, 1962). According to Johnson's hydrologic map (U.S.G.S. Water Supply Paper 278), the site is located south of the flowing well zone, however, it is possible that ground water under the site is artesian, but of insufficient hydraulic head to cause surface flow in wells. Experience has shown that areas underlain by artesian aquifers are the most likely areas to experience ground surface subsidence from overpumping.

Mr. John Pernula, Engineering Assistant, Palmdale Water District, indicated that the agency presently pumps from 25 wells, averaging 980 feet in depth (personal communication). He also indicated that the aquifer is in overdraft, but to what extent is unknown at this time because of uncertainties in recharge data and subsurface outflow. However, Mr. Pernula stated that he knows of no subsidence problems due to ground water overdraft in the Palmdale area at this time. Mr. Bill Edgenton, Geologist for the City of Palmdale, also is not aware of subsidence due to ground water withdrawal in the area at this time (personal communication).

It appears that overdraft in the Antelope Valley, mainly a result of pumping for irrigation northeast of Lancaster has existed at least since the early 1920's (Kunkel, 1962). To date, surface

subsidence due to ground water withdrawal has not been observed in the Palmdale area. Subsidence and ground cracking has, however, been detected in other areas of the Antelope Valley. Mr. Bill McCaffrey, U.S. Geological Survey, Sacramento, indicated that ground cracks and subsidence at Edwards Air Force Base, approximately 11 miles north of the subject site, have been observed since 1981 (personal communication). Mr. McCaffrey's studies (in press) have concluded that the subsidence and ground cracking are related to ground water withdrawal of the underlying confined aquifer. His studies suggest that subsidence is most likely to occur as a result of dewatering of fine-grained sediments under artesian pressure and he would not expect such phenomenon to occur in a coarse-grained aquifer under low pressure, such as is that of the Palmdale area.

In summary, significant subsidence of the area underlying the site due to ground water withdrawal is unlikely because, a) the aquifer pressure is relatively low as evidenced by lack of flowing wells (Johnson, 1911), b) borings indicate that soils underlying the site are generally coarse. Coarser sediments would be expected here as compared to the Edwards Air Force area because the subject site is closer to the sediment source area to the south, c) the aquifer underlying the site has apparently been in overdraft since the 1920's (Kunkel, 1962) and there is no known record of ground water related subsidence and/or cracking in the Palmdale area.

Therefore, it is our opinion that future ground water withdrawal-related subsidence underlying the subject site is unlikely and the risk to proposed development is very low.

EARTH MATERIALS

The site is underlain by deep Quaternary alluvial deposits with relatively minor amounts of fill associated with road grading adjacent to 10th Street and Avenue M. Bedrock was not encountered during our investigation. GeoSoils, Inc., boring B-5 was drilled 55 feet and encountered alluvial deposits to total depth.

Alluvium on the site consists of fine to coarse silty sand. The sand is crudely stratified and poorly consolidated. Detailed soil descriptions are provided in logs of the test pits and borings.

Expansion index (swell) tests performed on representative samples indicate that near-surface soils have a very low expansion potential (see Appendix A).

In general, the upper several feet of alluvium is loose, dry, and porous. This condition is typical of alluvial soils deposited in a semi-arid environment.

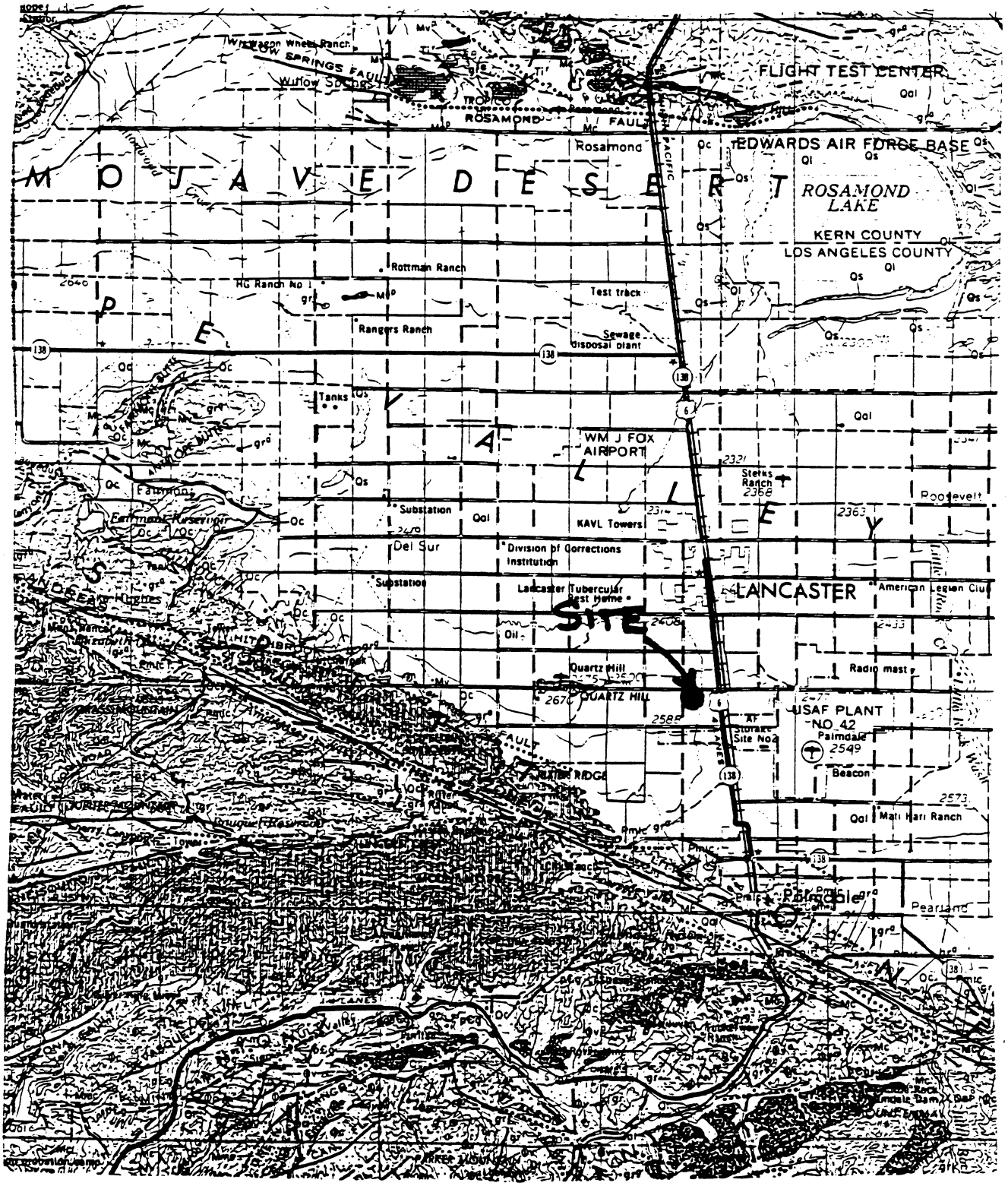
The soils become firmer and less porous with depth; however, laboratory tests indicate the alluvial soils have a significant hydroconsolidation potential (i.e., two to six percent compaction upon the addition of water) to depths up to 7½ feet (see Consolidation Diagrams, Plates C-1 to C-26, and consolidation data by Buena, Appendix B and C).

The hydroconsolidation potential of the upper eight feet of alluvial soils can be reduced by removal and recompaction of loose soils in combination with saturation of alluvial bottoms as discussed further in this report.

SEISMICITY

The site, as all of Southern California, is located within a seismically active region. Although there are no known active or potentially active faults on the site, there are faults in close enough proximity to cause moderate to intense ground shaking during the lifetime of the development (see Regional Geologic Map, Figure 2).

The site is located about five miles north of the Mojave segment of the San Andreas Fault, capable of generating a maximum credible earthquake of 8.5 Richter Magnitude, or about X Mercalli Intensity on the subject site. The maximum probable repeatable high ground acceleration is about .383 g. These values have been



NOTE: MODIFIED FROM C.D.M.G. GEOLOGIC ATLAS OF CALIFORNIA LOS ANGELES SHEET

GeoSoils, Inc.

REGIONAL GEOLOGIC MAP
PROPOSED BUSINESS PARK
AVENUE M AND 10th STREET PALMDALE
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FIGURE 2

determined by the unconstrained-mean, acceleration versus distance chart for a deep soil site by Campbell (1987). The results were generated by computer using E.Q. Fault and E.Q. Search programs by Tom Blake (see Appendix D). Other distant faults likely to affect the site during the lifetime of the development, as well as historic earthquakes that have affected the site in the past and probability of exceedance for acceleration and magnitude are also presented in Appendix D.

Potential earthquake related effects on the site, such as lurching, ground rupture, and liquefaction are considered remote. Ground shaking should be no more severe than that of similar developed properties adjacent to the site. Estimated accelerations expected during the lifetime of the proposed development are relatively high, therefore, we recommend seismicially resistant structural design for the project.

MASS WASTING

The site is gently sloping northward with no significant natural slopes. There is no evidence that significant mass wasting processes affect the site, other than minor surficial gullying and erosion due to storm runoff from off-site areas to the southwest. As previously mentioned, surface water runoff will require control as part of site development.

CONCLUSIONS

The most significant geotechnical constraint for site development is the presence of compressible alluvium subject to hydroconsolidation. We recommend this condition be minimized by densification of upper loose material by a combination of removal and mechanical compaction and saturation as outlined in the "Recommendations" section of this report. The removal depths will be similar to those recommended by Buena Engineers; however, the degree of saturation and depth of saturation of alluvial bottoms is higher.

The proposed development is feasible provided the recommendations contained herein are adhered to during both planning and construction phases of the project.

SLOPES

Grading will create nearly level lots. No graded slopes higher than four feet are currently planned. All graded slopes should be constructed at 2:1 gradients or flatter.

SITE PROCESSING AND GRADING

a. All vegetation, rubbish, and other deleterious material shall be disposed of off-site.

b. The following applies to both cut and fill areas. All old fill and compressible alluvium subject to hydroconsolidation should be removed and recompacted to 90 percent of its maximum density. The average depth of compressible material subject to significant hydroconsolidation is eight feet below the present ground surface based upon laboratory density tests, consolidation tests, and blow counts (see Appendix A).

An alternate method would be to remove a minimum of four feet of alluvium below existing or proposed grade, whichever is lower, and saturate the remaining underlying material that is subject to hydroconsolidation to a minimum of 85 percent degree of saturation. Based upon the sandy nature of the on-site soils and percolation rate tests performed by Buena Engineers, the saturation method appears feasible, however, actual field tests over limited areas should be considered prior to implementation over the entire site.

c. All excavation bottoms shall be observed and approved by the Geotechnical Engineer prior to placement of fill. Firm sand below eight feet, or artificially saturated silty sand below four feet, may provide a suitable removal bottom provided that the material is relatively dense and non-porous. Field density testing shall be performed on excavation bottoms by

technicians from this firm to ensure that the relative in-place density of natural and/or saturated soils to receive fill is a minimum of 85 percent (ASTM D-1557-78).

Following testing and approval of saturated areas, the bottoms should be scarified to a depth of 12 inches and compacted with a heavy vibrating compactor having pads of relatively large surface area (such as an "elephant's foot") as soon as possible after verification of saturation (i.e., within 24 hours).

d. Due to the relatively flat topography of the site and deep ground water table, no subdrains are anticipated beneath fill areas. If perched ground water is encountered in deeper excavations, recommendations by the Geotechnical Engineer will be provided at that time.

Fill Placement

a. All import soils must be tested for compaction and swell characteristics by the Geotechnical Engineer prior to transporting to the site.

b. Material used in the compacting process should be evenly spread, watered to 120 percent optimum moisture, processed, and compacted in thin lifts not to exceed six

inches in thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a horizontal plane, unless otherwise recommended by the Geotechnical Engineer.

c. If the moisture content or relative density varies from that required by the Geotechnical Engineer, the Contractor should rework the fill in accordance with the requirements of the Geotechnical Engineer.

d. Each layer should be compacted to at least 90 percent of the maximum density in compliance with the testing method ASTM Test Designation D-1557-78.

e. Rock fragments less than six inches in diameter may be utilized in the fill, provided:

    1) They are not placed in concentrated pockets.

    2) There is a sufficient percentage of fine materials to surround the rocks.

    3) The distribution of the rocks is supervised by the Geotechnical Engineer.

f. Rocks greater than six inches in diameter should be disposed of off-site or windrowed in deeper fill areas in

accordance with the recommendations of the Geotechnical Engineer in areas designated as suitable for rock disposal.

Grading Observations

a. Observation of the fill placement should be provided by the Geotechnical Engineer during the progress of grading.

b. In general, density tests will be made at intervals not to exceed 500 cubic yards or every 2 vertical feet of fill placed. The criteria will vary depending on soil conditions and the size of the fill. In any event, an adequate number of field density tests will be made to verify that the required compaction and moisture content is being achieved.

c. Density tests shall be made on the surface material to receive fill, as required by the Geotechnical Engineer.

d. All processed ground to receive fills, saturated alluvium, and rock disposal areas must be observed and tested by the Geotechnical Engineer prior to any fill placement. It will be the Contractor's responsibility to notify the Geotechnical Engineer when such areas are ready for observation.

e. Each day, the Contractor will receive a copy of the Geotechnical Engineer's "Daily Field Testing Report" which

will indicate the results of field density tests for that day. Where failing tests occur, or other field problems arise, the Contractor will be notified of such conditions by written communication from the Geotechnical Engineer in the form of a conference memorandum, to avoid misunderstandings arising from oral communication.

Shrinkage

Based on an analysis of the laboratory test results and experience with other similar grading projects nearby, an estimated shrinkage factor of 15 to 20 percent resulting from recompaction of the on-site alluvial soils can be used in the engineering design estimate for the proposed grading. This factor is based on an average of 90 to 93 percent recompaction and average densities of shallow undisturbed ring samples.

Preliminary Foundation Recommendations

The following recommendations are provided for preliminary design purposes. These recommendations assume the expansion index of the soil to be low to medium. Specific recommendations will depend largely upon actual expansion index tests performed at finish grade and the design of the proposed building. Settlement

analysis should be performed for each building on an individual basis as detailed building plans become available.

Conventional Foundations

a. An allowable bearing pressure of 2000 pounds per square foot on compacted fill including dead and live loads, for footings and foundations founded at a minimum depth of 18 inches below grade for single-story structures, or 24 inches below grade for two-story structures may be utilized in design. A minimum width of 18 inches should be utilized in all foundations. Footings should be continuous and reinforced with a minimum of one No. 4 rebar placed at the top and one at the bottom.

b. For continuous footings for both single and two-story structures, it is permissible to have lateral stem walls; however, all footings should be connected at least in one direction.

c. A friction coefficient for concrete on natural and compacted soil of 0.4 and a lateral bearing value of 200 pounds per square foot per foot of depth may be employed to resist lateral loads.

These values may be increased by one-third when considering short term seismic and wind loads.

d. Slabs-on-grade should be a minimum of four inches (nominal) in thickness, with a minimum of 6x6/10-10 welded wire mesh for reinforcement. Floor slabs in office areas should be further protected with an eight-mil plastic vapor barrier. The vapor barrier should be sandwiched between one-inch layers of clean sand to aid concrete curing and to protect the barrier from punctures. All slab reinforcement should be properly supported to ensure desired placement.

A grade beam 18 inches by 18 inches should be provided across any garage and/or warehouse entrance. The base of the grade beam should be at the same elevation as the adjoining footing.

Retaining Walls

Conventional retaining walls should be designed using an active earth pressure computed as an equivalent fluid having a density of 30 pounds per cubic foot when the grade of the backfill behind the wall is level. When the finished slope of the backfill is 2:1, an equivalent fluid density of 43 pounds per cubic foot may be used. Earth pressure will be greater on restrained walls where yielding at the top of the wall is limited either by stiffness (i.e., return walls, etc.) a structural floor network prior to

backfilling. For restrained walls, the equivalent fluid density to be used for design should be increased by 50 percent from the above recommendations for conventional walls. The walls should also be designed to support possible surcharge loads. Backfill within 24 inches of the walls should consist of clean, granular, free-draining material, and all walls should be constructed with weep-holes on ten foot centers, or with perforated drain pipe embedded in a drain rock envelope along the back base of the wall.

Pavement Design for Streets and Parking Area

All areas to be paved should be graded in accordance with the guidelines presented in the site grading recommendations. A laboratory "R" value test was performed on a sample of typical upper site soils in order to determine preliminary design sections. An "R" value of 70 by expansion can be used for preliminary pavement design for bidding and cost estimates (see Appendix A). The following pavement sections are recommended for preliminary design purposes.

Service	Pavement Thickness (inches)	Base Course (inches)
Light Passenger Car Parking Areas	3	4
Moderate Truck Driveways	4	6
Streets	4	6

Base coarse should be aggregate base material per "Standard Specification for Public Works Construction" Greenbook specifications.

Final pavement design sections cannot be determined at this time due to variable factors which may be associated with grading the site. These factors include the type of soil placed at subgrade levels during grading, with the possibility of importing soils onto the site. After rough grading is completed, additional "R"-value tests should be performed, and pavement sections for streets, driveways, and walkways should be designed by the Geotechnical Engineer.

Temporary Excavations

a. Temporary excavations over five feet in vertical height should be provided with temporary shoring or the upper portion in excess of five vertical feet in compacted fill should be trimmed back at a 1:1 gradient. No vertical excavations in saturated alluvial bottoms will be permitted, except as necessary to perform density tests under the direction of the Geotechnical Engineer.

b. No surcharge loading (i.e., traffic, equipment, etc.) should be permitted within ten feet of the top of temporary excavations.

Utility Trench Backfill

a. Utility tench backfill should be placed to the following standard: 90 percent of the laboratory standard if native material is used as backfill.

b. As an alternate, clean sand may be utilized and flooded in-place. No specific relative compaction will be required; however, observation, probing, and if deemed necessary, testing may be required.

c. Exterior trenches, paralleling a footing and extending below a 1½:1 plane projected from the outside bottom edge of the footing, should be compacted to 90 percent of the laboratory standard. Sand backfill, unless it is similar to the in-place fill, should not be allowed in these trench backfill areas. Density testing, along with probing, should be accomplished to verify the desired results.

Drainage

The site must be graded to provide positive drainage away from all footings. Area drains and rain gutters to dispose of roof runoff are recommended.

REVIEW AND INSPECTION

The site grading plans and foundation plans, including foundation loading details, should be forwarded to the Geotechnical Engineer for review and approval prior to finalizing design.

Inspections

It is recommended that all grading and footing excavations be inspected by a Geotechnical Engineer. All excavations should be free of loose or sloughed soils at the time of inspection.

INVESTIGATION LIMITATIONS

The materials encountered on the project site and utilized in our laboratory investigation are believed representative of the total area; however, soil material may vary in character between excavations.

Since our investigation is based upon site materials observed, selective laboratory testing and engineering analyses, the

conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty is expressed or implied.

As in most major projects, precise development plans or conditions revealed by excavation may vary from preliminary findings.

If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and Geologist, and the designs and recommendations adjusted as required or alternate designs recommended.

We appreciate this opportunity to be of service to you. If you have any questions regarding this report, please do not hesitate to contact us.

Very truly yours,

GEOSOILS, INC.

JOSEPH A. COTA
RG 4572

DELMAR D. YOAKUM
GE 918

REGISTERED PROFESSIONAL ENGINEER
DELMAR D. YOAKUM
No. GE 918
Exp. 6-30-93
GEOTECHNICAL
STATE OF CALIFORNIA

JAC/DDY/tk.C24:2351

APPENDIX A

METHODS OF FIELD EXPLORATION AND LABORATORY TEST RESULTS

General

Subsurface conditions were explored by GeoSoils, Inc., by drilling seven, eight-inch diameter, hollow-stem continuous flight auger borings to depths of 55 feet. The borings were drilled with a truck-mounted, CME 75 rotary-type drilling rig. Boring locations of both GeoSoils, Inc., borings, and previously drilled Buena Engineers borings can be found on Plate 1, Geologic and Boring Location Map.

Changes in the character of the soil were determined partly by the resistance to penetration and rotation of the bit, and partly by examination of the cuttings as they emerged from the holes. Definite identification of the soil was made when representative samples were taken from the bottom of the advancing hole.

Two kinds of samples were taken: a) ring samples, and c) bulk samples, which were collected from the cuttings as the excavation proceeded.

Appendix A

Ring Samples

Ring samples were obtained by driving a ring sampler with successive blows of the Standard Penetration Test (140-pound hammer falling 30 inches). Soils samples were retained in a series of brass rings, each having an inside diameter of 2.36 inches (6.0 centimeters) and a height of 1.0 inch (2.54 centimeters). The central portion of the samples was retained in close-fitting, moisture-tight containers for shipment to our laboratory.

Bulk Samples

Bulk samples were collected from the excavation trimmings. These samples were placed in moisture-tight containers and sent to our laboratory for testing. Cuttings were usually collected for a range of depth, and the depth interval for which the sample was collected is shown on the Boring Logs, Plates A-1 through A-9.

LABORATORY TESTING

Moisture-Density Tests

Soils were classified in the laboratory in accordance with the Unified Soil Classification System. Field moisture contents and dry unit weight were determined for the ring samples obtained in

Appendix A

the field. Moisture contents were also taken from the Standard Penetration Test samples. Field moisture contents and dry unit weights are shown on the Boring Logs, Plates A-1 through A-9.

Consolidation Tests

Twenty-five consolidation tests were performed on selected ring samples to develop data for settlement studies. These tests were performed on materials encountered within all soil zones to depths of our drilling. Loads were applied to each sample in several increments in geometric progression, and the resulting deformations were recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of the specimens to permit the release and addition of pore fluid. Inundation of the samples was performed at a load of one ton per square foot. Results of the consolidation tests are shown on Plates C-1 through C-26.

Shear Tests

One undisturbed and three remolded shear tests were performed in a strain control type Direct Shear Machine. The rate of deformation was approximately 0.05 inch per minute. Each sample was sheared under varying confining loads in order to determine the Coulomb shear strength parameters: cohesion (c) and angle of internal

Appendix A

friction (ϕ). All samples were tested in an artificially saturated condition. The results are plotted, and a linear approximation was drawn of the failure curves. Results are shown on the Shear Test Diagrams included with this report as Plates SH-1 through SH-4.

"R"-Value Tests

An "R" Value Test was performed on the typical soils encountered at proposed street subgrade elevations. The test was performed using the Hveem Stabilometer method, California Test Method 301 (or ASTM D-284-69). The test result is 70.

Compaction Test

To determine the moisture-density relationship of the on-site near surface soils, three compaction tests were performed in accordance with ASTM Test Designation D-1557-78. The maximum density curves are included in this report as Plates M-1 through M-3.

Expansion Index Tests

Expansion index tests were performed on representative soil samples from the subject property in accordance with UBC Standard

Appendix A

No. 29-2. Based on review of laboratory date for the on-site materials, the surface and near-surface soils have a low expansion potential.

Gradation Analyses

Three washed sieve analyses of selected representative samples were performed for grain size determination in accordance with California Test 202. This test establishes gradation (grain size) for the coarse-grained particles (i.e., sand and gravel). The gradation curves are included in this report as Plates G-1 through G-3.

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY

WORK ORDER NO. 3473-VN

DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation
Hollow Stem Rig

BORING NO. B-1

SHEET 1 OF 1

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-21' ALLUVIUM:
5		▨	29/45	SM	119.8	2.1	@ 5' Medium orange-brown, silty SAND, fine to very coarse, very poorly sorted, firm but very dry, no visible porosity.
10		▨	19/27	SM /SP	120.2	0.9	@ 10' Orange-brown to tan silty SAND, grading to coarse poorly graded sand, appears very firm to hard, but extremely dry, no visible porosity, appears fairly dense, some granitic rock fragments.
15	■	▨	26/28	ML /SP	113.8	1.2	@ 15' Upper 1/2 sample: orange, sandy SILT, firm and apparently dense, no visible porosity, very dry, lower 1/2 sample: orange-tan, coarse, poorly graded sand with minor silt, fairly dense, very dry.
20		▨	28/50	SM	118.4	2.0	@ 20' Orange-brown, silty SAND, poorly sorted, fine to coarse, appears dense, no visible porosity, still very dry.
25							Total Depth 21' No Ground Water No Caving
30							
35							

FORM 88/9

PLATE A-1

GeoSoils, Inc.

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

— DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation Hollow Stem Rig — BORING NO. B-2 — SHEET 1 OF 1

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-19' ALLUVIUM:
		▨	27/29	SM	117.4	1.4	@ 2' Orange silty SAND, fine to coarse, very poorly sorted, slightly loose, extremely dry, feels slightly clayey when wet, appears subject to hydroconsolidation.
5							
		▨	12/10	SM /SP	113.6	1.5	@ 7' Orange-tan, coarse silty SAND, grading to poorly graded sand, cohesionless, some clay coating of grains, very dry but overall, fairly dense appearance.
10							
		▨	12/20	SM	111.1	1.9	@ 12' Orange-tan silty SAND, generally very fine grained with occasional 1/4" rock fragments, moderately firm but extremely dry and easily friable, no visible porosity, appears slightly clayey when wet, probably subject to at least minor hydroconsolidation.
15							
		▨	17/21	SM	119.2	1.3	@ 18' Tan silty SAND, very coarse to medium grained, common subangular granitic pebbles, very granular and cohesionless, extremely dry, appears permeable, fairly dense.
20							Total Depth 19' No Ground Water No Caving
25							
30							
35							

FORM 88/9

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation — BORING NO. B-3 — SHEET 1 OF 1

Hollow Stem Rig

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-26' ALLUVIUM:
5		▨	30/40	SM	111.2	2.0	@ 5' Reddish-brown silty SAND, coarse grained, very poorly sorted, slightly loose, extremely dry, no visible porosity, appears slightly clayey and softer when wet, probably subject to moderate hydroconsolidation.
10		▨	15/21	SM /SP	112.2	1.0	@ 10' Reddish-brown silty SAND, grading to poorly graded coarse sand with pebbles, appears fairly dense but cohesionless and friable, very dry, very permeable appearance.
15		▨	17/37	SM	118.3	1.6	@ 14' Orange-brown coarse silty SAND, poorly graded, reddish clay coating on grains, appears dense with no visible porosity, but becomes slightly soft when wet.
20							
25		▨	17/32	SP /SM	116.8	1.1	@ 25' Tan to reddish-orange, poorly graded SAND, grading to silty sand, medium to very coarse grained, appears to be of granitic origin, dense, trace clay coating of grains, overall low cohesion, slightly moist to dry.
30							Total Depth 26' No Ground Water No Caving
35							

FORM 88/9

PLATE A-3

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation Hollow Stem Rig — BORING NO. B-4 — SHEET 1 OF 1

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-25' ALLUVIUM:
5		▨	17/26	SM	117.4	1.8	@ 3' Reddish-brown silty SAND with trace clay binder, coarse to fine, very poorly sorted, appears dense but becomes very soft and compressible when wet, clay content apparent only when wet.
10		▨	12/19	SC /SM	119.4	1.9	@ 8' Upper 1/2 sample: medium brown, clayey fine SAND, extremely dry, clay only apparent when wet, firm appearance but becomes soft when wet, no visible porosity, lower 1/2 sample: reddish-brown silty SAND as @ 3', dry.
15		▨	7/14	SP /SM	108.3	2.6	@ 13' Reddish-brown to tan silty SAND, grading to poorly graded sand, fine to medium, some coarse grained, poorly graded sand, dry to slightly moist, appears fairly dense, no visible porosity, becomes softer when moistened.
20		▨	17/25	SP	108.6	1.6	@ 18' Tan, poorly graded coarse SAND, some medium, few fines, cohesionless and easily friable but appears dense and compact, appears quite permeable, slightly moist.
25		▨	24/31	SP	120.0	1.9	@ 24' Tan, poorly graded coarse SAND as @ 18', slightly moist, cohesionless, few fines, appears dense but permeable, overall competent appearance.
							Total Depth 25' No Ground Water No Caving
30							
35							

FORM 88/9

PLATE A-4

GeoSoils, Inc.

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

— DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation Hollow Stem Rig — BORING NO. B-5 — SHEET 1 OF 2

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-50' ALLUVIUM:
5							
10							
15		▨	13/26	SM	115.8	1.1	@ 15' Orange-tan silty SAND, very coarse to fine, very poorly sorted, slightly moist to dry, low cohesion, fairly dense appearance, no visible porosity.
20							
25		▨	17/38	SM	121.5	1.3	@ 25' Tan to light brown, silty SAND, fine to coarse grained, poorly sorted, few subangular gravel clasts, dense appearance but cohesionless and easily friable, dry, appears somewhat permeable.
30							
35		▨	24/48	SM	120.5	2.4	@ 35' Orange-brown, silty SAND, fine to coarse, very poorly sorted, dense, no visible porosity, trace clay binder apparent only when wet, relatively low cohesion, moderate apparent permeability, slightly softer when wet, overall fairly competent. NOTE: Gravelly @ 38'

FORM 88/9

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

— DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation
Hollow Stem Rig

BORING NO. B-5 — SHEET 2 OF 2

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
45		▨	18/39	SM /SP	121.2	1.4	@ 45' Reddish-brown, coarse, silty SAND, grading to poorly graded sand, coarse grained, dry to slightly moist, low apparent cohesion, red clay coating on grains, dense, no visible porosity, high apparent permeability, very firm but becomes notably softer when wet.
50							
55		▨	23/40		122.4	1.7	@ 55' Reddish-brown, silty SAND, medium to very coarse, slightly moist, appears very dense to slightly hard, but becomes much softer when wet.
60							Total Depth 55' No Ground Water No Caving
65							
70							
75							

FORM 88/9

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

— DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation Hollow Stem Rig — BORING NO. B-6 — SHEET 1 OF 1

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-23' ALLUVIUM:
5		▨	10/27	SM	116.2	2.6	@ 5' Orange-brown, silty SAND, fine to medium grained, poorly sorted, low apparent density, very dry, firm, but becomes very soft when wet, appears subject to hydroconsolidation, feels slightly clayey when wet.
10	■						
	■	▨	16/36	SM /SP	118.2	1.8	@ 12' Upper 1/2 sample: orange-brown silty SAND as above; lower 1/2 sample: tan, poorly graded SAND, medium to occasionally coarse grained, very dry, appears compact, no visible porosity, few fines, high apparent permeability.
15	■						
		▨	16/26	SP /GP	111.6	1.3	@ 16' Gray to tan, poorly graded, coarse SAND to poorly graded sandy GRAVEL, cohesionless, appears dense and compact, few fines, appears quite permeable, overall dense, competent appearance but very dry.
20							
		▨	29/40	SM /SP	122.3	1.6	@ 22' Orange-brown, silty SAND, grading to poorly graded coarse SAND with few fines, occasional very coarse, very dry to slightly moist, low apparent cohesion, appears dense, fairly permeable.
25							Total Depth 23' No Ground Water No Caving
30							
35							

FORM 88/9

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY — WORK ORDER NO. 3473-VN

DATE EXCAVATED 6-14-90

SAMPLE METHOD 140#, 30" Drop, Foundation Hollow Stem Rig — BORING NO. B-7 — SHEET 1 OF 2

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
							0-51' ALLUVIUM:
5							
10							
15							
20		▨	12/31	SP	120.2	1.2	@ 20' Gray-brown, poorly graded, coarse SAND, few fines, appears compact and dense, good apparent permeability.
25							
30		▨	22/40	SM	117.4	1.1	@ 30' Reddish-brown, silty SAND, medium to coarse grained, poorly sorted, slightly moist, predominantly granitic origin, appears very firm and compact with no visible porosity, but becomes much softer when wet.
35							

FORM 88/9

GEOSOILS, INC.
BORING LOG

CLIENT THE LUSK COMPANY

WORK ORDER NO. 3473-VN

DATE EXCAVATED 6-14-90

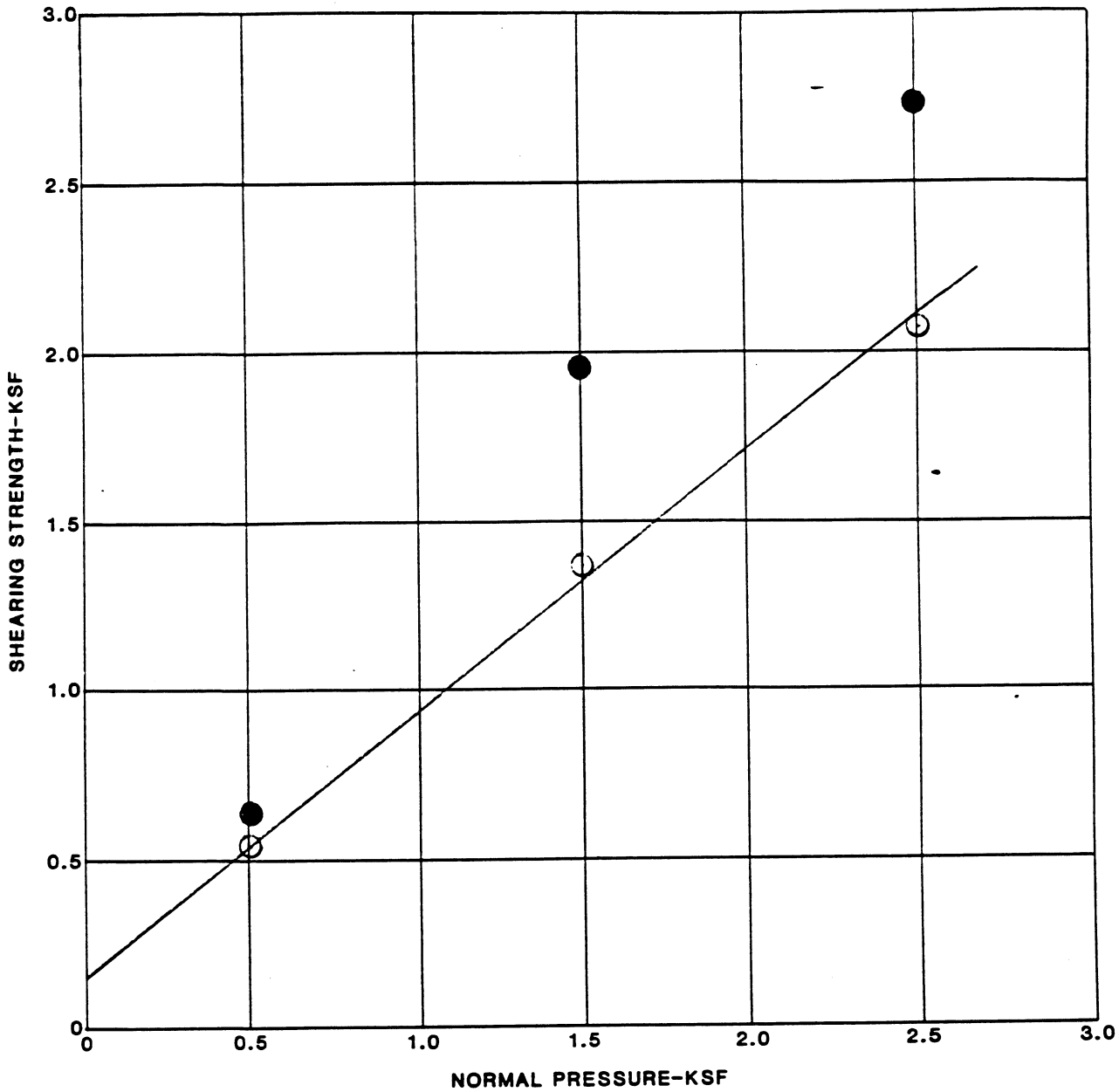
SAMPLE METHOD 140#, 30" Drop, Foundation
Hollow Stem Rig

BORING NO. B-7

SHEET 2 OF 2

Depth (ft.)	SAMPLE Bulk	SAMPLE Undis-turbed	SAMPLE Blows/ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	DESCRIPTION OF MATERIAL
		▨	19/27	SM /SP	119.2	1.0	@ 40' Gray-brown to slightly reddish-brown, silty SAND, grading to poorly graded coarse SAND with gravel, very poorly graded overall, low apparent cohesion, dense, slightly moist, no visible porosity, good apparent permeability.
45							
50		▨	30/50 for 3"	SM /SP	114.9	1.8	@ 50' Reddish-brown to tan poorly graded coarse SAND to silty SAND, predominantly coarse grained sand with few fines, very dense and compact, slightly dry, low apparent cohesion, appears quite permeable.
55							Total Depth 51' No Ground Water No Caving
60							
65							
70							
75							

FORM 88/9



EXPLANATION

● PEAK- AT SATURATION MOISTURE CONTENT C - Ø -

○ RESHEAR-AT SATURATION MOISTURE CONTENT C - 150 Ø - 38°

DIRECT SHEAR REMOLDED TO 90% RELATIVE DENSITY, THEN SATURATED

PCF % MOISTURE

% SATURATED MOISTURE CONTENT

UNDISTURBED NATURAL SHEAR SATURATED

B-1 @ 10'

Brown, silty, fine to coarse SAND

17.5 % SATURATED MOISTURE CONTENT

GeoSoils, Inc.

SHEAR TEST DIAGRAM

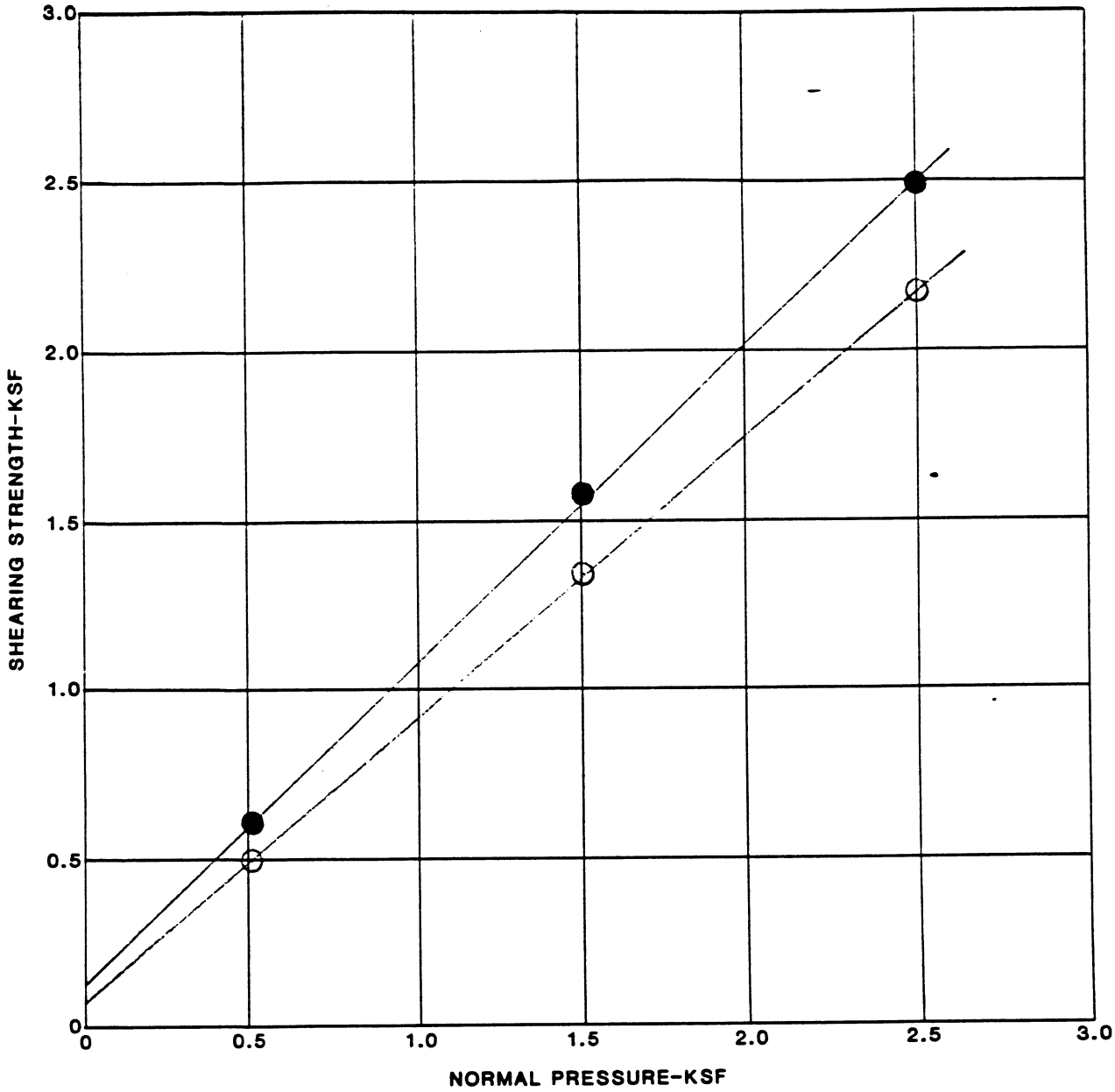
LUSK

DATE 7/90 W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

PLATE SH-1

FORM 87/8-2A



EXPLANATION

● PEAK- AT SATURATION MOISTURE CONTENT C - 120 psf Ø - 43.5°

○ RESHEAR-AT SATURATION MOISTURE CONTENT C - 70 psf Ø - 40.0°

DIRECT SHEAR REMOLDED TO 90% RELATIVE DENSITY, THEN SATURATED B-1 @ 15-20' Tan, silty SAND 131.5 PCF 9.0% MOISTURE 16.2 % SATURATED MOISTURE CONTENT	UNDISTURBED NATURAL SHEAR SATURATED % SATURATED MOISTURE CONTENT

GeoSoils, Inc.

SHEAR TEST DIAGRAM

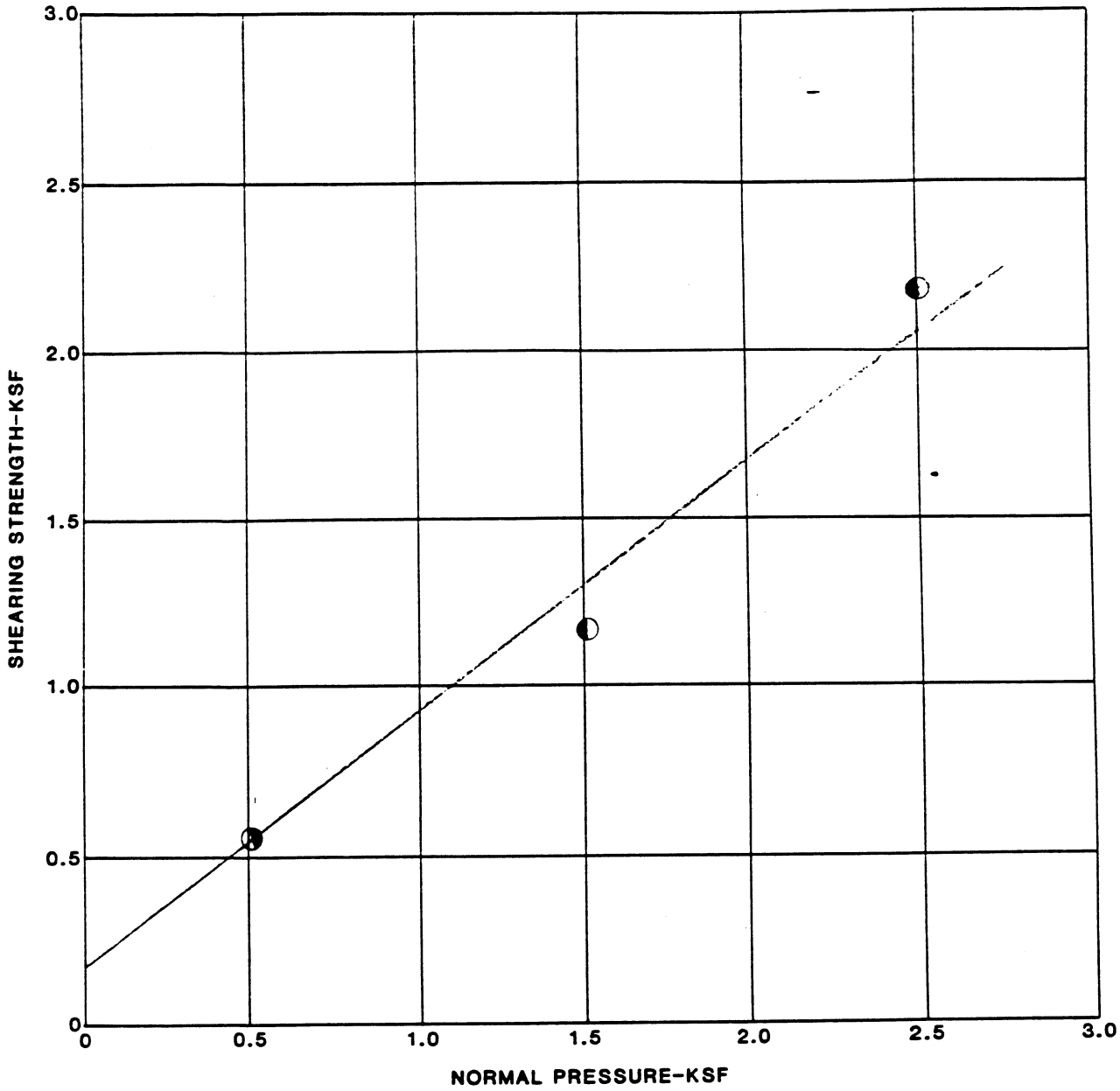
LUSK

DATE 7/90 W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

PLATE SH-2

FORM 87/8-2A



EXPLANATION

● PEAK- AT SATURATION MOISTURE CONTENT C - 170 psf Ø - 37°

○ RESHEAR-AT SATURATION MOISTURE CONTENT C - 170 psf Ø - 37°

DIRECT SHEAR REMOLDED TO 90% RELATIVE DENSITY, THEN SATURATED B-2 @ 0-7' Tan, silty SAND 133.0 PCF 7.5% MOISTURE 14.8 % SATURATED MOISTURE CONTENT	UNDISTURBED NATURAL SHEAR SATURATED % SATURATED MOISTURE CONTENT

GeoSoils, Inc.

SHEAR TEST DIAGRAM

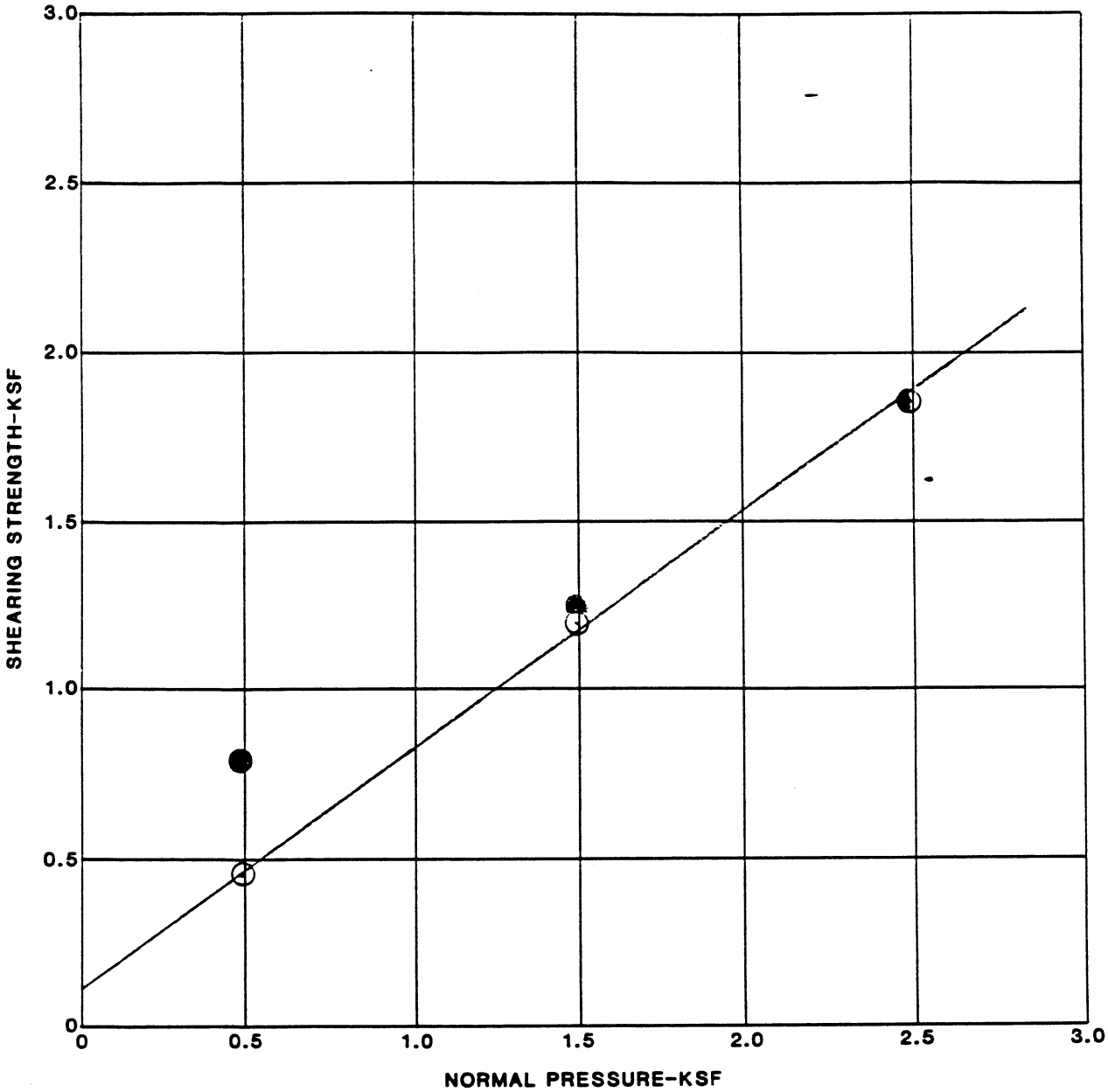
LUSK

DATE 7/90 W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

PLATE SH-3

FORM 87/8-2A



EXPLANATION

● PEAK- AT SATURATION MOISTURE CONTENT C - 120 psf Ø - 36°

○ RESHEAR-AT SATURATION MOISTURE CONTENT C - 120 psf Ø - 36°

DIRECT SHEAR REMOLDED TO 90% RELATIVE DENSITY, THEN SATURATED	UNDISTURBED NATURAL SHEAR SATURATED
B-6 @ 10-15'	
Tan, silty, fine to medium SAND	
131.5 PCF 8.5% MOISTURE	
16.1 % SATURATED MOISTURE CONTENT	% SATURATED MOISTURE CONTENT

GeoSoils, Inc.

SHEAR TEST DIAGRAM

LUSK / PALMDALE

DATE 7/90 W.O. NO 3473-VN

Geotechnical Engineering • Engineering Geology

PLATE SH-4

FORM 87/8-2A

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	1	5	2.1	10.9	1.0	2.36	Orange-brown silty fine to coarse sand

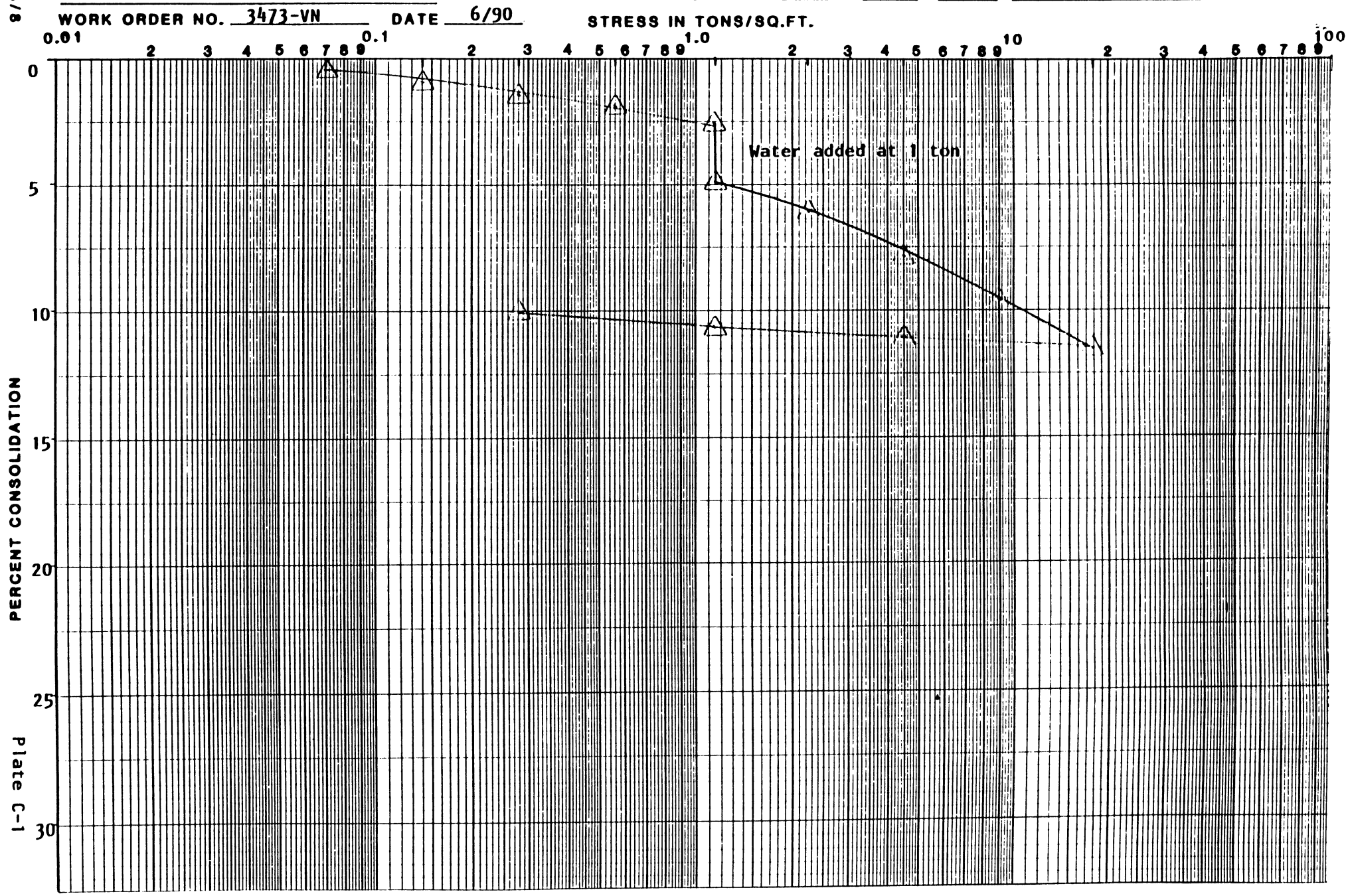


Plate C-1

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	1	15	1.2	14.2	10	2.36	Orange-brown silty fine to coarse sand with rock fragments

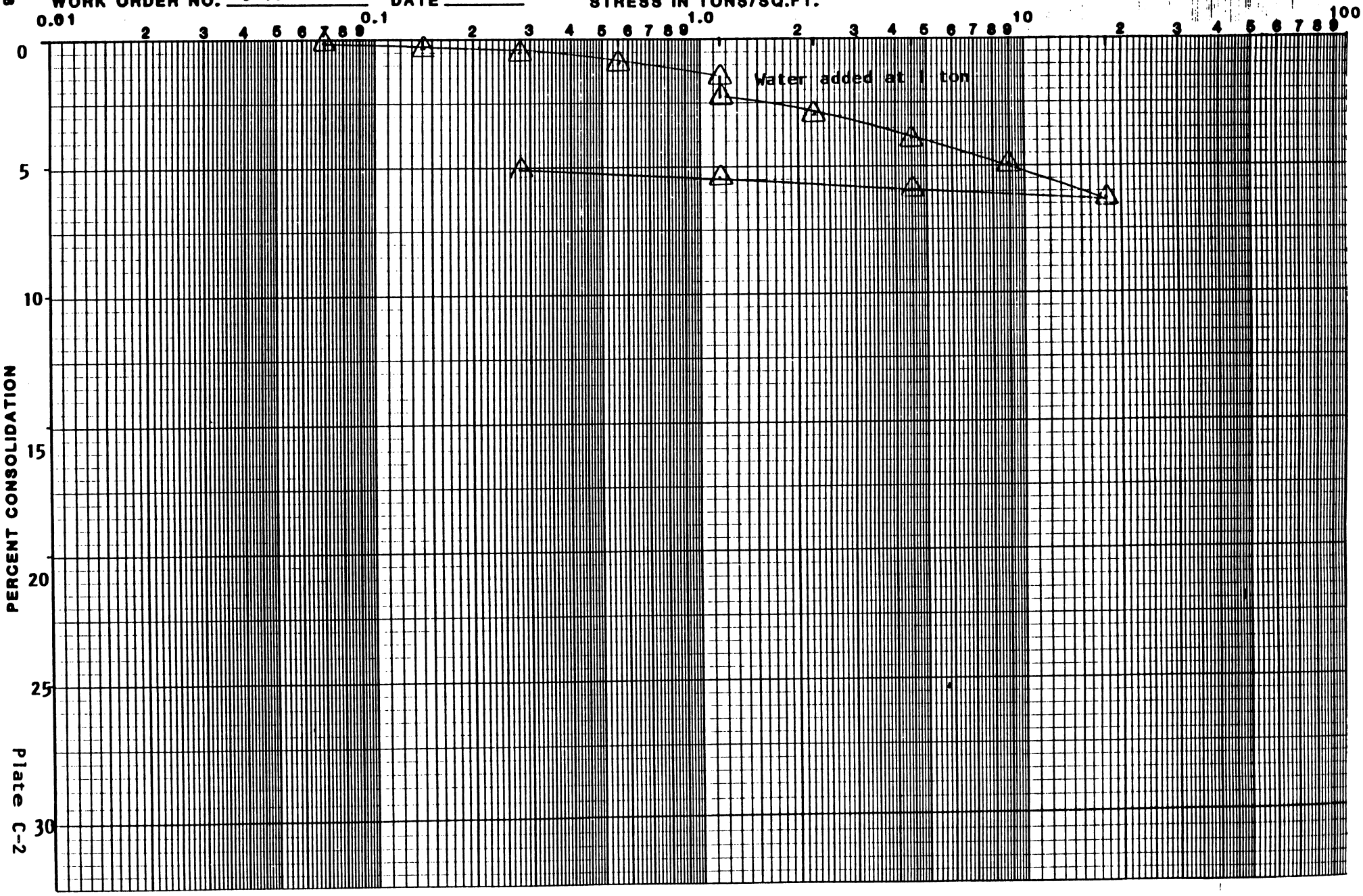


Plate C-2

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	2	7'	1.5	14.4	1.0	2.36	Orange-brown silty fine to coarse sand with rock fragments

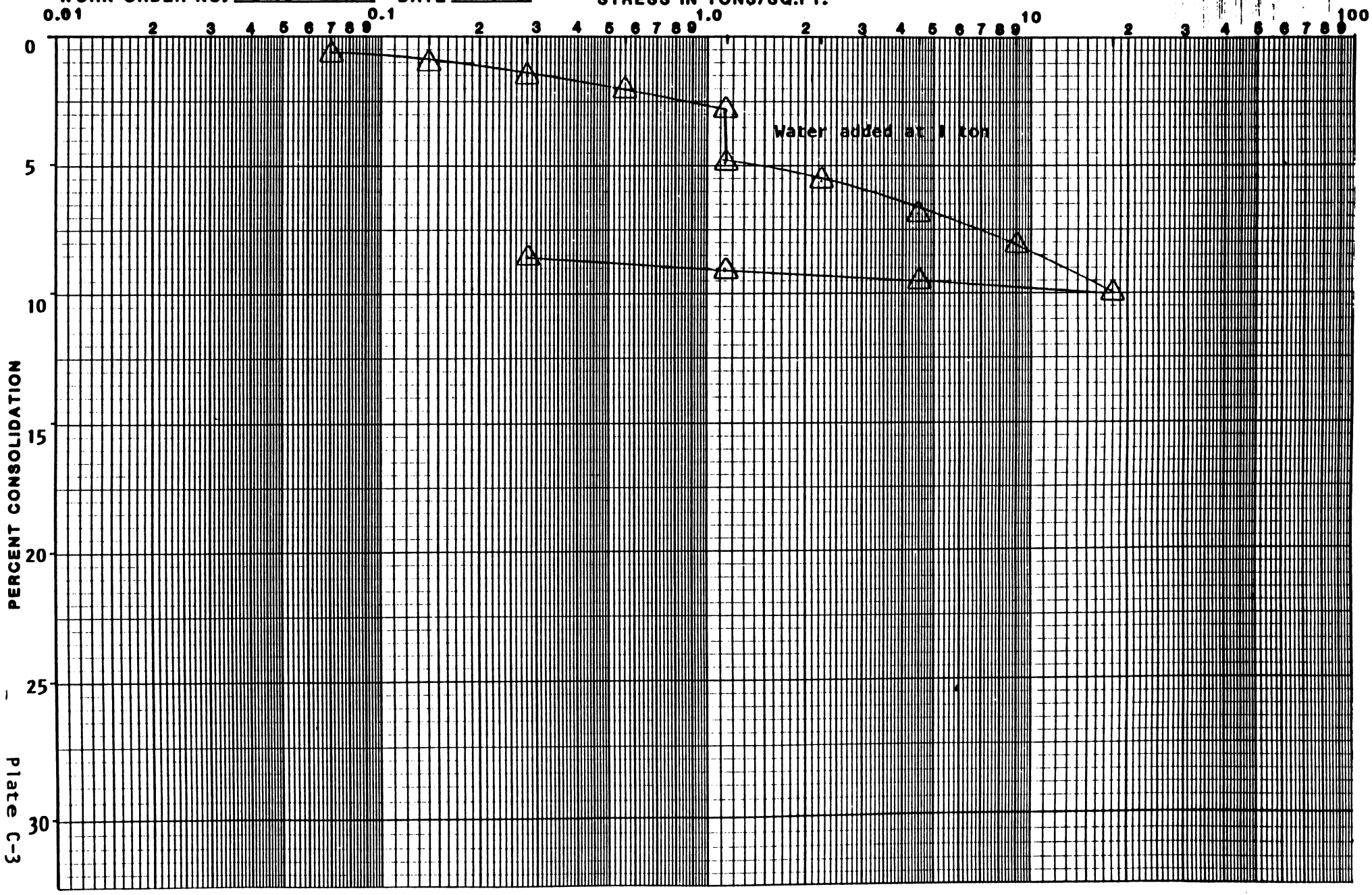


Plate C-3

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	2	12'	1.9	15.6	1.0	2.36	Orange-tan silty fine to coarse sand with rock fragments

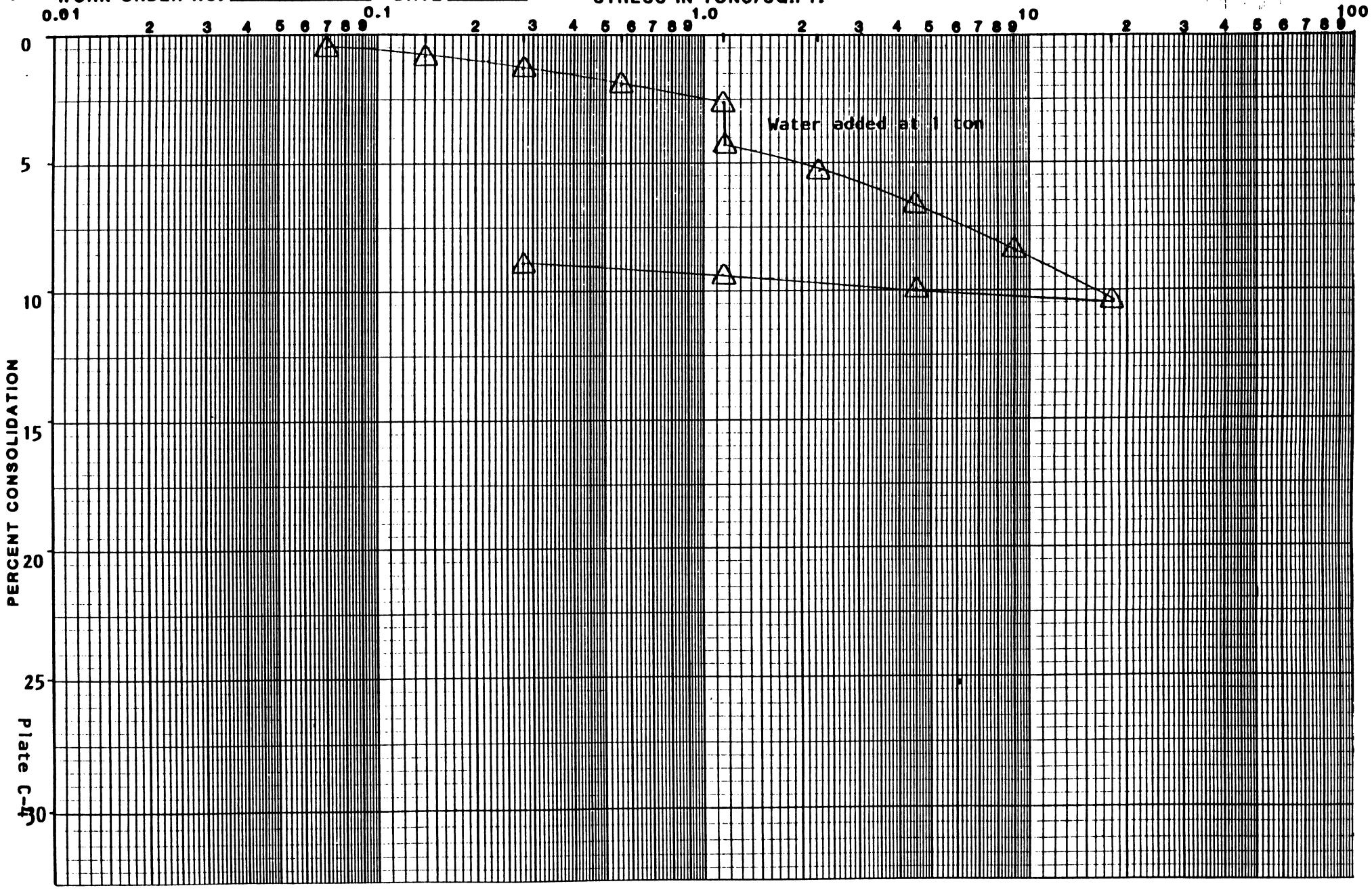


Plate C-4

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	2	18'	1.3	15.9	1.0	2.36	Tan silty medium to coarse sand with rock fragments

STRESS IN TONS/SQ.FT.

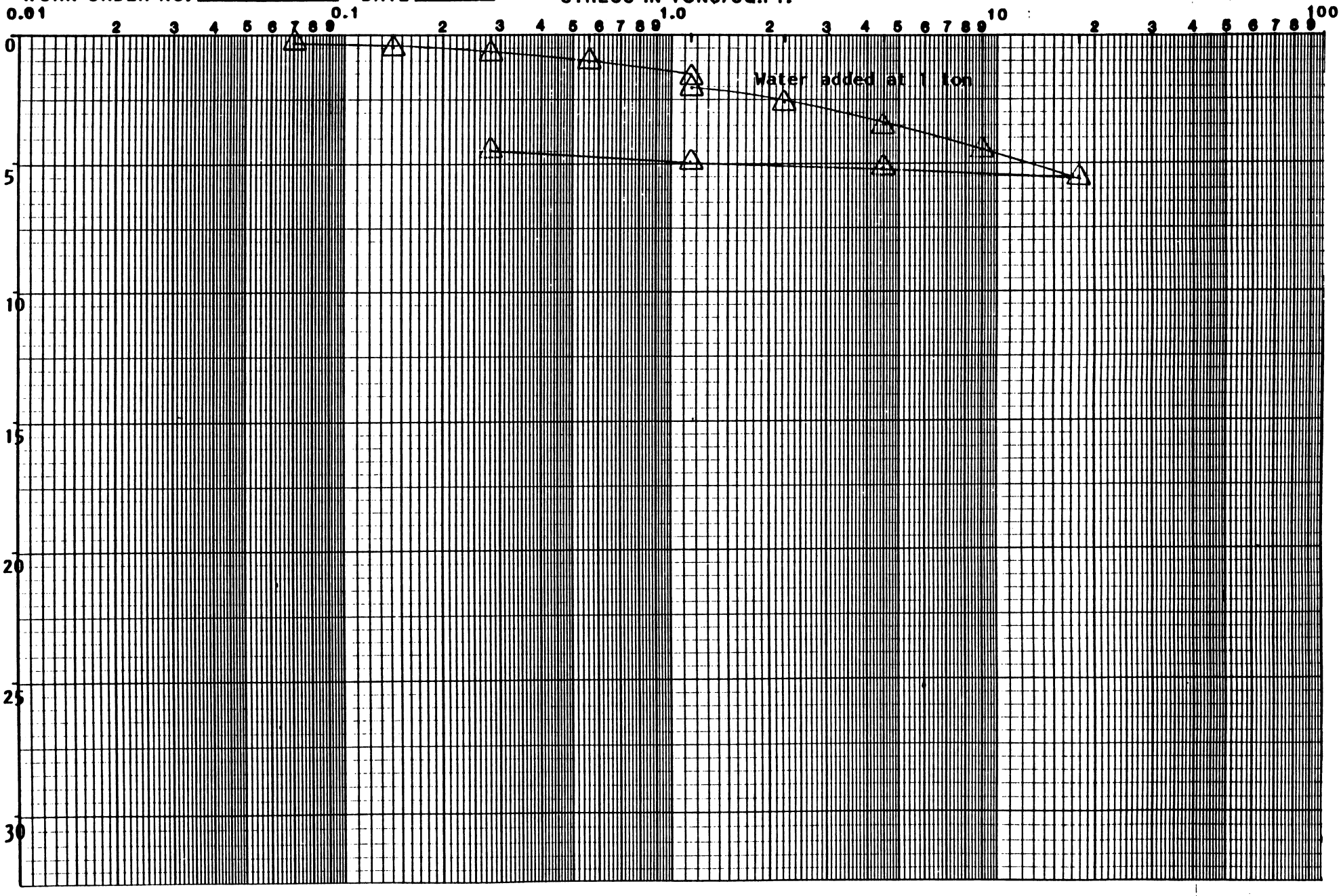


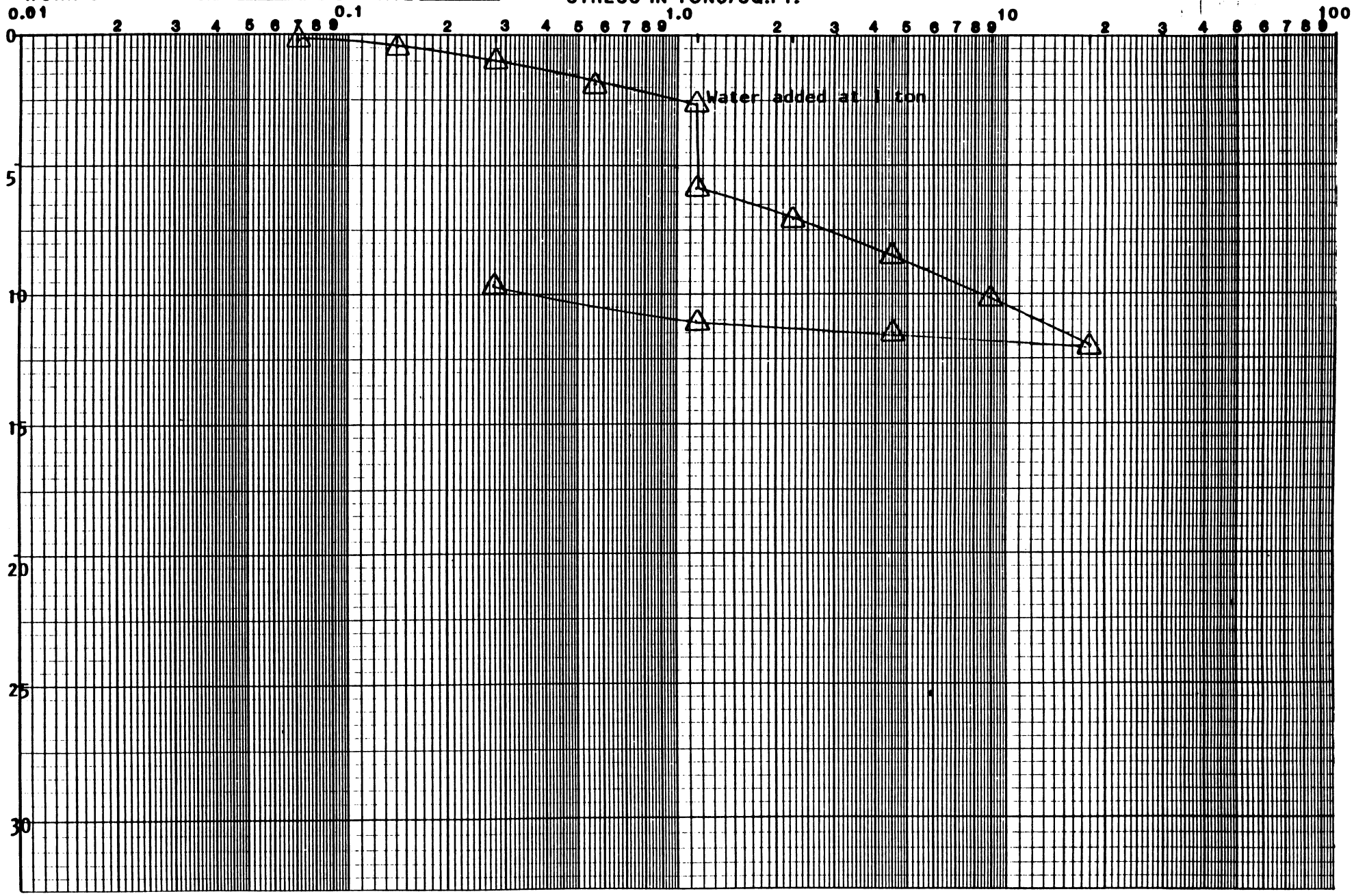
Plate C-5

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	3	5'	2.0	12.0	1.0	2.36	Reddish-brown silty fine to coarse sand with rock fragments



FORM 88/8

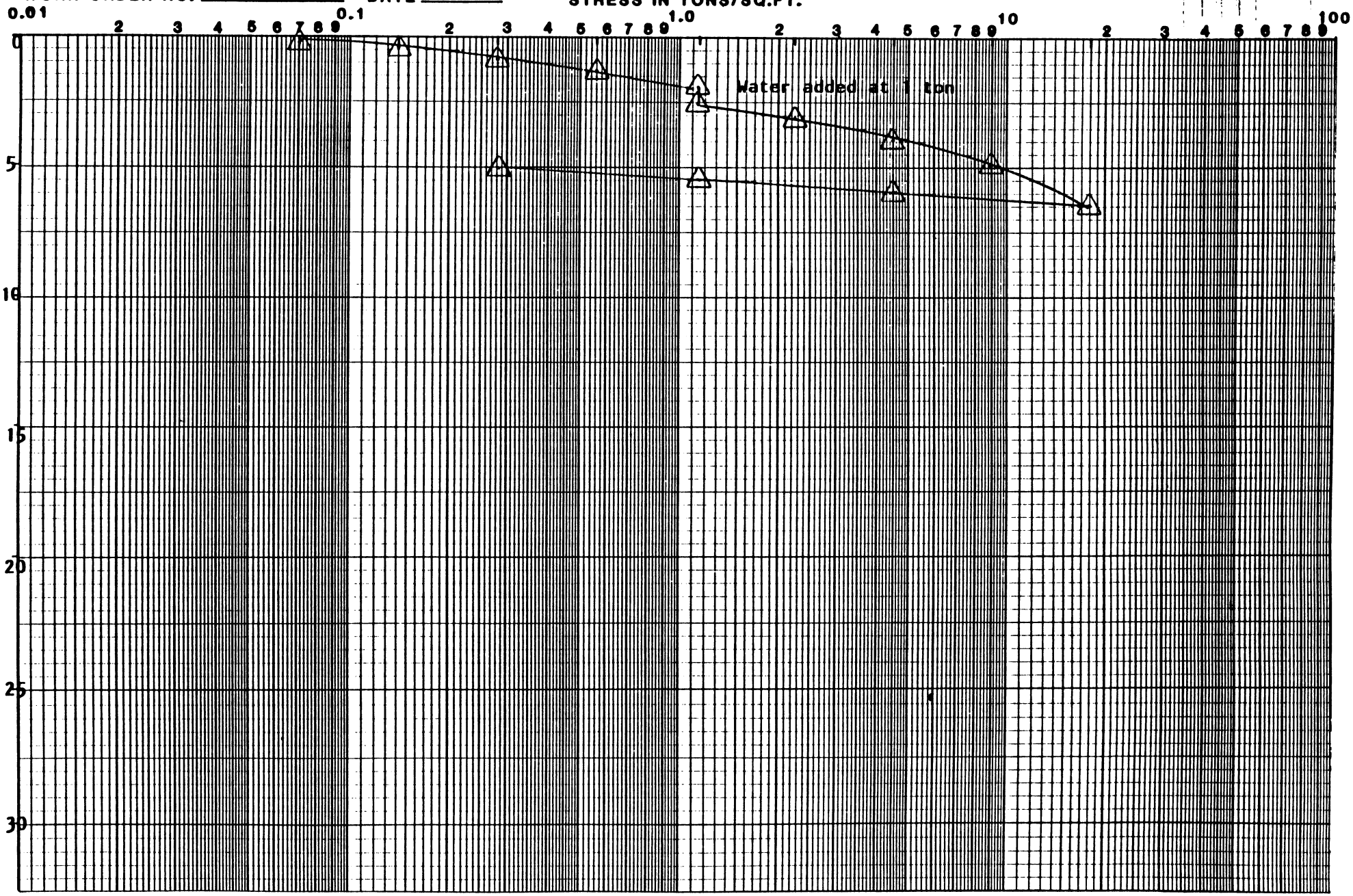
Plate C-6

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	3	10'	1.0	18.0	1.0	2.36	Reddish-brown fine to coarse sand with rock fragments



FORM 88/8

Plate C-7

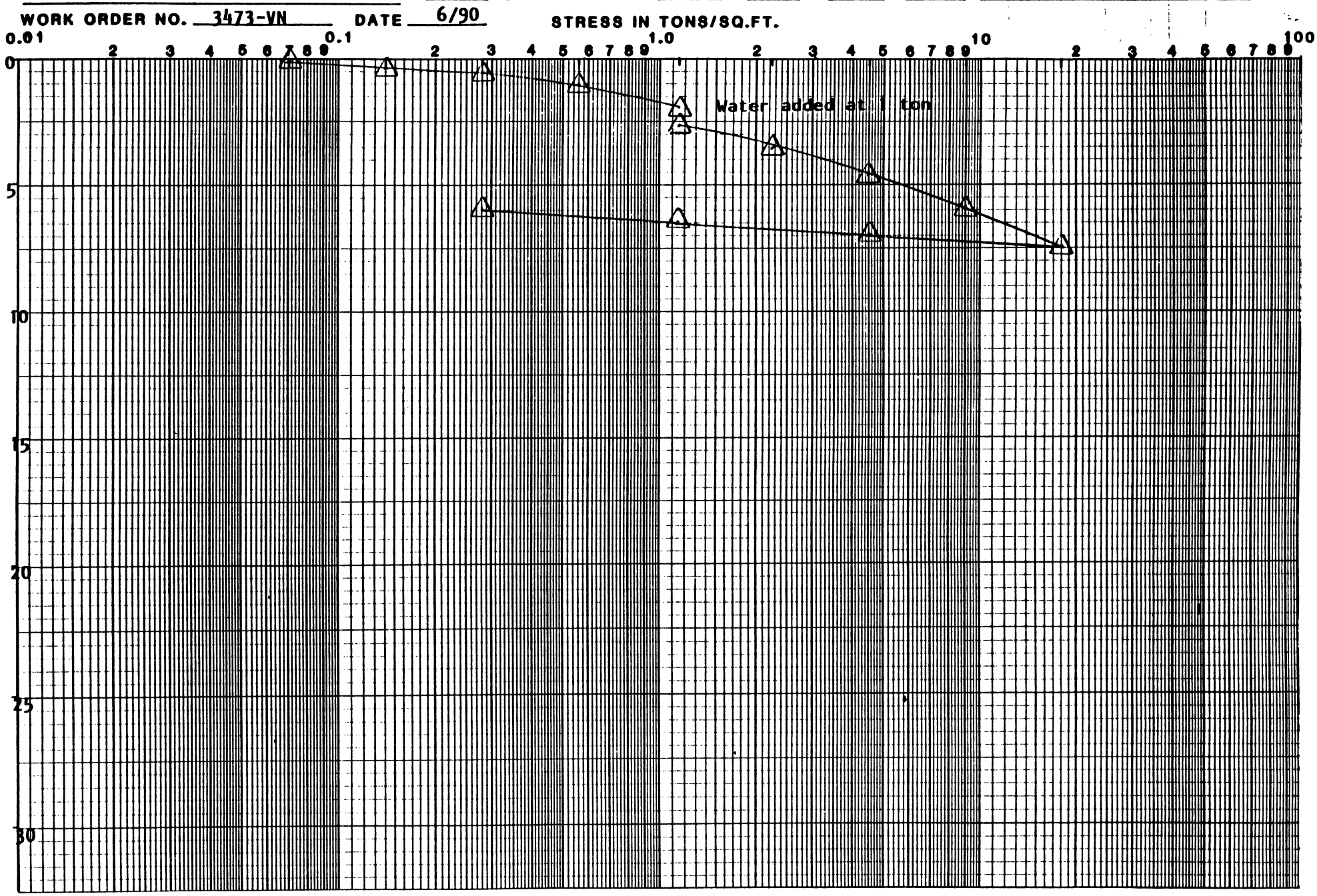
FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	3	14	1.6	13.8	1.0	2.36	Brown silty fine to coarse sand with rock fragments



FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	4	3'	1.8	11.1	1.0	2.36	Reddish-brown silty fine to coarse sand with rock fragments

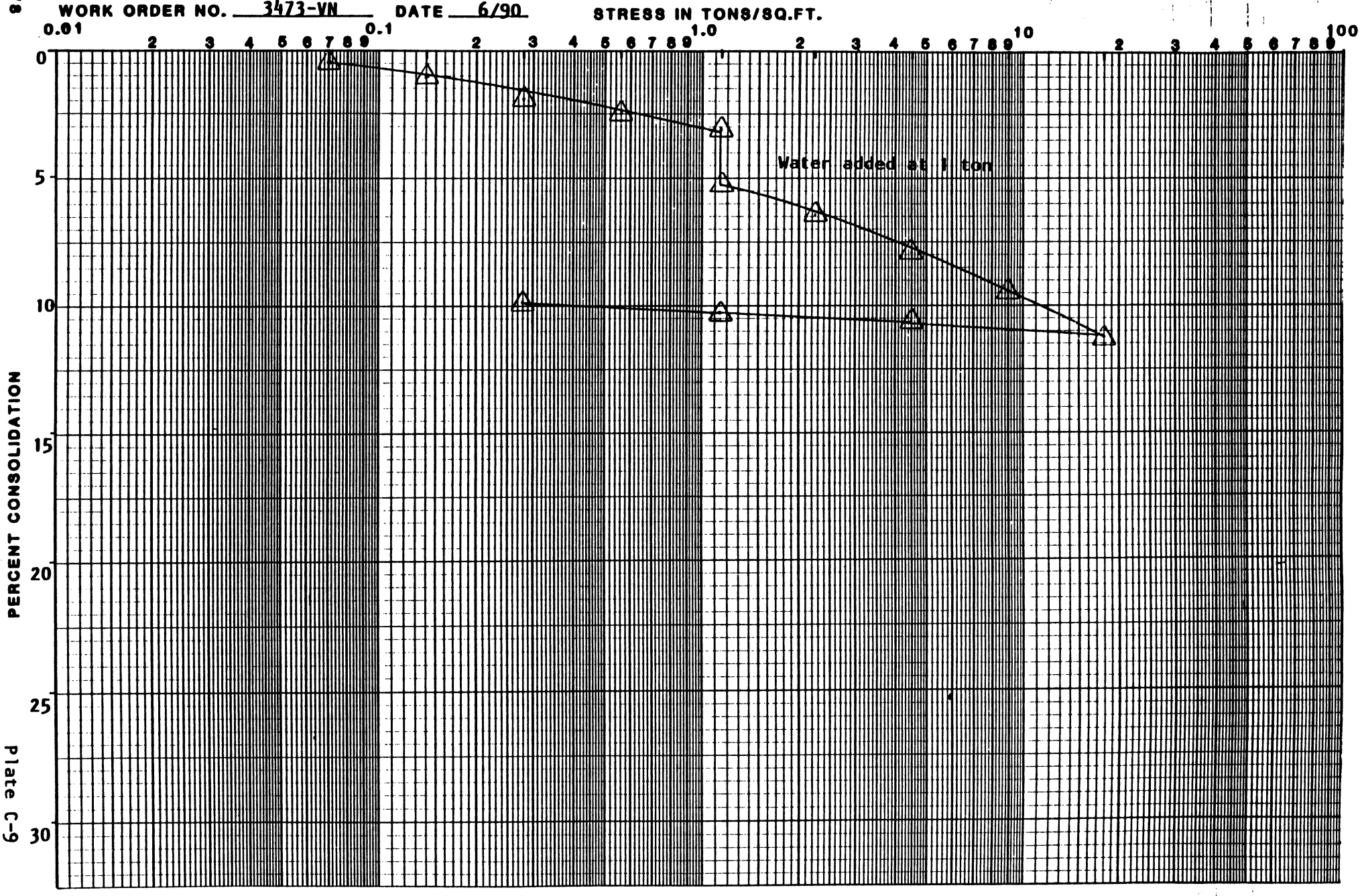


Plate C-9

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk-Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	4	8'	1.9	13.5	1.0	2.36	Brown silty fine to coarse sand with rock fragments

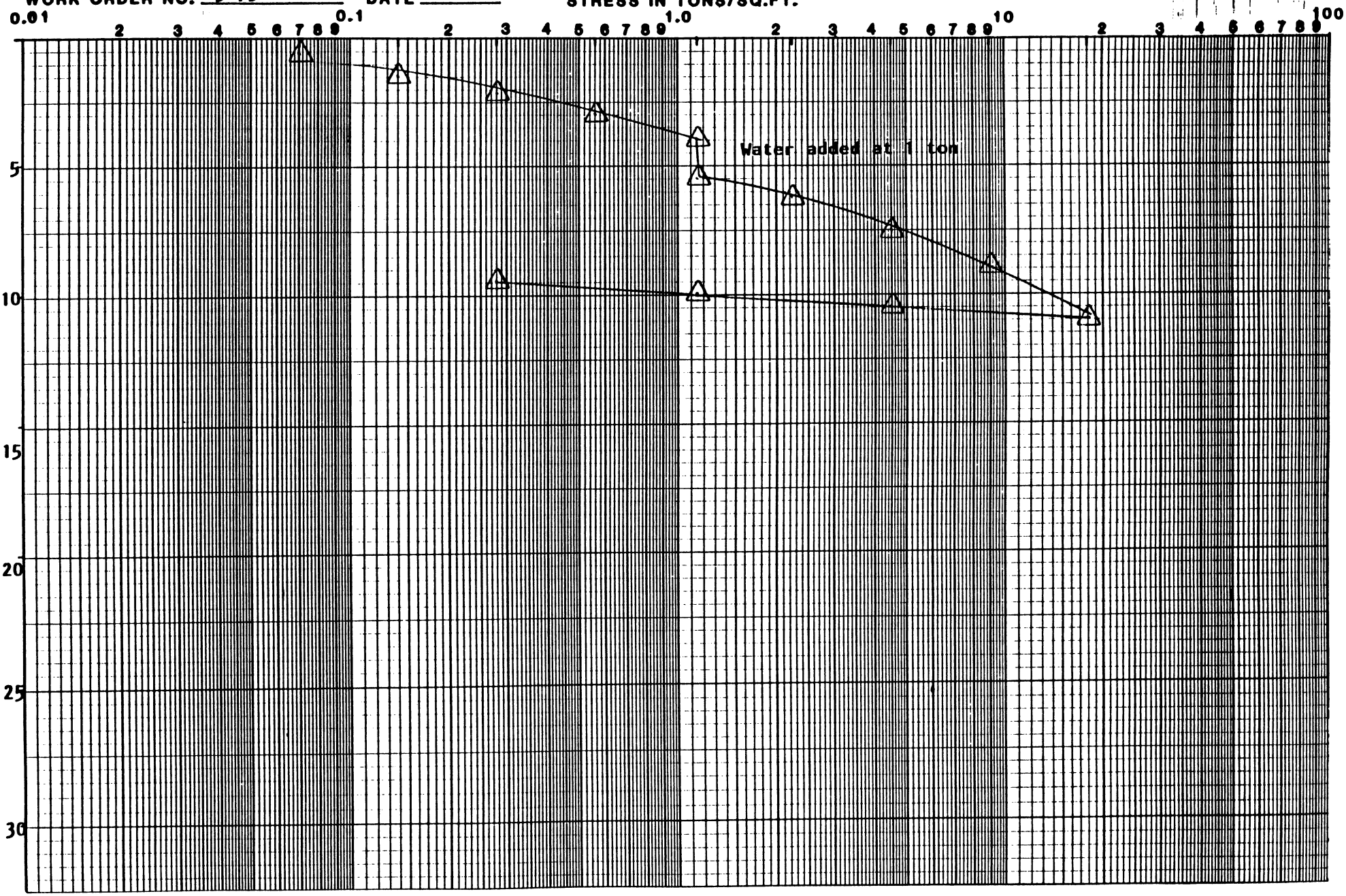


Plate C-10

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	4	13'	1.8	16.3	1.0	2.36	Tan to reddish-brown silty fine to coarse sand with rock fragments

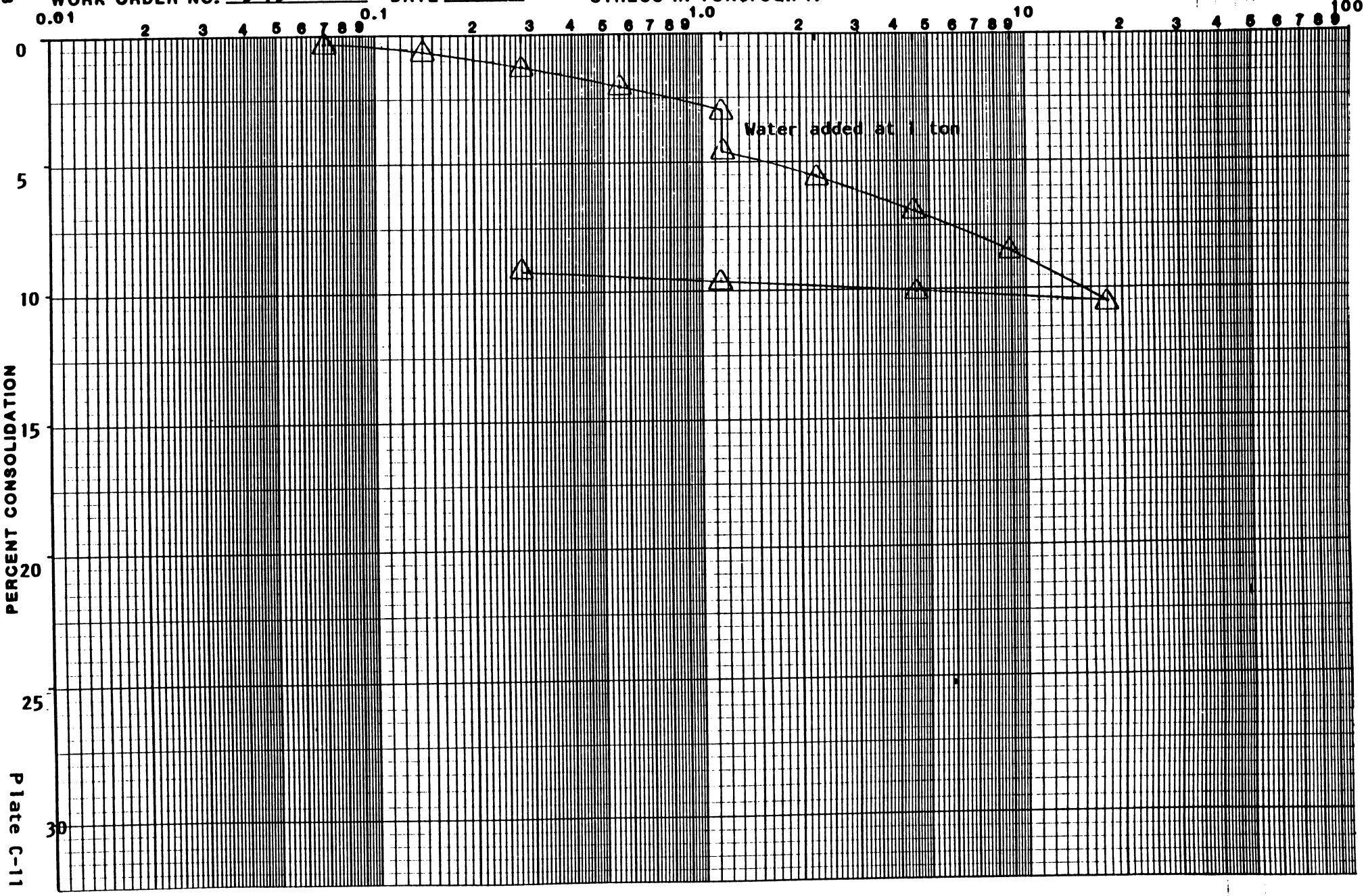


Plate C-11

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	4	18'	1.6	19.4	1.00	2.36	Brown silty fine to coarse sand with rock fragments

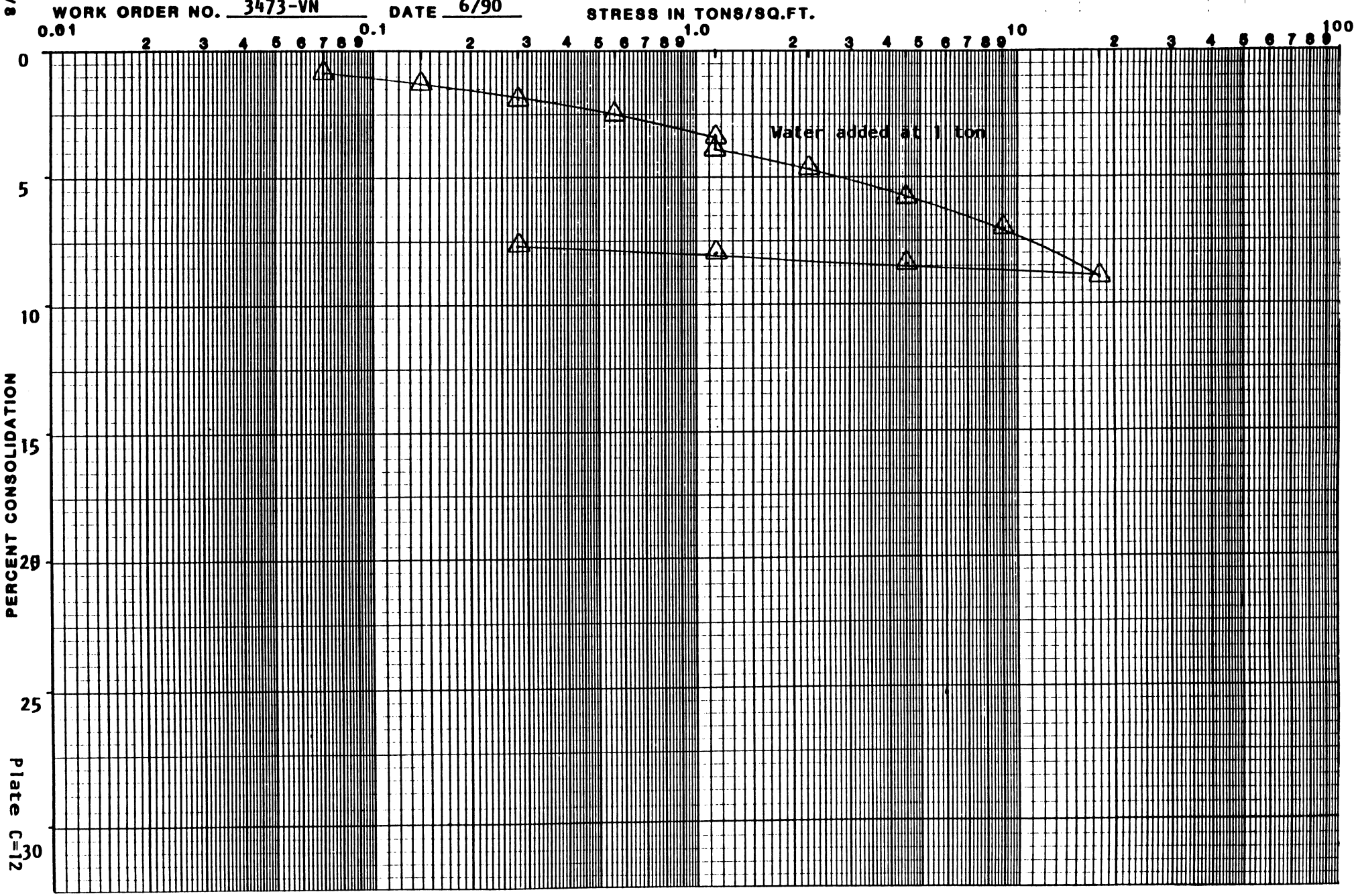


Plate C-12

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	5	15'	1.1	15.0	1.00	2.36	Brown silty fine to coarse with rock fragments

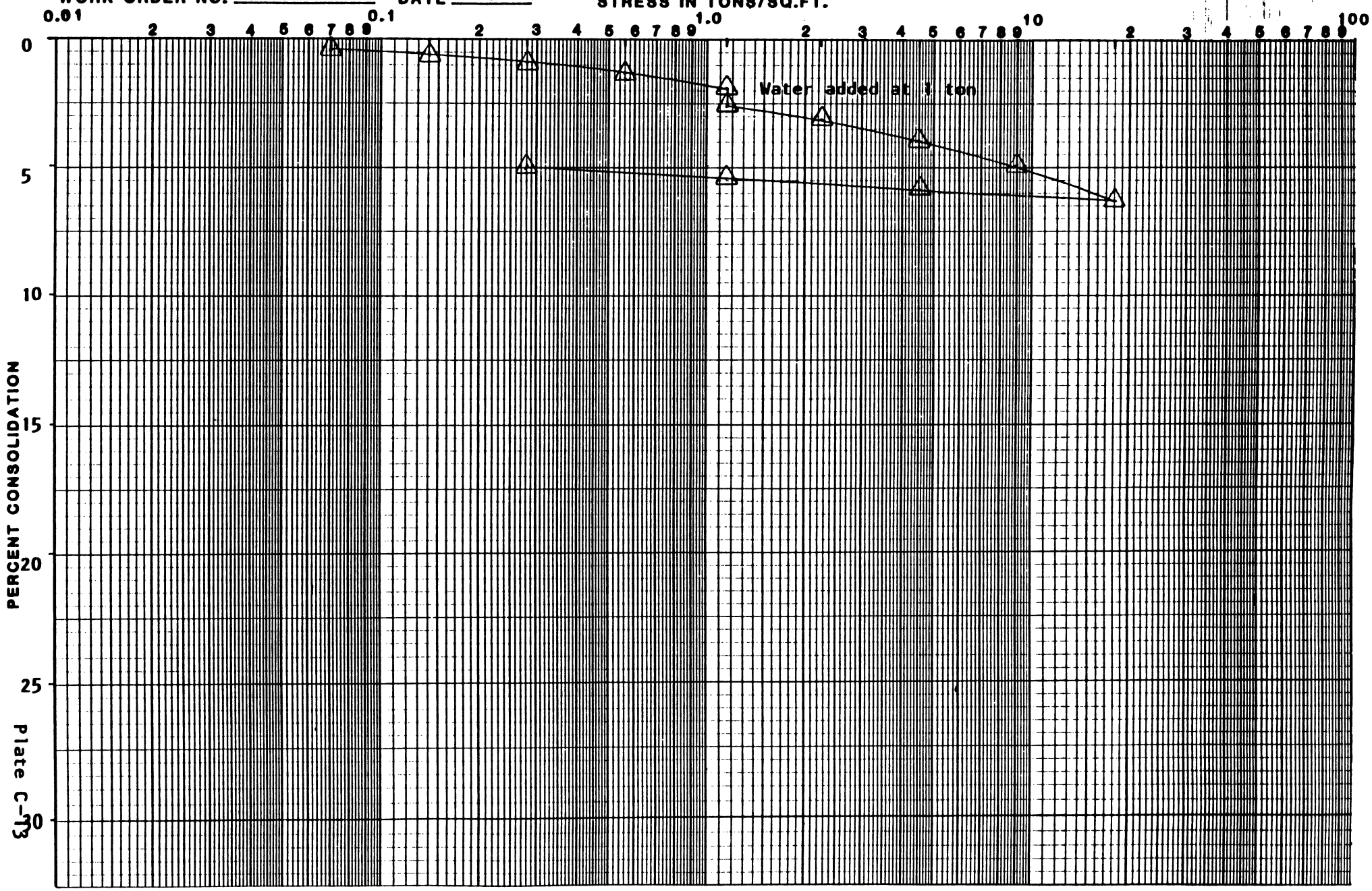


Plate C-13

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	5	25'	1.3	11.8	1.00	2.36	Brown silty fine to coarse SAND with rock fragments

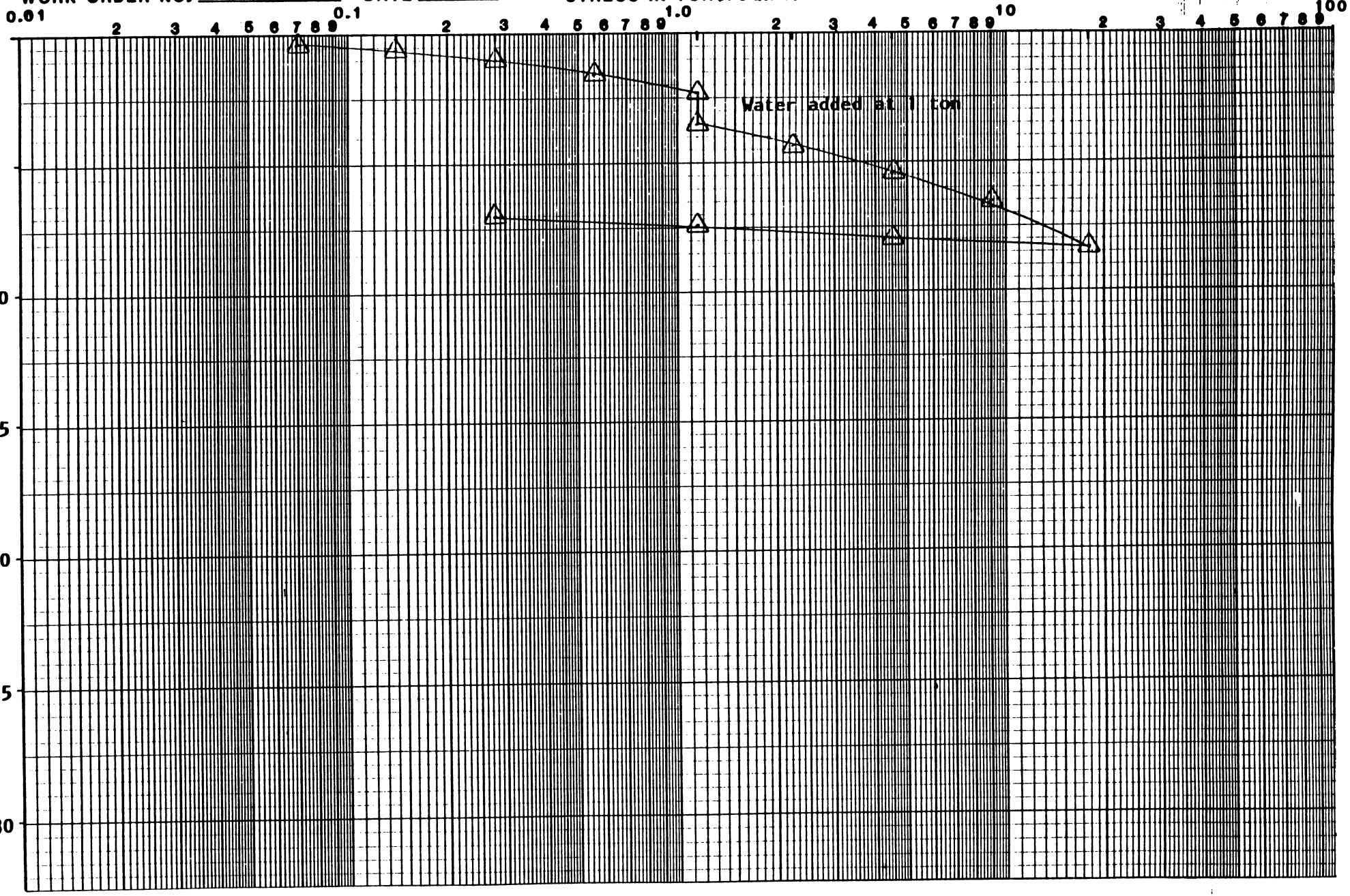


Plate C-14

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	5	35'	2.4	11.5	1.00	2.36	Brown silty fine to medium sand with rock fragments

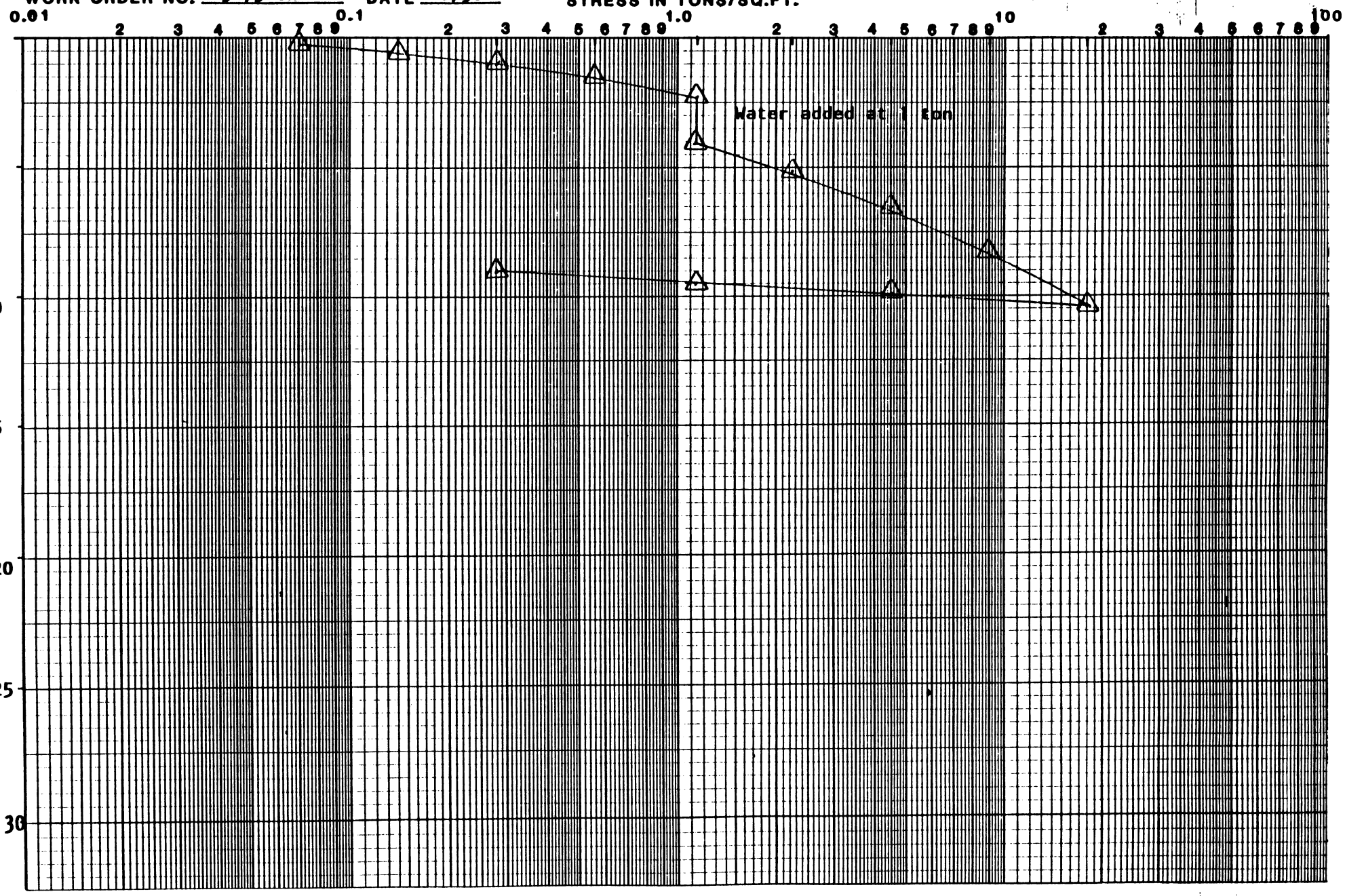


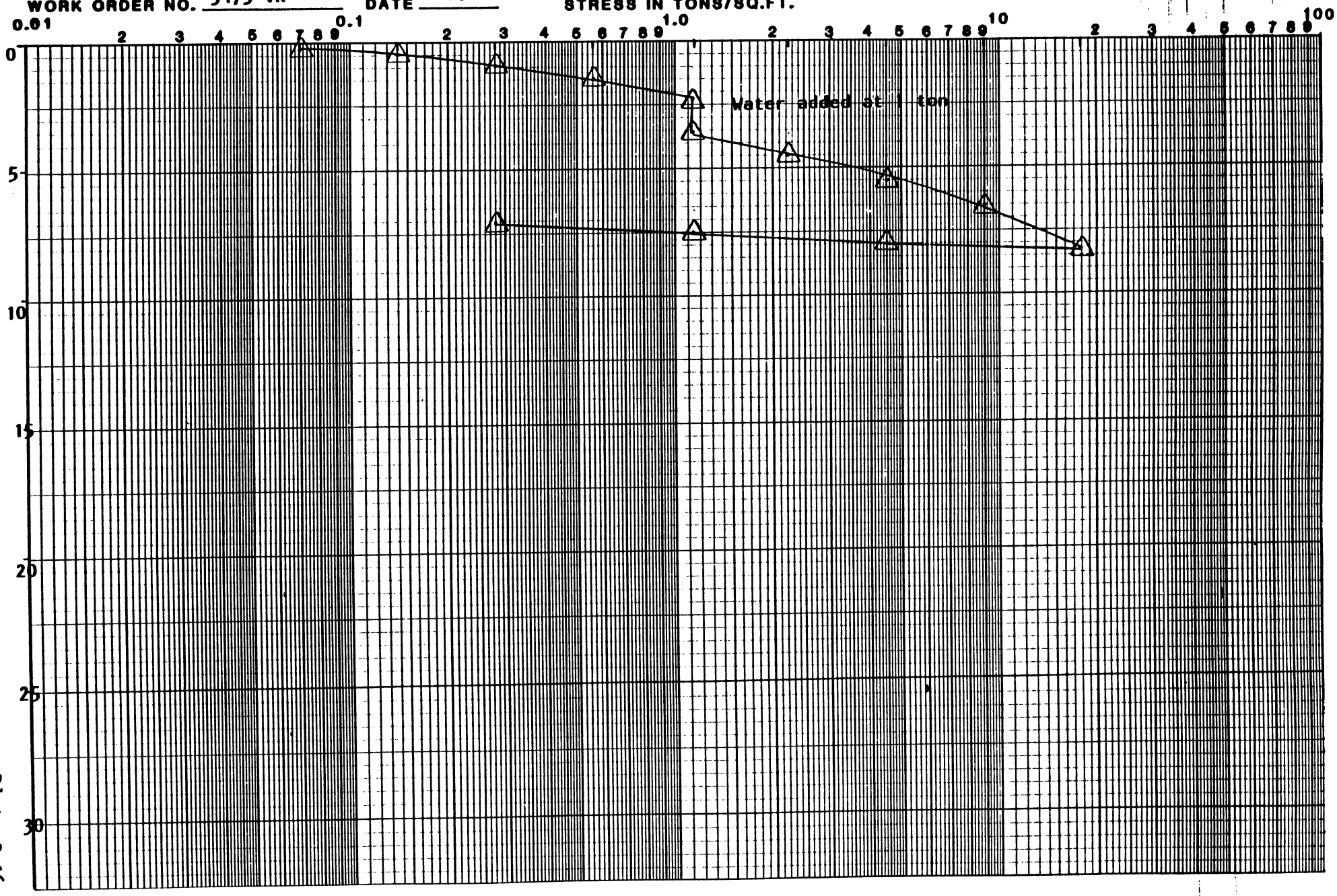
Plate C-15

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	5	45	1.4	13.1	1.0	2.56	Brown silty fine to coarse sand with rock fragments



FORM 88/8

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: Lusk/Palmdale

WORK ORDER NO. 3473-VN DATE 6/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	5	55	1.7	12.3	1.0	2.36	Brown silty fine to coarse sand with rock fragments

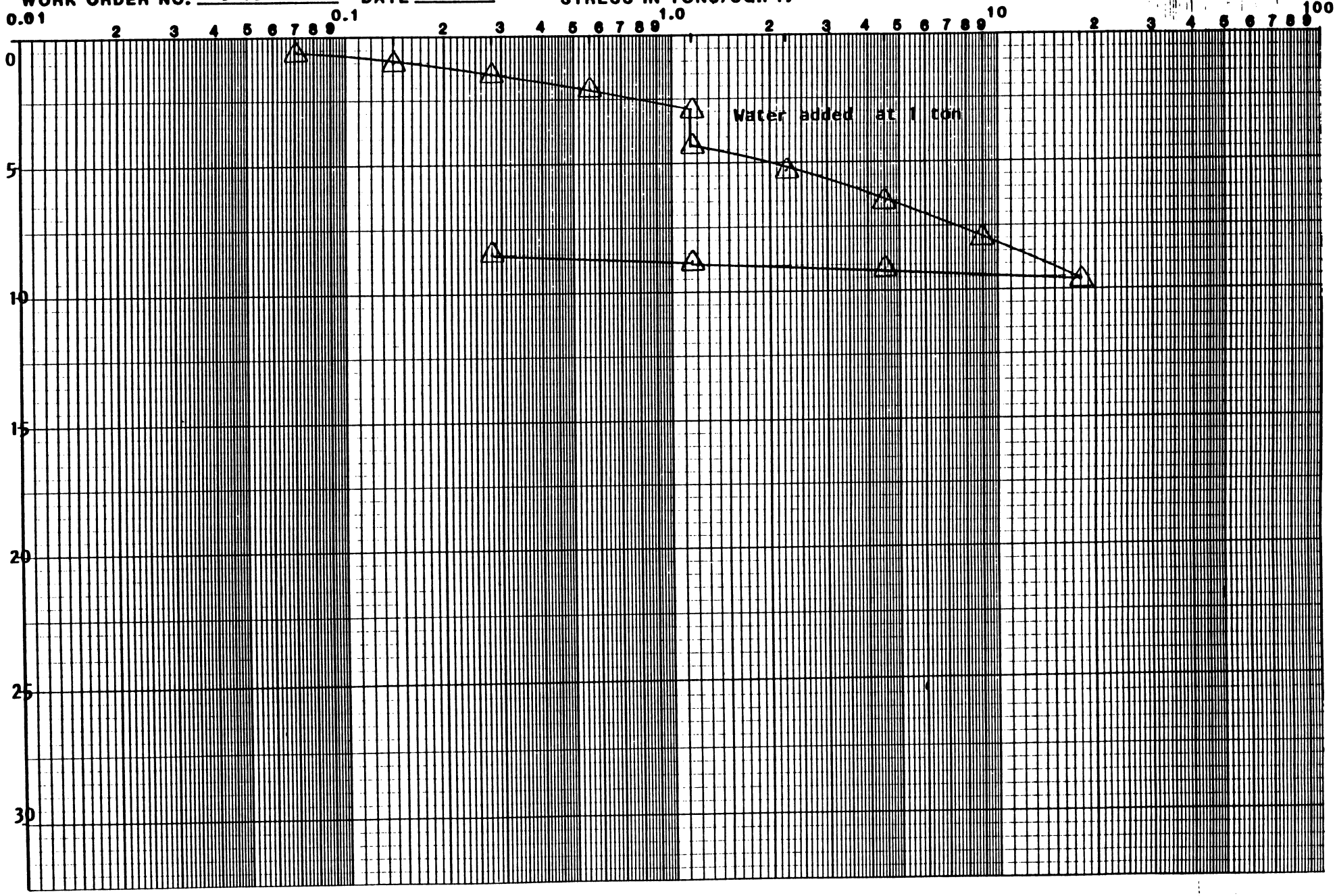


Plate C-17

FORM 88/8

GEOSOILS, INC.
CONSOLIDATION TEST

CLIENT: LUSK

WORK ORDER NO. 3473-VN DATE 8/90

BORING	SAMPLE	DEPTH FEET	WATER CONTENT, % BEFORE	WATER CONTENT, % AFTER	HEIGHT INCHES	DIA. INCHES	CLASSIFICATION
B	2	0-7'	7.0	12.3	1.00	2.36	Brown, silty, fine to coarse SAND with rock fragments.

Remolded to 90.1 Compaction

STRESS IN TONS/SQ.FT.

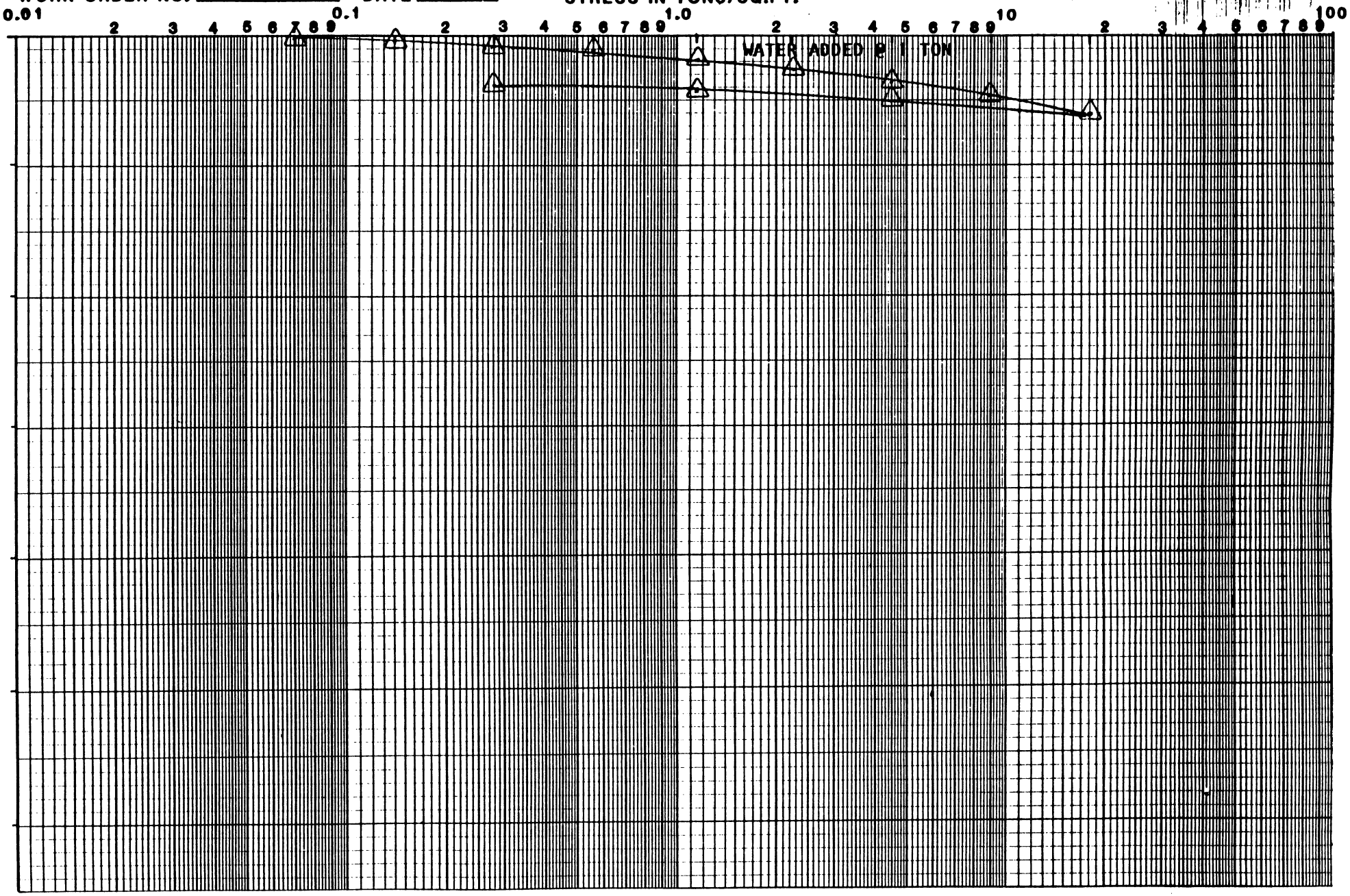
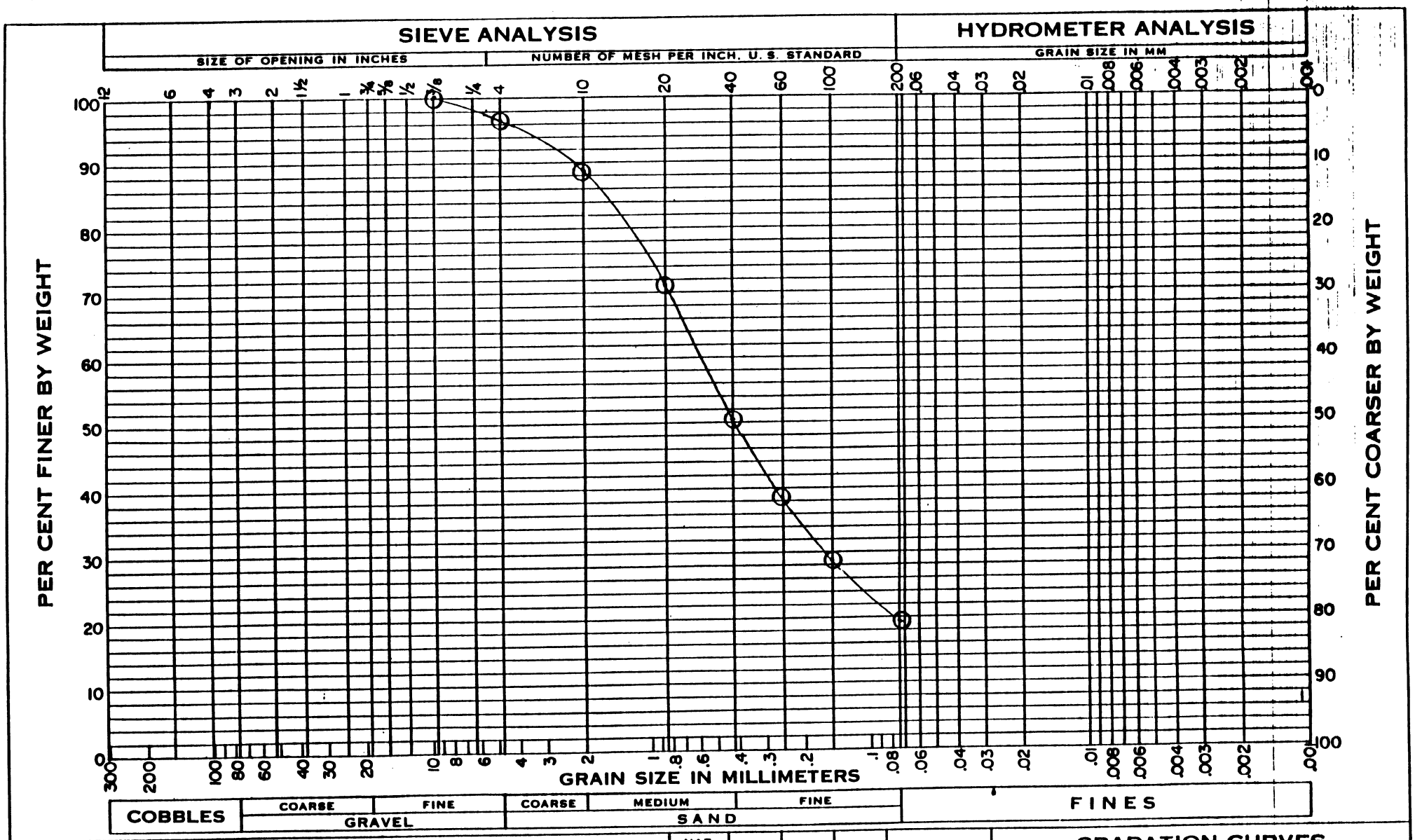


PLATE C-26



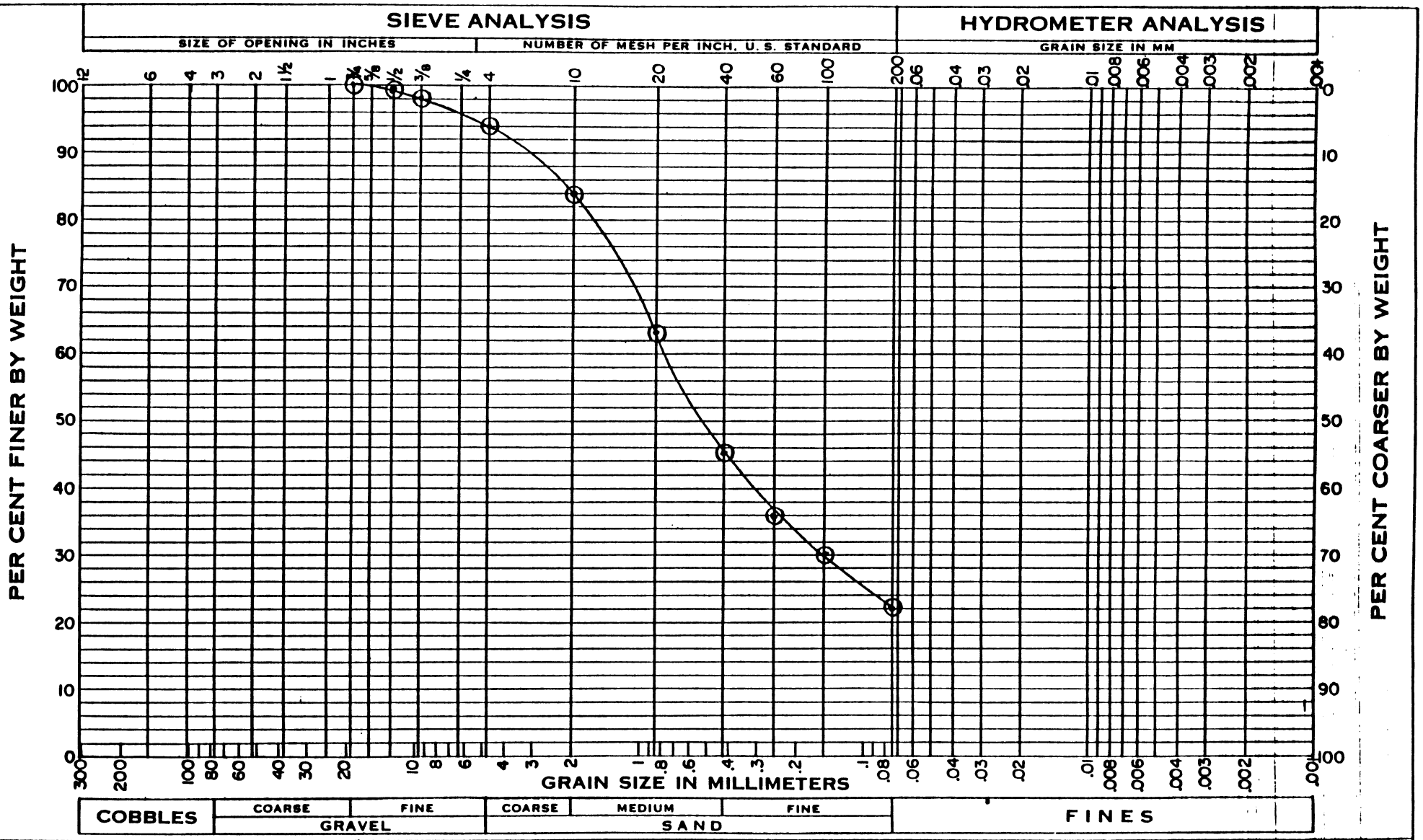
SAMPLE NO.	DEPTH —FT.	CLASSIFICATION	NAT. W. C.	LL	PL	PI	
B-1	5	Brown, silty, fine to coarse SAND					

GRADATION CURVES

LUSK / PALMDALE

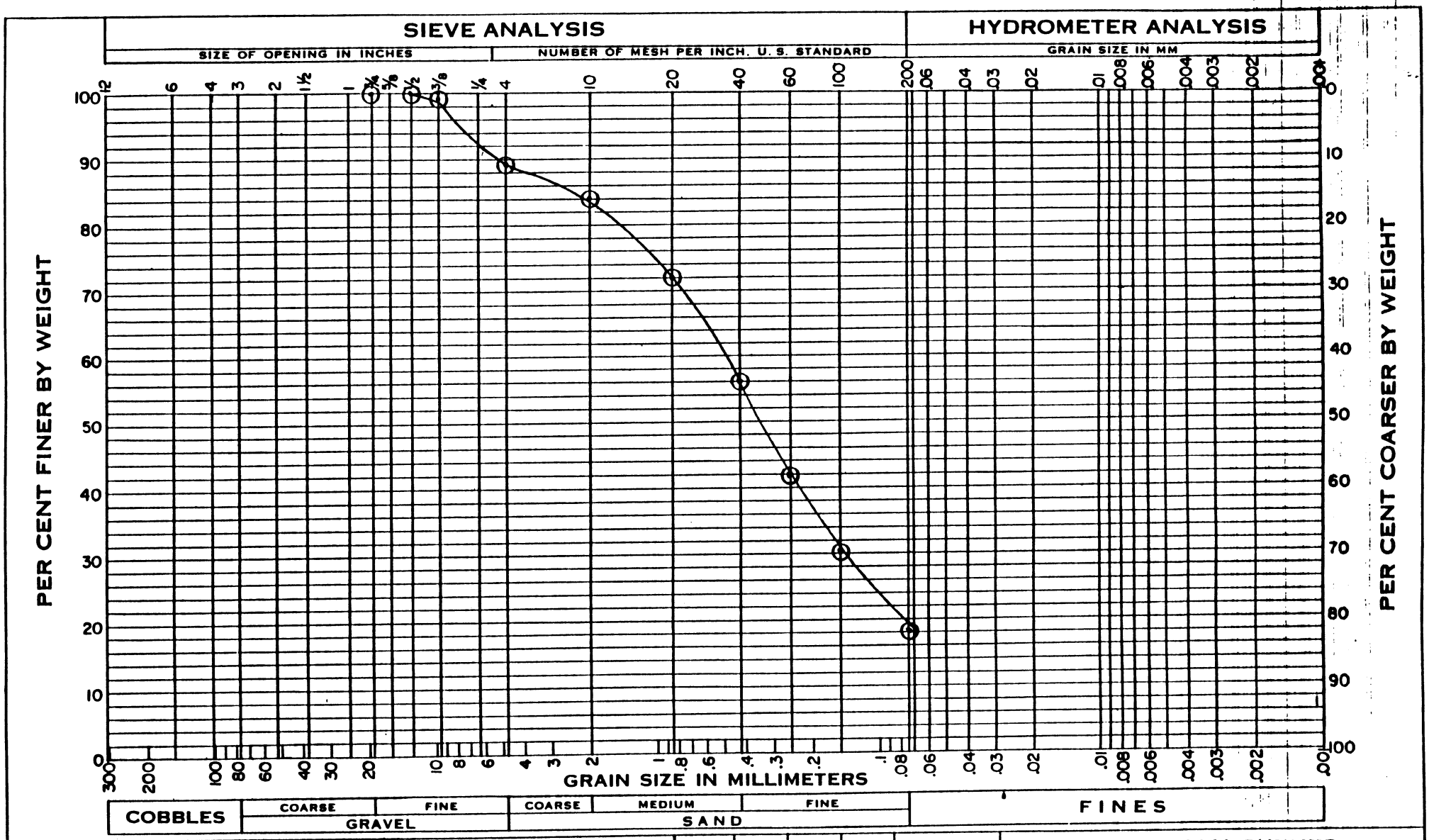
GeoSoils, Inc.

PLA G-1



SAMPLE NO.	DEPTH —FT.	CLASSIFICATION	NAT. W.C.	LL	PL	PI		GRADATION CURVES
B-2	0-7'	Brown, silty, fine to coarse SAND						LUSK / PALMDALE **GeoSoils, Inc.**

PLATE G-2



SAMPLE NO.	DEPTH —FT.	CLASSIFICATION	NAT. W. C.	LL	PL	PI
B-6	10-15'	Brown, silty, fine to coarse SAND				

GRADATION CURVES

LUSK / PALMDALE

GeoSoils, Inc.

PLATE G-3

GEOSOILS INC.

WORK ORDER: 3473-VN DATE: 6/90

CLIENT: Lusk/Palmdale

SOIL TYPE:

EXCAVATION: B-1 @ 15-20'

CLASSIFICATION: Brown silty fine to coarse sand

MAXIMUM DENSITY CURVE

131.5 pcf @ 90%

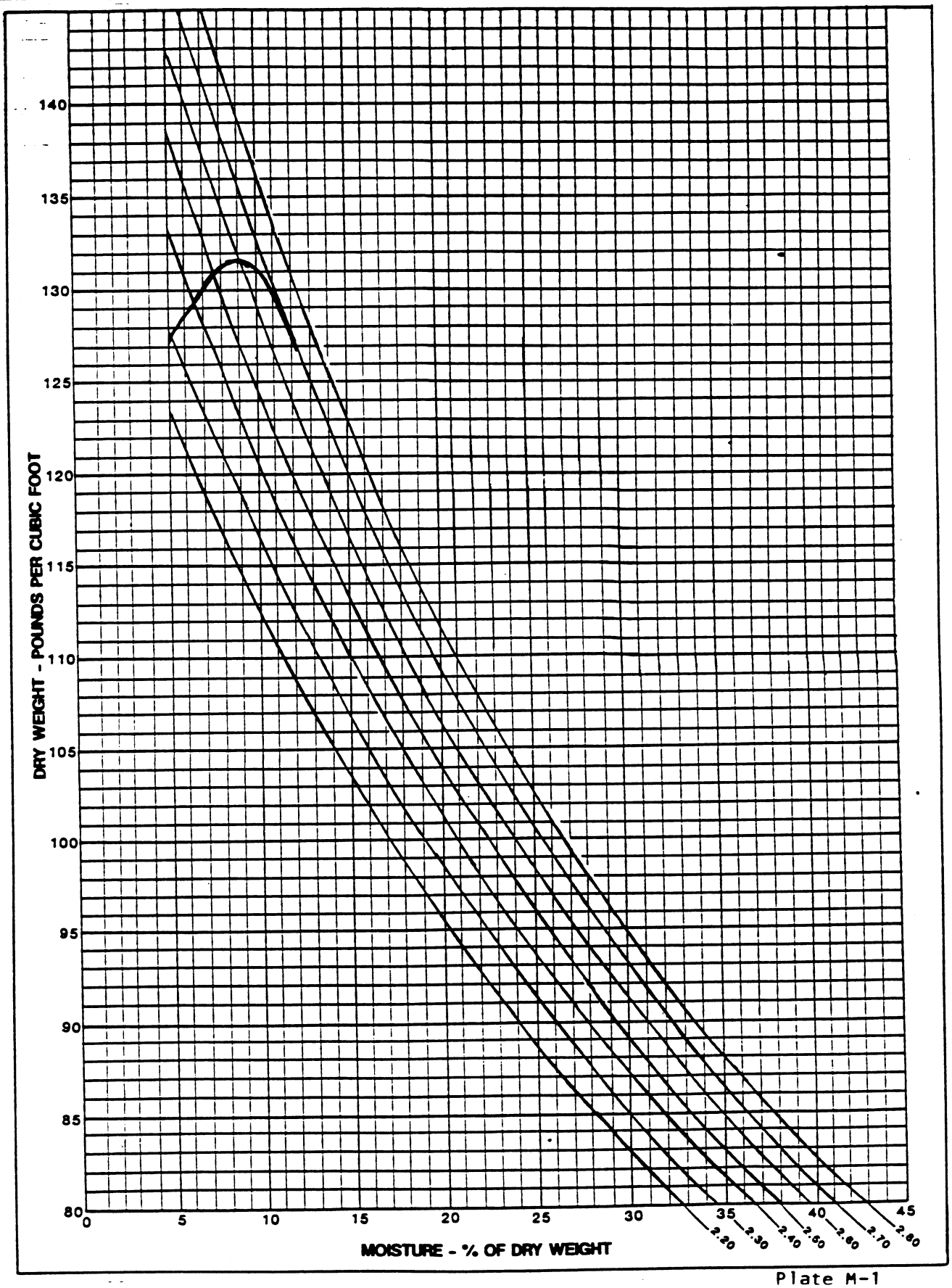


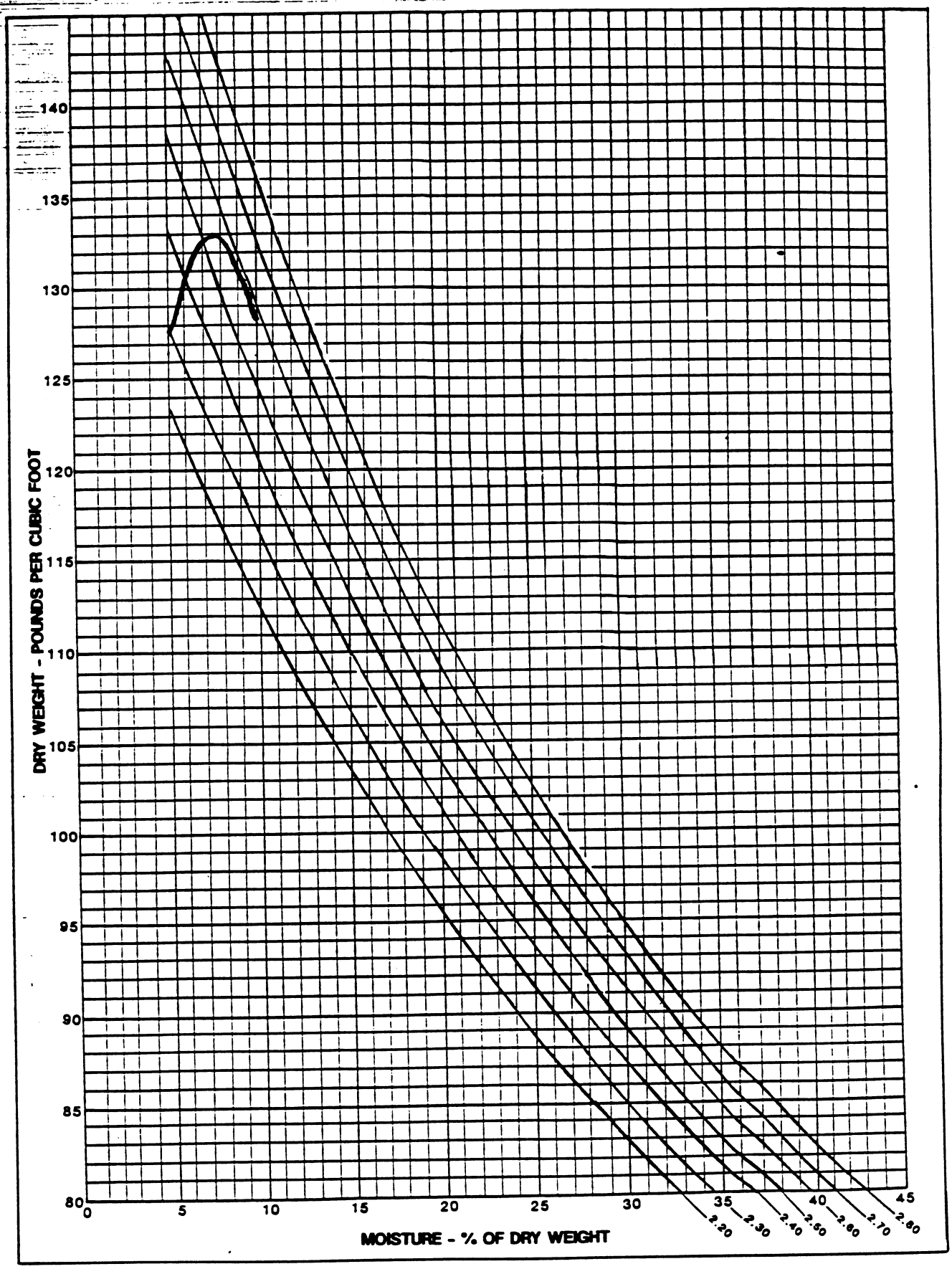
Plate M-1

GEOSOILS INC.

WORK ORDER: 3473-VN DATE: 7/90
CLIENT: Lusk/Palmdale
SOIL TYPE:
EXCAVATION: B-2 @ 0-7'
CLASSIFICATION: Brown silty fine to coarse sand

MAXIMUM DENSITY CURVE

133.0 pcf @ 75%



GEOSOILS INC.

WORK ORDER: 3473-VN DATE: 6/90

CLIENT: Lusk/Palmdale

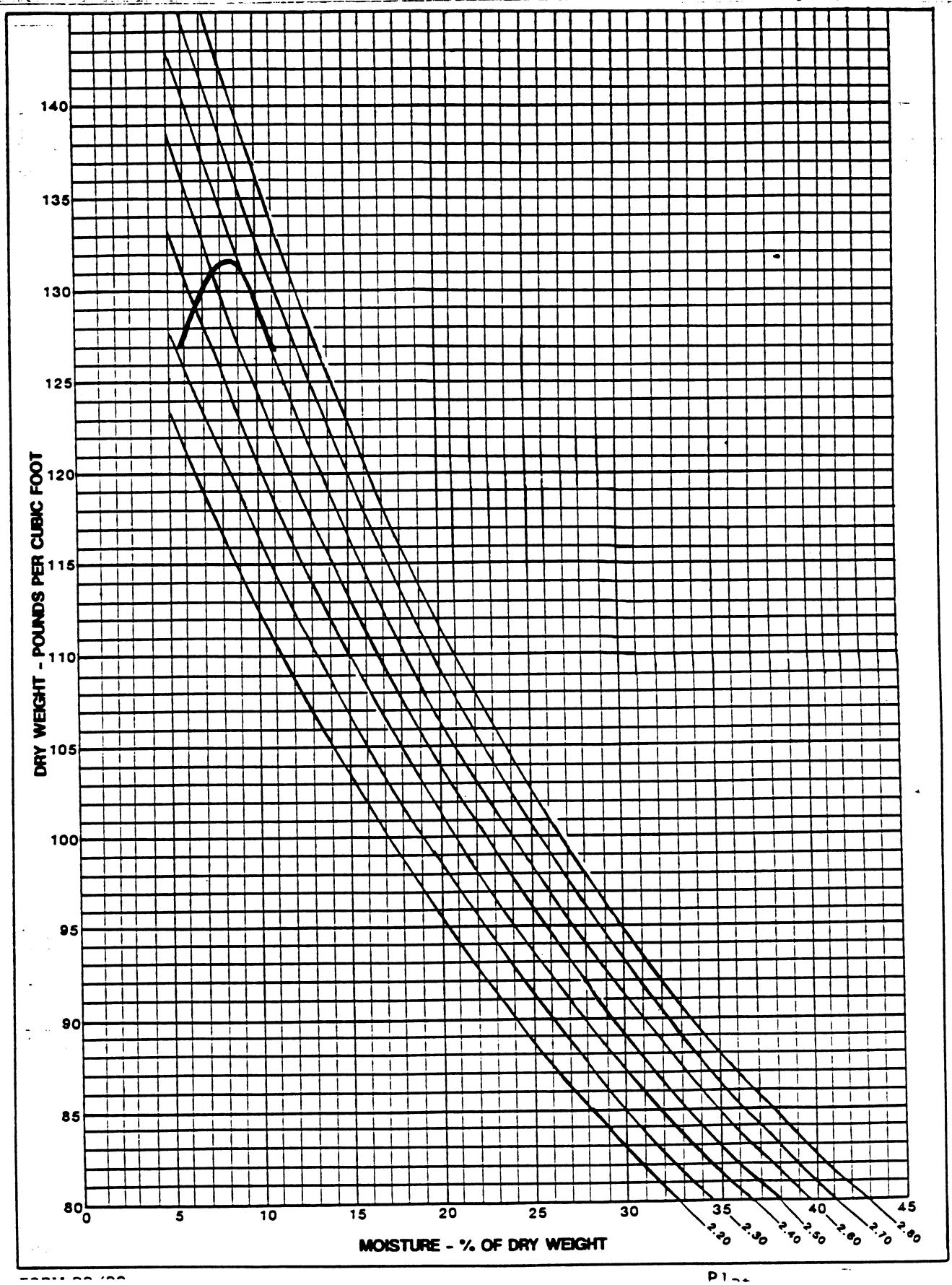
SOIL TYPE:

EXCAVATION: B-6 @ 10±15'

CLASSIFICATION: Brown silty fine to coarse sand

MAXIMUM DENSITY CURVE

131.5 pcf @ 85%



ANAHEIM TEST LABORATORY

3004 S. ORANGE AVENUE
SANTA ANA, CALIFORNIA 92707
PHONE (714) 549-7267

n: GEO SOILS, INC.
ATTN: EDDIE F

DATE: 7-18-90

P.O. No. Verbal

Shipper No.

Lab. No. N 1222-1

Specification:

Material: Soil

-1 WO 3453 VN Lusk
B 2 @ 0-7'

	r value
By Exudation	71
By Expansion	70

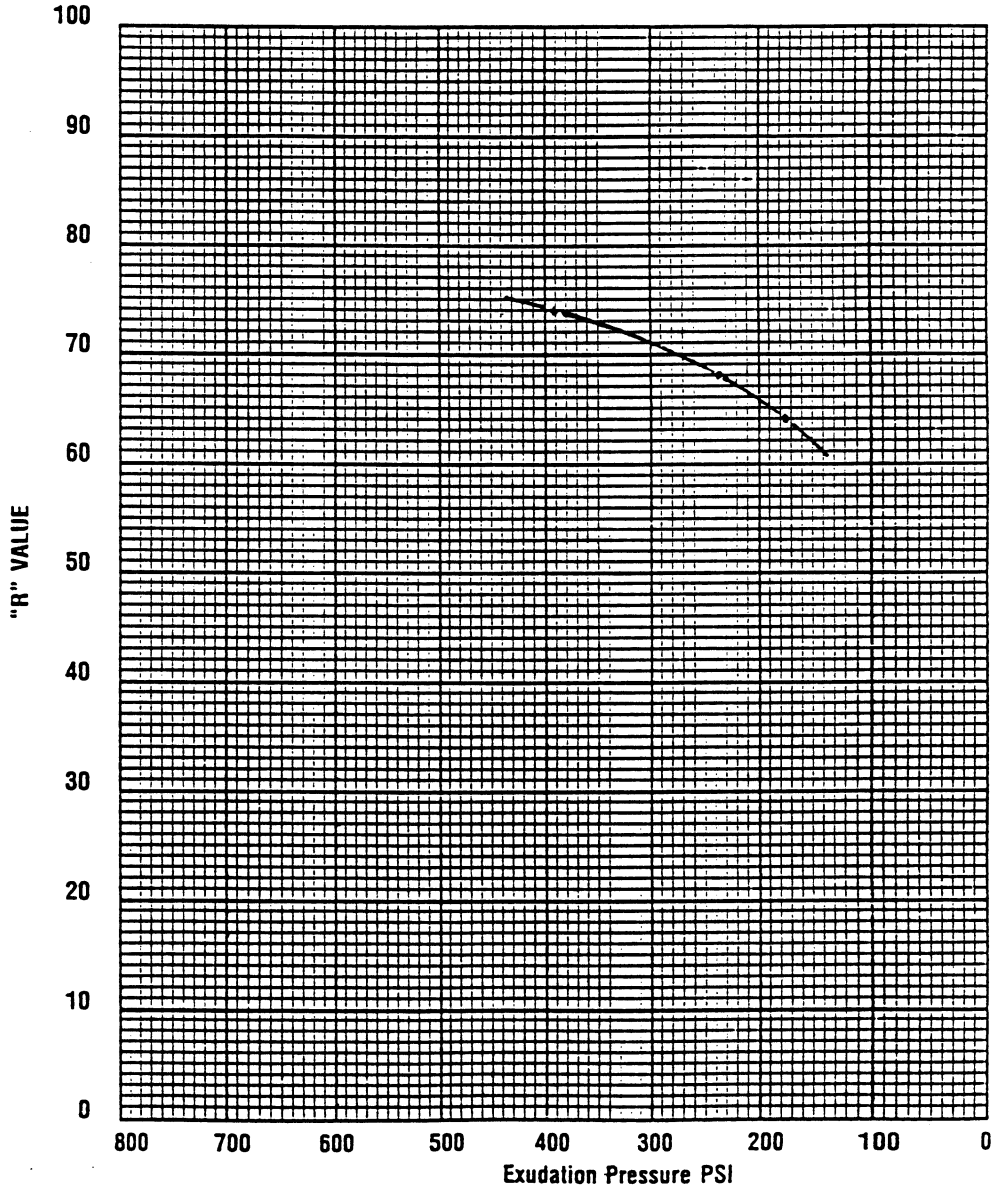
ANAHEIM TEST LABORATORY

James A. Kallas, Chief Chemist

I No.: N 1222-1 Soil Type: BROWN, F-M SILTY SAND

	TEST SPECIMAN		A	B	C	D	E
	DATE TESTED						
STABILOMETER	Compactor Air Pressure	psi	200	100	125		
	Initial Moisture	%	4.3	4.3	4.3		
	Moisture at Compaction	%	9.1	9.9	9.5		
	Briquette Height	In.	2.36	2.37	2.48		
	Density	pcf	127.6	125.9	126.4		
	EXUDATION PRESSURE	psi	391	175	237		
	EXPANSION dial (X.0001)		7	2	4		
SPECIMEN FABRICATION	Ph at 1000 pounds	psi	16	21	20		
	Ph at 2000 pounds	psi	24	33	32		
	Displacement	turns	4.46	4.72	4.70		
	"R" Value		76	67	68		
	CORRECTED "R" VALUE		74	64	68		

FINAL "R" VALUE	
IY EXUDATION:	71
IY EXPANSION: TI (5)	70

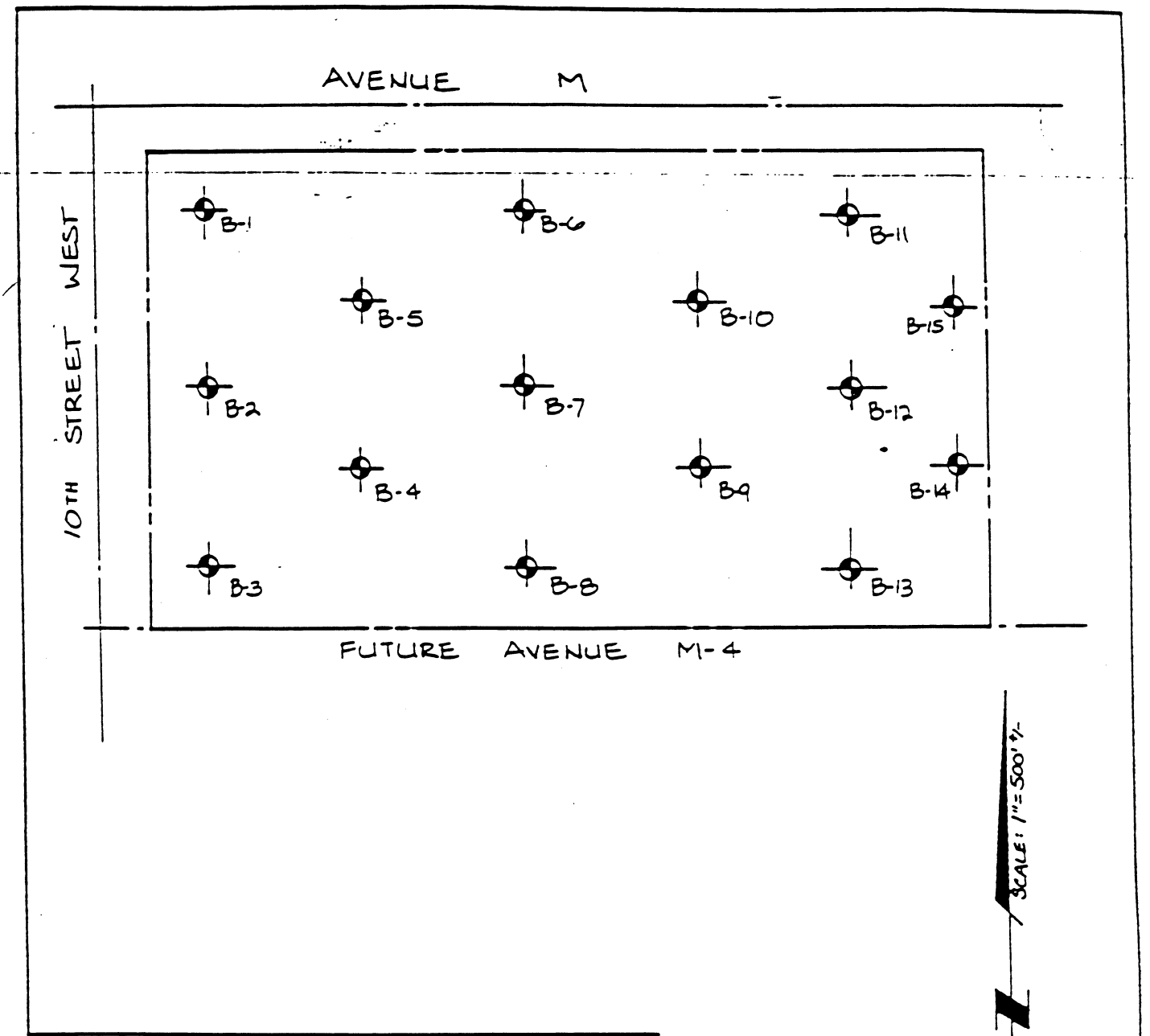


- August 27, 1990
W.O. 3473-VN

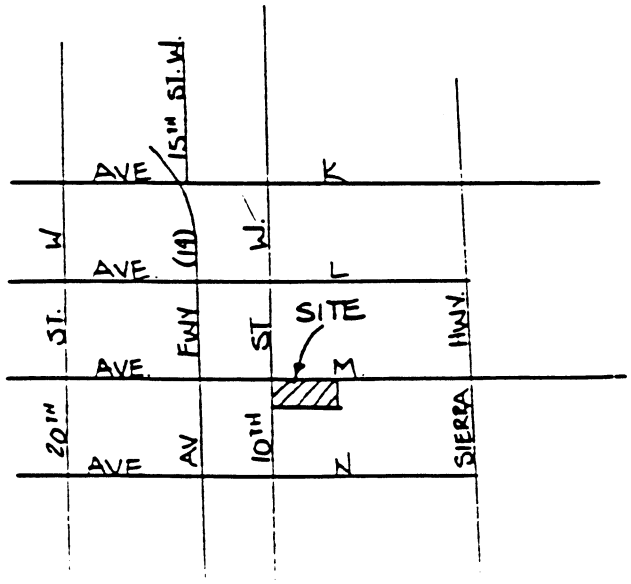
APPENDIX B

BORING LOGS AND LABORATORY TEST RESULTS

By Buena Engineers, 1988



VICINITY MAP



⊕ DENOTES APPROXIMATE LOCATION OF EXPLORATORY BORING

SITE PLAN & VICINITY MAP
PROPOSED INDUSTRIAL PARK

BUENA ENGINEERS, INC.

DATE 5-25-88 | FILE NO B-3114-L01

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

UNIFIED SOIL CLASSIFICATION SYSTEM

INDUSTRIAL PARK
10th STREET WEST & AVENUE M
PALMDALE, CALIFORNIA

BUENA ENGINEERS, INC.

DATE: 5-25-88 | FILE NO. B-3114-L01

REV12/87

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/25/88 | Logged by: JS | BORING NO. 1 | Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		11	Moderate yellowish brown silty fine sand with up to coarse sand and clay.	SM	107.6	2.6	Bag sample of auger tailings taken from 0 to 5 feet.
		29				2.5	
5		36	Moderate yellowish brown silty fine sand with up to 3/8 inch gravel.	SM	116.9	2.3	
		17				1.5	Caving Soils
10		17	Moderate yellowish brown coarse sandy fine to medium sand with up to 1/2 inch gravel and silt.	SP			Caving Soils
15		15	Dark yellowish brown fine sandy silt with medium sand and slight clay.	ML	106.0	2.9	
20		37	Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM	113.0	2.5	
25							Caving Soils
30		45	Pale redish brown clayey silt with fine sand.	ML	106.0	4.2	
35							

*ASTM D 3550 3" O.D. Sampler

Boring terminated at 31 feet.
No free groundwater encountered during drilling.
Caving soils encountered at 7.5, 10, and 26 feet.
The stratification lines represent approximate boundaries between soil types.
The actual transition may be gradual.

May 25, 1988 **Industrial Park** File No. B-3114-L01

Date Drilled: 4/25/88	Logged by: JS	BORING NO. 2	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		33	Moderate yellowish brown silty fine sand with up to #4 gravel.	SM	115.0	2.1	
5		52					
		17	Moderate yellowish brown silty fine to medium sand with up to #4 gravel and clay.	SM	113.0	1.8	3% gravel, 86% sand, 11% silt and clay.
10		20	Pale brown silty fine sand with up to 3/8 inch gravel.	SM	108.7	2.3	
15		24	Dark yellowish brown silty fine sand with up to #4 gravel.	SM	97.0	2.5	
20		54			110.9	6.8	
25							
30							
35							

Boring terminated at 21 feet.

No free groundwater encountered during drilling.

No caving soils encountered.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988

Idustrial Park

File No. B-3114-L01

Date Drilled: 4/23/88	Logged by: JS	BORING NO. 3	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0			Moderate yellowish brown silty fine sand with up to 3/8 inch gravel.	SM			Bag sample of auger tailings taken from 0 to 5 feet.
		18			111.0	2.4	
5		42					
		17	Moderate yellowish brown coarse sandy fine to medium sand with up to 3/8 inch gravel.	SP	114.0	1.2	Caving Soils
10		38				1.9	Disturbed Sample
15		27					Caving Soils
			Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM			
20					121.6	2.6	Caving Soils
25							
30							
35							

Boring terminated at 21 feet.

No free groundwater encountered during drilling.

Caving soils encountered below 8, 13, and 18 feet.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/25/88 | Logged by: JS | **BORING NO. 4** | Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		11 26	Moderate yellowish brown silty fine sand with up to 3/8 inch gravel.	SM	114.9	2.6	
5		13	Dark yellowish brown fine sandy silt with up to coarse sand.	ML		3.0	Disturbed Sample Caving Soils
10		13	Moderate olive brown coarse sandy fine to medium sand with slight silt.	SP	109.8	1.5	Caving Soils
15		18	Dark yellowish brown silty fine sand with slight medium sand.	SM	97.1	2.4	

20

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

*ASTM D 3550
3" O.D. Sampler

Caving soils encountered at 7 and 12 feet.

25

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

30

35

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/25/88	Logged by: JS	BORING NO. 5	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		16	Moderate yellowish brown silty fine sand with up to 3/8 inch gravel and slight clay.	SM	105.9	2.3	5% gravel, 76% sand, 13% silt, and 6% clay.
		32			114.5	2.7	
5		20	Moderate brown clayey fine sand with up to 3/8 inch gravel and silt.	SC	108.4	2.4	Caving Soils
10		15	Moderate brown silty fine to medium sand with up to #4 gravel.	SM			Caving Soils Disturbed Sample
15		21	Dark yellowish brown coarse sandy up to 3/8 inch gravelly fine to medium sand with silt.	SP	109.2	2.0	

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Caving soils encountered at 7 and 9 feet.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988 **Industrial Park** File No. B-3114-L01

Date Drilled: 4/25/88	Logged by: JS	BORING NO. 6	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		24	Moderate brown silty fine sand with up to #4 gravel and slight clay.	SM	107.6	4.4	Caving Soils
5		17	Moderate brown silty fine sand with up to 3/8 inch gravel and slight clay.	SM	108.3	2.7	
		12			115.4	1.7	Caving Soils
10		22					Disturbed Sample
			Moderate yellowish brown silty fine to medium sand with up to 1/2 inch gravel.	SM			Caving Soils
15		17				1.9	Disturbed Sample
20							
25							
30							
35							

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Caving soils encountered below 4, 8, and 13 feet.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 7	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		42	Moderate brown silty fine to medium sand with up to #4 gravel.	SM			Bag sample of auger tailings taken from 0 to 5 feet.
		14			106.2	2.5	
5		14	Moderate brown coarse sandy fine to medium sand with up to 3/8 inch gravel and slight silt.	SP	112.2	2.0	
		14			108.3	1.6	
10		25			105.2	2.1	
					107.8	4.6	
15		30					
			Dark yellowish brown silty fine sand with up to coarse sand and slight clay.	SM			
20		41					
25							
30							
35							

*ASTM D 3550
2" O.D. Sampler

Boring terminated at 21 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 8	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		13	Dark yellowish brown silty fine sand with up to 3/8 inch gravel.	SM	105.9	2.3	
		12					
5		21	Dark yellowish brown silty fine sand with up to coarse sand and clay.	SM	106.7	3.5	
10		16			110.0	3.2	
		25	Dark yellowish brown very silty fine sand with up to 1/2 inch gravel.	SM	98.3	3.5	
15							
20							
25							
30							
35							

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled 4/26/88	Logged by : JS	BORING NO. 9	Location : Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		9	Moderate brown silty fine sand with up to #4 gravel.	SM	104.8	2.2	
5		10 9	Moderate brown sitly fine to medium sand with up to #4 gravel and slight clay.	SM	106.0	2.3	3% gravel, 80% sand, 17% silt and clay.
10		31	Pale brown coarse sandy up 1/2 inch gravelly fine to medium sand with slight silt.	SP		1.5	
15		44	Moderate yellowish brown fine sandy silt with a trace of clay.	ML	105.7	6.3	

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
2" O.D. Sampler

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled : 4/26/88	Logged by : JS	BORING NO. 10	Location : Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		7	Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM	108.0	2.4	
		21					
5		19	Moderate brown silty fine to medium sand with up to #4 gravel.	SM	111.9	2.0	
10		21	Moderate brown coarse sandy fine to medium sand with slight #4 gravel and clay.	SP	101.0	1.7	
15		21	Pale brown silty fine to coarse sand with #4 gravel and clay.	SM	102.2	1.8	

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 11	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		13	Dark yellowish brown silty fine sand with up to 3/8 inch gravel.	SM		2.0	Disturbed Sample
		16			110.7	2.5	Bag sample of auger tailings taken from 0' to 5 feet.
5		15	Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM			
		15			109.7	3.9	
10		23	Moderate yellowish brown silty fine to medium sand with up to #4 gravel.	SM	108.5	2.9	
15		24	Dark yellowish brown coarse sandy 1/2 inch gravelly fine to medium sand with silt.	SM	115.4	2.0	
20		45				1.5	
25							
30							
35							

Boring terminated at 21 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25, 1988 **Industrial Park** File No. B-3114-L01

Date Drilled :4/26/88	Logged by : JS	BORING NO. 12	Location : Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		8	Moderate brown silty fine sand with up to 3/8 inch gravel	SM	108.0	2.1	
						2.3	Disturbed Sample
		14	Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM	103.9	2.1	
5		7					
10		18					
			Moderate olive brown silty fine sand with medium sand.	SM			
15		19			107.9	3.0	
20							
25							
30							
35							

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

May 25 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 13	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0			Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM			Bag sample of auger tailings taken from 0 to 5 feet.
		19					
5		20			112.9	1.9	
		30			112.1	2.0	
			Dark yellowish brown very silty fine sand with up to coarse sand.	SM			
10		30			107.8	3.1	
15		29			97.4	1.7	
			Pale brown coarse sandy #4 gravelly fine to medium sand with silt.	SM			
20		25			101.8	2.9	

Boring terminated at 21 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

25

30

35

May 25, 1988 — **Industrial Park** — File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 14	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		8	Moderate brown silty fine sand with up to #4 gravel.	SM	110.4	2.0	3% gravel, 79% sand, 12% silt, and 6% clay.
		17			111.8	3.0	
5		13	Moderate brown silty fine sand with up to 3/8 inch gravel.	SM	110.4	3.9	
		16					
10		17	Moderate brown silty fine to medium sand with up to 3/8 inch gravel.	SM	108.6	3.7	
15		22			103.7	2.5	

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

20 25 30 35

May 25, 1988

Industrial Park

File No. B-3114-L01

Date Drilled: 4/26/88	Logged by: JS	BORING NO. 15	Location: Per Plan

Depth (in feet)	Symbol	Pen. Resist.* (blows/ft.)	DESCRIPTION	Soil Type	Dry Density (pcf)	Moisture Content (%)	REMARKS
0		16	Moderate brown silty fine sand with up to 3/8 inch gravel.	SM	106.6	3.2	
5		16	Dark yellowish brown silty fine to medium sand with up to #4 gravel.	SM	111.6	2.6	
		15					
10		13			108.3	4.1	
		16	Moderate yellowish brown fine to coarse sandy medium sand with up to 3/8 inch gravel.	SP		2.3	
15							
20							
25							
30							
35							

Boring terminated at 16 feet.

No free groundwater encountered during drilling.

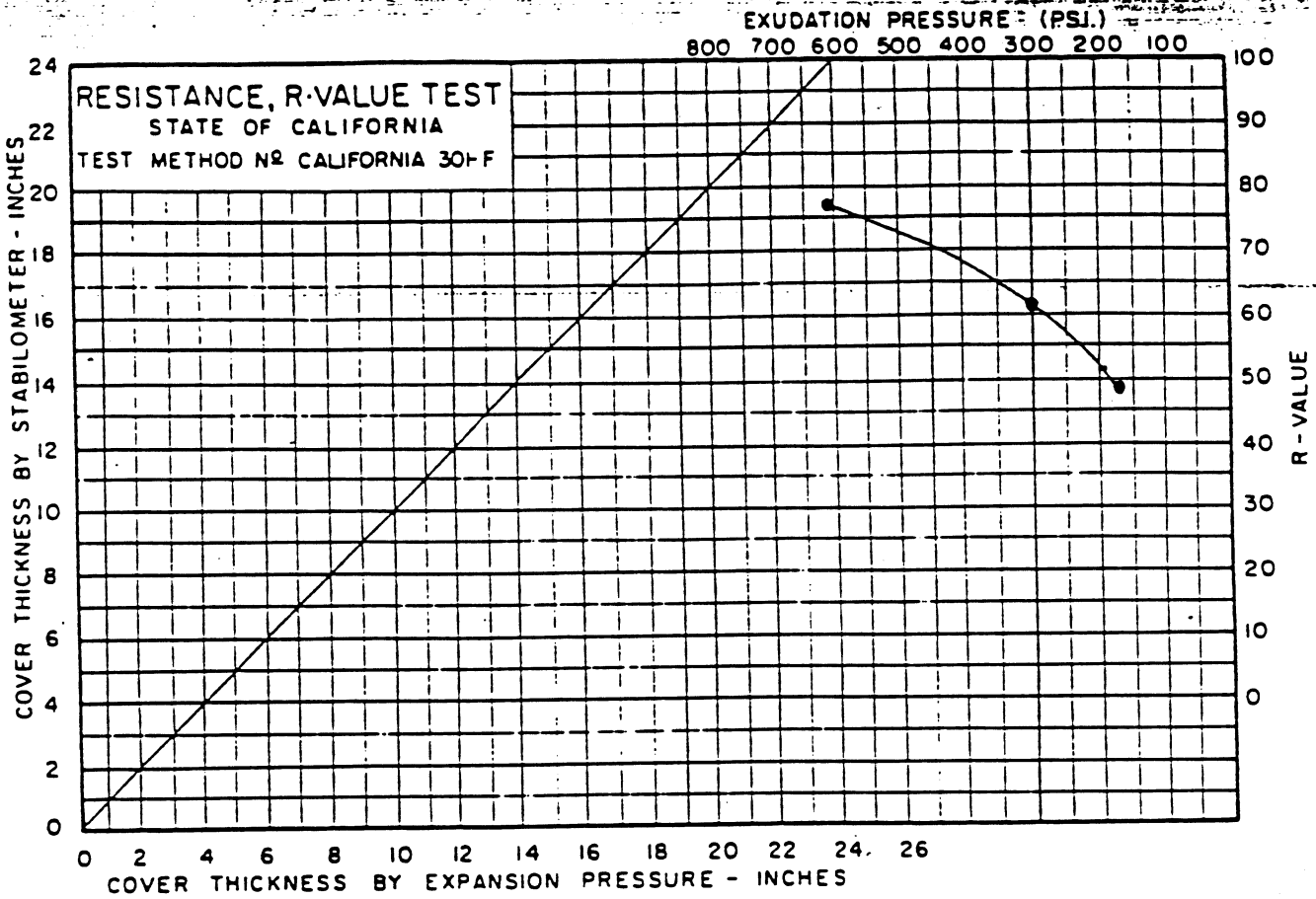
Eight inch hollow stem auger used due to caving soils.

The stratification lines represent approximate boundaries between soil types. The actual transition may be gradual.

*ASTM D 3550
3" O.D. Sampler

APPENDIX B

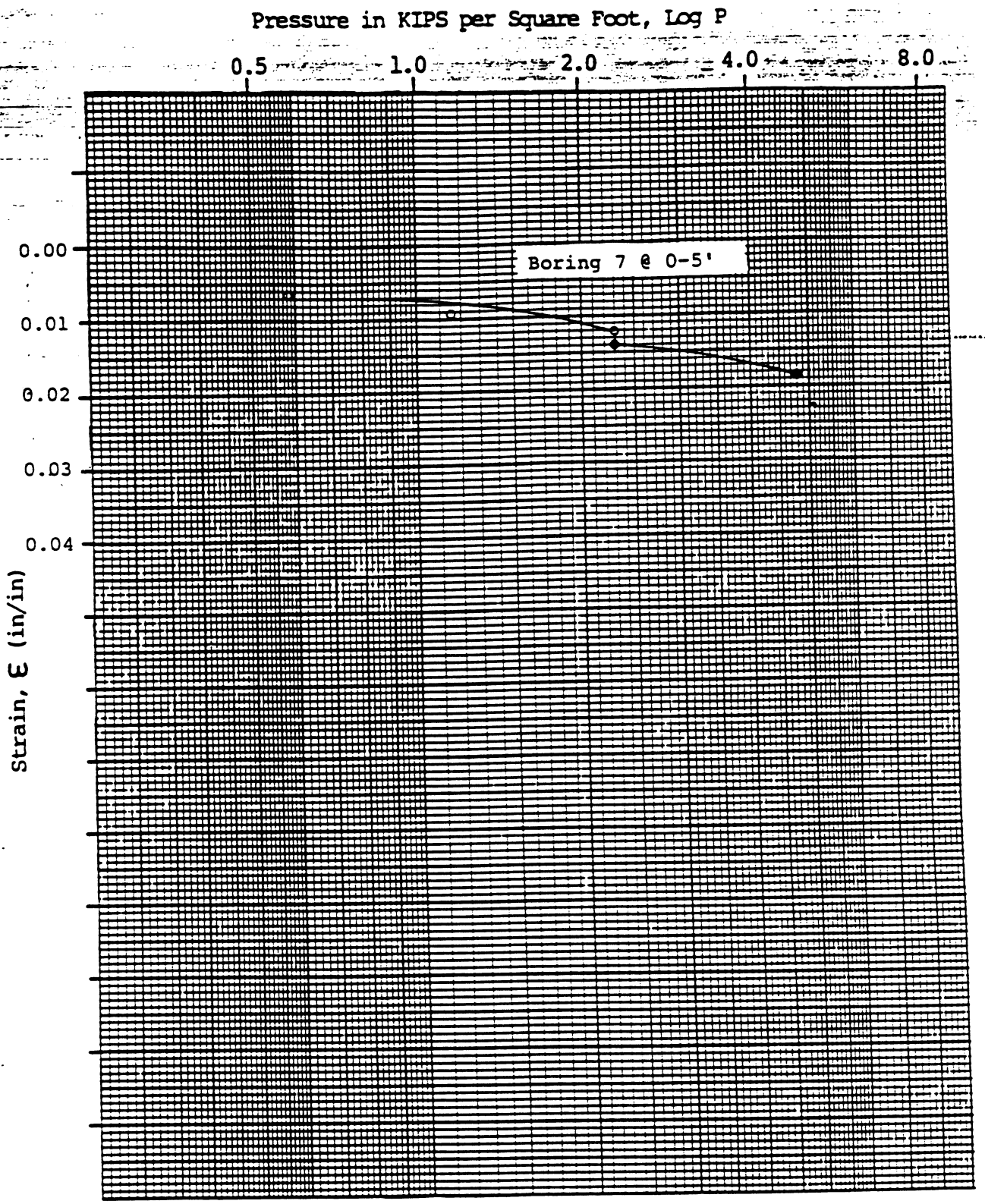
Summary of Test Results



SAMPLE: Boring #1 at 0-5 feet

DESCRIPTION: Moderate Yellowish Brown, Silty Fine to Medium Sand with up to 1/4" Gravel

SPECIMEN	A	B	C
EXUDATION PRESSURE (P.S.I.)	165	300	605
EXPANSION DIAL (.0001")	0	0	3
EXPANSION PRESSURE (P.S.F.)	0	0	13
RESISTANCE VALUE, "R"	48	62	77
% MOISTURE AT TEST	10.3	9.5	7.5
DRY DENSITY AT TEST (P.C.F.)	133.3	134.9	131.5
"R" VALUE AT 300 P.S.I. EXUDATION PRESSURE	= (62)		



*Recompacted to 90% of maximum dry density as determined by ASTM D 1557.

CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

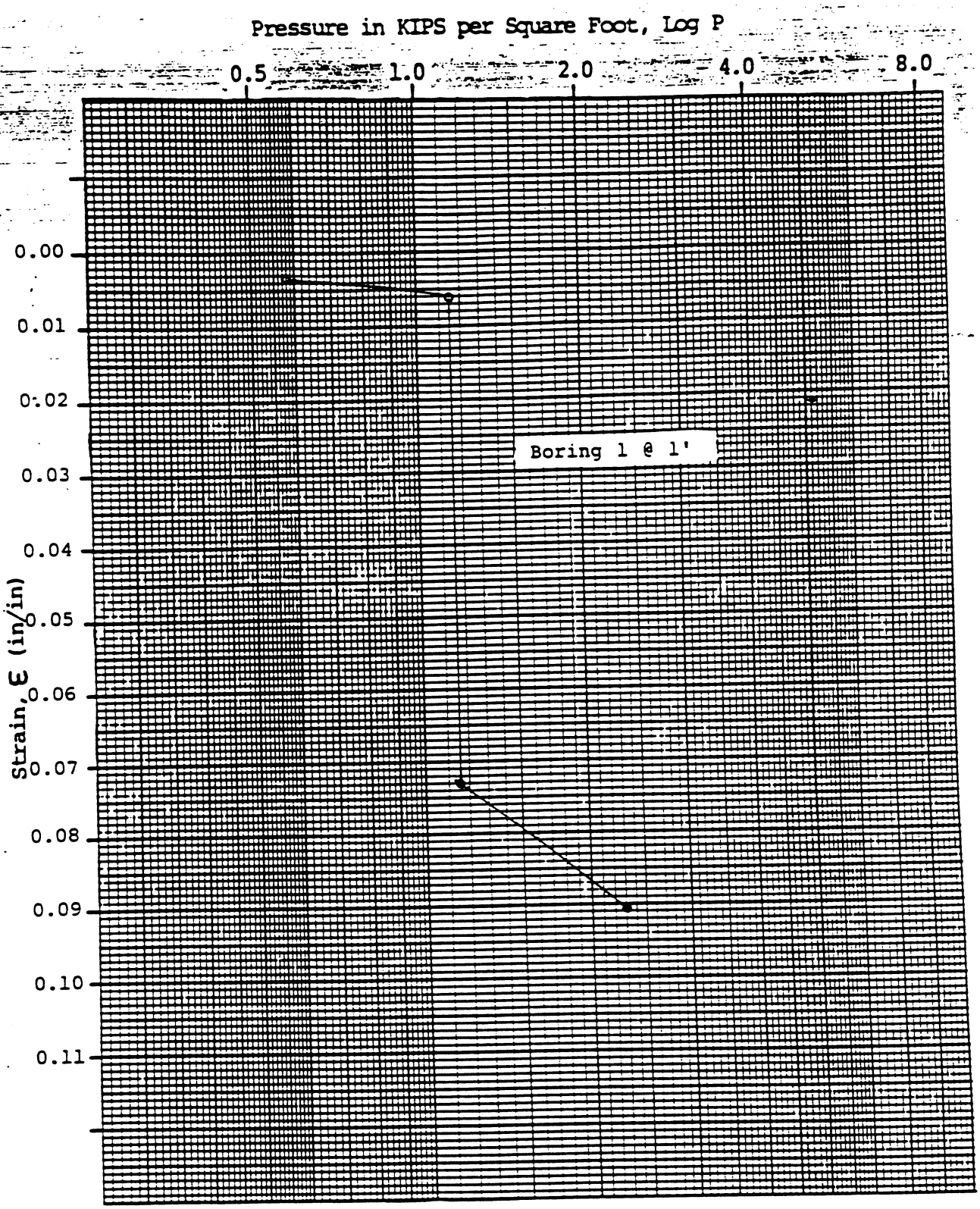
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE:

FILE NO B-3114-L01



CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

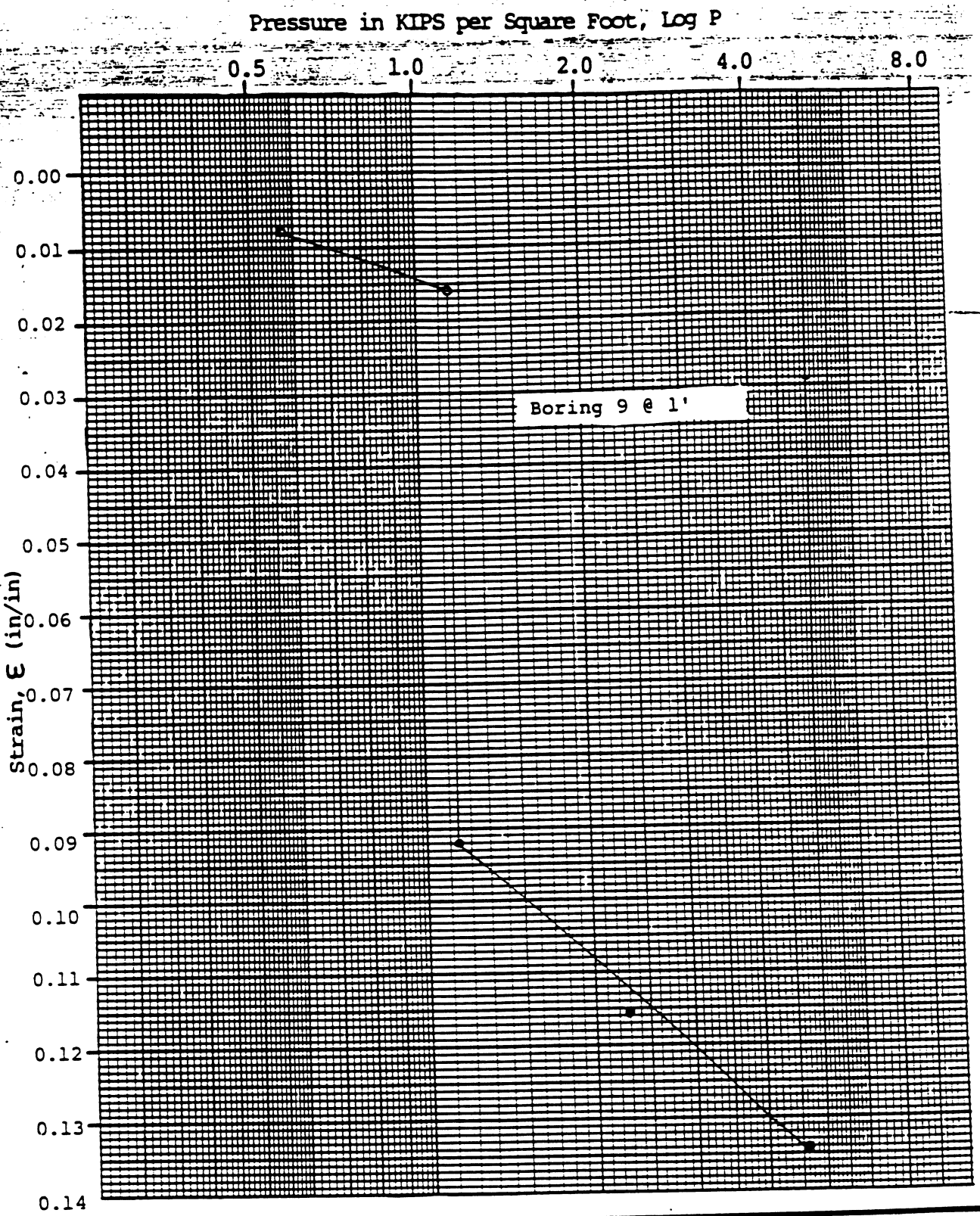
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE:

FILE NO. B-3114-L01



CONSOLIDATION DATA

- in-situ moisture
- saturated

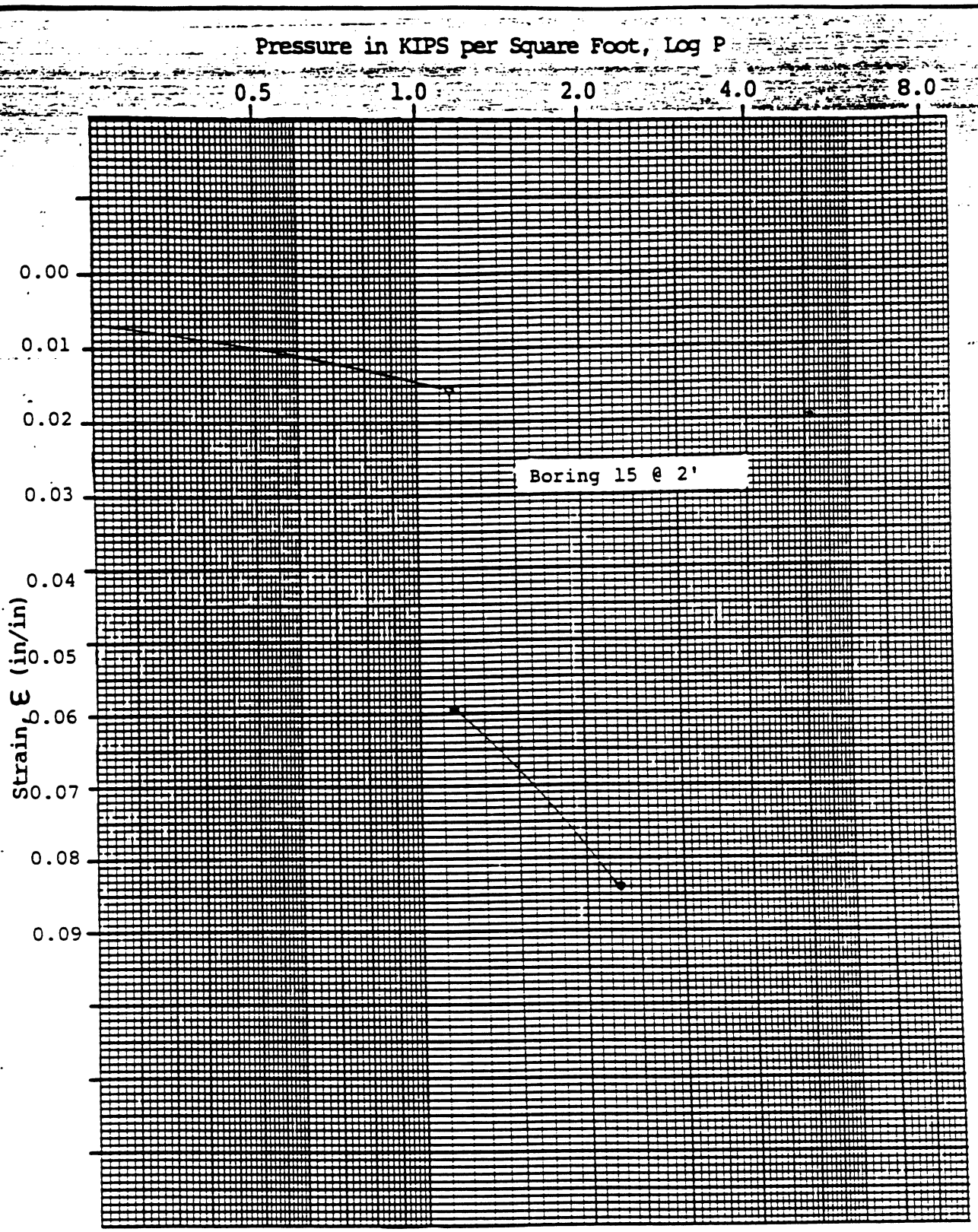
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

- in-situ moisture
- saturated

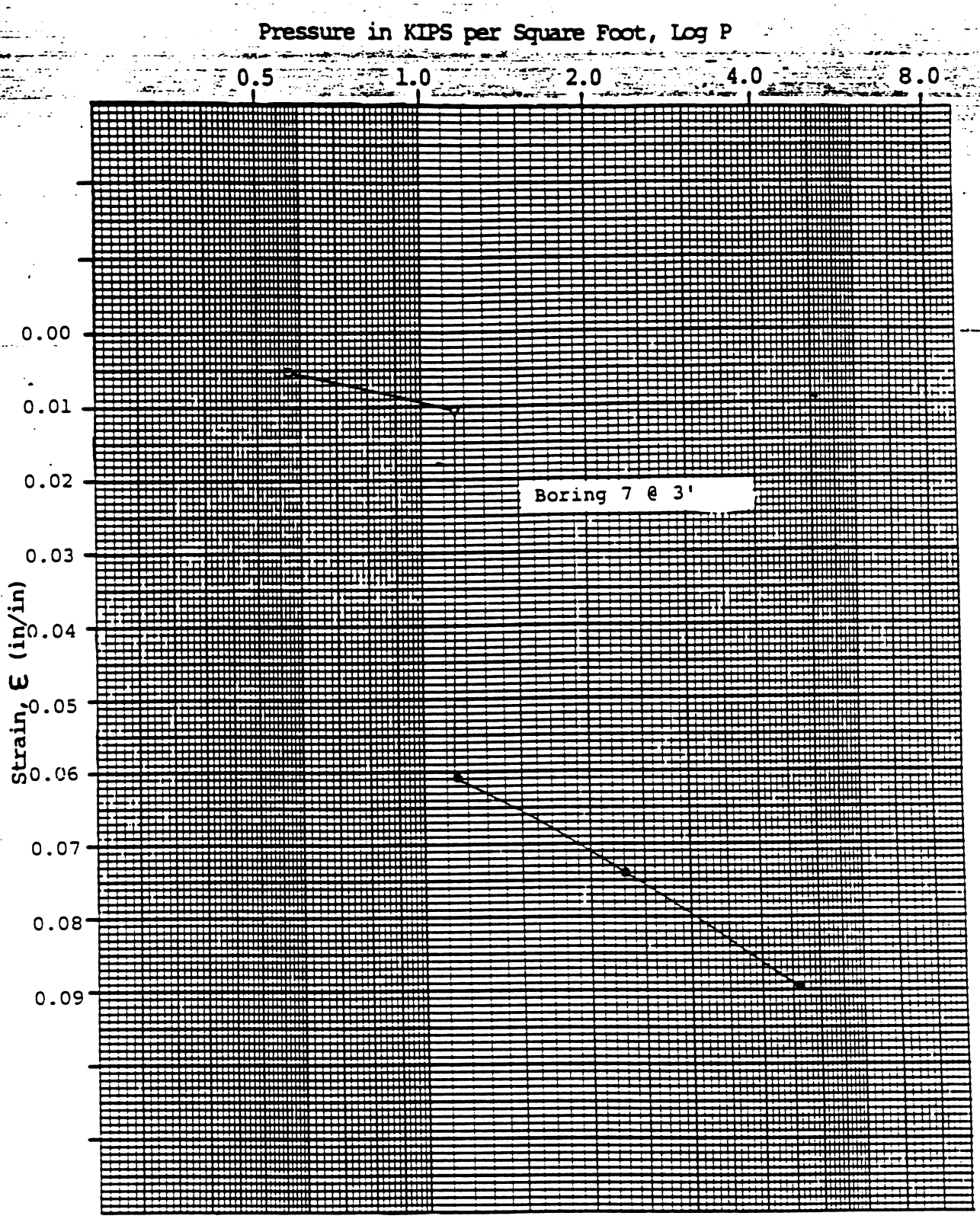
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

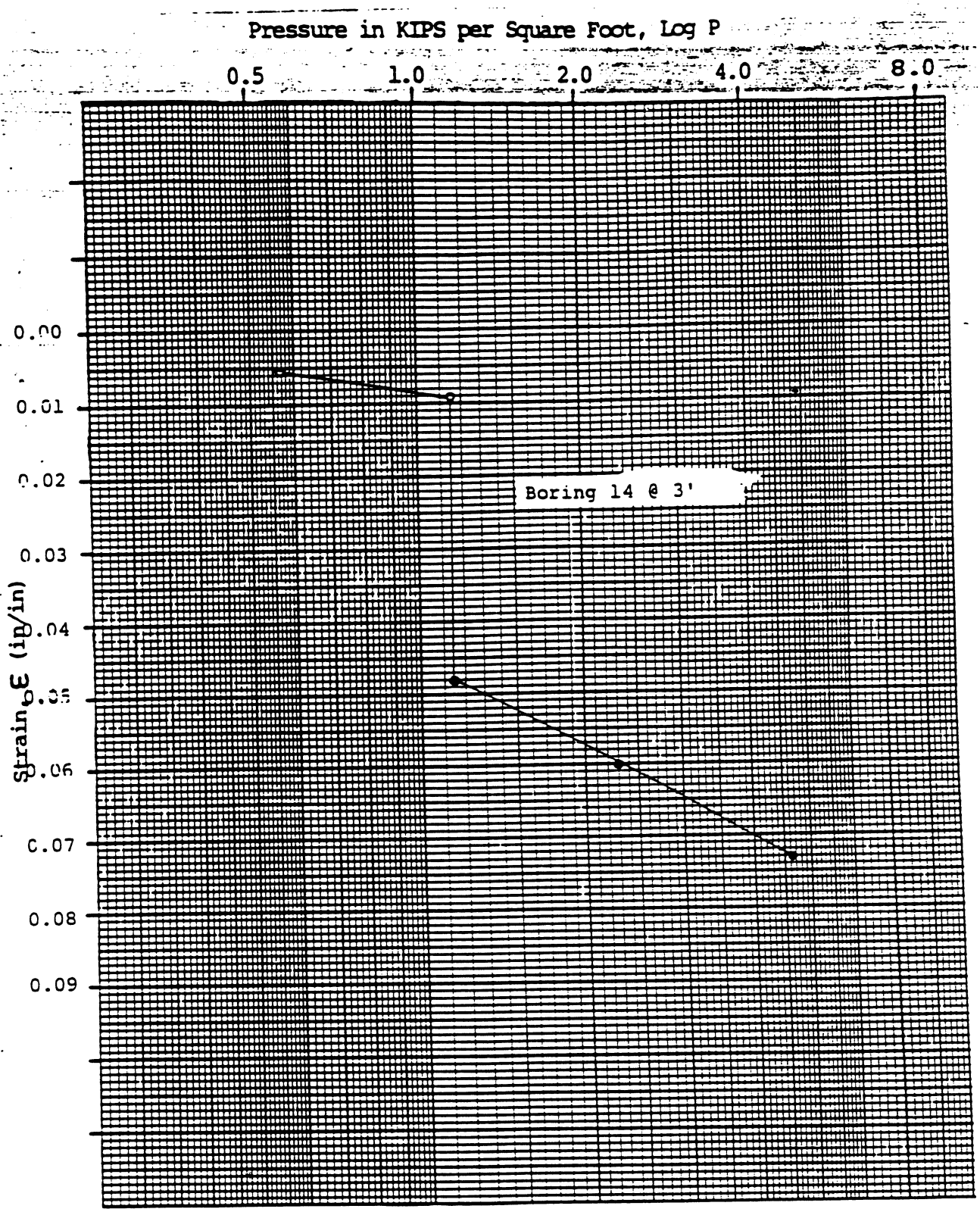
- in-situ moisture
- saturated

COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88 | FILE NO. B-3114-L.01



CONSOLIDATION DATA

- in-situ moisture
- saturated

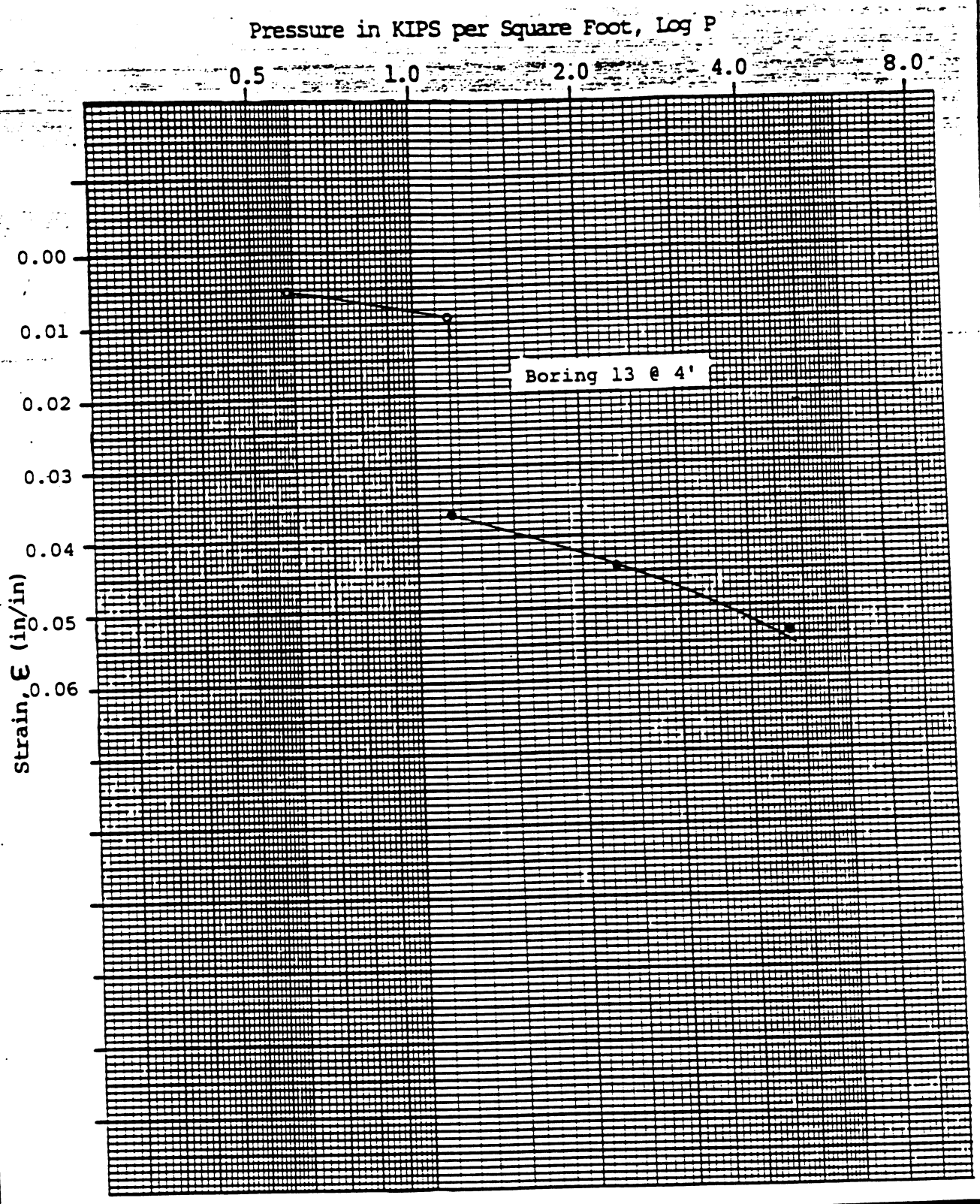
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-LO



CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

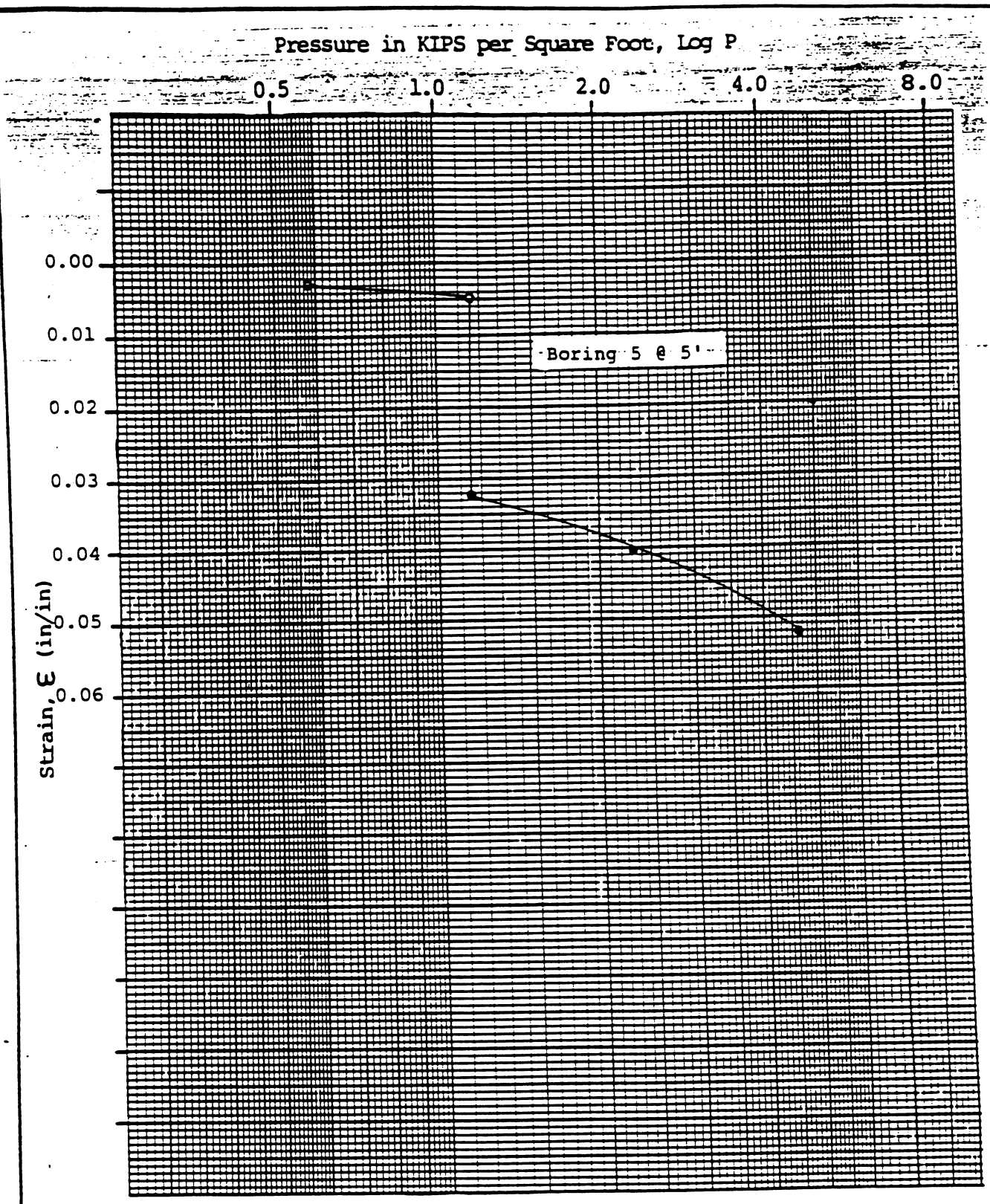
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

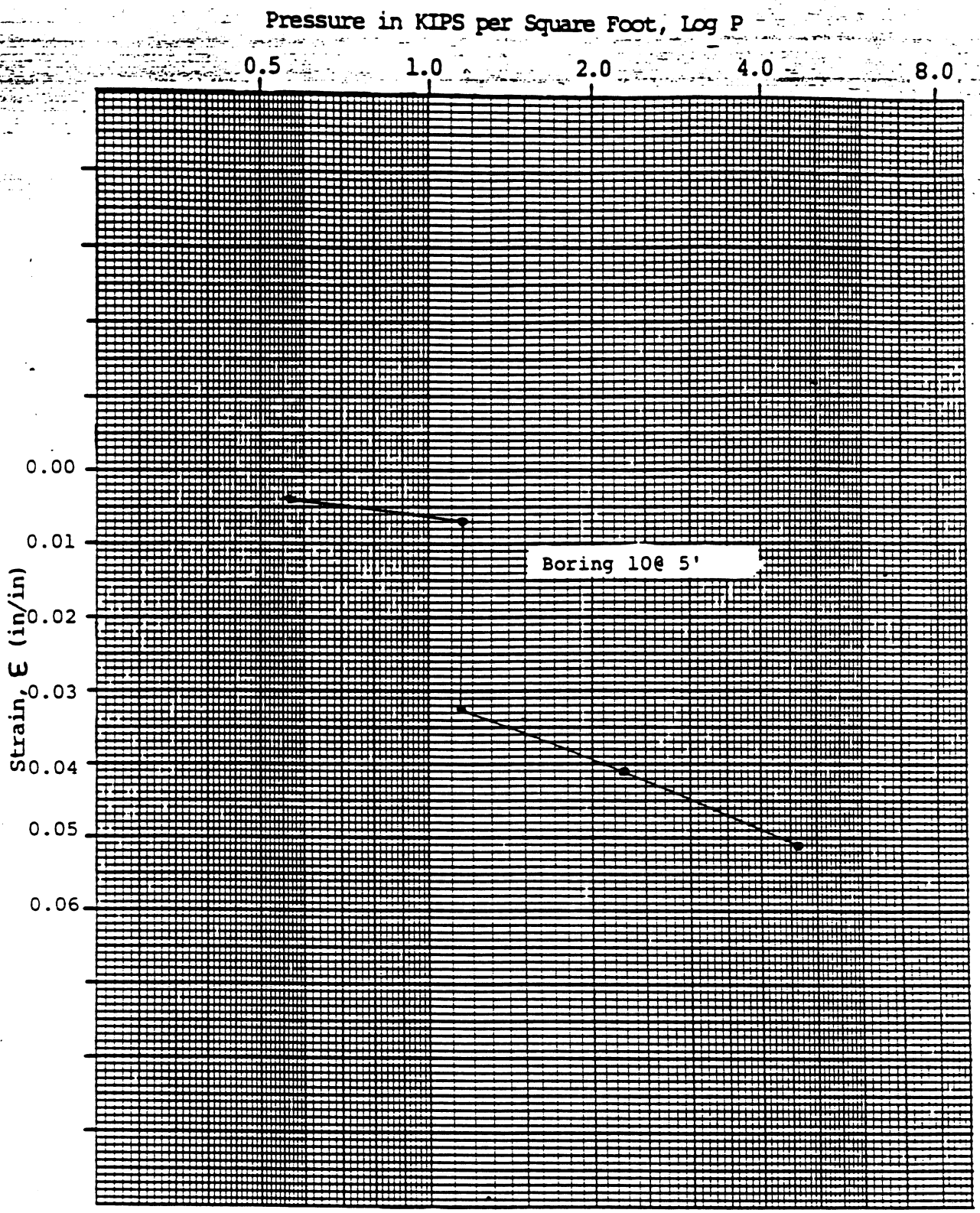
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

- in-situ moisture
- saturated

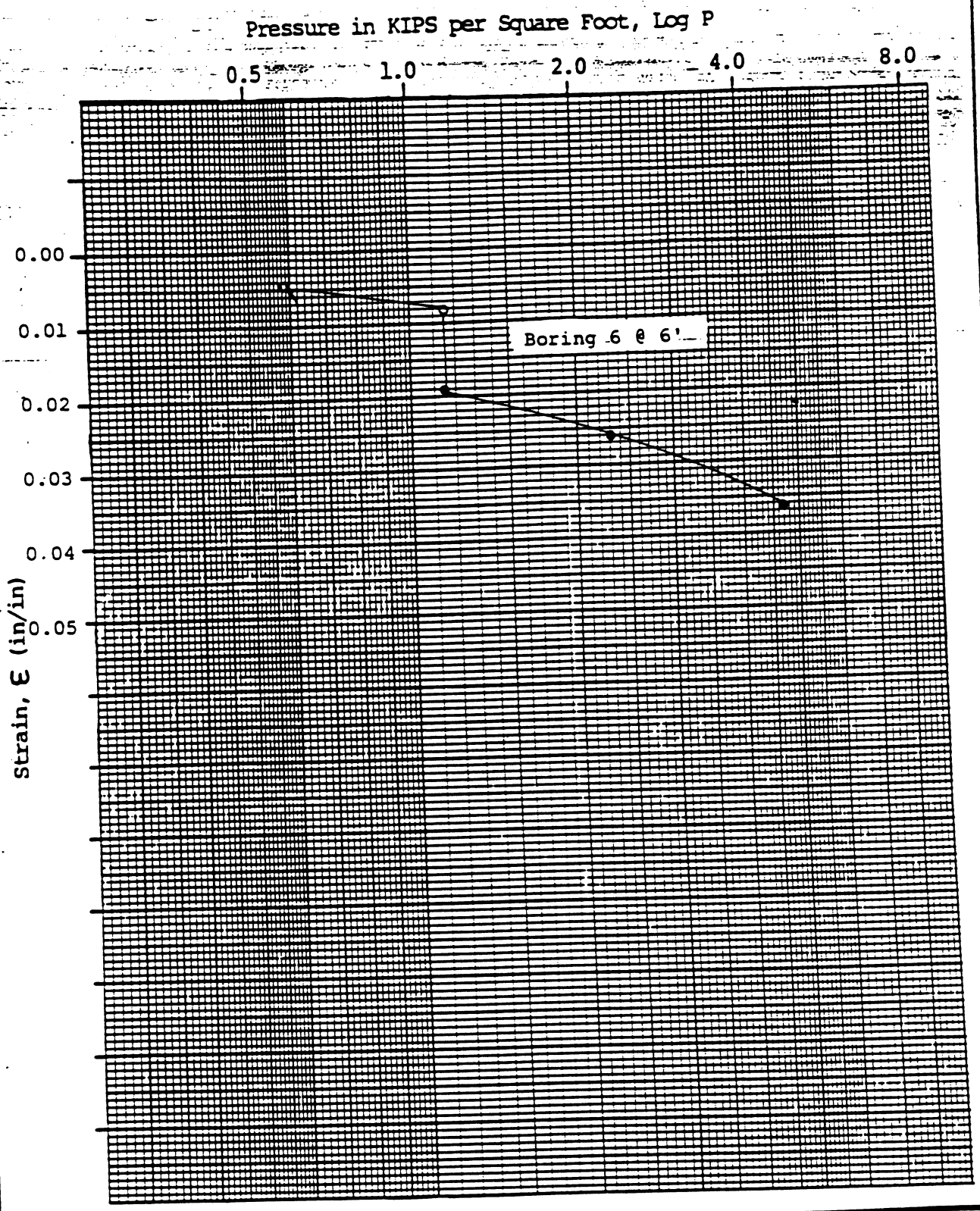
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

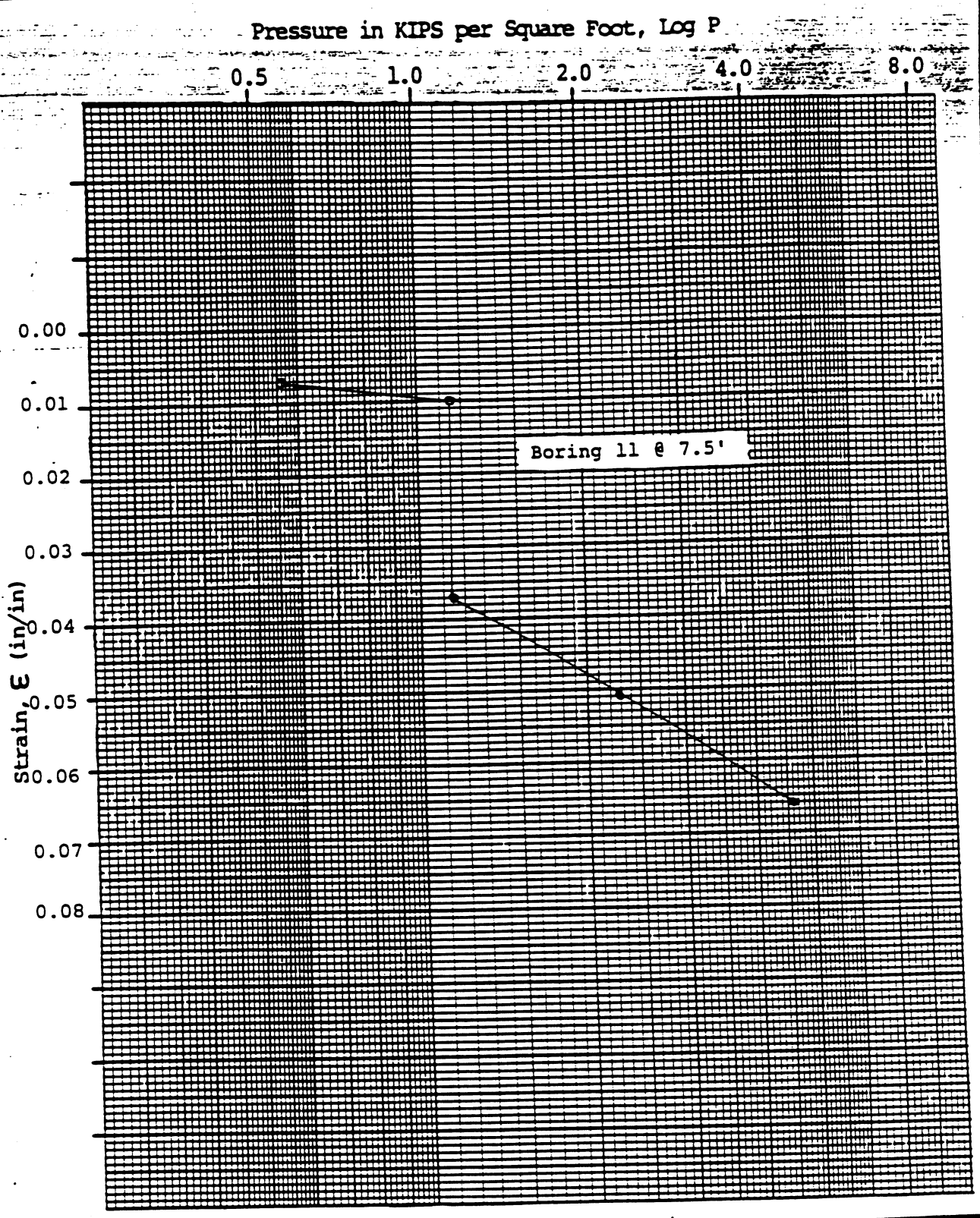
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-L01



CONSOLIDATION DATA

- in-situ moisture
- saturated

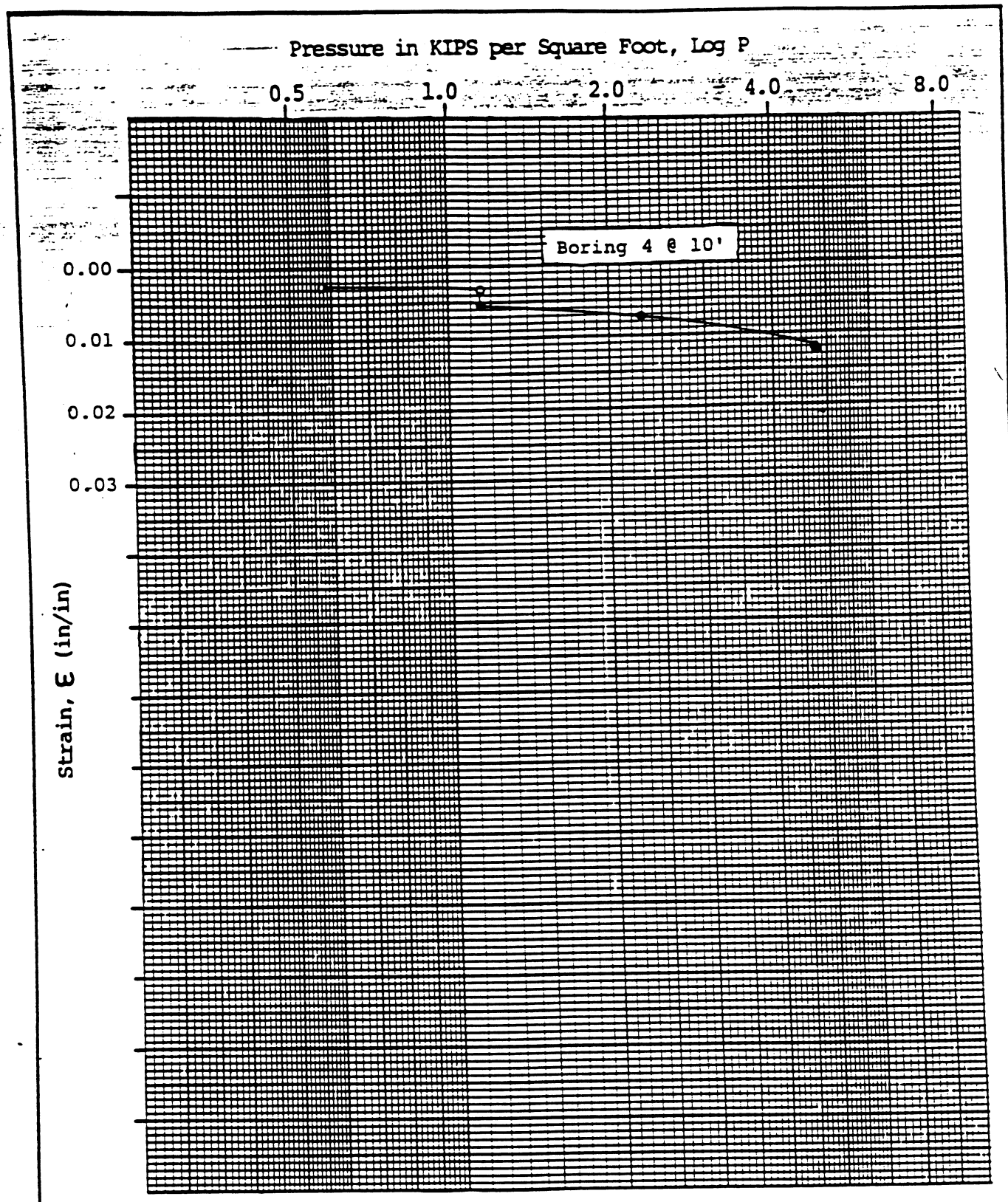
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

FILE NO. B-3114-LO1



CONSOLIDATION DATA

- in-situ moisture
- saturated

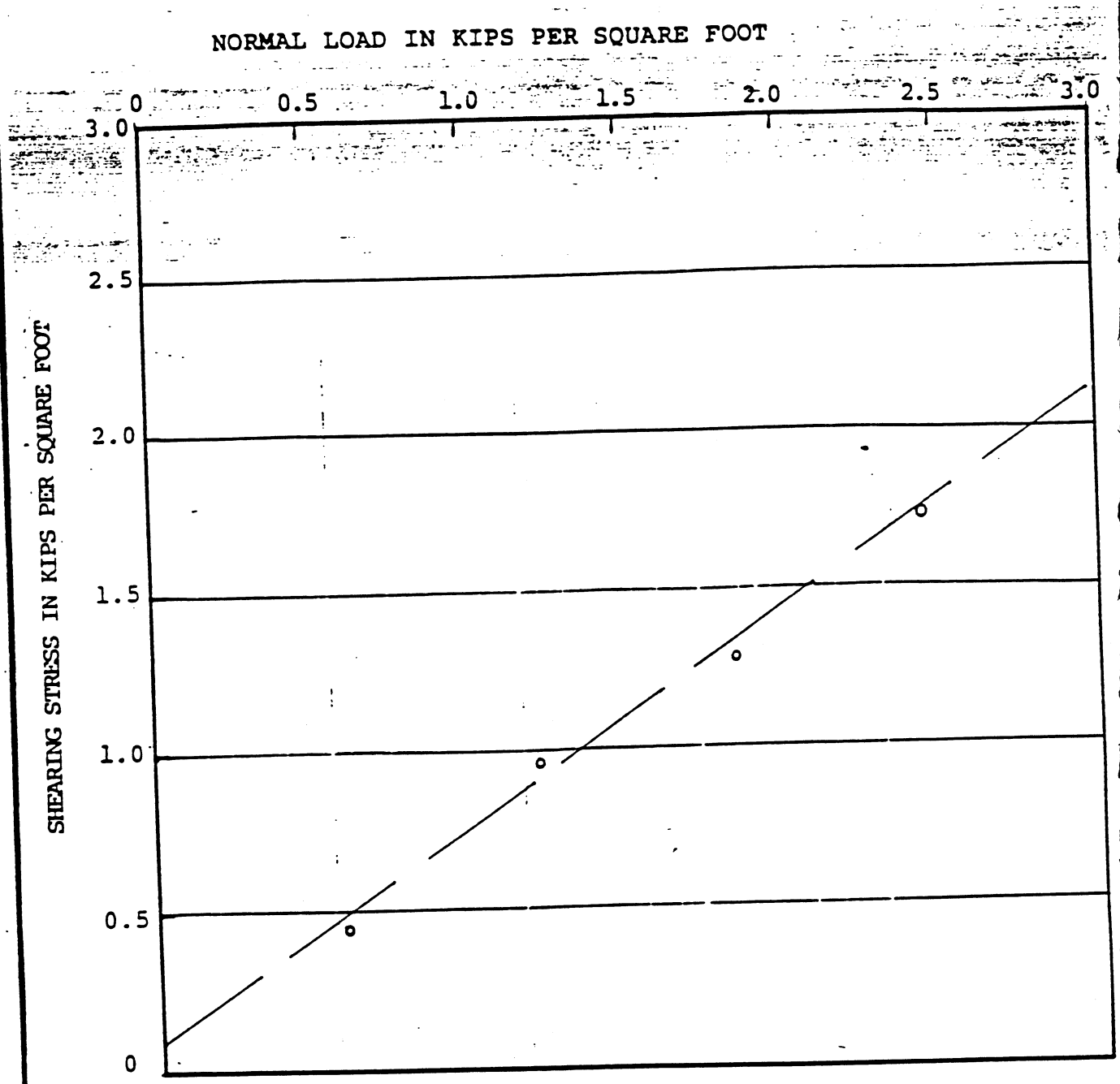
COMPRESSION DIAGRAM

(ε x Log P)

BUENA ENGINEERS, INC.

DATE: 5-25-88

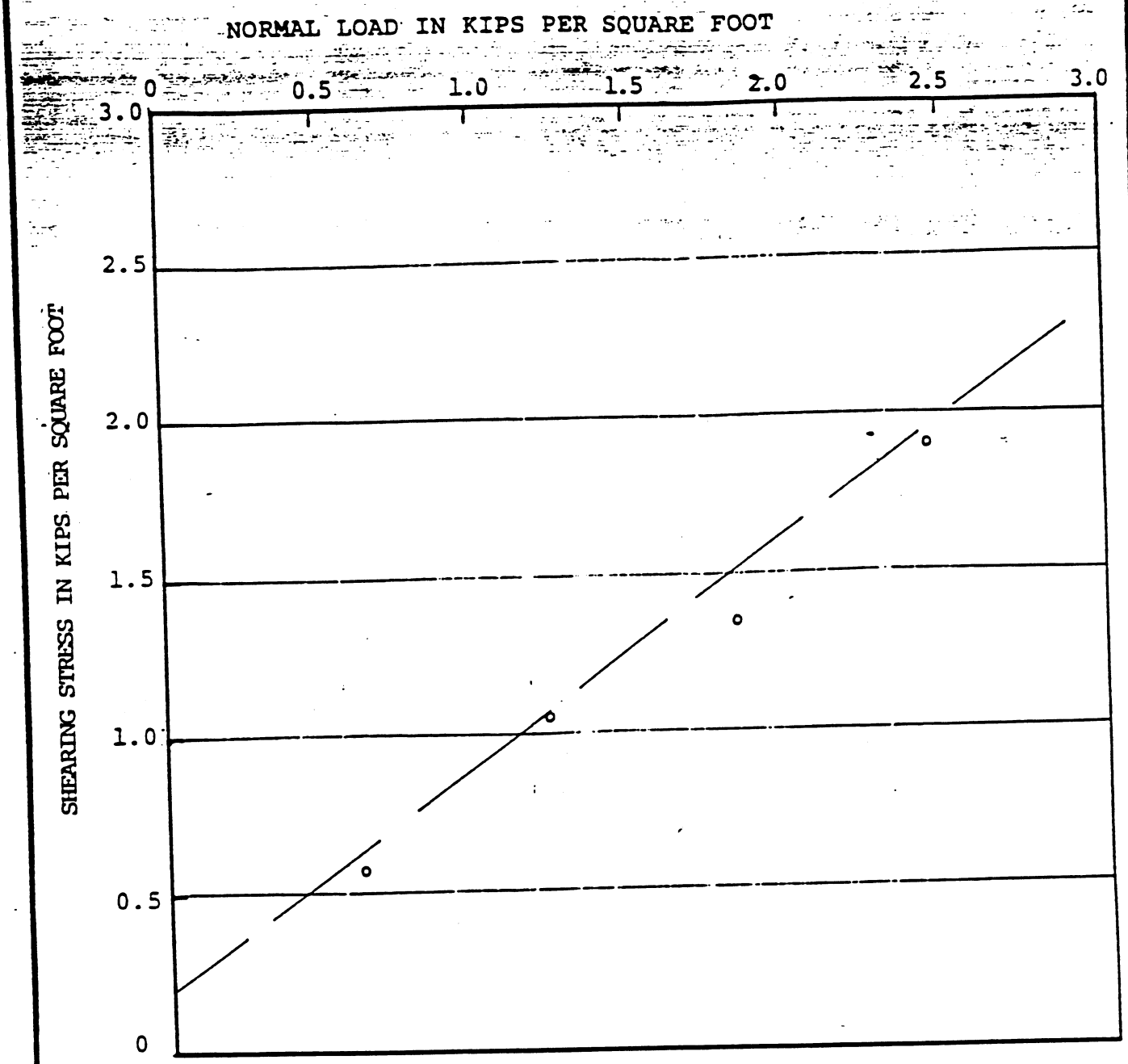
FILE NO. B-3114-L01



DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
3	o	0-5	115.3*	36	60

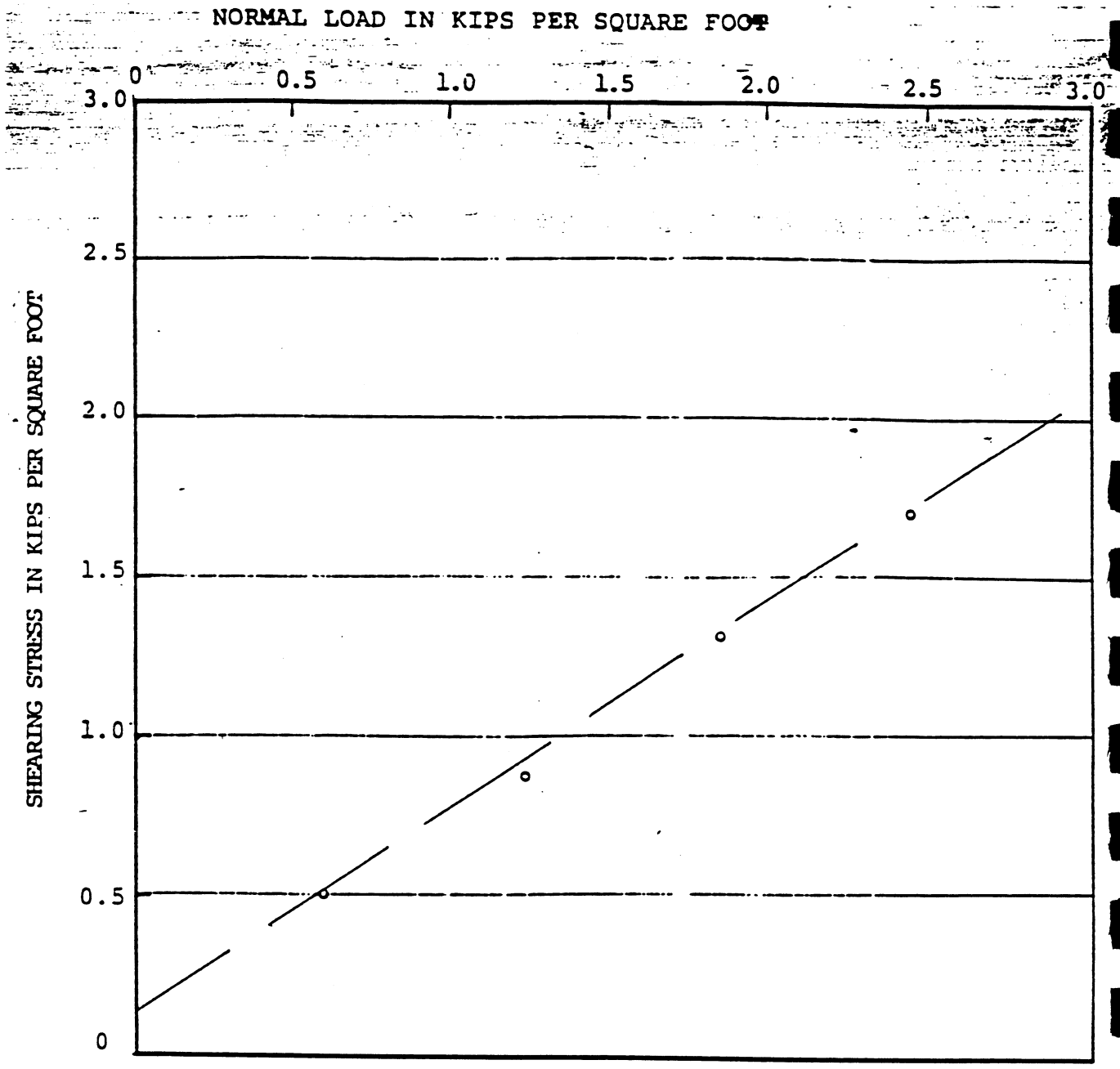
*Recompacted to 90% of maximum dry density as determined by ASTM D 1557.



DIRECT SHEAR DATA

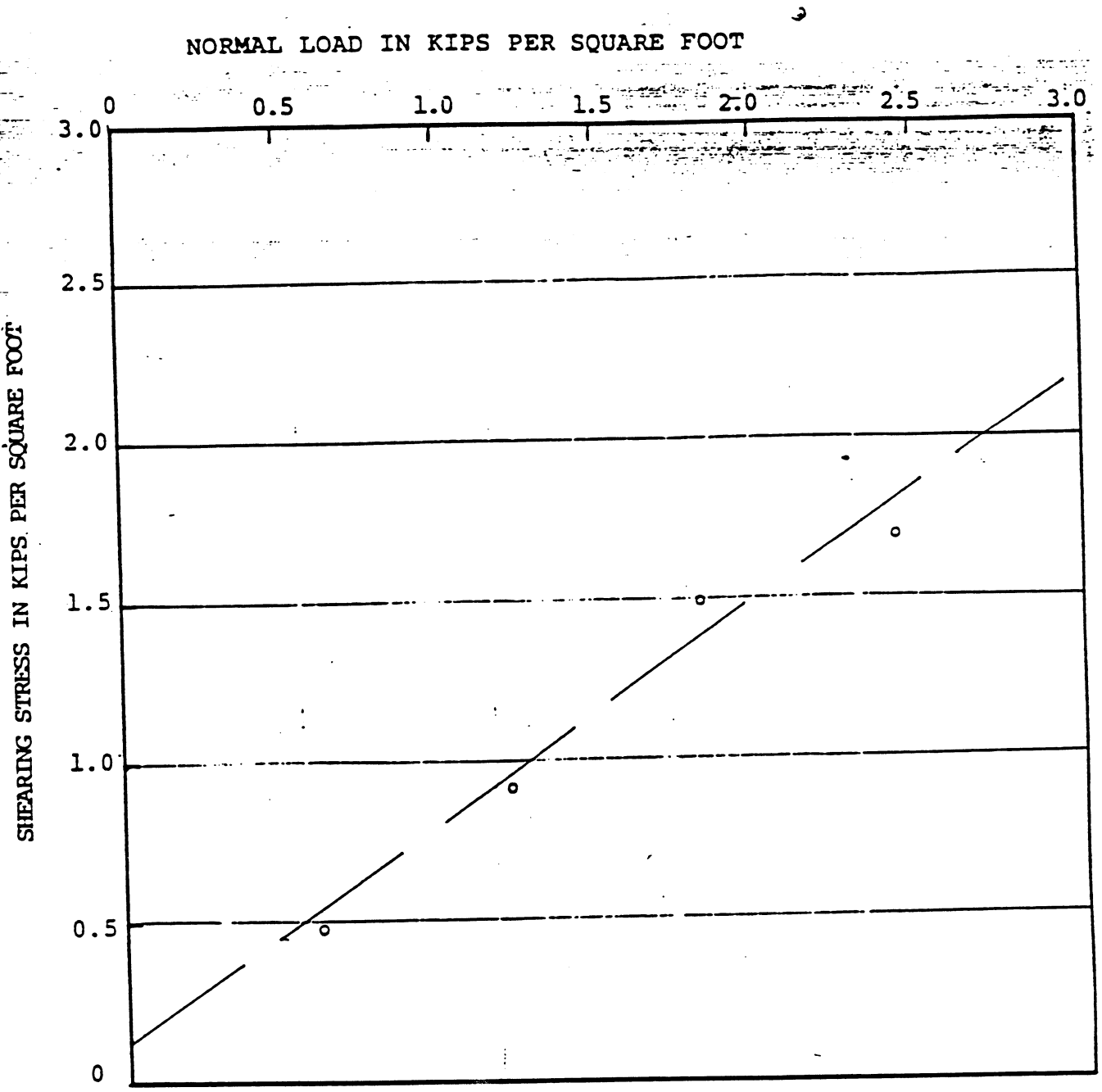
BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
11	o	0-5	117.5*	37	160

*Recompacted to 90% of maximum dry density as determined by ASTM D 1557.



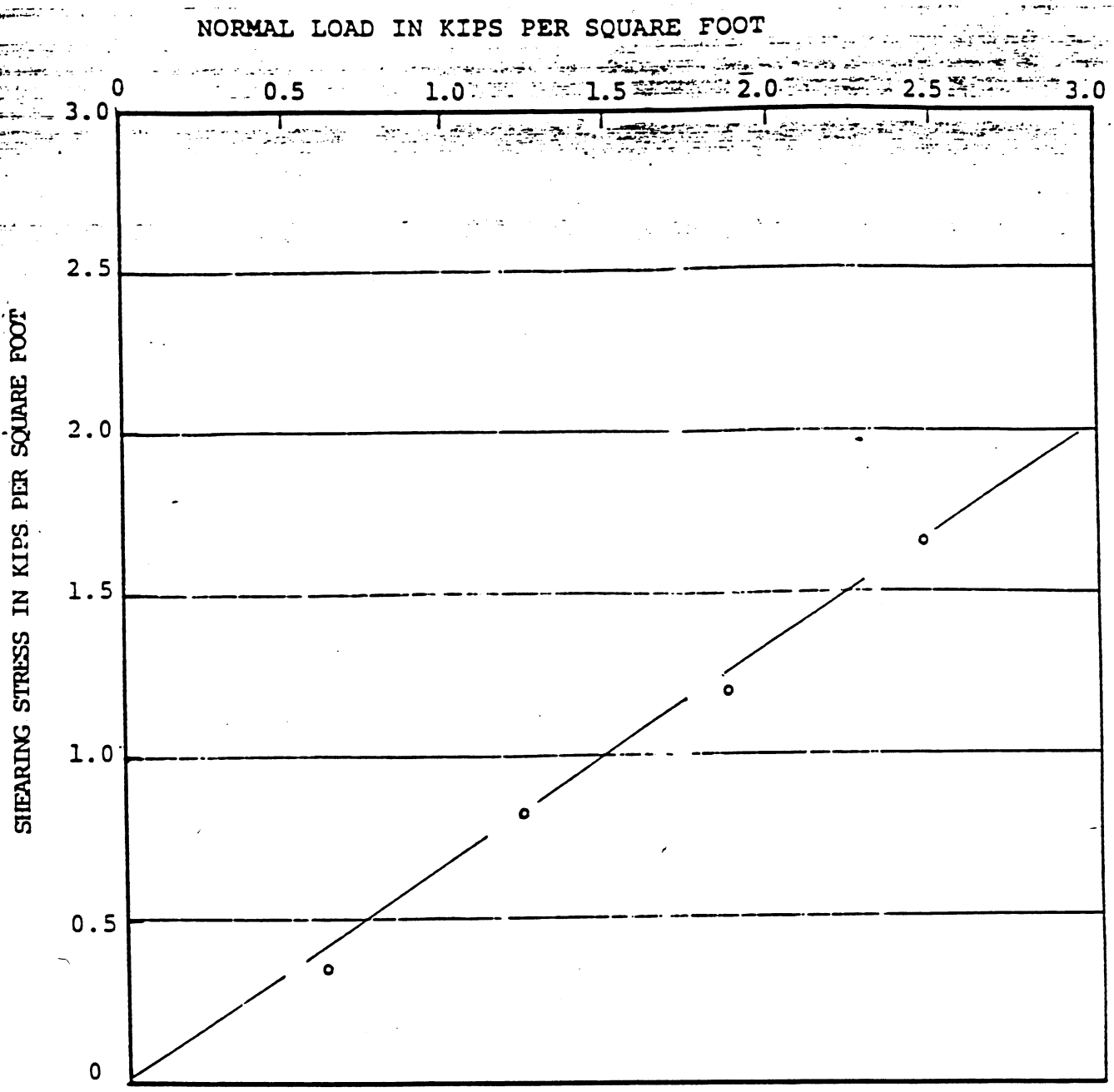
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
10	o	1	108.0	36	80



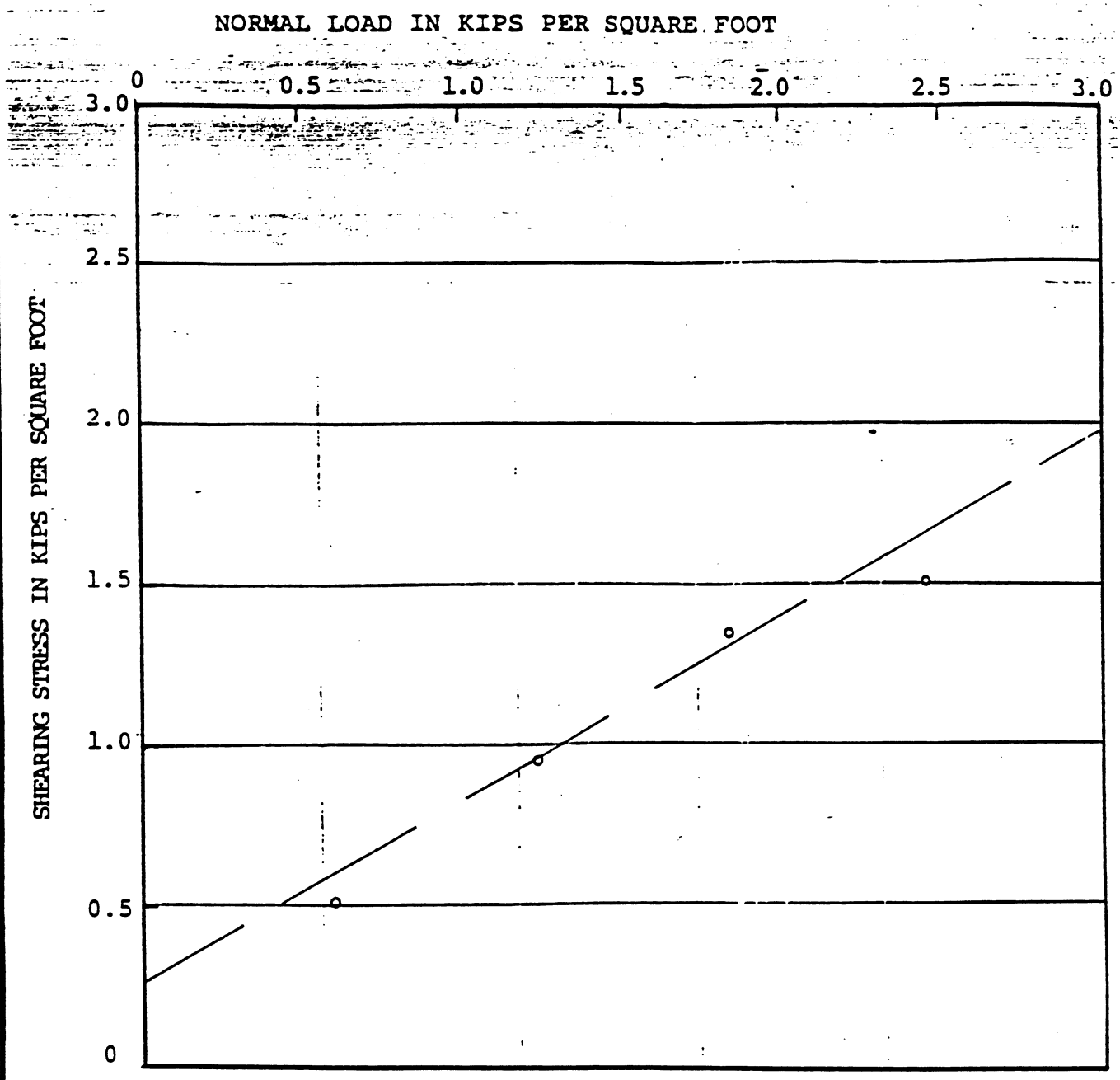
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
12	o	1	108.1	36	120



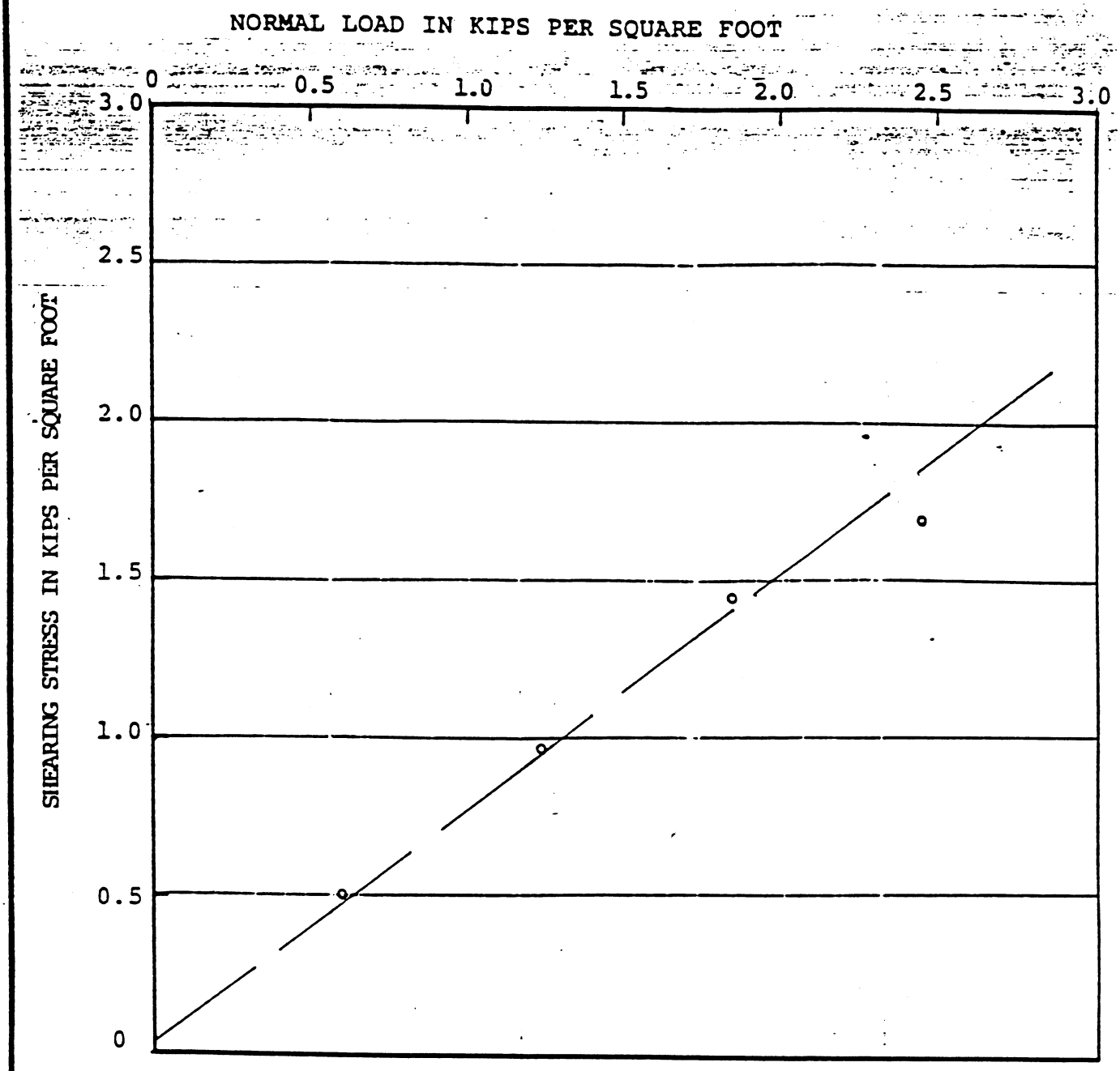
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
2	o	2	115.0	37	0



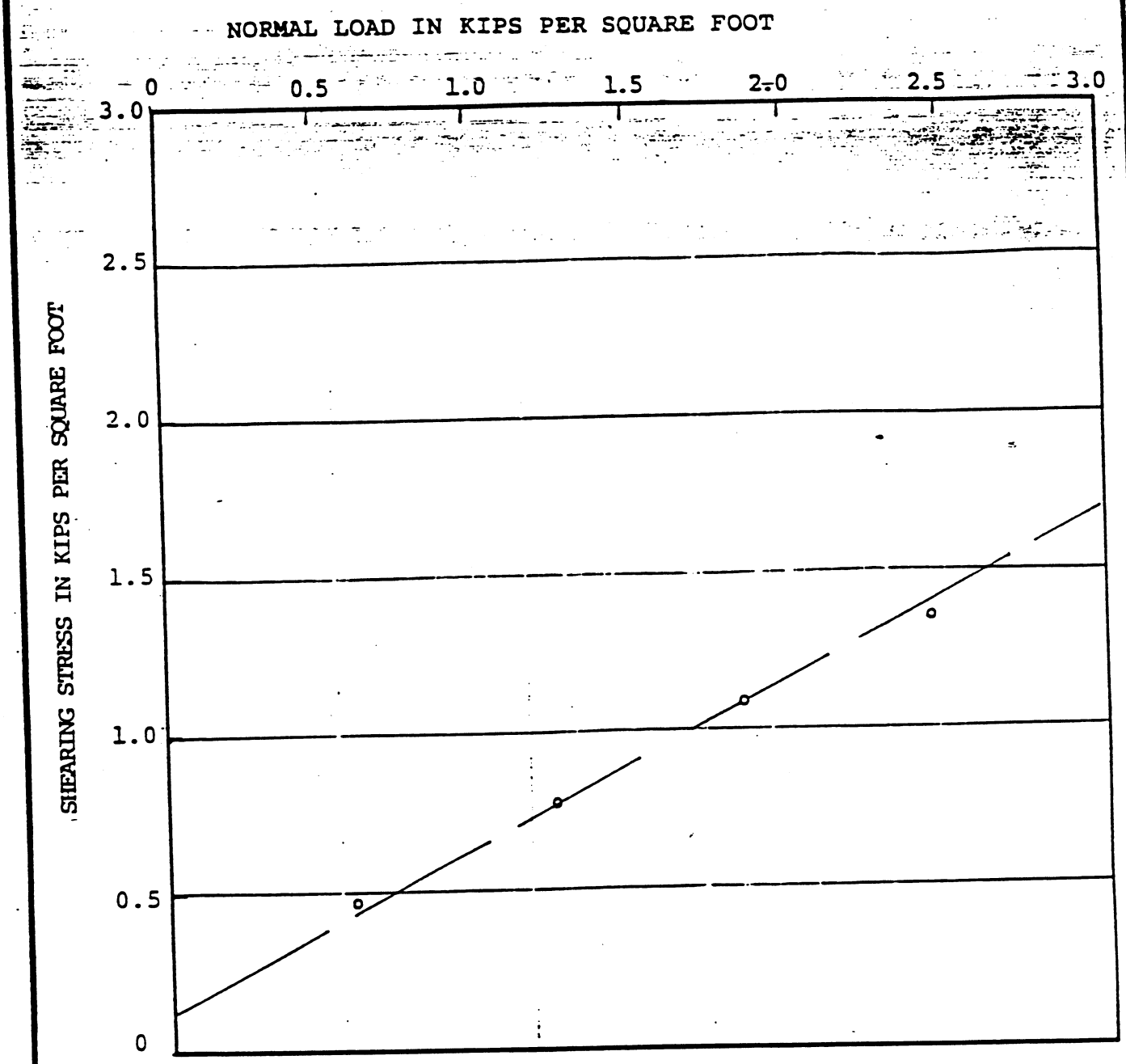
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
4	O	3	114.9	30	270



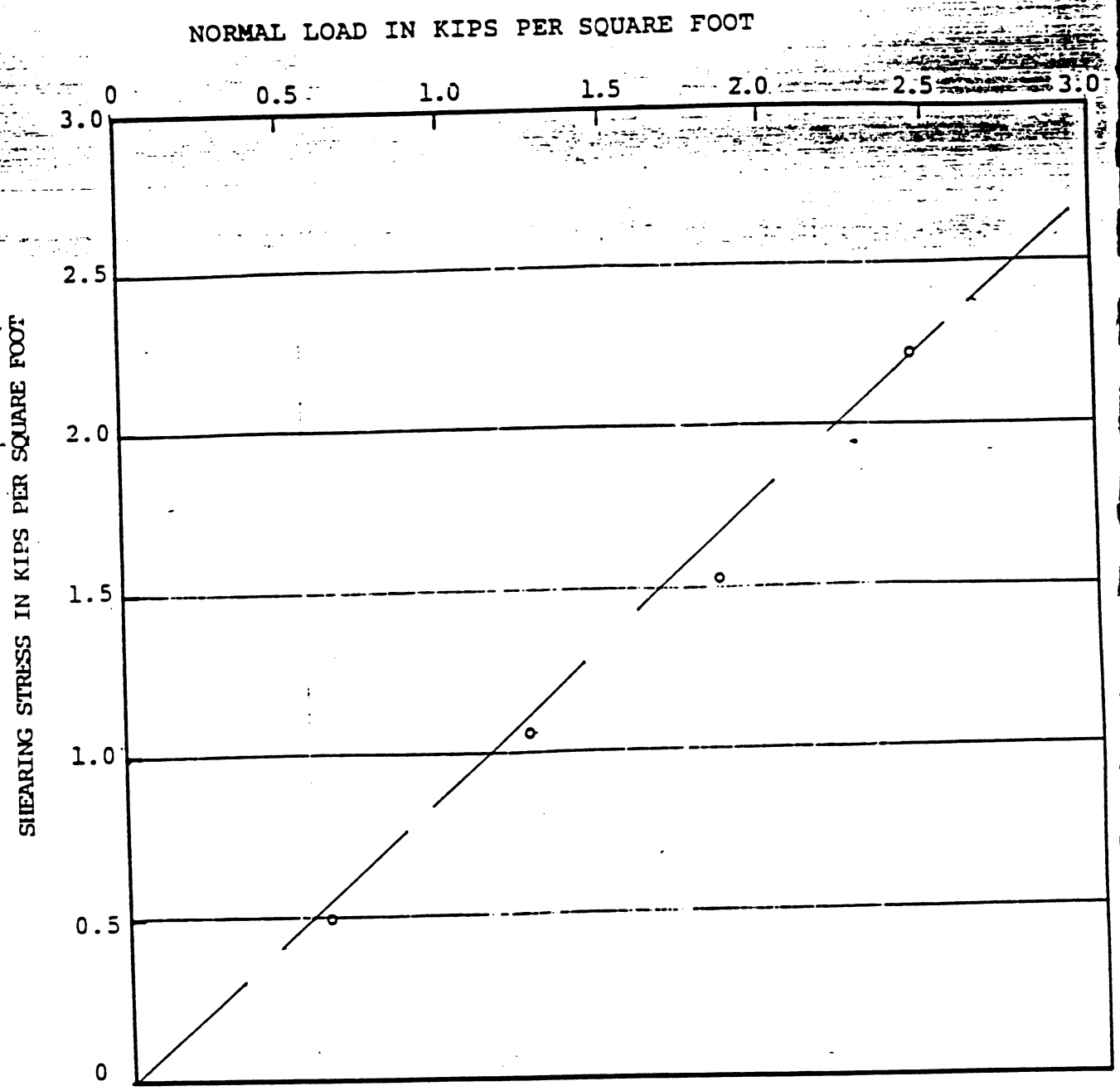
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
11	o	3	110.7	40	30



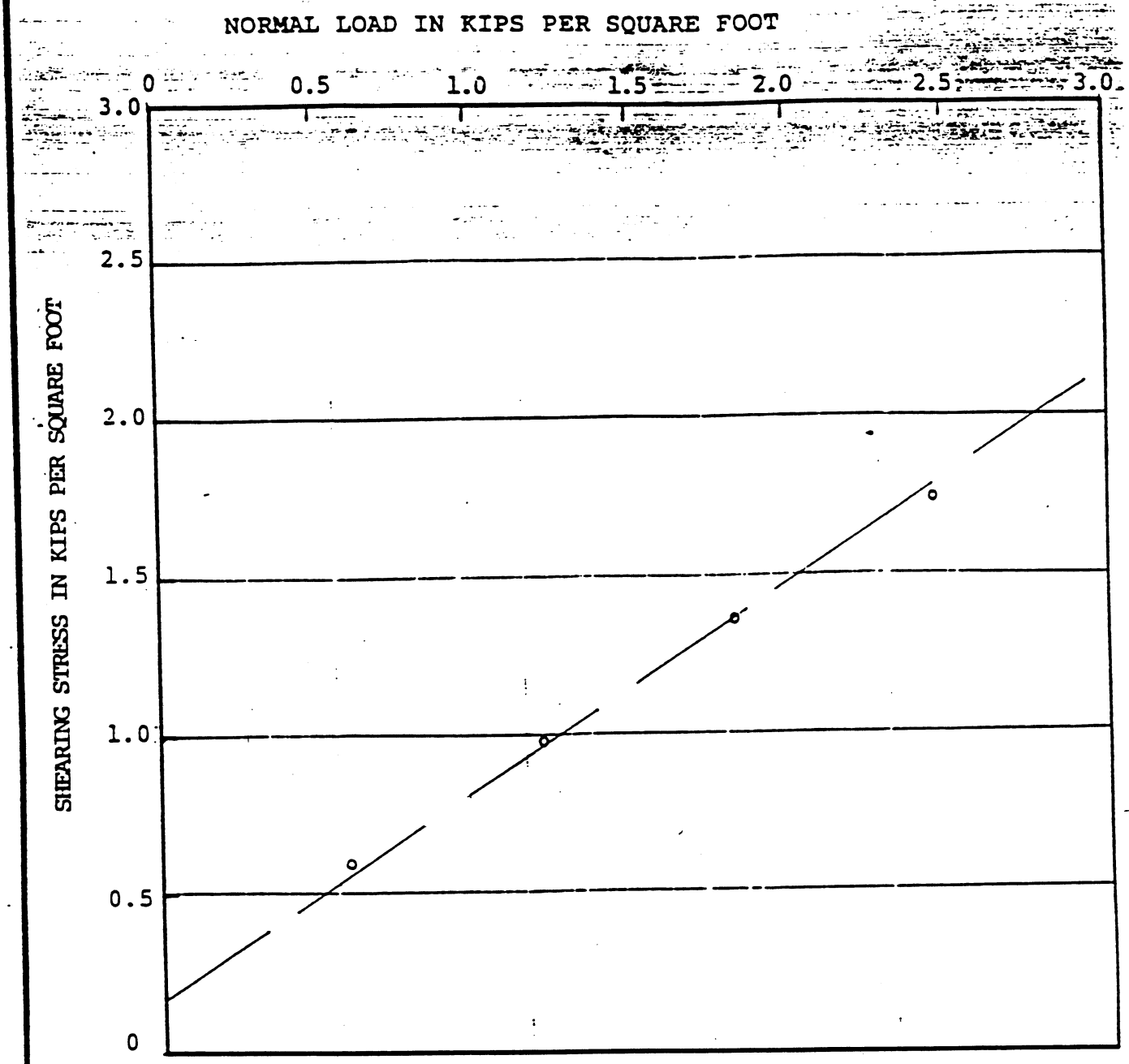
DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
8	o	5	110.0	29	150



DIRECT SHEAR DATA

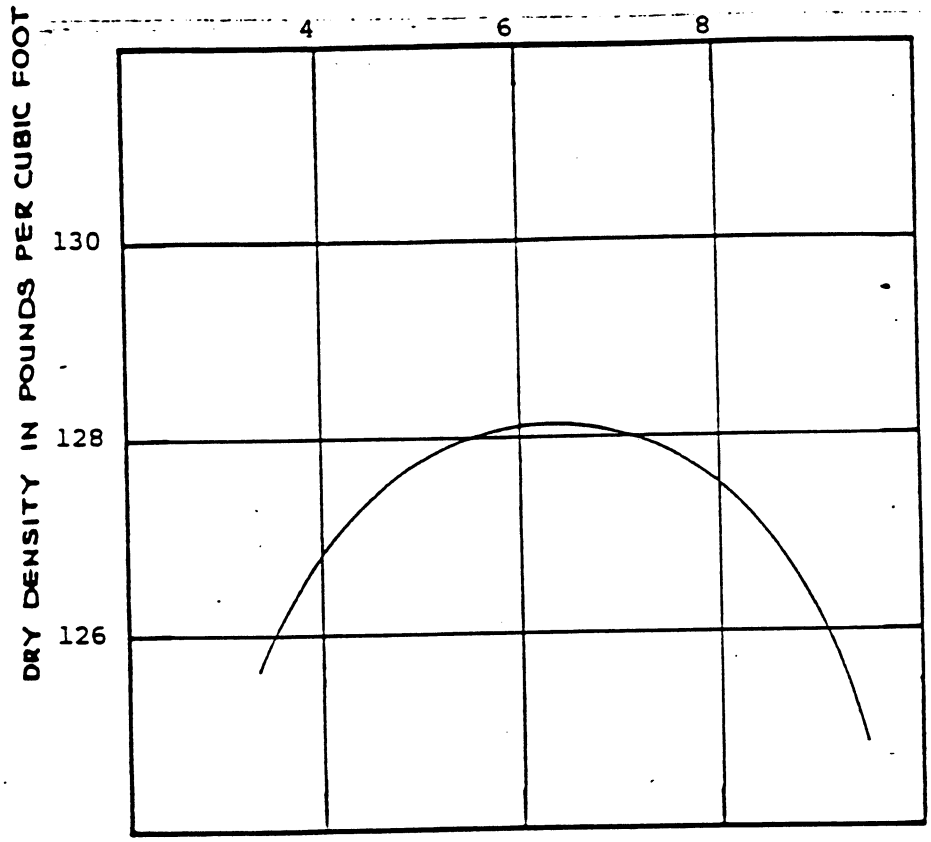
BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
3	o	6	114.0	44	0



DIRECT SHEAR DATA

BORING	SYMBOL	DEPTH (ft)	DRY DENSITY (pcf)	ANGLE OF FRICTION (degrees)	COHESION (psf)
7	o	7.5	108.3	34	210

BORING #3 AT 0-5 FEET



METHOD OF COMPACTION: ASTM D 1557

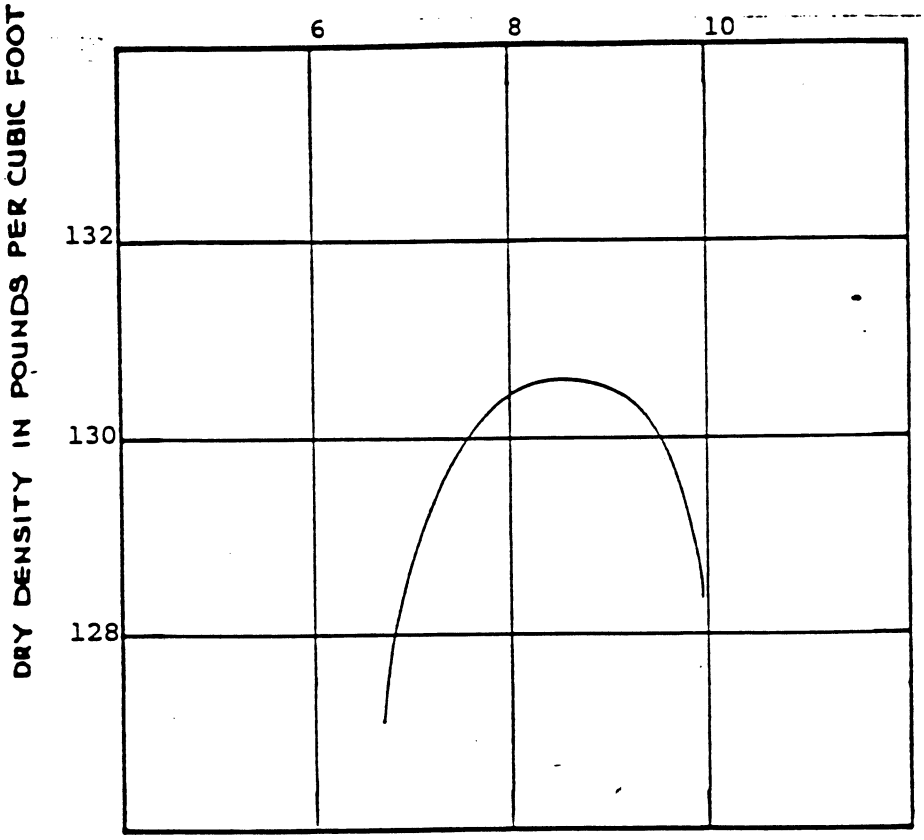
SOIL TYPE	MAXIMUM DENSITY	OPTIMUM MOISTURE
Moderate Yellowish Brown, Silty Fine to Medium Sand with up to 3/8" Gravel(SM)	128.0 PCF	6.0%

Expansion Index Test (UBC 29-2) performed on a remolded sample of this material yielded a value = 0.

MAXIMUM DENSITY - OPTIMUM MOISTURE CURVES

BORING #7 AT 0-5 FEET

MOISTURE CONTENT IN PERCENT OF DRY WEIGHT



METHOD OF COMPACTION: ASTM D 1557

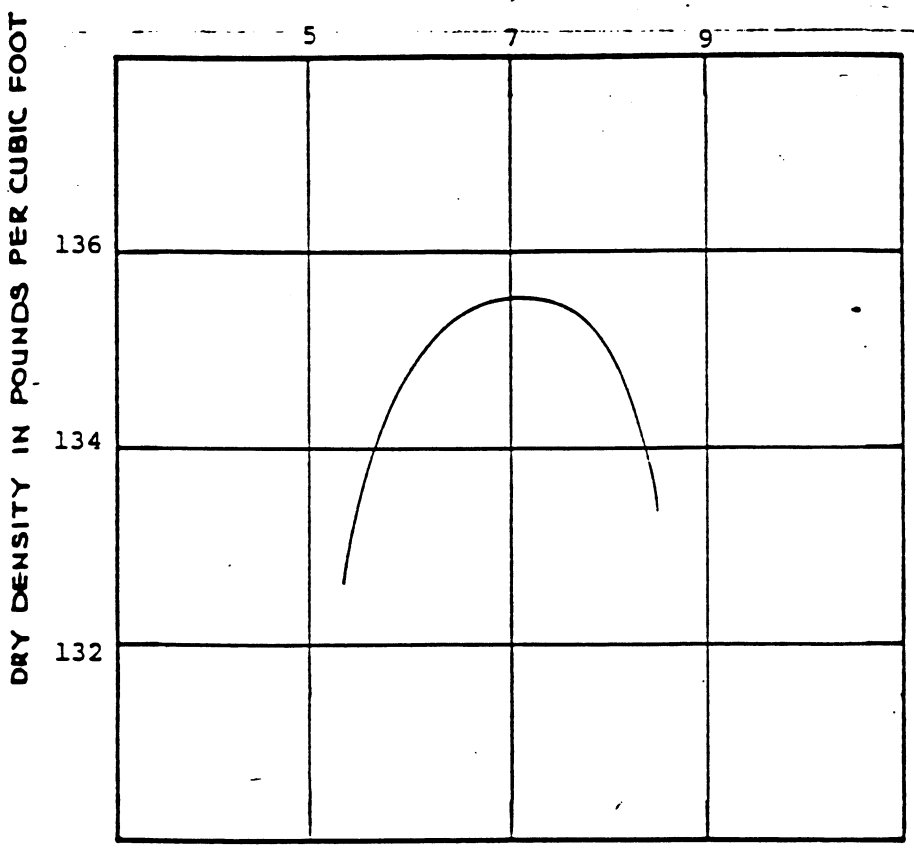
SOIL TYPE	MAXIMUM DENSITY	OPTIMUM MOISTURE
Moderate Yellowish Brown, Silty Fine to Medium Sand with up to #4 Gravel (SM)	130.5 PCF	8.5%

Expansion Index Test (UBC 29-2) performed on a remolded sample of this material yielded a value = 0.

MAXIMUM DENSITY - OPTIMUM MOISTURE CURVES

BORING #11 AT 0-5 FEET

MOISTURE CONTENT IN PERCENT OF DRY WEIGHT



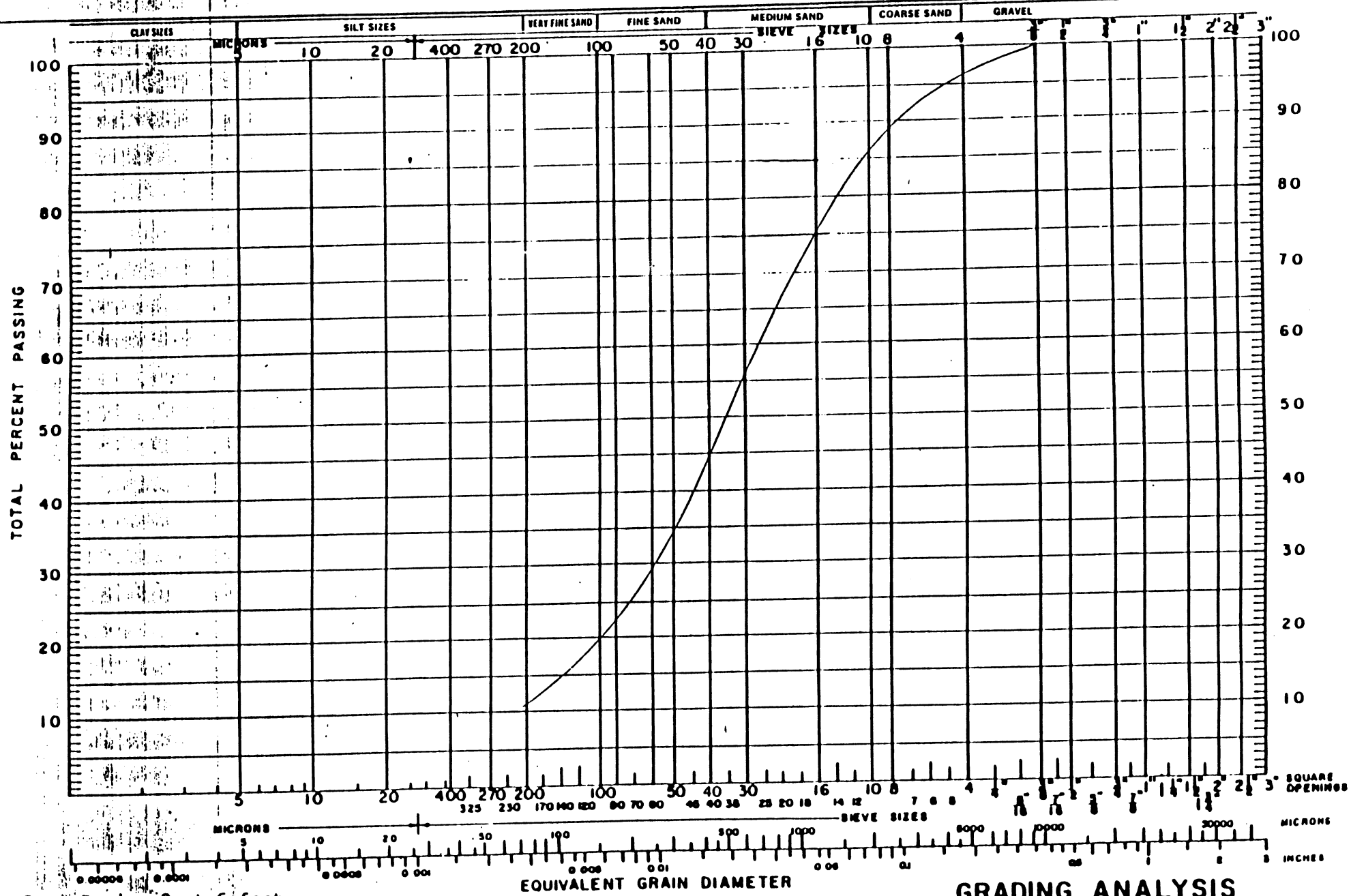
METHOD OF COMPACTION.

ASTM D 1557

SOIL TYPE	MAXIMUM DENSITY	OPTIMUM MOISTURE
Moderate Yellowish Brown, Silty Fine to Medium Sand with up to 3/8" Gravel(SM)	135.5 PCF	7.0%

Expansion Index Test (UBC 29-2) performed on a remolded sample of this material yielded a value = 0.

MAXIMUM DENSITY - OPTIMUM MOISTURE CURVES



NO. Boring 2 at 6 feet

DATE May 25, 1988

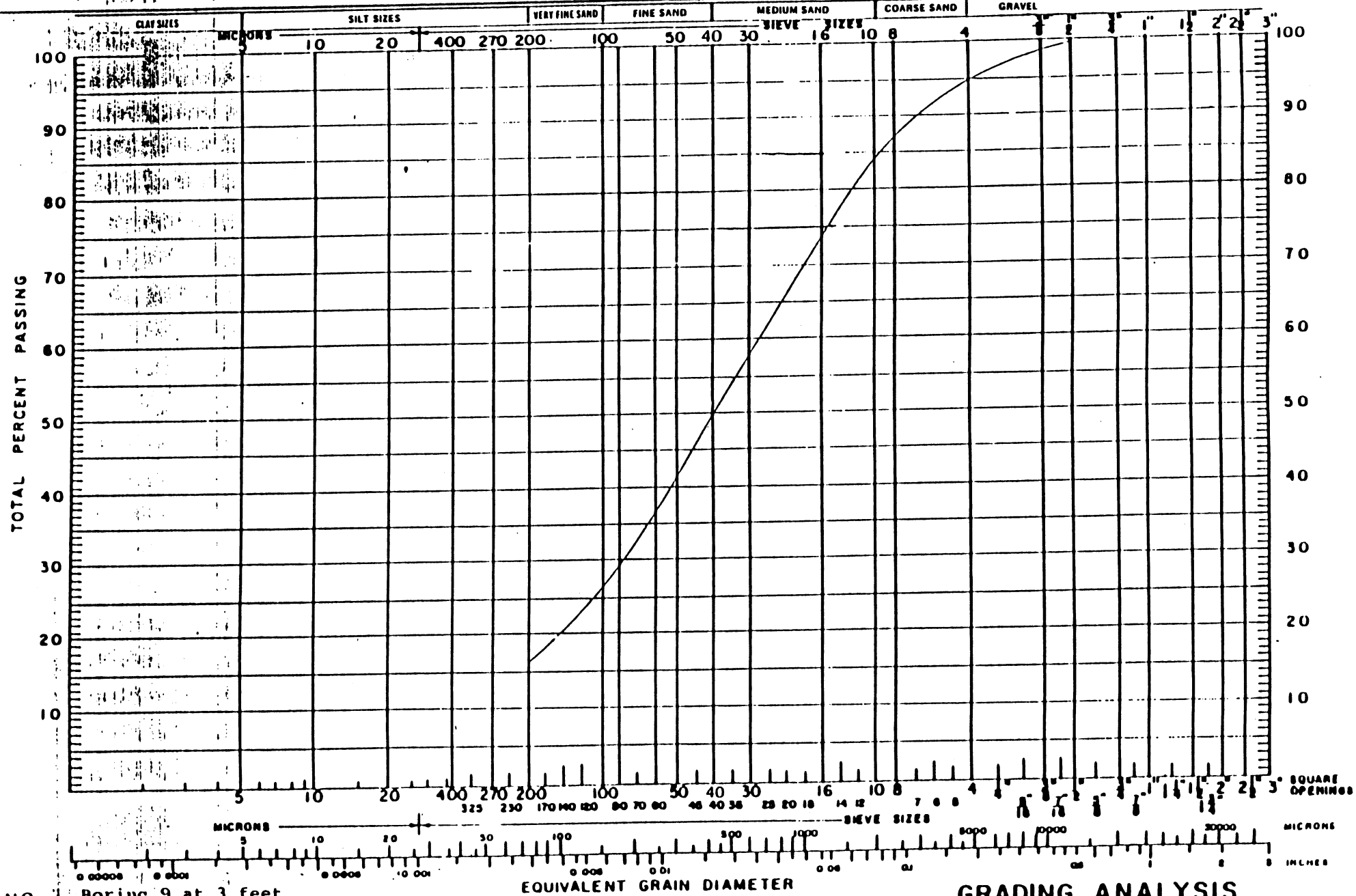
LOCATION

GRADING ANALYSIS

BUENA ENGINEERS, INC.

Consulting Engineers

PROJECT NO. B-3114-1.01



NO. Boring 9 at 3 feet

DATE May 25, 1988

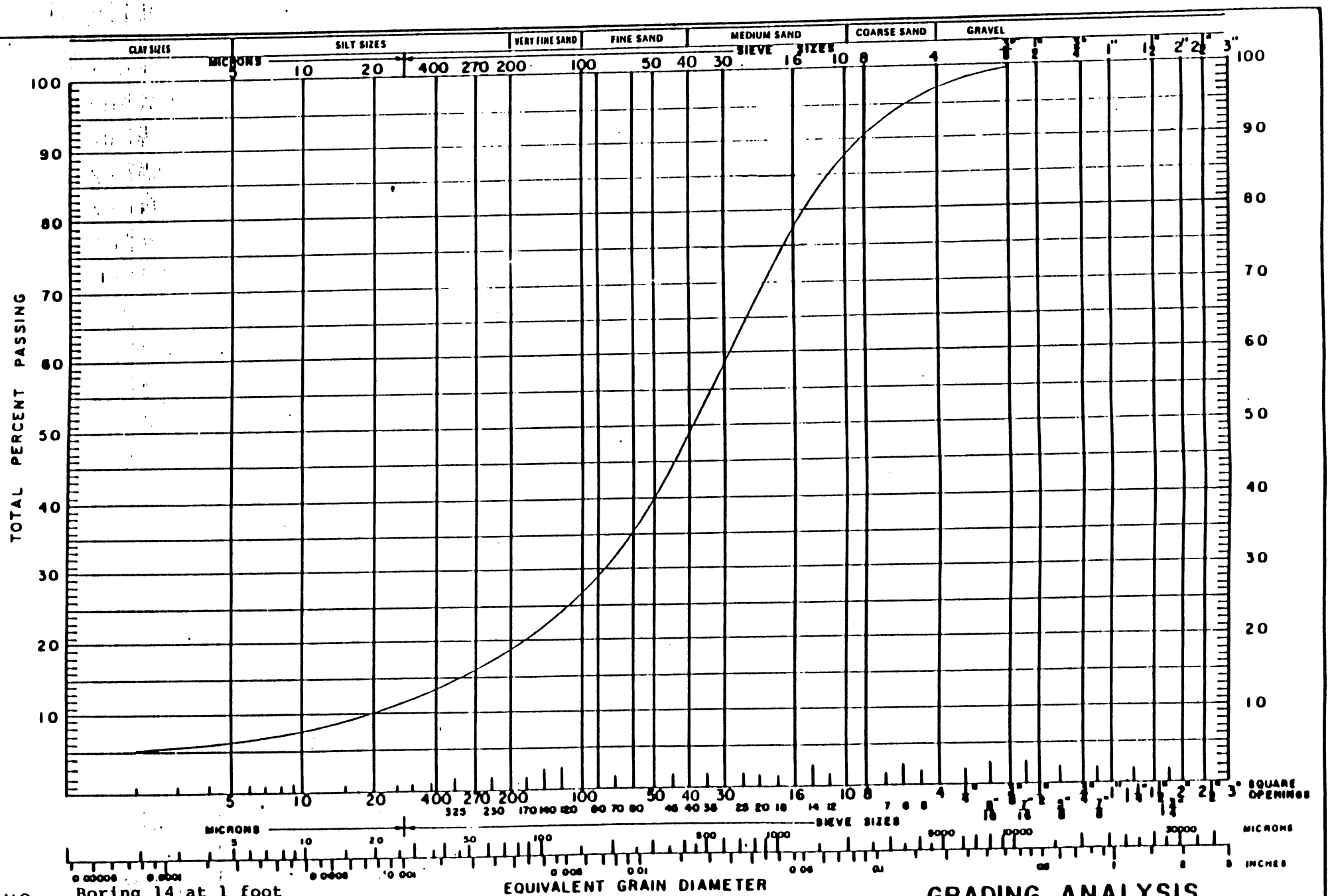
LOCATION

GRADING ANALYSIS

BUENA ENGINEERS, INC.

Consulting Engineers

PROJECT NO. B-3114-L01



NO. Boring 14 at 1 foot

DATE May 25, 1988

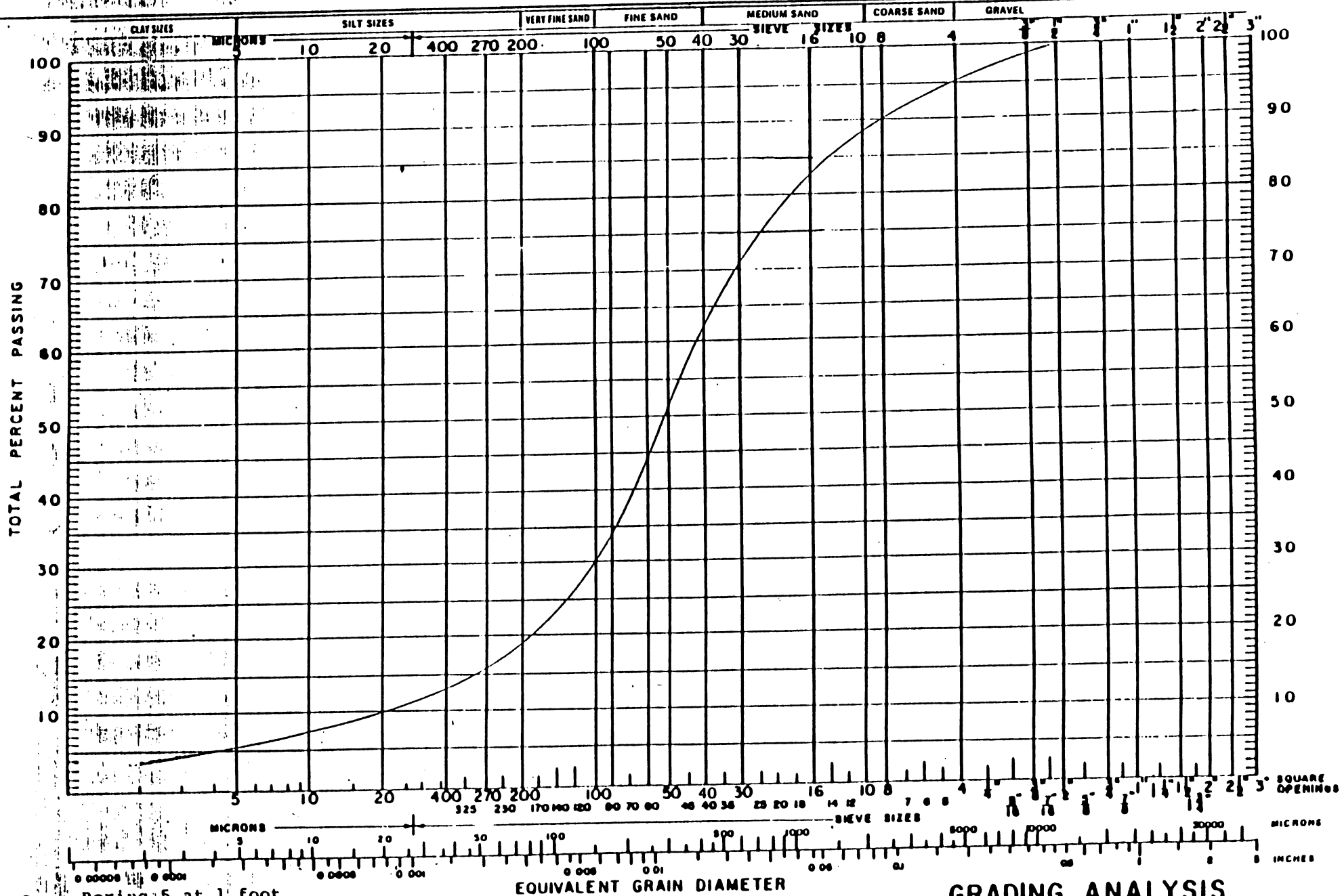
LOCATION

GRADING ANALYSIS

BUENA ENGINEERS, INC.

Consulting Engineers

PROJECT NO. B-3114-L01



NO. Boring 5 at 1' foot

DATE May 25, 1988

LOCATION

GRADING ANALYSIS

BUENA ENGINEERS, INC.

Consulting Engineers

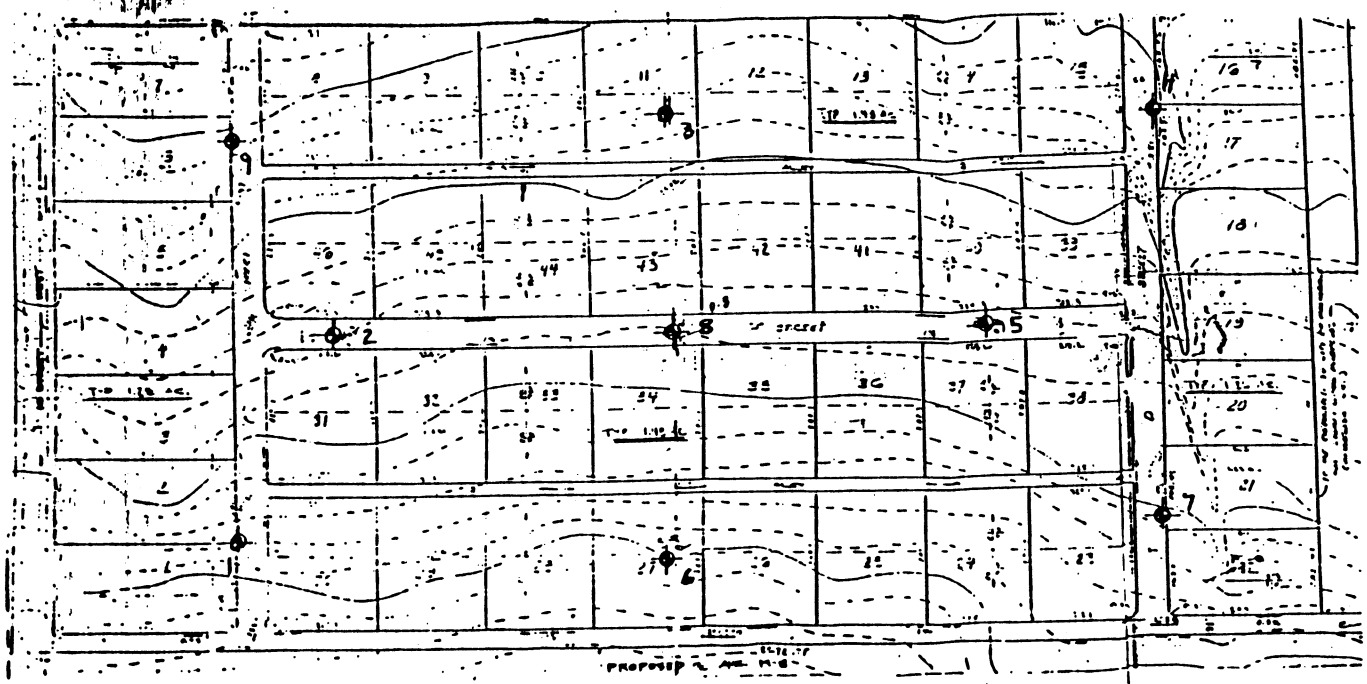
PROJECT NO. B-3114-L01

- August 27, 1990
W.O. 3473-VN

APPENDIX C

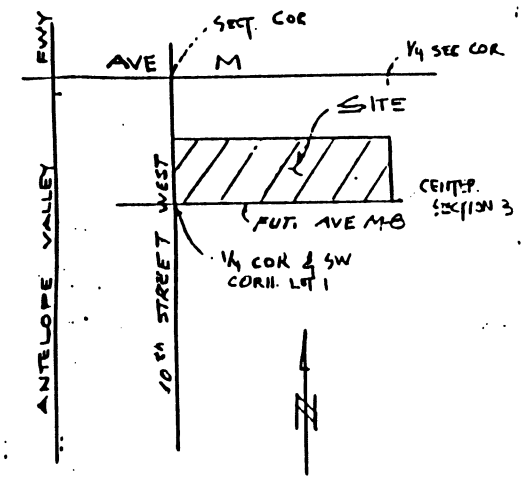
BORING LOGS AND LABORATORY TEST RESULTS

By Buena Engineers, 1982



TENTATIVE TRACT NO. 42026

LEGAL DESCRIPTION: LOT I IN THE NORTHWEST QUARTER OF SECTION 3, T6N, R12W, SBM



VICINITY MAP

INDICATES APPROXIMATE LOCATION OF BORING & PERCOLATION TEST

TENTATIVE TRACT 42026	
LOCATION OF BORINGS & PERCOALTION TEST	
BUENA ENGINEERS, INC.	
DATE MAY, 1982	JOB NO B-1976-1

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 1 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration*
0			Brown slightly moist, silty fine-medium sand	111.0	4.4			18/12
			dryer	110.6	2.2			85/12
5			More sand, slightly moist	113.0	2.2	SM		52/12
10			Brown, tan very silty fine-medium sand	109.9	4.7			72/12
15			Brown, tan fine-medium sand slightly moist	110.9	2.8	SW		73/12
20								

BORING TERMINATED @ 20'

NO FREE GROUND WATER

NO CAVING

*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 2 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration*
0		■	Brown, silty, fine-medium SAND	104.6	3.7			11/12
		■	more sandy, dryer	114.8	2.2	SM		78/12
5		■		114.2	2.7			68/12
10		■	Brown, moist fine-medium sand w/sl. silt	114.8	1.9	SW		85/12
15		■	Cleaner sand, slightly moist Trace ½" gravel	110.0	3.3			83/12

BORING TERMINATED @ 15'

NO FREE GROUND WATER

SLIGHT CAVING

*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 3 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration
0			Brown silty fine-medium sand slightly moist	111.8	3.9	SM		15/12
			Dryer					67/12
5				115.0	2.0			25/12
			Tan, Clean Sand			SW		
10								
			Brown silty f-m sand			SM		
15			Brown silty fine-medium sand	103.2	1.9	SW		62/12

BORING TERMINATED @ 15'

NO FREE GROUND WATER

SLIGHT CAVING

* ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 4 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration*
0			Brown, silty fine-medium sand slightly moist	101.9	3.8	SM		10/12
				110.3	2.9			22/12
5				110.5	3.9			20/12
10			Brown fine-medium sand slightly moist	109.3	3.2	SW		32/12
15								
			BORING TERMINATED @ 20'					
			NO FREE GROUND WATER					
			CAVING					* ASTM D 3550 Sampler with modified shoe

The straification lines represent the approximate boundary between soil types and the transition may be gradual.

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 5 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration*
0			Brown tan silty fine-medium sand	109.5	3.1	SM		23/12
				112.3	1.9			42/12
5				112.7	2.0			43/12
10			Brown fine-medium sand slightly moist			SW		
15								
20			BORING TERMINATED @ 20'					
			NO FREE GROUND WATER					
			CAVING					*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 6 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration
0			Brown silty fine-medium sand, slightly moist	106.7	2.7			11/12
			dryer	110.6	1.7	SM		34/12
5			slightly silty	114.7	110.3			26/12
10			Brown fine-medium sand some 1" gravel			SW		
15				110.3	2.8			60/12

BORING TERMINATED @ 15'

NO FREE GROUND WATER

SLIGHT CAVING

*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 7 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND- % SILT - % CLAY) Blows/Inches Penetration
0		■	Brown tan silty fine-medium sand	109.0	2.2			16/12
		■		110.8	3.6	SM		24/12
5		■		111.6	3.7			24/12
10		■	Clean fine-medium sand	110.7	2.7	SW		29/12
15		■		110.4	1.7			78/12

BORING TERMINATED @ 20'

NO FREE GROUND WATER

NO CAVING

*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 8 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND- % SILT - % CLAY) Blows/Inches Penetration*
0				111.7	2.2			13/12
				112.0	2.6	SM		57/12
5			Brown, silty fine-medium sand	113.5	2.0			44/12
10			Brown, fine-coarse clean sand	113.2	2.8			41/12
15			w/trace of silt	107.1	2.1	SW		76/12
20								
25								
30								

BORING TERMINATED @ 30'

NO CAVING

NO FREE GROUND WATER

* ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

B-1976-L01

BUENA ENGINEERS, INC.

LOG OF BORING

FOR

DATE 4-3-82 BORING NO. 9 LOCATION: Per Plan

DEPTH, FEET	SYMBOL	CORE	DESCRIPTION	UNIT DRY WT. LB/CU. FT.	MOISTURE PERCENT	SOIL TYPE	RELATIVE COMPACTION PERCENT	REMARKS AND ANALYSIS (% SAND - % SILT - % CLAY) Blows/Inches Penetration*
0			Brown slightly moist, silty f-m sand	104.3	2.3			26/12
				115.3	2.9	SM		43/12
5				113.6	1.9			51/12
10			Brown Sand Fine-Medium	113.2	2.8			44/12
15			Some 2" Ø gravel			SW		
20			BORING TERMINATED @ 20'					
			NO FREE GROUND WATER					
			CAVING					*ASTM D 3550 Sampler with modified shoe

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

APPENDIX B

Summary of Test Results

SUMMARY OF IN-PLACE DENSITIES

Boring Number	Depth Feet	Dry Density PCF	Moisture Percent
1	1	111.0	4.4
	3	110.6	2.2
	5	113.0	2.2
	10	109.9	4.7
	15	110.9	2.8
2	1	104.6	3.7
	3	114.8	2.2
	5	114.2	2.7
	10	114.8	1.9
	15	110.0	3.3
3	1	111.8	3.9
	5	115.0	2.0
	15	103.2	1.9
4	1	101.9	3.8
	3	110.3	2.9
	5	110.5	3.9
	10	109.3	3.2
5	1	109.5	3.1
	3	112.3	1.9
	5	112.7	2.0
6	1	106.7	2.7
	3	110.6	1.7
	5	114.7	2.0
	15	110.3	2.8
7	1	109.0	2.2
	3	110.8	3.6
	5	111.6	3.7
	10	110.7	2.7
	15	110.4	1.7
8	1	111.7	2.2
	3	112.0	2.6
	5	113.5	2.0
	10	113.2	2.8
	15	107.1	2.1
9	1	104.3	2.3
	3	115.3	2.9
	5	113.6	1.9
	10	110.0	2.6

June 7, 1982 B-1976-L01

SUMMARY OF TEST RESULTS

Unified Classification	SM	SM
Soil I.D.	A-1	A-2
Boring, No.	9	4
Depth, Feet	0-3	0-3
Maximum Density, PCF	131.7	131.6
Optimum Moisture, %	8.2	7.8
Expansion Index	0	0
Specific Gravity	2.6	2.6
Classification %		
Gravel	6.8	1.4
Sand	74.6	70.9
Clay & Silt	18.6	27.7

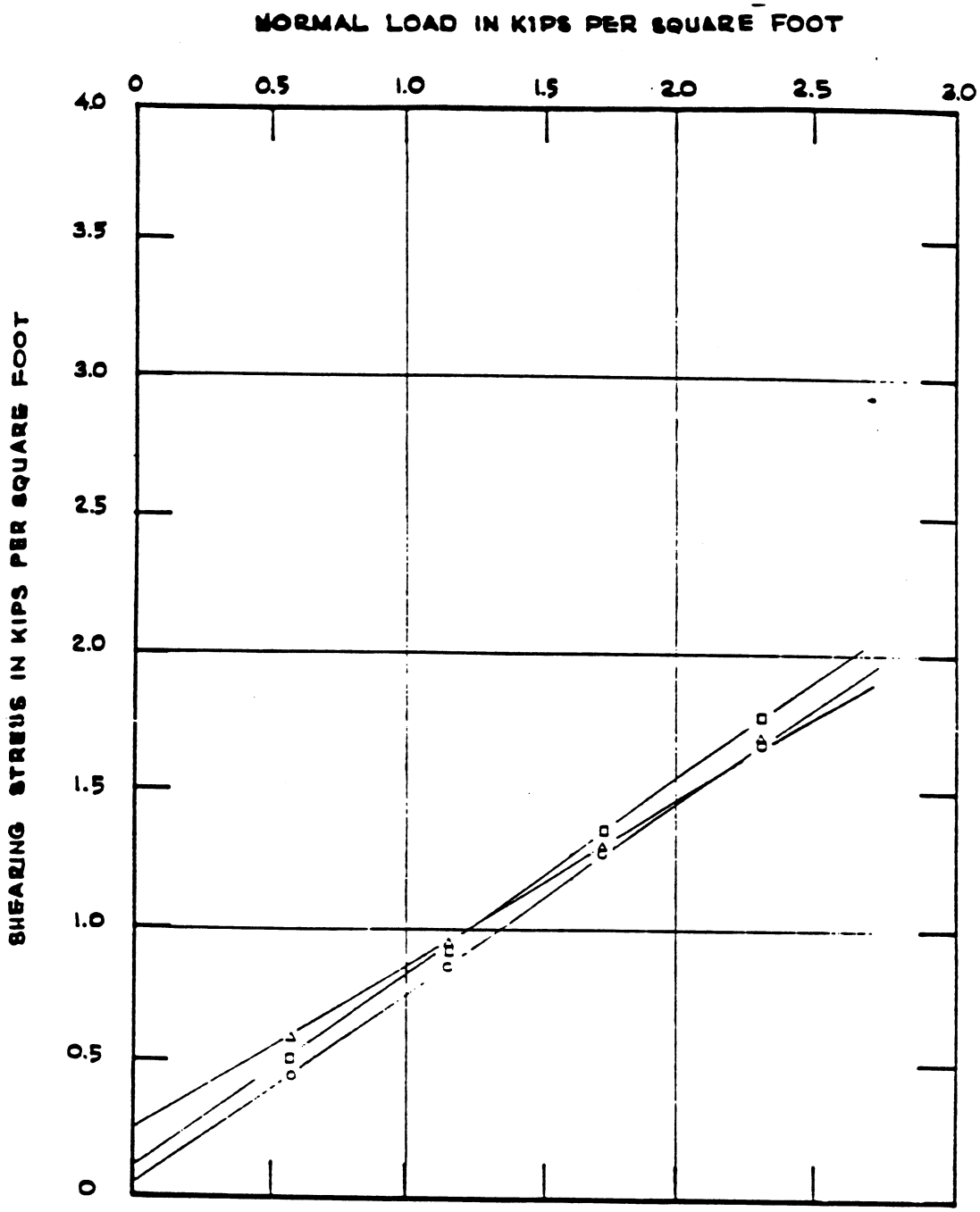
A-1: Brown Silty, fine to medium SAND

A-2: Brown Silty, fine to medium SAND

DIRECT SHEAR RESULTS

Boring Number	Depth Feet	Dry Density	Friction Degrees	Cohesion PSF
1	3	110.6	34.9	120
3	1	111.8	33.8	89
5	3	112.3	35.6	115
7	1	109.0	38.1	0
Soil I.D.				
A-1*		118.5	35.3	62
A-2*		118.4	30.6	250

*Remolded to 90% of Maximum Density

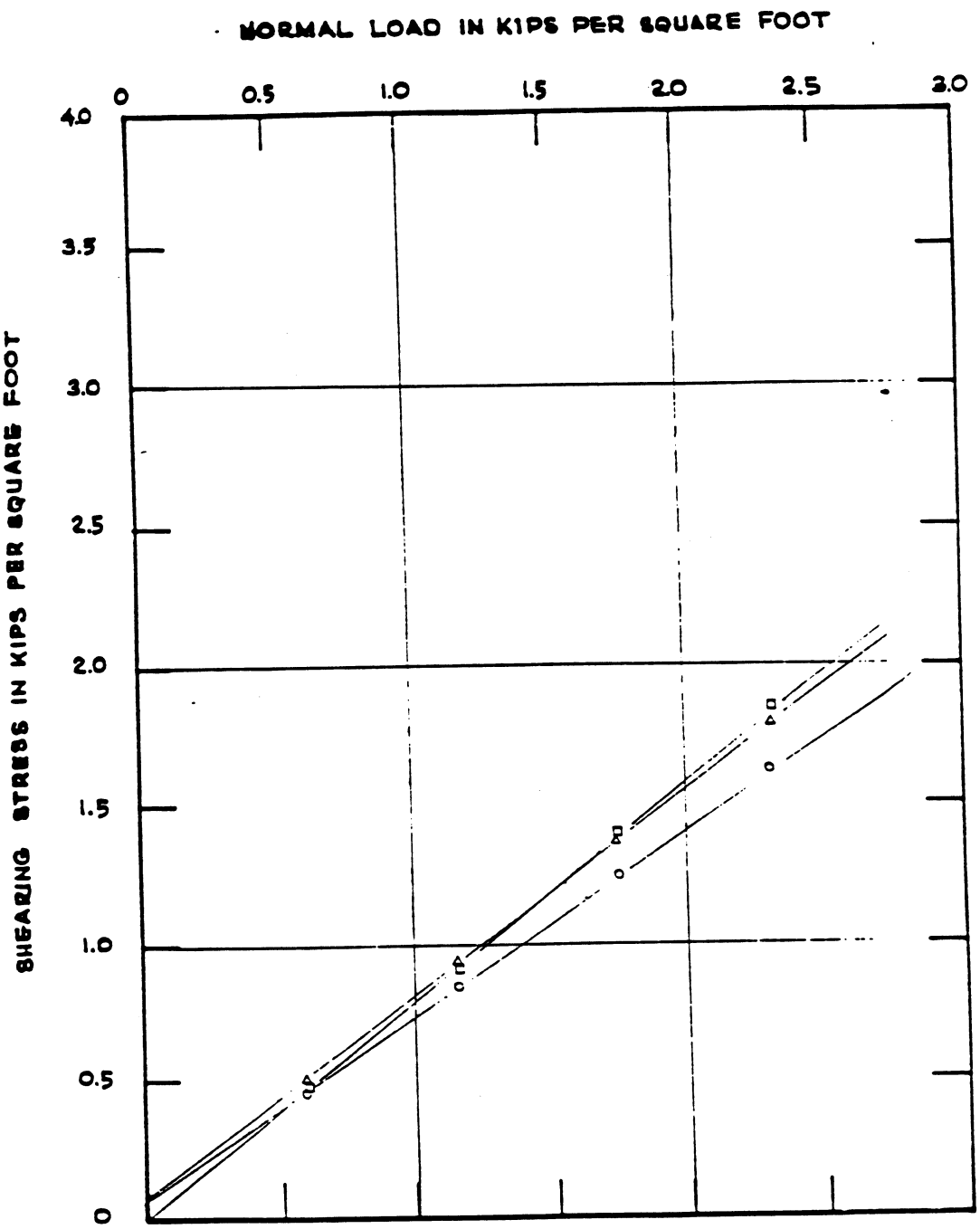


DIRECT SHEAR DATA

Sample	Cohesion	Angle of Friction
A1*	62 psf	35.3°
A2*	250psf	30.6°
1 @ 3'	120psf	34.9°

* Remolded to 90% of Maximum Density

B-1976-L01
BUENA ENGINEERS INC

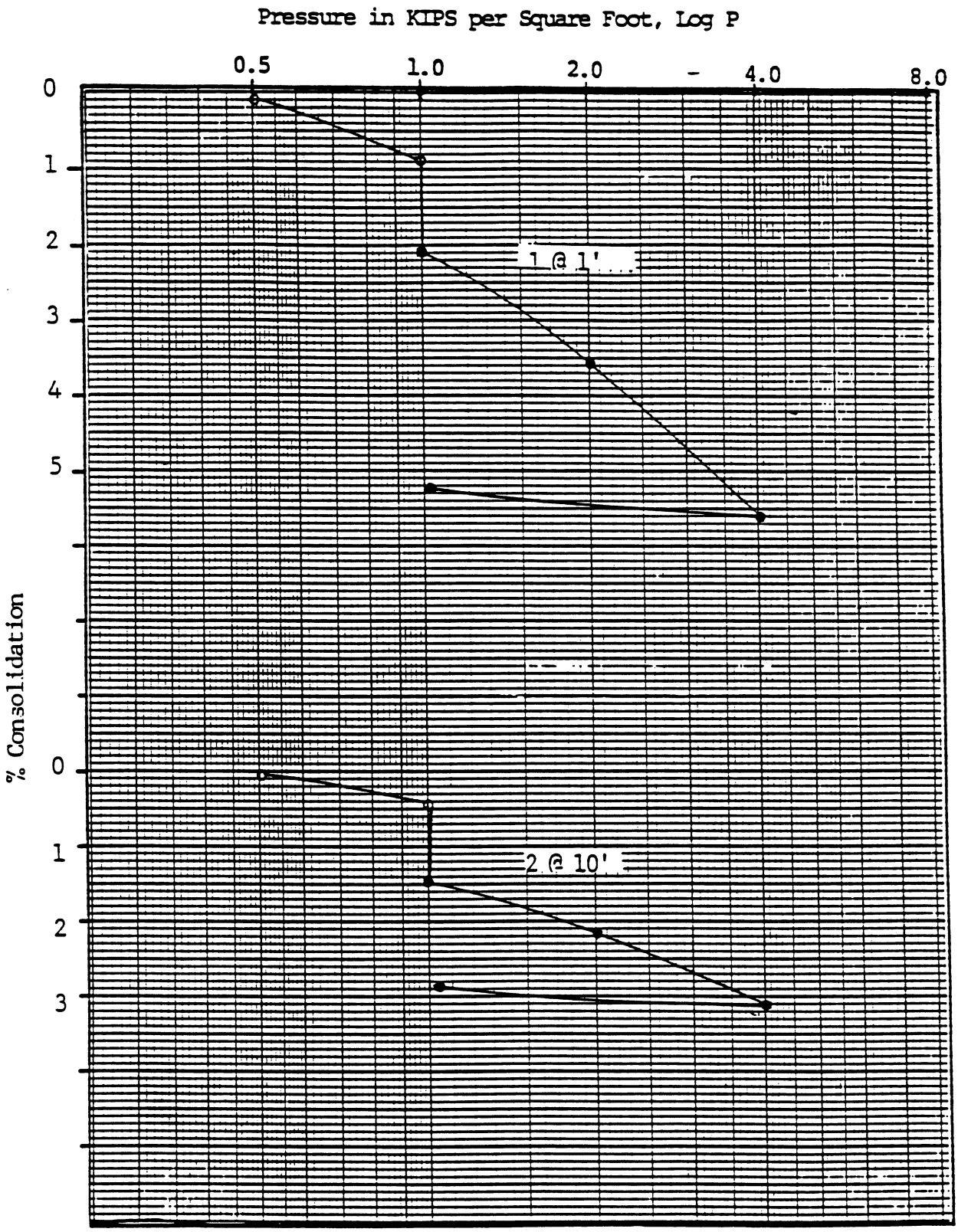


DIRECT SHEAR DATA

Sample	Cohesion	Angle of Friction
3 @ 1'	89 PSF	33.8°
5 @ 3'	11.5 PSF	35.6°
7 @ 1'	0 PSF	38.1°

B-1976-L01

BUENA ENGINEERS INC



CONSOLIDATION DATA

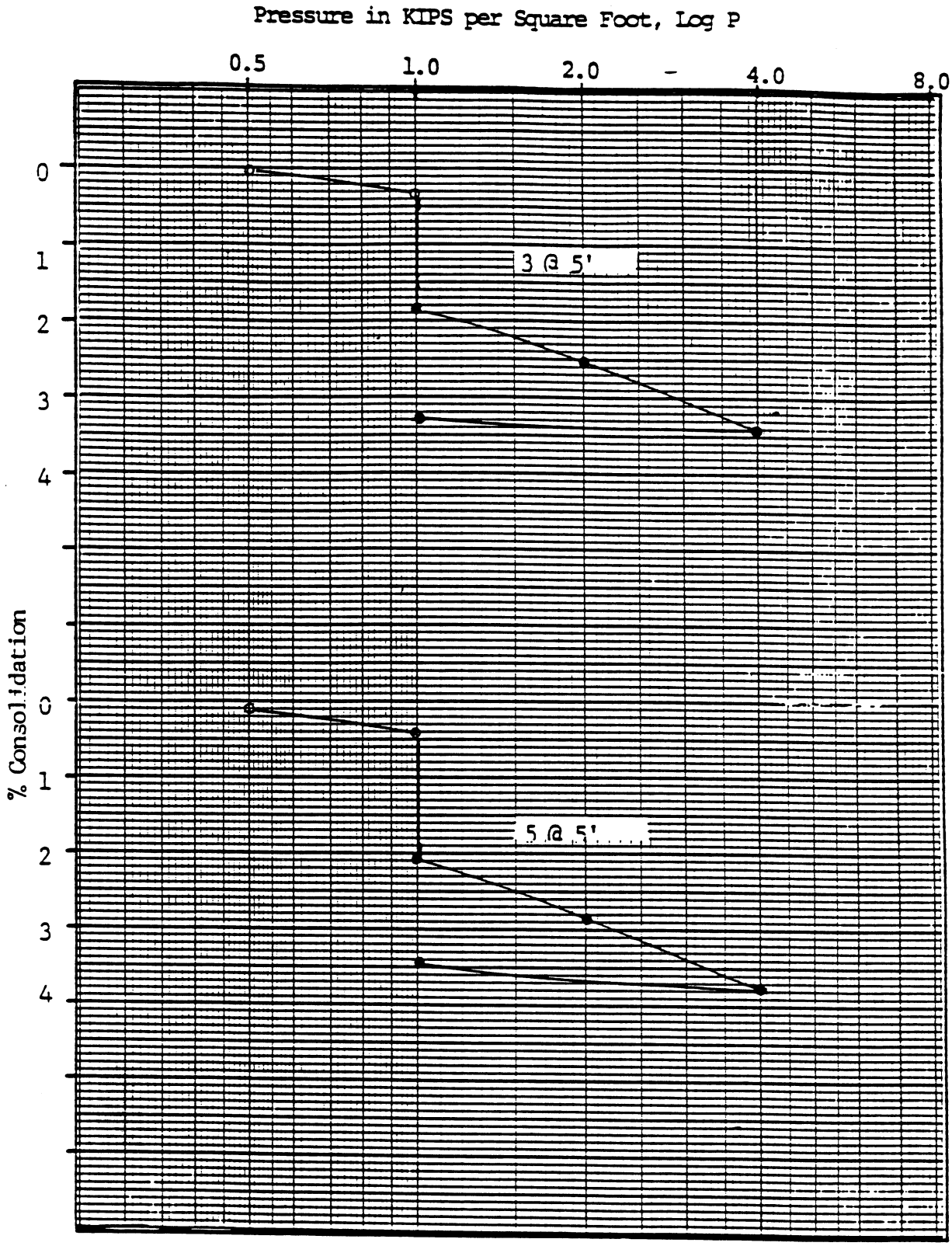
- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982

FILE NO. B-1976-101



CONSOLIDATION DATA

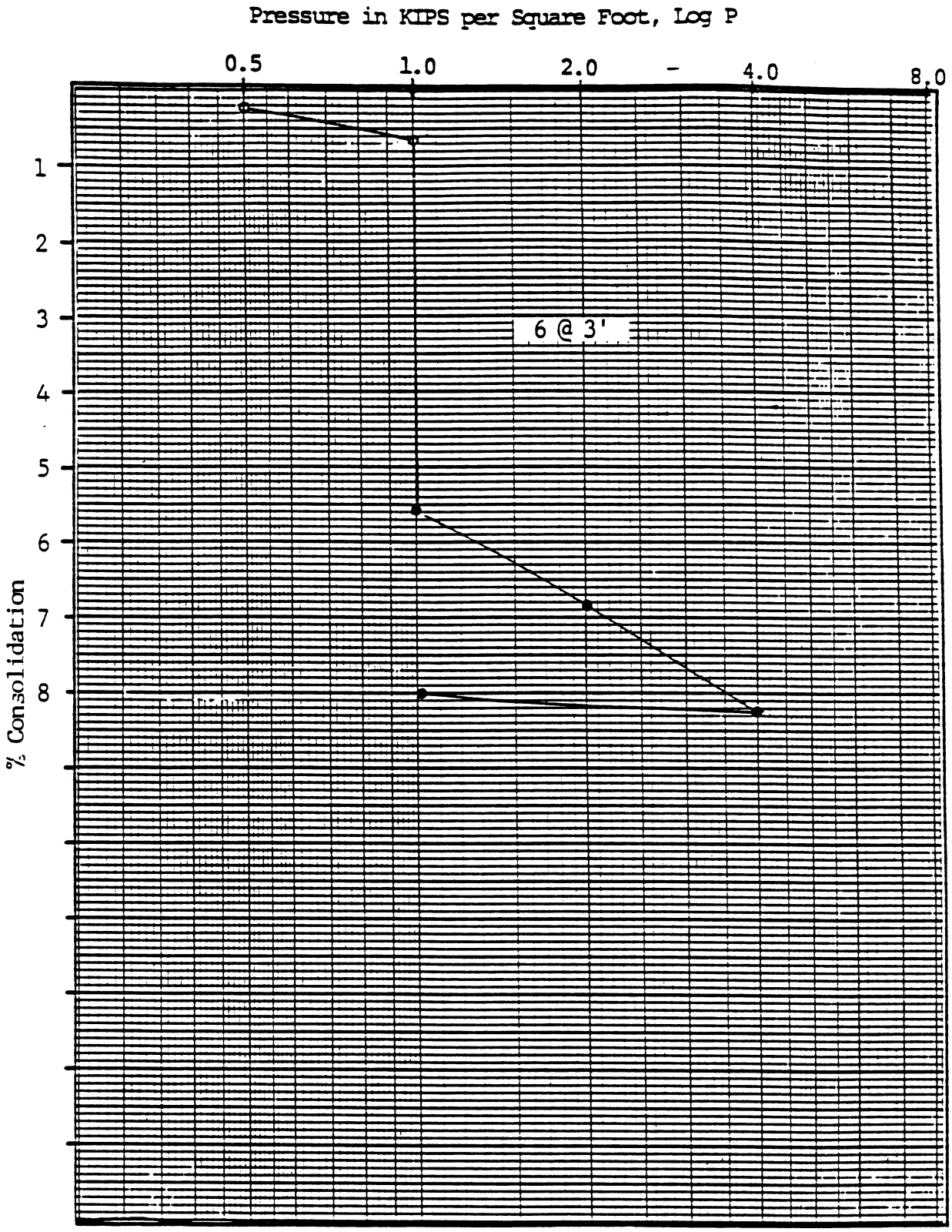
- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982

FILE NO. B-1976-101



CONSOLIDATION DATA

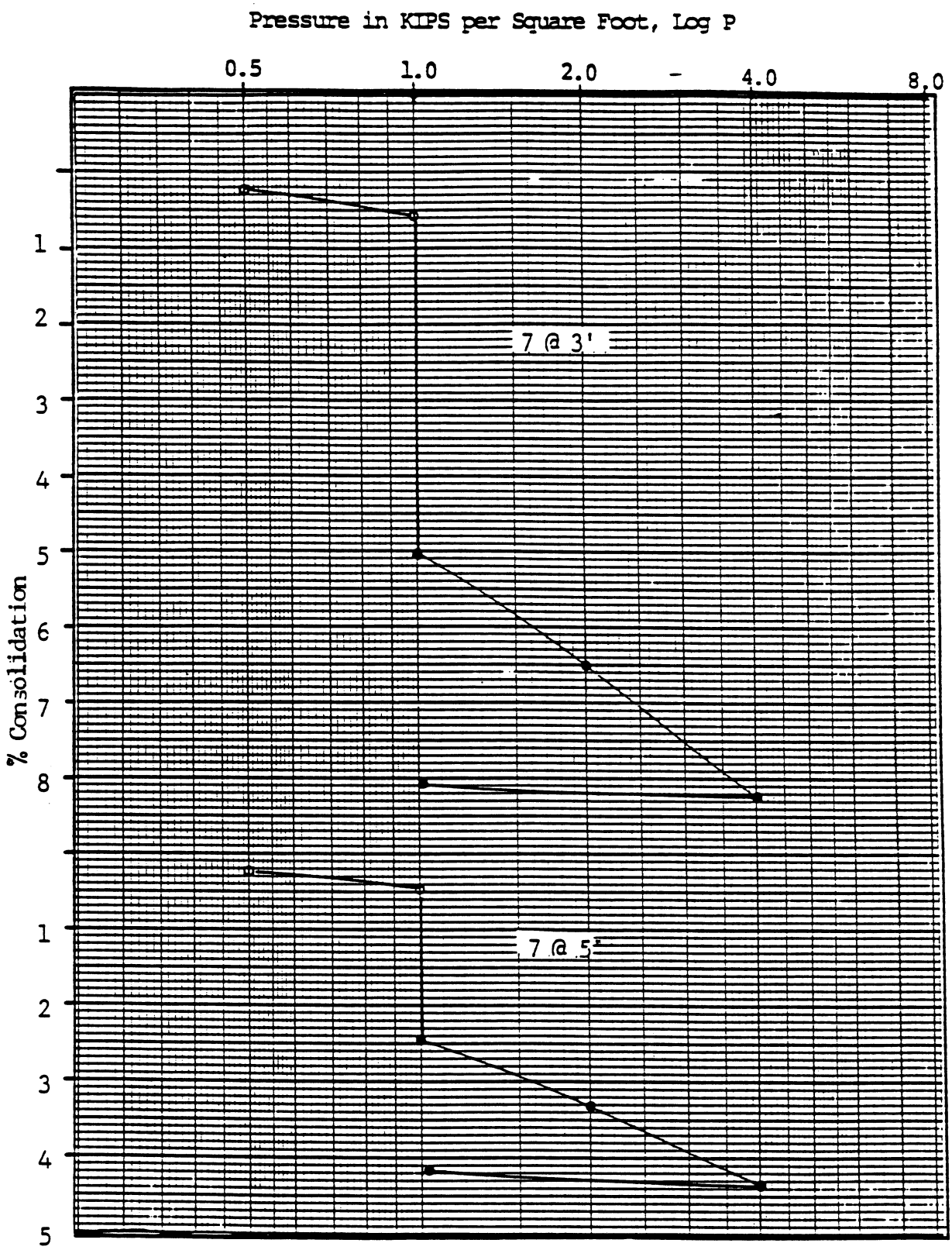
- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982

FILE NO. B-1976-101



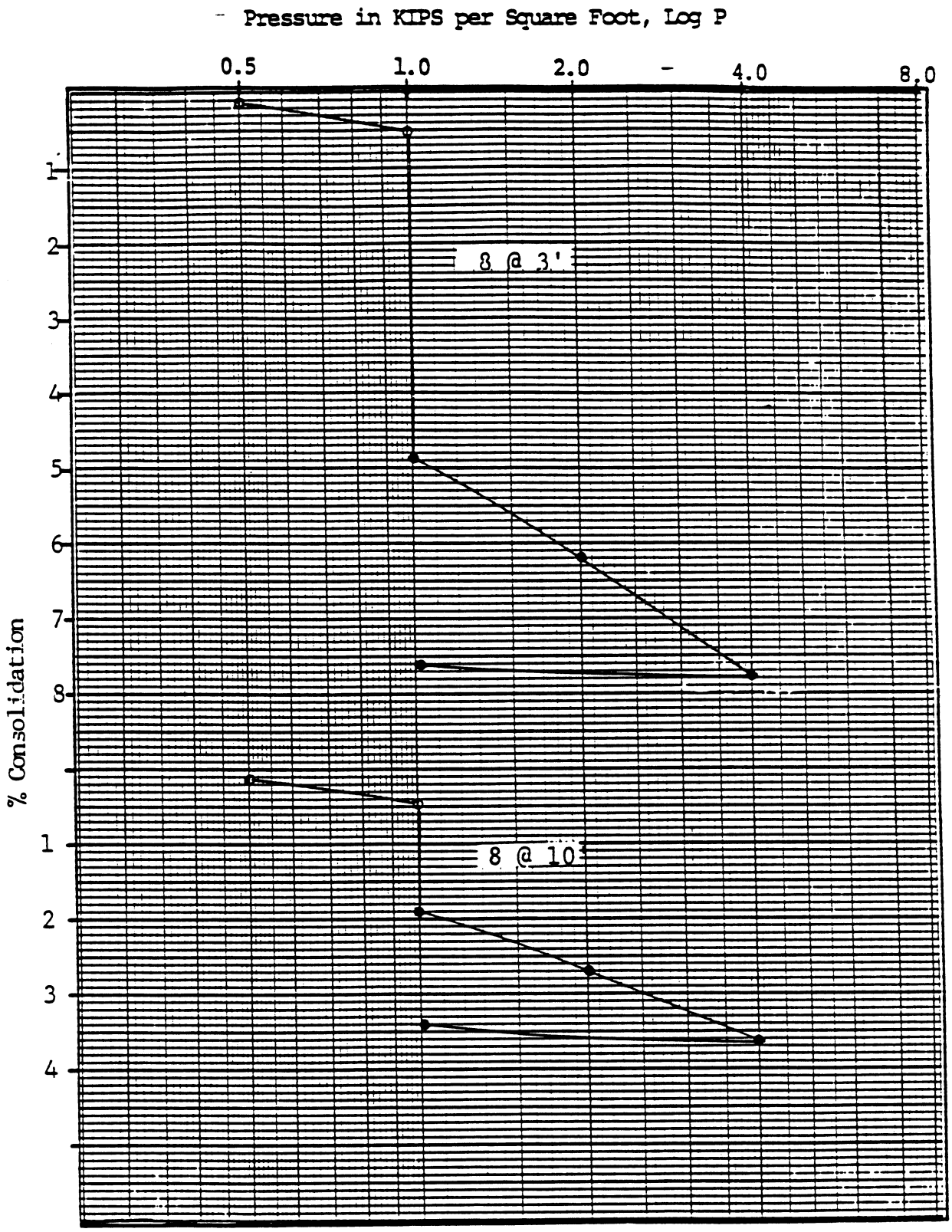
CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982 | FILE NO B-1976-L01



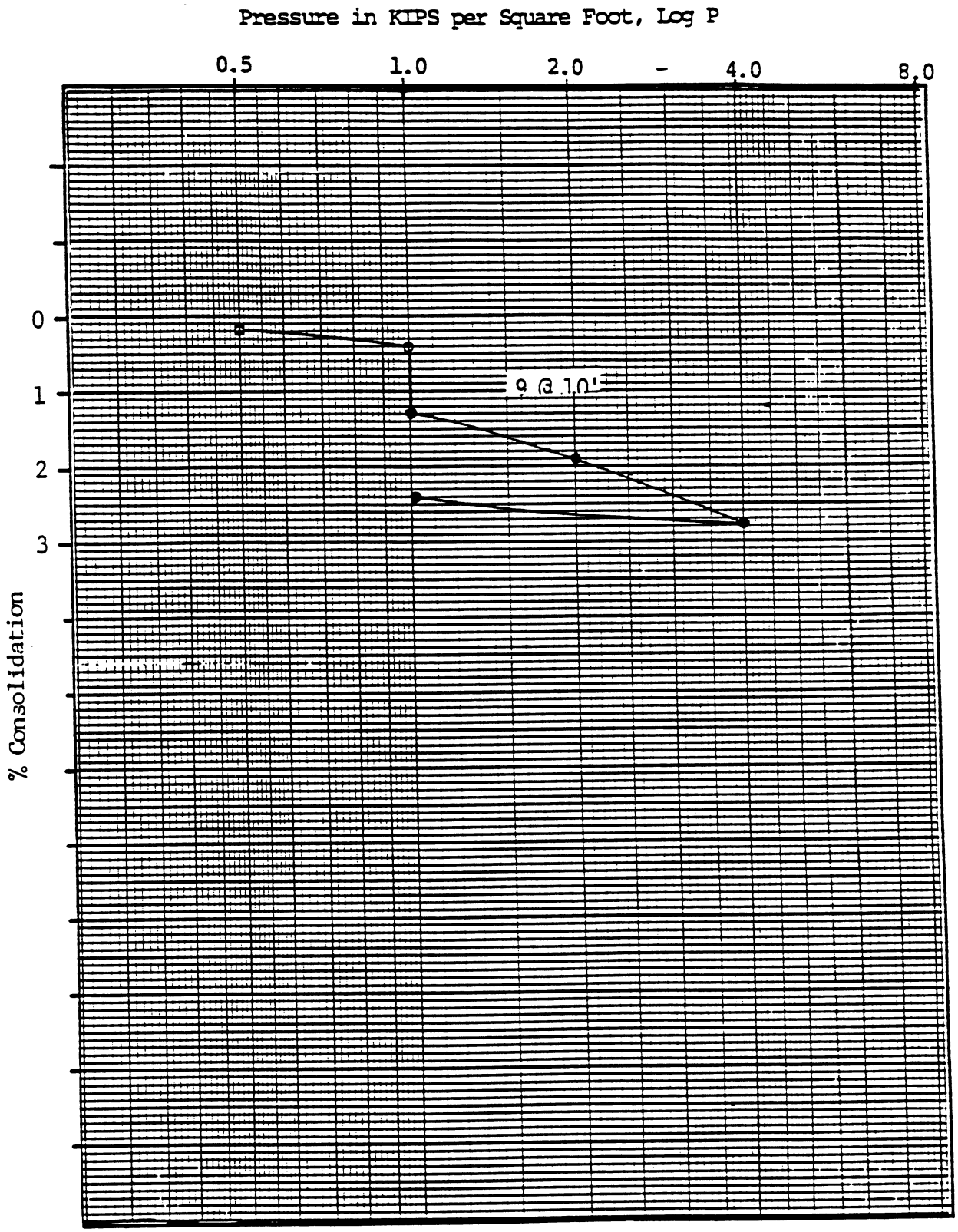
CONSOLIDATION DATA

- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982 | FILE NO B-1976-L01



CONSOLIDATION DATA

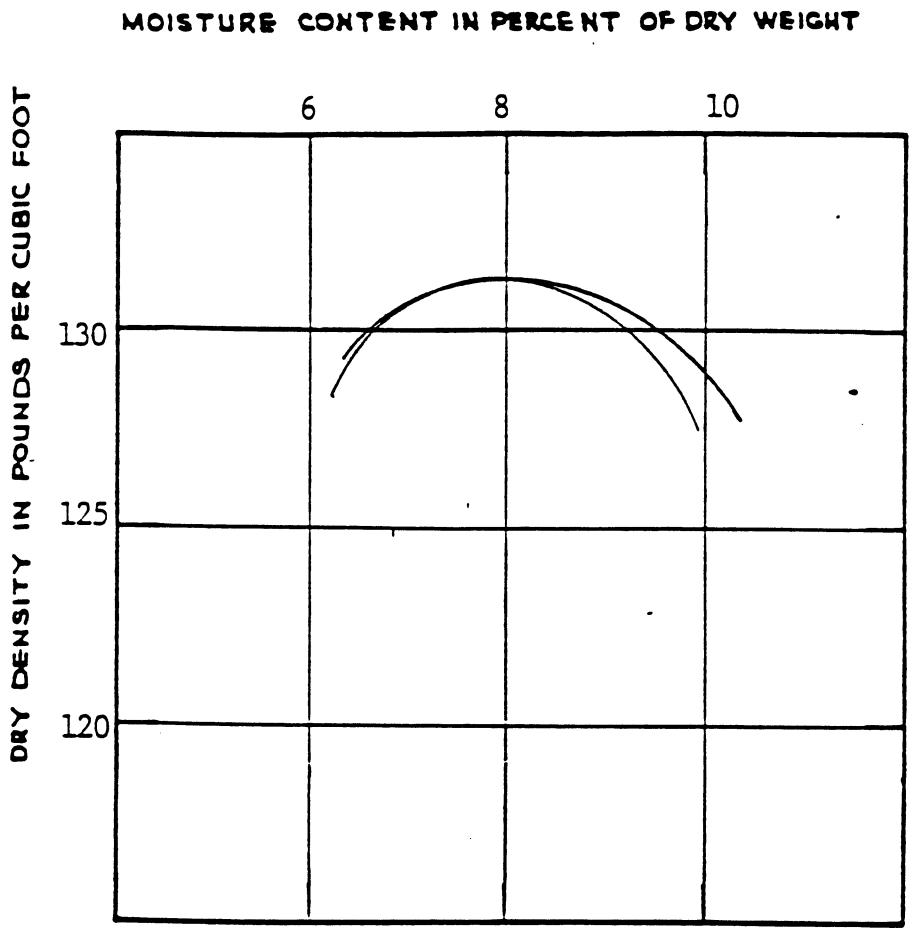
- ○ in-situ moisture
- ● saturated

COMPRESSION DIAGRAM

BUENA ENGINEERS, INC.

DATE: May, 1982

FILE NO. B-1976-I



METHOD OF COMPACTION. ASTM D 1557, Method A

SOIL TYPE	MAXIMUM DENSITY	OPTIMUM MOISTURE
A-1	131.7 PCF	8.2%
A-2	131.6 PCF	7.8%

MAXIMUM DENSITY - OPTIMUM MOISTURE CURVES

B-1976-L01
BUENA ENGINEERS INC.

August 27, 1990
W.O. 3473-VN

APPENDIX D

EQFAULT AND EQSEARCH

SEISMIC ANALYSIS

APPENDIX D

EQFAULT AND EQSEARCH

EQFAULT, a computer program written by Thomas F. Blake, effectively performs deterministic seismic hazard analyses using up to 150 digitized California faults as earthquake sources. The program estimates the closest distance between each fault and a user-specified site. If a fault is found to be within a user-selected radius, the program estimates peak horizontal ground acceleration that may occur at the site from the "maximum credible" and "maximum probable" earthquakes on that fault. EQFAULT allows the option of using computed peak acceleration values or estimating "Repeatable High Ground Acceleration" (RGHA) values from the peak values. Site acceleration (g) is computed by any of the 14 user-selected acceleration-attenuation relations that are contained in EQFAULT. Site Modified Mercalli Intensities are also predicted for each earthquake event. A fault-model map and a comparison plot of earthquake accelerations are also created by EQFAULT.

Appendix D

EQSEARCH

EQSEARCH, written by Thomas F. Blake, is a computer program for the estimation of peak horizontal acceleration from Southern California historical earthquake catalogs. The program performs historical-earthquake searches using an abbreviated and supplemented version of the California Division of Mines and Geology (C.D.M.G.) computerized earthquake catalog for the state of California. Search parameters (i.e., geographic limits, limiting dates, and limiting magnitudes) are specified and one of 14 available acceleration-attenuation relations is selected by the user. The user also has the option of using computed peak acceleration values or estimating "Repeatable High Ground Acceleration: (RHGA) values from the peak values. For each historical earthquake in the search area, EQSEARCH prints latitude, longitude, date of event, depth, Richter magnitude, computed site-acceleration, computed site-Modified-Mercalli-Intensity, and the approximate earthquake-to-site distance in both mile and kilometers. An epicenter map and a seismic recurrence curve are also created by EQSEARCH.

DATE: Tuesday, August 14, 1990

```
*************************************
*                                   *
*          E Q F A U L T            *
*                                   *
*           Ver. 1.01               *
*                                   *
*   Licensed to:  GEOSOILS, INC.    *
*                                   *
*************************************
```

(Estimation of RHGA Horizontal Acceleration
From Digitized California Faults)

SEARCH PERFORMED FOR: THE LUSK COMPANY

JOB NUMBER: 3473-VN

JOB NAME: THE LUSK COMPANY

SITE COORDINATES:
LATITUDE: 34.6459 N
LONGITUDE: 118.1469 W

SEARCH RADIUS: 60 mi

ATTENUATION RELATION: CAMPBELL (1997) Unconstrained - mean

Soil Conditions: Deep Soil

COMPUTE RHGA HORIZ. ACCEL. (FACTOR: 0.650 DISTANCE: 20.0 mi)

FAULT-DATA FILE USED: CALIFLT.DAT

GeoSoils, Inc.

EQFAULT
Tract 44769
The Lusk Company

DATE 8/90 | W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

FORM 89/22

FIGURE 1

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROX. DISTANCE mi (km)	MAX. CREDIBLE EVENT			MAX. PROBABLE EVENT		
		MAX. CRED. MAG.	RHGA SITE ACC. g	SITE INTENS MM	MAX. PROB. MAG.	RHGA SITE ACC. g	SITE INTENS MM
ANACAPA	60 (96)	7.00	0.044	VI	6.25	0.026	V
ARROYO PARIDA - MORE RANCH	58 (93)	7.00	0.045	VI	6.00	0.023	IV
BIG PINE	50 (81)	7.50	0.053	VI	5.75	0.016	IV
CHINO	47 (75)	7.00	0.057	VI	4.75	0.013	III
CLEARWATER	13 (22)	7.00	0.127	VIII	3.00	0.010	III
CLEGHORN	46 (74)	6.50	0.030	V	6.25	0.026	V
CUCAMONGA	40 (65)	7.00	0.068	VI	6.75	0.057	VI
FRAZIER MOUNTAIN	45 (72)	6.50	0.043	VI	3.00	0.004	I
GARLOCK (East)	43 (69)	7.75	0.074	VII	7.00	0.046	VI
GARLOCK (West)	31 (50)	7.75	0.103	VII	6.75	0.055	VI
GLN.HELEN-LYTLE CR-CLREMNT	37 (59)	7.50	0.074	VII	7.00	0.054	VI
HARPER	55 (89)	7.00	0.034	V	5.75	0.015	IV
HELENDALE	45 (73)	7.50	0.059	VI	6.25	0.026	V
HOLSER	28 (46)	6.75	0.083	VII	6.25	0.060	VI
LOCKHART	44 (71)	7.50	0.061	VI	6.00	0.023	IV
MALIBU COAST	49 (79)	7.50	0.075	VII	5.00	0.014	IV
MOJAVE RIVER (Ord Mtn.)	55 (88)	7.00	0.048	VI	6.25	0.029	V
NEWPORT - INGLEWOOD	44 (70)	7.50	0.062	VI	6.50	0.032	V
NORTHRIDGE HILLS	34 (54)	6.50	0.059	VI	4.00	0.011	III
OAK RIDGE	37 (60)	7.50	0.100	VII	6.25	0.045	VI
PALOS VERDES HILLS	55 (89)	7.00	0.034	V	5.50	0.013	III
PINE MOUNTAIN	37 (59)	7.00	0.075	VII	4.50	0.014	IV
PLEITO	45 (72)	7.50	0.083	VII	6.00	0.031	V
RAYMOND	35 (57)	7.50	0.106	VII	5.50	0.029	V
SAN ANDREAS (Mojave)	5 (8)	8.50	0.419	X	8.25	0.383	X

GeoSoils, Inc.

EQFAULT
Tract 44769
The Lusk Company

DATE 8/90 | W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROX. DISTANCE mi (km)	MAX. CREDIBLE EVENT			MAX. PROBABLE EVENT		
		MAX. CRED. MAG.	RHGA SITE ACC. g	SITE INTENS MM	MAX. PROB. MAG.	RHGA SITE ACC. g	SITE INTENS MM
SAN ANDREAS (Southern)	46 (74)	8.00	0.080	VII	7.25	0.050	VI
SAN CAYETANO	38 (61)	7.50	0.098	VII	6.25	0.044	VI
SAN GABRIEL	24 (39)	7.50	0.113	VII	6.25	0.052	VI
SANTA MONICA - HOLLYWOOD	37 (60)	7.50	0.100	VII	6.00	0.038	V
SANTA SUSANA	27 (44)	7.00	0.101	VII	6.50	0.074	VII
SANTA YNEZ (East)	43 (69)	7.50	0.063	VI	5.75	0.020	IV
SIERRA MADRE-SAN FERNANDO	28 (46)	7.50	0.133	VIII	6.50	0.071	VI
SIERRA NEVADA-OWENS VALLEY	45 (73)	8.00	0.112	VII	6.50	0.043	VI
SIMI - SANTA ROSA	37 (60)	7.00	0.073	VII	4.25	0.011	III
VERDUGO	31 (50)	7.00	0.089	VII	4.50	0.017	IV
WHITE WOLF	50 (80)	8.00	0.101	VII	7.75	0.086	VII
WHITTIER - NORTH ELSINORE	38 (62)	7.50	0.071	VI	6.25	0.031	V

****

-END OF SEARCH- 37 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SAN ANDREAS (Mojave) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 4.9 MILES AWAY.

LARGEST MAXIMUM-CREDIBLE SITE ACCELERATION: 0.419 g

LARGEST MAXIMUM-PROBABLE SITE ACCELERATION: 0.383 g

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The Lusk Company

DATE 8/90 W.O. NO. 3473-VN

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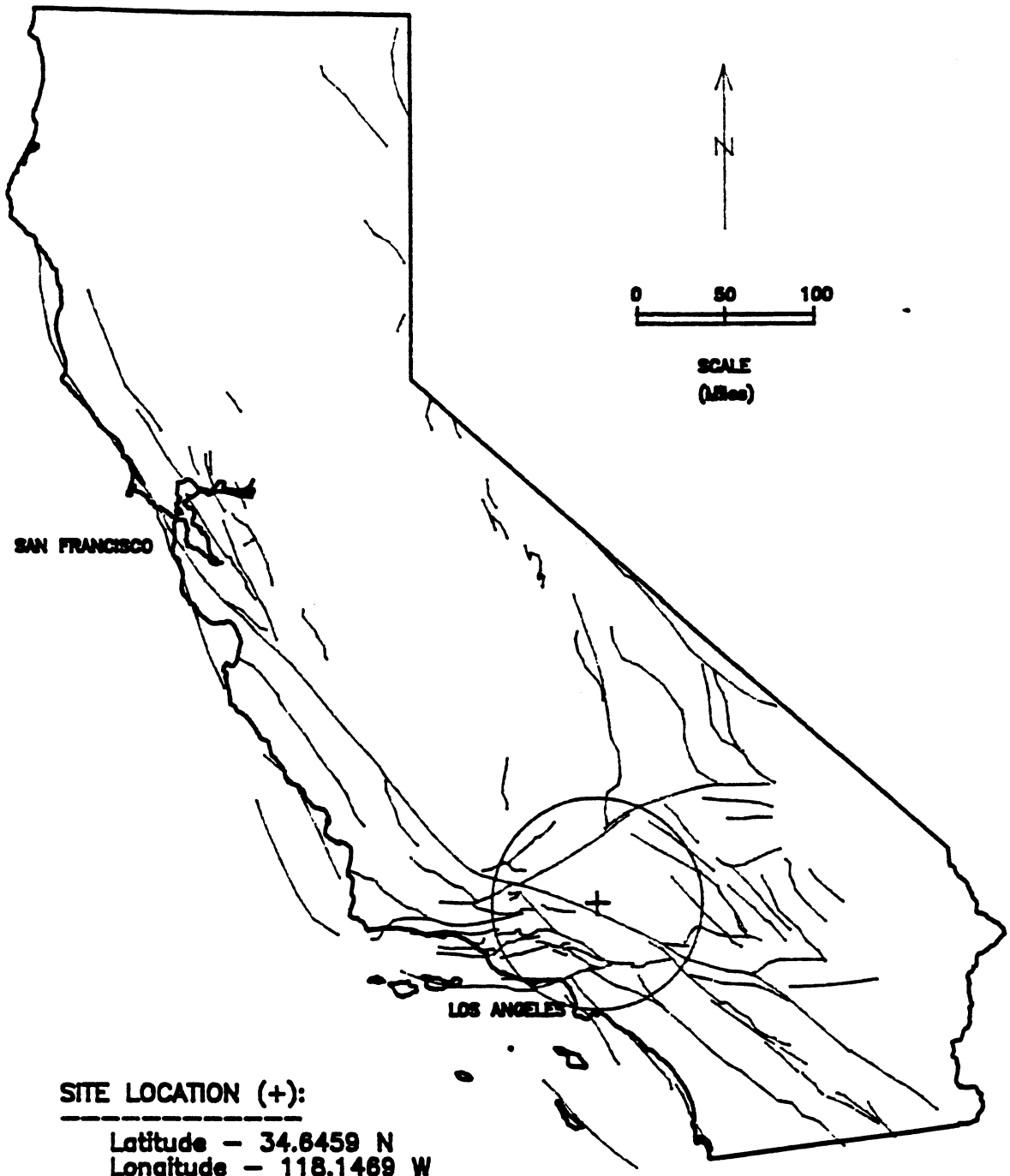
FIGURE 3



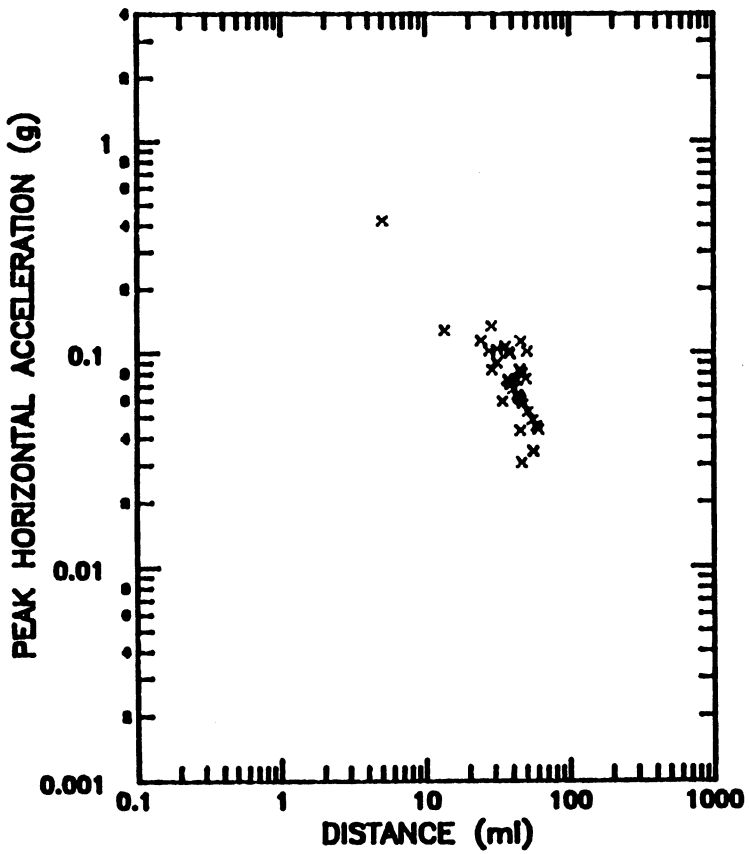
SITE LOCATION (+):

Latitude – 34.6459 N
Longitude – 118.1469 W
THE LUSK COMPANY

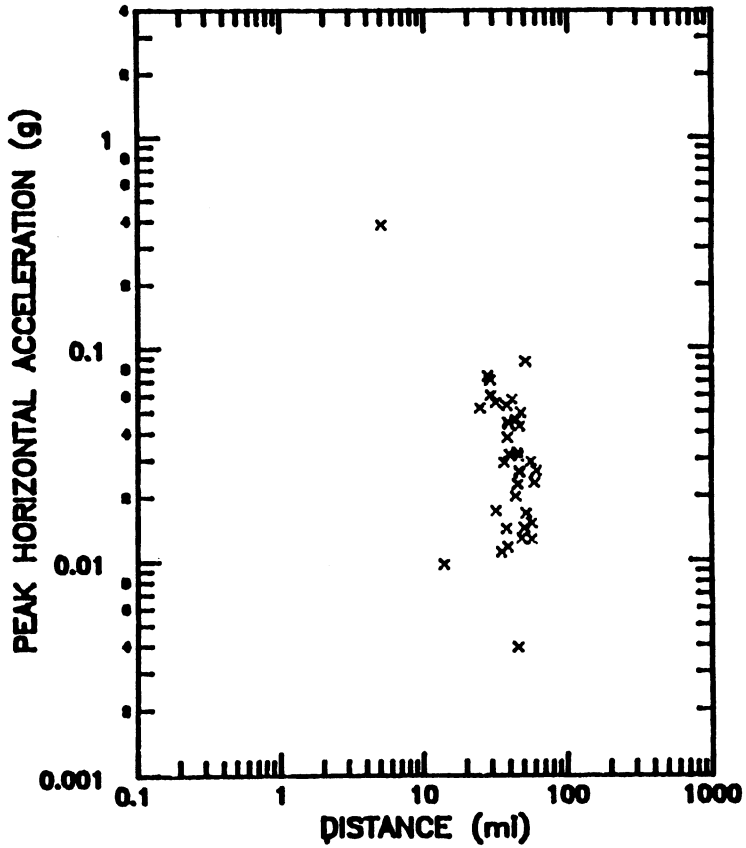
CALIFORNIA FAULT MAP

COMPARISON OF MAXIMUM EARTHQUAKES

MAXIMUM CREDIBLE EARTHQUAKES



MAXIMUM PROBABLE EARTHQUAKES



JOB NO.: 3473-VN

LATITUDE: 34.6459 N – LONGITUDE: 118.1469 W

```
DATE: Tuesday, August 14, 1990

                    ************************************
                    *                                  *
                    *          E Q S E A R C H         *
                    *                                  *
                    *             Ver. 1.50            *
                    *                                  *
                    * Licensed to: GEOSOILS, INCORPORATED *
                    *                                  *
                    ************************************

                 (Estimation of RHGA Horizontal Acceleration
                    From California Earthquake Catalogs)

SEARCH PERFORMED FOR:  THE LUSK COMPANY

JOB NUMBER:  3473-VN

JOB NAME:  THE LUSK COMPANY

SITE COORDINATES:
   LATITUDE:  34.6459  N
   LONGITUDE:  118.1469  W

TYPE OF SEARCH:   RADIUS
  SEARCH RADIUS:  60  mi

SEARCH MAGNITUDES: 4.4 TO 9.0

SEARCH DATES:  1890  TO  1990

ATTENUATION RELATION: CAMPBELL (1987) Unconstrained - mean

    Soil Conditions: Deep Soil

 COMPUTE RHGA HORIZ. ACCEL.  (FACTOR:  0.650   DISTANCE:    20.0 mi)

EARTHQUAKE-DATA FILE USED: ALLQUAKE.DAT

TIME PERIOD OF EXPOSURE FOR STATISTICAL COMPARISON:  25  years
```

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FIGURE 4

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (GMT)	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi	[km]
DMG	34.200	117.500	6/14/1892	1925	0.0	4.90	0.010	III	48	[77]
DMG	34.300	118.600	4/ 4/1893	1940	0.0	5.40	0.020	IV	35	[57]
DMG	34.300	117.600	7/30/1894	512	0.0	5.90	0.024	V	39	[63]
DMG	34.200	117.400	7/22/1899	046	0.0	5.50	0.013	III	53	[85]
DMG	34.300	117.500	7/22/1899	2032	0.0	6.50	0.032	V	44	[71]
MGI	34.000	118.000	12/25/1903	1745	0.0	5.00	0.011	III	45	[73]
MGI	34.000	118.300	9/ 3/1905	540	0.0	5.30	0.014	III	45	[73]
DMG	35.300	118.800	12/23/1905	2223	0.0	5.00	0.008	III	58	[94]
DMG	34.000	118.500	11/ 8/1914	1140	0.0	4.50	0.007	II	49	[79]
DMG	34.900	118.900	10/23/1916	244	0.0	6.00	0.022	IV	46	[74]
DMG	34.700	119.000	10/23/1916	254	0.0	5.50	0.015	IV	49	[78]
MGI	34.000	118.200	2/13/1917	13 5	0.0	4.60	0.009	III	45	[73]
MGI	34.000	118.200	6/26/1917	2115	0.0	4.60	0.009	III	45	[73]
MGI	34.000	118.200	6/26/1917	2120	0.0	4.60	0.009	III	45	[73]
MGI	34.000	118.200	6/26/1917	2130	0.0	4.60	0.009	III	45	[73]
MGI	35.500	118.000	3/23/1918	1515	0.0	4.60	0.006	II	60	[96]
MGI	34.000	118.500	11/19/1918	2016	0.0	5.00	0.010	III	49	[79]
DMG	35.000	119.000	2/16/1919	1557	0.0	5.00	0.009	III	54	[87]
MGI	34.000	118.400	2/22/1920	1610	0.0	4.60	0.008	III	47	[75]
DMG	34.000	118.500	6/22/1920	248	0.0	4.90	0.010	III	49	[79]
MGI	34.080	118.260	7/16/1920	18 8	0.0	5.00	0.013	III	40	[64]
MGI	34.100	118.300	7/16/1920	2022	0.0	4.60	0.010	III	39	[62]
MGI	34.100	118.300	7/16/1920	2127	0.0	4.60	0.010	III	39	[62]
MGI	34.100	118.300	7/16/1920	2130	0.0	4.60	0.010	III	39	[62]
MGI	34.200	118.000	1/ 9/1921	530	0.0	4.60	0.013	III	32	[51]
MGI	34.000	118.400	2/ 7/1927	429	0.0	4.60	0.008	III	47	[75]
DMG	34.000	118.500	8/ 4/1927	1224	0.0	5.00	0.010	III	49	[79]
MGI	33.900	118.200	10/ 8/1927	1914	0.0	4.60	0.007	II	52	[83]
DMG	35.000	119.000	3/13/1929	228	0.0	4.50	0.006	II	54	[87]
MGI	34.000	118.000	5/ 5/1929	1 7	0.0	4.60	0.008	III	45	[73]
DMG	33.900	118.100	7/ 8/1929	1646	6.7	13.0	4.70	0.008	II	52	[83]
MGI	34.100	118.000	1/27/1930	2026	0.0	4.60	0.010	III	39	[62]
DMG	33.950	118.632	8/31/1930	04036	0.0	5.20	0.010	III	55	[89]
MGI	34.000	118.400	10/ 1/1930	040	0.0	4.60	0.008	III	47	[75]
DMG	33.850	118.267	3/11/1933	629	0.0	4.40	0.006	II	55	[89]
DMG	33.850	118.267	3/11/1933	1425	0.0	5.00	0.009	III	55	[89]
DMG	33.883	118.217	3/11/1933	1457	0.0	4.90	0.009	III	54	[86]
DMG	33.783	118.133	10/ 2/1933	91017	6.6	0.0	5.40	0.011	III	60	[96]
DMG	34.100	117.633	1/ 9/1934	1410	0.0	0.0	4.50	0.008	II	46	[74]
DMG	34.200	117.900	7/13/1935	105416	5.5	0.0	4.70	0.013	III	34	[54]
DMG	34.127	117.338	2/23/1936	222042	7.7	10.0	4.50	0.006	II	58	[94]
DMG	34.211	117.530	9/ 1/1937	1348	8.2	10.0	4.50	0.005	II	46	[74]
DMG	34.183	117.548	9/ 1/1937	163533	5.5	10.0	4.50	0.008	II	47	[75]
DMG	34.911	118.973	2/23/1939	84551	7.7	10.0	4.50	0.007	II	50	[81]
DMG	34.885	119.002	2/23/1939	91846	7.7	10.0	4.50	0.007	II	51	[82]
DMG	34.903	119.038	5/ 8/1939	246	5.3	10.0	4.50	0.007	II	54	[86]
DMG	33.783	118.200	12/27/1939	192845	0.0	0.0	4.70	0.007	II	60	[96]
DMG	34.867	118.933	9/21/1941	1953	7.2	0.0	5.20	0.012	III	47	[76]
DMG	33.817	118.217	10/22/1941	65718	5.5	0.0	4.90	0.005	III	57	[92]
DMG	33.783	118.250	11/14/1941	84136	3.3	0.0	5.40	0.011	III	60	[96]
DMG	34.483	118.993	9/ 3/1942	14 6	1.0	0.0	4.50	0.007	II	49	[79]
DMG	34.483	118.983	9/ 4/1942	63433	0.0	0.0	4.50	0.007	II	49	[79]
DMG	33.867	118.217	6/19/1944	0 333	0.0	0.0	4.50	0.006	II	54	[87]
DMG	33.867	118.217	6/19/1944	3 6 7	0.0	0.0	4.40	0.006	II	54	[87]
DMG	35.353	117.826	7/ 3/1944	53823	5.5	-2.0	4.70	0.008	II	52	[84]
DMG	34.167	117.533	3/ 1/1948	61213	0.0	0.0	4.70	0.008	III	48	[77]
DMG	34.617	119.083	2/26/1950	0 622	0.0	0.0	4.70	0.009	II	53	[86]
DMG	35.000	119.017	7/21/1952	115214	0.0	0.0	7.70	0.055	VI	55	[89]

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FIGURE 5

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (GMT)	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi	[km]
DMG	35.000	119.033	7/21/1952	1154 0.0	0.0	4.50	0.006	II	56	[90]
DMG	35.000	119.033	7/21/1952	1155 0.0	0.0	4.50	0.006	II	56	[90]
DMG	35.000	119.033	7/21/1952	1157 0.0	0.0	4.50	0.006	II	56	[90]
DMG	35.000	119.033	7/21/1952	1158 0.0	0.0	4.60	0.007	II	56	[90]
DMG	35.000	119.033	7/21/1952	1159 0.0	0.0	4.50	0.006	II	56	[90]
DMG	35.000	119.033	7/21/1952	12 2 0.0	0.0	5.60	0.013	III	56	[90]
DMG	35.000	119.000	7/21/1952	12 531.0	0.0	6.40	0.024	IV	54	[87]
DMG	35.000	119.000	7/21/1952	12 6 0.0	0.0	4.80	0.009	III	54	[87]
DMG	35.000	119.000	7/21/1952	12 7 0.0	0.0	4.70	0.007	II	54	[87]
DMG	35.000	119.000	7/21/1952	1210 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.000	119.000	7/21/1952	1212 0.0	0.0	4.60	0.007	II	54	[87]
DMG	35.000	119.000	7/21/1952	1216 0.0	0.0	4.40	0.006	II	54	[87]
DMG	34.950	118.667	7/21/1952	121936.0	0.0	5.30	0.014	III	46	[74]
DMG	35.000	119.000	7/21/1952	1222 0.0	0.0	4.90	0.008	III	54	[87]
DMG	35.000	119.000	7/21/1952	1225 0.0	0.0	4.70	0.007	II	54	[87]
DMG	35.000	119.000	7/21/1952	1240 0.0	0.0	4.90	0.008	III	54	[87]
DMG	35.000	119.000	7/21/1952	13 8 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.000	119.000	7/21/1952	1313 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.000	119.000	7/21/1952	132512.0	0.0	4.50	0.006	II	54	[87]
DMG	35.000	119.000	7/21/1952	1359 0.0	0.0	4.60	0.007	II	54	[87]
DMG	35.000	119.000	7/21/1952	1415 0.0	0.0	4.40	0.006	II	54	[87]
DMG	35.183	118.650	7/21/1952	151356.0	0.0	5.10	0.012	III	47	[75]
DMG	35.000	119.000	7/21/1952	1553 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.000	119.000	7/21/1952	1638 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.233	118.533	7/21/1952	174244.0	0.0	5.10	0.012	III	46	[74]
DMG	35.000	119.000	7/21/1952	18 0 0.0	0.0	4.50	0.006	II	54	[87]
DMG	35.300	118.533	7/21/1952	182338.0	0.0	4.50	0.007	II	50	[81]
DMG	35.133	118.767	7/21/1952	194122.0	0.0	5.50	0.015	IV	49	[78]
DMG	34.983	119.033	7/21/1952	235328.0	0.0	4.50	0.006	II	55	[89]
DMG	35.133	118.517	7/22/1952	141 2.0	0.0	4.50	0.009	III	40	[64]
DMG	35.283	118.550	7/22/1952	15151.0	0.0	4.40	0.007	II	50	[80]
DMG	35.200	118.633	7/22/1952	321 5.0	0.0	4.40	0.007	II	47	[76]
DMG	35.083	118.583	7/22/1952	91624.0	0.0	4.40	0.009	III	39	[63]
DMG	35.083	118.750	7/22/1952	94734.0	0.0	4.70	0.009	III	46	[73]
DMG	35.233	118.600	7/22/1952	91025.0	0.0	4.50	0.007	II	48	[77]
DMG	35.000	119.000	7/22/1952	133143.0	0.0	4.80	0.008	III	54	[87]
DMG	35.033	118.933	7/22/1952	223133.0	0.0	4.70	0.008	II	52	[84]
DMG	35.367	118.583	7/23/1952	03832.0	0.0	6.10	0.019	IV	56	[89]
DMG	35.000	119.000	7/23/1952	043 8.0	0.0	4.40	0.006	II	54	[87]
DMG	35.367	118.583	7/23/1952	04738.0	0.0	4.60	0.007	II	56	[89]
DMG	35.367	118.583	7/23/1952	31923.0	0.0	5.00	0.009	III	56	[89]
DMG	35.283	118.550	7/23/1952	34928.0	0.0	4.70	0.008	III	50	[80]
DMG	35.367	118.583	7/23/1952	4 140.0	0.0	4.70	0.007	II	56	[89]
DMG	35.383	118.567	7/23/1952	546 3.0	0.0	4.70	0.007	II	56	[90]
DMG	35.283	118.550	7/23/1952	737 0.0	0.0	4.80	0.009	III	50	[80]
DMG	35.000	118.833	7/23/1952	75319.0	0.0	5.40	0.014	IV	46	[74]
DMG	35.217	118.817	7/23/1952	1317 5.0	0.0	5.70	0.015	IV	55	[89]
DMG	35.250	118.483	7/23/1952	1330 4.0	0.0	4.40	0.007	II	46	[74]
DMG	35.333	118.600	7/23/1952	161836.0	0.0	4.50	0.006	II	54	[87]
DMG	35.333	118.600	7/23/1952	164853.0	0.0	4.50	0.006	II	54	[87]
DMG	35.235	118.474	7/23/1952	172224.0	6.6	4.50	0.007	II	51	[82]
DMG	35.000	118.833	7/23/1952	181351.0	0.0	5.20	0.013	III	46	[74]
DMG	35.340	118.473	7/24/1952	5 249.6	2.1	4.50	0.007	II	51	[83]
DMG	35.400	118.583	7/24/1952	114756.0	0.0	4.40	0.006	II	58	[93]
DMG	35.311	118.499	7/25/1952	1313 8.2	2.8	5.00	0.010	III	50	[81]
DMG	35.133	118.767	7/25/1952	143442.0	0.0	4.40	0.007	II	49	[78]
DMG	35.317	118.494	7/25/1952	19 944.6	5.5	5.70	0.016	IV	50	[81]
DMG	35.315	118.516	7/25/1952	194323.7	11.2	5.70	0.016	IV	51	[82]

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FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (GMT)	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi	[km]
DMG	35.299	118.435	7/25/1952	20 6 6.1	-1.4	4.80	0.009	III	48	[77]
DMG	35.083	118.750	7/26/1952	15 831.0	0.0	4.40	0.007	II	46	[73]
DMG	35.183	118.600	7/26/1952	2241 3.0	0.0	4.60	0.009	III	45	[73]
DMG	35.163	118.600	7/29/1952	154950.0	0.0	4.90	0.011	III	45	[73]
DMG	35.233	118.533	7/29/1952	173643.0	0.0	4.40	0.007	II	46	[74]
DMG	35.333	118.600	7/31/1952	12 9 9.0	0.0	5.80	0.016	IV	54	[87]
DMG	35.283	119.583	7/31/1952	1719 8.0	0.0	4.50	0.007	II	50	[81]
DMG	35.283	118.550	8/ 1/1952	31611.6	0.0	4.50	0.007	II	50	[80]
DMG	34.900	118.950	8/ 1/1952	13 430.0	0.0	5.10	0.011	III	49	[79]
DMG	35.333	118.733	8/ 5/1952	65010.0	0.0	4.40	0.006	II	58	[93]
DMG	35.033	119.050	8/ 7/1952	163151.0	0.0	4.90	0.008	II	58	[93]
DMG	35.289	118.411	8/10/1952	122318.0	4.0	4.60	0.008	III	47	[75]
DMG	35.351	118.527	8/11/1952	132149.2	-2.0	4.40	0.006	II	53	[86]
DMG	35.294	118.401	8/13/1952	42940.6	14.5	4.60	0.008	III	47	[76]
DMG	35.150	118.683	8/13/1952	173925.0	0.0	4.70	0.009	III	46	[74]
DMG	35.033	119.050	8/18/1952	44010.0	0.0	4.70	0.007	II	58	[93]
DMG	34.519	118.198	8/23/1952	10 9 7.1	13.1	5.00	0.037	V	9	[15]
DMG	35.100	118.967	8/25/1952	62026.0	0.0	4.70	0.007	II	56	[90]
DMG	35.063	118.423	8/26/1952	205440.6	-0.8	4.40	0.011	III	33	[53]
DMG	35.314	118.482	8/30/1952	45559.8	5.5	4.70	0.008	III	50	[80]
DMG	35.133	118.700	9/ 2/1952	124132.0	0.0	4.60	0.008	III	46	[74]
DMG	34.967	119.000	9/ 2/1952	204556.0	0.0	4.70	0.008	II	53	[86]
DMG	35.303	118.481	9/ 4/1952	18 649.1	5.8	4.40	0.007	II	49	[79]
DMG	35.000	119.050	9/12/1952	103525.0	0.0	4.50	0.006	II	57	[91]
DMG	35.316	118.467	9/15/1952	44013.2	4.2	4.90	0.009	III	50	[81]
DMG	35.000	119.083	11/ 7/1952	85535.0	0.0	4.60	0.006	II	58	[94]
DMG	35.000	118.833	12/ 1/1952	52610.0	0.0	4.40	0.007	II	46	[74]
DMG	35.300	118.500	2/19/1953	812 6.0	0.0	4.40	0.007	II	49	[79]
DMG	35.000	118.733	4/29/1953	124745.0	0.0	4.70	0.010	III	41	[66]
DMG	35.000	119.017	5/25/1953	324 1.0	0.0	4.80	0.008	II	55	[89]
DMG	35.367	118.500	6/20/1953	231852.0	0.0	4.40	0.006	II	54	[86]
DMG	35.033	118.850	10/ 7/1953	145921.0	0.0	4.90	0.010	III	48	[77]
DMG	35.454	118.476	11/23/1953	2039 0.9	5.9	4.40	0.005	II	59	[95]
DMG	35.217	118.817	12/15/1953	124436.0	0.0	4.60	0.007	II	55	[88]
DMG	35.000	119.017	1/12/1954	233349.0	0.0	5.90	0.017	IV	55	[89]
DMG	35.150	118.633	1/27/1954	141948.0	0.0	5.00	0.011	III	44	[71]
DMG	34.933	119.067	2/10/1954	235838.0	0.0	4.50	0.006	II	56	[90]
DMG	35.067	119.067	2/24/1954	223022.0	0.0	4.50	0.006	II	60	[96]
DMG	34.983	118.983	5/23/1954	235243.0	0.0	5.10	0.010	III	53	[85]
DMG	34.500	119.117	11/17/1954	23 351.0	0.0	4.40	0.006	II	56	[90]
DMG	35.321	118.494	2/11/1955	194431.5	14.7	4.50	0.007	II	51	[81]
DMG	35.395	118.620	8/ 8/1955	32150.5	4.1	4.70	0.007	II	58	[94]
DMG	34.583	118.613	2/ 7/1956	31638.6	2.6	4.60	0.015	IV	27	[43]
DMG	34.941	118.997	11/15/1961	53855.5	10.7	5.00	0.010	III	52	[83]
DMG	34.932	118.976	3/ 1/1963	02557.9	13.9	5.00	0.010	III	51	[82]
DMG	34.140	117.515	1/ 1/1965	8 416.0	5.5	4.40	0.007	II	50	[81]
DMG	34.132	117.426	4/15/1965	20 833.3	5.5	4.50	0.006	II	54	[87]
DMG	35.106	117.346	10/11/1966	165912.9	6.5	4.40	0.006	II	55	[89]
DMG	34.304	117.570	5/ 5/1969	16 2 9.6	8.8	4.40	0.008	III	40	[65]
DMG	34.270	117.540	9/12/1970	143053.0	8.0	5.40	0.016	IV	43	[70]
DMG	34.281	117.552	9/13/1970	44748.6	8.0	4.40	0.008	III	42	[68]
DMG	34.411	118.401	2/ 9/1971	14 041.8	8.4	6.40	0.063	VI	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 1 8.0	8.0	5.80	0.043	VI	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 150.0	8.0	4.50	0.018	IV	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 231.0	8.0	4.70	0.021	IV	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 244.0	8.0	5.80	0.043	VI	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 325.0	8.0	4.40	0.017	IV	22	[35]
DMG	34.411	118.401	2/ 9/1971	14 745.0	8.0	4.50	0.018	IV	22	[35]

GeoSoils, Inc.

EQSEARCH
Tract 44769
The Lusk Company

DATE 8/90 W.O. NO. 3473-VN

Geotechnical Engineering • Engineering Geology

FIGURE 7

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (GMT)	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.411	118.401	2/ 9/1971	14 838.0	8.0	4.50	0.018	IV	22 [35]
DMG	34.411	118.401	2/ 9/1971	14 853.0	8.0	4.60	0.019	IV	22 [35]
DMG	34.361	118.306	2/ 9/1971	141021.5	5.0	4.70	0.021	IV	22 [35]
DMG	34.411	118.401	2/ 9/1971	141028.0	8.0	5.30	0.031	V	22 [35]
DMG	34.344	118.636	2/ 9/1971	143436.1	-2.0	4.90	0.014	IV	35 [56]
DMG	34.308	118.454	2/ 9/1971	144346.7	6.2	5.20	0.021	IV	29 [47]
DMG	34.335	118.331	2/ 9/1971	155820.7	14.2	4.80	0.020	IV	24 [38]
DMG	34.426	118.414	2/10/1971	518 7.2	5.8	4.50	0.018	IV	21 [35]
DMG	34.397	118.439	2/21/1971	55052.6	6.9	4.70	0.019	IV	24 [38]
DMG	34.392	118.427	2/21/1971	71511.7	7.2	4.50	0.016	IV	24 [38]
DMG	34.353	118.456	3/ 7/1971	13340.5	3.3	4.50	0.014	IV	27 [43]
DMG	34.286	118.515	3/31/1971	145222.5	2.1	4.60	0.012	III	33 [52]
DMG	34.784	118.902	7/27/1972	03117.4	8.0	4.40	0.008	II	44 [71]
DMG	34.399	118.473	3/ 9/1974	05431.9	24.4	4.70	0.018	IV	25 [41]
PAS	35.000	119.103	5/13/1975	02135.6	19.1	4.50	0.006	II	59 [96]
PAS	34.347	118.656	4/ 8/1976	152138.1	14.5	4.60	0.011	III	36 [57]
PAS	34.380	118.459	8/12/1977	21926.1	9.5	4.50	0.015	IV	26 [41]
PAS	33.944	118.681	1/ 1/1979	231436.9	11.3	5.00	0.009	III	57 [92]
PAS	34.061	118.079	10/ 1/1987	144220.0	9.5	5.90	0.023	IV	41 [65]
PAS	34.049	118.101	10/ 1/1987	144541.5	13.6	4.70	0.010	III	41 [66]
PAS	34.060	118.100	10/ 1/1987	1449 5.9	11.7	4.70	0.010	III	41 [65]
PAS	34.052	118.090	10/ 1/1987	151231.8	10.8	4.70	0.010	III	41 [66]
PAS	34.073	118.098	10/ 4/1987	105938.2	8.2	5.30	0.016	IV	40 [64]
PAS	34.077	118.047	2/11/1988	152555.7	12.5	4.70	0.011	III	40 [64]
PAS	34.943	118.743	6/10/1988	23 643.0	6.8	5.40	0.017	IV	40 [64]
PAS	34.136	117.709	6/26/1988	15 458.5	7.9	4.60	0.009	III	43 [69]
PAS	34.149	118.135	12/ 3/1988	113826.4	13.3	4.90	0.014	IV	34 [55]
PAS	33.919	118.627	1/19/1989	65328.8	11.9	5.00	0.009	III	57 [92]
BSP	34.030	118.180	6/12/1989	165718.4	16.0	4.40	0.008	III	43 [69]

****

-END OF SEARCH- 203 RECORDS FOUND

COMPUTER TIME REQUIRED FOR EARTHQUAKE SEARCH: 11.9 minutes

MAXIMUM SITE ACCELERATION DURING TIME PERIOD 1890 TO 1990: 0.063g

MAXIMUM SITE INTENSITY (MM) DURING TIME PERIOD 1890 TO 1990: VI

MAXIMUM MAGNITUDE ENCOUNTERED IN SEARCH: 7.70

NEAREST HISTORICAL EARTHQUAKE WAS ABOUT 9 MILES AWAY FROM SITE.

NUMBER OF YEARS REPRESENTED BY SEARCH: 101 years

GeoSoils, Inc.

EQSEARCH
Tract 44769
The Lusk Company

DATE 8/90 W.O. NO. 3473-VN

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RESULTS OF PROBABILITY ANALYSES

TIME PERIOD OF SEARCH: 1890 TO 1990
LENGTH OF SEARCH TIME: 101 years
ATTENUATION RELATION: CAMPBELL (1987) Unconstrained - mean
*** TIME PERIOD OF EXPOSURE FOR PROBABILITY: 25 years

PROBABILITY OF EXCEEDANCE FOR ACCELERATION

ACC. g	NO.OF TIMES EXCED	AVE. OCCUR. #/yr	RECURR. INTERV. years	COMPUTED PROBABILITY OF EXCEEDANCE in 0.5 yr	in 1 yr	in 10 yr	in 50 yr	in 75 yr	in 100 yr	in *** yr
0.01	75	0.743	1.347	0.3102	0.5241	0.9994	1.0000	1.0000	1.0000	1.0000
0.02	15	0.149	6.733	0.0716	0.1380	0.7735	0.9994	1.0000	1.0000	0.9756
0.03	7	0.069	14.429	0.0341	0.0670	0.5000	0.9687	0.9945	0.9990	0.8232
0.04	4	0.040	25.250	0.0196	0.0388	0.3270	0.8620	0.9487	0.9809	0.6295
0.05	2	0.020	50.500	0.0099	0.0196	0.1796	0.6285	0.7735	0.8620	0.3905
0.06	1	0.010	101.000	0.0049	0.0099	0.0943	0.3905	0.5241	0.6285	0.2193

PROBABILITY OF EXCEEDANCE FOR MAGNITUDE

MAG.	NO.OF TIMES EXCED	AVE. OCCUR. #/yr	RECURR. INTERV. years	COMPUTED PROBABILITY OF EXCEEDANCE in 0.5 yr	in 1 yr	in 10 yr	in 50 yr	in 75 yr	in 100 yr	in *** yr
4.50	174	1.723	0.580	0.5774	0.8214	1.0000	1.0000	1.0000	1.0000	1.0000
5.00	52	0.515	1.942	0.2270	0.4024	0.9942	1.0000	1.0000	1.0000	1.0000
5.50	19	0.188	5.316	0.0898	0.1715	0.8476	0.9999	1.0000	1.0000	0.9909
6.00	6	0.059	16.833	0.0293	0.0577	0.4479	0.9487	0.9884	0.9974	0.7735
6.50	2	0.020	50.500	0.0099	0.0196	0.1796	0.6285	0.7735	0.8620	0.3905
7.00	1	0.010	101.000	0.0049	0.0099	0.0943	0.3905	0.5241	0.6285	0.2193
7.50	1	0.010	101.000	0.0049	0.0099	0.0943	0.3905	0.5241	0.6285	0.2193

GUTENBERG & RICHTER RECURRENCE RELATIONSHIP:

a-value= 4.565
b-value= 0.965

beta-value= 2.222

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DATE 8/90 W.O. NO. 3473-VN

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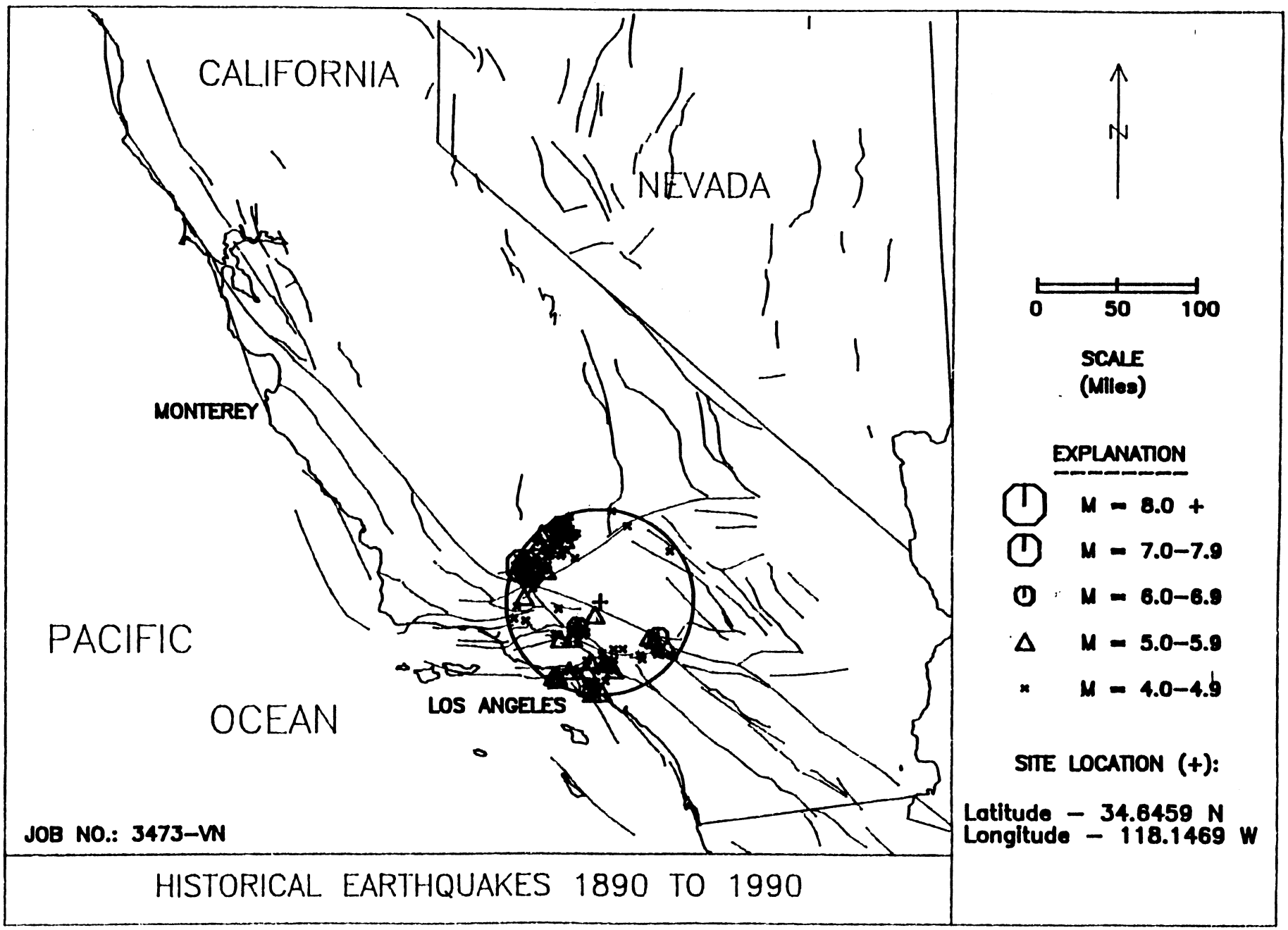
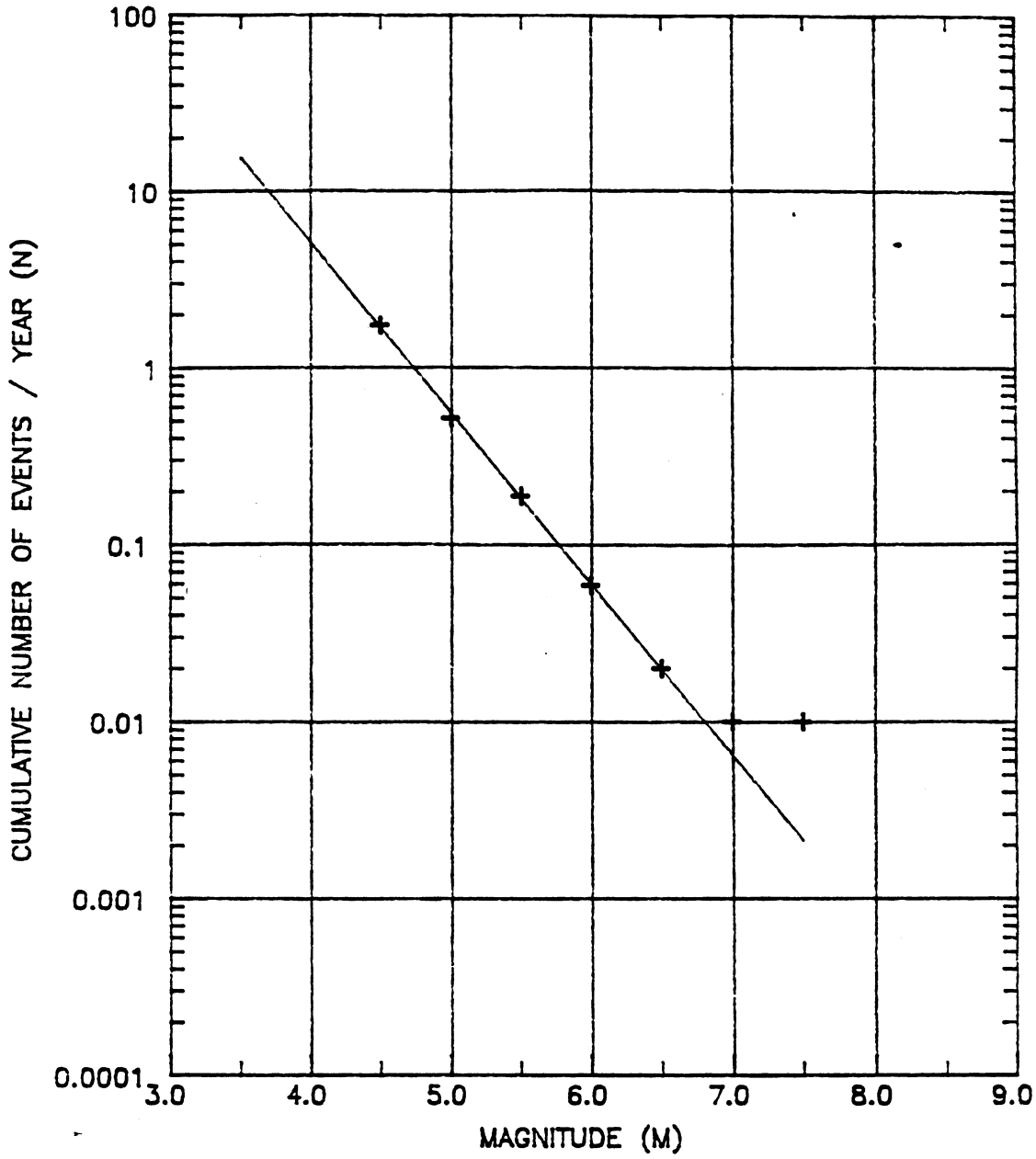
FORM 89/22

FIGURE 9



HISTORICAL EARTHQUAKES 1890 TO 1990

LOG N = 4.565 − 0.965M



SEISMIC RECURRENCE CURVE

HISTORICAL EARTHQUAKES FROM 1890 TO 1990

THE LUSK COMPANY

GeoSoils, Inc.

Geotechnical Engineering • Engineering Geology

6634 Valjean Avenue • Van Nuys, California 91406 • (818) 785-2158 • FAX (818) 785-1548

May 10, 1991
W.O. 3473-VN

The Lusk Company
Tri-Counties Division
15350 Sherman Way, Suite 490
Van Nuys, California 91406

Attention: Mr. Peter Lauener

Subject: Geotechnical Response to Comments by City of Palmdale Planning Department, Antelope Valley Business Park, Tract 44769, Palmdale, California.

Dear Mr. Lauener:

As requested, GeoSoils, Inc., has prepared this response to geotechnical issues raised by the City of Palmdale Planning Department upon their review of the Draft Environmental Impact Report for Antelope Valley Business Park Specific Plan by Regional Environmental Consultants (RECON), dated January 22, 1991. For convenience of reference, the City review letter (dated February 13, 1991) is included in Appendix A.

Item 1:

The report does not summarize the findings of the GeoSoils, Inc., geotechnical investigation report (see B. Hydrology, Page 39), a separate topic. Also paragraph one of Environmental Setting, Page 39, should read "... southern slope of Portal and Ritter ridges."

Response:

Refer to RECON. Agree that paragraph one of Environmental Setting, Page 39, should read "... Portal and Ritter ridges."

We offer the following summary of GeoSoils, Inc., geotechnical investigation of Tract 44769 to be incorporated into the revised Draft EIR by RECON.

GEOTECHNICAL SUMMARY

The site lies to the east of the Amargosa Creek drainage, which flows northeasterly. A portion of the site lies in a known flood hazard Zone (National Flood Insurance Program Flood Insurance Rate Map, zone AO). It is our understanding that the Amargosa Creek will be channelized in the future.

The proposed Antelope Valley Business Park is scheduled at some time after the channelization of the creek. If the

channel is properly engineered, future developments adjacent to its banks should have a sufficiently low potential of flooding.

Regional groundwater data indicate that the groundwater table below the site is over 240 feet deep. Significant subsidence in the future of the site in response to groundwater withdrawal is considered unlikely because, a) the aquifer pressure is relatively low as evidenced by lack of flowing wells, b) boring data indicate that soils underlying the site are generally coarse, and c) there is no known record of groundwater related subsidence in the Palmdale area. In our professional opinion, future subsidence of the project site due to groundwater withdrawal is unlikely and the risk to proposed development is very low.

The site is underlain by deep Quaternary alluvial deposits and minor amounts of surficial fill. On-site soils have a low expansion potential. The upper alluvial soils are somewhat loose, dry, and subject to significant hydroconsolidation potential (i.e., compaction upon addition of water).

The hydroconsolidation potential of the collapsible soils can be reduced to acceptable levels by removal and recompaction, combined with artificial saturation of alluvial bottoms prior to fill placement. This process should be performed in the upper eight feet (measured from existing grade), as determined by laboratory testing and engineering analysis.

The site is located in a seismically active region. There are no known active faults on the site; however, there are faults in close enough proximity to cause moderate to intense ground shaking during the lifetime of the proposed development. The site is located about five miles north of the Mojave segment of the San Andreas Fault Zone, capable of generating a maximum credible earthquake of 8.5 Richter Magnitude, or about X Mercalli Intensity on-site. The maximum probable repeatable horizontal ground acceleration is about 0.383 g.

Potential earthquake related effects on the site, such as lurching, ground rupture, and liquefaction are considered remote. Ground shaking should be no more severe than that of similar developed properties adjacent to the site. Estimated accelerations expected during the lifetime of the proposed

development are relatively high, therefore, we recommend seismically resistant structural design for the project.

There is no evidence that significant mass wasting processes affect the site, other than minor surficial gullying and erosion due to uncontrolled storm runoff. Surface water runoff will require control as part of site development.

In conclusion, the most significant geotechnical constraint for site development is the presence of collapsible alluvium. This condition will be mitigated by mass grading as recommended in GeoSoils, Inc., report dated August 27, 1990.

Item 2:

Refer to Mitigation monitoring, Page 41. The Geotechnical Engineer is not normally the monitor of re-vegetation of projects. A Landscape Architect would be more appropriate for this function. Also, inspection of sediment control measures is probably more a function of Public Works Inspectors, instead of Planning Personnel.

Response:

Agree

Item 3:

Response regarding A.1. is confusing mitigation of settlement and hydroconsolidation potential within surficial soils with local and regional subsidence related to groundwater

withdrawals. Significant deep subsidence in the Palmdale area of the Antelope Valley has not been observed to date, but the potential may exist. The GeoSoils, Inc., report dated August 27, 1991 [sic, should be 1990], indicates that the subsidence risk to the proposed development is very low, but that assessment is based upon very little evidence and research.

Response:

The following summarizes our observations and conclusions concerning possible subsidence due to groundwater withdrawal. Groundwater was not encountered in any of the GeoSoils, Inc., exploratory borings (maximum depth 55 feet). Water was also not encountered in exploratory borings by Buena Engineers. Regional groundwater data indicate that the groundwater table is over 240 feet below the site (Knunkel, 1962).

The site is underlain by the Lancaster Submit aquifer. The recharge area for the aquifer is presumably to the south near the northern perimeter of the San Gabriel Mountains (Duell, 1987). In the 1880's water wells drilled to depths of 200 to 500 feet in certain areas of the Antelope Valley yielded flowing water (i.e., artesian wells) suitable for irrigation (Kunkel, 1962). According to Johnson's hydrologic map (U.S.G.S. Water Supply Paper 278), the site is located south of the flowing well zone, however, it is possible that ground-

water under the site is artesian, but of insufficient hydraulic head to cause surface flow in wells. Experience has shown that areas underlain by artesian aquifers are the most likely areas to experience ground surface subsidence from over pumping.

Mr. John Pernula, Engineering Assistant, Palmdale Water District, indicated that the agency presently pumps from 25 wells, averaging 980 feet in depth (personal communication). He also indicated that the aquifer is in overdraft, but to what extent is unknown at this time because of uncertainties in recharge data and subsurface outflow. However, Mr. Pernula stated that he knows of no subsidence problems due to groundwater overdraft in the Palmdale area at this time. Mr. Bill Edgenton, Geologist for the City of Palmdale, also is not aware at this time (personal communication).

It appears that overdraft in the Antelope Valley, mainly a result of pumping for irrigation northeast of Lancaster has existed at least since the early 1920's (Kunkel, 1962). To date, surface subsidence due to groundwater withdrawal has not been observed in the Palmdale area. Subsidence and ground cracking has, however, been detected in other areas of the Antelope Valley. Mr. Bill McCaffrey, U.S. Geological Survey,

Sacramento, indicated that ground cracks and subsidence at Edwards Air Force Base, approximately 11 miles north of the subject site, have been observed since 1981 (personal communication). Mr. McCaffrey's studies (in press) have concluded that the subsidence and ground cracking are related to groundwater withdrawal of the underlying confined aquifer. His studies suggest that subsidence is most likely to occur as a result of dewatering of fine-grained sediments under artesian pressure and he would not expect such phenomenon to occur in a coarse-grained aquifer under low pressure, such as is that of the Palmdale area.

In summary, significant subsidence of the area underlying the site due to groundwater withdrawal is unlikely because, a) the aquifer pressure is relatively low as evidenced by lack of flowing wells (Johnson, 1911), b) borings indicate that soils underlying the site are generally coarse. Coarser sediments would be expected here as compared to the Edwards Air Force area because the subject site is closer to the sediment source area to the south, c) the aquifer underlying the site has apparently been in overdraft since the 1920's (Kunkel 1962) and there is no known record of groundwater related subsidence and/or cracking in the Palmdale area.

Therefore, it is our opinion that future groundwater withdrawal-related subsidence underlying the subject site is unlikely and the risk to proposed development is very low.

Item 4:

The GeoSoils, Inc., report does not include a test boring location plan and the three maximum density curves erroneously report the optimum moisture determined. The 90 percent, 75 percent, and 85 percent should read 9.0 percent, 7.5 percent, and 8.5 percent, respectively.

Response:

Enclosed herein is a copy of the requested map (see Plate 1). We concur that the optimum moisture contents should have read 9.0 percent, 7.5 percent, and 8.5 percent.

Item 5:

Consolidation Test Plates C-18 through C-25, are misplaced in the report binding, within the Hydrology Report.

Summary

The project is not within an Alquist-Priolo Special Studies Zone and, while the site is in an area subject to significant shaking during a major earthquake on the nearby San Andreas Fault and possible subsidence due to past and future ground water withdrawals, the proposed use is geotechnically feasible with proper engineering and construction.

Response:

Refer to RECON: We recommend that you supply revised report with consolidation plates in proper order. Consolidation plates should be included in the geotechnical report, not in the hydrology report.

We generally concur with the City's summary; however, it should be noted that the future potential for subsidence due to groundwater withdrawal is sufficiently low to require no special engineering and/or mitigation.

We appreciate this opportunity to be of continued service to you. If you should have any questions concerning this report, please do not hesitate to contact us.

Very truly yours,

GEOSOILS, INC.

JOSEPH A. COTA
CEG 1490

JAC/sb:A56:1838

Encl. References
Appendix A, City Review Letter of Draft EIR
Plate 1, Geologic and Boring Location Map

cc: (2) Addressee
(1) RECON
Attention: Mr. Jerry Hittlemen

May 10, 1991
W.O. 3473-VN

REFERENCE

1. GeoSoils, Inc., August 27, 1990, Preliminary Geotechnical Investigation, Antelope Valley Business Park, Tract 44769, Southeast Corner of 10th Street West and Avenue M, Palmdale, California.

May 10, 1991
W.O. 3473-VN

APPENDIX A

City Review Letter of Draft EIR

Dated February 13, 1991

CITY OF PALMDALE
OFFICE OF THE
CITY ENGINEER

M E M O R A N D U M

TO: Robert J. Stanley, Associate Planner

FROM: Bill Edgington, City Engineering Geologist

SUBJECT: Geotechnical Review of Administrative Draft EIR for the Antelope Valley Business Park Specific Plan (Lusk), Dated January 22, 1991

DATE: February 13, 1991

I have reviewed the above referenced and have the following comments:

1. The report does not summarize the findings of the GeoSoils, Inc. geotechnical investigation report (see B. Hydrology, page 39) - a separate topic. Also paragraph one of Environmental Setting, page 39, should read "...southern slope of Portal and Ritter ridges."

2. Refer to Mitigation Monitoring, page 41. The Soils Engineer is not normally the monitor of revegetation of projects. A landscape architect would be more appropriate for this function. Also, inspection of sediment control measures is probably more a function of Public Works Inspectors, instead of Planning personnel.

3. Response regarding A.1. is confusing mitigation of settlement and hydroconsolidation potential within surficial soils with local and regional subsidence related to groundwater withdrawals. Significant deep subsidence in the Palmdale area of the Antelope Valley has not been observed to date, but, the potential may exist. The GeoSoils, Inc. report, dated August 27, 1991, indicates that the subsidence risk to the proposed development is very low, but that assessment is based upon very little evidence and research.

4. The GeoSoils, Inc. report does not include a test boring location plan and the three maximum density curves erroneously report the optimum moisture determined. The 90%, 75% and 85% should read 9.0%, 7.5% and 8.5%, respectively.

5. Consolidation Test Plates C-18 through C-25 are misplaced in the report binding, within the Hydrolog Report.

The project is not within an Alquist-Priolo Special Studies Zone and, while the site is in an area subject to significant shaking during a major earthquake on the nearby San Andreas Fault and possible subsidence due to past and future groundwater withdrawals, the proposed use is geotechnically feasible with proper engineering and construction.

WJE/daw
2462

Plate 1

Available from GeoSoils, Inc. and RECON

APPENDIX D

CUSHMAN AND ASSOCIATES, INC.
43434 SAHUAYO STREET
LANCASTER, CALIFORNIA 93535
PHONE: (805) 945-5979

HYDROLOGY REPORT
for
TRACT NO. 44769
(88-041)

August 1991

Municipality : City of Palmdale

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE P. CUSHMAN
Exp. 3-31-95
No. 29088
CIVIL
STATE OF CALIFORNIA

Lawrence P. Cushman

INTRODUCTION

Tract 44769 is located on the southeast corner of 10th Street West and Avenue M in the City of Palmdale. A hydrologic analysis was conducted for the undeveloped and developed conditions of this project using the Los Angeles County Modified Rational Hydrology Program F0601. A 25 year storm will be used in the calculations. Tract 44769 is approximately 120 acres gross, with the project being developed for industrial and commercial uses. This project is inside a known flood zone and the offsite flow will be mitigated by the Amargosa Flood Control Channel upon completion. Since offsite hydrology has already been established by the City of Palmdale in their flood study for the Amargosa Creek, there is no reason for this study to redevelop the offsite flows.

ONSITE HYDROLOGY

In the undeveloped analysis: The storm runoff from the westerly 66 acres (sub areas 5B through 12C) flows northerly across the site to Avenue M. Then it is conveyed westerly to 10th Street West. The 25-year storm runoff from this area is 16 cfs. (Ref. point 13BC on the undeveloped map). The storm runoff from the easterly 55 acres (sub areas 1A - 4A) flows northerly across the site to Avenue M and continues north along 6th Street West. The 25-year storm runoff from this area is 18 cfs.

Developed analysis: The westerly 62 acres (sub areas 9B - 17B) produces a 25-year storm runoff of 64 cfs. The easterly 59 acres (sub areas 1A - 8A) produces a 25-year storm runoff of 53 cfs.

The developmental increase in 25-year storm runoff for the west side of the project is Q dev - Q undev (64 cfs - 16 cfs = 48 cfs) and for the east side is (53 cfs - 18 cfs) = 35 cfs.

CONCLUSION

As a part of Palmdale's drainage plan, a storm drain will be installed in 10th Street West to mitigate the storm flow on 10th Street West. Prior to the construction of the noted storm drain a detention basin is required to mitigate the onsite storm runoff from the westerly portion of the project site.

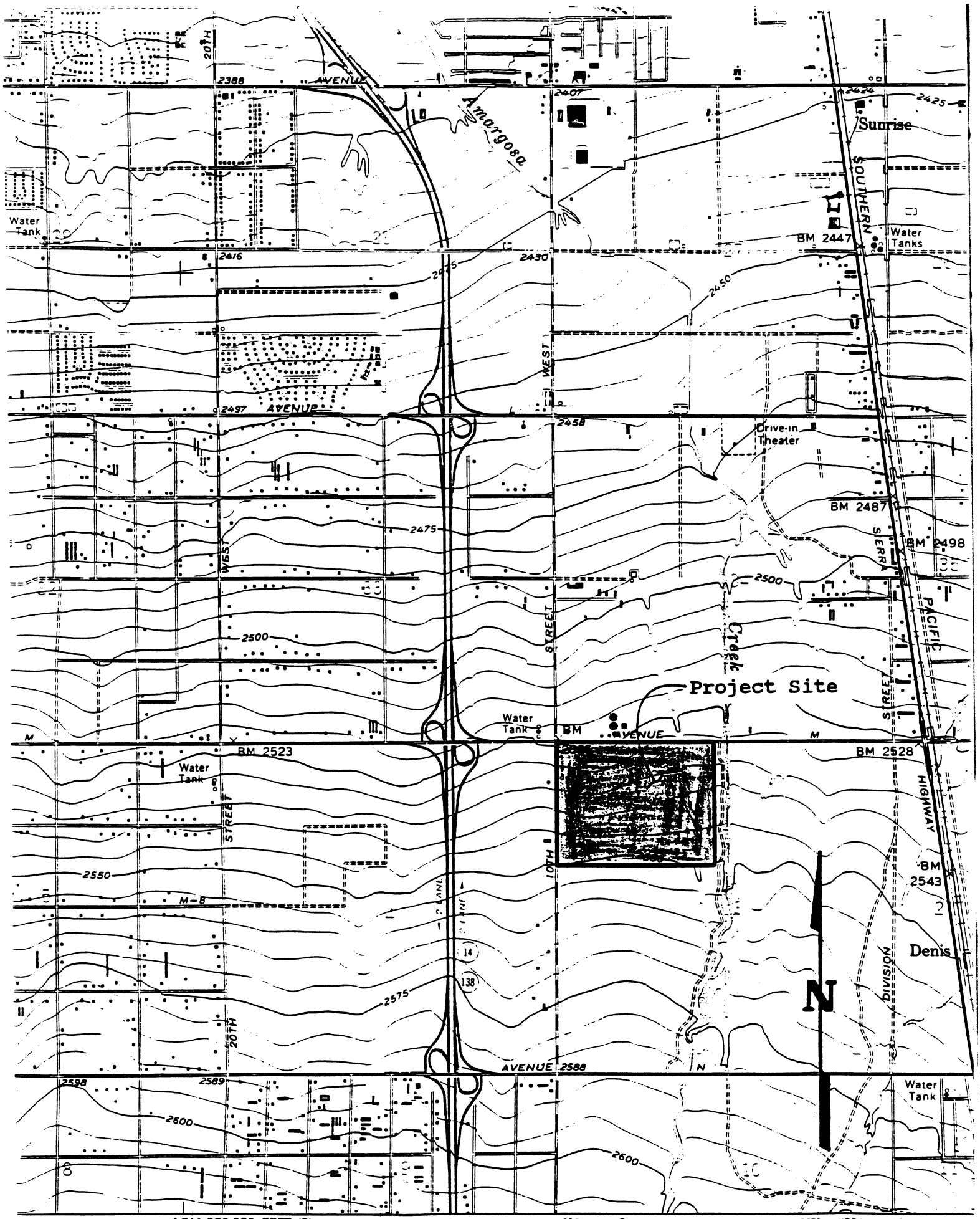
Undeveloped and developed hydrographs were developed and the required storage volume was determined per the City of Palmdale's Engineering Design Standards. The required basin volume is 446,580 c.f. (see section 6). The basin size will be approximately 1 1/2 acres with a depth of 8 feet.

Storm runoff from the easterly side of the site will be directed to the Amargosa Channel via a storm drain system. The developed storm runoff of 53 cfs will be directed to the Amargosa Channel.

It is understood that this project will not be allowed to proceed unless the Amargosa Assessment District is completed and the facilities are constructed. As city policy, it is also understood that this project's participation in the proposed assessment district is considered adequate mitigation measures for the adverse affects created by the increase in runoff as a result of the project development.

Project location ..... Section 1
Undeveloped onsite calculations and TC nomographs ..... Section 2
Developed onsite calculations and TC nomographs ..... Section 3
Undeveloped onsite map ..... Section 4
Developed onsite map ..... Section 5
Supporting information ..... Section 6

SECTION 1



10°1 950 000 FEET (5) 394 395 INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1975 118°0

PALMDALE EXIT 3 MI

396000m E.

1 MILE

ROAD CLASSIFICATION

SECTION 2

MODIFIED RATIONAL METHOD HYDROLOGY

UNDEVELOPED ONSITE TRACT NO. 44769 (88-041) STORM DAY 4

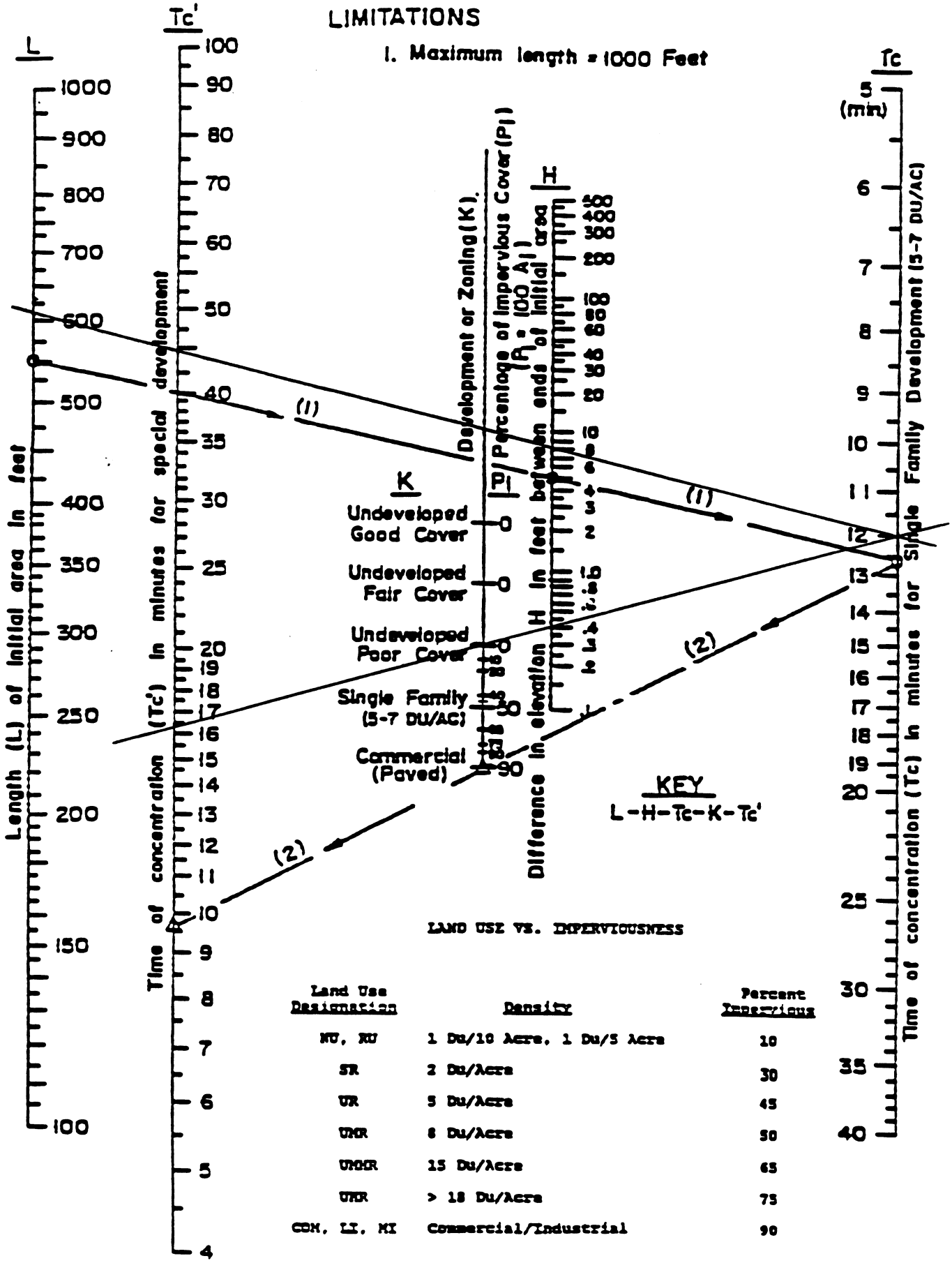
LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
8041	1A	20.	7.	20.	7.	2	600.	.01330	.00	.00	0.	134	17	J25	.10
8041	2A	12.	4.	32.	10.	2	450.	.00890	.00	.00	0.	134	16	J25	.10
8041	3A	12.	8.	44.	16.	2	450.	.00800	.00	.00	0.	120	16	J25	.10
8041	4A	11.	5.	55.	18.	2	450.	.01330	.00	.00	0.	134	14	J25	.10
8041	5B	12.	4.	12.	4.	2	600.	.01500	.00	.00	0.	134	16	J25	.10
8041	6B	9.	4.	21.	7.	2	400.	.01250	.00	.00	0.	134	14	J25	.10
8041	7B	14.	5.	35.	10.	2	550.	.01270	.00	.00	0.	134	16	J25	.10
8041	8B	8.	2.	43.	12.	2	450.	.01330	.00	.00	0.	124	15	J25	.10
8041	9C	4.	1.	4.	1.	2	350.	.01430	.00	.00	0.	124	13	J25	.10
8041	10C	4.	1.	8.	2.	2	390.	.01000	.00	.00	0.	124	15	J25	.10
8041	11C	6.	2.	14.	3.	2	600.	.00830	.00	.00	0.	124	16	J25	.10
8041	12C	9.	2.	23.	5.	2	640.	.01380	.00	.00	0.	124	17	J25	.10
8041	13BC	23.	5.	66.	16.	0	0.	.00000	.00	.00	0.	124	0	J25	.00

MODIFIED RATIONAL METHOD HYDROLOGY

HYDROGRAPH AT 8041 13B

HYDROGRAPH AT 8041 13B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	1.	200	1.	300	1.	400	2.
500	2.	600	2.	700	2.	800	3.	900	3.
1000	3.	1050	3.	1100	3.	1110	4.	1120	4.
1130	5.	1131	5.	1132	5.	1133	5.	1134	5.
1135	5.	1136	5.	1137	5.	1138	5.	1139	6.
1140	6.	1141	6.	1142	6.	1143	6.	1144	6.
1145	6.	1146	6.	1147	6.	1148	7.	1149	7.
1150	7.	1151	7.	1152	7.	1153	8.	1154	8.
1155	9.	1156	9.	1157	10.	1158	11.	1159	12.
1160	12.	1161	13.	1162	14.	1163	15.	1164	15.
1165	16.	1166	16.	1167	16.	1168	16.	1169	16.
1170	16.	1171	15.	1172	15.	1173	14.	1174	13.
1175	13.	1176	12.	1177	11.	1178	11.	1179	10.
1180	10.	1181	9.	1182	9.	1183	8.	1184	8.
1185	8.	1186	7.	1187	7.	1188	7.	1189	6.
1190	6.	1191	6.	1192	5.	1193	5.	1194	5.
1195	5.	1196	5.	1197	5.	1198	4.	1199	4.
1200	4.	1201	4.	1202	4.	1203	4.	1204	4.
1205	4.	1206	4.	1207	4.	1208	4.	1209	4.
1210	4.	1211	4.	1212	3.	1213	3.	1214	3.
1215	3.	1216	3.	1217	3.	1218	3.	1219	3.
1220	3.	1221	3.	1222	3.	1223	3.	1224	3.
1225	3.	1226	3.	1227	3.	1228	3.	1229	3.
1230	3.	1231	3.	1232	3.	1233	3.	1234	3.
1235	3.	1236	3.	1237	3.	1238	3.	1239	3.
1240	3.	1241	3.	1242	3.	1243	3.	1244	3.
1245	3.	1246	3.	1247	3.	1248	3.	1249	3.
1250	3.	1251	3.	1252	3.	1253	3.	1254	3.
1255	3.	1256	3.	1257	3.	1258	3.	1259	3.
1260	3.	1261	3.	1262	3.	1263	3.	1264	3.
1265	3.	1266	3.	1267	3.	1268	3.	1269	3.
1270	3.	1271	3.	1272	3.	1273	3.	1274	3.
1275	3.	1276	3.	1277	3.	1278	3.	1279	3.
1280	3.	1281	3.	1282	3.	1283	3.	1284	3.
1285	2.	1286	2.	1287	2.	1288	2.	1289	2.
1290	2.	1291	2.	1292	2.	1293	2.	1294	2.
1295	2.	1296	2.	1297	2.	1298	2.	1299	2.
1300	2.	1310	2.	1320	2.	1330	2.	1340	2.
1350	2.	1360	2.	1370	2.	1380	2.	1390	1.
1400	1.	1420	1.	1440	1.	1460	1.	1500	1.



LAND USE VS. IMPERVIOUSNESS

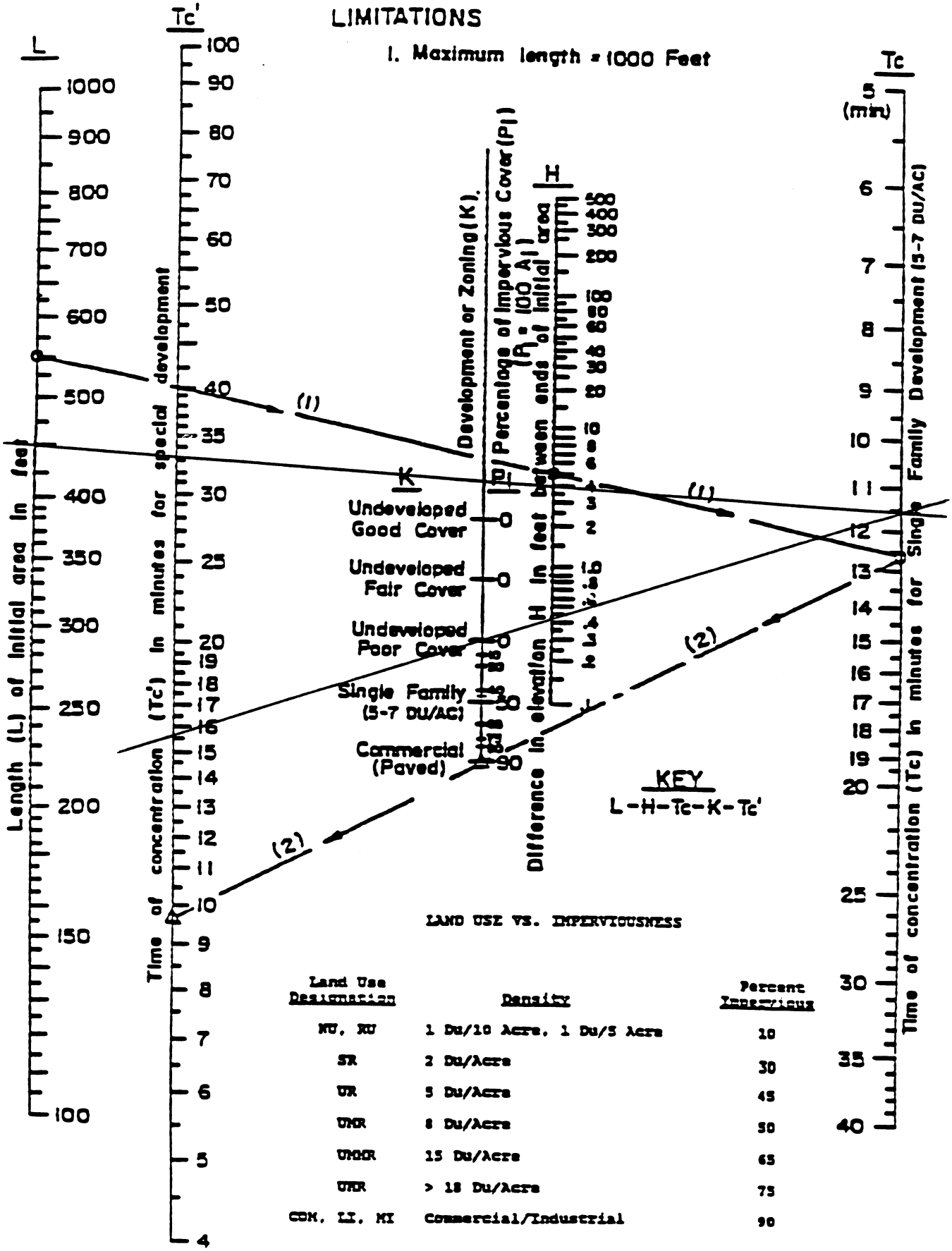
Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA

LIMITATIONS

1. Maximum length = 1000 Feet

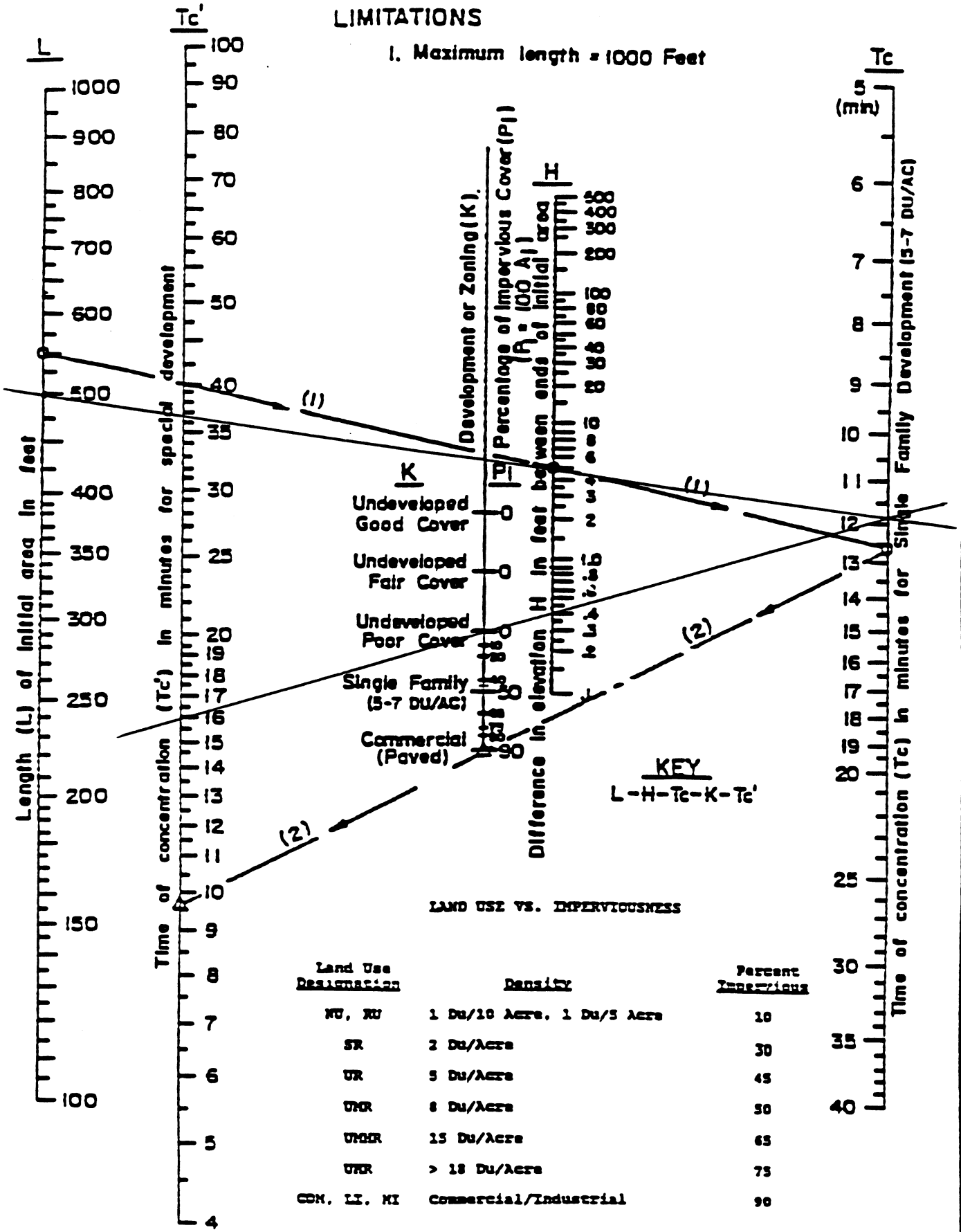


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBARE

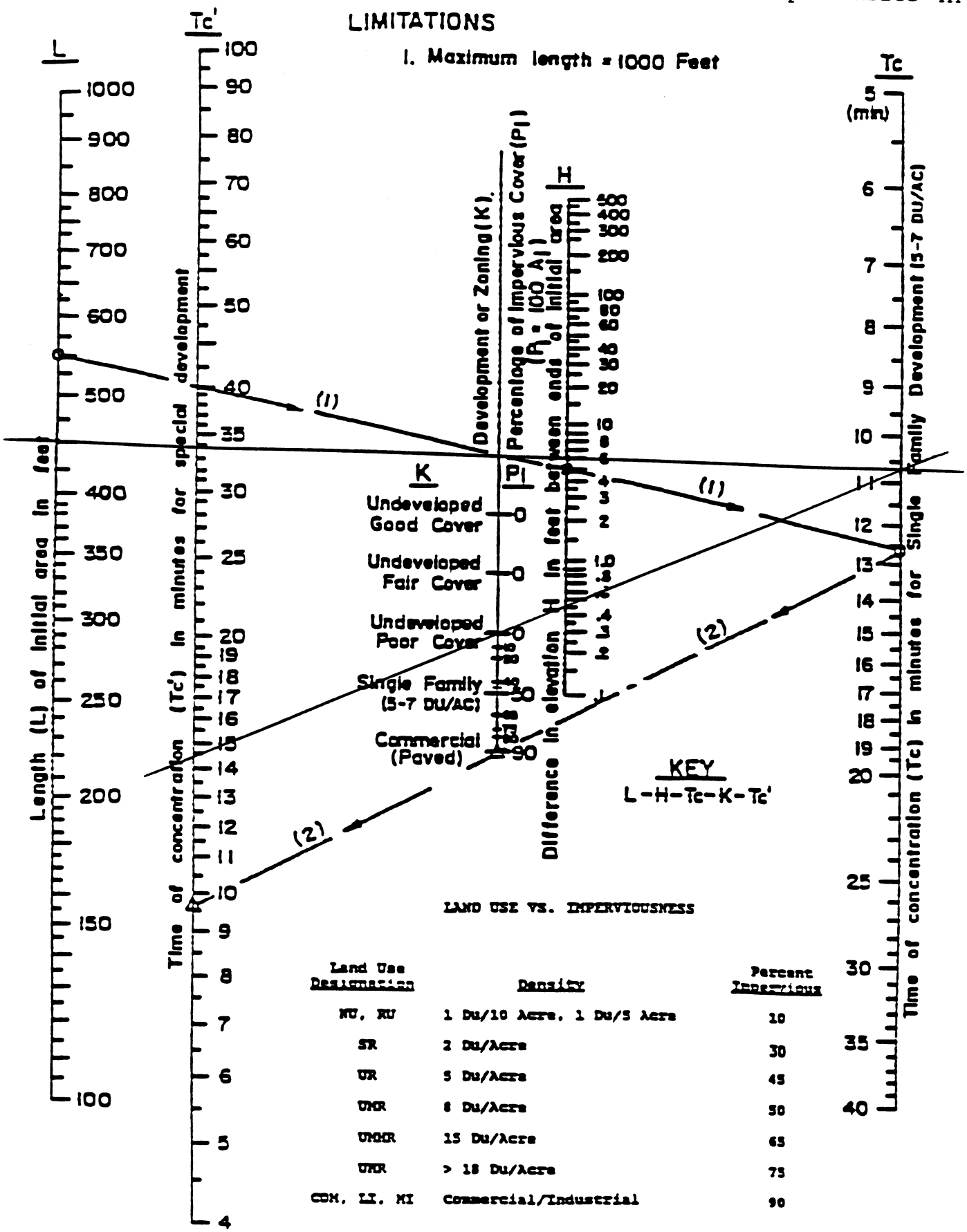


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA



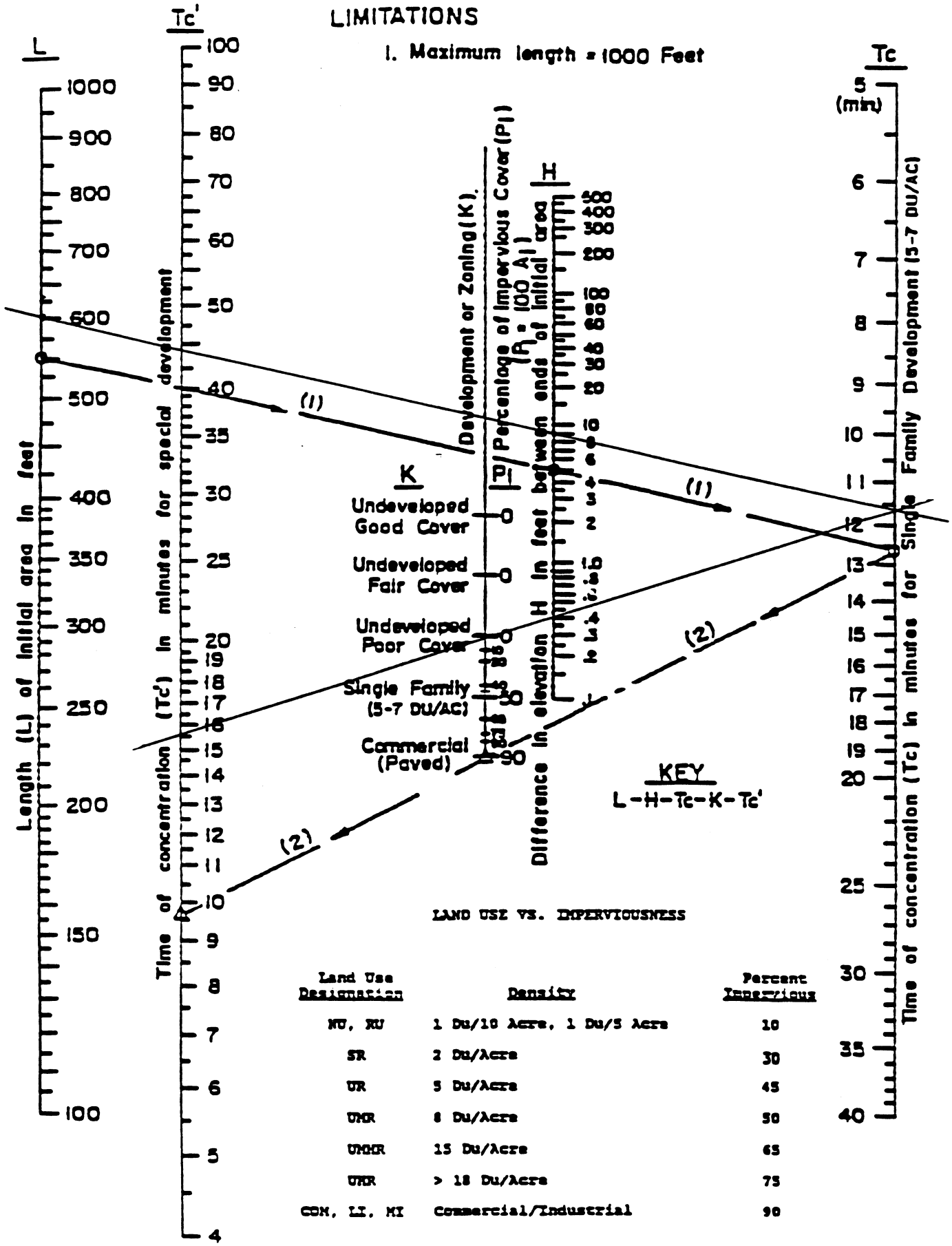
LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

LIMITATIONS

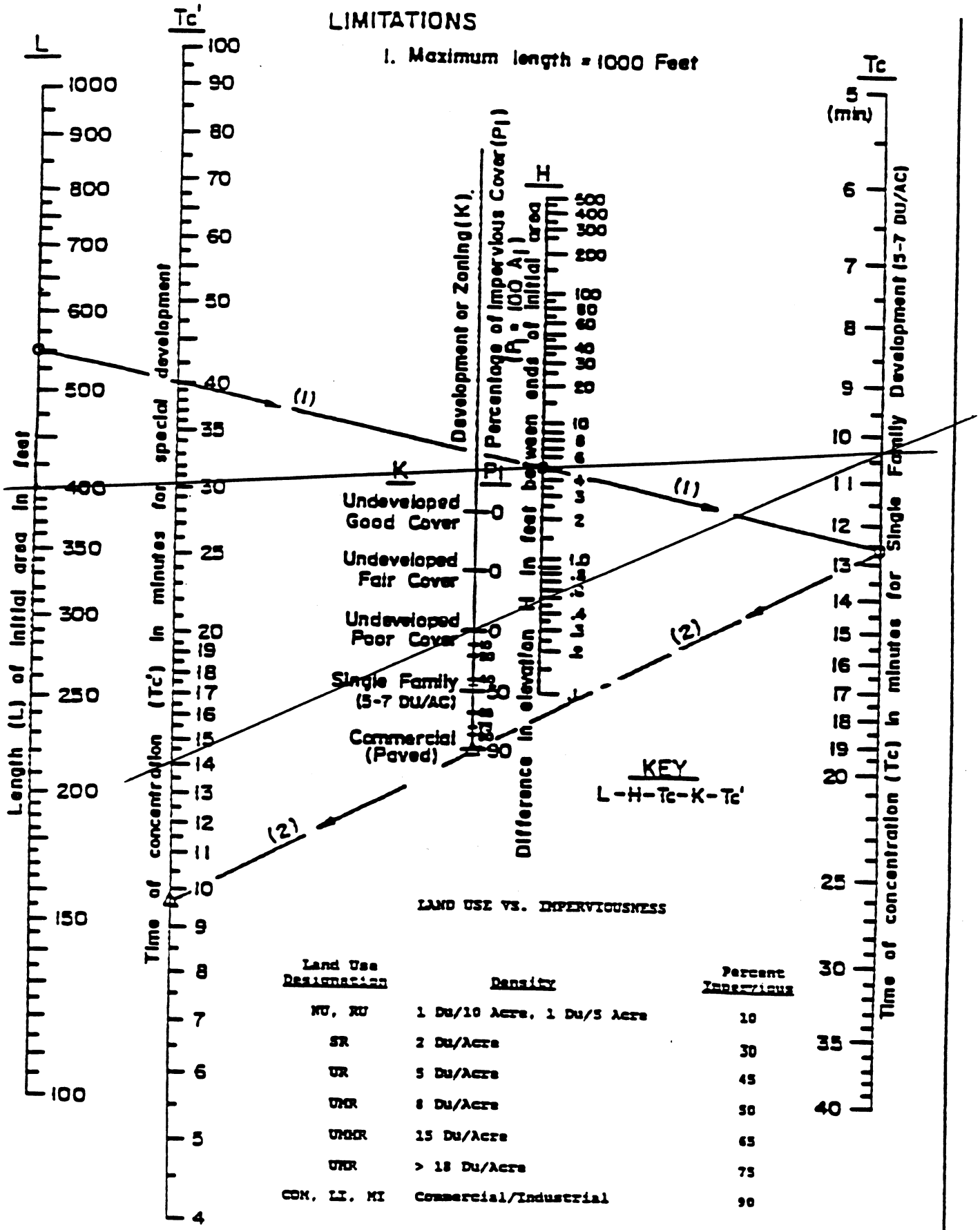
1. Maximum length = 1000 Feet



LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

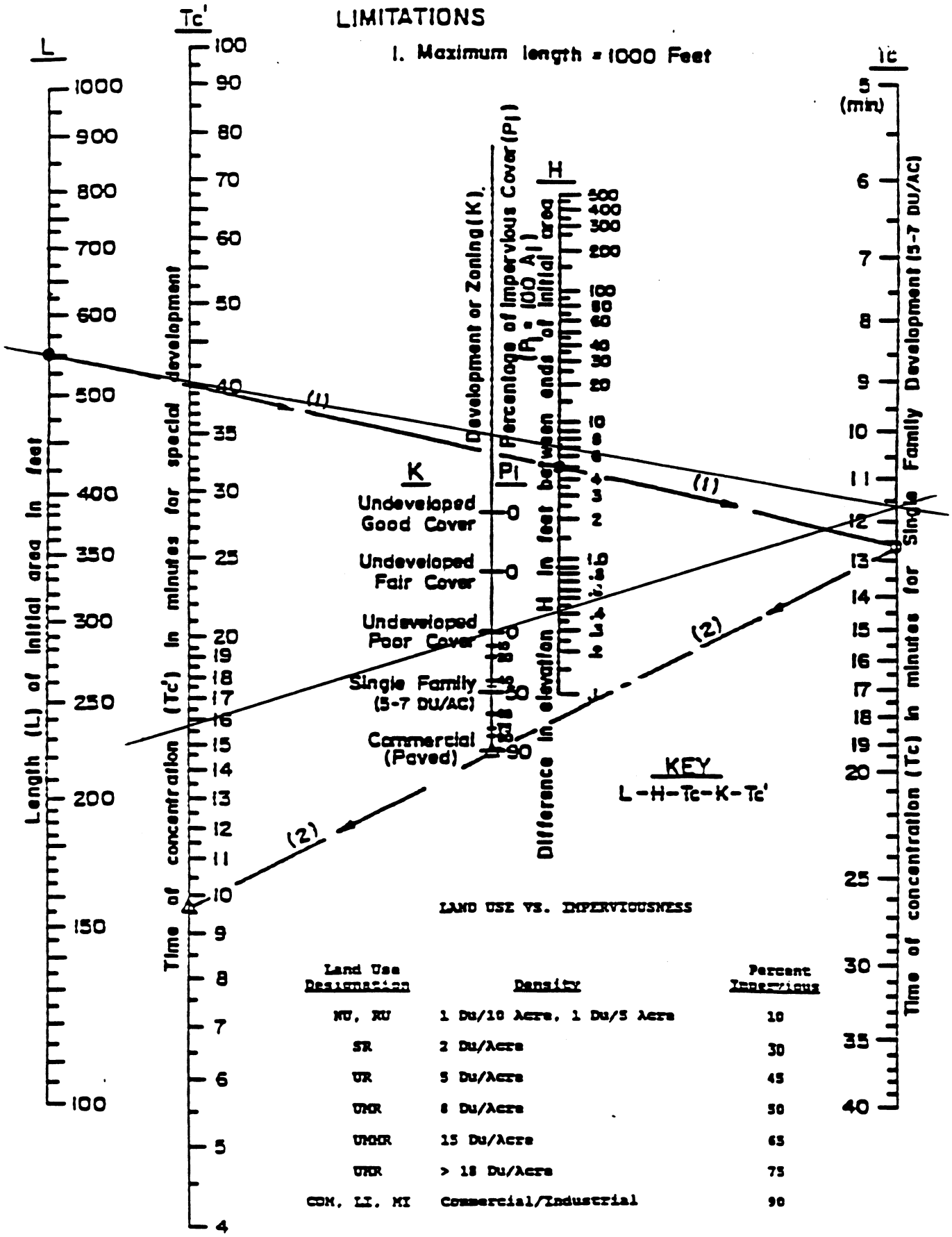


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA

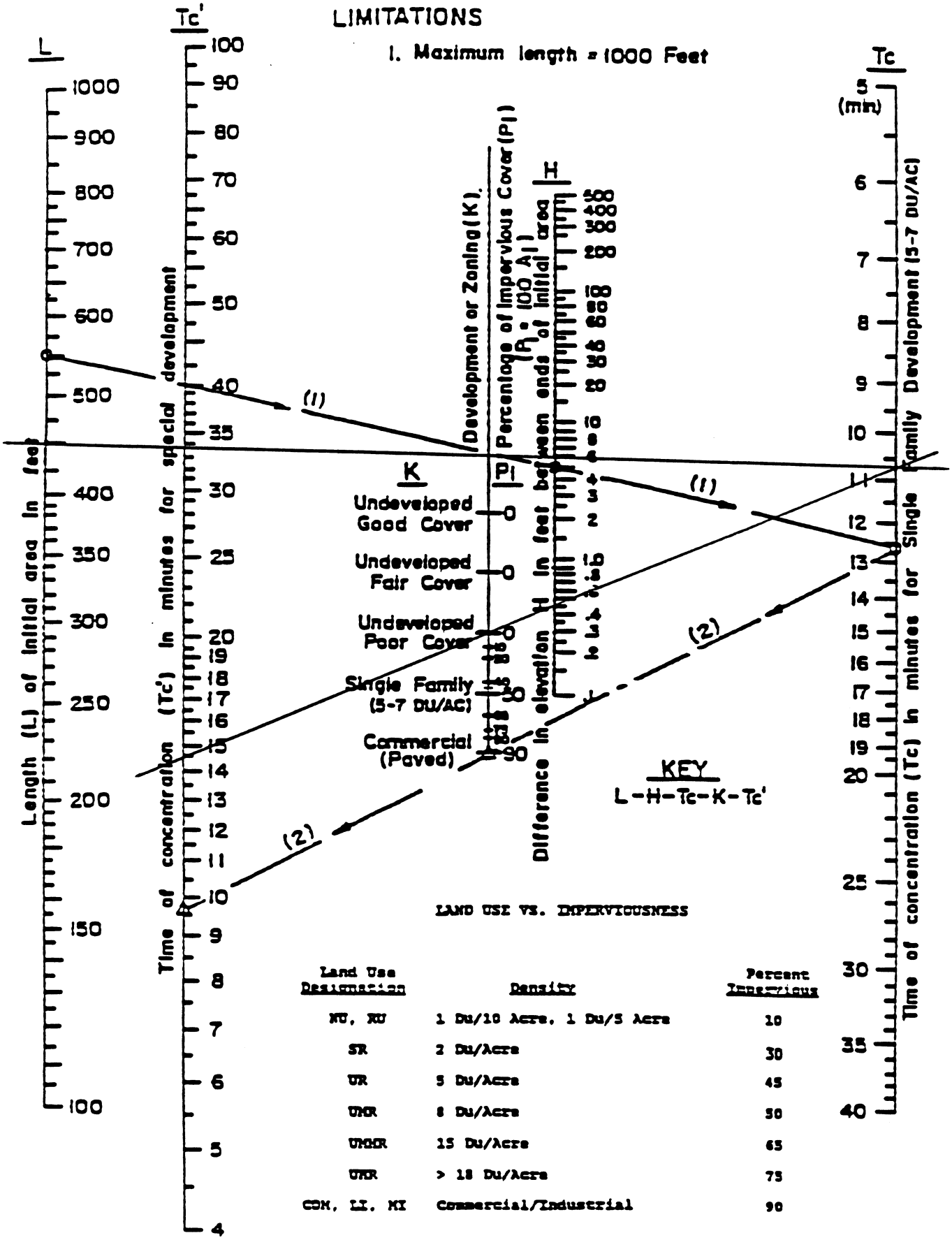


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA

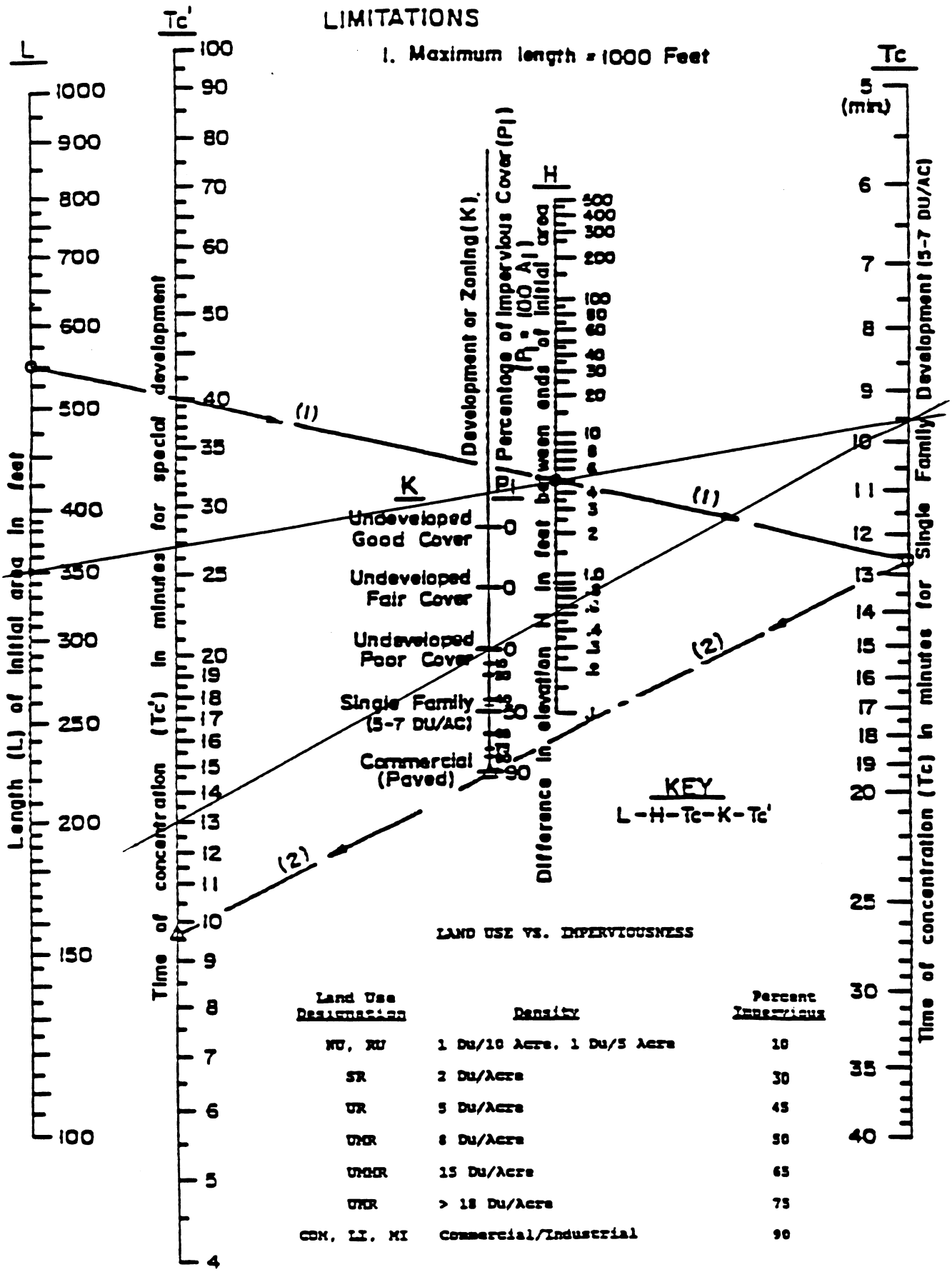


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UHR	8 Du/Acre	50
UHHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, HI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA



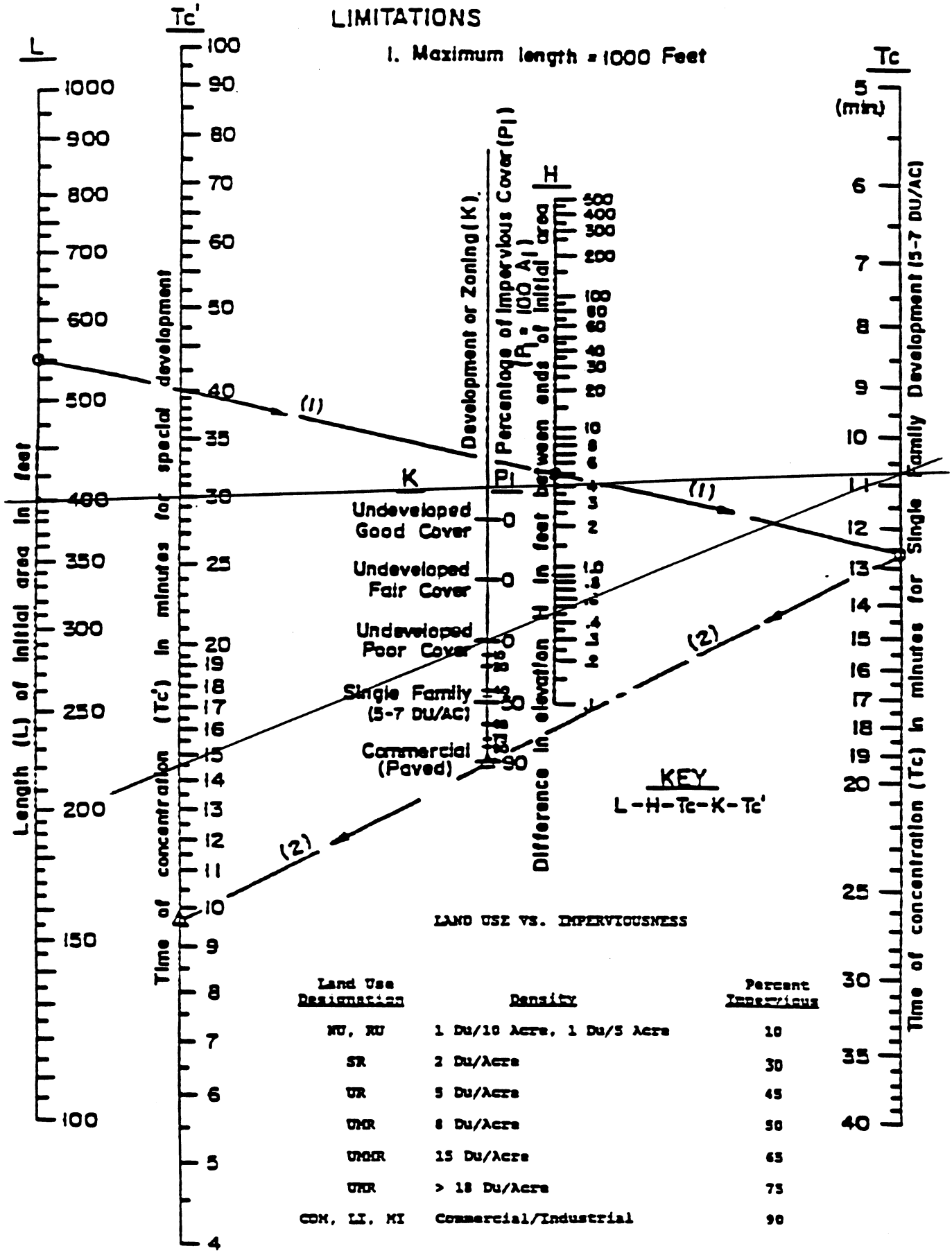
LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

LIMITATIONS

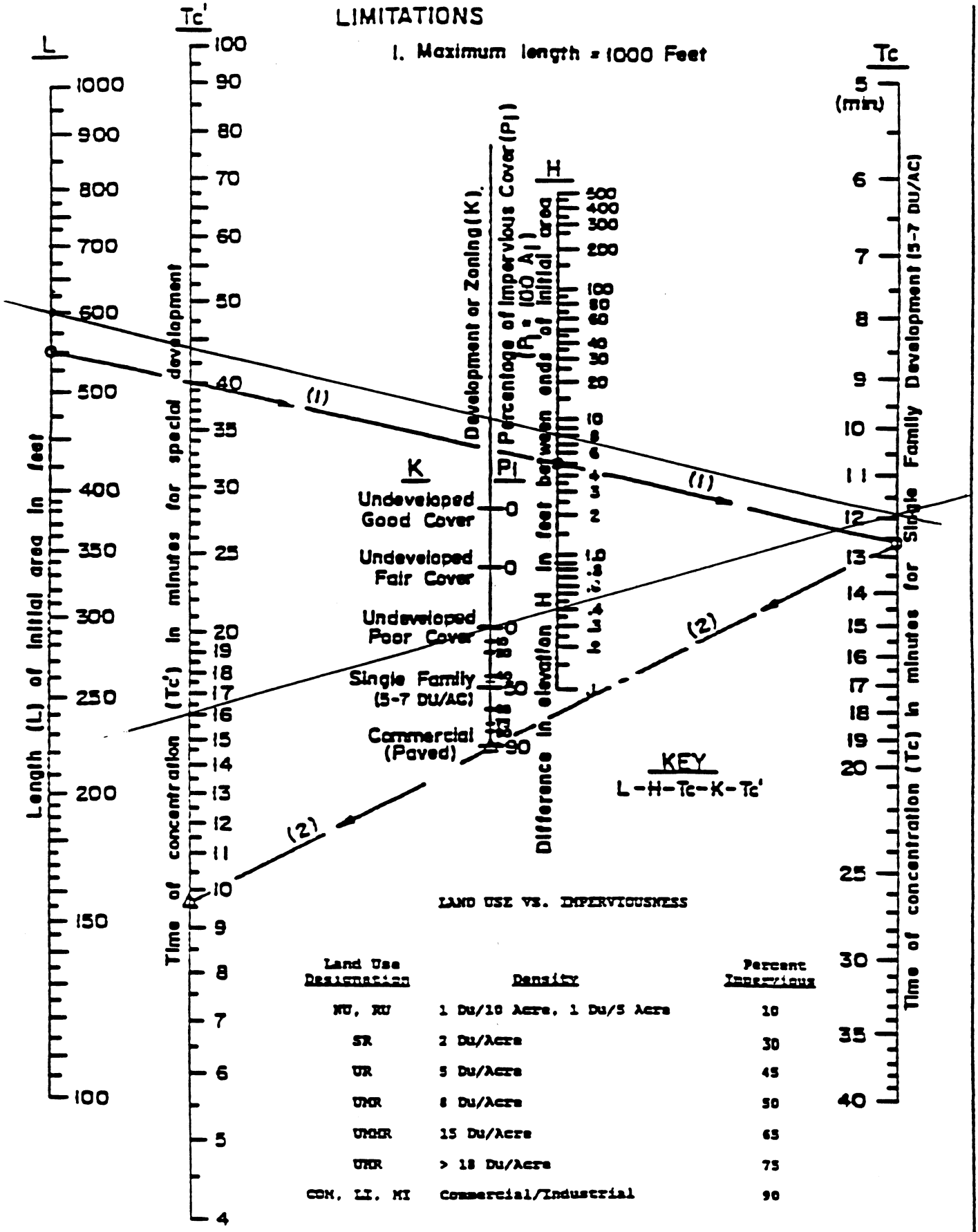
1. Maximum length = 1000 Feet



LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA



LAND USE VS. IMPERVIOUSNESS

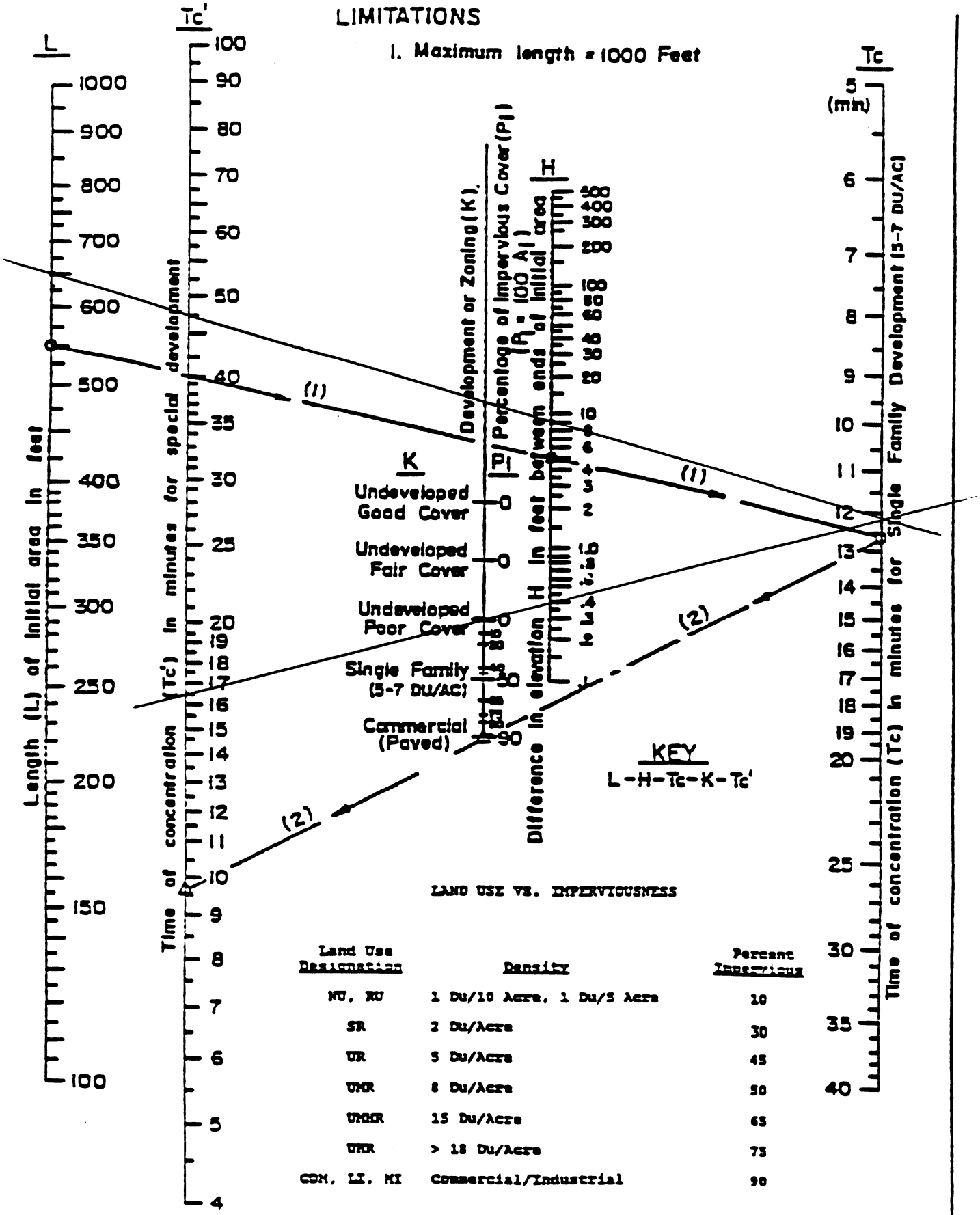
Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SURFACE

LIMITATIONS

1. Maximum length = 1000 Feet



LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UHRR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
CDM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA

SECTION 3

MODIFIED RATIONAL METHOD HYDROLOGY

DEVELOPED ONSITE TRACT NO. 44769 STORM DAY 4

LOCATION		SUBAREA AREA	SUBAREA Q	TOTAL AREA	TOTAL Q	CONV TYPE	CONV LNGTH	CONV SLOPE	CONV SIZE	CONV Z	CONTROL Q	SOIL NAME	TC	RAIN ZONE	PCT IMPV
8041	1A	10.	15.	10.	15.	2	1000.	.01000	.00	.00	0.	120	12	J25	.90
8041	2A	12.	18.	22.	28.	2	900.	.01110	.00	.00	0.	134	11	J25	.90
8041	3A	6.	13.	28.	28.	2	200.	.01250	.00	.00	0.	134	6	J25	.90
8041	4A	6.	10.	34.	38.	2	500.	.01200	.00	.00	0.	134	9	J25	.90
8041	5A	9.	14.	43.	50.	2	730.	.00960	.00	.00	0.	120	11	J25	.90
8041	6A	5.	9.	48.	50.	2	500.	.01400	.00	.00	0.	134	9	J25	.90
8041	7A	4.	7.	52.	51.	2	575.	.01390	.00	.00	0.	134	9	J25	.90
8041	8A	7.	12.	59.	53.	2	675.	.01190	.00	.00	0.	120	10	J25	.90
8041	9B	3.	7.	3.	7.	2	200.	.01500	.00	.00	0.	134	6	J25	.90
8041	10B	8.	14.	11.	20.	2	600.	.01330	.00	.00	0.	134	9	J25	.90
8041	11B	6.	11.	17.	26.	2	500.	.01800	.00	.00	0.	134	8	J25	.90
8041	12B	3.	5.	20.	29.	2	450.	.01110	.00	.00	0.	134	9	J25	.90
8041	13B	5.	9.	25.	32.	2	575.	.01570	.00	.00	0.	134	9	J25	.90
8041	14B	6.	10.	31.	35.	2	750.	.01200	.00	.00	0.	124	10	J25	.90
8041	15B	6.	11.	37.	37.	2	520.	.01540	.00	.00	0.	124	8	J25	.90
8041	16B	9.	15.	46.	45.	2	675.	.01330	.00	.00	0.	134	9	J25	.90
8041	17B	16.	26.	62.	64.	2	675.	.01190	.00	.00	0.	124	10	J25	.90

MODIFIED RATIONAL METHOD HYDROLOGY

HYDROGRAPH AT 8041 17B

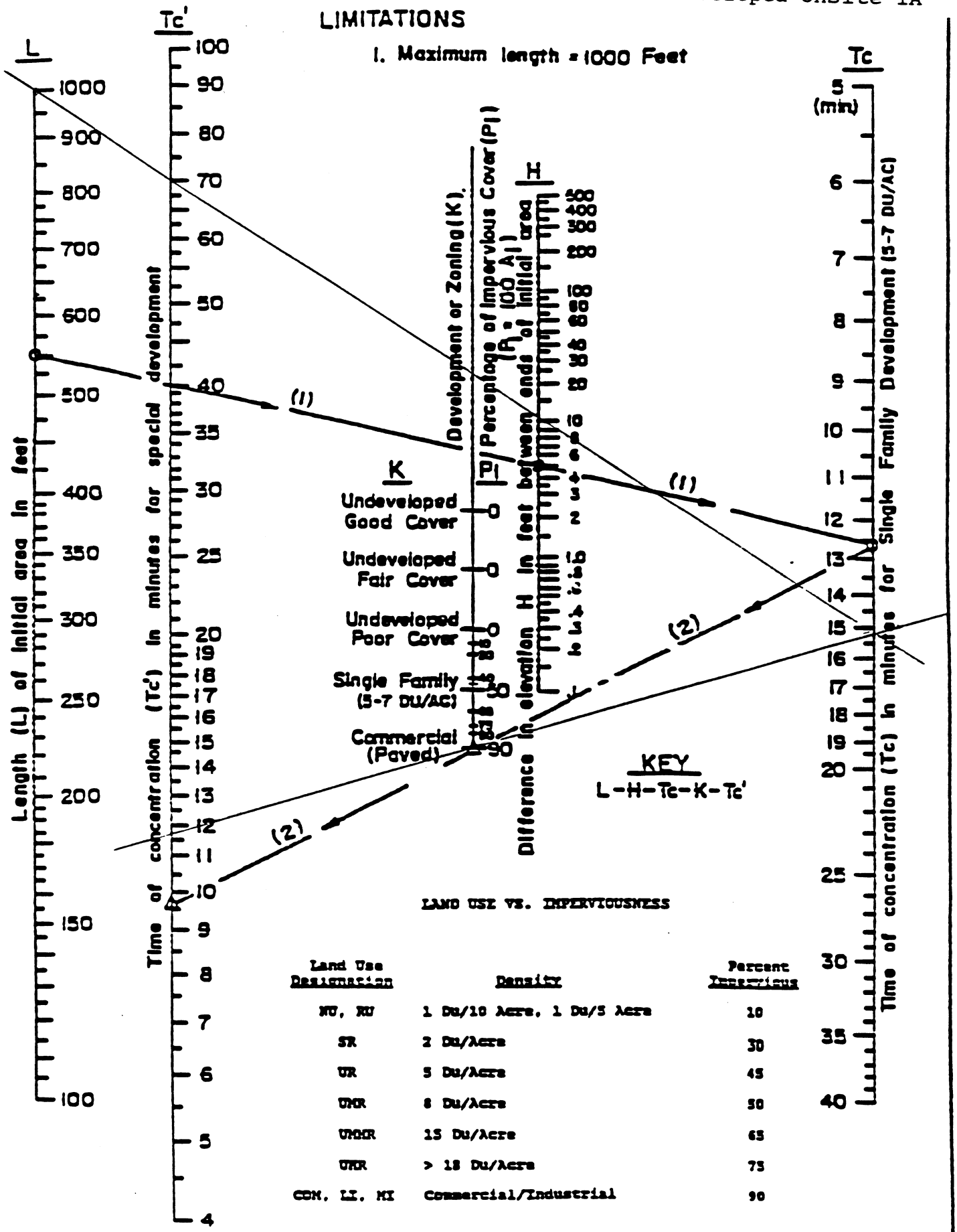
HYDROGRAPH AT 8041 17B STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	0.	100	1.	200	2.	300	4.	400	5.
500	6.	600	8.	700	9.	800	11.	900	12.
1000	13.	1050	13.	1100	14.	1110	17.	1120	19.
1130	23.	1131	23.	1132	23.	1133	24.	1134	24.
1135	24.	1136	25.	1137	25.	1138	26.	1139	26.
1140	27.	1141	28.	1142	29.	1143	30.	1144	31.
1145	32.	1146	33.	1147	34.	1148	35.	1149	38.
1150	42.	1151	45.	1152	49.	1153	54.	1154	56.
1155	59.	1156	61.	1157	63.	1158	64.	1159	63.
1160	61.	1161	58.	1162	54.	1163	50.	1164	48.
1165	46.	1166	46.	1167	45.	1168	45.	1169	45.
1170	44.	1171	44.	1172	44.	1173	43.	1174	42.
1175	42.	1176	41.	1177	40.	1178	38.	1179	37.
1180	36.	1181	34.	1182	33.	1183	32.	1184	30.
1185	29.	1186	28.	1187	27.	1188	26.	1189	25.
1190	24.	1191	23.	1192	22.	1193	21.	1194	21.
1195	20.	1196	19.	1197	19.	1198	18.	1199	18.
1200	18.	1201	17.	1202	17.	1203	17.	1204	16.
1205	16.	1206	16.	1207	16.	1208	15.	1209	15.
1210	15.	1211	15.	1212	15.	1213	15.	1214	14.
1215	14.	1216	14.	1217	14.	1218	14.	1219	14.
1220	14.	1221	14.	1222	14.	1223	13.	1224	13.
1225	13.	1226	13.	1227	13.	1228	13.	1229	13.
1230	13.	1231	13.	1232	13.	1233	13.	1234	13.
1235	13.	1236	13.	1237	13.	1238	12.	1239	12.
1240	12.	1241	12.	1242	12.	1243	12.	1244	12.
1245	12.	1246	12.	1247	12.	1248	12.	1249	12.
1250	12.	1251	12.	1252	12.	1253	12.	1254	12.
1255	12.	1256	12.	1257	12.	1258	12.	1259	12.
1260	12.	1261	11.	1262	11.	1263	11.	1264	11.
1265	11.	1266	11.	1267	11.	1268	11.	1269	11.
1270	11.	1271	11.	1272	10.	1273	10.	1274	10.
1275	10.	1276	10.	1277	10.	1278	10.	1279	10.
1280	10.	1281	10.	1282	10.	1283	10.	1284	10.
1285	10.	1286	10.	1287	10.	1288	10.	1289	10.
1290	10.	1291	10.	1292	10.	1293	10.	1294	10.
1295	10.	1296	10.	1297	10.	1298	9.	1299	9.
1300	9.	1310	8.	1320	8.	1330	8.	1340	7.
1350	6.	1360	6.	1370	5.	1380	5.	1390	5.
1400	4.	1420	3.	1440	2.	1460	1.	1500	1.

AREA Developed Onsite 1A

LIMITATIONS

1. Maximum length = 1000 Feet

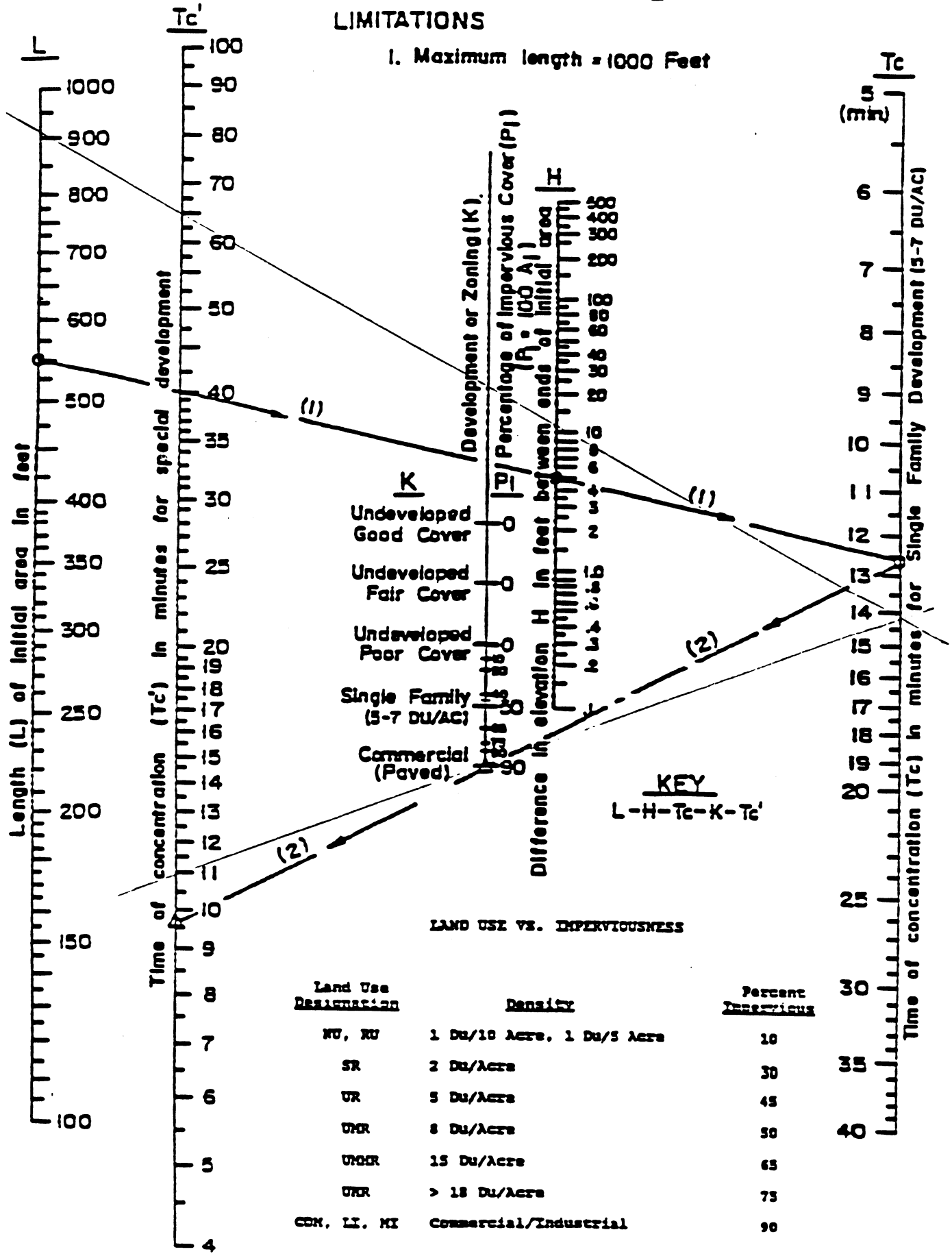


LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
COM, LI, HI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

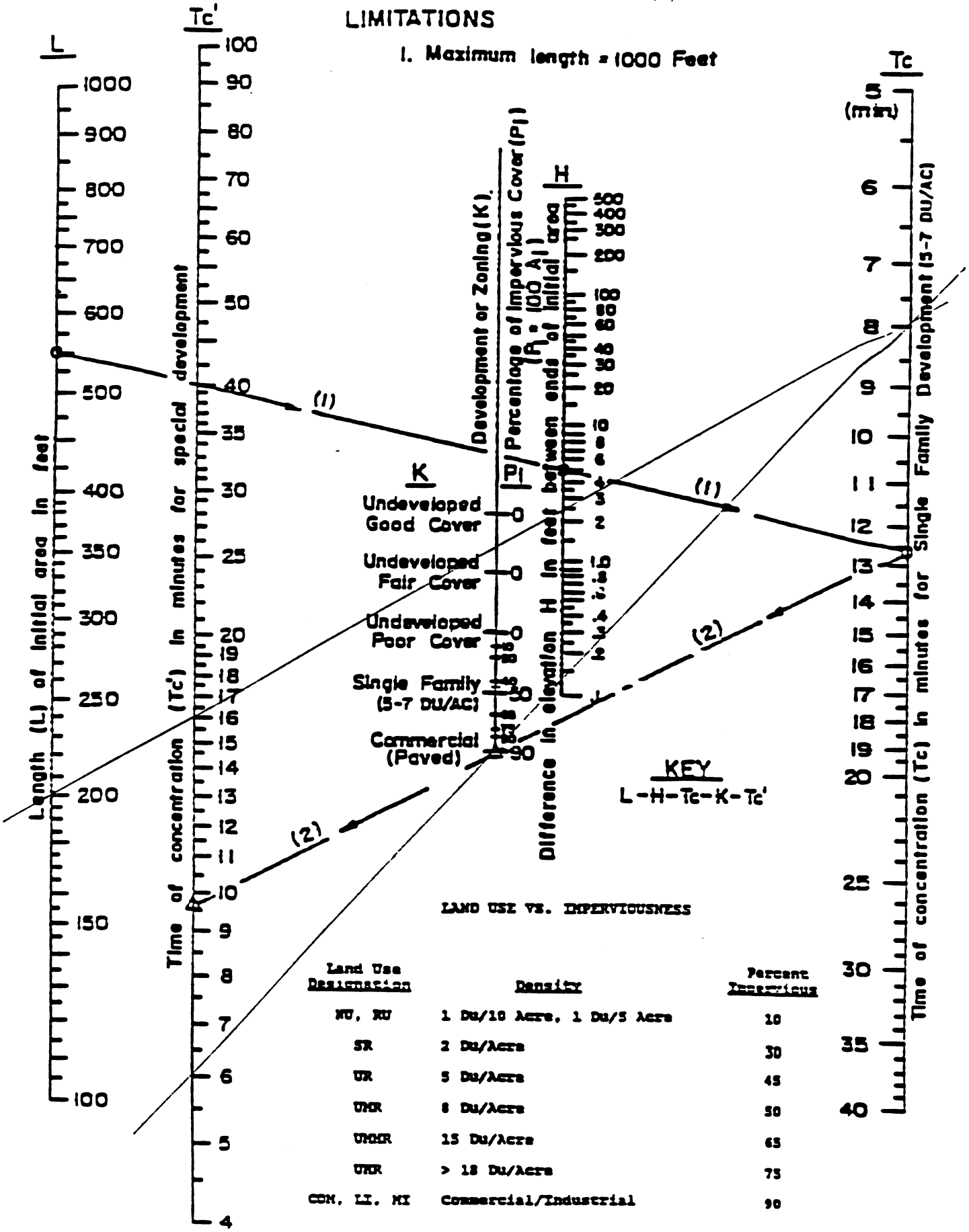
AREA Developed Onsite 2A



LAND USE VS. IMPERVIOUSNESS

Land Use Designation	Density	Percent Impervious
NU, RU	1 Du/10 Acre, 1 Du/5 Acre	10
SR	2 Du/Acre	30
UR	5 Du/Acre	45
UMR	8 Du/Acre	50
UMHR	15 Du/Acre	65
UHR	> 18 Du/Acre	75
CDM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH



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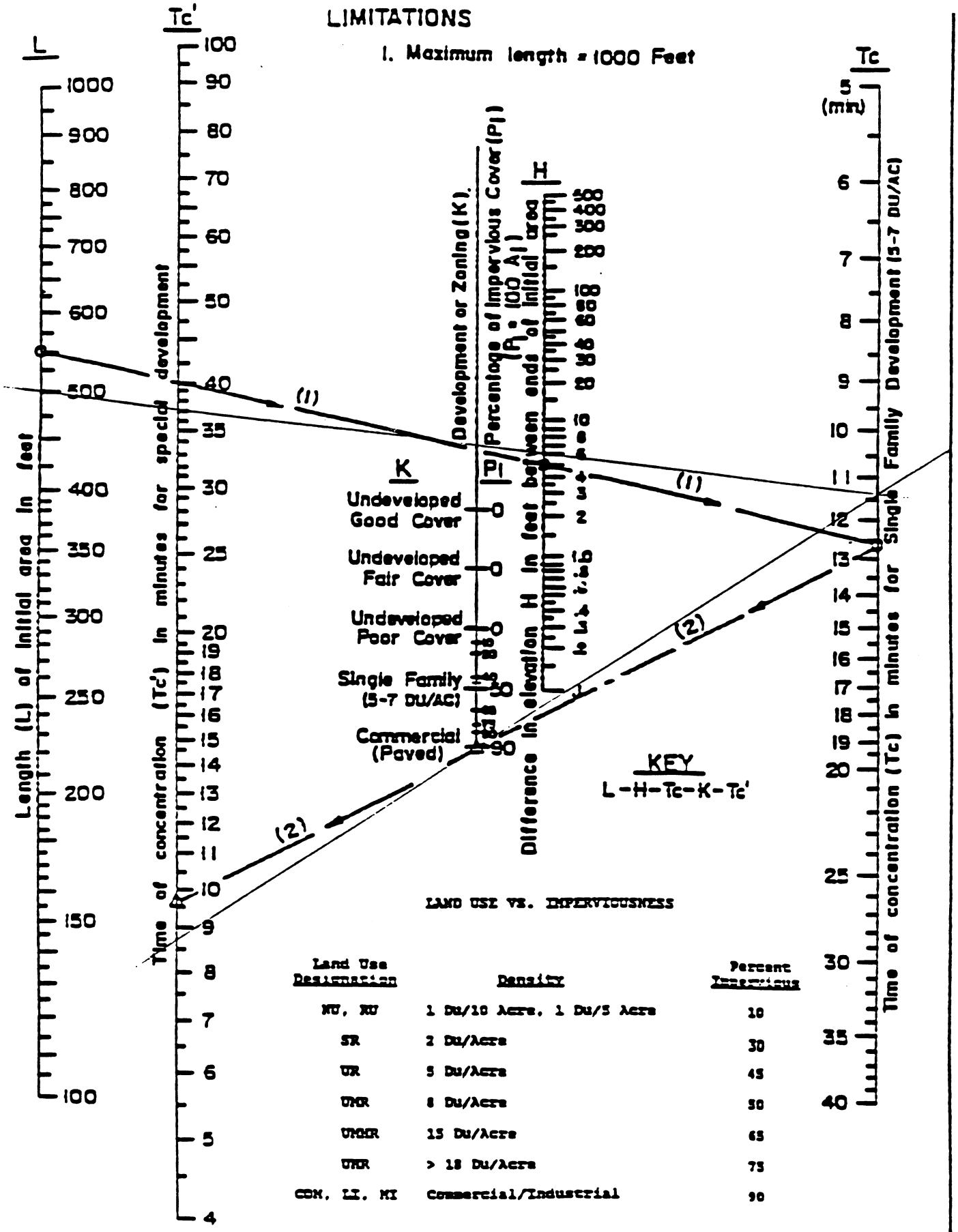

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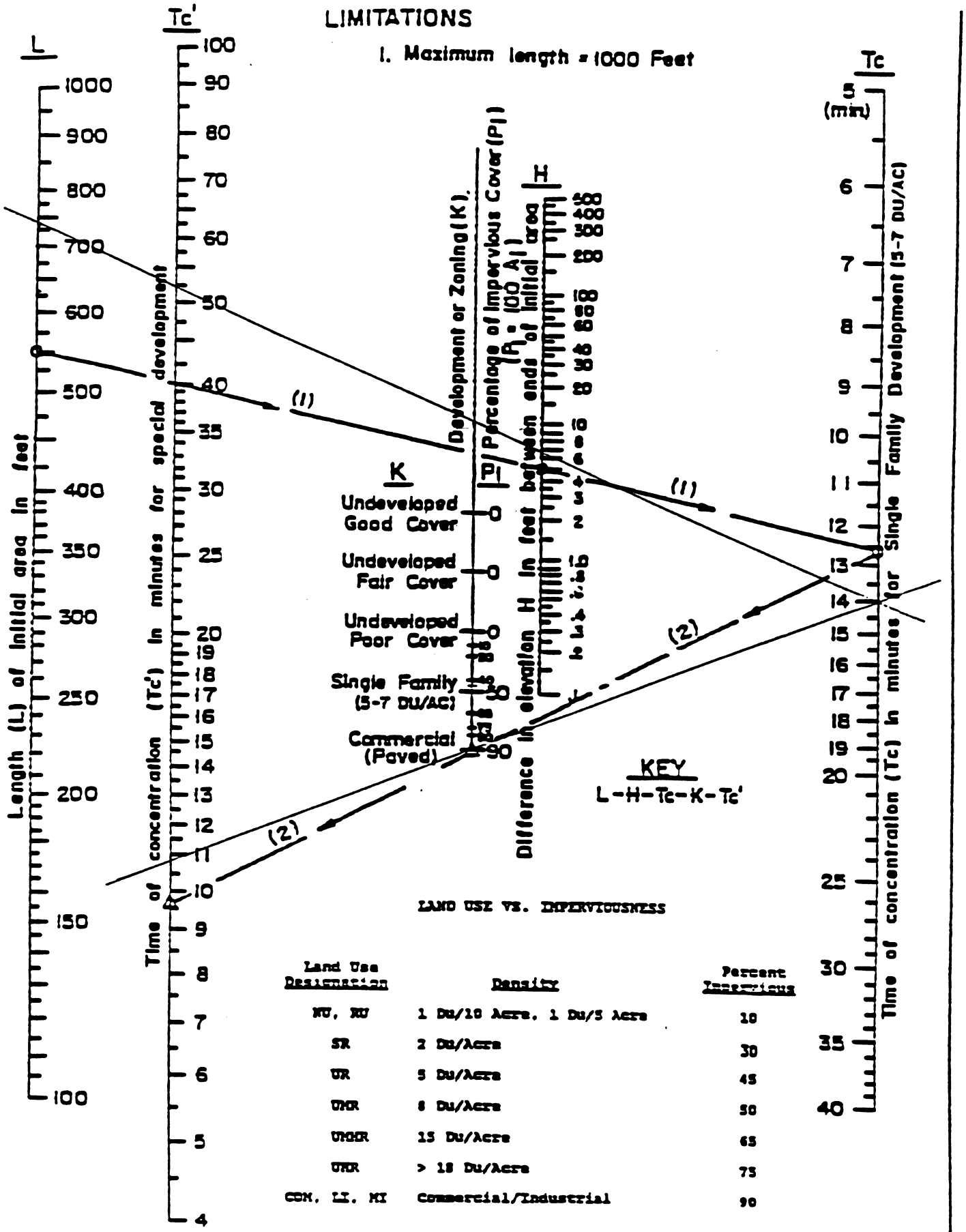

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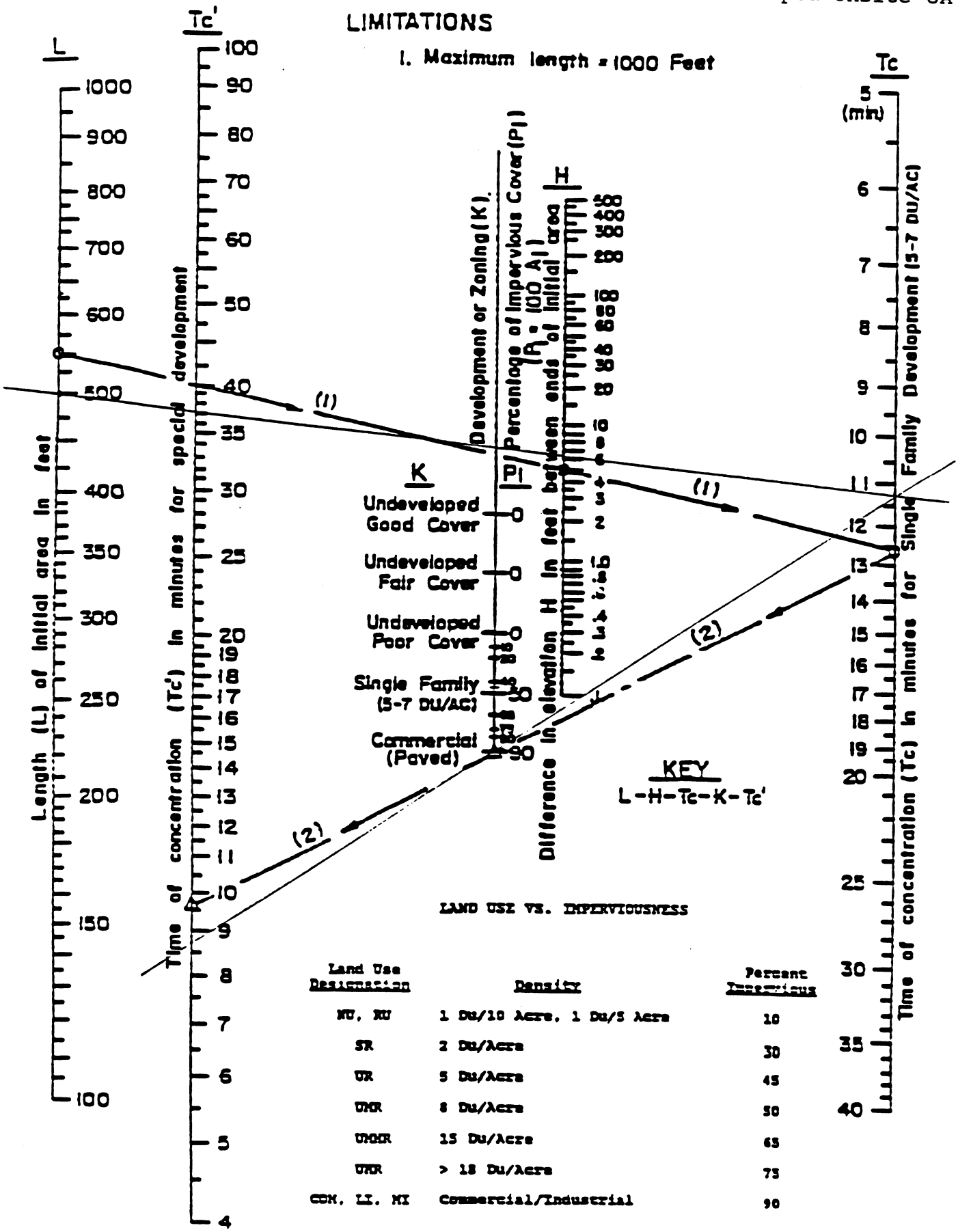

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TIME OF CONCENTRATION NOMOGRAPH

LIMITATIONS

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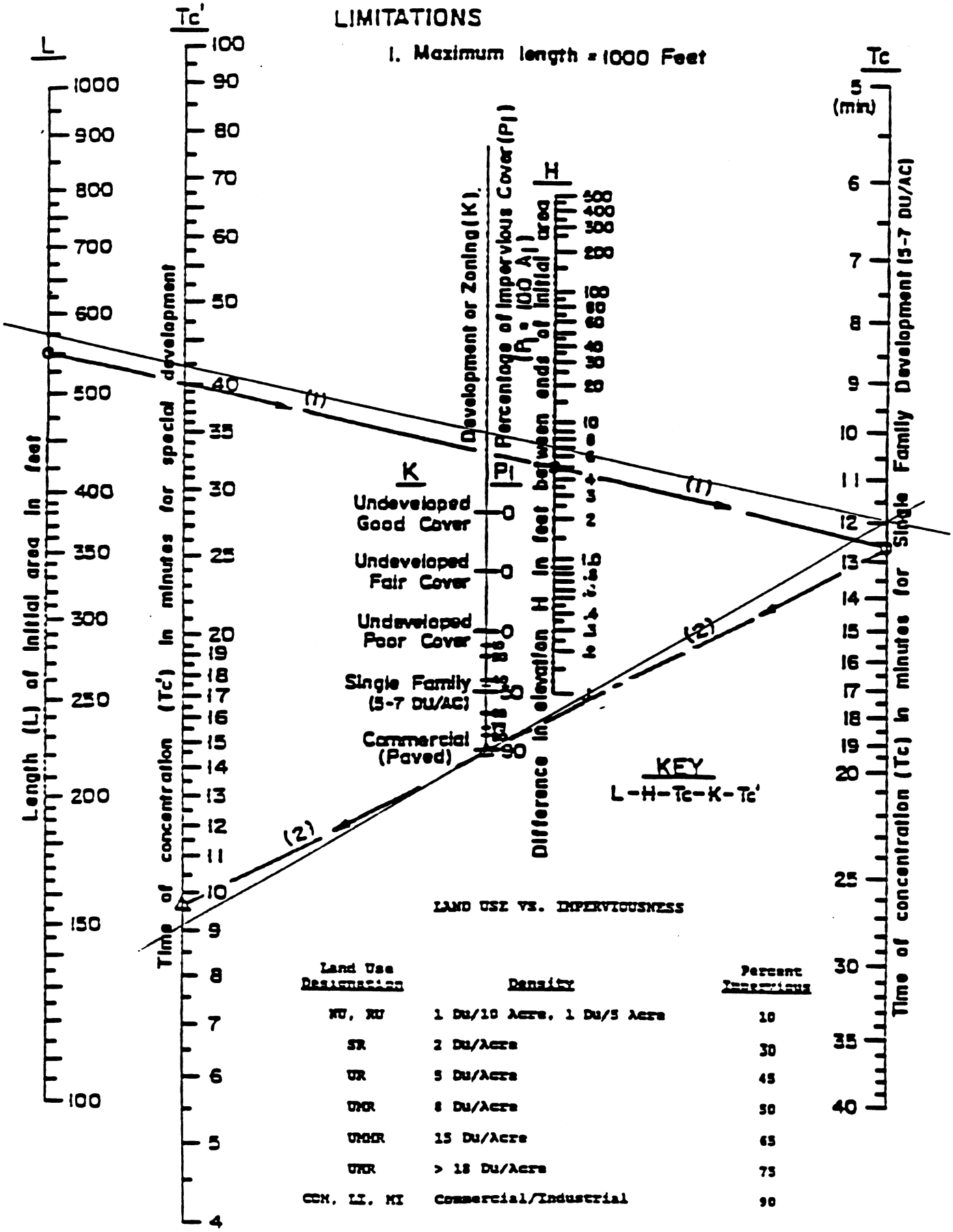

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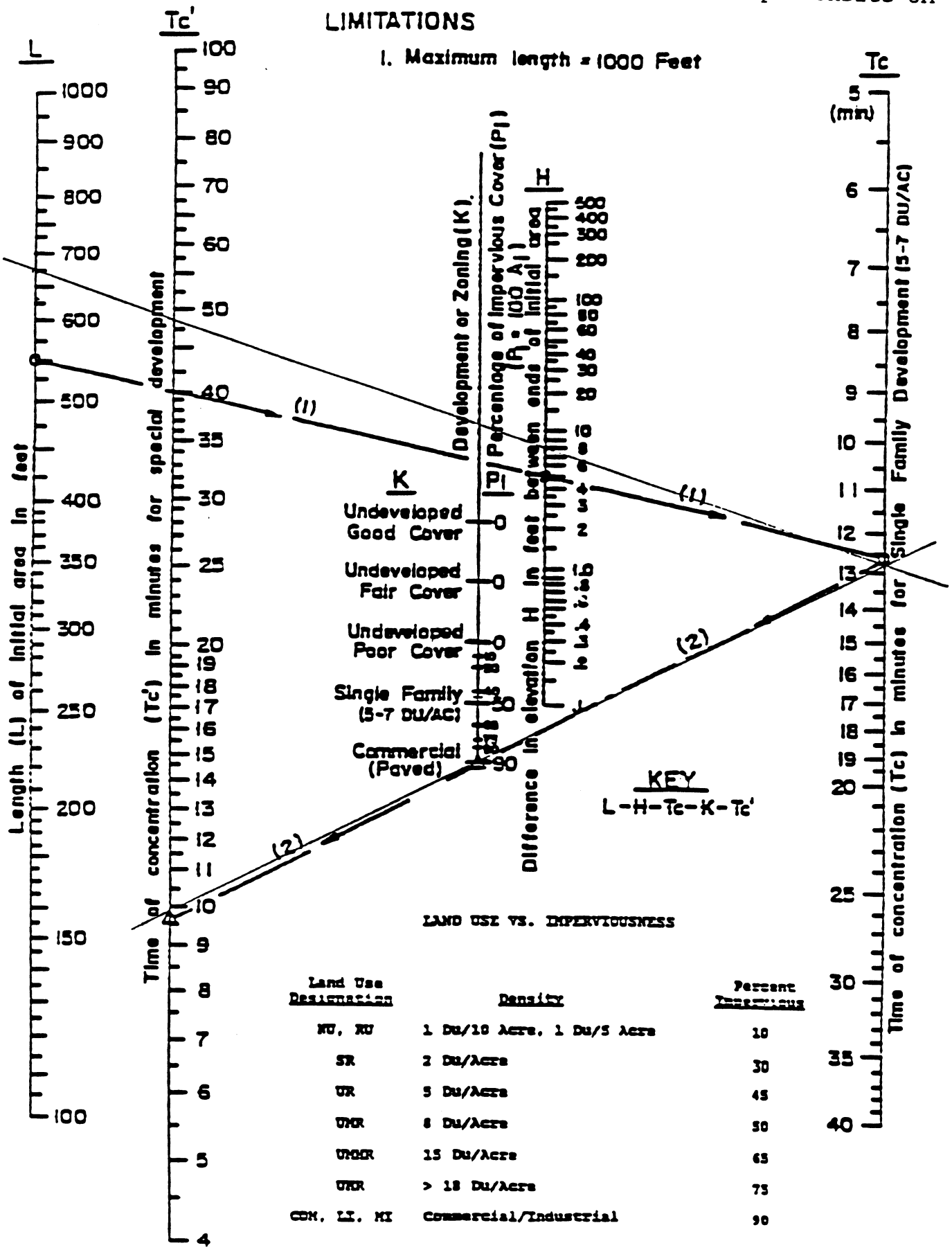

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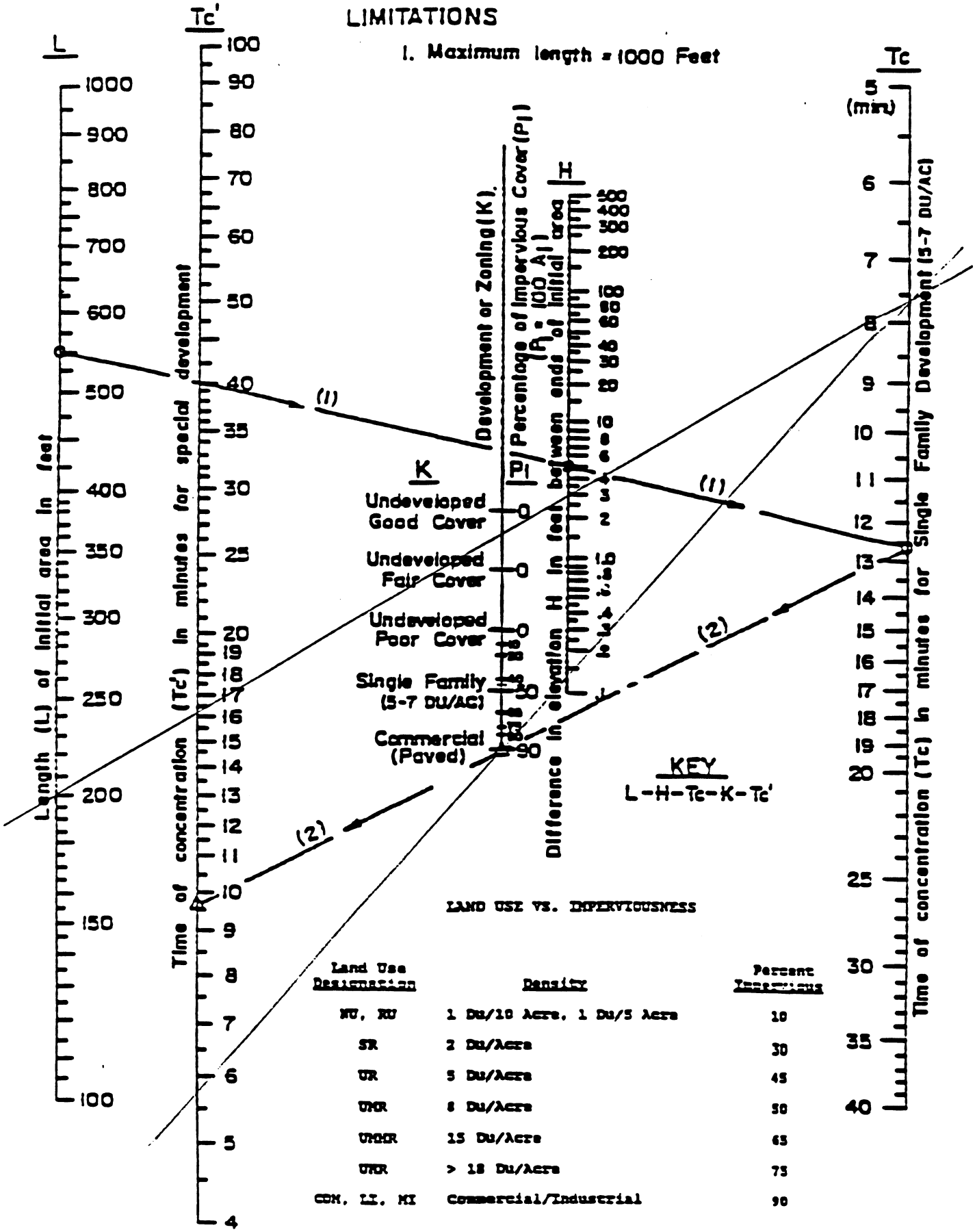

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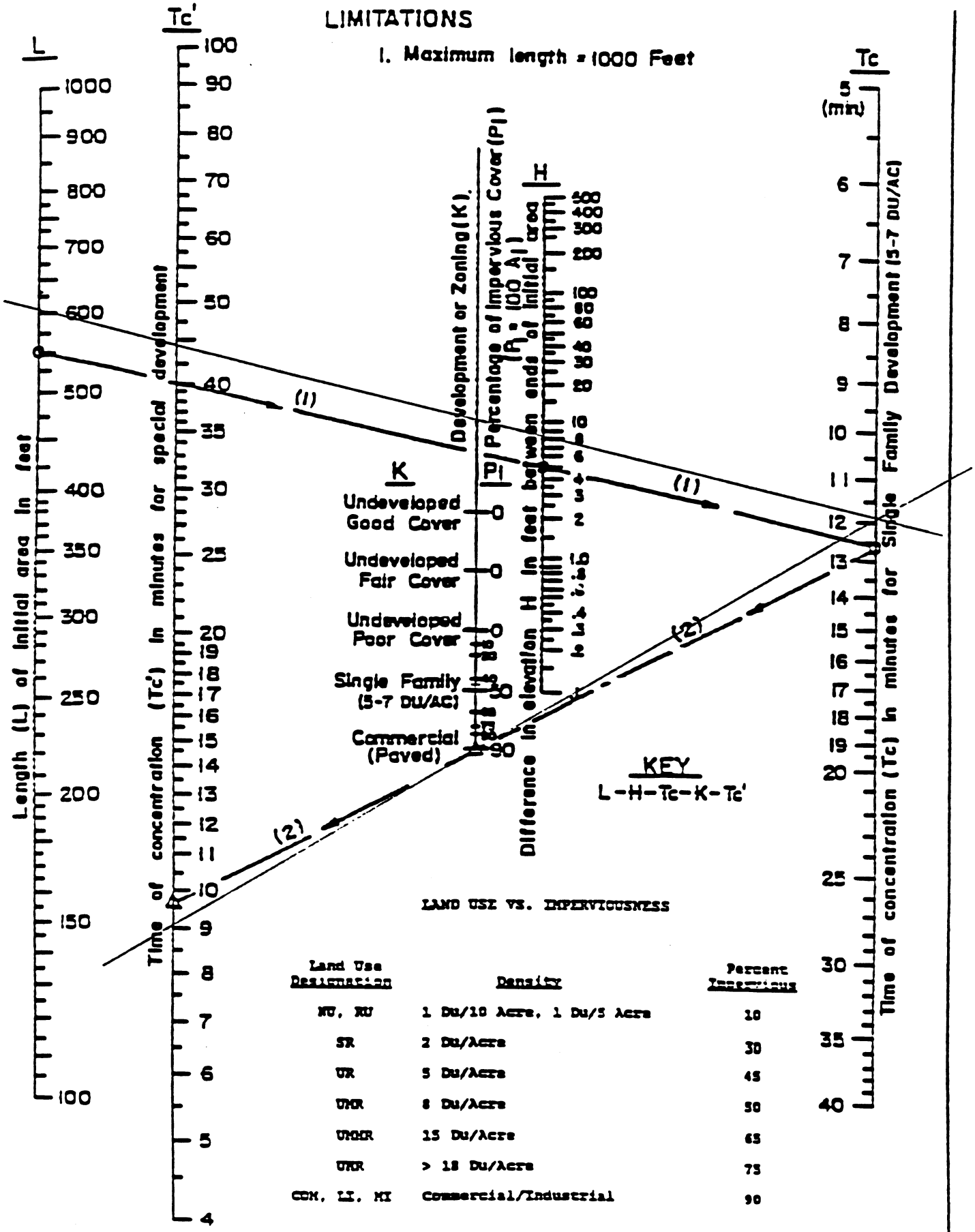

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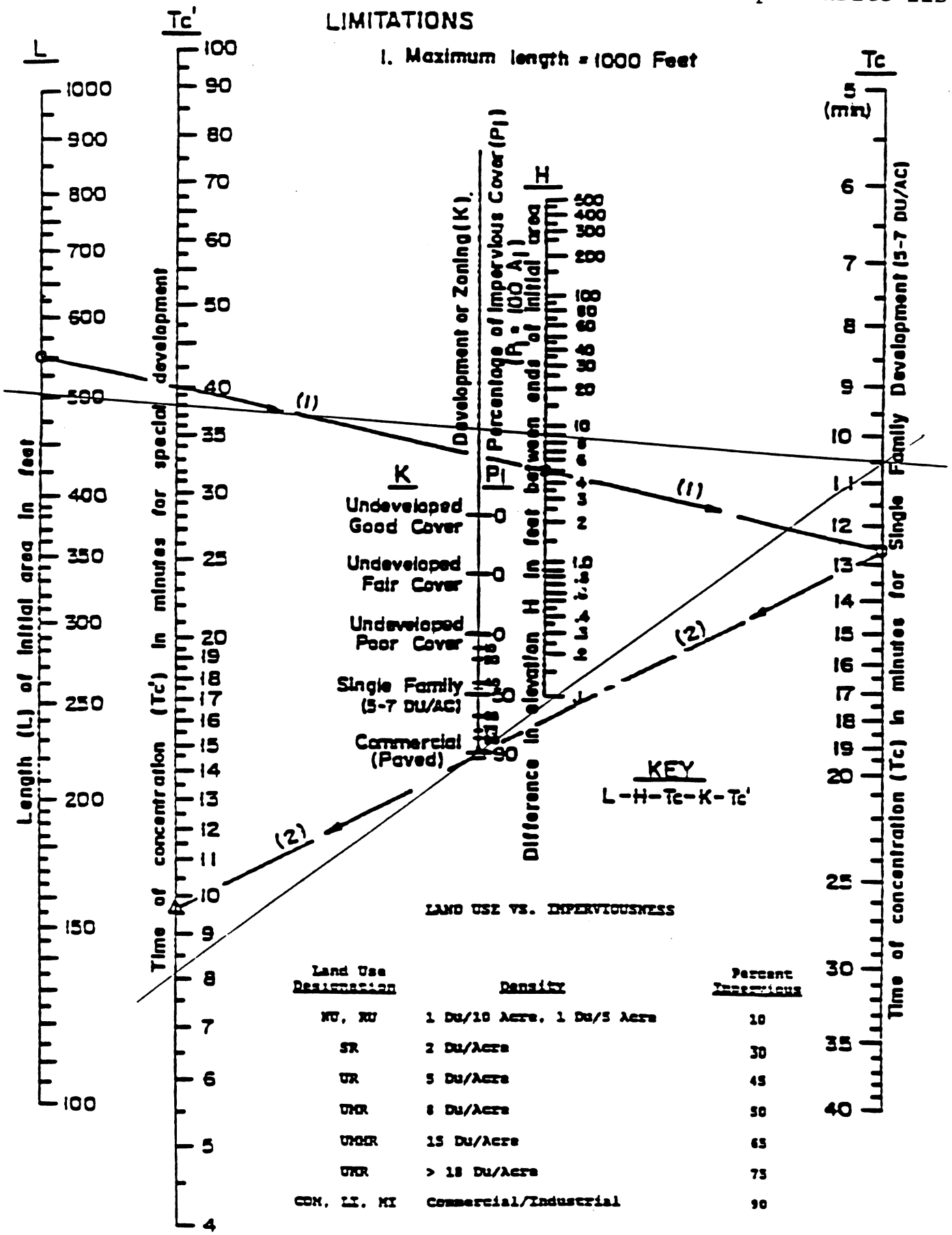

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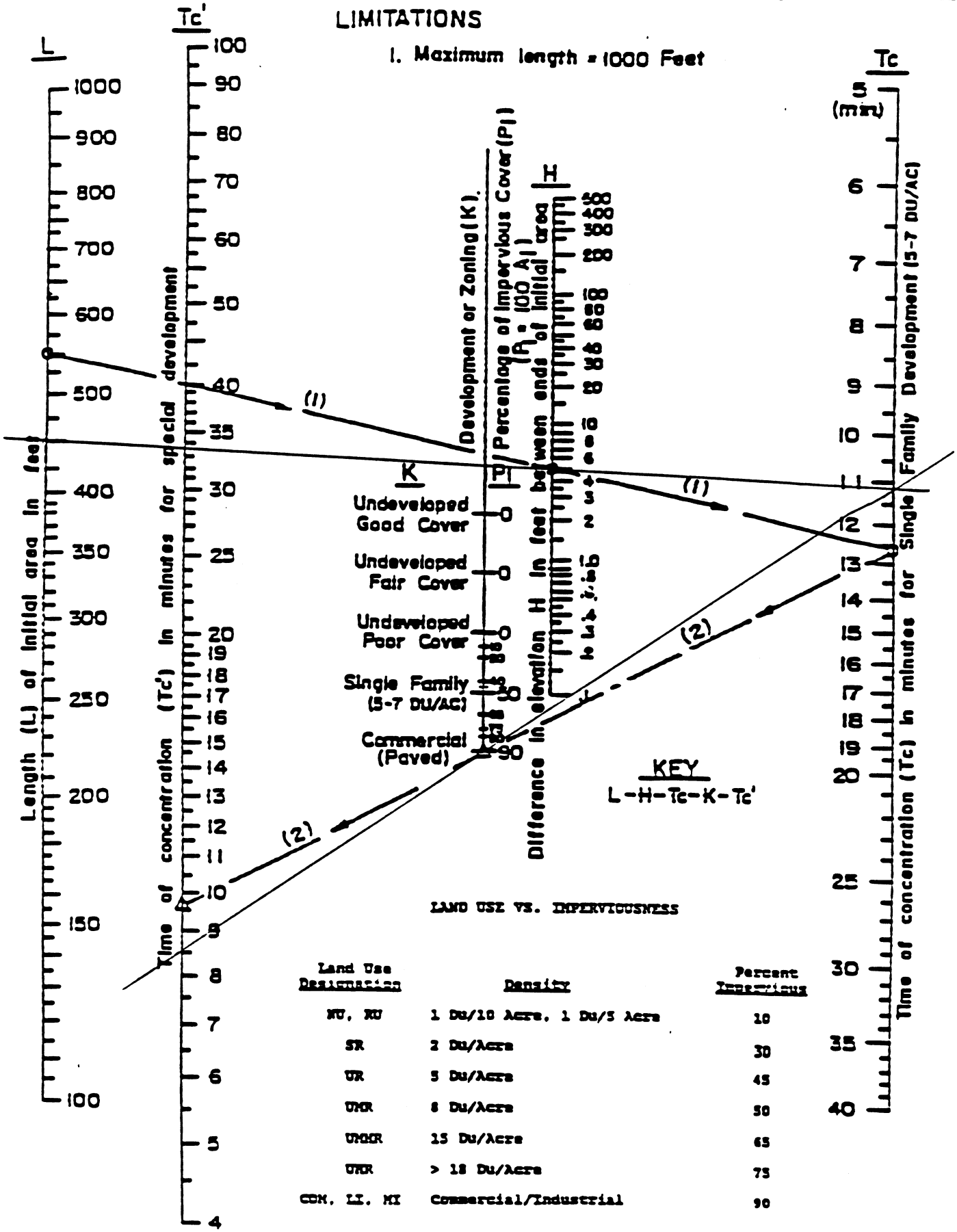

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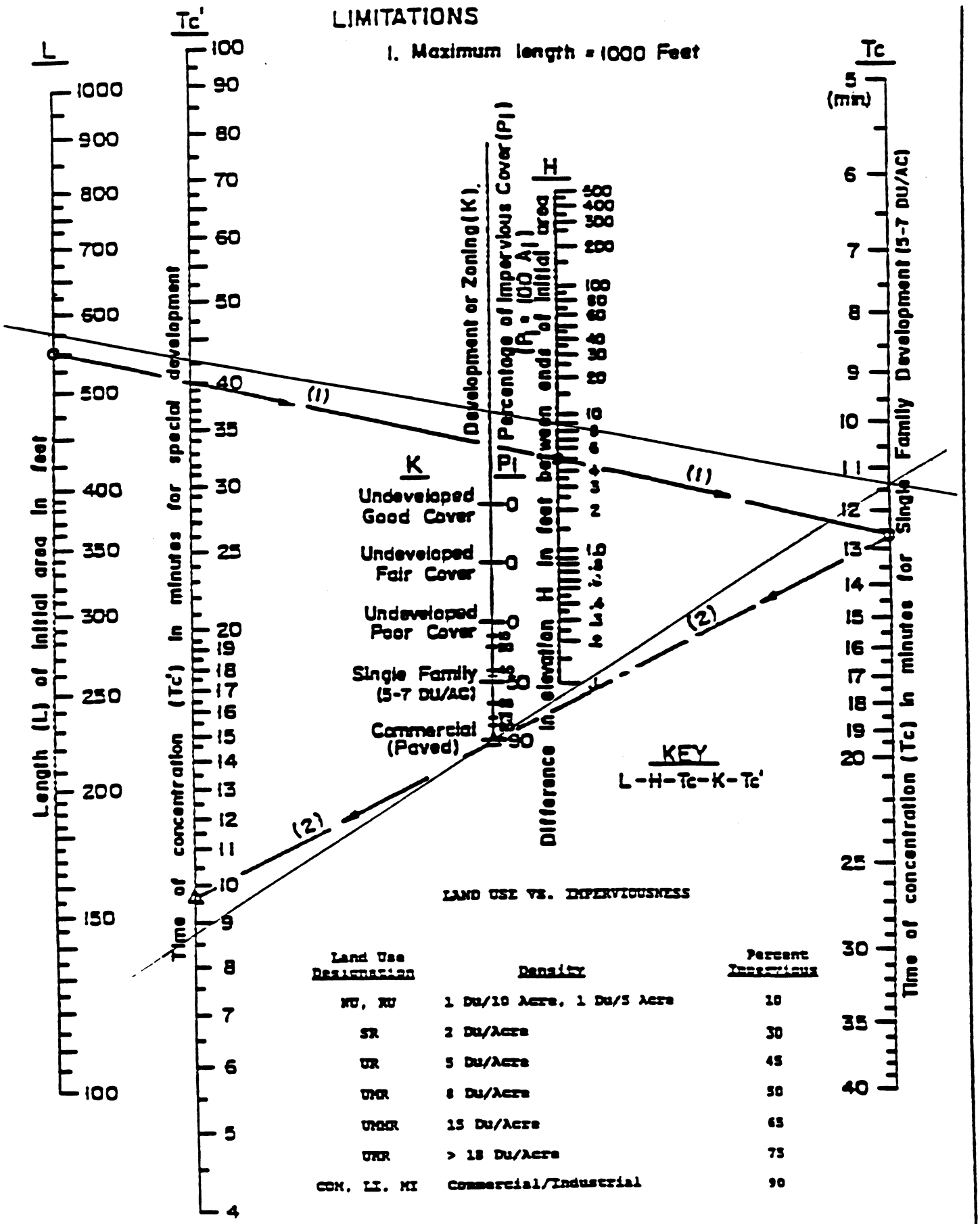

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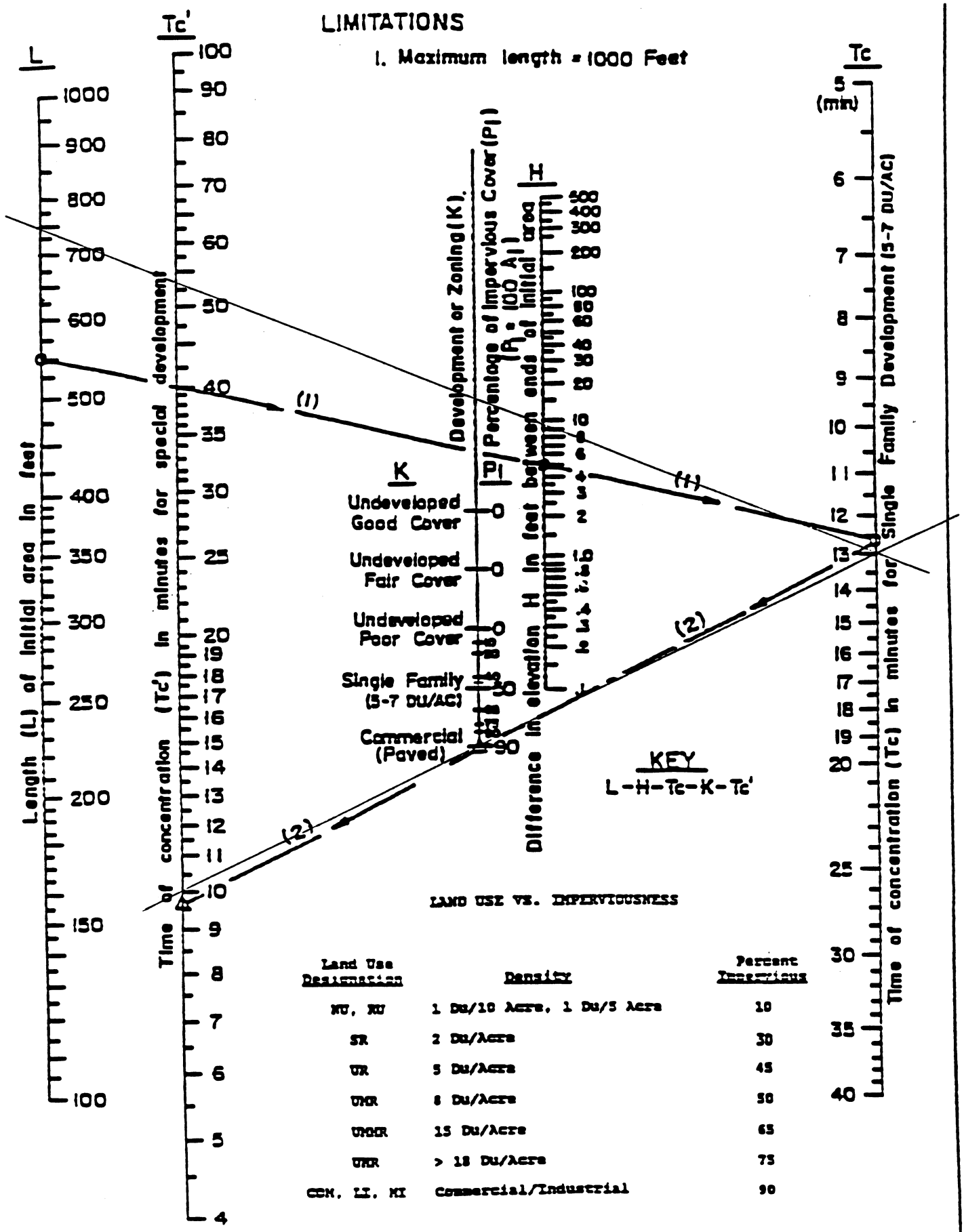

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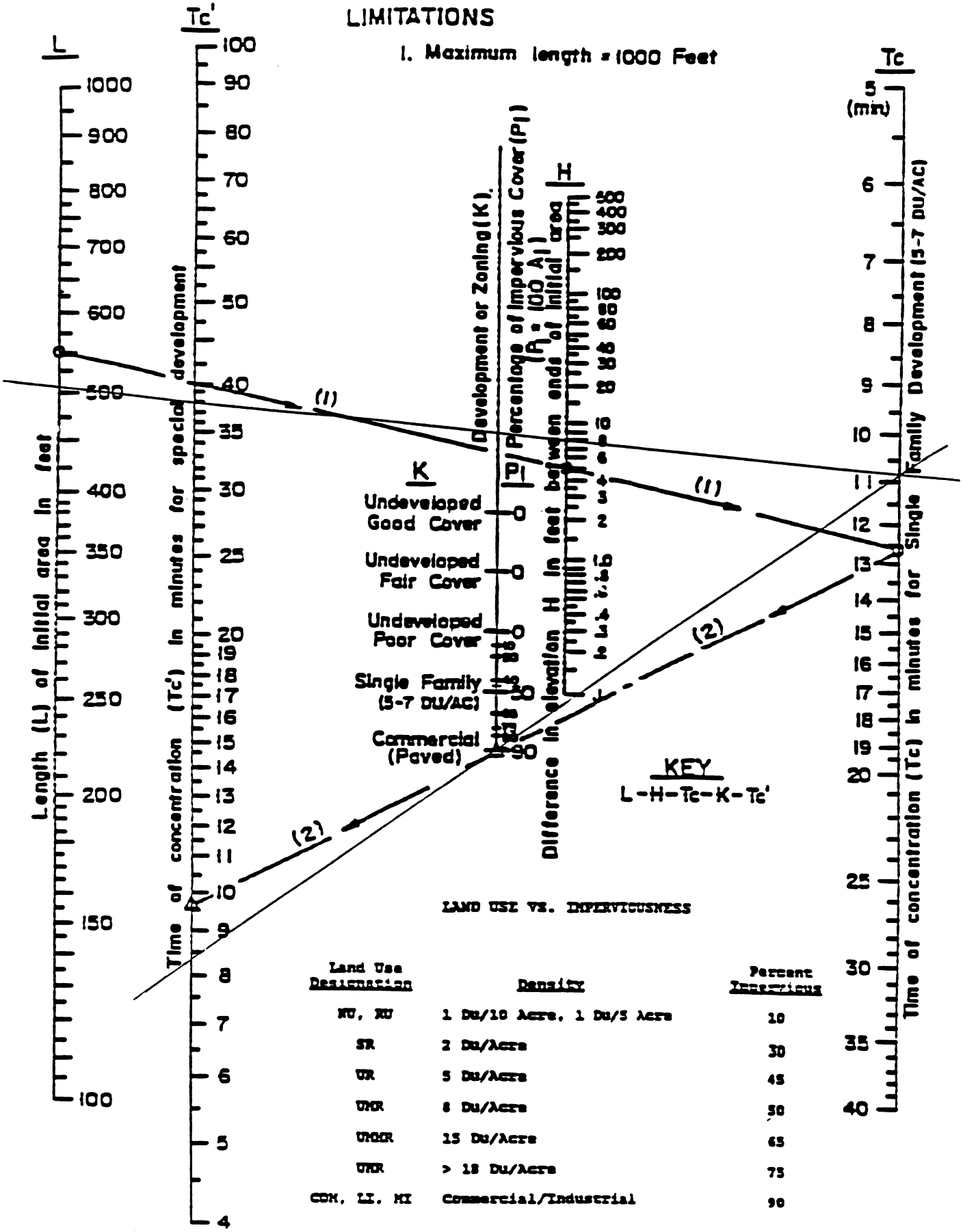

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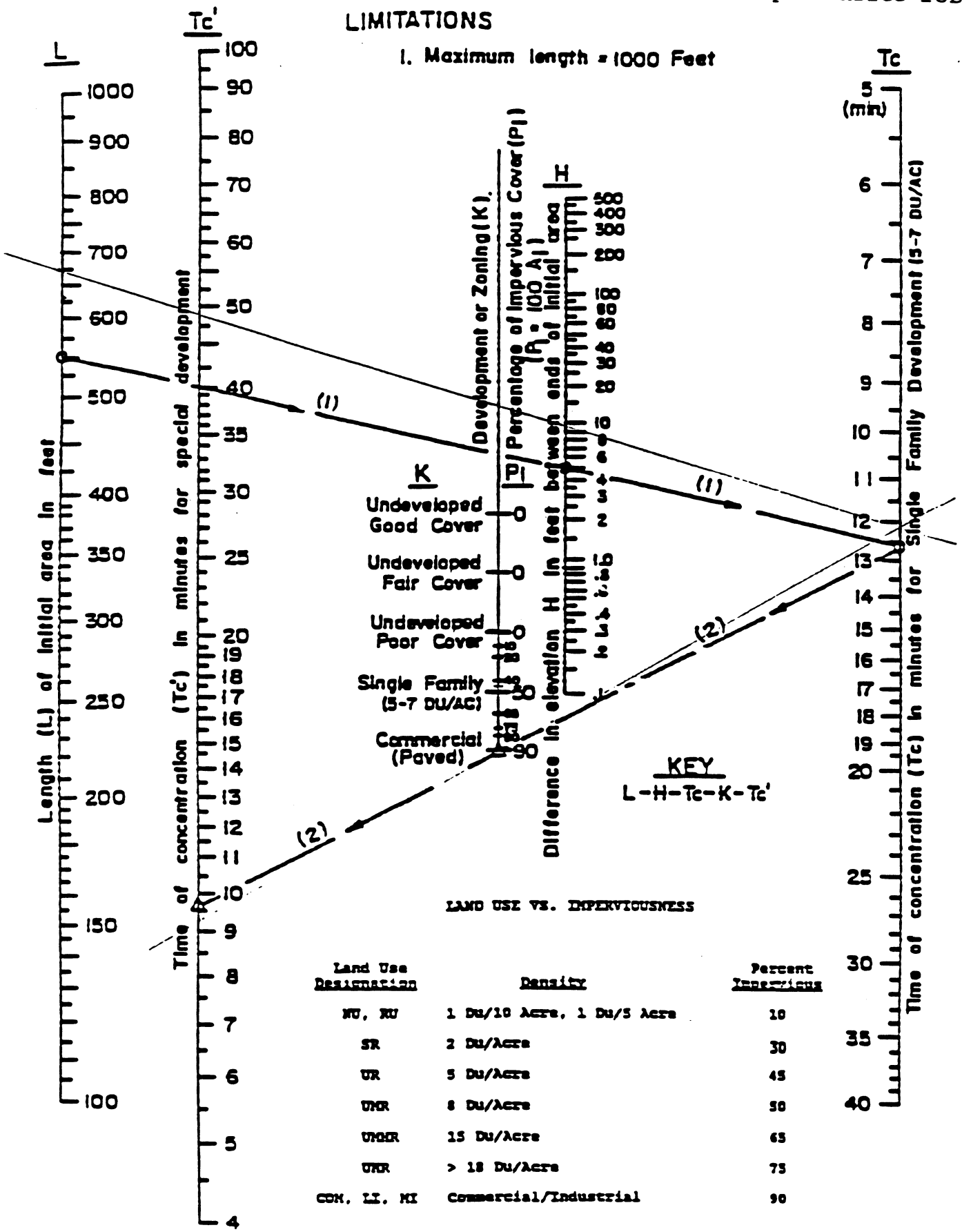

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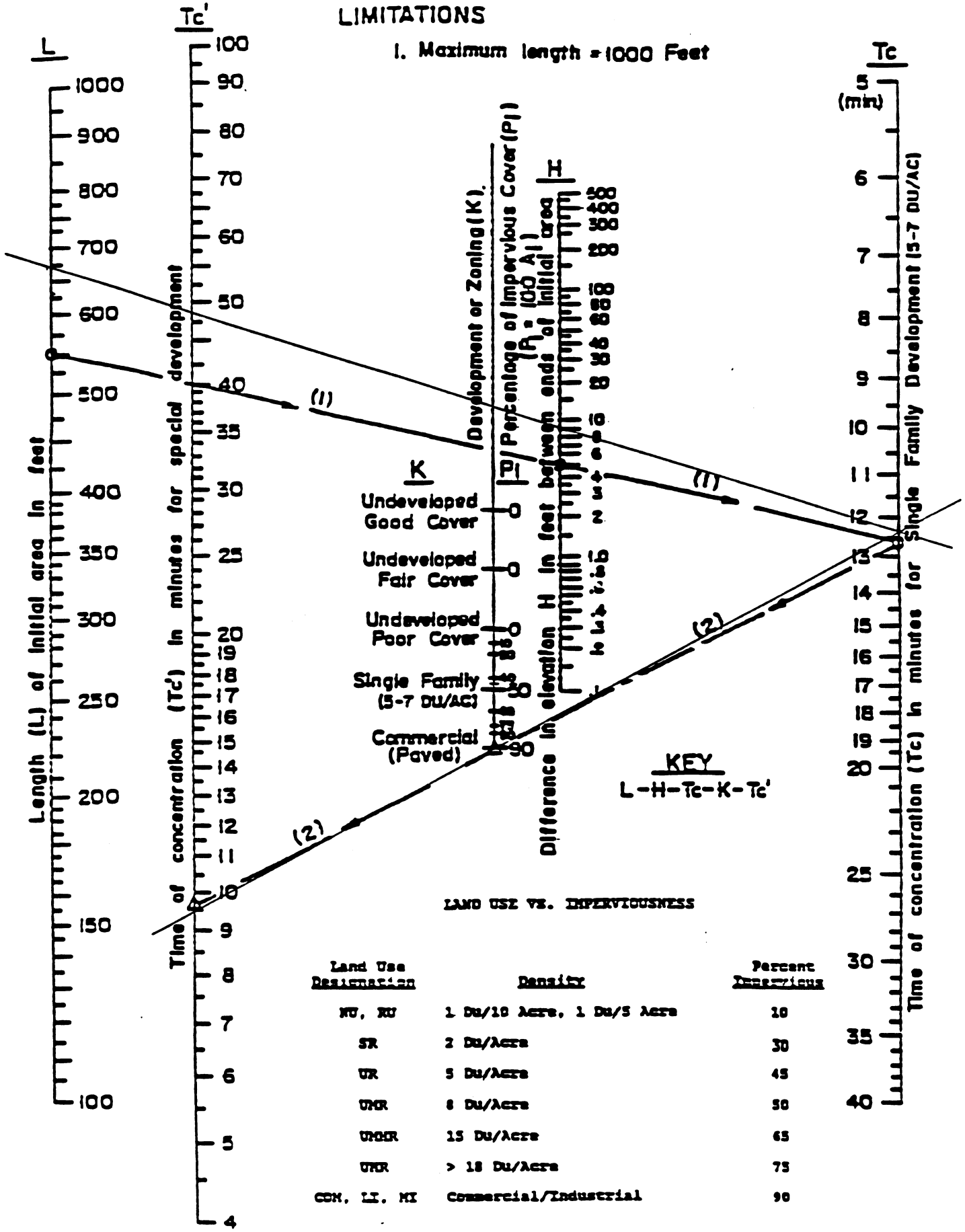
COM, LI, MI	Commercial/Industrial	90

TIME OF CONCENTRATION NOMOGRAPH

FOR INITIAL SUBAREA

LIMITATIONS

1. Maximum length = 1000 Feet



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Land Use Designation	Density	Percent Impervious
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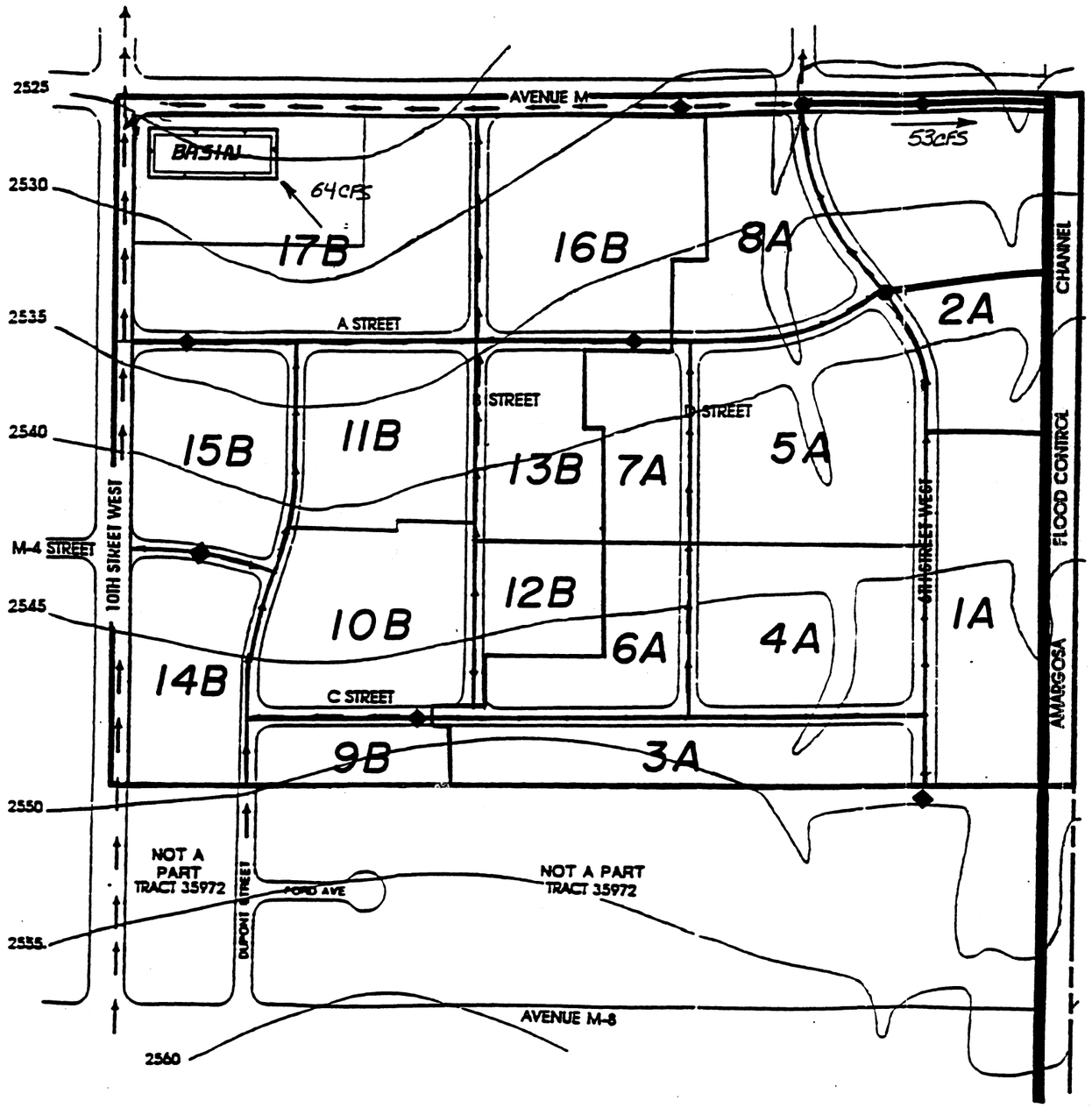
TIME OF CONCENTRATION NOMOGRAPH

SECTION 4



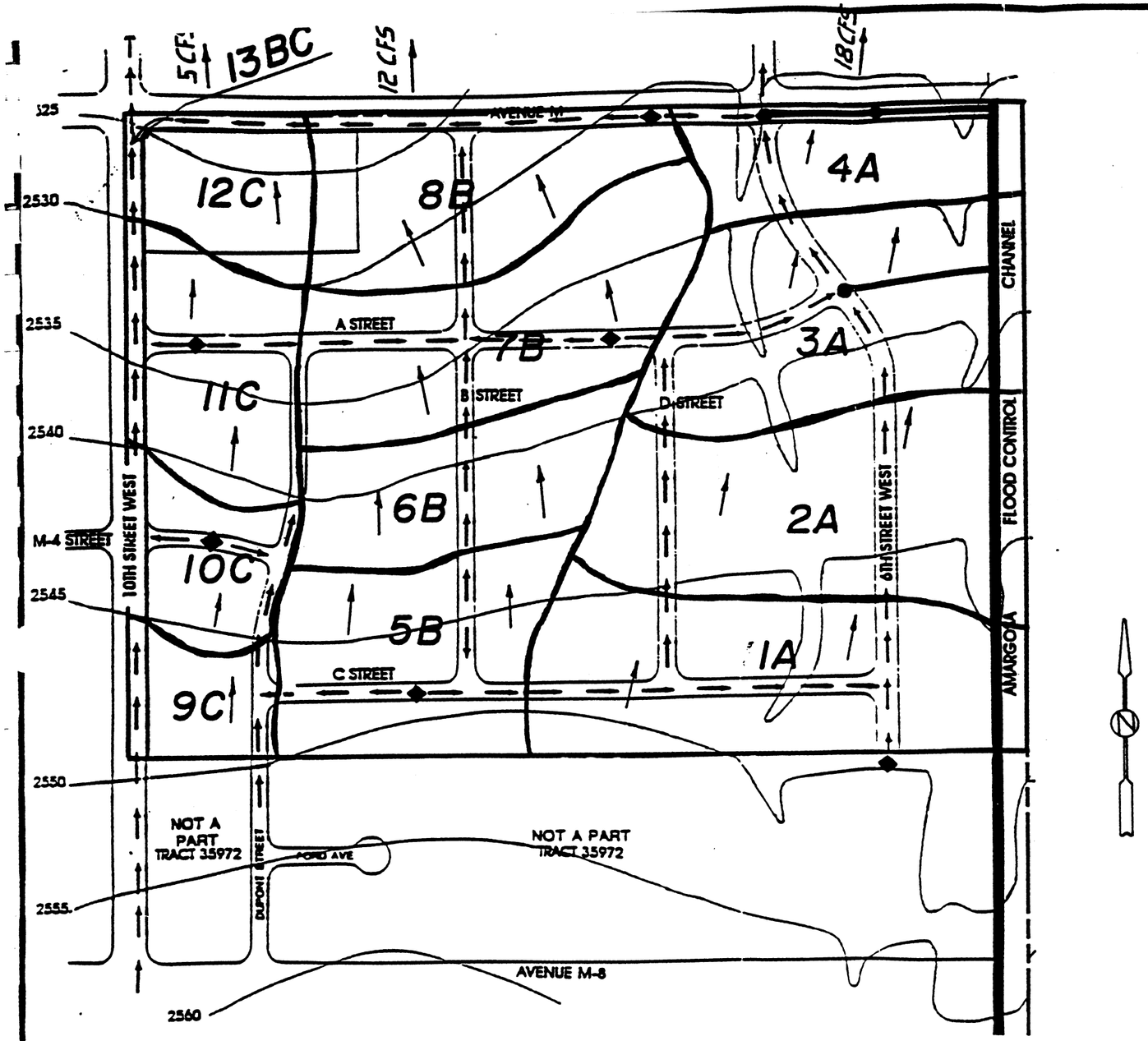
AREA	Q	TC	ACRE
1A	15	12	10
2A	18	11	12
3A	13	06	6
4A	10	09	6
5A	14	11	9
6A	9	09	5
7A	7	09	4
8A	12	10	7
9B	7	06	3
10B	14	[illegible]	8
11B	11	08	6
12B	5	09	3
13B	9	09	5
14B	10	10	6
15B	11	08	6
16B	15	09	9
17B	26	10	16

TENTATIVE TRACT 44769

ONSITE DEVELOPED

HYDROLOGY MAP

SECTION 5



AREA	Q	TC	ACRE
1A	7	17	20
2A	4	16	12
3A	8	16	12
4A	5	14	11
5B	4	16	12
6B	4	14	9
7B	5	16	14
8B	2	15	8
9C	1	13	4
10C	1	15	4
11C	2	16	6
12C	2	17	9
13BC	16	00	66

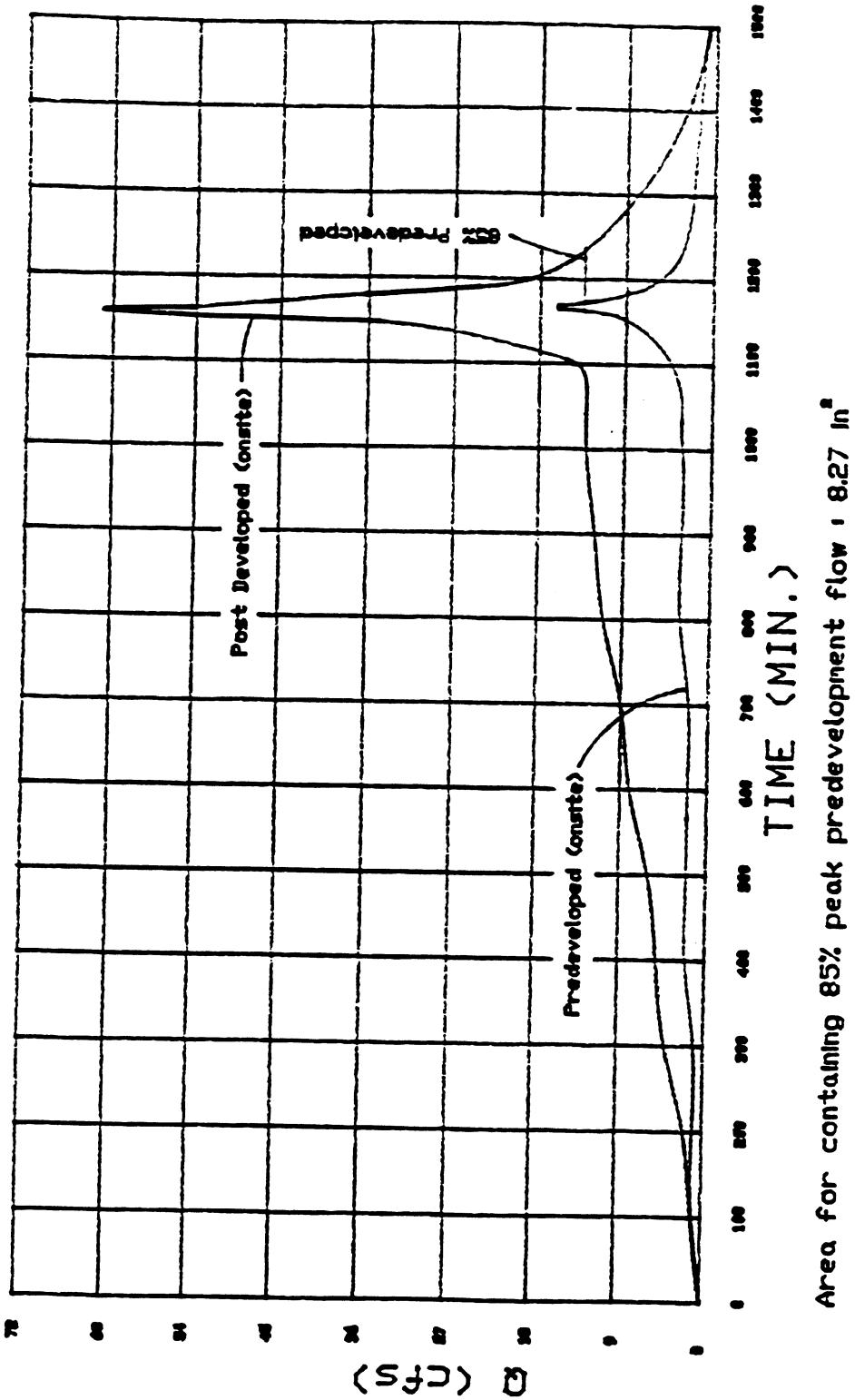
TENTATIVE TRACT 44769

ONSITE UNDEVELOPED

HYDROLOGY MAP

SECTION 6

25 YEAR STORM DETENTION BASIN VOLUME
(NORTHWEST CORNER)



Area for containing 85% peak predevelopment flow = 8.27 in^2

Volume = 446,580.00 ft^3 (10.25 ac-ft)

LEGEND

AREA #	=	Drainage Area Designation
SOIL TYPE	=	S.C.S. soil designation
A	=	Area (acres)
L	=	Length (ft)
H	=	Change in elevation
S	=	Slope (ft/ft)
V	=	Velocity (fps)
AREA Tc	=	Time of concentration for individual area
TOT. Tc	=	Total time of concentration
I	=	Rainfall Intensity (in./hr.)
INF.	=	Infiltration
C	=	Coefficient of runoff
Q	=	Individual Area Runoff
QT	=	Total runoff at concentration point
ZONING	=	Current Lancaster Zoning Designation
% IMP.	=	Impervious portion of land f(zoning)

CALCULATIONS

S = H/L
V = fig. (C-12.4)
Tc = L / 60V
TOT. Tc = Tc + TOT. Tc(previous)
I = fig. (C-2)
INF. = fig. (C-6.4)
% IMP. = .42 (single family)
.68 (multi-family)
.92 (commercial)
.91 (industrial)
.68 (institutional)
C = [0.9 * IMP] + [(1.0 - IMP) * CU]
Q = C x I x A
QT = Q + QT(previous)

JUNCTION CALCULATIONS

Drainage areas are to be numbered 1,2,3 in order of increasing Tc.

F1 = Q1 + T1/T2*Q2 + T1/T3*Q3
F2 = Q2 + I2/I1*Q1 + T2/T3*Q3
F3 = Q3 + I3/I1*Q1 + I3/I2*Q2

The maximum of F1,F2,F3 is to be used for the flow for the summation of all areas.

Q# = Area flow
T# = Tc for area
I# = Intensity of area

STREET CAPACITIES

Assumptions : Manning n-value = n = 0.015
Hydraulic Radius = R = A/P (defined below)

R/W - R/W :
(80' R/W Rd) Area = A =2x[.5*.5*30+.17*2*.5+.5*2+.16*32+8x.16x.5]=28.86
Wetted Perimeter = P = 81.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 1440.7840 x S^.5
@ 0.9' above r/w, S = .003, A = 100.89, Q = 685 cfs
@ min. grade, s = 0.010, Street full capacity = 144 cfs

T/C - T/C :
(80' R/W Rd) Area = A = 2x[.5*.5*30+.17*2*.5+.5*2] = 17.34
Wetted Perimeter = P = 65.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 765.5289 * S^.5
@ min. grade, s = 0.0040, Q = 48 cfs

STREET CAPACITIES

Assumptions : Manning n-value = n = 0.015
Hydraulic Radius = R = A/P (defined below)

R/W - R/W :

(60' R/W Rd) Area = A =2x[.5*.29*16+.17*2*.5+.29*2+.47*18+12x.26x.5]=21.88
Wetted Perimeter = P = 61.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 1097.2038 x S^.5
@ s = 0.004, Street full capacity = 69 cfs
@ 0.1' above R/W, A=27.88, Q=1643.22*S^.5=103.3 cfs
@ 0.2' above R/W, A=33.88, Q=2273.95*S^.5=143.8 cfs
@ 0.3' above R/W, A=39.88, Q=2984.01*S^.5=188.7 cfs
@ s = 0.010, Street full capacity = 110 cfs

(64' R/W Rd) Area = A =2x[.5*.33*18+.17*2*.5+.33*2+.43*20+12x.26x.5]=27.92
Wetted Perimeter = P = 65.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 1578.8655 x S^.5
@ 0.1' above R/W, A=34.32, Q=2219.3258*S^.5
@ 0.4' above R/W, A=53.52, Q=4670.3161*S^.5
@ s = 0.004, Street full capacity = 100 cfs
@ 0.1' above R/W, Q = 140 cfs
@ 0.4' above R/W, Q = 295 cfs
@ s = 0.010, Street full capacity = 158 cfs

(80' R/W Rd) Area = A =2x[.5*.5*30+.17*2*.5+.5*2+.16*32+8x.16x.5]=28.86
Wetted Perimeter = P = 81.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 1440.7840 x S^.5
@ 0.9' above r/w, S = .003, A = 100.89, Q = 685 cfs
@ S = 0.0040, Street Full Capacity = 91.1 cfs
@ S = 0.010, Street full capacity = 144 cfs

(100' R/W Rd) Area = A = 34.77
Wetted Perimeter = P = 101
Street Capacity to crown elev. = Q = 1696.5054 * S^.5
@ S=.0040'/' Q = 107.3 cfs
@ S=.0100'/' Q = 169.6 cfs
@ S=.0200'/' Q = 239.9 cfs
Street Capacity to R/W elev. = Q = 1326.4853 * S^.5
A = 28.26 P=87
@ S=.0020'/' Q = 59.3 cfs
@ S=.0040'/' Q = 83.9 cfs
@ S=.0100'/' Q = 132.6 cfs
@ S=.0200'/' Q = 187.6 cfs
Above Crown = 0.1' A = 44.77 P = 101 Q = 2585.3891
@ S=.0100'/' Q = 258.5 cfs

(120' R/W Rd)
Street Capacity to R/W elev. :
Area=A=33*.5*(.83-.17)+2*(.83+.66)/2+.16*8/2
= 13.020
Wetted Perimeter = P = 43.5
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 577.20*S^.5 (1/2 street)
@ S=.0040'/' Q = 36.5 (1/2 street)
@ S=.0100'/' Q = 57.7 (1/2 street)
Street Capacity to crown elev. :
Area = 13.02 + (1.17-.83)*(60+43)/2
= 30.53
Wetted Perimeter = 60.7
Street Capacity = Q = 1917.9939 * S^.5
@ S=.0040'/' Q = 121.3 (1/2 street)

T/C - T/C :

(60' R/W Rd) Area = A = 2x[.5*.29*16+.17*2*.5+.29*2+.21*18] = 13.70
Wetted Perimeter = P = 37.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 701.7162 * S^.5
@ min. grade, s = 0.0040, Q = 44 cfs
@ s = 0.0100, Q = 70 cfs
@ s = 0.0200, Q = 99 cfs

(64' R/W Rd) Area = A = 2x[.5*.33*18+.17*2*.5+.33*2+.17*20] = 14.40
Wetted Perimeter = P = 41.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 712.0491 * S^.5
@ min. grade, s = 0.0040, Q = 45 cfs
@ s = 0.0100, Q = 71 cfs

(80' R/W Rd) Area = A = 2x[.5*.5*30+.17*2*.5+.5*2] = 17.34
Wetted Perimeter = P = 65.0
Street Capacity = Q = (1.49/n)*A*R^(2/3)*S^.5
= 765.5289 * S^.5
@ min. grade, s = 0.0040, Q = 48 cfs
@ s = 0.0100, Q = 76.5 cfs

IMPERVIOUSNESS GUIDELINES

LAND CLASSIFICATION	AREA PER DWELLING UNIT	% IMPERV.
Open space, national forest	0	10
Rural residential	2.5 acres	15
Rural residential	1 acre	21
Semi-rural residential	.5 - 1 acre	27
Residential	10,000 S.F. lots	35
Residential	7,000 S.F. lots	42
Residential	6,000 S.F. lots	45
Residential	5,000 S.F. lots	48
Multi residential	7.1 - 11 units/acre	60
Multi residential	11.1 - 15 units/acre	65
Multi residential	15.1 - 20 units/acre	70
Multi residential	20.1 - 30 units/acre	75
Commercial		85
General industrial		90

STANDARD VALUE TABLES

MANNING'S N VALUES

TYPE OF DEVELOPMENT	N
Industrial-Commercial	0.014
Residential	0.040
Rural	0.060

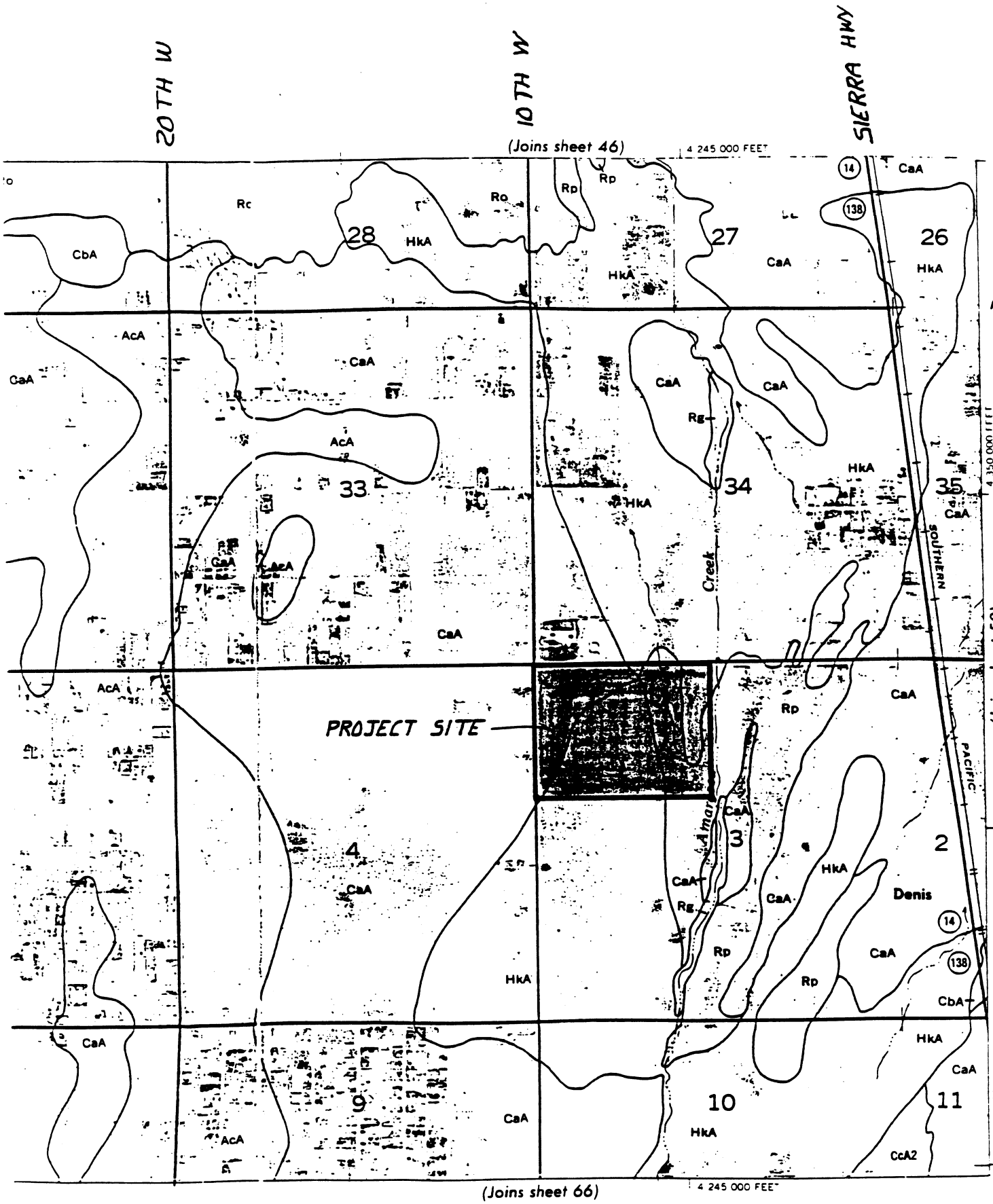
STANDARD LOT VALUES

TYPE OF DEVELOPMENT	LOT LENGTH	LOT SLOPE RANGE
Industrial-Commercial	200	0.005-0.02
Residential	100	0.01 -0.05
Rural	200	0.05 -1.00

STANDARD RANGE OF PROPORTION IMPERVIOUS

TYPE OF DEVELOPMENT	PROPORTION IMPERVIOUS
Single-Family	0.21-0.45
Multi-Family	0.40-0.80
Commercial	0.48-0.92
Industrial	0.60-0.92
Institutional	0.70-0.90

Average Values for Metropolitan Los Angeles County are:
Single-Family=0.42 Multi-Family=0.68 Commercial=0.92
Industrial=0.91 Institutional=0.68
For more detail, see the separate Proportion Impervious Table.


20TH W
10TH W
SIERRA HWY
(Joins sheet 46)
4 245 000 FEET
(Joins sheet 50)
(Joins sheet 66)
4 245 000 FEET
4 350 000 FEET
4 340 000 FEET
AVE L
AVE N
PROJECT SITE
Amargosa Creek
SOUTHERN PACIFIC
Denis
28
27
26
33
34
35
4
3
2
9
10
11
CbA
Rc
Ro
Rp
HkA
CaA
AcA
Rg
CcA2

2 Miles

HYDROLOGIC SOIL GROUPS

Soil A : AsB AtA CaA CaC CcA2 CcD2 CbA CyA CyC CzC DuD HaB2 HbA Hbc HbB HdC MfA MfC SoB

Soil B : AaB AcA AdB GsA GsC GsC2 GsD2 HcA HcC HeC HfA HgA HgA2 HgB HkA HkB HmA HnA LeF MgA MgB MoA MpA MpC OaC ObA ObC OcC OdA OdC ScE ScF ScF2 ShE ShE2 ShF ShF2 SsA SsB VaA VbA VbB VcA VsD2 VsE VsE2 VsF VaF2 WqC WqD WoC YoA YoC

Soil C : AqF AmF2 AnE ApF ChC ChE CkC CkD CmD CmE CmF CmF2 CnG3 Co GbF LaE LdF Me MzB OqC OqD OqE OqF OqF2 OzE OhF Po Ps Px RcA RcB RcC RcD RdF2 ReC ReE RfB RfC Rm Rm2 Ro Rp Rr Ru Rs Rt Su Sv Sw Sx Sy TrF Tl2 Tu Tv Tw

Soil D : AyD GaE2 GaF2 GcE GdF MhE2 MhF2

SOIL SURVEY GROUP

Group	Soil #
A	124
B	134
C	120
D	123

APPENDIX E

BIOLOGICAL TECHNICAL REPORT
FOR
ANTELOPE VALLEY BUSINESS PARK
PALMDALE, CALIFORNIA

Prepared for

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RECON NUMBER 2262B
JUNE 13, 1991

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I. INTRODUCTION

An analysis of biological resources is presented for the proposed industrial Antelope Valley Business Park located in the city of Palmdale, Los Angeles County, California (Figure 1). The project area is 120.8 acres located in the northwest quarter of Section 3, Township 6 North, Range 12 West, Lancaster West Quadrangle, 7.5-minute series, San Bernardino Base Meridian (Figure 2). The city of Palmdale is found approximately 4.5 miles to the southwest, and the city of Lancaster boundaries begin north of M Avenue, which forms the northern boundary of the project site. Tenth Street forms the western boundary of the site.

The purpose of this report is to describe the general biological character of the site in terms of vegetation, flora, wildlife, and wildlife habitats; describe and interpret the sensitive resources found on-site; analyze the biological significance of the site in view of federal, state, and local laws and policies; assess project impacts; and present mitigation for identified significant impacts.

II. SURVEY METHODS

The biological resources of the project site are described herein based upon information compiled through field reconnaissance, supplemented by previous documentation of biological resources within the project vicinity and applicable reference material. The methods used are described below.

Prior to site reconnaissance, sensitive biological resources potentially present were identified through a literature search using the following sources: U.S. Fish and Wildlife Service (USFWS 1987), California Department of Fish and Game (CDFG) (State of California 1980, 1985, 1986), California Natural Diversity Data Base (CNDDB) (State of California 1989), City of Palmdale General Plan (City of Palmdale 1990a), County of Los Angeles General Plan (1975), and unpublished data from other environmental reports (Fishman and Charlton 1989; Fishman 1989). As the California Natural Diversity Data Base relies on voluntary information submitted by biologists and not all biologists contribute, the information obtained is not a complete inventory; therefore, the CNDDB search is only used to supplement field reconnaissance observations.

Botanical and zoological field surveys were conducted October 22, 1990, by Julie M. Vanderwier, botanist, and Nancy C. Nicolai, wildlife biologist. These surveys identified on-site plant communities and wildlife habitat types as well as all observed plant and animals species. Six transects were walked (Figure 3) with special attention being directed towards the banks of Amargosa Creek and an unnamed drainage to the west of the creek.

All flora encountered during the survey were identified and are contained within Table 1. Plant taxonomy follows that of Munz (1974) for vascular plants, and plant community classifications follow Holland (1986) with modifications, as necessary, based on Thorne (1976) and Barbour and Major (1980). Common names for plants follow those of Munz (1974) and Abrams (1984). Vertebrate taxonomy follows the nomenclature of the American Ornithologists' Union (1957, 1973, 1982) for birds, Jones et al. (1982) for mammals, and Jennings (1983) for reptiles and amphibians. Assessments of the sensitivity of species and habitats are based on Tate (1986), Smith and Berg (1988), State of California (1986,

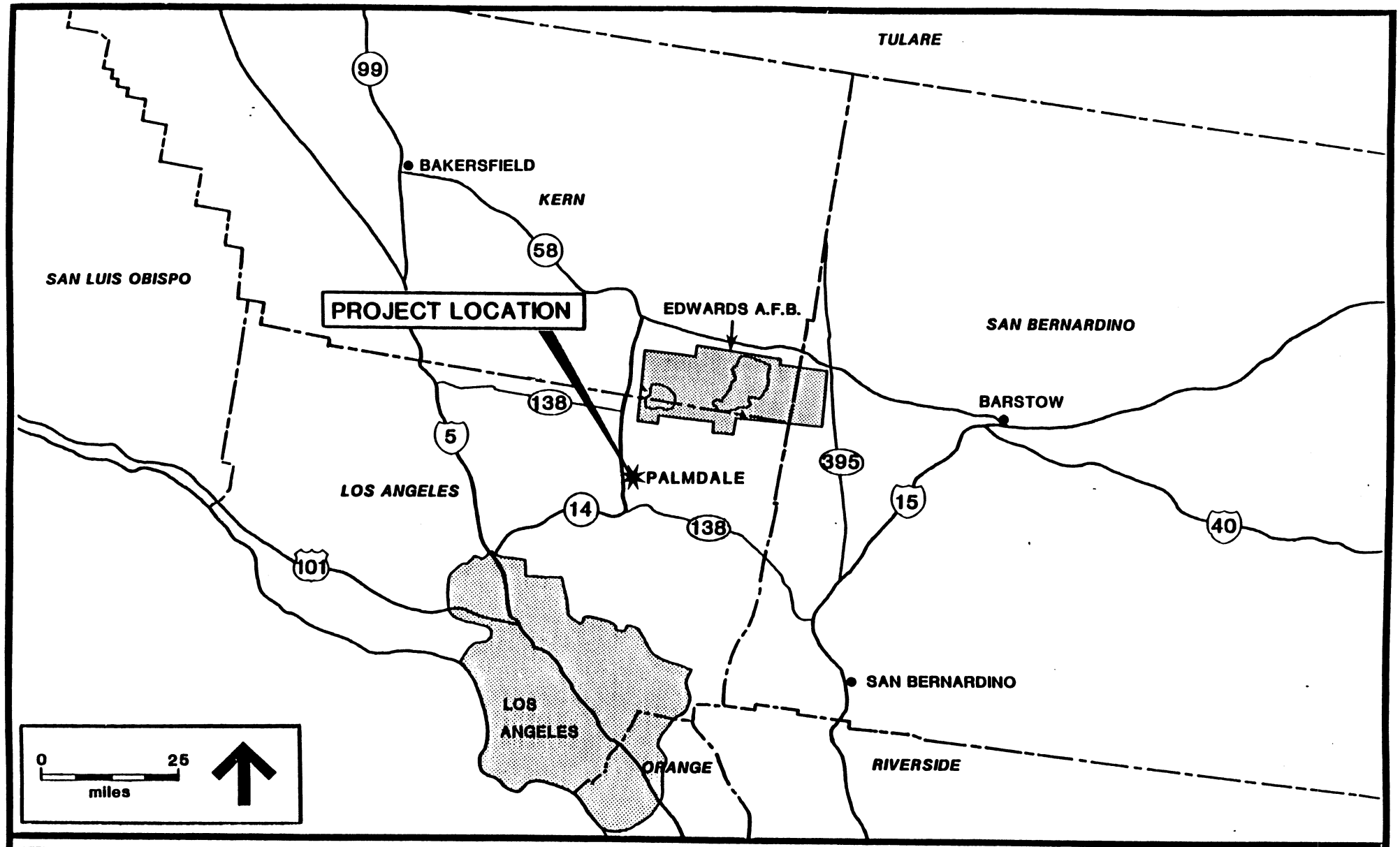

FIGURE 1. THE LOCATION OF THE PROPOSED PROJECT RELATIVE TO THE COUNTY OF LOS ANGELES

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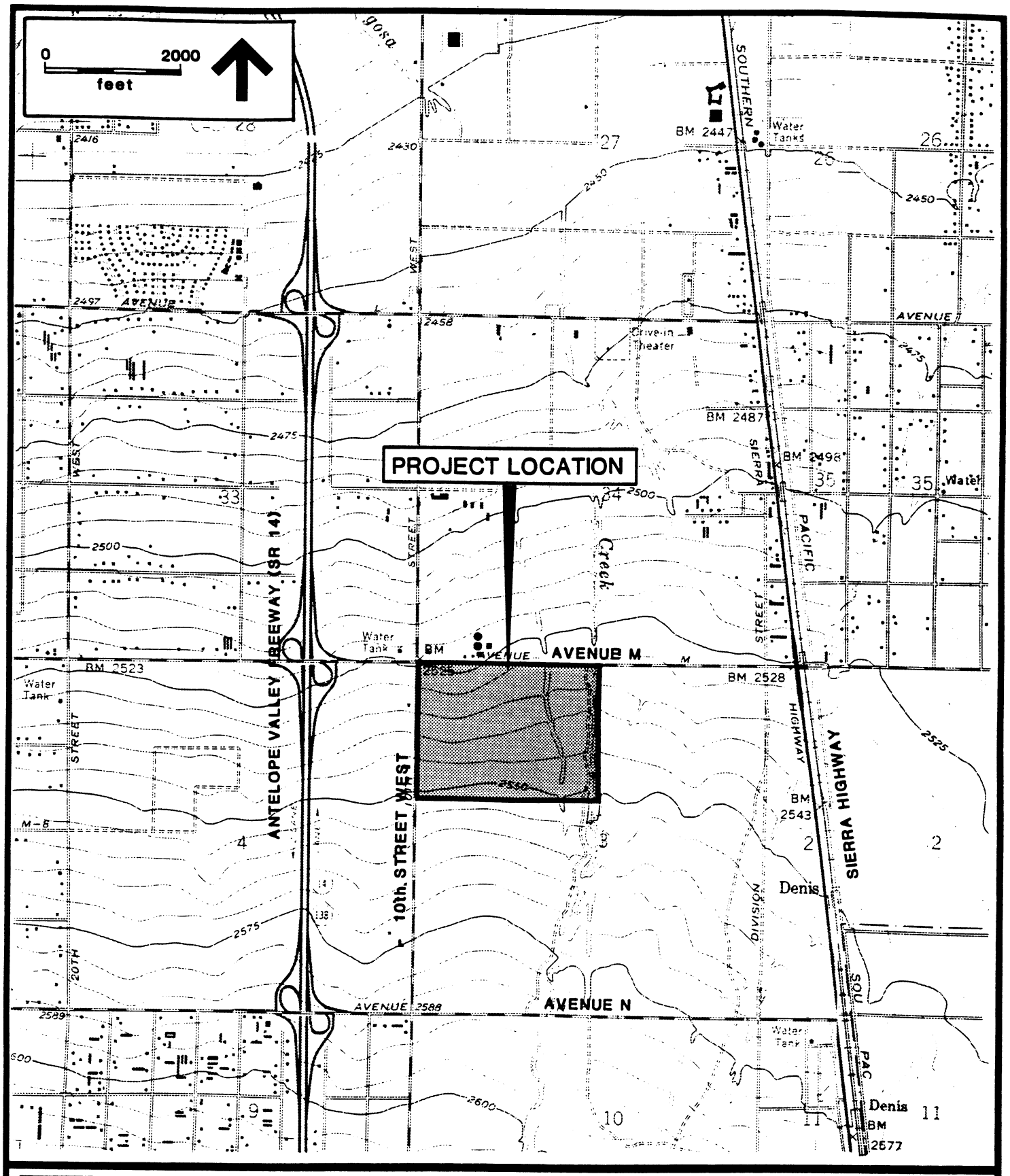

FIGURE 2. PROJECT LOCATION ON U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS, LANCASTER EAST AND LANCASTER WEST QUADRANGLES

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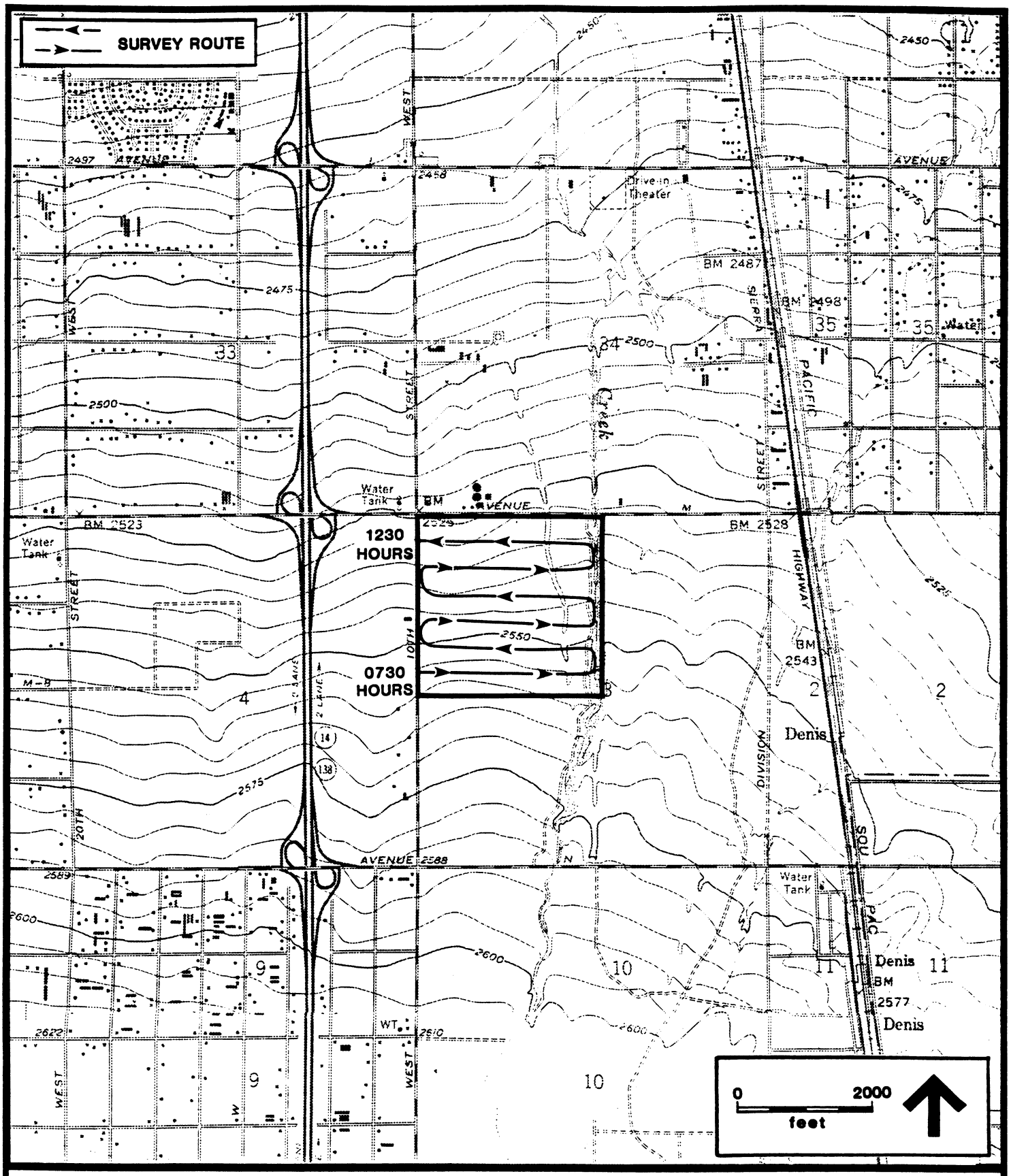

FIGURE 3. SURVEY ROUTES

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TABLE 1
VASCULAR PLANT LIST

Scientific Name	Common Name	Habitat	Status
Acamptopappus sphaerocephalus	Yellowhead	JTW	N
Ambrosia acanthicarpa	Ragweed	JTW	N
Ambrosia dumosa	Burrobush	JTW	N
Amsinckia tesselata Gray	Fiddleneck	JTW	N
Artemisia tridentata Nutt. ssp. *tridentata*	Basin sagebrush	JTW	N
Atriplex canescens Nutt.	Four-wing saltbush	JTW	N
Bromus diandrus Roth.	Ripgut grass	JTW	I
Bromus rubens L.	Red brome	JTW	I
Bromus tectorum L.	Cheat-grass	JTW	I
Camissonia sp.	Sun-cup	JTW	N
Chrysothamnus nauseosus (Pall.) Britton	Rubber rabbit brush	JTW	N
Cryptantha circumcissa (H. & A.) Jtn.	Dwarf hiddenflower	JTW	N
Ephedra nevadaensis Wats.	Nevada ephedra	JTW	N
Eremocarpus setigerus (Hook.) Benth.	Dove weed	JTW	N
Eriastrum densifolium (Benth.) Mason.	Many-leaved eriastrum	JTW	N
Eriogonum parishii Wats.	Parish's eriogonum	JTW	N
Erodium cicutarium (L.) L. Her.	White-stemmed filaree	JTW	I
Euphorbia albomarginata T. & G.	Rattlesnake weed	JTW	N
Eurotia lanata (Pursh) Moq.	Winterfat	JTW	N
Grayia spinosa (Hook) Moq.	Spiny hopsage	JTW	N
Hymenoclea salsola T. & G.	Cheese bush	JTW	N
Larrea tridentata (Sessé & Moc. ex DC.) Cov.	Henbit	JTW	I
Lasthenia californica (F.& M.) Greene	Gold fields	JTW	N
Lessingia lemmonii Gray	Valley lessingia	JTW	N
Linanthus parryae (Gray) Greene.	Parry's linanthus	JTW	N
Lycium andersonii Gray	Water jacket	JTW	N
Lycium cooperi Gray	Peachthorn	JTW	N
Mirabilis bigelovii Gray var. *bigelovii*	Wishbone bush	JTW	N
Opuntia echinocarpa Engel. & Bigel. var. *echinocarpa*	Golden cholla	JTW	N
Oryzopsis hymenoides (R. & S.) Ricker	Indian rice grass	JTW	I

TABLE 1
VASCULAR PLANT LIST
(continued)

Scientific Name	Common Name	Habitat	Status
Petalonyx thurberi G. ssp. *thurberi*	Sandpaper plant	JTW	N
Poa secunda Presl.	Sandberg bluegrass	JTW	I
Schismus barbatus (L.) Thell.	Mediterranean schismus	JTW	I
Stipa speciosa Trin. & Ruper	Desert stipa	JTW	N
Tetradymia stenolepis Greene	Cotton-thorn	JTW	N
Yucca brevifolia Engelm. in Wats. var. *brevifolia*	Joshua tree	JTW	N

HABITATS

JTW = Joshua tree woodland

OTHER TERMS

N = Native to locality
I = Introduced species from outside locality

1989), and Holland (1986). The list of observed vertebrate species is contained in Table 2.

III. PHYSIOGRAPHY

The project site is located in Antelope Valley. Mountain ranges to the north, west, and south block the movement of moist coastal air into this valley, and this results in the high desert climate found here. Average temperatures for Palmdale in January are -0.7 degrees C; average July temperatures are 36.3 degrees C (Turner 1982). The topography of the site is relatively flat, with slopes not exceeding two percent. Amargosa Creek forms the eastern boundary of the project site.

Soils on-site consist of Cajon loamy sand (0-2 percent slope), Hesperia fine sandy loam (0-2 percent slope), and Rosamund loam (slopes less than 1 percent) with a very limited amount of River Wash (slopes less than 1 percent) being present within Amargosa Creek (U.S. Department of Agriculture 1970).

The site is bordered to the west and north by two- and four-lane city streets; Highway 14 is approximately 0.25 mile to the west. Adjacent land uses include a mixture of undeveloped lands to the east and south and industrial and scattered residential development to the west and north.

IV. RESULTS

A. VEGETATION

A total of 36 plant species were identified on-site, 28 (80 percent) of which are native species.

The vegetation of the project area is classified as Joshua tree woodland due to the presence of Joshua trees (*Yucca brevifolia* var. *brevifolia*). The density of Joshua trees varies on-site, with greater densities being found in the western portion. A vegetation map is provided as Figure 4.

Joshua tree woodland is an open woodland habitat consisting of an overstory of Joshua trees and an understory of various shrubs and perennial herbs. Often these trees are dominant in a visual sense rather than ecologically; such is the case on-site. There is little or no herbaceous cover in this habitat type during most of the year as these species are generally ephemeral annuals. The dominant species in this community display a diversity of life forms: sclerophyllous (thick-leaved) evergreen trees and shrubs (*Yucca* spp.), microphyllous (small-leaved) evergreen shrubs (*Juniperus* spp.), semideciduous shrubs (*Eriogonum fasciculatum* ssp. *polifolium* and *Tetradymia axillaris*), semisucculents (*Lycium* spp.), and succulents (*Opuntia* spp.). Joshua tree woodlands are endemic to the Mojave Desert, although they do make contact with the Sonoran Desert in west-central Arizona near Wickenberg (Lowe 1964). They are found predominantly on sandy, loamy, or fine gravelly soils where runoff is minimal. At lower elevations, Joshua tree woodland intergrades with creosote bush scrub. Gradations at higher elevations occur with pinon or juniper woodlands. The main growing season is spring, with most growth limited by cold weather in winter and drought in summer and fall.

TABLE 2
WILDLIFE SPECIES OBSERVED

Common Name	Scientific Name	Habitat
Reptiles		
Side-blotched lizard	*Uta stansburiana*	JTW, AW
Western whiptail	*Cnemidophorus tigris*	JTW
Desert spiny lizard	*Sceloporus magister*	JTW
Mammals		
Coyote	*Canis latrans*	JTW
Desert kit fox	*Vulpes macrotis*	AW
White-tailed antelope squirrel	*Ammospermophilus leucurus*	JTW, AW
California ground squirrel	*Spermophilus beecheyi*	JTW, AW
Valley pocket gopher	*Thomomys bottae*	D
Merriam's kangaroo rat	*Dipodomys merriami*	JTW
Blacktail hare	*Lepus californicus*	JTW
Desert cottontail	*Sylvilagus audubonii*	JTW
Deermice	*Peromyscus* spp.	JTW
Birds		
Mourning dove	*Zenaida macroura*	JTW
Common raven	*Corvus corax*	JTW
Cactus wren	*Campylorhyncus brunneicapillus*	JTW
Purple finch	*Carpodacus purpureus*	JTW
House finch	*Carpodacus mexicanus*	JTW
White-crowned sparrow	*Zonotrichia leucophrys*	JTW
Rock dove	*Columba livia*	D
California towhee	*Piplio fuscus*	JTW

JTW = Joshua tree woodland
AW = Amargosa wash
D = Disturbed areas

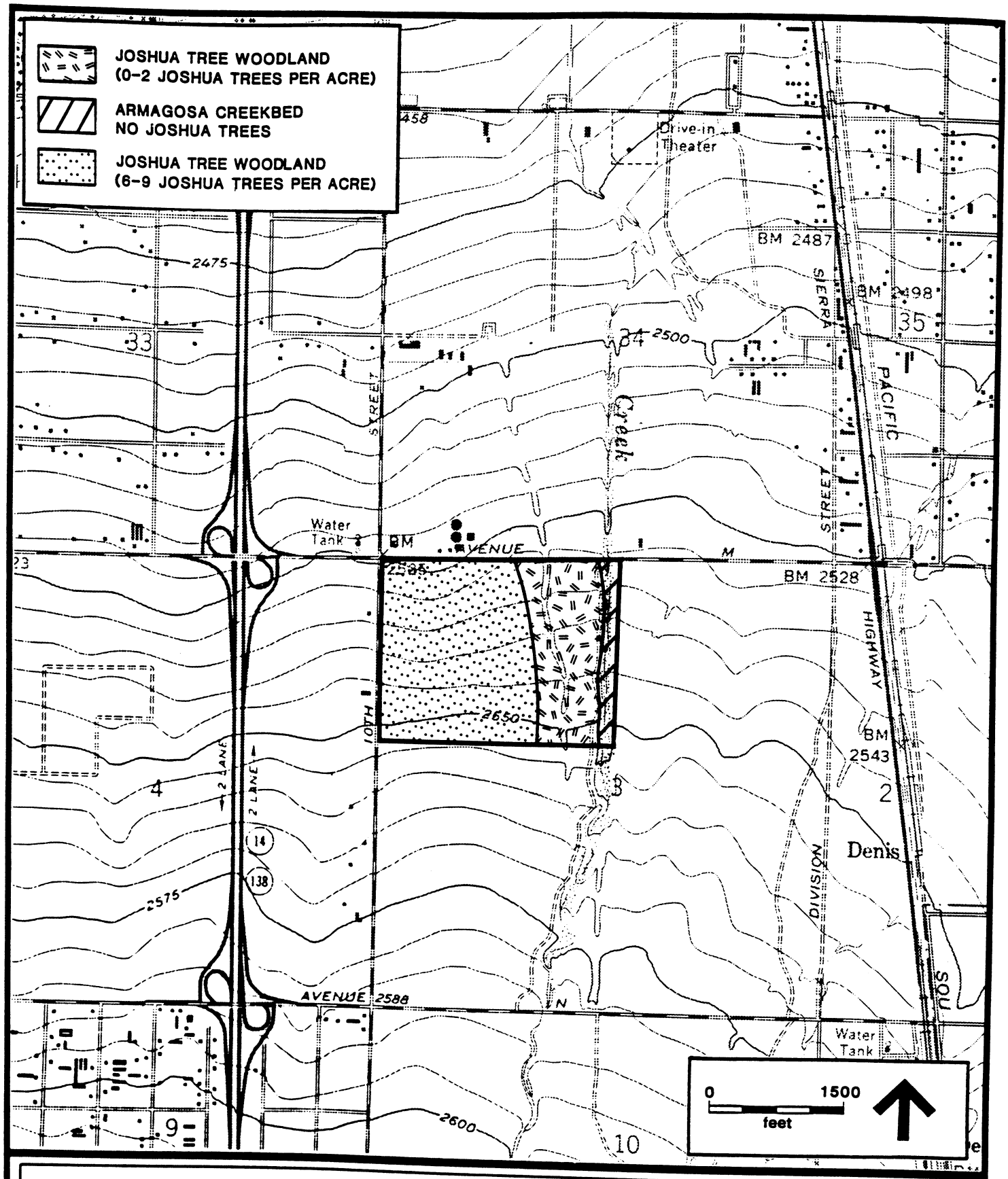

FIGURE 4. VEGETATION MAP

Joshua trees of all ages are found on-site, but most appear to be of moderate age. Fishman and Charlton (1989) consider the density of these trees to be average to low, ranging from six to eight trees per acre in the western portion of the site to zero to two trees per acre in the eastern portion. Analysis of data collected during the October survey in four 50- by 2,650-foot transects reveals a gross estimated average of nine trees per acre and confirmed the pattern that density per acre is substantially greater in the western portion. Areas where there are few or no Joshua trees appear to coincide with the occurrence of Rosamund loam soils. Based on the most conservative estimate of Joshua tree densities, at least 480 trees are found on-site. Older, denser stands of Joshua tree exist off-site to the southeast.

Understory shrubs, which range in height from one to four meters, include water jacket (*Lycium andersonii*), peachthorn (*Lycium cooperi*), Nevada ephedra (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), rubber rabbitbrush (*Chrysothanumnus nauseosus*), cotton-thorn (*Tetradymia stenolepis*), and white burrowbush (*Hymenoclea salsola*). Creosote bush (*Larrea tridentata*) is an uncommon element within this shrub understory. Because the survey was conducted in autumn (last October), the majority of herbaceous species were not identifiable; however, Fishman and Charlton (1989) identified a number of these species during their April 1989 survey. These include tesselate fiddleneck (*Amsinkia tessellata*), Lemmon's lessingia (*Lessingia lemmonii*), goldfields (*Lasthenia californica*), desert needlegrass (*Stipa speciosa*), many-leaved eriastrum (*Eriastrum densiflorum*), and Parry's linanthus (*Linanthus parryi*).

The Amargosa wash contains shrubs not found on the less disturbed parts of the site, and these include great basin sagebrush (*Artemisia tridentata*) and four-wing saltbush (*Atriplex canescens*).

B. WILDLIFE

Twenty vertebrate species were identified on-site: three reptile species, nine mammal species, and eight bird species. The reptile and bird species were identified through direct observation, while mammals were identified via sign such as scat or burrows. All 20 species are typical residents of Joshua tree woodland and desert scrub habitats. Joshua tree woodland in this area of the Mojave Desert has, however, the potential to provide habitat for a greater diversity of species including, but in no way limited to, quail, sage thrasher, poorwill, loggerhead shrike, gopher snake, red racer, and coachwhip.

C. SENSITIVE RESOURCES

1. Plant Communities

Joshua tree woodland is considered to be a rare habitat by the California Natural Diversity Data Base and is included in their inventory as a community which is possibly threatened but for which more information is needed (State of California 1989). The North Los Angeles County General Plan (1975) identified Joshua tree woodland as a fragile community, affected by subdivisions, off-road vehicle activities, fires, and tree cutting. At the time of the 1975 plan, it was considered to be near a critical level in northern Los Angeles County. The City of Palmdale, in its draft General Plan (1990a), states that rapid development in the Palmdale area has raised concerns about the destruction

of large numbers of Joshua trees. Joshua trees are also one of the main concerns of a draft ordinance (City of Palmdale n.d.) regarding the preservation of native desert vegetation within the city of Palmdale. Joshua tree woodlands are generally found on level lands or gentle slopes which are good grazing lands and, as a result, have been subjected to moderate or severe grazing pressures (Vasek and Barbour 1977).

On-site, Joshua tree woodland covers approximately 115 acres. Habitat quality is considered to be low to moderate based on the low density of trees within the woodland, low number of young trees, lack of downfall, moderate understory diversity, trash accumulation, and grazing history. This site is also bordered to the north and west by streets which carry a high volume of traffic traveling at high speeds. This would effect the wildlife use and productivity of the property due to isolation from larger areas of similar habitat.

2. Plant Species

No plant species listed by the state or federal government or contained within the California Native Plant Society's (CNPS) inventory of rare and endangered plant species were identified on-site.

Potentially occurring plant species state, federal, or CNPS listed, based upon habitat type and general locational information, include alkali mariposa lily (*Calochortus striatus*), Mohave spineflower (*Chorizanthe spinosa*), Peirson's morning-glory (*Convolvulus peirsonii*), and desert cymopteris (*Cymopteris deserticola*). In addition, a CNDDB search identified records of occurrence for alkali mariposa lily and Mohave spineflower within one mile of the project site.

a. Alkali Mariposa Lily. This plant is a CNPS List 1B (plants rare, threatened, or endangered in California and elsewhere) species as well as a Category 2 candidate species for federal listing. The blooming period for this lily is April-June, and therefore, it would not have been in an identifiable state during the current field reconnaissance. The likelihood of its occurrence on-site is extremely low as this species is found in moist, low-lying alkaline areas. Although small saline or alkaline areas may be found within Rosamund loam and Hesperia fine sandy loam soil series, no such areas are present on-site. Fishman and Charlton (1989) also did not identify any suitable habitat on-site.

b. Mohave Spineflower. This plant is a CNPS List 4 (plants of limited distribution) species. Munz (1974) states that Mohave spineflower is found on dry sandy or gravelly soils in creosote bush scrub and Joshua tree woodland habitats, and based upon this, on-site conditions would appear to be suitable. Fishman and Charlton (1989) state, in addition, that the species prefers areas adjacent to small depressions or playas and that no suitable habitat for the spineflower is present on-site. The blooming period for this species is April-July; nevertheless, a directed search for any species of *Chorizanthe* was made. None were identified.

c. Peirson's Morning-glory. This plant is also a CNPS List 4 species which is found within Joshua tree woodland on dry slopes (Munz 1974). Although the habitat type is appropriate, the site is without slope and below

the elevational range (3,000-4,500 feet) at which this plant is found; therefore, this plant is not expected to occur within the project area. During the course of the surveys, special attention was directed towards the detection of any *Convolvulus* species; however, none were observed.

d. Desert Cymopteris. This species is a CNPS List 1B species as well as a Category 2 candidate for endangered species listing. Munz (1974) identifies it as occurring in creosote bush scrub and Joshua tree woodland, being "very rare." Information from the California Native Plant Society (Smith and Berg 1988) indicates that populations of this plant are found substantially east of the project site and centered around Kramer; it is therefore highly unlikely that desert cymopteris would occur on-site. Searches were made for any vegetative remains in any case; however, none were found.

3. Animal Species

No state or federally listed animal species were identified on-site; however, several sensitive animal species have the potential to occur on-site. These are discussed below.

a. Mojave Ground Squirrel. The Mojave ground squirrel *(Spermophilus mojavensis)* is a state threatened species and a federal Category 2 candidate for endangered species listing. Small burrows of the appropriate size for Mojave ground squirrel were observed in the banks of both drainages. As this species hibernates during the winter and summer seasons, it could not have been observed during the course of the field survey. Two other small ground squirrels with similar habitat requirements and sign (burrows and scat) co-occur with this species; one of these, the white-tailed antelope squirrel, was observed on-site during the surveys. A trapping program, conducted by a qualified biologist who has obtained the proper state permits, is required to conclusively determine the presence or absence of Mojave ground squirrels on-site.

b. Desert Tortoise. The desert tortoise (*Gopherus agassizii*) is currently emergency listed as endangered by the federal government. Directed searches were made for tortoises or tortoise sign; however, no desert tortoises or their sign were observed. Habitat on-site is considered to be suitable for tortoises, although none are expected to occur due to the degree of development which has surrounded the site for over a decade, past grazing history, degree of site disturbance, and the fact that no burrows were identified.

c. San Diego Horned Lizard. The San Diego horned lizard *(Phrynosoma coronatum blainvillei)* is a Category 2 candidate for federal listing and a CDFG Species of Special Concern. A CNDDB search revealed an element recordation for San Diego horned lizard from the section immediately north of the project site. This record is based on a specimen housed at the Los Angeles County Museum of Natural History, and the date of collection, along with any other pertinent information, is unknown. These lizards feed on ants and require soft, sandy soils for burying themselves. Active ant mounds were common on-site and on-site soils appear suitable for burrowing. Assuming the identification of the museum specimen is correct, the potential does exist for the presence of this horned lizard on-site. However, the site is currently not considered to be part of the known range for the horned lizard and none were observed during the survey.

d. Prairie Falcon. The prairie falcon (*Falco mexicanus*) is an inhabitant of dry, open country and, occasionally, woodlands. For nesting, they require cliffs or rocky outcroppings adjacent to the open, arid valleys needed for foraging. This falcon is a CDFG Species of Special Concern. The project site is identified in the Palmdale Community General Plan (County of Los Angeles 1975) as "Prairie Falcon Assemblage." Development of surrounding lands has effectively reduced the amount of open area necessary for large predators to use as foraging territory, and therefore, these birds are no longer expected to occur in this area of Palmdale.

e. Burrowing Owl. The burrowing owl (*Athene cunicularia*) is a ground-dwelling, diurnal species found in open country, often utilizing abandoned ground squirrel burrows. Open desert scrub communities are widely, but sparsely, inhabited. This owl is also a CDFG Species of Special Concern, having become quite scarce on the northern deserts from the eastern Mojave Desert north through Inyo County (Garrett and Dunn 1981). Fishman and Charlton (1989) identified burrows of burrowing owl on adjacent property in their surveys of the project area; however, a directed search during their survey and the current survey identified no evidence of burrowing owls on-site.

V. PROJECT IMPACTS

The proposed project involves the creation of 57.94 acres of industrial, 37.73 acres of business park, and 5.53 acres of commercial land uses with lot sizes ranging from 0.6 to 7.32 acres. Approximately 20 acres of the site will be streets.

Project implementation will result in the loss of 115 acres of Joshua tree woodland habitat. Due to the low to moderate habitat quality of the site and its reduced value as wildlife habitat due to the existing degree of isolation from high-quality Joshua tree habitat, the loss of these 115 acres is not considered to be significant pursuant to the California Environmental Quality Act in terms of posing a threat to the existence of this habitat type within its range. The impact is, however, cumulatively considerable when viewed in connection with the incremental effects of past, current, and probable future projects on Joshua tree woodland within the city of Palmdale and this part of Los Angeles County.

The City of Palmdale, in its General Plan, identifies very little open space, and it is unknown just how much currently contains Joshua tree woodland. The lands which surround the site are zoned as light industrial, a designation which affords little opportunity for the preservation and maintenance of biological habitat values. The City of Palmdale is currently using a draft Native Desert Vegetation Ordinance (#692) as policy intended to offset such impacts to Joshua trees and other desert vegetation (Stanley 1990). This policy provides for the on-site retention, and transplantation, of Joshua trees and California junipers as a mechanism to protect these species. The ordinance, however, does not provide a means to achieve mitigation for the impacts to desert vegetation (in this case, Joshua tree woodland), as there is no mechanism for the maintenance of desert vegetation habitat values. Project conformance to this policy is discussed in a subsequent section.

VI. MITIGATION MEASURES

As previously discussed in the impact analysis section, the loss of 115 acres of Joshua tree woodland on-site is not considered to be a significant impact requiring mitigation under state law. It is, however, a cumulatively considerable impact for which there is no mechanism for mitigation currently in place within the City of Palmdale. It is recommended that a mitigation banking program be established to deal with this type of cumulative impact to Joshua tree and California juniper woodlands (also found in the vicinity), as well as other types of desert vegetation.

Potentially significant impacts to Mojave ground squirrel could occur as a result of project implementation if these animals are present on-site. A trapping program must be conducted during the spring season to conclusively determine species presence or absence. This trapping effort may only be conducted by a biologist with the necessary state permits and/or memoranda of understanding. If Mojave ground squirrels are present, mitigation measures, as determined by the California Department of Fish and Game, would be required prior to project approval.

If San Diego horned lizards occur on-site, impacts associated with project implementation could be considered significant. San Diego horned lizards are generally a coastal species, occurring predominantly in coastal sage scrub and chaparral communities of southwestern California (McGurty 1981). McGurty (1987) notes that collection for the pet trade and habitat destruction have almost eliminated the subspecies from the Los Angeles Basin. Its presence here would represent an occurrence on the eastern edge of its distributional range, which would be noteworthy. As a result, directed surveys for the presence of this lizard should be conducted at a time when these lizards are active (April-July). If San Diego horned lizards are identified on-site, mitigation measures shall be proposed in accordance with California Department of Fish and Game and U.S. Fish and Wildlife Service requirements.

Although not a mitigation measure for project impacts, it is recommended that on-site landscaping be in accordance with the City of Palmdale's Assessment District Tree List (City of Palmdale 1990b), with emphasis being placed on the use of native desert species.

No other mitigation measures are deemed necessary.

VII. PALMDALE NATIVE DESERT VEGETATION DRAFT ORDINANCE

Draft Ordinance 692, referred to as the Palmdale Native Desert Vegetation Ordinance and currently being treated as policy by the City of Palmdale Planning Department (Stanley 1990), provides for several measures to preserve individual specimens of Joshua trees and California junipers. These include on-site preservation through project design or as transplanted landscape elements; off-site preservation for city, private, and/or public landscape use; or payment of a fee in lieu of preservation.

The project proponent is required to preserve 242 Joshua trees pursuant to the minimum requirements of the draft ordinance (two trees per gross acre, averaged for the entire site under consideration). Compliance with this ordinance would mitigate project-related impacts to Joshua trees. A Joshua Tree

Preservation and Transplantation Plan will need to be developed and submitted to the City of Palmdale Planning Department for approval prior to issuance of grading permits. As the project proposes the development of the entire site, in situ preservation through project design is infeasible. The proponent, therefore, proposes to retain 242 Joshua trees as landscape elements within the project area. This will be accomplished by the creation of an on-site holding area for the 242 Joshua trees to be transplanted as landscape elements. The maintenance of these tree will be supervised by a desert vegetation specialist. Potential transplant candidates should be Joshua trees not greater than 12 feet in height showing evidence of past blooming (if of sufficient age) and having healthy foliage and root systems (Tony Baal, The Tree Movers, 11/90). As a condition of project approval and prior to the project implementation (such as issuance of a grading permit), these trees should be selected and tagged by a desert vegetation specialist with experience in the transplanting of Joshua trees. The selected trees would then be maintained in an on-site nursery holding area until needed for landscaping purposes.

As project development will be phased, trees can then be removed from the holding area as needed for landscaping purposes. Those trees which cannot be accommodated as landscape elements within the project area will be made available to the City, private contractors, and the public as specified in Section 14.04.060(B)(2)(a-c). It is not anticipated that the identification of a temporary off-site holding area or payment of fees in lieu of preservation will be necessary.

Pursuant to Section 14.04.070 of the draft ordinance, the proponent will bond for the required two-year maintenance of Joshua trees in a healthy condition. Any losses of Joshua trees within this maintenance period will require replacement as determined by the Director of Planning, City of Palmdale.

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APPENDIX F

NOISE TECHNICAL ANALYSIS
FOR
ANTELOPE VALLEY BUSINESS PARK

Prepared for

CITY OF PALMDALE
708 E. PALMDALE BOULEVARD
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RECON NUMBER 2262N
JUNE 17, 1991

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ATTACHMENT

1: FHWA Noise Prediction Model Input and Output Data

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I. INTRODUCTION

The proposed Antelope Valley Business Park is located in the northern portion of Los Angeles County within the city of Palmdale. The currently undeveloped 120-acre site is bounded on the west by 10th Street West, on the north by Avenue M, and on the south by vacant land. Amargosa Creek comprises the eastern boundary of the site. Figures 1 and 2 show the site in relation to the region and to the city of Palmdale. The site is generally flat, sloping slightly to the north with elevations ranging from 2,525 feet to 2,560 feet above mean sea level.

A mixture of land uses are proposed for the site. The Antelope Valley Business Park would include 5.67 acres for commercial use, 57.00 acres for industrial use, and 37.87 acres for business park use. Figure 3 presents a project land use plan detailing the locations of these land uses.

Industrial or proposed industrial lands surround the site. Air Force Plant 42 is located approximately one and one quarter miles east of the site. An 80-acre area to the south has been proposed for an industrial center. There is an industrial complex north of Avenue M and scattered industrial businesses are located to the west. Over 2,000 feet to the west, the land is zoned for equestrian residential.

This report includes the following analyses:

- Increases in noise levels on the surrounding roadways due to traffic generated by development of the project.
- The existing and future noise environment on the site from exterior transportation sources.
- Noise impacts on the site from truck traffic on the site.
- Any noise impacts to the commercial or business park areas of the site which may occur from activities in the industrial portion of the project.

II. SUMMARY OF FINDINGS

Existing noise levels on the site are produced by both vehicular traffic and aircraft from U.S. Air Force Plant 42. The combined existing average noise levels on the site range from approximately 70 A-weighted decibel (dBA) average day/night noise level (L_{dn}) to 74 L_{dn}. Aircraft overflights could cause single event noise levels up to 92 dB on the site (City of Palmdale 1990a).

Development of the project would not cause significant impacts to the adjacent land uses. Future noise levels on the site are predicted to exceed noise standards set by the City of Palmdale for exterior commercial and industrial areas regardless of whether the project is developed. Because noise levels on the property will exceed the noise level standards stated in the Draft General Plan, noise impacts to the proposed land uses on the project are considered significant.

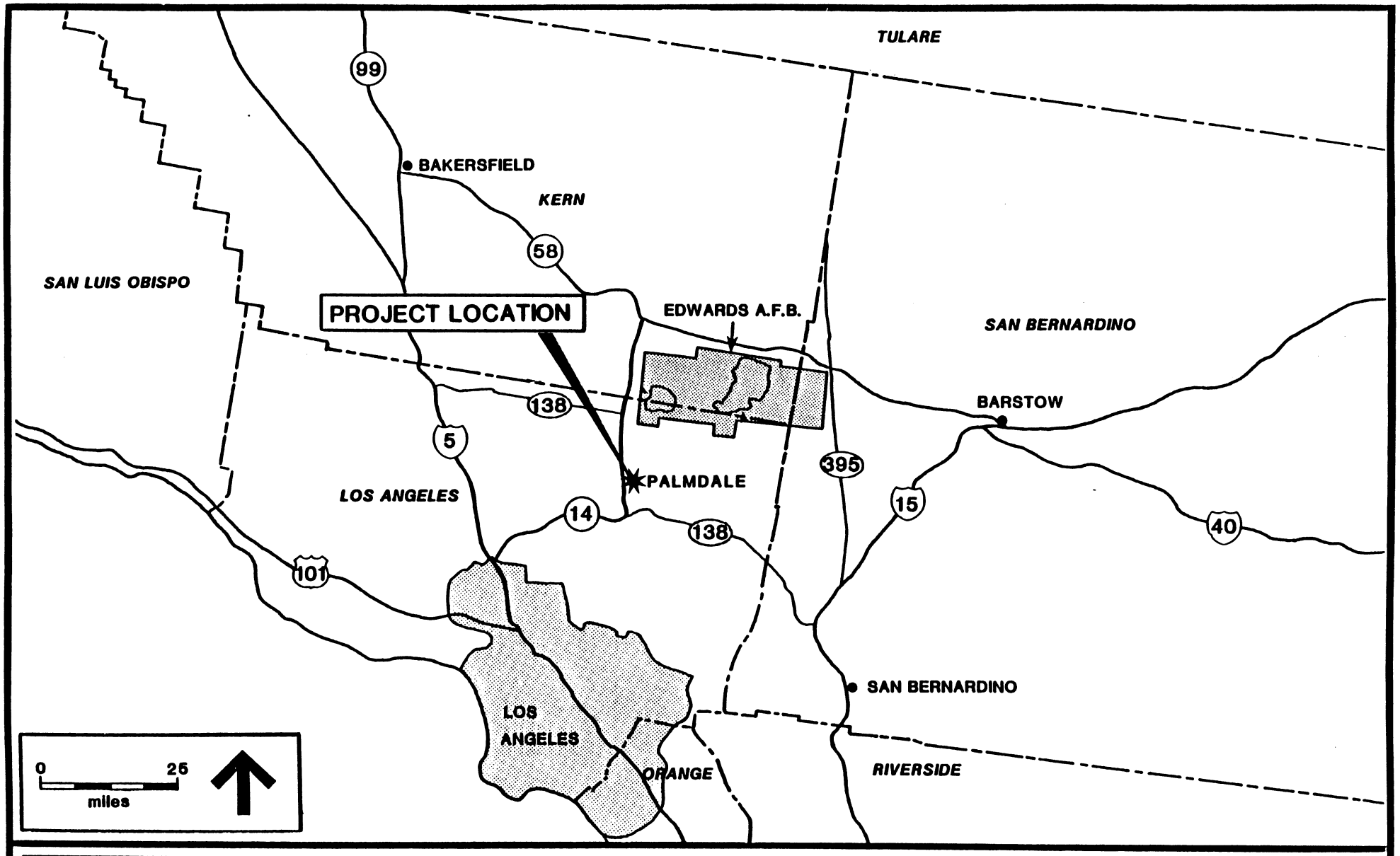

FIGURE 1. THE LOCATION OF THE PROPOSED PROJECT RELATIVE TO THE COUNTY OF LOS ANGELES

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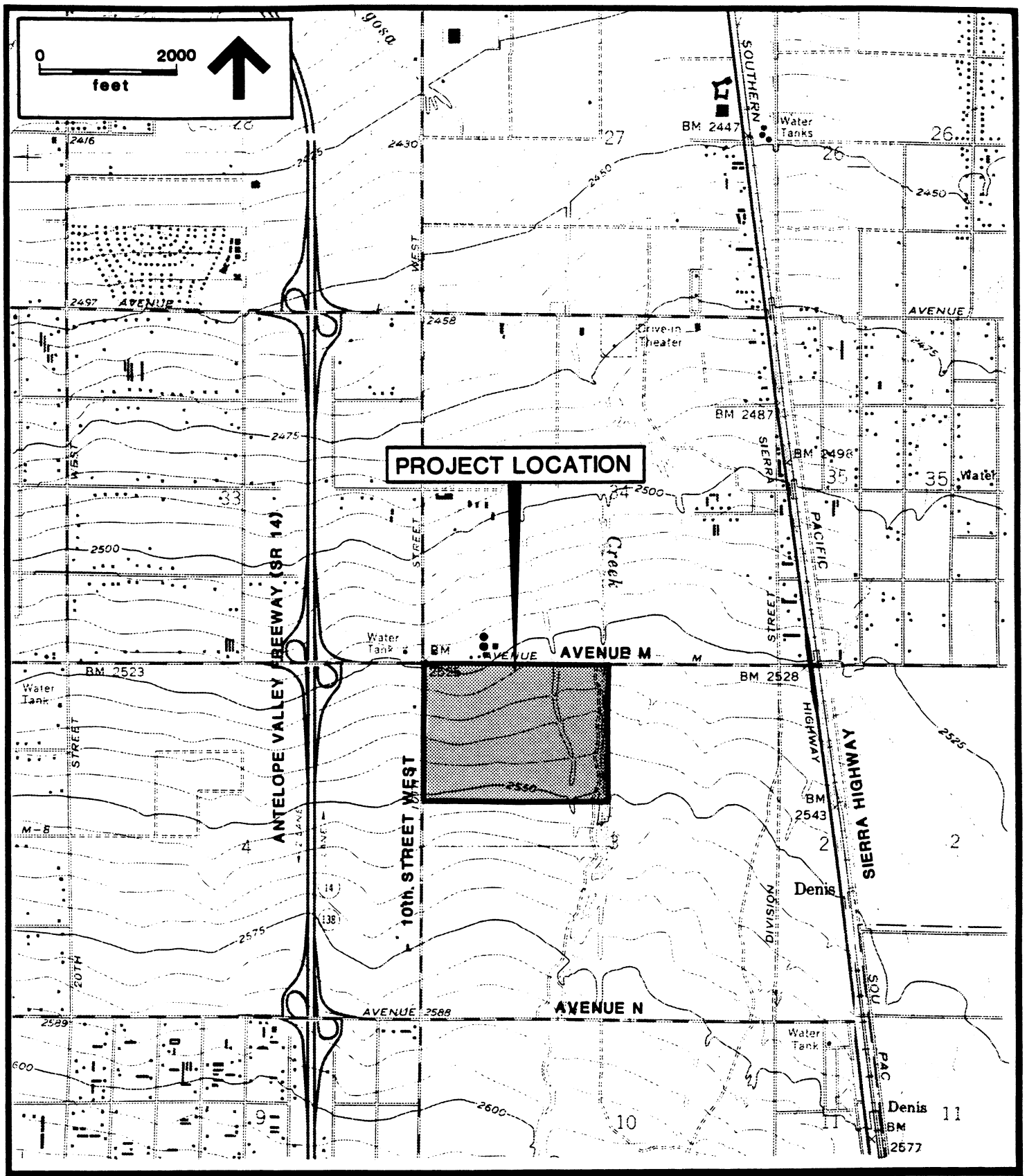

FIGURE 2. PROJECT LOCATION ON U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS, LANCASTER EAST AND LANCASTER WEST QUADRANGLES

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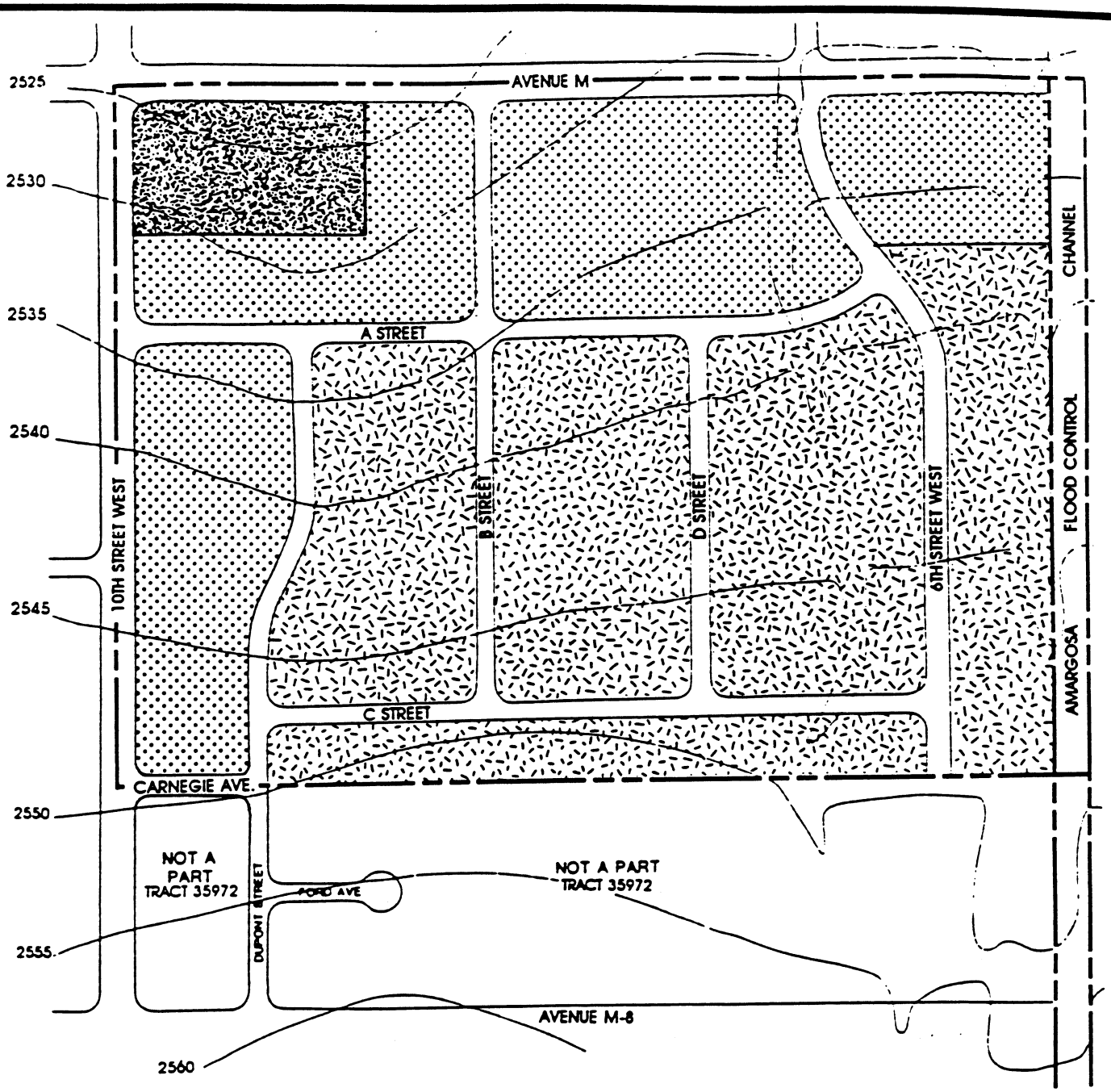

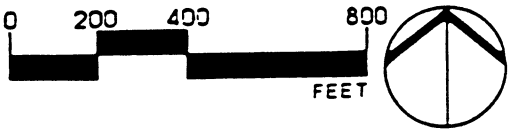

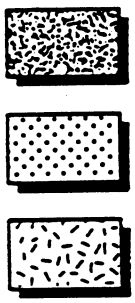

FIGURE 3. PROJECT LAND USE PLAN

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The project-generated traffic would cause average traffic noise levels to increase by approximately 1-2 dBA on Avenue M and 10th Street West. Future noise levels 50 feet from the roadways average 71 L_{dn} with the project-generated traffic. The surrounding areas zoned light industrial would not be significantly impacted by the increased noise levels on 10th Street West and Avenue M. The land zoned office/commercial adjacent to 10th Street West could be exposed to future noise levels above 65 dBA community noise equivalent level (CNEL), the limit stated in the General Plan. This area would be exposed to noise levels above the 65 CNEL limit whether or not the project is developed.

Future noise levels across the property generated by traffic on external roadways, with or without the project, and aircraft from Plant 42 would exceed the standards set in the Draft General Plan for exterior noise on both commercial (65 CNEL) and industrial (70 CNEL) land uses. Future interior noise levels would depend on the design and construction of the buildings.

Truck traffic using the internal circulation system could produce single-event noise levels up to 79 dBA at 50 feet from the roadways. Depending on the types of uses which are developed, these truck passes and the single-event noise levels produced by aircraft from Plant 42 and could be a source of nuisance noise to the users of the site.

Specific activities and uses on the site have not yet been developed, therefore, noise levels which would be produced on the lots cannot be predicted. However, because the ambient noise levels would be high, most activities occurring in the industrial portion of the project would not be expected to have a significant noise impact on the business park or commercial areas of the site. If an exceptionally noisy use is proposed, one in excess of 75 CNEL, then it may impact other lots on the site.

Because the locations of parking lots and other areas and the locations and types of buildings are not specifically known at this time, detailed mitigation measures to reduce traffic noise cannot be determined. When uses for the lots are known in more detail, or site plans have been developed for the lots, further exterior and interior noise studies should be conducted to determine adequate noise reduction. Barriers around the property or the individual lots could reduce traffic noise by up to 10 dBA in some areas. Because aircraft noise cannot be mitigated in exterior areas, aircraft noise would still be expected to produce noise levels of 69-75 L_{dn} southeast to northwest across the property. Aircraft would become the dominant external source of noise to the site.

III. METHODS OF ANALYSIS

The existing noise levels on the site due to external transportation sources were approximated based on data contained in the Noise Element of the City of Palmdale Draft General Plan (City of Palmdale 1990b) and the Air Installation Compatible Use Zone (AICUZ) Report (U.S. Air Force 1990).

The future noise levels on the site due to external transportation sources were approximated based on future noise level data contained in the Noise Element of the Draft General Plan and the 1990 AICUZ Report.

Noise impacts to the project from trucks using internal streets were estimated based on truck trip generation levels stated in the Traffic Analysis for the Antelope Valley Business Park (Crenshaw and Associates 1991). Trucks were assumed to travel at 25 miles per hour (mph) on the internal streets. Truck noise emission levels were calculated using the Calveno reference noise emission levels (California Department of Transportation 1983).

Avenue M and 10th Street West are expected to carry the project-generated traffic. Increases in noise levels on Avenue M and 10th Street West due to traffic generated by the project were calculated using the FHWA Noise Prediction Model (Federal Highway Administration 1979) with California Vehicle Noise Emission Levels (California Department of Transportation 1983). The model requires as input the roadway grade, distance between the roadway and receptor, average daily traffic volumes, percentages of cars, medium trucks, and heavy trucks and the vehicle speed. The base traffic volume used for comparison was the existing traffic on Avenue M and 10th Street West plus additional traffic produced by build-out of proposed developments within one mile of the project.

Traffic generation rates for the project and traffic volumes for build-out of the proposed developments within one mile of the project were obtained from the traffic report prepared for this project. Traffic volumes are expected to have a mix of 98 percent automobiles, 1 percent medium trucks, and 1 percent heavy trucks (Crenshaw, pers. comm., 1/17/91). The project is expected to generate an average daily traffic volume (ADT) of 24,408. This traffic would be divided between Avenue M and 10th Street West. Twenty-five percent of the traffic would travel on 10th Street West north of Avenue M, 25 percent on 10th Street West south of Avenue M, 30 percent on Avenue M east of 10th Street West, and 20 percent on Avenue M west of 10th Street West. This distribution of traffic was calculated in the traffic report (Crenshaw and Associates 1991) based on "manual count data, observation of peak-hour traffic movements, the characteristics of the nearby road system, and the population distribution of the region."

Avenue M and 10th Street West are classified in the Circulation Element as a Major Arterial and a Major Arterial Highway, respectively (City of Palmdale 1990c). The Circulation Element also states that facility speeds for a Major Arterial or a Divided Major Arterial are 45-50 mph (City of Palmdale 1990c). Therefore, approach speeds of 45 mph on Avenue M and 10th Street West, which were also used in the traffic impact study, were input for vehicular speeds in the noise prediction model.

Topographical information was obtained from the project site plan. The entire area is generally flat. Receptors were placed at a standard elevation of five feet above the ground to approximate the average height of a human ear.

The City of Palmdale noise standards are expressed in maximum CNELs and an hourly average noise level (L_{eq}). The CNEL is roughly the equivalent of the day/night average noise level (L_{dn}), the measure used in this study. Both the CNEL and L_{dn} scales are 24-hour, cumulative measures of community noise exposure based on an A-weighted noise level in units of decibels. A-weighting is a frequency correction that correlates noise levels with the frequency response of the human hearing system. Both the CNEL and L_{dn} add 10 decibels (dBA) to the average noise levels between 10:00 p.m. and 7:00 a.m. to account for the added sensitivity to noise during the nighttime hours. The only difference between the two measurement scales is that the CNEL also adds 5 decibels to the evening

hours of 7:00 p.m. through 10:00 p.m. For purposes of this analysis, the scales are close enough to be considered equivalent. An average noise level (L_{eq}) is the constant noise level over a given period of time that would transmit the same acoustical energy as the actual time varying noise level.

Future noise levels on the site were analyzed for compliance with the City of Palmdale noise standards contained in the Noise Element of the City of Palmdale Draft General Plan. The Draft General Plan states that industrial properties should be exposed to an exterior "noise level of 70 CNEL or less or which does not interfere with normal business activities." A noise level limit of 65 dBA L_{eq} is set for industrial interiors. The exterior noise level limit for commercial properties is 65 CNEL and the interior noise level limit is 45 to 65 dBA L_{eq}, depending on interior use.

IV. EXISTING NOISE ENVIRONMENT

Existing noise levels on the site are produced by both vehicular traffic and aircraft from U.S. Air Force Plant 42. Adding the noise levels from the 1990 AICUZ contours and the FHWA model results for traffic on Avenue M and 10th Street West, the combined existing day/night average noise levels on the site range from approximately 70 L_{dn} to 74 L_{dn}. Aircraft overflights could cause maximum noise levels up to 92 dB on the site (City of Palmdale 1990a).

The existing noise contours estimated from the FHWA Noise Prediction Model results for vehicular noise sources are presented in Figure 4. Vehicular sources which contribute to the noise on the property are traffic on 10th Street West and Avenue M. The Circulation Element of the City of Palmdale Draft General Plan estimates that the existing ADT is 7,300 ADT on Avenue M and 15,800 ADT on 10th Street West (City of Palmdale 1990c).

Aircraft operating from U.S. Air Force Plant 42 produce average existing noise levels on the site ranging from approximately 69 L_{dn} in the northwest section of the property to 74 L_{dn} in the southeast section of the property (U.S. Air Force 1990). These noise levels are based on 100 aircraft operations daily.

V. FUTURE ACOUSTICAL CONDITIONS

A. INCREASES IN NOISE LEVELS ON SURROUNDING ROADWAYS DUE TO PROJECT

Average daily traffic volumes on Avenue M and 10th Street West for the future conditions with and without the project are presented in Table 1. The future condition without the project is the existing traffic volumes plus traffic which will be generated upon build-out of the developments proposed or constructed within one mile of the site.

The project-generated traffic would cause average traffic noise levels to increase by approximately 1 to 2 dBA on Avenue M and 10th Street West relative to the traffic volumes upon build-out of the proposed developments within one mile of the site.

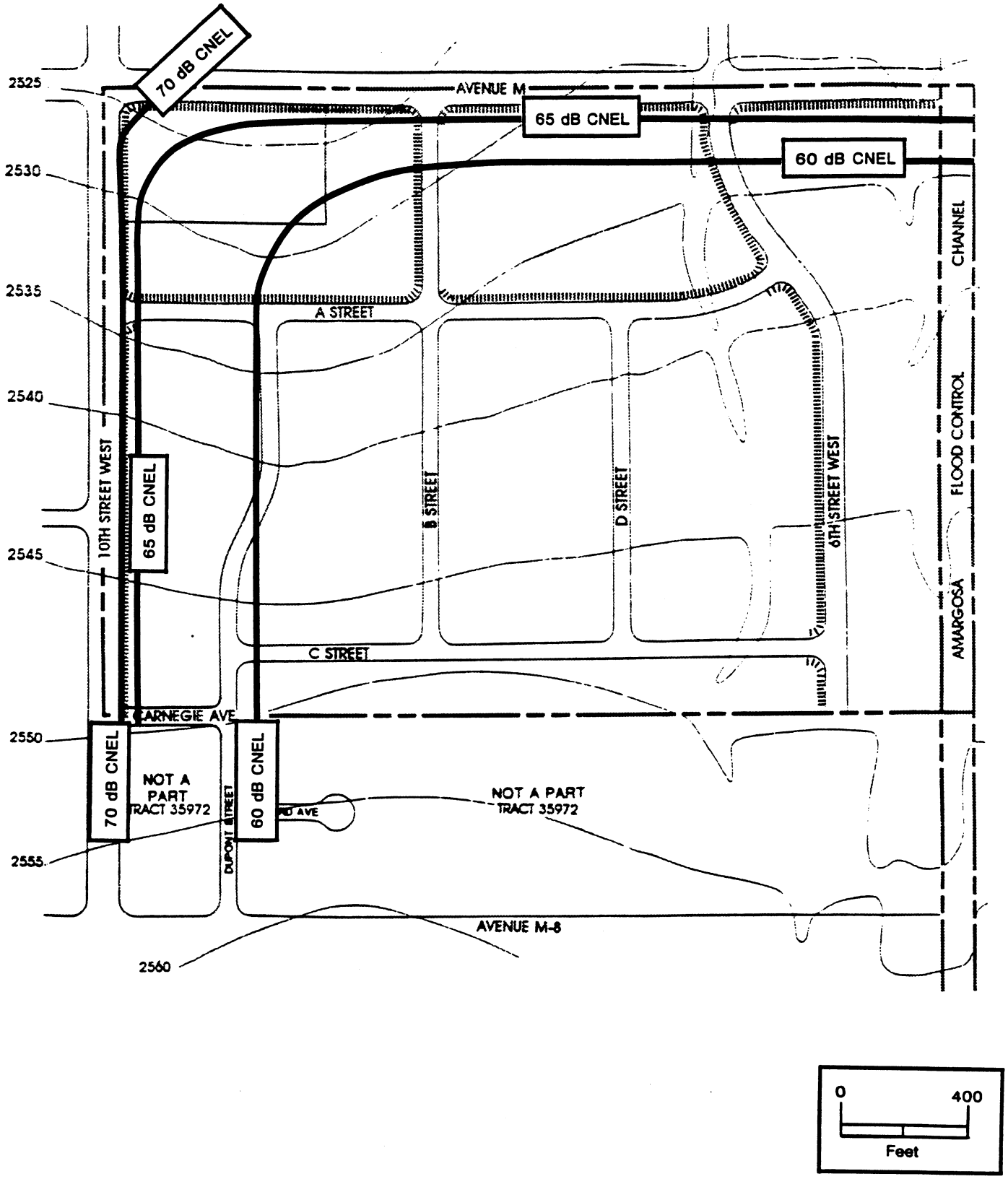

FIGURE 4. EXISTING AVERAGE NOISE LEVELS DUE TO TRAFFIC ON SURROUNDING ROADWAYS

TABLE 1
AVERAGE FUTURE DAILY TRAFFIC VOLUMES
WITH AND WITHOUT PROJECT*

Roadway	ADT Without Project	ADT With Project
10th Street West north of Avenue M-4	12,960	19,062
10th Street West south of Avenue M-4	13,150	19,252
Avenue M east of 10th Street West	13,810	21,132
Avenue M west of 10th Street West	13,810	18,692

*Future traffic volumes without the project are volumes which would occur upon build-out of proposed developments within one mile of the project.

Future traffic volumes without the project and upon build-out of proposed developments within one mile of the site are expected to be 12,960 ADT for 10th Street West from Avenue M to M-4, 13,150 ADT for 10th Street West from Avenue M-4 to Avenue M-8, and 13,810 ADT for Avenue M. Using the FHWA Noise Prediction Model, the average noise levels produced 50 feet from the roadway for the future without project condition are presented in Table 2. The data input into the program and the results are included as Attachment 1.

Average daily traffic volumes generated by the project are estimated to be 24,408 ADT (Crenshaw and Associates 1991). Dividing the traffic on the roadways as stated in the Methods of Analysis section would result in an increase of 6,102 ADT on 10th Street West both north and south of Avenue M, an increase of 7,322 ADT on Avenue M east of 10th Street West, and an increase of 4,882 ADT on Avenue M west of 10th Street West (see Table 1). Table 2 presents the average noise levels 50 feet from the roadway produced by the future traffic including the project. The assumptions used to arrive at the values in Table 2 are discussed in the Methods of Analysis section above.

B. FUTURE NOISE LEVELS ON THE SITE DUE TO EXTERNAL SOURCES

Future noise levels on the site from external sources will be produced by vehicular traffic on the nearby roadways and aircraft operations from U.S. Air Force Plant 42.

Future average noise levels on the site due to both vehicular traffic on the surrounding roadways (excluding project-generated traffic) and future aircraft operations at U.S. Air Force Plant 42 range from 76 L_{dn} in the northwest section of the site to 74 L_{dn} in the southeast section of the site. Aircraft overflights could produce single event noise levels up to 92 dBA (City of Palmdale 1990a).

Future noise levels on the site due to vehicular traffic on the surrounding roadways (excluding project-generated traffic) are depicted as noise contour lines in Figure 5. These noise contour lines were developed using distances to future noise levels given in the Draft Noise Element (City of Palmdale 1990b:Table N-3). The future traffic volumes used in the calculation of future noise levels in the Draft Noise Element were based on build-out of the entire city of Palmdale. Therefore, the future estimated noise levels presented in the Draft Noise Element were used to estimate worst-case noise levels on the project site due to external roadway traffic. Traffic on Avenue M, 10th Street West, and Antelope Valley Freeway contribute noise to the site. This traffic produces noise levels up to 78 L_{dn} near the intersection of 10th Street West and Avenue M, based on information in the Draft Noise Element.

Noise levels from aircraft operating at Plant 42 were based on 400 daily operations (U.S. Air Force 1990). Figure 6 presents the L_{dn} noise contours calculated by the Air Force for Plant 42 in relation to the project site. These aircraft are expected to produce average noise levels on the site ranging from 69 L_{dn} in the northeast section of the site to 75 L_{dn} in the southwest section of the site.

TABLE 2
FUTURE NOISE LEVELS 50 FEET FROM ROADWAY
WITH AND WITHOUT PROJECT*

Roadway	Without Project (L_{dn})	With Project (L_{dn})	Difference
10th Street West north of Avenue M-4	68.9	70.6	1.7
10th Street West south of Avenue M-4	69.0	70.6	1.6
Avenue M east of 10th Street West	69.2	70.5	1.3
Avenue M west of 10th Street West	69.2	71.0	1.8

*Future noise levels are based on traffic volumes for build-out of proposed developments within one mile of the project.

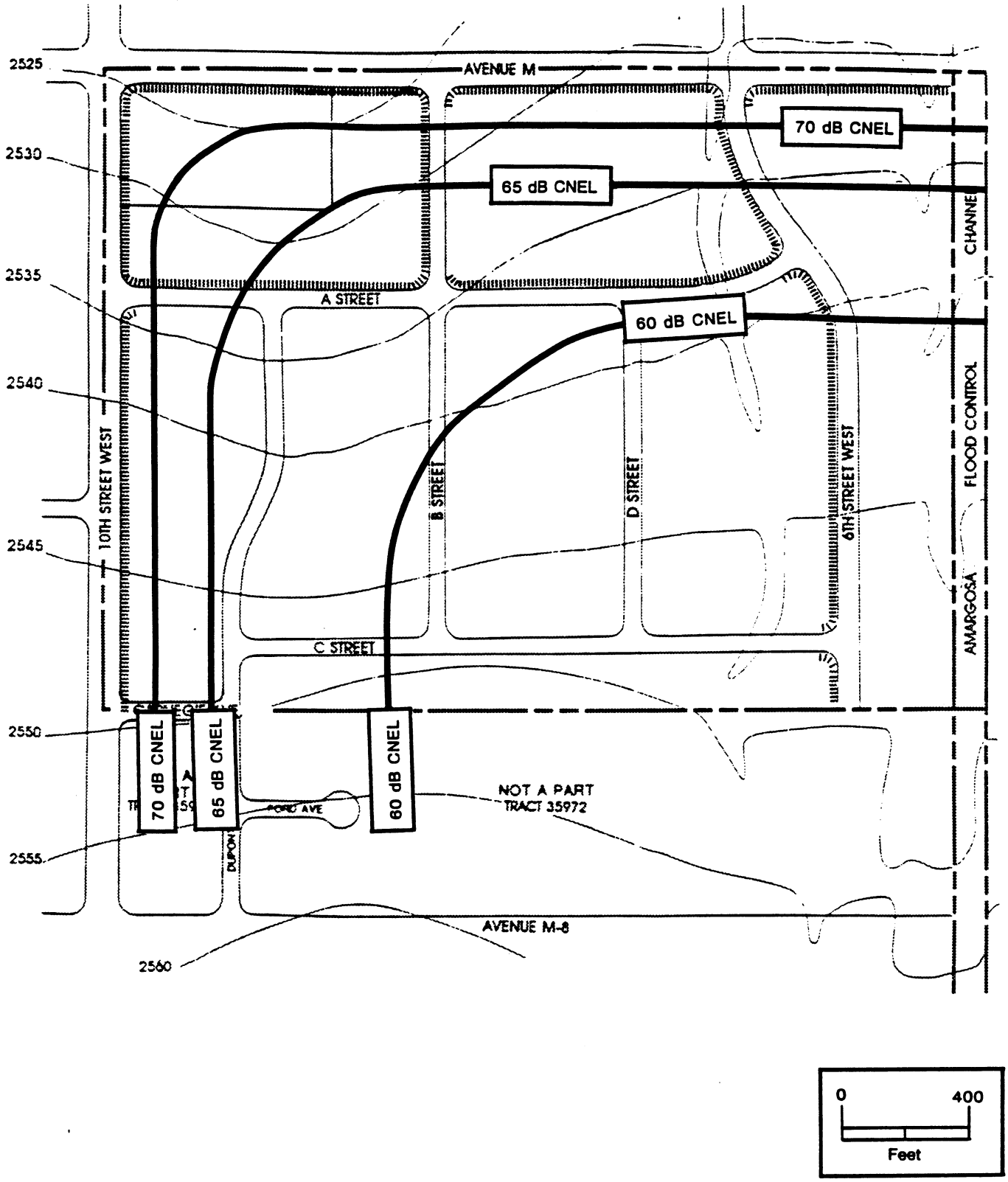

FIGURE 5. FUTURE AVERAGE NOISE LEVELS DUE TO TRAFFIC ON SURROUNDING ROADWAYS

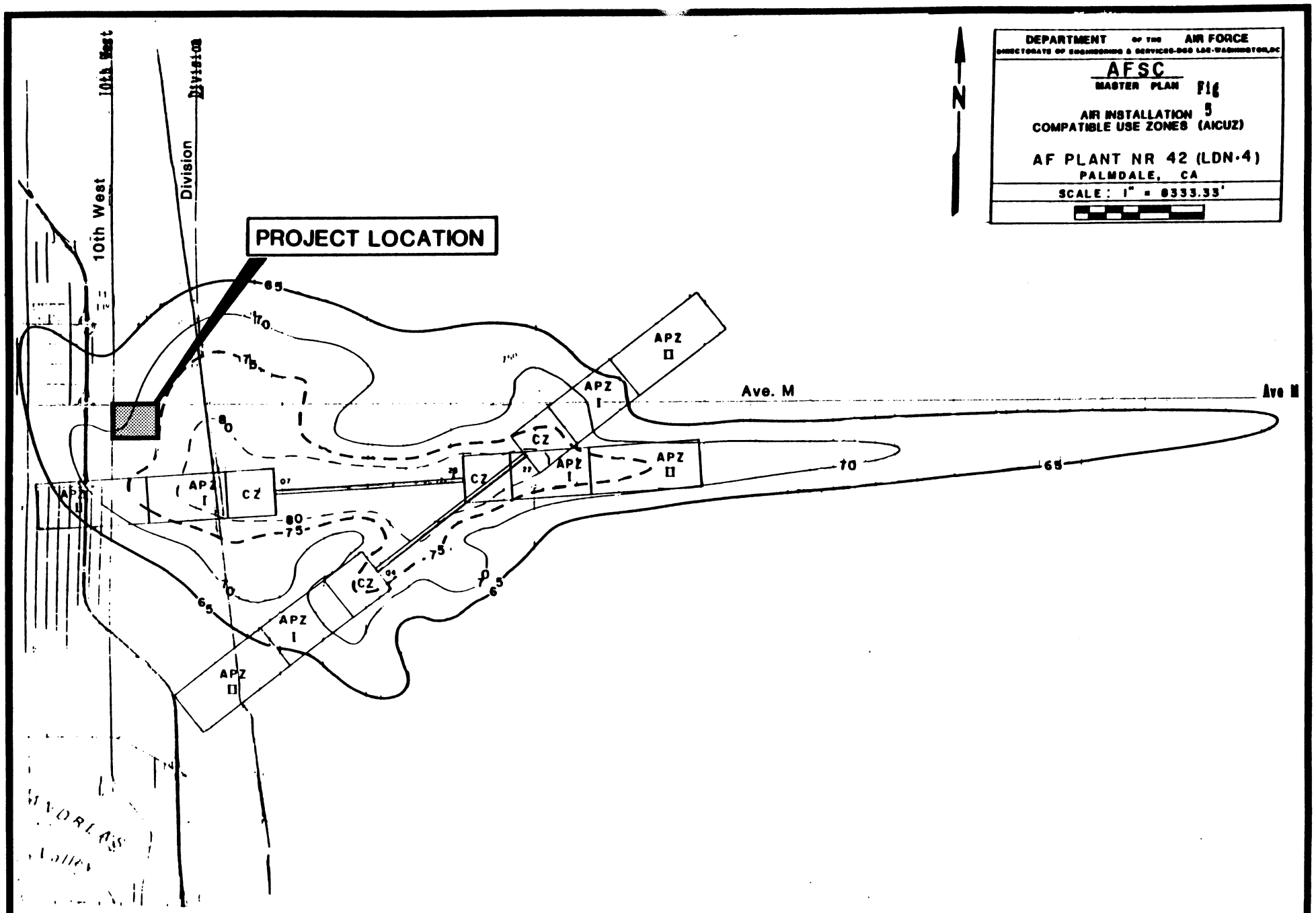

FIGURE 6. AIR FORCE PLANT 42 AIRCRAFT NOISE LEVELS (400 OPERATIONS/ DAY)

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C. FUTURE NOISE LEVELS ON SITE DUE TO INTERNAL VEHICULAR TRAFFIC

The project is expected to generate an ADT of 24,408. Two percent of this traffic, or 488 vehicles, is expected to be equal amounts of medium and heavy trucks. Heavy trucks traveling on the internal roadways at 25 mph would produce single-event noise levels of 79 dBA at 50 feet from the roadway and medium trucks passing at 25 mph would produce single-event noise levels of 71 dBA also at 50 feet.

D. ON-SITE NOISE LEVELS IN COMMERCIAL AREA AND BUSINESS PARK AREA DUE TO ACTIVITIES IN INDUSTRIAL AREA

Future noise levels in the commercial and business park area due to traffic on Avenue M and 10th Street West and aircraft from Plant 42 are estimated to range from 74 to 78 L_{dn} with the project-generated traffic. Maximum noise levels up to 92 dB can occur due to aircraft overflights.

The closest industrial lots are across an internal street from the business park area and 320 feet away from the boundary of the commercial area. Because the ambient noise levels in the commercial and business park areas are high, it is not anticipated that noise generated in the industrial area would significantly increase future noise levels already predicted to occur from traffic and aircraft. Since exact uses for the lots on the site have not been established, it is not possible to predict exactly what activities will occur in the different areas of the site nor what noise levels they would generate.

Single-event noise levels from the industrial area could possibly be audible above the future ambient conditions in both the commercial and business park areas. However, the business park area is between the commercial and industrial areas. Depending on their location, buildings on the business park lots could act as barriers to reduce noise levels in the commercial area that are generated in the industrial area.

VI. IMPACTS

Development of the project would not cause significant impacts to the adjacent land uses. Future noise levels on the site are predicted to exceed noise standards set by the City of Palmdale for exterior commercial and industrial areas regardless of whether the project is developed. Because noise levels on the property will exceed the noise level standards stated in the Draft General Plan, noise impacts to the proposed land uses on the project are considered significant.

Project-generated traffic is predicted to increase noise levels on 10th Street West and Avenue M by 1 to 2 dBA relative to traffic volumes upon build-out of proposed developments within one mile of the project. The future L_{dn} due to traffic (project plus build-out of vicinity) on 10th Street West and Avenue M is approximately 71 L_{dn} 50 feet from the roadway, based on Table 2. Based on information in the Draft General Plan, the future L_{dn} due to traffic (build-out of entire city) was presented as 76-77 L_{dn} 50 feet from the roadways. Project-generated traffic would not cause significant impacts to the surrounding industrial and commercial areas. Residential areas are not close enough to the project to be affected by this traffic.

Future noise levels on the site produced by traffic on external roadways are presented in Figure 5. The business park and commercial lots would be exposed to future traffic noise levels greater than the City of Palmdale noise level limit of 65 CNEL. Future noise levels generated by a combination of traffic (including project-generated traffic) on external roadways and aircraft from Plant 42 would range from approximately 74 L_{dn} in the southeast section of the property to 75-78 L_{dn} in the northwest corner of the property. These predicted noise levels exceed the standards set in the Draft General Plan for exterior noise on both commercial (65 CNEL) and industrial (70 CNEL) land uses. Future interior noise levels would depend on the design and construction of the buildings.

Truck traffic using the internal circulation system could produce single-event noise levels up to 79 dBA at 50 feet from the roadways. Depending on the types of uses which are developed, these truck passes and the single-event noise levels produced by aircraft from Plant 42 could be a source of nuisance noise to the users of the site.

Specific activities and uses on the site have not yet been developed, therefore, noise levels which would be produced on the lots cannot be predicted. However, because the ambient noise levels would be high, most activities occurring in the industrial portion of the project would not be expected to have a significant noise impact on the business park or commercial areas of the site. If an exceptionally noisy use is proposed, one in excess of 75 CNEL, then this type of use may impact other lots on the property.

VII. MITIGATION

Because the locations of parking lots and other areas and the locations and types of buildings are not specifically known at this time, detailed mitigations measures cannot be determined. Aircraft noise across the site cannot be mitigated in the exterior environment.

When site plans are developed for the business park and commercial lots, further exterior noise studies shall be conducted to determine, if necessary, any feasible noise mitigation measures available to reduce exterior traffic noise. Barriers around the property or the individual lots could reduce traffic noise by up to 10 dBA in some areas.

Because aircraft noise cannot be mitigated in exterior areas, aircraft noise would still be expected to produce noise levels of 69-75 L_{dn} southeast to northwest across the property. Aircraft would become the dominant external source of noise to the site.

The applicant shall demonstrate that their building design attenuates exterior average noise levels to below the standards set by the City of Palmdale. The interior noise level limit ranges from 45 to 65 L_{eq} for commercial buildings, depending on the interior uses. Industrial uses have an interior noise level limit of 65 L_{eq}. Once the specific use of a building is established, an interior noise study shall be conducted to ensure that exterior noise levels are attenuated to the interior limit appropriate for their use, as determined by the City of Palmdale.

VIII. REFERENCES CITED

California Department of Transportation
1983 California Vehicle Noise Emission Levels. Report No. FWHA/CA/TL-84/13. August.

Crenshaw Traffic Engineering
1991 Traffic Impact Study, Tract 44769, Southeast Quadrant Avenue M and 10th Street West, City of Palmdale, California. January.

City of Palmdale
1990a Joint Land Use Committee Policy Recommendations Regarding Land Use Around Air Force Plant 42 for Planning Commission Consideration. City of Palmdale Planning Department Memorandum. October 23.

1990b Noise Element. Draft General Plan.

1990c Circulation Element. Draft General Plan.

1990d Land Use Element. Draft General Plan.

Federal Highway Administration
1979 FHWA Highway Traffic Noise Prediction Model. Report No. FHWA-RD-77-108, Federal Highway Administration, Washington, D.C. February.

1973 Fundamentals and Abatement of Highway Traffic Noise. FHWA PB-222-703. Federal Highway Administration, Washington, D.C. June.

United States Air Force
1990 Air Installation Compatible Use Zone Report. Air Force Plant 42, Palmdale, California.

ATTACHMENT 1

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	AVE. M EAST OF 10TH ST. W.
CROSS SECTION / SECTION	FUTURE WITHOUT PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	13810
PERCENTS AUTOS,MEDIUM,HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	67.27
Leq night	61.23
Ldn	69.20

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	AVE M EAST OF 10TH ST. W.
CROSS SECTION / SECTION	FUTURE WITH PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	21132
PERCENTS AUTOS,MEDIUM,HEAVY	98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	69.12
Leq night	63.08
Ldn	71.05

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	AVE. M WEST OF 10TH ST. W.
CROSS SECTION / SECTION	FUTURE WITHOUT PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	13810
PERCENTS AUTOS.MEDIUM.HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	67.27
Leq night	61.23
Ldn	69.20

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	AVE. M WEST OF 10TH ST. W.
CROSS SECTION / SECTION	FUTURE WITH PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	18692
PERCENTS AUTOS,MEDIUM,HEAVY	98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	68.58
Leq night	62.55
Ldn	70.51

JOB 2262N ANTELOPE VALLEY B.P 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	10TH ST. W. NORTH OF AVE. M-4
CROSS SECTION / SECTION	FUTURE WITHOUT PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	12960
PERCENTS AUTOS,MEDIUM,HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	0
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

50 FEET FROM BARRIER TO RECEPTOR

Leq day	66.99
Leq night	60.96
Ldn	68.92

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	10TH ST. W. ~~SOUTH~~ NORTH OF AVE. M-4
CROSS SECTION / SECTION	FUTURE WITH PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	19062
PERCENTS AUTOS,MEDIUM,HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	68.67
Leq night	62.63
Ldn	70.60

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	10TH ST. W. SOUTH OF AVE. M-4
CROSS SECTION / SECTION	FUTURE WITHOUT PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	13150
PERCENTS AUTOS.MEDIUM.HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	67.06
Leq night	61.02
Ldn	68.99

JOB 2262N ANTELOPE VALLEY BUSINESS PARK 01-17-1991

INPUT PARAMETERS (INITIAL RECEPTOR)

SOURCE	10TH ST. W. SOUTH OF AVE. M-4
CROSS SECTION / SECTION	FUTURE WITH PROJECT
BARRIER TYPE	NONE
LEFT ANGLE	-87
RIGHT ANGLE	87
ADT	19252
PERCENTS AUTOS,MEDIUM,HEAVY	.98 1E-002 1E-002
SOURCE TO BARRIER DISTANCE	50
BARRIER HIEGHT ABOVE ROAD	0
RECPTOR HEIGHT ABOVE ROAD	5
GRADE	0 %
SITE CONDITION	REFLECTIVE
SPEED	45 MPH

HEIGHT OF RECEPTOR TO ROAD

5

0 FEET FROM BARRIER TO RECEPTOR

Leq day	68.71
Leq night	62.68
Ldn	70.64

APPENDIX G

GLOBAL
*GEO*CHEMISTRY
CORPORATION

TELEX: 4720127
FAX: (818) 992-8940

6919 ETON AVENUE • CANOGA PARK • CALIFORNIA 91303-2194 (818) 992-4103

October 22, 1990

Mr. Bryan L. Morrell
Director of Operations
15350 Sherman Way/Suite 490
Van Nuys, CA 91406

RE: Site Assessment Report
Antelope Valley Business Park
Palmdale, CA

Dear Mr. Morrell,

Thank you for sending me a copy of the Montgomery Engineers response to my letter.

I raised four potential problems in my letter of September 25, after reviewing the Montgomery report.

The response by Richard Jenkins addressed all the issues. It seems to me that item 1 and 2 should be pursued further to obtain the records. I think attention should also be paid to item 4, to obtain information from the literature or state and county records. A knowledge of groundwater contamination in the area could be important at a later time.

As far as item 3 is concerned, Mr. Jenkins is correct in saying that EPA analysis 8080 will analyze for PCB. However, I am concerned if two combined samples from two depths (1 and 5 feet) is sufficient to determine that the site is clean.

Overall I think that Montgomery performed an adequate, cost-effective survey. The results seem to show that the site is clean. However, due to limited sampling and the high permeability of the sandy soil in the area, there is a possibility for offsite contaminant mobility. But proving this could require an extensive study.

Please call if you have any further questions and we could meet if you think this is necessary.

Sincerely yours,

Ian Kaplan

Ian Kaplan
President

IK/pr/morrell.let

THE LUSK COMPANY

TRI-COUNTIES DIVISION

October 10, 1990

GLOBAL GEOCHEMISTRY CORPORATION
6919 Eton Avenue
Canoga Park, CA 91303-2194

Attention: Ian Kaplan

Re: Site Assessment Report
Antelope Valley Business Park
Palmdale, CA

Dear Dr. Kaplan:

Enclosed is a copy of Montgomery Engineers' response to your questions stemming from your second-party review of their report.

Please review their comments; and let me know if they have adequately addressed your concerns, therefore, deeming the Site Assessment Report complete.

As you may or may not know, Ted Tunstall is no longer with The Lusk Company. Please direct any questions or inquiries to my attention.

Very truly yours,

THE LUSK COMPANY

Bryan L. Morrell
Director of Operations
Tri-Counties Division

BLM:dv
Enclosure

cc: Mike McGovern (w/enclosure)

15350 Sherman Way • Suite 490 • Van Nuys, CA 91406

Serving the World's
Environmental Needs

Telephone
818 796-9141

250 North Madison Avenue
P.O. Box 7009, Pasadena
California 91109-7009

JMM James M. Montgomery
Consulting Engineers, Inc.

October 5, 1990

RECEIVED
OCT 8 - 1990
ACCOUNTING

The Lusk Company
15350 Sherman Way, Suite 490
Van Nuys, California 91460

Attention: Mr. E.V. Tunstall

Subject: Site Assessment Report, Antelope Valley Business Park, Palmdale, California

Dear Mr. Tunstall:

James M. Montgomery, Consulting Engineers, Inc. (JMM) is submitting this addendum to the subject report in response to your letter dated October 1, 1990. The following comments specifically address each item of concern as expressed by Global Geochemistry Corporation (GGC) in their letter dated September 25, 1990.

GGC Comment #1: No aerial photographs more recent than 1957 were located.

JMM Response: The Fairchild collection of historic aerial photographs of the subject property were examined at Whittier College. The historic aerial photographs made available to JMM which depicted the subject property were limited to three (3) flight paths flown in the years 1928, 1940, and 1957. A more extensive search of other collections (e.g. Teledyne and Fairchild collection located at U.C. Santa Barbara) did not appear warranted based on the observations of the three available photographs, current observations of the subject property noted during the site visit conducted in May, 1990, and no indication of previous development made obvious within the Grantee/Grantor Indices contained in Section 2.4 of the subject report.

GGC Comment #2: No description of the activities of Southern California Edison Co. and US Air Force Plant 42 were given to determine if pollutants could have been released by those adjacent property holders.

JMM Response: The Southern California Edison Co. facility was identified in one (1) database; the Hazardous Waste Information Systems (HWIS) developed by the California Department of Health Services. The HWIS listed the SCE facility as a generator of hazardous waste (CAD 981681364) and included no other description.

U.S. Air Force Plant 42 was identified in several government maintained databases including the California State Expenditure Plan. Pertinent pages from the California State Expenditure Plan have been attached which contain a description of facility activities. In addition, just as a reminder, Plant 42 is not considered an adjacent property but is located more than one (1) mile from the subject property.

GGC Comment #3: No apparent search seems to have been specifically made for PCB - a common insulating material used in transformers and condensers.

JMM Response: JMM believes that the potential threat of Polychlorinated Biphenyl (PCB) contamination on-site was adequately addressed. Section 2.1, Site Inspection, specifically states that "no evidence of oil or oily discharge was observed on the property" and "no electrical equipment potentially containing polychlorinated biphenyls (PCBs) was observed on the property." In addition, based on information contained in the government databases reviewed, indicating that PCB's were utilized at Plant 42 and that a Southern California Edison facility, which presumably handles electrical equipment, is located nearby, it was determined to be prudent to conduct a limited soil sampling program. That program specifically analyzed for the presence of PCB's in the soil samples collected. The analytical results, as determined by EPA method 8080, organochlorine pesticides and PCB's summarized in Table 4 on page 4-6 of the subject report, indicate that no detectable levels of PCB concentrations were present in the soil samples analyzed.

GGC Comment #4: No discussion is given on the depth of the water table underlying the property and the potential of the groundwater being contaminated beneath the site.

JMM Response: The site assessment report, dated September, 1990, presented to the Lusk Company was intended to provide information concerning the potential presence or absence of waste discharges and soil contamination on the subject property.

Groundwater was not made an issue due to the low potential of impact caused by past on-site activity. However, the potential presence of contaminated groundwater beneath the site is possible due to surrounding activities. JMM cannot speculate on the magnitude of that potential without first installing and sampling a groundwater monitoring well on-site. This action may not be in The Lusk Company's best interest.

To provide some information concerning groundwater, based on data obtained from the "Water Resources Data California, Water Year 1989 Volume 5. U.S.G.S. Water-Data Report CA-89-5," the depth to groundwater in the vicinity of the subject property is approximately 360-380 feet.

This environmental assessment of the subject property was conducted in a manner which is consistent with standard industry practices. If the Lusk Company requires that additional services beyond the scope of our assignment be conducted, JMM can provide these services.

If you have any questions, please call me at (818) 796-9141.

Very truly yours,

JAMES M. MONTGOMERY,
CONSULTING ENGINEERS, INC.

Richard L. Jenkins

Richard L. Jenkins
National Coordinator
Waste Remediation Programs

RLJ:rdb

Health and Welfare Agency
Department of Health Services
Toxic Substances Control Division

...ITURE PLAN FOR THE
...BSTANCE CLEANUP BOND ACT
OF 1984

Revised January, 1988
(Originally Published January 1985)
Revision No. 3
Volume 2

Site-Specific Workplans for the Abatement
of Listed Hazardous Waste Sites

STATE OF CALIFORNIA
HEALTH AND WELFARE AGENCY

EXPENDITURE PLAN FOR THE HAZARDOUS SUBSTANCE CLEANUP BOND ACT OF 1984

Revised January, 1988
(Originally Published January 1985)
Revision No. 3

Volume II.
Site-Specific Workplans for the Abatement of Listed Hazardous Waste Sites

Department of Health Services

Kenneth W. Kizer, M.D., M.P.H.
Director

Alex R. Cunningham
Chief Deputy Director

C. David Willis
Deputy Director

TOXIC SUBSTANCES CONTROL PROGRAM

NOTICE TO READERS

Readers who are using the Expenditure Plan as a reference for financial or real estate planning should be advised that this document does not necessarily reflect the entire population of known or protential hazardous waste sites in California. Sites listed include only those targeted for expenditure of State bond funds, either for total cleanup costs or for State oversight.

Not included in this Expenditure Plan are any references to sites where work is being undertaken by local agencies, a Regional Water Quality Control Board, or a responsible party without State knowledge. Also absent are potential sites currently being reviewed by the Toxic Substances Control Division's Site Evaluation or Rural County Survey Programs. Anyone wishing to obtain information on a specific site not listed in the Expenditure Plan should contact the Toxic Substances Control Division, Office of External Affairs, P.O. Box 942372, Sacramento, CA. 94234.

Information contained in this document is current as of December, 1987.

FEDERAL FACILITY SITE CLEANUP WORKPLAN

AIR FORCE PLANT 42

I. Site Information

A. Location and Type of Site

Palmdale Airport
Palmdale, CA 93550
San Bernardino

Air Force research and development facility.

B. Description of Hazardous Wastes

Plant 42 is an Air Force research and development facility. Twenty-three contaminated areas were discovered in the initial assessment phase. Contaminants are fuels, oils, solvents, paint, soil sludges, acids, heavy metals, and polychlorinated biphenyls (PCBs).

The large variety of wastes have a wide range of potential health effects. Some compounds are toxic, some flammable orignitable, some are respiratory or central nervous system depressants, some may affect liver function. PCB is a suspected carcinogen and a known teratogen. Actual effects are dependent on specific compounds, concentrations, and exposure.

C. Threat to Public Health and Environment

The types and quantities of wastes released on base pose a threat to ground water and drinking water supplies. There is no known exposure at this time.

The degree of health hazard posed by chemical contamination of a site depends on the concentration of the material present and the duration of exposure. DHS policy is to evaluate all listed hazardous waste sites for the need to take action to abate any acute public health or environmental threats posed by a site. Therefore, the threats described in this document generally represent the potential impact of long-term exposure to specific hazardous substances if: 1) the site is not abated, 2) the substances migrate off site, and 3) the substances at some point come into contact with human or environmental receptors.

II. Site Status

A. Status of Site Activity

The Installation Restoration Program (IRP) has been initiated at this base. Currently, the program is in the Confirmation Quantification (Site Investigation) Phase of the mitigation process.

B. Projected Revenue Sources

The Department of Defense will provide funding for site characterization and remedial actions.

III. Project Completion Estimates

DHS has budgeted $100,000 from the bond fund to provide for private consultant assistance to DHS oversight staff. DHS will seek cost recovery from the U.S. Government.

Task Group	Estimated Completion
1. Site Characterization	
a) Remedial Action Order	July 1991
b) Remedial Investigation/ Feasibility Study	April 1994
2. Remedial Action Plan	Oct. 1994
3. Remedial Action	
a) Design	April 1995
b) Implementation	Oct. 1996
c) Certification	Dec. 1996
4. Cost Recovery and/or Operation and Maintenance	
a) Cost Recovery	Dec. 1997
b) Operation and Maintenance	N/A

THE LUSK COMPANY

TRI-COUNTIES DIVISION

October 1, 1990

JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC.
250 No. Madison Avenue
P.O. Box 7009
Pasadena, CA 91109-7009

Attention: Richard L. Jenkins
Coordinator Remediation Service

Subject: Environmental Assessment Report
Antelope Valley Business Park, Palmdale, CA

Dear Mr. Jenkins:

The Lusk Company forwarded your report to Global Geochemistry Corporation for a secondary review.

They indicated that the report was adequate, but have listed four items that should be addressed in some manner as to depict a complete research for the site. You can address these items as a supplement to the original report. I am enclosing a copy of Global Geochemistry's comments.

If you have any questions, please call me or Mike McGovern.

Sincerely,

THE LUSK COMPANY

E. V. Tunstall
Division Engineer
Tri-Counties Division

EVT:dv
Enclosure

cc: Mike McGovern
Bryan Morrell

15350 Sherman Way • Suite 490 • Van Nuys, CA 91406
(818) 376-0244 • FAX (818) 376-0668

GLOBAL
*GEO*CHEMISTRY
CORPORATION

TELEX: 4720127
FAX: (818) 992-8940

6919 ETON AVENUE • CANOGA PARK • CALIFORNIA 91303-2194

(818) 992-4103

September 25, 1990

Mr. E.V. Tunstall
The Lusk Company
15350 Sherman Way/Suite 490
Van Nuys, CA 91406

RE: Site Assessment Report
Antelope Valley Business Park
Palmdale, California

RECEIVED
SEP 27 1990
TRI-COUNTIES

Dear Mr. Tunstall,

I have reviewed the report on the above subject prepared for you by J.M. Montgomery.

In general, I found the report adequate, with the possible exception of the items described below.

1. No aerial photographs more recent than 1957 were located

2. No description of the activities of Southern California Edison Co. and US Air Force Plant 42 were given to determine if pollutants could have been released by those adjacent property holders.

3. No apparent search seems to have been specifically made for PCB - a common insulating material used in transformers and condensers.

4. No discussion is given on the depth of the water table underlying the property and the potential of the ground water being contaminated beneath the site.

Sincerely yours,

Ian Kaplan

Ian Kaplan
President

IK/pr/tunstall.let

The Lusk Company
Tri-Counties Division

Site Assessment Report
for the

Proposed Antelope Valley Business Park

September 1990

JMM James M. Montgomery
Consulting Engineers, Inc.

ENVIRONMENTAL ASSESSMENT REPORT

PROPOSED ANTELOPE VALLEY BUSINESS PARK

Prepared for

The Lusk Company
Tri-Counties Division
15350 Sherman Way
Van Nuys, California 91406

Prepared by

James M. Montgomery, Consulting Engineers, Inc.
250 North Madison Avenue
Pasadena, California 91101

September, 1990

EXECUTIVE SUMMARY

The Lusk Company requested that James M. Montgomery, Consulting Engineers, Inc. (JMM) conduct an environmental assessment of the Proposed Antelope Valley Business Park located in Palmdale, California. The following is a summary of significant findings of that study:

- A site visit was conducted by JMM personnel on May 31, 1990. The subject property appeared to be undeveloped virgin desert land. No visual observations of chemical contamination were evident.

- Historic Aerial Photographs were examined to determine past land uses of the property and its surroundings. Based on a review of 1928, 1940 and 1957 photos, from the Whittier College Geology Department, of the area, agricultural activity was observed in some of the surrounding areas. No evidence of past land development or use was observed on the subject property.

- A review of Public Agency files was conducted and several governmental databases were accessed. Based on available information, only one (1) facility listed as a potential generator of hazardous waste was identified within 2,000 feet of the subject property. One additional facility of concern Plant 42, an Air Force Research and Development facility, was identified within 7,000 feet of the parcel.

- To further demonstrate the absence of any chemical contamination, four shallow subsurface borings were conducted on the property. Soil samples from one (1) and five (5) foot depths were analyzed for semi-volatile organics, PCBs and organochlorine pesticides, and heavy metals. No significant chemical contamination was evident in the soil samples collected based on analytical results.

- Based on the above described level of effort, the subject property appeared to be undisturbed, virgin desert never before developed. No potential sources of contamination was evident on the property based on a visual inspection nor were identified in any of the databases researched. In addition, no significant chemical contamination was detected in the soil samples collected based on laboratory analyses. Based upon the evaluation of available data, no further chemical assessment/environmental evaluation of the site appears warranted.

This environmental assessment has been conducted in a manner which is consistent with standard industry practices. This report is not a guarantee that no chemical contamination exists at the site.

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B LABORATORY ANALYTICAL REPORTS/ CHAIN-OF-CUSTODY DOCUMENTATION

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SECTION 1

INTRODUCTION

This environmental assessment was conducted by JMM from May to August, 1990. The subject parcel, located in a commercial/industrial area, was observed to be vacant and undeveloped. The property is bounded on the north by Avenue M, on the west by 10th Street west and on the south by undeveloped land. Figure 1 shows the general location of the property.

This report includes a detailed review of historical, ownership and land use records pertaining to the subject parcel and to the surrounding properties; and a description of existing condition as were observed during a site visit conducted on May 31; 1990. Also included are results of a soil sampling and a analytical program conducted on August 2, 1990.

This environmental assessment was based on the information provided to and reasonably attainable by JMM and is focused on the following areas of concern:

- Water and wastewater;
- Hazardous waste and solid waste;
- Presence of polychlorinated biphenyls (PCBs); and
- Pesticides.

1.1 Purpose and Objective

The purpose of this environmental assessment was to identify potential chemical contamination associated with the subject property due to geographical location and/or property use.

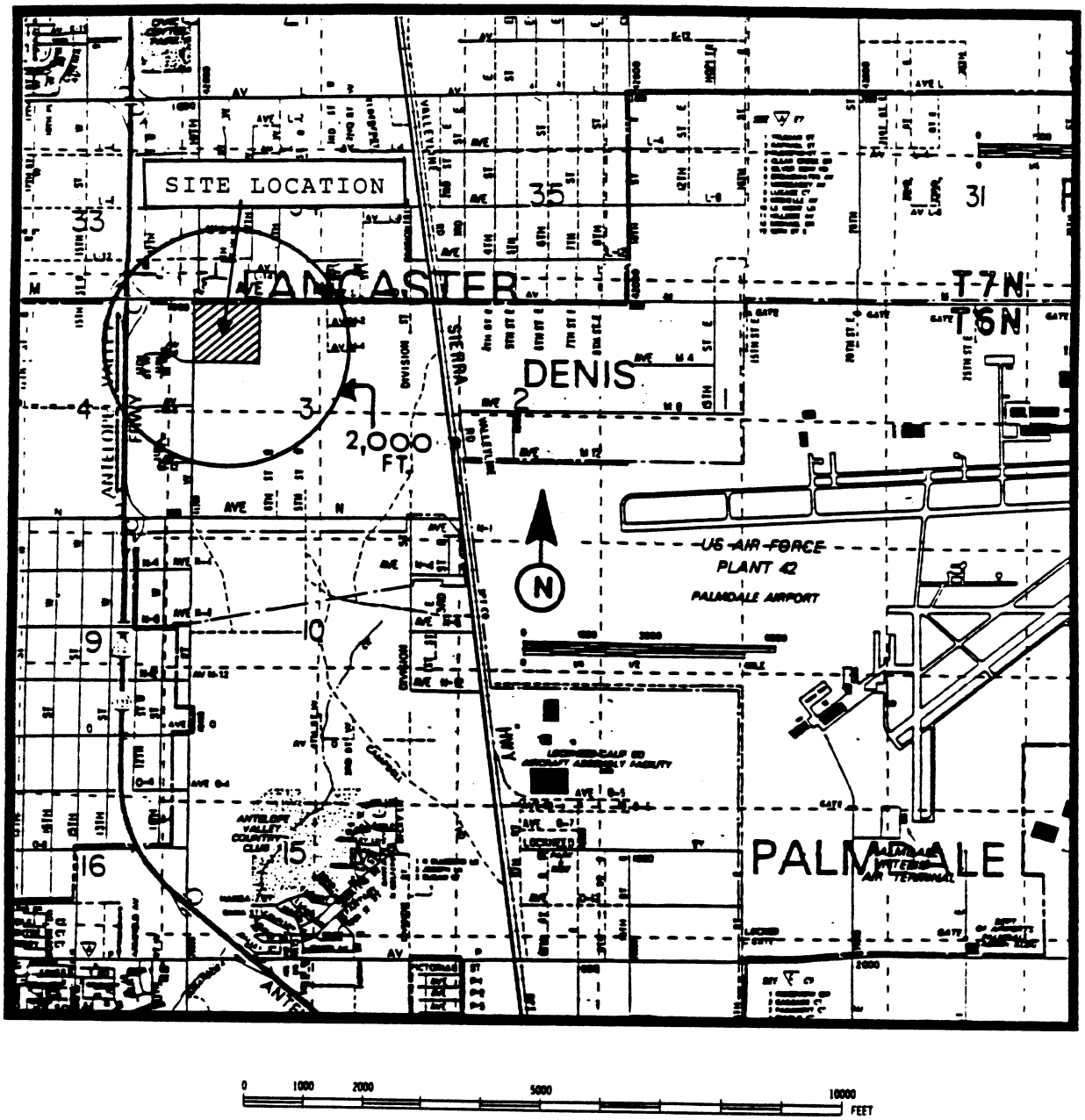

FIGURE 1

SITE LOCATION MAP

SECTION 2

SITE RESEARCH/AUDIT

JMM conducted an environmental site audit and area reconnaissance from May 28, 1990 to June 8, 1990. The study involved a review of available information regarding the history of the site, a site visit, and a reconnaissance of the surrounding areas to observe land use.

2.1 Site Inspection

A site visit was conducted on May 31, 1990. Based upon a reconnaissance of the subject property, the following observations were noted:

- No industrial wastewater discharge was observed.
- No visual evidence of the presence of hazardous wastes was observed on the property.
- No evidence of oil or oily discharge was observed on the property.
- No electrical equipment potentially containing polychlorinated biphenyls (PCBs) was observed on the property.
- No visual evidence of pesticide use on the property was observed.

2.2 Aerial Photographs

Historical aerial photographs, available through Whittier College (Fairchild aerial photos collection), were reviewed to determine past land uses of the property. Photographs showing both the subject property and the surrounding areas taken in 1928, 1940 and 1957 were closely examined. The following interpretations were derived from viewing the aerial photographs:

Date Flown	Flight No.	Frame No.	Remarks
1928	C-300	c:317-319 c:350-353	Few isolated areas that appeared to be agricultural lands within the general area of the subject property were found. No apparent industrial facilities were observed. Photographic magnification was too weak to be able to identify buildings/structures.
June 25, 1940	C-6500	306:101-104;	Same observation as in 1928 photographs. However, relatively more and bigger areas that appeared to be agricultural lands were observed. What appeared to be creeks or irrigation canals were observed running in different directions. Grading of the area that were to be later developed or the airport was apparent.
March 24, 1957	C-22867	132-134	Same observations as in 1940 photographs. In addition, the airfield which is now known as U.S. Air Force Plant 42 appears to have been completed. No apparent extension of the airfield or its operations to the west of the Sierra Highway towards the subject property were observed.

2.3 Public Agency File Review

The historical records review for the subject property and surrounding areas included an investigation of the following sources of information:

- City of Palmdale Planning Department;
- City of Palmdale Building and Safety Department;
- Los Angeles County Fire Department;

- Environmental Protection Agency, Region 9 (EPA); and
- Los Angeles County Department of Public Works (LACDPW).

The following database sources were reviewed in order to identify sites of potential environmental concern in the immediate vicinity (within 2,000 feet away) of the subject property:

Database	Type of Records	Agency
CERCLIS	Federal Superfund Sites	U.S. EPA
NPL	National Priority List Sites	U.S. EPA
LIENS	Filed Notices of Superfund Liens	U.S. EPA
CORTESE	Hazardous Waste & Substances Site List	California Governor's Office of Planning & Research
BEP	Sites Authorized for Cleanup Under the California Bond Expenditure Plan	CAL-DHS
HWP	Sites designated as Hazardous Waste Properties and Border Zone Properties	CAL-DHS
ASPIS	Abandoned Site Program	CAL-DHS
HWIS	Hazardous Waste Generators, Treatment, Storage & Disposal Facilities	CAL-DHS
SWIS	Active & Inactive Sanitary Landfills and Disposal Facilities	CAL-Waste Management Board
LUST	Leaking Underground Storage Tanks	CAL Regional Water Resources Control Boards
COUNTY DATA	Landfills & Waste Disposal Facilities	County Departments of Health & Safety

Review of the above records revealed that one potential generator of hazardous waste is located within 2,000 feet of the subject property. Southern California Edison, located at 42060 10th Street in Lancaster is listed in the Hazardous Waste Information Systems (HWIS) Database as a potential generator of hazardous waste (See Figure 2).

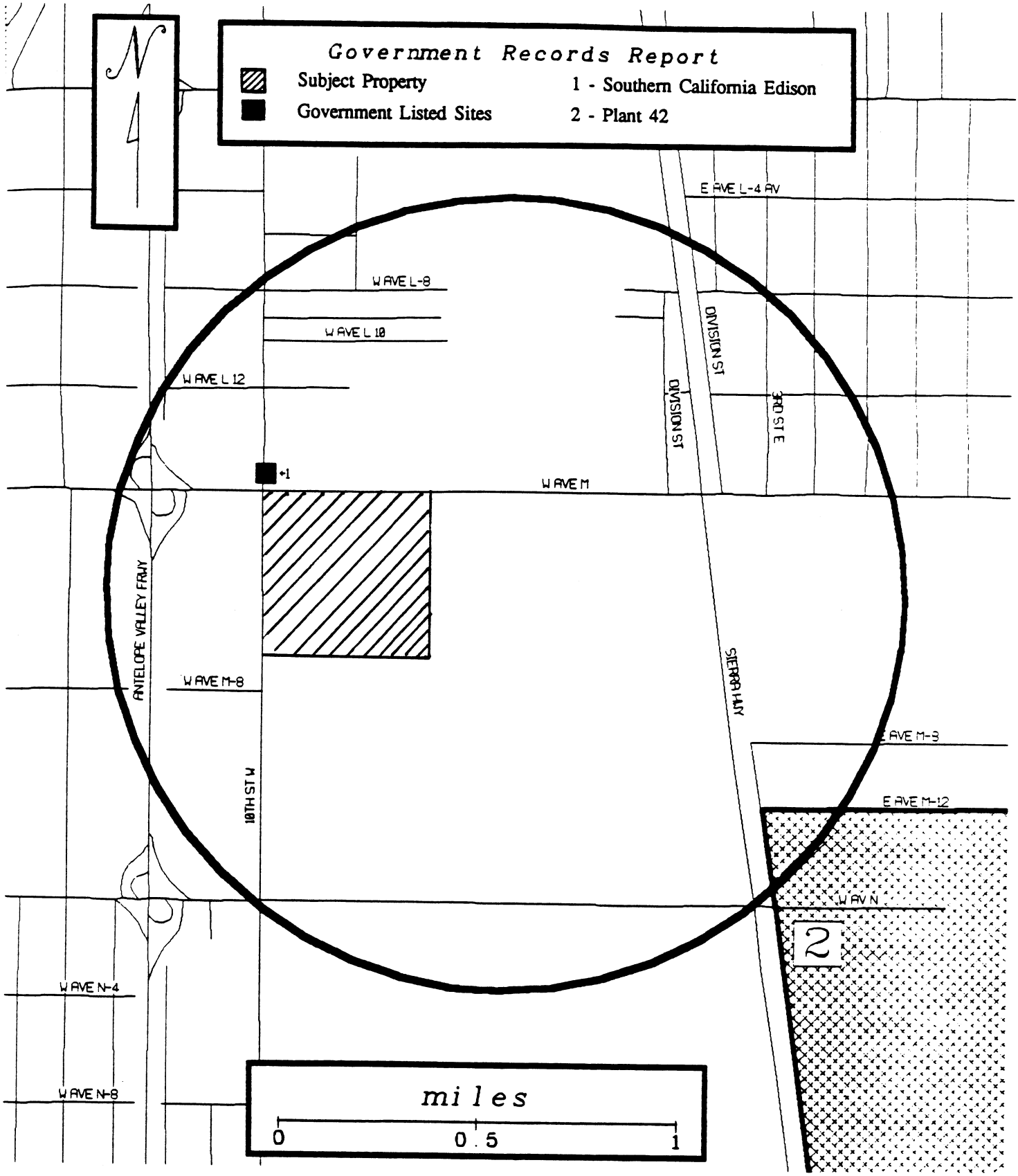

FIGURE 2

GOVERNMENT FILE/DATABASE LISTED SITES IN THE GENERAL VICINITY OF THE LUSK PROPERTY

Plant 42, an Air Force Research and Development facility is located approximately 7,000 feet to the southwest of the subject property. Although Plant 42 is not in the immediate vicinity of the proposed Antelope Valley Business Park property, the facility warrants attention and is listed in the CERCLIS, CORTESE, BEP, COUNTY DATA, HWP AND ASPIS Databases as a contaminated site. Currently, an installation restoration program (IRP) is in the confirmation quantification (site investigation) phase of the mitigation process for this facility according to references listed above.

2.4 Site Ownership and Property Use

The subject property is currently vacant and undeveloped. According to official records in the Los Angeles County Assessor's and Recorder's office, known as the Grantee/Grantor indices subsequent to January 1, 1950, there are no documents describing said real property or any portion thereof, other than those listed below.

1.	Grantor:	Bernard N. Sandler.
	Grantee:	The heirs or devisees of Mac C. Sandler, Deceased, and Helen Sandler Brand.
	Recorded:	October 14, 1959 as Instrument No. 5358.
2.	Grantor:	Allen F. Sandler.
	Grantee:	The heirs or devisees of Mac C. Sandler, Deceased, and Helen Sandler Brand.
	Recorded:	October 14, 1959 as Instrument No. 5359.
3.	Grantor:	The Estate of Mac C. Sandler, Deceased.
	Grantee:	Helen Sandler Brand, formerly Helen Sandler, a widow.
	Recorded:	March 3, 1960 as Instrument No. 4431.
4.	Trustor:	George Kaufman, as Executor of the Estate of Helen Karas, Deceased.
	Beneficiary:	The United States of America.
	Recorded:	November 30, 1972 as Instrument No. 4209.
5.	Grantor:	Helen Karas, also known as Helen B. Karas and Helen Brand Karas, formerly known as Helen Brand and Helen Sandler.
	Grantee:	James L. Cole and Laurie M. Cole, husband and wife, as joint tenants.
	Recorded:	March 29, 1979 as Instrument No. 79-339668.
6.	Grantor:	George Kaufman, as Executor of the Estate of Helen Karas, also known as Helen B. Karas and Helen Brand Karas, formerly known as Helen Brand and Helen Sandler, Deceased.
	Grantee:	James L. Cole and Laurie M. Cole, husband and wife, as joint tenants.
	Recorded:	March 29, 1979 as Instrument No. 79-339669.

7. Trustor: James L. Cole and Laurie M. Cole, husband and wife.
   Beneficiary: George Kaufman, as Executor of the Estate of Helen Karas, Deceased.
   Recorded: March 29, 1979 as Instrument No. 79-339670.

8. Grantor: James L. cole and Laurie M. Cole, husband and wife, as joint tenants.
   Grantee: Palmdale M, a limited partnership, as to an individual one-half interest, and M Street Partnership, a limited partnership, as to an undivided one-half interest, as tenants in common.
   Recorded: March 29, 1979 as Instrument No. 79-341566.

9. Trustor: Palmdale M, a limited partnership, as to an individual one-half interest, and M Street Partnership, a limited partnership, as to an undivided one-half interest, as tenants in common.
   Beneficiary: James L. Cole and Laurie M. Cole, husband and wife, as joint tenants.
   Recorded: March 29, 1979 as Instrument No. 79-341567.

10. Trustor: Palmdale M, a limited partnership, as to an individual one-half interest, and M Street Partnership, a limited partnership, as to an undivided one-half interest, as tenants in common.
    Trustee: Continental Land Title Company, for: Lawyers Title Insurance Corporation.
    Recorded: (Reconveyance for Item No. 9 above). May 30, 1985 as Instrument No. 85-602866.

11. Trustor: James L. Cole and Laurie M. Cole.
    Trustee: First Interstate Bank of California.
    Recorded: (Reconveyance for Item No. 9 above). May 30, 1985 as Instrument No. 86-741545.

2.5 Summary of Findings and Recommendation

Based on an analysis of the databases described in Section 2.3, observations during the site visit and a detailed review of aerial photographs no potential sources of contamination were identified on the subject property. However, the databases reviewed indicate that one potential generator of hazardous waste, is located within 2,000 feet of the property. In addition, Plant 42, an Air Force Research and Development Facility, listed in several databases as a potential generator is located within 7,000 feet of the property.

Based on these findings, it was determined to be prudent to conduct a limited soil sampling program in order to further demonstrate the absence of chemical contamination. This program, described in the following sections, involved soil sampling of four shallow subsurface borings located on the subject property.

SECTION 3

SUBSURFACE INVESTIGATIONS

Based on the findings of the Phase I Environmental Audit, outlined in the previous sections, the following subsurface soil sampling effort was conducted on August 2, 1990.

3.1 Soil Sampling

Four shallow soil borings were conducted by hand augering in the locations shown on Figure 3. Borings A, B and D were advanced to 5 feet below ground surface. Boring C was advanced to 3-1/2 feet deep where refusal was encountered. Soil samples were collected from each boring at 1 foot and the lower most depth attained at each location.

Soil samples were collected using a tube sampler containing one 6-inch long, 2-inch diameter brass sample sleeve. The sampler was driven into native soil with a slide hammer connected to extension rods to ensure that the undisturbed samples collected were representative of existing conditions.

Soils contained in the tip of the cone sampler were screened in the field with an HNu Photoionization Detector (PID) equipped with a 10.2 eV tip to determine the presence of volatile/semi-volatile organics. PID readings are given in Table 1.

The sample sleeve was removed from the sample tube, trimmed, and capped with aluminum foil and plastic caps. Each sample was then sealed with electrical tape, labelled and placed in a chilled ice cooler for submittal to the laboratory. All field operations were conducted in accordance with the Health and Safety Plan presented in Appendix A.

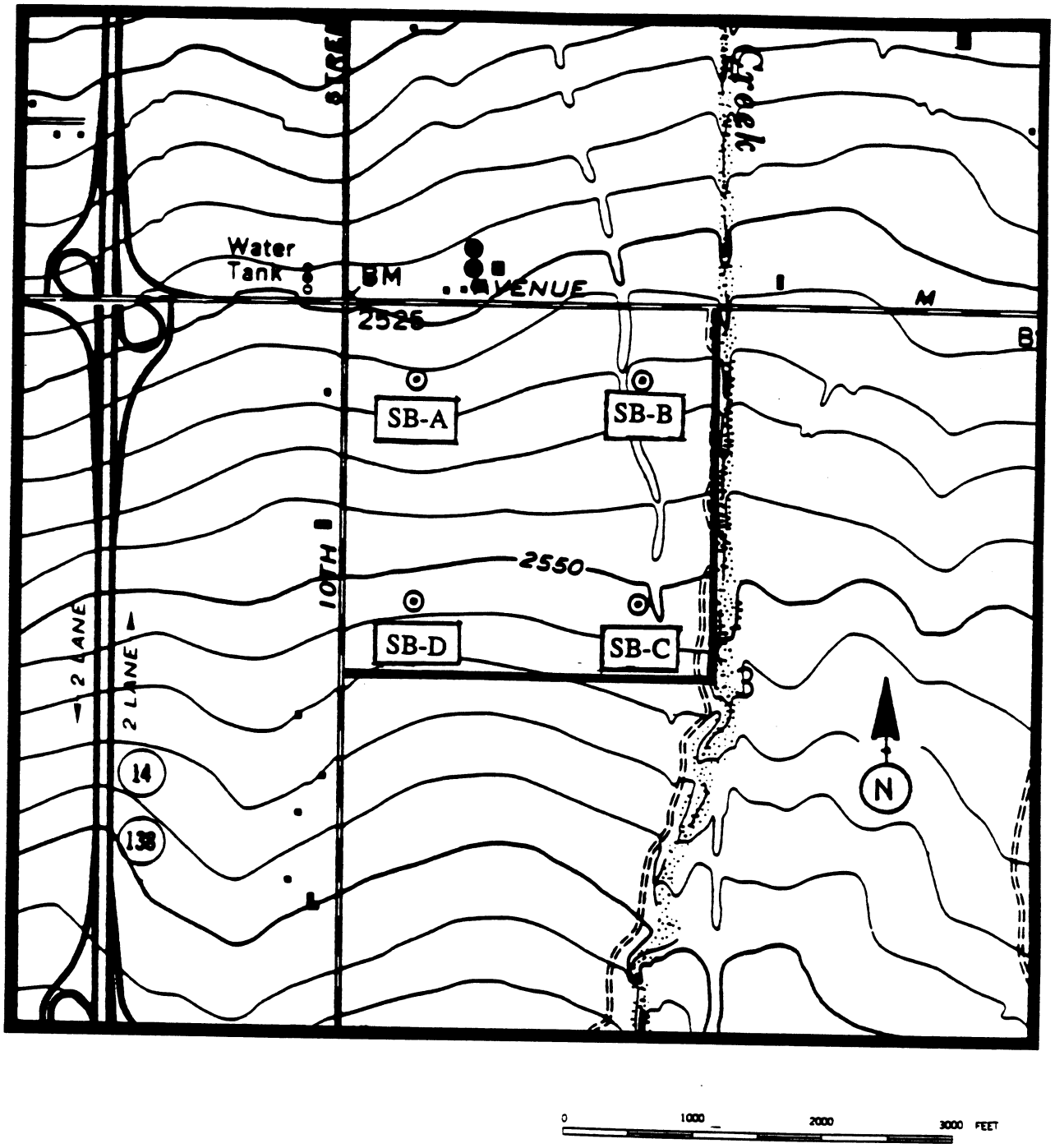

FIGURE 3

SOIL BORING LOCATIONS

TABLE 1

PID READINGS

Boring	Sample ID	Depth (ft.)	Result
A	A-1	1	ND
A	A-5	5	ND
B	B-1	1	ND
B	B-5	5	ND
C	C-1	1	ND
C	C-5	5	ND
D	D-1	1	ND
D	D-5	3-1/2	ND

ND: None detected

SECTION 4

CHEMICAL CONTAMINATION ASSESSMENT

4.1 Laboratory Analysis

Analysis of soil samples were conducted by Montgomery Laboratories, a California State Department of Health Services certified laboratory. In order to minimize costs, the laboratory compiled two (2) composite samples as follows:

Composite (A-D)-1 Comp:	Combined soil samples from one (1) foot depths from borings A through D
Composite (A-3)-5 Comp:	Combined soil samples from five (5) foot depths from Borings A, B, and C including the 3-1/2 foot soil samples from Boring D

Both composite samples were analyzed for heavy metals (CAM Metals), semi-volatile organic compounds (EPA Method 8270), and organochlorine pesticides and PCBs (EPA Method 8080). Results of these analyses are summarized in Tables 2, 3 and 4.

No significant chemical contamination was evident in the soil samples collected according to analytical results.

TABLE 2

CAM METALS

Compound	Sample ID (A-D)-1 Comp	(A-D)-5 Comp
Lead (Pb)	16 ppm	<10 ppm
Copper (Cu)	27 ppm	15 ppm
Chromium VI (Cr VI)	<0.05 ppm	<0.05 ppm
Cobalt (Co)	7.4 ppm	6.6 ppm
Chromium (Cr)	20 ppm	16 ppm
Cadmium (Cd)	<0.50 ppm	<0.50 ppm
Beryllium (Be)	<0.50 ppm	<0.50 ppm
Barium (Ba)	67 ppm	49 ppm
Arsenic (As)	10 ppm	10 ppm
Antimony (Sb)	<5 ppm	<5 ppm
Mercury (Hg)	<0.02 ppm	<0.02 ppm
Molybdenum (Mo)	<5 ppm	<5 ppm
Nickel (Ni)	14 ppm	11 ppm
Selenium (Se)	<5 ppm	<5 ppm
Silver (Ag)	<1.0 ppm	<1.0 ppm
Thallium (Ti)	<10 ppm	<10 ppm
Vanadium (V)	30 ppm	28 ppm
Zinc (Zn)	48 ppm	30 ppm

TABLE 3

SEMI-VOLATILE ORGANICS

EPA METHOD 8270

Compound	Sample ID (A-D)-1 Comp	(A-D)-5 Comp
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS:		
Acenaphthene	ND	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzidine	ND	ND
Benzo(a)anthracene	ND	ND
Benzo(a)pyrene	ND	ND
Benzo(g,h,i)perylene	ND	ND
Benzo(b)fluoranthene	ND	ND
Benzo(k)fluoranthene	ND	ND
bis(2-Chloroethoxy)methane	ND	ND
bis(2-Chloroethyl)ether	ND	ND
bis(2-Chloroisopropyl)ether	ND	ND
bis(2-Ethylhexyl)phthalate	ND	ND
4-Bromophenylphenylether	ND	ND
Butylbenzylphthalene	ND	ND
2-Chloronaphthalene	ND	ND
4-Chlorophenylphenylether	ND	ND
Chrysene	ND	ND
Dibenzo(a,h)anthracene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
3,3'-Dichlorobenzidine	ND	ND
Diethylphthalate	ND	ND
Dimethylphthalate	ND	ND

ND - None detected

Note: Detection limits for each analyte are specified on the complete laboratory reports contained in Appendix B.

TABLE 3 (Continued)

SEMI-VOLATILE ORGANICS

EPA METHOD 8270

Compound	Sample ID (A-D)-1 Comp	(A-D)-5 Comp
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS: (Continued)		
Di-n-butylphthalate	ND	ND
2,4-Dinitrotoluene	ND	ND
2,6-Dinitrotoluene	ND	ND
Di-n-octylphthatlate	ND	ND
1,2-Diphenylhydrazine	ND	ND
Fluoranthene	ND	ND
Fluorene	ND	ND
Hexachlorobenzene	ND	ND
Hexachlorobutadiene	ND	ND
Hexachlorocyclopentadiene	ND	ND
Hexachloroethane	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND
Isophorone	ND	ND
Naphthalene	ND	ND
Nitrobenzene	ND	ND
N-Nitrosodimethylamine	ND	ND
N-Nitrosodi-N-propylamine	ND	ND
N-Nitrosodiphenylamine	ND	ND
Phenanthrene	ND	ND
Pyrene	ND	ND
1,2,4-Trichlorobenzene	ND	ND
ACID EXTRACTABLE PRIORITY POLLUTANTS:		
2-Chlorophenol	ND	ND
2,4-Dichlorophenol	ND	ND
2,4-Dimethylphenol	ND	ND
4,6-Dinitro-o-cresol	ND	ND
2,4-Dinitrophenol	ND	ND

TABLE 3 (Continued)

SEMI-VOLATILE ORGANICS

EPA METHOD 8270

Compound	Sample ID (A-D)-1 Comp	(A-D)-5 Comp
ACID EXTRACTABLE PRIORITY POLLUTANTS: (Continued)		
2-Nitrophenol	ND	ND
4-Nitrophenol	ND	ND
p-Chloro-m-cresol	ND	ND
Pentachlorophenol	ND	ND
Phenol	ND	ND
2,4,6-Trichlorophenol	ND	ND
HAZARDOUS SUBSTANCES COMPOUNDS:		
Aniline	ND	ND
Benzyl Alcohol	ND	ND
2-Methylphenol	ND	ND
4-Mehtylphenol	ND	ND
Benzoic Acid	ND	ND
4-Chloroaniline	ND	ND
2-Methylnaphthalene	ND	ND
Dibenzofuran	ND	ND
2-Nitroaniline	ND	ND
3-Nitroaniline	ND	ND
4-Nitroaniline	ND	ND
2,4,5-Trihclorophenol	ND	ND

TABLE 4

ORGANOCHLORINE PESTICIDES AND PCBs

EPA METHOD 8080

Compound	Sample ID (A-D)-1 Comp	(A-D)-5 Comp
Aldrin	ND	ND
Alpha-BHC	ND	ND
Beta-BHC	ND	ND
Delta-BHC	ND	ND
BHC (Lindane)	ND	ND
Chlorodane	ND	ND
p,p' DDD	ND	ND
p,p' DDE	ND	ND
p,p' DDT	ND	ND
Dieldrin	ND	ND
Endosulfan I (alpha)	ND	ND
Endosulfan II (beta)	ND	ND
Endosulfan sulfate	ND	ND
Endrin	ND	ND
Heptachlor	ND	ND
Heptachlor Epoxide	ND	ND
Endrin Aldehyde	ND	ND
Toxaphene	ND	ND
POLYCHLORINATED BIPHENYLS:		
Arochlor 1016	ND	ND
Arochlor 1221	ND	ND
Arochlor 1232	ND	ND
Arochlor 1242	ND	ND
Arochlor 1248	ND	ND
Arochlor 1254	ND	ND
Arochlor 1260	ND	ND

ND: None detected
Note: Detection limits for each analyte are specified on the complete laboratory reports contained in Appendix B.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

The subject property appeared to be undisturbed, virgin desert never before developed. No potential sources of contamination were evident on the property based on a visual inspection nor were identified in any of the databases researched. In addition, no significant chemical contamination was detected in the soil samples collected based on laboratory analyses. Based upon the evaluation of available data, no further chemical assessment/environmental evaluation of the site appears warranted.

This environmental assessment has been conducted in a manner which is consistent with standard industry practices. This report is not a guarantee that no chemical contamination exists at the site.

APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

ENVIRONMENTAL ASSESSMENT
PROPOSED ANTELOPE VALLEY BUSINESS PARK
PALMDALE, CALIFORNIA

1.0 INTRODUCTION

This Health and Safety Plan (HSP) establishes the responsibilities, requirements, and procedures for the protection of personnel while performing environmental assessment activities at the Proposed Antelope Valley Business Park in Palmdale, California. During the site work, the use of proper health and safety procedures, in accordance with all applicable OSHA regulations, shall be required. Site-specific conditions may necessitate modification of the HSP. **Except in emergency situations, no deviations from this plan may be implemented without the prior notification and approval of the designated Project Safety Officer.**

2.0 PROJECT DESCRIPTION AND HAZARD SUMMARY

2.1 Project Description

The principal objectives of this project are to conduct a limited subsurface sampling effort to minimize the risk of environmental impairment liability associated with the potential presense of hazardous waste.

2.2 Project Hazard Summary

The hazards associated with the Environmental Assessments will consist of physical hazards and potential chemical exposure hazards. Physical hazards at the specific sites will include the hazards potentially present during sampling operations, heat stress, vehicle traffic and the possibility of slip, trip and fall. The risk of an adverse occupational chemical exposure (inhalation or dermal) to site investigation personnel is probably slight due to the lack of any comprehensively documented site contamination problems. However, the potential exists that product or waste may be encountered in the breathing zone. Standard operating safety procedures will be followed to ensure that all field activities are accomplished in a manner that protects the workers.

The toxic hazard to site personnel, associated with the potential site contaminants, can be expressed in Threshold Limit Values-Time Weighted Averages (TLV-TWA) as established by the American Conference of Governmental Industrial Hygienists (ACGIH), and, by Immediately Dangerous to Life or Health (IDLH) values established by the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA).

- **TLV-TWA:** The time-weighted average airborne concentration of a substance, for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect

Certain substances will have a **skin notation, (s)**, following the TLV-TWA. This implies that the overall exposure to a substance is enhanced by skin, mucous membrane or eye contact

Other substances have a **ceiling value, (C)**. This TLV concentration should not be exceeded during any part of the working exposure

- **IDLH:** The maximum airborne concentration of a substance which one could escape within 30 minutes without escape-impairing symptoms or any irreversible health effects

Personnel must be aware of the potential chemical and physical hazards present at the site. For this reason, personnel training will be mandatory prior to working on-site (see Section 4.0), and a tailgate safety meeting form will be completed, discussed, signed by all site personnel and posted on-site at the beginning of each work shift (see Section 3.1).

To ensure safe work practices and conditions, the On site Safety Officer (OSO) shall document instances of noncompliance with this HSP, follow up "near miss" incidents and rectify any noted safety problems.

Based on the unlikelihood of encountering significant concentrations of contaminants at the investigation sites, Level D protection will be used by field personnel. A contingency to upgrade to level C is included in the event that atmospheric monitoring during invasive site activities indicates unexpectedly high levels of toxic air contaminants. Criteria for upgrading level of protection are found in Section 8.0 of this plan.

All site sampling locations will be clearly delineated. The site exit/entry point will be established upwind of sampling operations. Atmospheric monitoring for organic vapors will be continuous while personnel conduct invasive sampling operations. All atmospheric monitoring will follow the procedures established in Section 8.0.

3.0 ACCIDENT PREVENTION PROGRAM

3.1 Accident Prevention Program Administration

An accident prevention plan is included in the HSP to comply with OSHA requirements and to assure a safe and healthful work environment for the on-site personnel. The On-site Safety Officer (see Section 5.4) shall be responsible for implementation of this accident prevention plan and all on-site personnel will be accountable for reading, understanding, and following the guidelines contained herein.

- Site personnel will receive site orientation and review the HSP on their first day on-site, prior to initiation of actual field work.

- The OSO will be responsible for maintaining a clean job site free from hazards and providing safe access and egress from the site. Cones and high visibility surveyor tape will be utilized for traffic control if necessary, and limiting access to hazardous and restricted areas.

- Emergency phone numbers will be posted for the fire department ambulance service and a nearby emergency medical clinic/hospital. The fastest route to the clinic/hospital, along with emergency telephone numbers shall be prominently posted in the work area. The OSO will be the lead person in all emergency situations.

- A tailgate safety meeting shall be conducted to discuss pertinent site safety topics at the beginning of each shift, whenever new personnel arrive at the job site, and as site conditions change. These meetings shall be conducted by the OSO and as a result of each meeting, a completed tailgate safety meeting form shall be posted at the job site. The proposed Antelope Valley Business Park Property Environmental Assessment health and safety requirements will be stressed during these meetings. A sample tailgate safety meeting form is found in **Attachment A.**

Should an accident occur, the On-site Safety Officer will immediately notify the Project Safety Officer, complete an accident report and investigate the cause. Any recommended hazard control measures must be discussed with the Project Safety Officer and meet his approval, prior to implementation. Any chemical exposures or occupational injuries and illnesses shall also be reported to the Project Safety Officer and recorded, if recordable, on the appropriate OSHA Form. Records of all site accidents and first aid treatments will be maintained by the On-site Safety Officer. Additionally, records of recordable workplace injuries and illnesses are routinely maintained at the Contractor's office for at least five years as required by OSHA.

3.2 Activity Hazard Analysis

During the proposed Environmental Assessments, a variety of physical and/or chemical hazards, as described in Section 2.2, may be encountered. The potential hazards of each sampling activity, and the control measures that should be used to minimize or eliminate them, are discussed below.

4.0 PERSONNEL TRAINING

All personnel who will perform field activities for the Proposed Antelope Valley Business Park Environmental Assessment shall meet the training requirements specified in the "OSHA Hazardous Waste Operations and Emergency Response" Standard [29CFR 1910.120(e)].

To ensure that all site personnel understand the hazards associated with site operations, the SS/OSO shall (1) assure that all personnel have read the HSP and acknowledged an understanding and willingness to comply with its' provisions, and (2) perform a safety meeting at the beginning of each work shift. (See **Attachment B; Personal Acknowledgement)** The SS/OSO will emphasize the following aspects of site operations:

- Hazard Recognition

- Review of Known or Suspected Chemical Contaminants (None expected)

- o Site Physical Hazards (Heat Stress, Slip, trip, and fall)
- o Protective Equipment Requirements (Level C and D)
- o Site Control
- o Emergency Action/Assistance
- o Site Safety Rules

5.0 ASSIGNMENT OF RESPONSIBILITIES

Assignment of responsibilities for development, coordination and implementation of the HSP is essential for proper administration of the Plan's requirements.

5.1 Project Manager

The Project Manager maintains overall responsibility for the performance of the project in a safe manner and is the central point of contact for the Wynn Oil Environmental Assessments. Should a health and safety issue develop in the performance of the contract requiring consultation with The Lusk Company, the Project Manager, or the Field Team Leader, will immediately contact Mr. Ted Tunstall, or his designee.

Dr. R. L. Jenkins will perform the Project Manager role for this project.

5.2 Field Team Leader (FTL)

The Field Team Leader is responsible to assure that the goals of the site investigation are attained in a manner consistent with the HSP requirements. He will coordinate with the Project Safety Officer and the On-site Safety Officer in the selection of sampling locations, media and techniques. The Field Team Leader is also the secondary contact with The Lusk Company regarding HSP implementation.

Mr. Dean G. Rusciolelli of JMM will act as the Field Team Leader for field investigations.

5.3 Project Safety Officer

The Project Safety Officer is responsible for the preparation of the site specific HSP. He will ensure that the safety plan complies with all federal, state, and local health and safety requirements. If necessary, the Project Safety Officer can modify the site specific HSP to adjust for on-site changes that affect safety. The Project Safety Officer will coordinate with the On-site Safety Officer on all modifications to the HSP and will be available for consultation when required. The Project Safety Officer will periodically be on-site during the investigation. The Project Safety Officer will prepare the materials to be used in the training program and ensure that the On-site Safety Officer is knowledgeable in all components of the HSP.

Mr. Peter J. Carroll, CIH, of JMM will act as the Project Safety Officer.

5.4 On-site Safety Officer (OSO)

The OSO is responsible for the implementation of the HSP. He has the responsibility and authority to halt or modify any working condition, or remove personnel from the site, if he considers conditions to be unsafe. The OSO will be the main contact in any on-site emergency situation; he will direct all field activities involved with safety. He is responsible for assuring that all on-site personnel understand and comply with all safety requirements. Except in an emergency, he can modify the HSP requirements only after consultation and agreement of the Project Safety Officer.

Mr. R. L. Jenkins and Mr. Dean G. Rusciolelli of JMM will serve as the OSO during the field activities.

5.5 Field Investigation Personnel

All field staff are responsible for understanding and complying with all requirements of the HSP. Field staff will be instructed during each tailgate safety meeting to bring all perceived unsafe site conditions to the attention of the OSO, or his designee.

6.0 MEDICAL PROGRAM

A site medical program includes two major components: a baseline medical surveillance program and emergency medical assistance procedures.

6.1 Baseline Medical Program

Establishment of a medical surveillance program is essential for the protection of site personnel. The purpose of the program is threefold:

- To establish a baseline picture of health against which future changes can be measured;
- To identify any underlying illnesses or conditions that might be aggravated by chemical exposures or job activities, (ie) use of respiratory protective equipment; and,
- To allow recognition of any medical/physical abnormalities at the earliest opportunity, so that corrective measures can be implemented.

All on-site personnel will have had an initial baseline examination. All subcontractor personnel will also be subject to the medical examination requirements. The JMM baseline physical/medical, described in **Attachment C**, includes periodic follow-up examinations designed to measure changes in an individual's health status. Basic components of the baseline JMM physical/medical examination include:

- Occupational History
- Family History
- Medical History

- Physical Examination
- Basic Blood and Urine Analyses
- Pulmonary Function Tests
- X-Ray
- Vision and Hearing Testing

6.2 Emergency Medical Assistance and First Aid Equipment

Prior to work start up, an emergency medical assistance network will be established. The fire department, ambulance service and hospital with an emergency room will be identified. **Attachment D** includes the telephone number of the Project Safety Officer. Peter J. Carroll; 911 for emergency ambulance, fire and police services; and the location and telephone number of a nearby hospital with emergency room services for each of the service station locations.

A vehicle shall be available on-site during all work activities to transport injured personnel to the identified emergency medical facilities. All site vehicles shall be equipped with fire extinguishers. Telephone numbers and locations of the emergency room facilities shall be posted at the Site.

The OSO will be certified to render first-aid and cardiopulmonary resuscitation (CPR) prior to initiation of field activities. A first-aid kit shall be available at the site. An adequate supply of fresh water or a portable emergency eye wash will be available at each active work site.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Levels of Protection

Personal protective equipment will be required during the course of The Lusk Company Environmental Assessments. Selection will be based primarily on hazard assessment data and work task requirements. During specific sampling activities, sites will be monitored for potentially hazardous contaminants using an HNU (Model No. PI 101) photoionization detector (HNU Systems, Inc.) with a 10.2 eV probe to detect hydrocarbon vapors. The HNU will be calibrated with the HNU Systems, Inc. calibration span gas (Part 101-350) at least daily.

Based upon the site history, the initial level of protection for all sampling activities is Level D. Provisions are made in Section 8.0 for upgrading the level of protection to Level C.

7.2 Level D Personnel Protective Equipment

Personnel working under Level D protection shall wear as a minimum:

- Coveralls, Tyvek or polyethylene-coated tyvek
- Boots, chemical-resistant, steel toe
- Hardhat and faceshield (or safety glasses) - faceshield or safety glasses to be worn only when actively sampling

- Gloves, chemical-resistant (nitrile) - when handling soil cuttings or samples only

7.3 Level C Personnel Protective Equipment

Air monitoring information will dictate when a particular site shall be upgraded to Level C protection. Level C personal protection shall consist of the following, as a minimum:

- Half-face air purifying respirator, organic vapor cartridge (MSHA/NIOSH approved)
- Coveralls, Polyethylene-coated tyvek
- Gloves, chemical-resistant (nitrile) - when handling soil cuttings or samples only
- Boots, chemical-resistant, steel toe
- Hard hat and faceshield (or safety glasses) - faceshield or safety glasses to be worn only when actively sampling

7.4 Respirator Selection and Fit Test

For site work that requires Level C protection, the OSO or the Project Safety Officer must assure that all field personnel are medically approved to use respiratory equipment, fit tested and trained in the proper use of the air purifying respirators.

The OSO shall maintain documentation of the size, brand and model number of air purifying respirator with which each site worker has achieved a successful face seal fit. These procedures shall comply with the requirements of the OSHA Respiratory Protection Standard (29CFR 1910.134).

8.0 HAZARD ASSESSMENT

Hazard assessment is essential for determination of hazard control measures that must be implemented during the site investigation; it involves characterization of the chemical, physical and other safety hazards at the site. Hazard assessment will consist of a site survey and air monitoring.

The OSO shall conduct a site survey to locate hazards and to determine appropriate control measures prior to initiation of work activities. Hazards may include underground utilities, normal site work operations or product transfer lines.

The main objective of atmospheric monitoring is to assess the explosive and inhalation hazard presented to site personnel. During invasive sampling activities, air monitoring will be conducted by using a "real time" field instrumentation. This will consist of a combustible gas indicator and a photoionization detector. As stated in Section 7.1, a HNU (PI 101) PID, equipped with a 10.2 eV probe, will be used to assess the inhalation hazard to site workers. Initially, organic vapor levels will be measured upwind of any specific drilling site to determine the background PID and combustible gas indicator reading.

Combustible Gas Indicator (CGI) Readings: CGI readings greater than ten percent of the lower explosive limit (10% LEL), taken approximately one to two feet above a given borehole, shall cause the project to halt until the CGI reading is reduced to less than 10% of the LEL.

PID Readings: In establishing **action levels**, it is important to assess the likelihood of chemical exposures and the explosive potential associated with various site activities. The established **action level** for upgrading to Level C protective equipment is an HNU meter reading that consistently exceeds 5 meter units, based on sampling in the breathing zone of Site Workers (4-6 feet above the ground). If the PID organic vapor readings exceed 25 meter units above background for longer than 15 minutes, all site work shall cease and the designated work area (Exclusion Zone) shall be evacuated until the vapor levels have subsided. If levels in excess of 25 meter units do not dissipate in the worker breathing zone at a specific site, all work will cease at that site and The Lusk Company Contact will be notified of the situation.

PID monitoring of the boring and sampling sites will be continuous as long as the drilling or sampling operation is active and personnel are within the defined boundaries of the work area.

PID readings will be recorded in a safety log book, by the OSO or his designee, at 30 minute intervals.

9.0 SITE CONTROL

Site control requires the establishment of a regulated area, designated work zones, an evacuation protocol and site security.

9.1 **Regulated Area(s):** Each site will have an established exclusion zone, with controlled access, and a support zone.

Personnel on-site will use the "buddy system", and will maintain communication or visual contact between team members at all times.

9.2 **Work Zones:** Safety procedures for preventing physical and chemical hazards during site operations includes establishing zones for specific activities. Site investigation activities mandate the formation of an Exclusion and Support Zone; The zones are described as follows:

- **Exclusion Zone:** Exclusion Zones must be isolated with cones, barricades or high visibility surveyor tape. Personnel working in an Exclusion Zone will at minimum use Level D personal protective equipment as described in Section 9.0.

The outer boundary of the Exclusion Zone shall be established by the SS/OSO so that sufficient area is available to conduct operations while providing a protective buffer for personnel outside of the Zone.

- **Support (Clean) Zone:** This is the area outside of the Exclusion Zone. Adverse exposure to contaminants and physical hazards are unlikely in this area.

9.3 **Emergency Protocol:** It is the objective of a HSP to minimize chemical/physical hazards and operational mishaps. The following items are intended so that personnel respond to emergency situations in a calm, reasonable manner:

- Evacuation routes from each site shall be established by the SS/OSO, and communicated to all personnel during the safety meeting, prior to work start up in any area.

- Prior to work start up, an emergency medical assistance network shall be established. The fire department, ambulance service, security, and clinic or hospital emergency room shall be identified **(See Attachment D)**.

- A first-aid kit will be available at the site for use by trained personnel.

- All injuries or illnesses not limited to a first-aid case shall be immediately reported to the PSO.

10.0 DECONTAMINATION PROCEDURES

Project activities will be initially conducted in Level D protection. Hazards of greatest concern are physical. Due to the expected low level of contamination, and the types of contaminants at the site, personnel will not perform routine decontamination procedures when leaving the Exclusion Zone. When decontamination is necessary it will consist of:

- Removal of contaminated garments in an "inside out" manner at a designated decontamination station located at the step-off location where personnel routinely enter/exit the Exclusion Zone.

- Placement of contaminated garments in designated plastic bags or drums prior to disposal or transfer off-site.

11.0 HEAT STRESS

Heat stress may be of concern during any field project. Therefore, potential heat stress conditions may require the implementation of a heat stress management program. This program will be implemented at the discretion of the SS/OSO and will require the following:

- Establishment of a work regimen that will provide personnel with adequate rest periods for body cooling

- Maintenance of adequate supplies of cool drinking water and electrolyte replacement fluids in personnel rest areas

- Employees be informed of the importance of adequate rest and proper diet in the prevention of heat stress

12.0 HEALTH AND SAFETY PROGRAM DOCUMENTATION

12.1 Site Safety Plan

All site work shall be performed in accordance with the provisions stated in this HSP.

12.2 On-site Safety Officer's Daily Log

The OSO shall maintain a daily log that includes pertinent observations including PID and CGI monitoring results and changes in implementation of the HSP (and their justification).

12.3 Tailgate Safety Meeting Documentation

The OSO shall conduct tailgate safety meetings at the beginning of each work shift, whenever new personnel arrive at the site, as site conditions change, or as needed. These meetings must be documented in writing, signed by the attendees at each meeting and posted at the Site. A file of tailgate safety meeting forms shall be kept by the OSO.

13.0 GENERAL SITE SAFETY REQUIREMENTS

The following practices are expressly forbidden during on-site investigations:

- Smoking, eating, drinking, or chewing tobacco while in the exclusion zone or any potentially contaminated area.
- Ignition of flammable materials in the work zone; equipment shall be bonded and grounded, sparkproof and explosion resistant, as appropriate.
- Contact with potentially contaminated substances. Walking through puddles or pools of liquid, kneeling on the ground or leaning, sitting or placing equipment on the contaminated soil should be avoided.
- Facial hair that may affect a respirator face seal or wearing contact lenses when use of respiratory protection is required.
- Performance of tasks in the Exclusion Zone individually; personnel shall work using the "buddy system" at all times.

Personnel should keep the following prudent guidelines in mind when on-site conducting an investigation:

- Hazard assessment is a continual process: personnel must be aware of their surroundings and constantly be aware of the chemical/physical hazards that are present.
- Personnel in the Exclusion Zone shall be the minimum number necessary to perform work tasks in a safe and efficient manner.

- Team members will be familiar with the physical characteristics of each investigation site including wind direction, site access, location of communication devices and safety equipment.

- Prior to invasive activities, the location of overhead power lines and underground utilities must be established.

Team members will be familiar with emergency hand signals:

Hand gripping throat:	Respirator problems, can't breathe
Grip team member's wrist or place both hands around waist:	Leave site immediately, no debate!
Thumbs up:	OK, I'm alright, I understand
Thumbs down:	No, negative

ATTACHMENT A

TAILGATE SAFETY MEETING FORM

Date:_____ Time:_____ Job Number:_____

Client: The Lusk Company

Site Location:

Scope of Work:_____

_____

Safety Topics Presented

Protective Clothing/Equipment:_____

_____

Chemical Hazards:_____

_____

Physical Hazards:_____

_____

Special Equipment:_____

_____

Other:_____

Emergency Procedures:_____

_____

Hospital:_____ Phone:_____ Ambulance Phone:_____

Hospital Address and Route:_____

_____

ATTENDEES

NAME PRINTED	SIGNATURE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting Conducted By:_____ _____
Name Printed Signature

Project Safety Officer:_____ Project Manager:_____

ATTACHMENT B

PERSONAL ACKNOWLEDGEMENT

As a component of the Health and Safety Plan (HSP) designed to provide personnel safety during the site activities conducted at The Lusk Company Site, you are required to read and understand the HSP. When you have fulfilled this requirement, please sign and date this personal acknowledgement.

_____ _____

Signature Name (Printed)

_____

Date

ATTACHMENT C

MEDICAL SURVEILLANCE PROGRAM REQUIREMENTS

The purpose of this program is to define those requirements and responsibilities necessary to ensure that all site investigation personnel are protected by an adequate medical surveillance protocol.

This program applies to all JMM and subcontract personnel who enter exclusion or contamination reduction zones while working at sites suspected of contamination with hazardous substances.

BASELINE HEALTH ASSESSMENT

Personnel who will be required to work at a suspect hazardous substance site shall be provided a baseline health assessment. This assessment will investigate existing conditions which would predispose personnel to illness due to exposure to hazardous substances, or to the physical demands of using personal protective equipment. This assessment shall include but not be limited to the following items:

- Work history
- Family history
- Laboratory analyses
- Medical history
- Physical examination
- Pulmonary function tests
- Ear/eye examination

CRITERIA FOR THE BASELINE HEALTH ASSESSMENT

Medical monitoring shall include occupational, medical, and family histories, a screening physical examination, basic blood and urine laboratory tests, pulmonary function tests, ear/eye examination, and a physician's evaluation.

Basic Blood and Urine Laboratory Tests

Blood Tests

On-site personnel shall receive a basic panel of blood counts and chemistries to evaluate blood-forming, kidney, liver, endocrine, and metabolic functions. The following blood tests are considered the minimum desirable:

- White blood cell count, differential cell count, and platelet estimate
- Hemoglobin and/or hematocrit
- Albumin, globulin, and total protein
- Total bilirubin
- Serum glutamic oxalacetic transaminase (SGOT)
- Lactic dehydrogenase (LDH)
- Inorganic phosphate
- Alkaline phosphatase
- Calcium
- Phosphorus
- Uric acid
- Creatinine
- Urea nitrogen

- Cholesterol
- Glucose

Urine Tests

On-site personnel shall have a routine urinanalysis that includes:

- Specific gravity
- Microscopic examination
- Acetone
- Albumin
- pH
- Protein
- Glucose

Pulmonary Function Tests

Pulmonary function testing is a requirement of the baseline medical examination. At a minimum, the tests shall include lung ventilation evaluations of forced expiratory volume in one second (FEV1) and forced vital capacity (FVC).

X-Ray

X-Ray exams should be obtained only when clinically indicated by other testing procedures, e.g., pulmonary function testing. A chest x-ray, when required, should be a standard 14 x 17 inch P-A (posterior-anterior) exposure. However, no chest x-ray shall be obtained if the employee has had one within the past three years. That record shall be obtained from the former examining physician, radiologist, or hospital. All films shall be read or reviewed by a board-certified radiologist or other competent medical specialist.

Electrocardiogram

An electrocardiogram will be included in the baseline examination only when deemed necessary by the examining physician. It shall be of the standard 12-lead resting type and interpreted by an internist or cardiologist.

Vision and Hearing Testing

Vision testing that measures refraction, depth perception and color vision should be administered by a qualified technician or physician. Audiometric testing shall be performed at 500, 1,000, 2,000, 3,000, 4,000, and 6,000 hertz pure tone in an approved booth (29CFR Part 1910.95) by a qualified technician and the results read by a certified audiologist or a physician familiar with audiometric evaluation.

APPENDIX B

LABORATORY ANALYTICAL REPORTS/ CHAIN-OF-CUSTODY DOCUMENTATION

MONTGOMERY LABORATORIES
a division of James M. Montgomery, Consulting Engineers, Inc.
555 East Walnut Street, Pasadena, California 91101
(818) 796-9141 / (213) 681-4255 Telex 67-5420

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Lusk Palmdale
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Acct#: 2899.0010
PO#: 2899.0010

Sample date: 8/2/90
WO#: W30171

The following samples were received from you on 8/3/90 . They have been scheduled for the tests listed beside each sample. If this information is not correct, please contact Client Services at 818-568-6500. Thank you for using Montgomery Laboratories.

Lab#	Sample Identification	Tests Scheduled			
K83861	(A-D)-1 COMP	PB	CU	CRVI	CO
		CR	CD	BE	BA
		AS	SB	HG	MO
		NI	SE	AG	TL
		V	ZN	TTLC	BNA
		PEST-PCB			
K83862	(A-D)-5 COMP	PB	CU	CRVI	CO
		CR	CD	BE	BA
		AS	SB	HG	MO
		NI	SE	AG	TL
		V	ZN	TTLC	BNA
		PEST-PCB			

Test Acronymn Description

Test Acronym	Description
PB	Lead Analysis in soil-Soil
CU	Copper Analysis in soil-Soil
CRVI	Chromium VI Analysis in soil-Soil
CO	Cobalt Analysis in soil-Soil
CR	Chromium Analysis in soil, Total-Soil
CD	Cadmium Analysis in soil-Soil

* Rush

Test Acronymn Description

Test Acronym	Description
BE	Beryllium Analysis-Soil
BA	Barium Analysis in soil-Soil
AS	Arsenic Analysis in soil-Soil
SB	Antimony analysis in soil-Soil
HG	Mercury Analysis in soil-Soil
MO	Molybdenum Analysis in soil-Soil
NI	Nickel Analysis in soil-Soil
SE	Selenium Analysis in soil, Total-Soil
AG	Silver Analysis-Soil
TL	Thallium Analysis in soil-Soil
V	Vanadium Analysis in soil-Soil
ZN	Zinc Analysis in soil-Soil
TTLC	Pretreatment: for TTLC-Soil
BNA	BNA Extractable Organics Analysis, in Soil-Soil
PEST-PCB	Pesticides/PCBs Analysis, Pri.Pol. in soil-Soil

* Rush

LABORATORIES

555 East Walnut Street, P.O. Box 7009
Pasadena, California 91109-7009
(818) 796-9141

QUOTATION/WORK ORDER

CLIENT NAME LUSK PALMDALE / JMM PAS3 JOB# PO#/CHECK# 2899.0010 same

W30171

ORIGINATOR	SHIPPING ADDRESS	REPORT ADDRESS	BILLING ADDRESS
QUOTE DATE		JMM-PAS3	JMM-PAS 3
BOTTLE ORDER DATE	ATTN:	ATTN: DEAN RUSCIOLELLI	ATTN: DEAN RUSCIOLELLI
DATE B'TTLES REQ'D BY CLIENTS	PHONE:	PHONE: X6933	PHONE: X6933

# SAMPLES	ANALYSIS	TEST#	LAB#s	SID/COMMENTS	UNIT PRICE	TOTAL PRICE
2	CAMTTLC, BNA, PEST-PCB		K8386 1	(A-D)-1 COMP		
			K8386 2	(A-D)-5 COMP		

* SAMPLES NEED COMPOSITING

A1, B1, C1, D1 (A-D)-1

A5, B5, C5, D5 (A-D)-5

DATE SHIPPED	SHIPPED VIA	COOLER #	SAMPLE DATE	DATE REC'D	CHAIN OF CUSTODY
			8/2/90	8/3/90	

TYPE OF MATRIX (CIRCLE): POTABLE WATER, OTHER WATER, WASTEWATER, SOIL, SLUDGE, OTHER

HAZARDOUS (TYPE OF HAZARD)

EXPECTED ARRIVAL DATE

DUE DATE

OTHER CHARGES

% DISCOUNT

RUSH MULT

TURNAROUND TIME (DAYS)

STORAGE PERIOD

FULL CHAIN OF CUSTODY

COMPOSITING

SPECIAL SHIPPING CHARGES

STORAGE CHARGES

M[redacted]ARG[redacted]TIMA[redacted]TOTAL CHARGE

Attn: Dean Russotelli

Charge to 2899.0010

Environmental Auditors, Inc.

Custody Transfer Record/Lab Work Request

Client: James M. Montgomery/LUSK

Work Order: 0020-01-01-0002

Date Rec'd. _____ Date Due in 2 weeks

Client Contact/Phone: Richard Jenkins

Lab ID	Client ID/Description	Matrix	Date Collected	CAM metals		Semi volatiles (EPA 8270)						
	A-1 } composite and	S	8-2-90	✓		✓	K8386 1					
	A-5 } and analyze composite	S					K8386 2					
	B-1 } -same-	S		✓		✓	K8386 1					
	B-5 }	S					K8386 2					
	C-1 } -same-	S		✓		✓	K9386 1					
	C-5 }	S					K8386 2					
	D-1 } -same	S		✓		✓	K8386 1					
	D-3 }	S					K8386 2					

Matrix:
S - Soil
SE - Sediment
SO - Solid
W - Water
O - Oil
A - Air
WI - Wipe
DS - Drum Solids
DL - Drum Liquids
F - Fish
L - EP/TCLP Leachate
X - Other

Special Instructions: Composite samples with same letter prefixes and analyze the composites

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
	[signature] 8-3-90						A. ESTRADA	8/3/90	8:38

LAB USE ONLY

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed)
Y N
NOTES:

4 Properly Preserved
Y N
NOTES:

5 Received Within Holding Times
Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

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Report of Analysis for
PRIORITY POLLUTANT PESTICIDES
POLYCHLORINATED BIPHENYLS (PCBs)

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44586
Phone #: X6933

Date Sampled: 8/2/90
Date Extracted: 8/9/90
Date Received: 8/3/90
Date Analyzed: 8/15/90

Lab Number: K83861
Sample I.D.: (A-D)-1 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
PRIORITY POLLUTANT PESTICIDES:		
Aldrin	ND	0.004
Alpha-BHC	ND	0.004
Beta-BHC	ND	0.004
Delta-BHC	ND	0.004
BHC (Lindane)	ND	0.004
Chlordane	ND	0.04
p,p' DDD	ND	0.004
p,p' DDE	ND	0.004
p,p' DDT	ND	0.004
Dieldrin	ND	0.004
Endosulfan I (alpha)	ND	0.004
Endosulfan II (beta)	ND	0.004
Endosulfan sulfate	ND	0.004
Endrin	ND	0.002
Heptachlor	ND	0.002
Heptachlor Epoxide	ND	0.002
Endrin Aldehyde	ND	0.004
Toxaphene	ND	0.10

ND: Not Detected
NA: Not Analyzed

Approved by Carole J Leong

APPROVED
AUG 2[illegible]
QC OFFICER

Report of Analysis for
PRIORITY POLLUTANT PESTICIDES
POLYCHLORINATED BIPHENYLS (PCBs)

Lab Number:	K83861
Sample I.D.:	(A-D)-1 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
POLYCHLORINATED BIPHENYLS:		
Arochlor 1016	ND	0.02
Arochlor 1221	ND	0.04
Arochlor 1232	ND	0.02
Arochlor 1242	ND	0.02
Arochlor 1248	ND	0.02
Arochlor 1254	ND	0.02
Arochlor 1260	ND	0.02

ND: Not Detected
NA: Not Analyzed

Report of Analysis for
PRIORITY POLLUTANT PESTICIDES
POLYCHLORINATED BIPHENYLS (PCBs)

Lab Number:	K83861
Sample I.D.:	(A-D)-1 COMP

Compound	Recovery (%)	QC Limits (%)
SURROGATE:		
Dibutyl Chlorendate	123	24-1_0

ND: Not Detected
NA: Not Analyzed

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(818) 796-9141 / (213) 681-4255 Telex 67-5420

Report of Analysis for
PRIORITY POLLUTANT PESTICIDES
POLYCHLORINATED BIPHENYLS (PCBs)

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44587
Phone #: X6933

Date Sampled: 8/2/90
Date Extracted: 8/9/90
Date Received: 8/3/90
Date Analyzed: 8/15/90

Lab Number: K83862
Sample I.D.: (A-D)-5 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
PRIORITY POLLUTANT PESTICIDES:		
Aldrin	ND	0.004
Alpha-BHC	ND	0.004
Beta-BHC	ND	0.004
Delta-BHC	ND	0.004
BHC (Lindane)	ND	0.004
Chlordane	ND	0.04
p,p' DDD	ND	0.004
p,p' DDE	ND	0.004
p,p' DDT	ND	0.004
Dieldrin	ND	0.004
Endosulfan I (alpha)	ND	0.004
Endosulfan II (beta)	ND	0.004
Endosulfan sulfate	ND	0.004
Endrin	ND	0.002
Heptachlor	ND	0.002
Heptachlor Epoxide	ND	0.002
Endrin Aldehyde	ND	0.004
Toxaphene	ND	0.10

ND: Not Detected
NA: Not Analysed

Approved by Carole J. Leary

APPROVED
AUG 22 1990
QC OFFICER

Report of Analysis for PRIORITY POLLUTANT PESTICIDES POLYCHLORINATED BIPHENYLS (PCBs)

Lab Number:	K83862
Sample I.D.:	(A-D)-5 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
POLYCHLORINATED BIPHENYLS:		
Arochlor 1016	ND	0.0[illegible]
Arochlor 1221	ND	0.04
Arochlor 1232	ND	0.02
Arochlor 1242	ND	0.02
Arochlor 1248	ND	0.02
Arochlor 1254	ND	0.02
Arochlor 1260	ND	0.02

ND: Not Detected
NA: Not Analyzed

Report of Analysis for PRIORITY POLLUTANT PESTICIDES POLYCHLORINATED BIPHENYLS (PCBs)

Lab Number:	K83862
Sample I.D.:	(A-D)-5 COMP

Compound	Recovery (%)	QC Limits (%)
SURROGATE:		
Dibutyl Chlorendate	126	24-150

ND: Not Detected
NA: Not Analyzed

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(818) 796-9141 / (213) 681-4255 Telex 67-5420

Report of CAM Metals in Soil

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44582
Phone #: X6933

Date Sampled: 8/2/90
Date Completed: 8/20/90
Date Received: 8/3/90

Lab#	Sample I.D.	Pb mg/kg	Cu mg/kg	Cr VI mg/kg	Co mg/kg	Cr mg/kg
K83861	(A-D)-1 COMP	16	27	<0.50	7.4	20

Lab#	Sample I.D.	Cd mg/kg	Be mg/kg	Ba mg/kg	As mg/kg	Sb mg/kg
K83861	(A-D)-1 COMP	<0.50	<0.5	67	10	<5.0

Lab#	Sample I.D.	Hg mg/kg	Mo mg/kg	Ni mg/kg	Se mg/kg	Ag mg/kg
K83861	(A-D)-1 COMP	<0.02	<5.0	14	<5.0	<1.0

Lab#	Sample I.D.	Tl mg/kg	V mg/kg	Zn mg/kg
K83861	(A-D)-1 COMP	<10	30	48

NA: Not Analyzed

Approved by [signature]

APPROVED
AUG 2 [illegible]
QC OFFICER

MONTGOMERY LABORATORIES
a division of James M. Montgomery, Consulting Engineers, Inc.
555 East Walnut Street, Pasadena, California 91101
(818) 796-9141 / (213) 681-4255 Telex 67-5420

Report of CAM Metals in Soil

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44583
Phone #: X6933

Date Sampled: 8/2/90
Date Completed: 8/20/90
Date Received: 8/3/90

Lab#	Sample I.D.	Pb mg/kg	Cu mg/kg	Cr VI mg/kg	Co mg/kg	Cr mg/kg
K83862	(A-D)-5 COMP	<10	15	<0.50	6.6	16

Lab#	Sample I.D.	Cd mg/kg	Be mg/kg	Ba mg/kg	As mg/kg	Sb mg/kg
K83862	(A-D)-5 COMP	<0.50	<0.5	49	10	<5.0

Lab#	Sample I.D.	Hg mg/kg	Mo mg/kg	Ni mg/kg	Se mg/kg	Ag mg/kg
K83862	(A-D)-5 COMP	<0.02	<5.0	11	<5.0	<1.0

Lab#	Sample I.D.	Tl mg/kg	V mg/kg	Zn mg/kg
K83862	(A-D)-5 COMP	<10	28	30

NA: Not Analyzed

Approved by [signature]

APPR[illegible]
AUG 2[illegible]
QC OFFICER

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a division of James M. Montgomery, Consulting Engineers, Inc.
555 East Walnut Street, Pasadena, California 91101
(818) 796-9141 / (213) 681-4255 Telex 67-5420

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44584
Phone #: X6933

Date Sampled: 8/2/90
Date Extracted: 8/7/90
Date Received: 8/3/90
Date Analyzed: 8/22/90

Lab Number: K83861
Sample I.D.: (A-D)-1 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS:		
Acenaphthene	ND	1.0
Acenaphthylene	ND	1.0
Anthracene	ND	1.0
Benzidine	ND	10
Benzo(a)anthracene	ND	1.0
Benzo(a)pyrene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
bis(2-Chloroethoxy)methane	ND	2.0
bis(2-Choroethyl)ether	ND	2.0
bis(2-Chloroisopropyl)ether	ND	2.0
bis(2-Ethylhexyl)phthalate	ND	4.0
4-Bromophenylphenylether	ND	1.0
Butylbenzylphthalate	ND	1.0
2-Chloronaphthalene	ND	1.0
4-Chlorophenylphenylether	ND	1.0
Chrysene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND: Not Detected
NA: Not Analyzed

Approved by

APPROVED
AUG 28 1990
QC OFFICER

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number: K83861
Sample I.D.: (A-D)-1 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS (continued):		
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
3,3'-Dichlorobenzidine	ND	10
Diethylphthalate	ND	1.0
Dimethylphthalate	ND	1.0
Di-n-butylphthalate	ND	2.0
2,4-Dinitrotoluene	ND	1.0
2,6-Dinitrotoluene	ND	1.0
Di-n-octylphthalate	ND	2.0
1,2-Diphenylhydrazine	ND	2.0
Fluoranthene	ND	1.0
Fluorene	ND	1.0
Hexachlorobenzene	ND	1.0
Hexachlorobutadiene	ND	2.0
Hexachlorocyclopentadiene	ND	2.0
Hexachloroethane	ND	1.0
Indeno(1,2,3-c,d)pyrene	ND	2.0
Isophorone	ND	1.0
Naphthalene	ND	1.0
Nitrobenzene	ND	1.0
N-Nitrosodimethylamine	ND	1.0
N-Nitrosodi-N-propylamine	ND	1.0
N-Nitrosodiphenylamine	ND	1.0
Phenanthrene	ND	1.0
Pyrene	ND	1.0
1,2,4-Trichlorobenzene	ND	1.0
ACID EXTRACTABLE PRIORITY POLLUTANTS:		
2-Chlorophenol	ND	1.0
2,4-Dichlorophenol	ND	1.0
2,4-Dimethylphenol	ND	1.0
4,6-Dinitro-o-cresol	ND	10
2,4-Dinitrophenol	ND	10
2-Nitrophenol	ND	1.0
4-Nitrophenol	ND	2.0

ND: Not Detected
NA: Not Analyzed

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number: K83861
Sample I.D.: (A-D)-1 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
ACID EXTRACTABLE PRIORITY POLLUTANTS (continued):		
p-Chloro-m-cresol	ND	1.0
Pentachlorophenol	ND	2.0
Phenol	ND	1.0
2,4,6-Trichlorophenol	ND	1.0
HAZARDOUS SUBSTANCES COMPOUNDS:		
Aniline	ND	1.0
Benzyl Alcohol	ND	1.0
2-Methylphenol	ND	1.0
4-Methylphenol	ND	1.0
Benzoic Acid	ND	10
4-Chloroaniline	ND	1.0
2-Methylnaphthalene	ND	1.0
Dibenzofuran	ND	1.0
2-Nitroaniline	ND	2.0
3-Nitroaniline	ND	4.0
4-Nitroaniline	ND	4.0
2,4,5-Trichlorophenol	ND	1.0

ND: Not Detected
NA: Not Analyzed

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number:	K83861
Sample I.D.:	(A-D)-1 COMP

Compound	Recovery (%)	QC Limits (%)
SURROGATE:		
Nitrobenzene-d5	62	23-120
2-Fluorobiphenyl	66	30-115
Terphenyl-d14	117	18-137
2-Fluorophenol	119	25-121
Phenol-d5	110	24-113
2,4,6-Tribromophenol	64	19-122

ND: Not Detected
NA: Not Analyzed

MONTGOMERY LABORATORIES
a division of James M. Montgomery, Consulting Engineers, Inc.
555 East Walnut Street, Pasadena, California 91101
(818) 796-9141 / (213) 681-4255 Telex 67-5420

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lusk Palmdale/JMM-PAS 3
****
****
Pasadena, CA 91109-7009
Attn: Dean Rusciolelli

Job#: 2899.0010
PO#: 2899.0010
Workorder#: W30171
Report#: R44585
Phone #: X6933

Date Sampled: 8/2/90
Date Extracted: 8/7/90
Date Received: 8/3/90
Date Analyzed: 8/22/90

Lab Number: K83862
Sample I.D.: (A-D)-5 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS:		
Acenaphthene	ND	1.0
Acenaphthylene	ND	1.0
Anthracene	ND	1.0
Benzidine	ND	10
Benzo(a)anthracene	ND	1.0
Benzo(a)pyrene	ND	1.0
Benzo(g,h,i)perylene	ND	1.0
Benzo(b)fluoranthene	ND	1.0
Benzo(k)fluoranthene	ND	1.0
bis(2-Chloroethoxy)methane	ND	2.0
bis(2-Choroethyl)ether	ND	2.0
bis(2-Chloroisopropyl)ether	ND	2.0
bis(2-Ethylhexyl)phthalate	ND	4.0
4-Bromophenylphenylether	ND	1.0
Butylbenzylphthalate	ND	1.0
2-Chloronaphthalene	ND	1.0
4-Chlorophenylphenylether	ND	1.0
Chrysene	ND	1.0
Dibenzo(a,h)anthracene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND: Not Detected
NA: Not Analyzed

Approved by

APP[illegible]
AUG 28 [illegible]
QC OFFICER

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number: K83862
Sample I.D.: (A-D)-5 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
BASE/NEUTRAL EXTRACTABLE-PRIORITY POLLUTANTS (continued):		
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
3,3'-Dichlorobenzidine	ND	10
Diethylphthalate	ND	1.0
Dimethylphthalate	ND	1.0
Di-n-butylphthalate	ND	2.0
2,4-Dinitrotoluene	ND	1.0
2,6-Dinitrotoluene	ND	1.0
Di-n-octylphthalate	ND	2.0
1,2-Diphenylhydrazine	ND	2.0
Fluoranthene	ND	1.0
Fluorene	ND	1.0
Hexachlorobenzene	ND	1.0
Hexachlorobutadiene	ND	2.0
Hexachlorocyclopentadiene	ND	2.0
Hexachloroethane	ND	1.0
Indeno(1,2,3-c,d)pyrene	ND	2.0
Isophorone	ND	1.0
Naphthalene	ND	1.0
Nitrobenzene	ND	1.0
N-Nitrosodimethylamine	ND	1.0
N-Nitrosodi-N-propylamine	ND	1.0
N-Nitrosodiphenylamine	ND	1.0
Phenanthrene	ND	1.0
Pyrene	ND	1.0
1,2,4-Trichlorobenzene	ND	1.0
ACID EXTRACTABLE PRIORITY POLLUTANTS:		
2-Chlorophenol	ND	1.0
2,4-Dichlorophenol	ND	1.0
2,4-Dimethylphenol	ND	1.0
4,6-Dinitro-o-cresol	ND	10
2,4-Dinitrophenol	ND	10
2-Nitrophenol	ND	1.0
4-Nitrophenol	ND	2.0

ND: Not Detected
NA: Not Analyzed

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number:	K83862
Sample I.D.:	(A-D)-5 COMP

Compound	Concentration (milligrams/kilogram)	Detection Limit (milligrams/kilogram)
ACID EXTRACTABLE PRIORITY POLLUTANTS (continued):		
p-Chloro-m-cresol	ND	1.0
Pentachlorophenol	ND	2.0
Phenol	ND	1.0
2,4,6-Trichlorophenol	ND	1.0
HAZARDOUS SUBSTANCES COMPOUNDS:		
Aniline	ND	1.0
Benzyl Alcohol	ND	1.0
2-Methylphenol	ND	1.0
4-Methylphenol	ND	1.0
Benzoic Acid	ND	10
4-Chloroaniline	ND	1.0
2-Methylnaphthalene	ND	1.0
Dibenzofuran	ND	1.0
2-Nitroaniline	ND	2.0
3-Nitroaniline	ND	4.0
4-Nitroaniline	ND	4.0
2,4,5-Trichlorophenol	ND	1.0

ND: Not Detected
NA: Not Analyzed

Report of GC/MS Analysis for BASE/NEUTRAL/ACID EXTRACTABLE ORGANICS in Soil

Lab Number:	K83862
Sample I.D.:	(A-D)-5 COMP

Compound	Recovery (%)	QC Limits (%)
SURROGATE:		
Nitrobenzene-d5	53	23-120
2-Fluorobiphenyl	56	30-115
Terphenyl-d14	87	18-137
2-Fluorophenol	99	25-121
Phenol-d5	89	24-113
2,4,6-Tribromophenol	55	19-122

ND: Not Detected
NA: Not Analyzed

APPENDIX H

TRAFFIC IMPACT STUDY
TRACT 44769

SOUTHEAST QUADRANT
AVENUE M AND 10TH STREET WEST
CITY OF PALMDALE, CALIFORNIA

REVISED MAY 6, 1991

PREPARED FOR:
THE LUSK COMPANY
15350 Sherman Way, Suite 490
Van Nuys, California 91406

PREPARED BY:
CRENSHAW TRAFFIC ENGINEERING

WALLACE W. CRENSHAW, P.E. #TR0366

REGISTERED PROFESSIONAL ENGINEER
WALLACE W. CRENSHAW
No. 0366
Exp 3-31-93
TRAFFIC
STATE OF CALIFORNIA

CTE CRENSHAW TRAFFIC ENGINEERING Traffic and Transportation Consulting
41765 12th Street West, Suite A Lancaster California 93534 (805) 949-7714

REVISED

TRAFFIC IMPACT STUDY

TRACT 44769

East of 10th Street West, South of Avenue M

City of Palmdale, California

INTRODUCTION

This traffic study has been prepared to determine the traffic impact on the local roadway system from traffic generated by the proposed specific plan development. The proposed project will be located east of 10th Street West and South of Avenue M in the City of Palmdale. The traffic (trips) estimated to be generated by this project has been added to the existing on-street traffic volumes and their impact has been analyzed on the existing and proposed street network within this project as well as key intersections in the general vicinity of the site. Future known development traffic volumes have also been added to this scenario. The following material

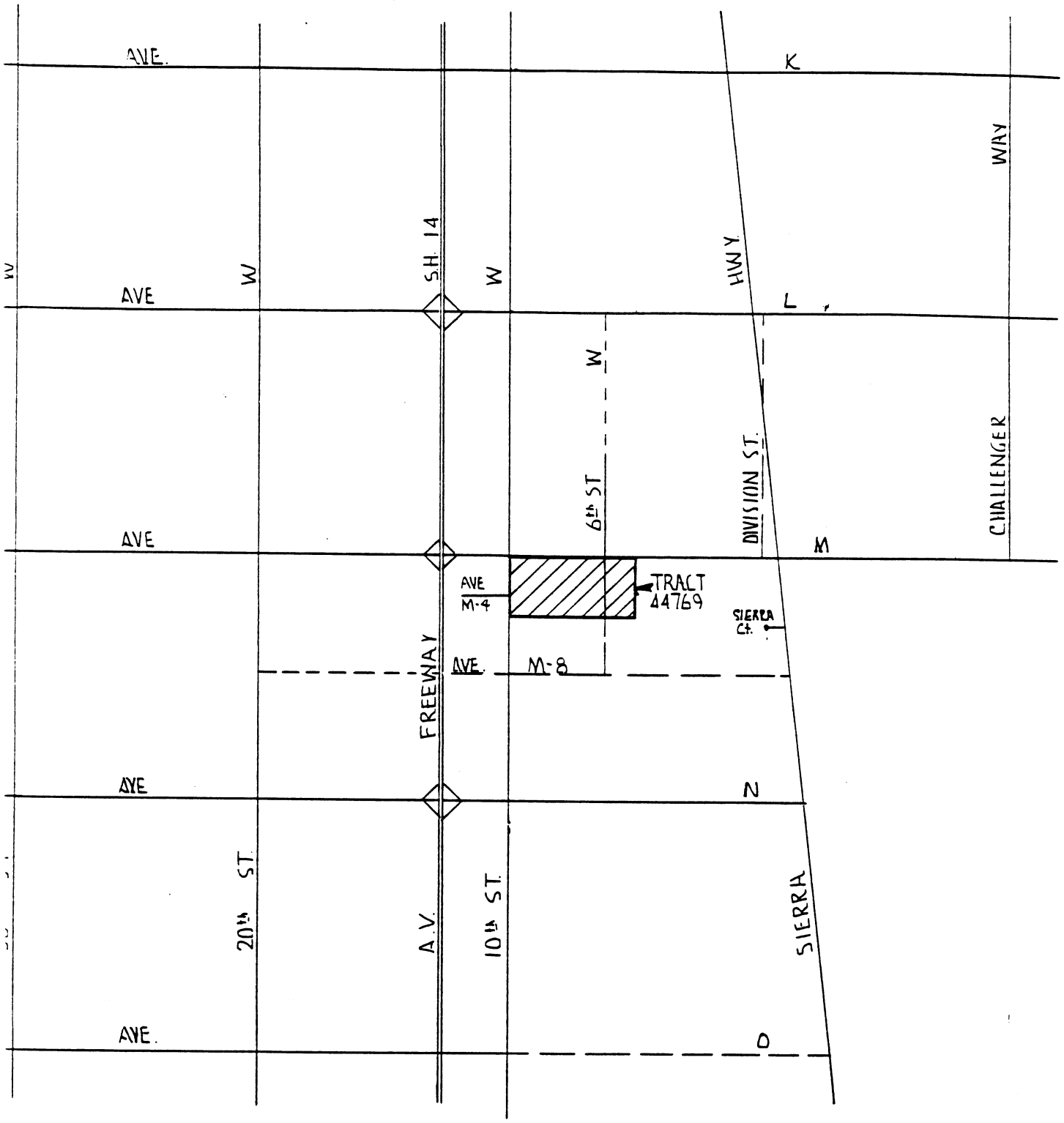
sets forth existing traffic counts, estimated trip generation, distribution of project related traffic and capacity analysis at the key intersections for projected conditions before and after the proposed development.

PROJECT

The proposed project consists of: a Light Industrial Development containing 1,117,314 square feet of gross leasable floor area; Business Park (Office Units) with 743,650 square feet of gross leasable floor area; Commercial usage of 98,794 square feet of gross leasable floor area. The site is presently undeveloped, and primarily vacant of structures.

SITE LOCATION

The proposed development is located within the City of Palmdale, Los Angeles County, California. The site is located at the southeast quadrant of 10th Street West and Avenue M, and is a 120 acre parcel. (See vicinity map, Exhibit 1 herein.)



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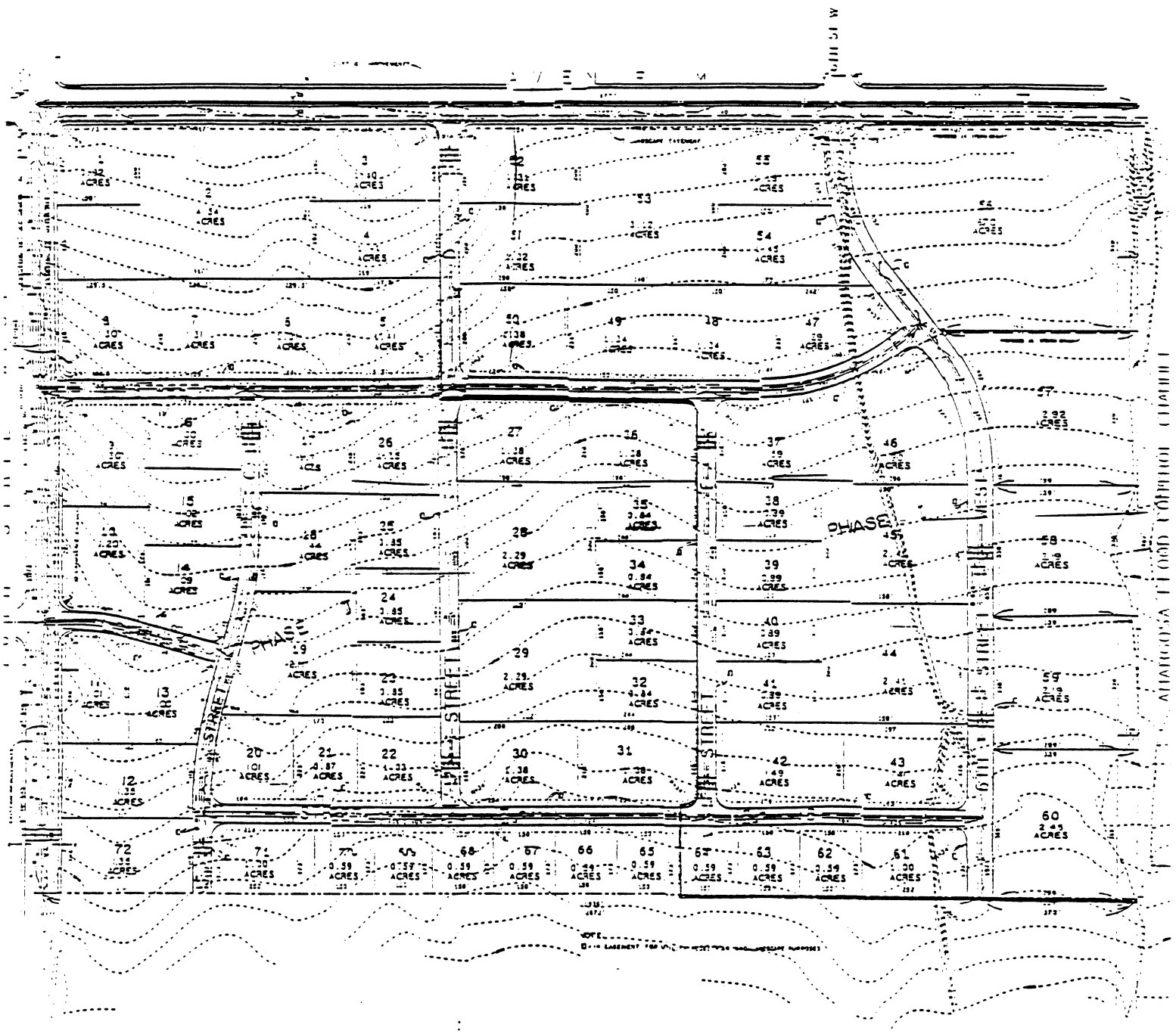
VICINITY MAP
TRACT 44769

EXHIBIT 1



ANTELOPE VALLEY BUSINESS PARK

TRACT 44769

EXHIBIT 2

TRAFFIC AND CIRCULATION

At the present time, this parcel has access to 10th Street West and Avenue M. A network of major and secondary highways and local streets exist in the area. In the project vicinity, these street networks will provide access to nearby commercial, residential and employment centers.

Regional transportation to this area is provided by State Highway 14 and State Highway 138. Avenue M has on and off access to the Antelope Valley Freeway (SR-14) approximately one-half mile to the west.

STREETS AND HIGHWAYS

Following is a summary description of the streets and highways which will serve the proposed project, and which could be affected by project traffic.

10th Street West

At the present time 10th Street West is a wide (26′) two-lane street south of Avenue M and is developed on the west side south of Avenue M at several locations. The east side is one lane. 10th Street West is classified as a major arterial highway by the City of Palmdale. Ultimate right-of-way width - 100 feet.

Avenue M

Avenue M is a four lane street (64') with painted left turn pocket at the intersection of 10th Street West. Presently there are traffic signals at the intersections of Avenue M and 10th Street West and Avenue M and 6th Street West. Avenue M is designated as a major arterial. Ultimate right-of-way width - 100 feet.

6th Street West

6th Street West is developed to Commercial Standards north of Avenue M, City of Lancaster, and is non-existent south of Avenue M at this time. 6th Street West will be developed as a part of this project, south of Avenue M to an ultimate right-of-way width of 66 feet.

Avenue M-4

Avenue M-4 is a fully improved Industrial Street (76' wide) west of 10th Street West, and does not exist east of 10th Street West but will be constructed as a part of this project.

Avenue M-8

At the present time, Avenue M-8 is developed to half street

width on the south side, west of 10th Street West for approximately 330 feet. Avenue M-8 does not exist east of 10th Street West.

RECENT AREA TRAFFIC COUNTS

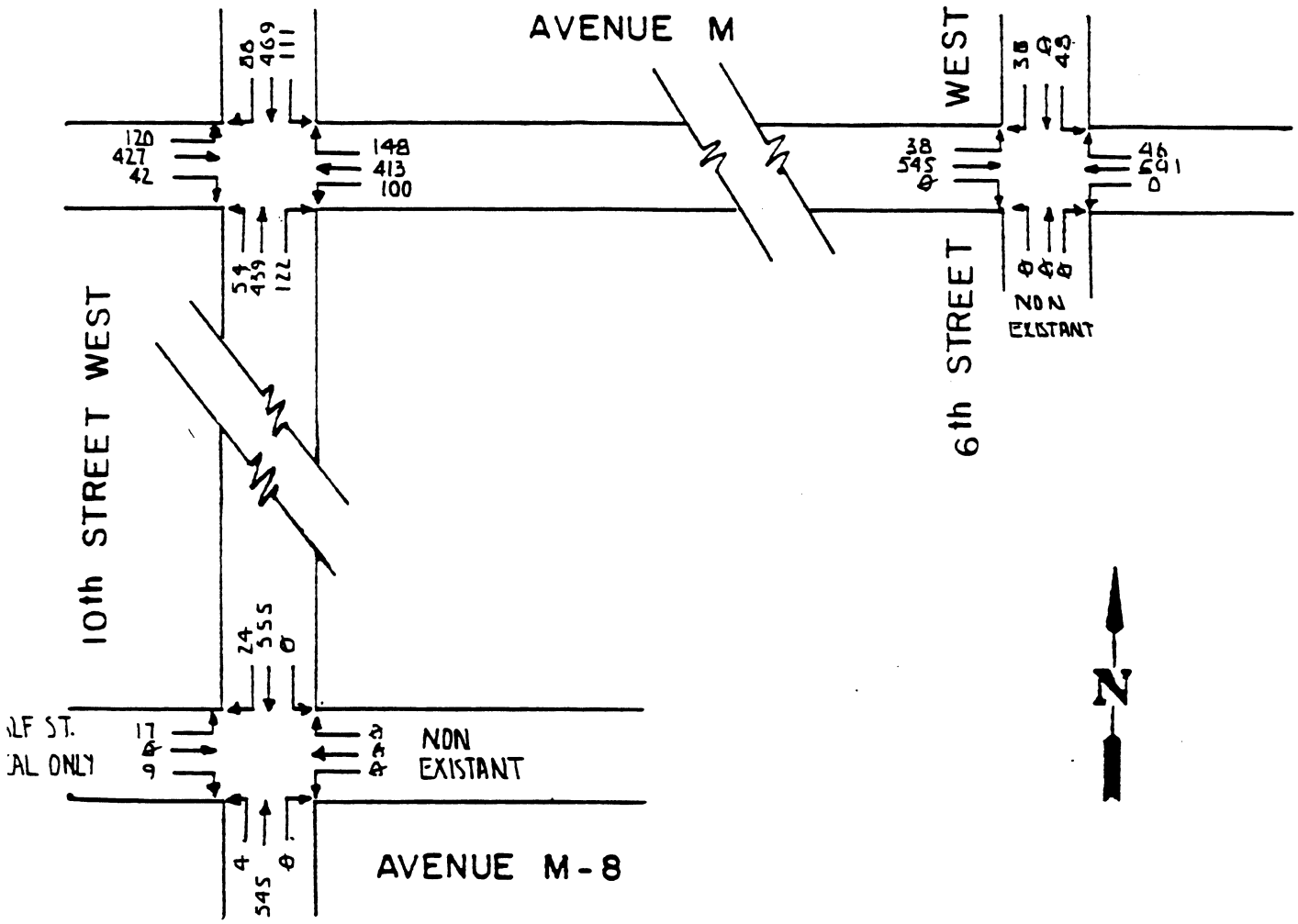
Traffic volumes on these streets and other major thoroughfares in the area show typical peak periods associated with major streets in the area.

The volumes show a peak during the morning commuter period, another peak during the noon hour, and a third peak during the evening commuter period. The evening peak has the highest volume of traffic during the three peak periods. Table 1 shows a summary of recent traffic counts taken in the area. These counts were conducted at the key intersections in the vicinity of the project. Manual counts were conducted by Crenshaw Traffic Engineering during the PM peak hours to determine the turning movements at key intersections. These turning movements were used in the intersection analysis. The average PM peak hour of these counts was found to be between 4:00 PM and 6:00 PM. The PM peak hours were used for analysis purposes as they represent the highest peak volumes. See Exhibit 3. (See Appendix A for details of manual count data.)

TABLE 1

MANUAL TURN MOVEMENT COUNTS

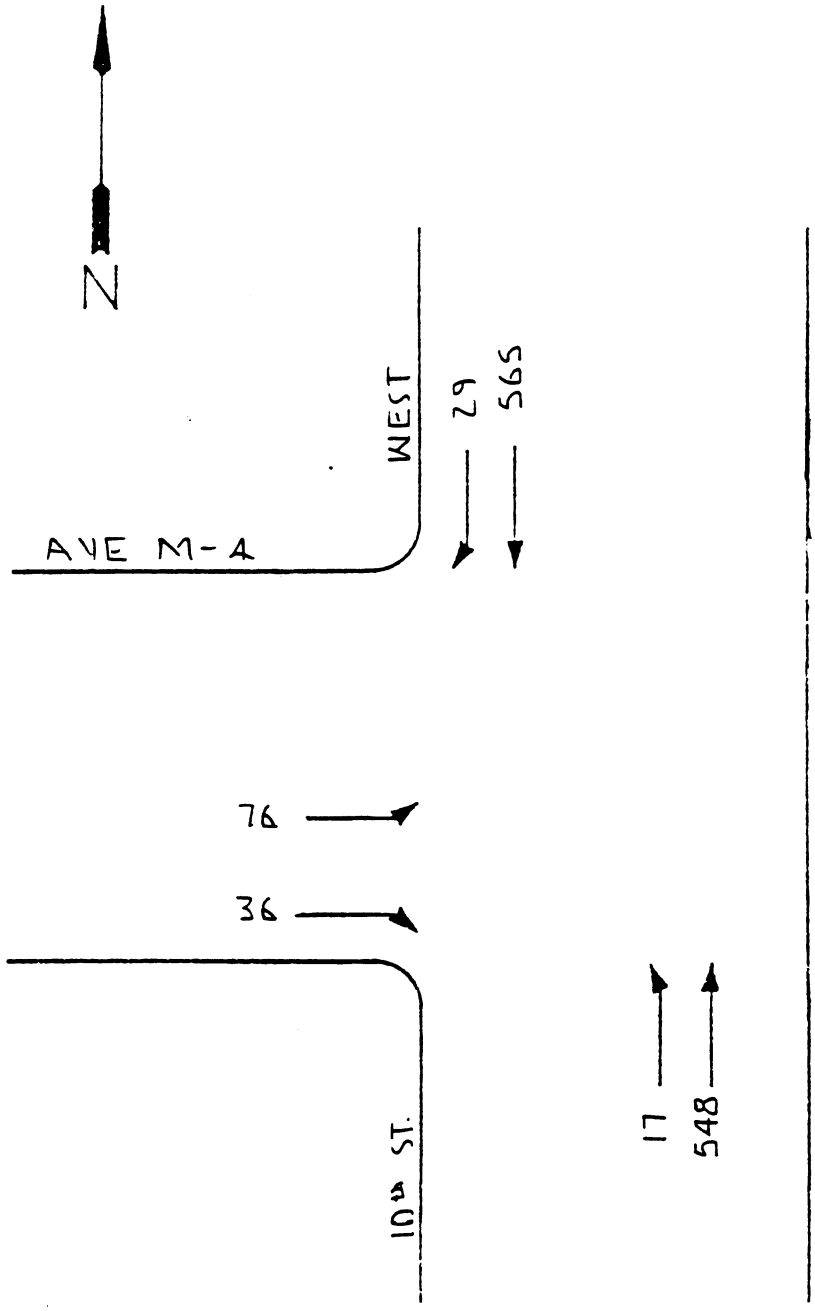
STREET LOCATION	COUNT DATE	DIR.	P.M. PEAK HOUR BEGAN	VOL.
Avenue M and 10th Street West	12-20-90	NB	4:00	615
		SB	4:00	668
		EB	4:00	589
		WB	4:00	661
Avenue M-4 and 10th Street West	12-20-90	NB	4:00	565
		SB	4:00	594
		EB	4:00	112
		WB	4:00	-0-
Avenue M-8 and 10th Street West	12-20-90	NB	4:00	549
		SB	4:00	579
		EB	4:00	26
		WB	4:00	-0-
Avenue M and 6th Street West	1-9-91	NB	4:00	-0-
		SB	4:00	86
		EB	4:00	583
		WB	4:00	637
Avenue M and Sierra Highway	4-19-91	NB	3:15	1,132
		SB	3:15	868
		EB	3:15	568
		WB	3:15	1,086
Avenue M and SR-14 Northbound Ramps	4-19-91	NB	4:00	432
		SB	4:00	-0-
		EB	4:00	300
		WB	4:00	657
Avenue M and SR-14 Southbound Ramps	4-19-91	NB	4:00	-0-
		SB	4:00	116
		EB	4:00	252
		WB	4:00	592



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
EXISTING VOLUMES

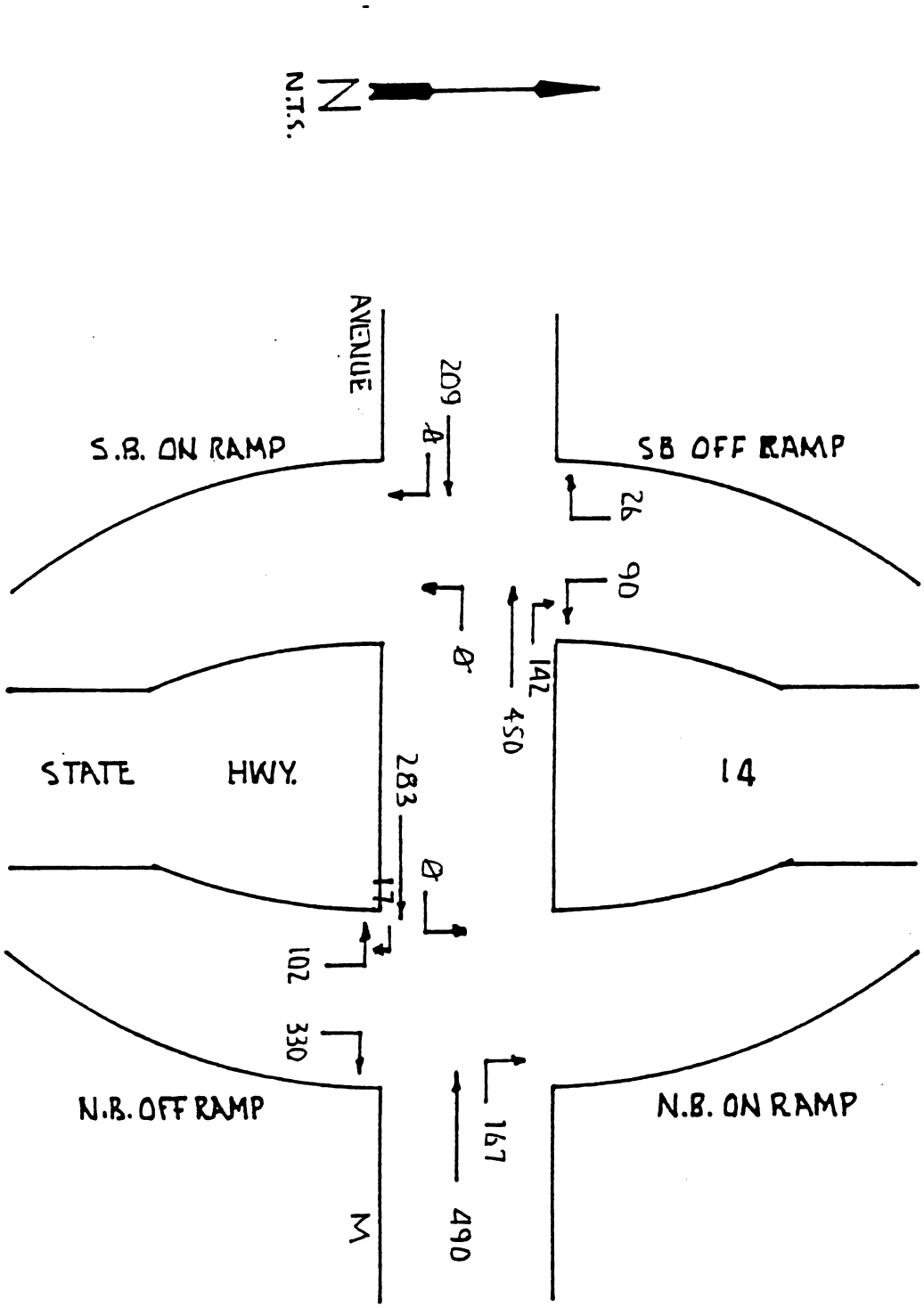
EXHIBIT 3



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
EXISTING VOLUMES

EXHIBIT 3A

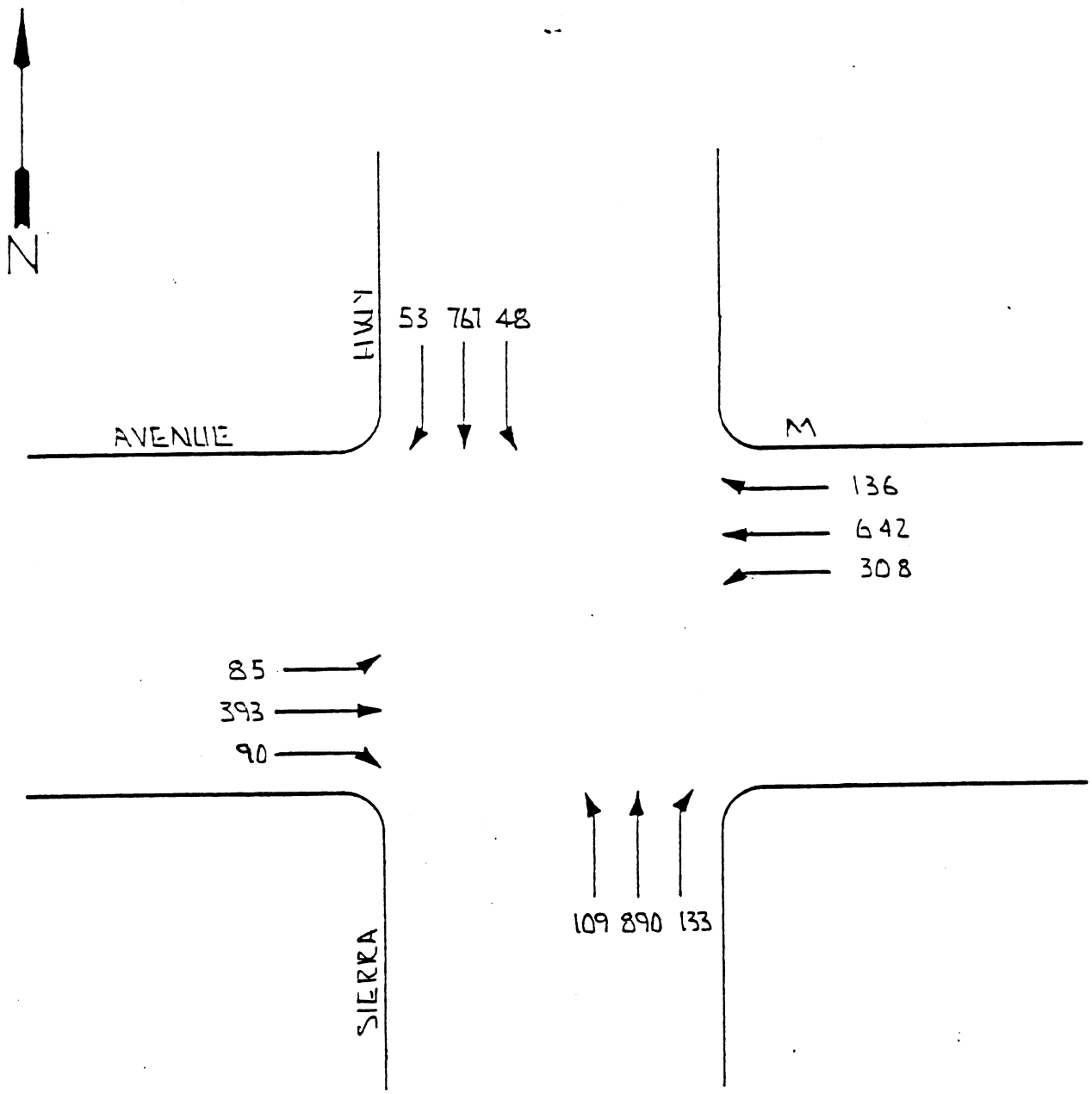


CTE CRENSHAW TRAFFIC ENGINEERING

Traffic and Transportation Consulting

P.M. PEAK HOUR DISTRIBUTION
EXISTING VOLUMES

EXHIBIT 3B



CRENSHAW TRAFFIC ENGINEERING
43434 SAHUAYO STREET
LANCASTER, CA 93535

P.M. PEAK HOUR DISTRIBUTION
EXISTING VOLUMES

EXHIBIT 3C

TRAFFIC GENERATION AND DISTRIBUTION

The daily traffic volumes estimated to be generated by the proposed project were based on the data obtained from the Institute of Transportation Engineers (ITE), "Trip Generation", 4th Edition, dated September, 1987. At full buildout, it is estimated that this project will generate a total of approximately 24,408 vehicular trip ends per day.

Table 2 shows the daily and peak hour generation factors and resulting trip ends for the proposed project. Table 2 also shows the project will generate 660 vehicles arriving and 2,120 vehicles leaving the site during the PM commuter peak hour.

The expected project-related traffic volumes were distributed onto the local roadway system based on manual count data, observation of peak hour traffic movements, the characteristics of the nearby road system and the population distribution of the region.

Exhibit 4 shows the percentage of trip distribution on a regional scale. Exhibit 5 shows the project-related traffic distributed on the local roadway system for the PM peak hour.

TABLE 2

TRAFFIC GENERATION
Tract 44769

DESIGNATED; INDUSTRIAL PARK

1,117,314 Gross Leasable Floor Area

ADT Generated Traffic

6.967 X 1,117,314/1000 GLFA = 7,784 Vehicle Trip Ends Per Day

PM Peak Hour Generated Traffic

1.037 P.M. Peak Hour Rate X 1,117,314 GLFA = 1,158 VPPH P.M.

Enter: 12% = 139 VPPH P.M.
Exit: 88% = 1,019 VPPH P.M.

AM Peak Hour Generated Traffic

0.960 A.M. Peak Hour Rate X 1,117,314 GLFA = 1,072 VPPH A.M.

Enter: 88% = 945 VPPH A.M.
Exit 12% = 127 VPPH A.M.

DESIGNATED; COMMERCIAL

98,794 SF Gross Leasable Floor Area

ADT Generated Traffic

74.80 trips/1000 SF GLFA X 98,794/1000 = 7,390 Vehicle Trips Per Day

P.M. Peak Hour Generated Traffic

6.289 P.M. Peak Hour Rate X 98,794/1000 = 620 VPPH P.M.

Enter: 50% = 310 VPPH P.M.
Exit: 50% = 310 VPPH P.M.

A.M. Peak Hour Generated Traffic

1.7635 A.M. Peak Hour Rate X 98,794/1000 = 174 VPPH A.M.

Enter: 50% = 87 VPPH A.M.
Exit: 50% = 87 VPPH A.M.

TABLE 2, CONTINUED

DESIGNATED: BUSINESS PARK

743,650 SF Gross Leasable Floor Area

ADT Generated Traffic

12.417 trips/1000 SF GLFA X 743,650/1000 = 9,234 Vehicle Trips Per Day

P.M. Peak Hour Generated Traffic

1.350 P.M. Peak Hour Rate X 743,650/1000 = 1,003 VPPH P.M.

Enter: 21% = 210 VPPH P.M.
Exit: 79% = 792 VPPH P.M.

A.M. Peak Hour Generated Traffic

1.537 A.M. Peak Hour Rate X 743,650/1000 = 1,142 VPPH A.M.

Enter: 85% = 970 VPPH A.M.
Exit: 15% = 172 VPPH A.M.

TOTAL

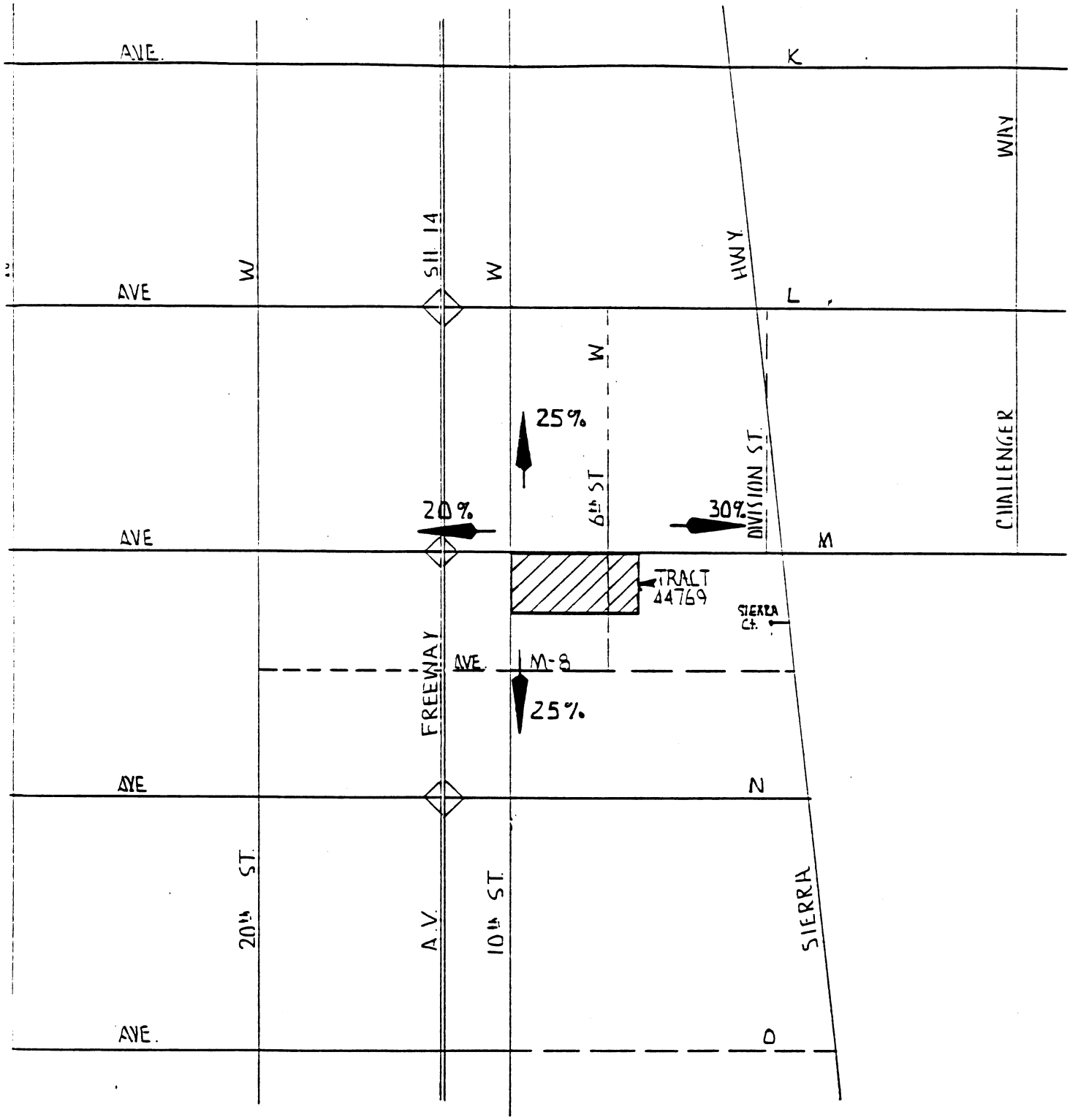
Traffic Per Day = 24,408 VPPH P.M.

P.M. Peak Hour = 2,780 VPPH P.M.

Enter: = 660 VPPH
Exit: = 2,120 VPPH

A.M. Peak Hour = 2,388 VPPH A.M.

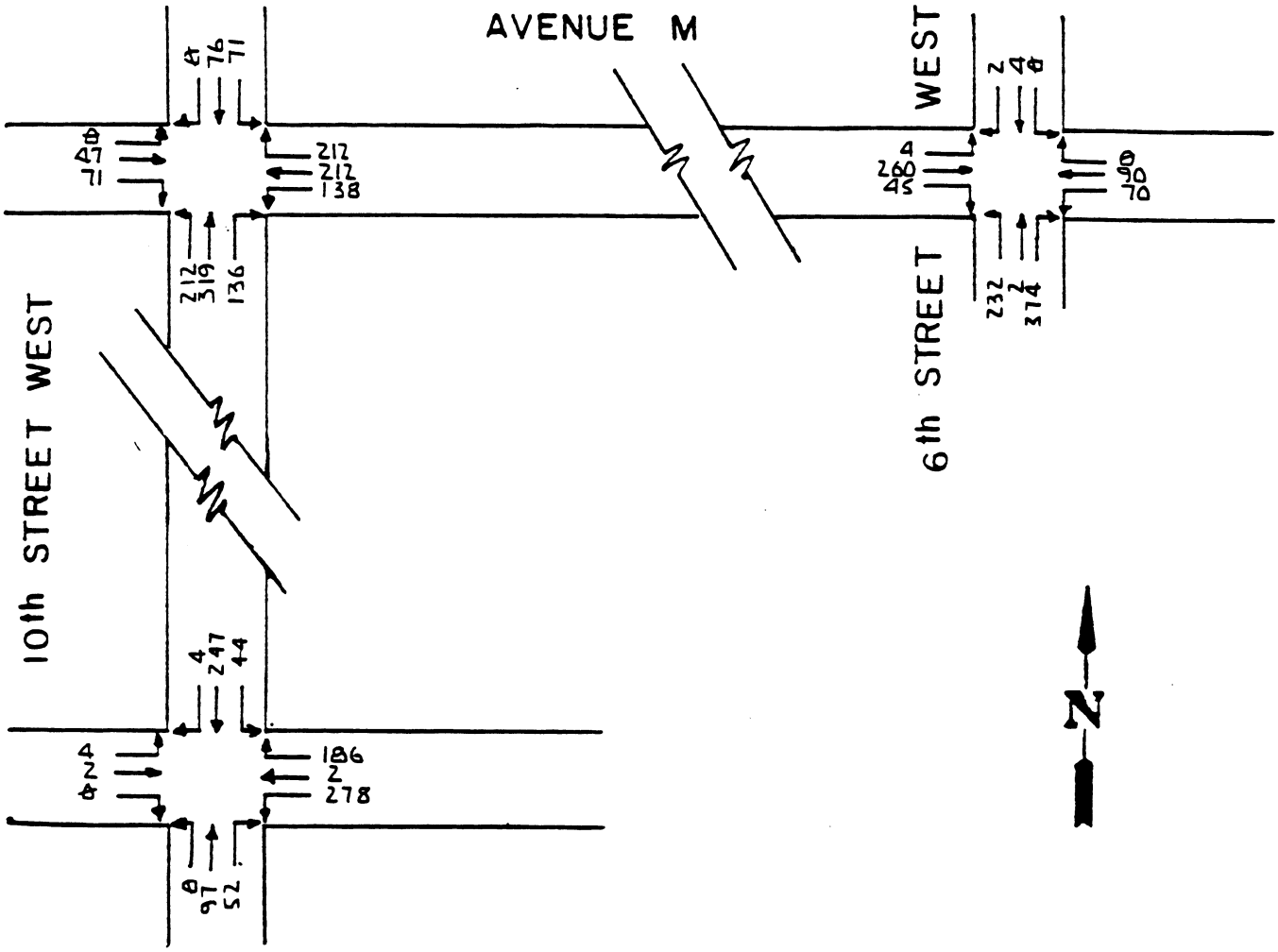
Enter: = 2,000 VPPH
Exit: = 388 VPPH



CRENSHAW TRAFFIC ENGINEERING

PM PEAK HOUR DISTRIBUTION
PROJECT GENERATED VOLUMES
PERCENT

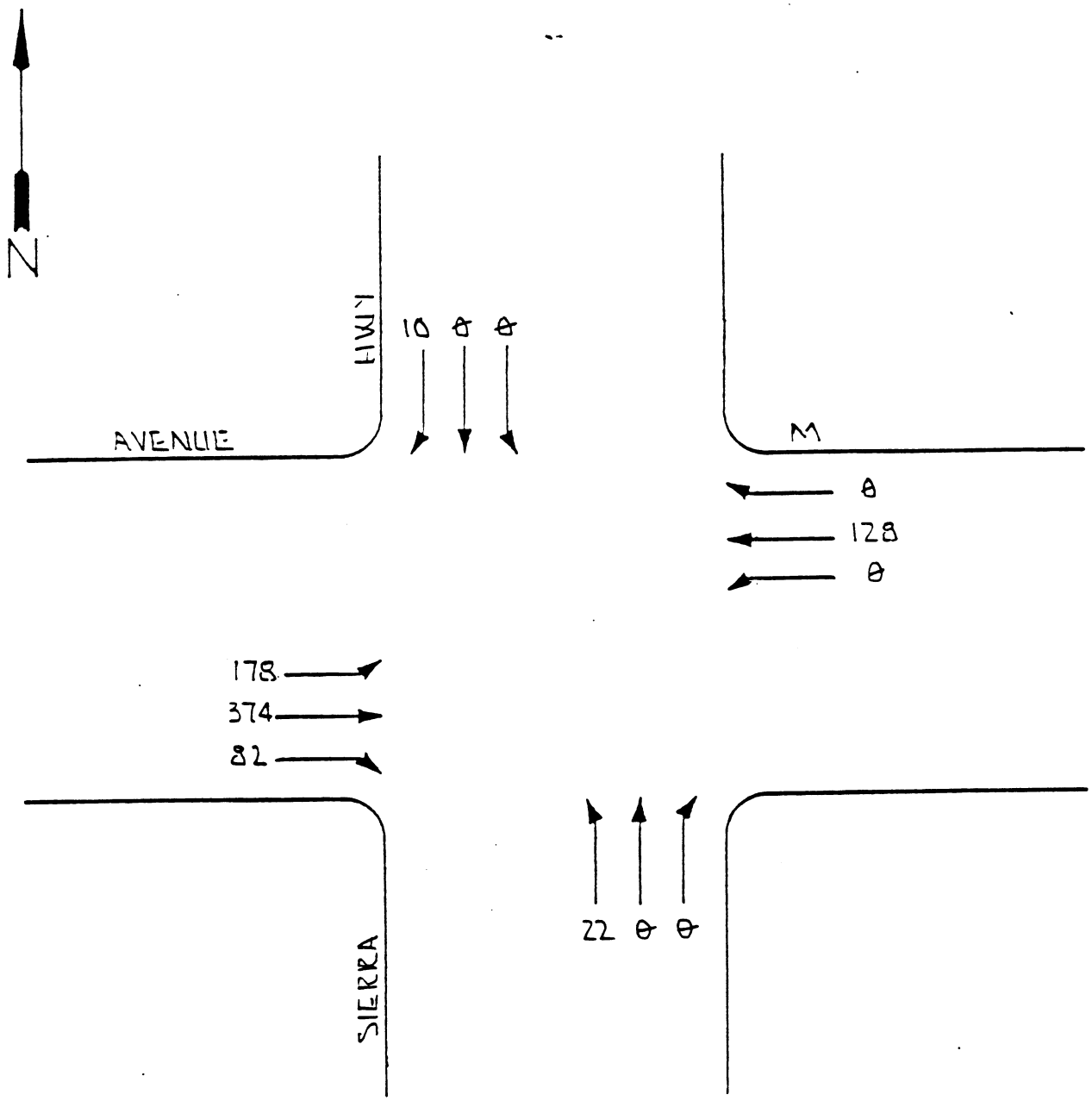
EXHIBIT 4



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
PROJECT GENERATED VOLUMES
ONLY

EXHIBIT 5



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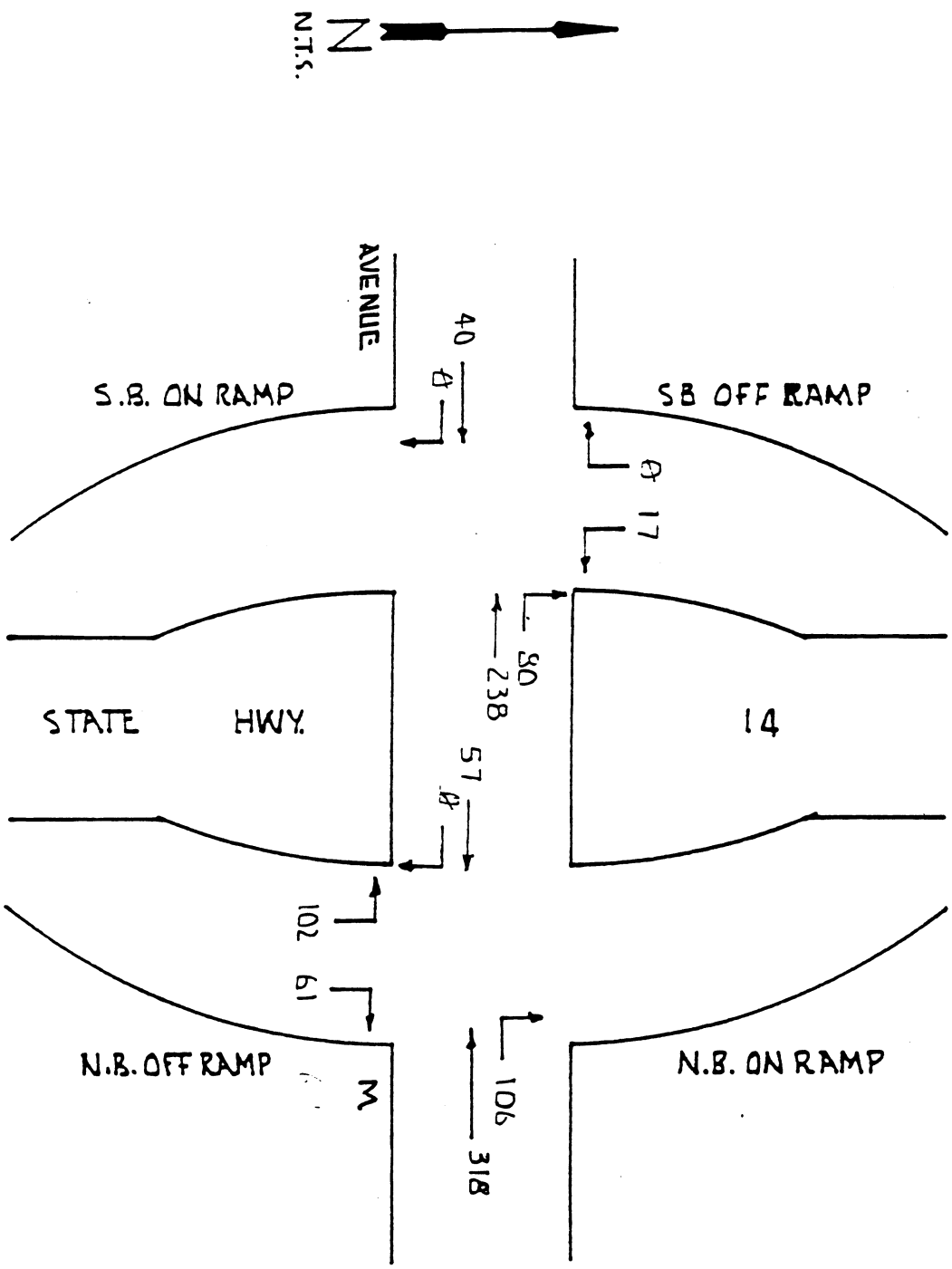
LANCASTER, CA 93535

P.M. PEAK HOUR DISTRIBUTION
PROJECT GENERATED VOLUMES
ONLY.

EXHIBIT



PEAK HOUR DISTRIBUTION
PROJECT GENERATED
VOLUMES ONLY.

EXHIBIT

OTHER KNOWN PROJECTS

The City of Palmdale and the City of Lancaster's records were reviewed to obtain any known projects in the area. Other known projects in the general vicinity of the proposed development are shown in Tables 3 - 3E. Exhibit 6 shows the approximate location of these projects. These projects are located within the vicinity of the development, and are considered to have a cumulative impact on the traffic conditions in the area.

The daily traffic volumes estimated to be generated by these other known projects were also based on informational data from ITE'S "Trip Generation". Tables 3 - 3E also show the generation factors and resulting volumes for these other known projects and the number of these vehicles using the intersections.

TRAFFIC ANALYSIS AND IMPACT

Analysis assumptions include the following:

1. The proposed development will be completed in the near future, with traffic patterns established.

TABLE 3

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M AND 10TH STREET WEST

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	10	29	5
2)*	45282	307,336 SF	Ind/Com	1070	150	25	268	38
3)*	PM 13213	123,726 SF	Ind/Com	750	105	40	300	42
4)	47767	46,000 SF	Ind	320	50	25	80	13
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	25	51	6
6)	88-12	33,000 SF	Office	410	45	15	61	7
7)	88-10	17,800 SF	Ind	125	18	15	19	3
8)	89-63	31,400 SF	Office	390	42	30	116	13
9)	88-44	39,600 SF	Office/In	492	53	30	148	16
				TOTAL			1,073	143

* Partially Developed

TABLE 3A

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M-4 AND 10TH STREET WEST

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	10	29	5
2)*	45282	307,336 SF	Ind/Com	1070	150	30	321	45
3)*	PM 13213	123,726 SF	Ind/Com	750	105	100	750	105
4)	47767	46,000 SF	Ind	320	50	30	96	15
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	30	62	7
6)	88-12	33,000 SF	Office	410	45	15	62	7
7)	88-10	17,800 SF	Ind	125	18	15	19	3
8)	89-63	31,400 SF	Office	390	42	25	98	11
9)	88-44	39,600 SF	Office/In	492	53	25	123	13
					TOTAL		1,560	211

* Partially Developed

TABLE 3B

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M-8 AND 10TH STREET WEST

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	10	29	5
2)*	45282	307,336 SF	Ind/Com	1070	150	60	642	90
3)*	PM 13213	123,726 SF	Ind/Com	750	105	25	188	26
4)	47767	46,000 SF	Ind	320	50	30	96	15
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	30	62	7
6)	88-12	33,000 SF	Office	410	45	15	62	7
7)	88-10	17,800 SF	Ind	125	18	15	19	3
8)	89-63	31,400 SF	Office	390	42	20	78	8
9)	88-44	39,600 SF	Office/In	492	53	20	98	11
					TOTAL		1,274	172

* Partially Developed

TABLE 3C

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M AND 6TH STREET WEST

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	15	44	7
2)*	45282	307,336 SF	Ind/Com	1070	150	20	214	30
3)*	PM 13213	123,726 SF	Ind/Com	750	105	30	225	32
4)	47767	46,000 SF	Ind	320	50	20	64	10
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	20	41	4
6)	88-12	33,000 SF	Office	410	45	15	62	7
7)	88-10	17,800 SF	Ind	125	18	15	19	3
8)	89-63	31,400 SF	Office	390	42	20	78	8
9)	88-44	39,600 SF	Office/In	492	53	20	98	11
					TOTAL		845	112

* Partially Developed

TABLE 3D

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M AND SIERRA HIGHWAY

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	30	88	13
2)*	45282	307,336 SF	Ind/Com	1070	150	10	107	15
3)*	PM 13213	123,726 SF	Ind/Com	750	105	15	112	16
4)	47767	46,000 SF	Ind	320	50	10	32	5
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	10	21	2
6)	88-12	33,000 SF	Office	410	45	10	41	5
7)	88-10	17,800 SF	Ind	125	18	10	13	2
8)	89-63	31,400 SF	Office	390	42	12	47	5
9)	88-44	39,600 SF	Office/In	492	53	12	59	6
					TOTAL		520	69

* Partially Developed

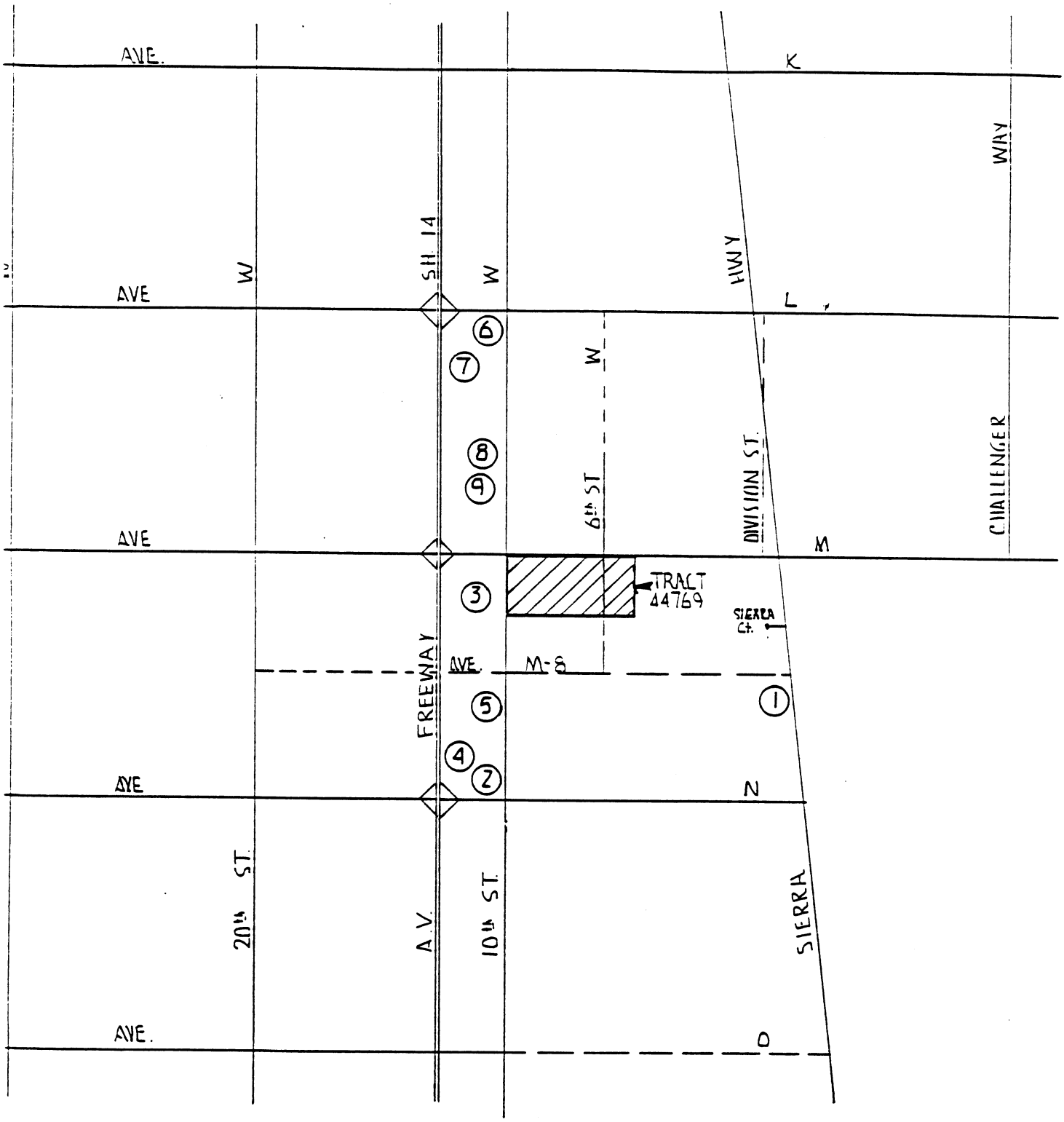
TABLE 3E

KNOWN PROJECTS WITHIN ONE MILE OF TRACT 44769

DISTRIBUTION TO AVENUE M AND NB/SB RAMPS SR-14

	I.D.#	UNITS	ZONE	ADT	PM PEAK	% USING INT.	VPD USING INT.	PM PEAK HR. USING INT.
1)	SPC9-89-14	42,000 SF	Ind.	293	44	10	29	5
2)*	45282	307,336 SF	Ind/Com	1070	150	15	160	23
3)*	PM 13213	123,726 SF	Ind/Com	750	105	20	150	21
4)	47767	46,000 SF	Ind	320	50	15	48	8
5)	SPRC3-89-13	16,500 SF	Office/WH	205	22	10	21	2
6)	88-12	33,000 SF	Office	410	45	10	41	5
7)	88-10	17,800 SF	Ind	125	18	10	13	2
8)	89-63	31,400 SF	Office	390	42	15	59	6
9)	88-44	39,600 SF	Office/In	492	53	15	74	8
				TOTAL			595	80

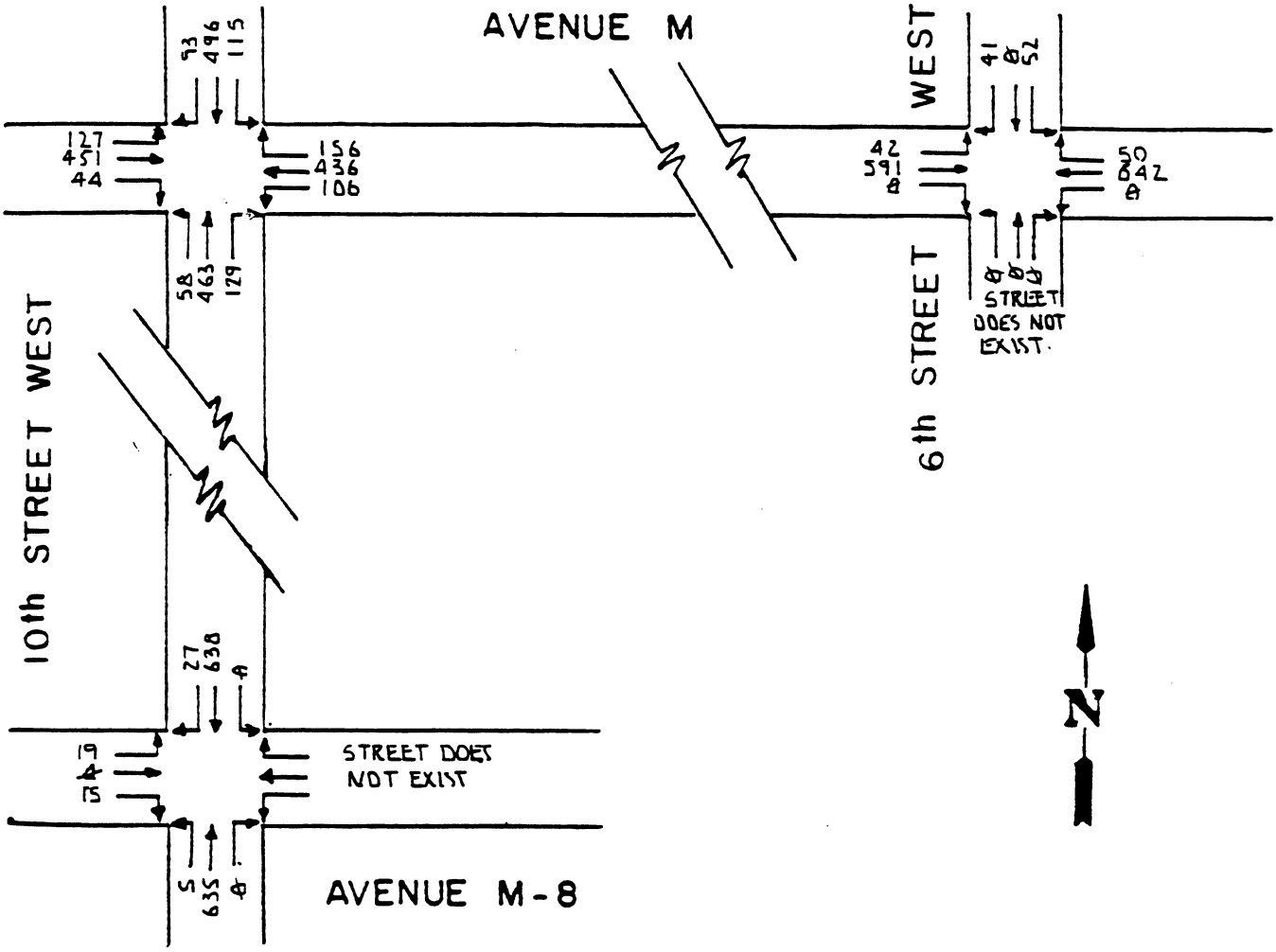
* Partially Developed



CRENSHAW TRAFFIC ENGINEERING

OTHER KNOWN PROJECTS IN VICINITY OF TR 44769

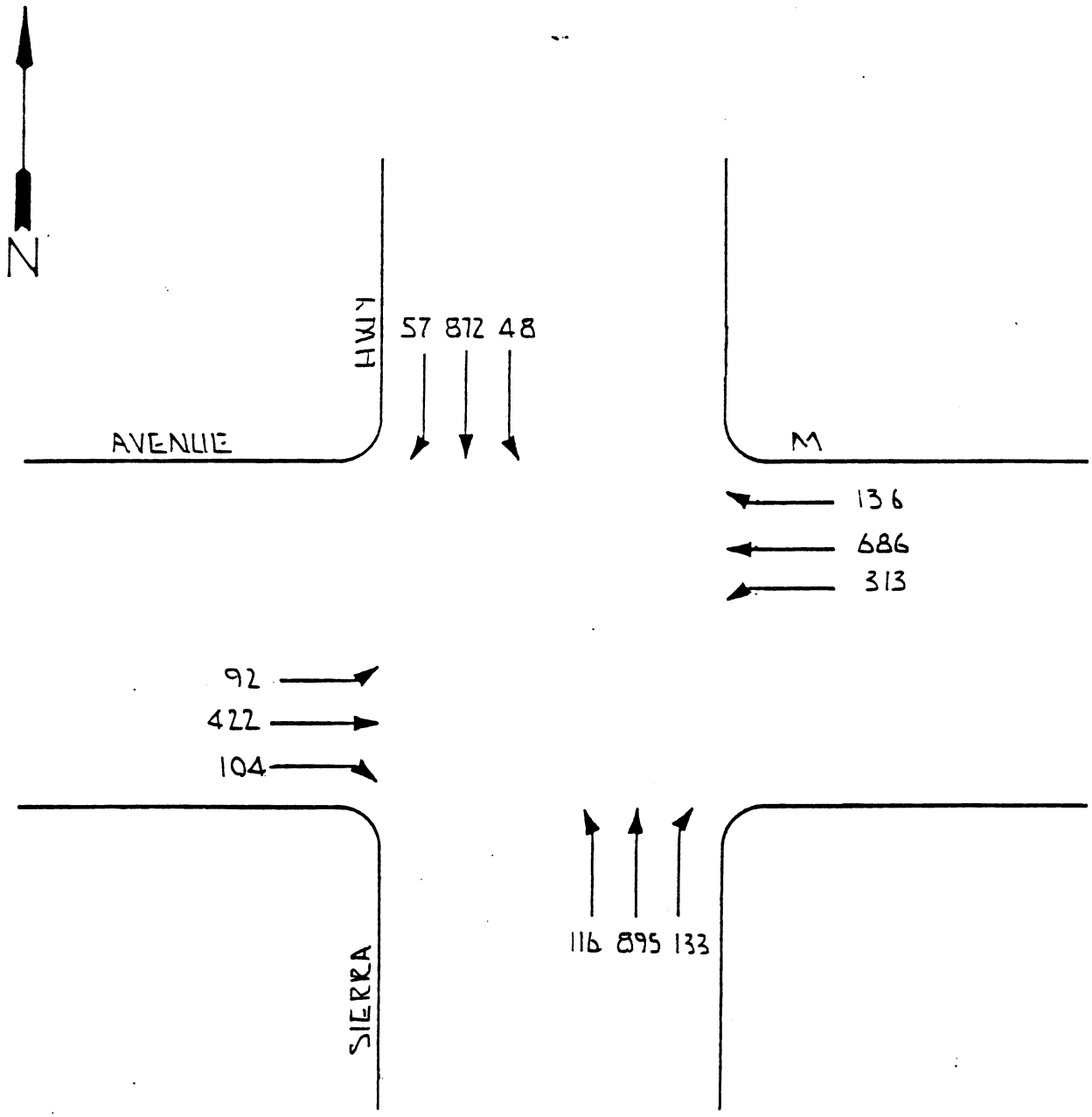
EXHIBIT 6



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
FUTURE WITHOUT PROJECT

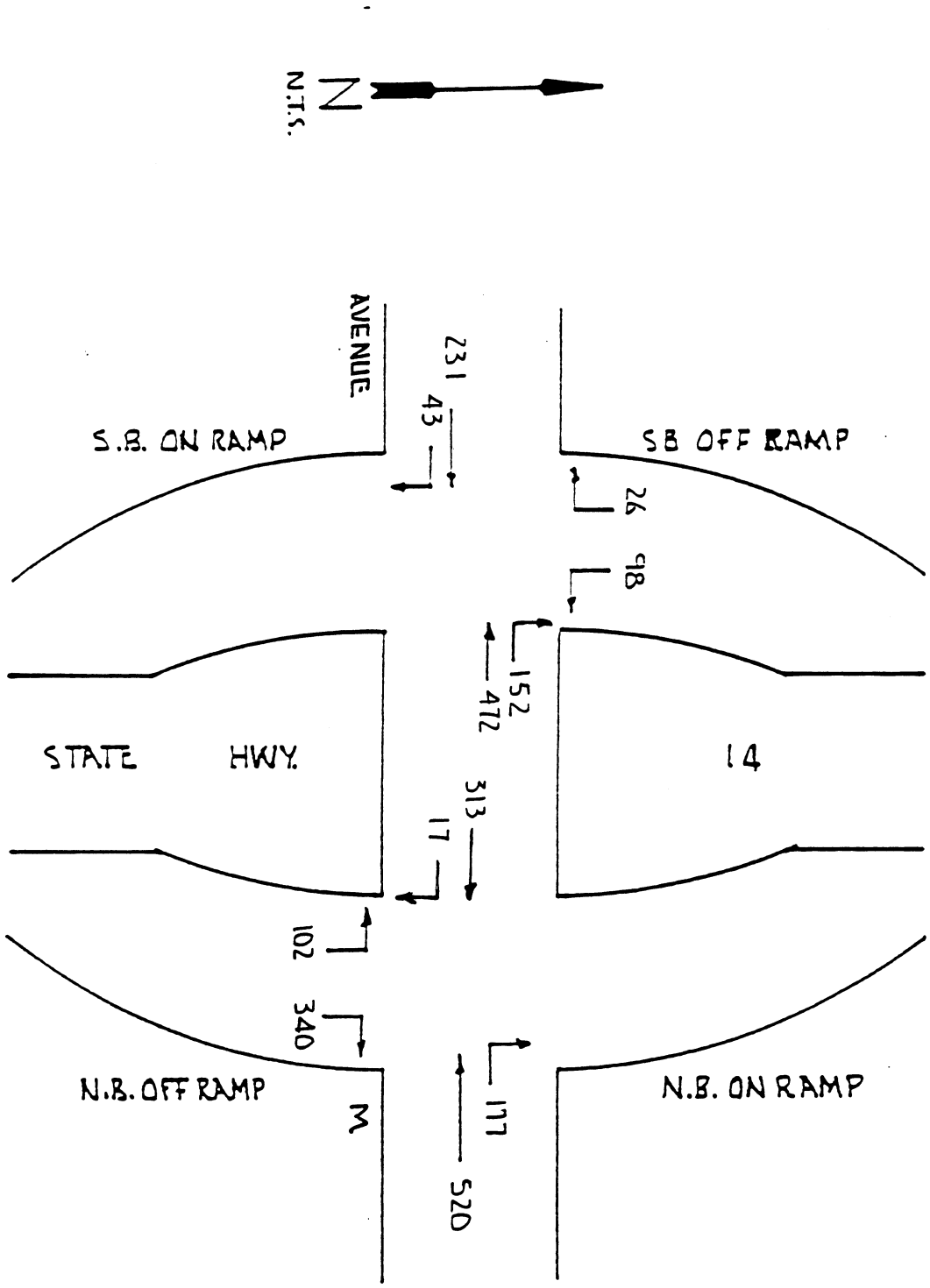
EXHIBIT 7



CRENSHAW TRAFFIC ENGINEERING
43434 SAHUAYO STREET
LANCASTER, CA 93535

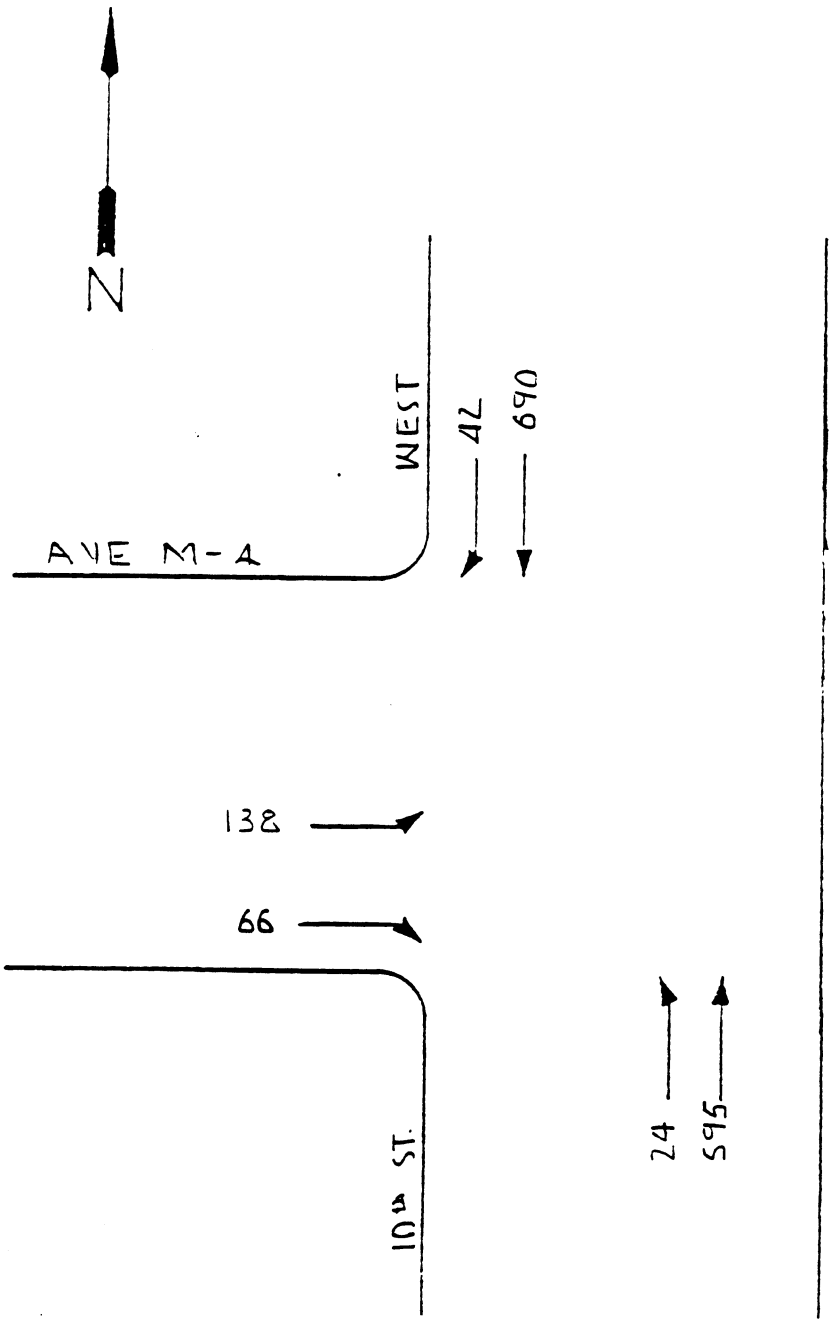
P.M. PEAK HOUR DISTRIBUTION
FUTURE WITHOUT PROJECT

EXHIBIT 7A



PEAK HOUR DISTRIBUTION
FUTURE WITHOUT PROJECT

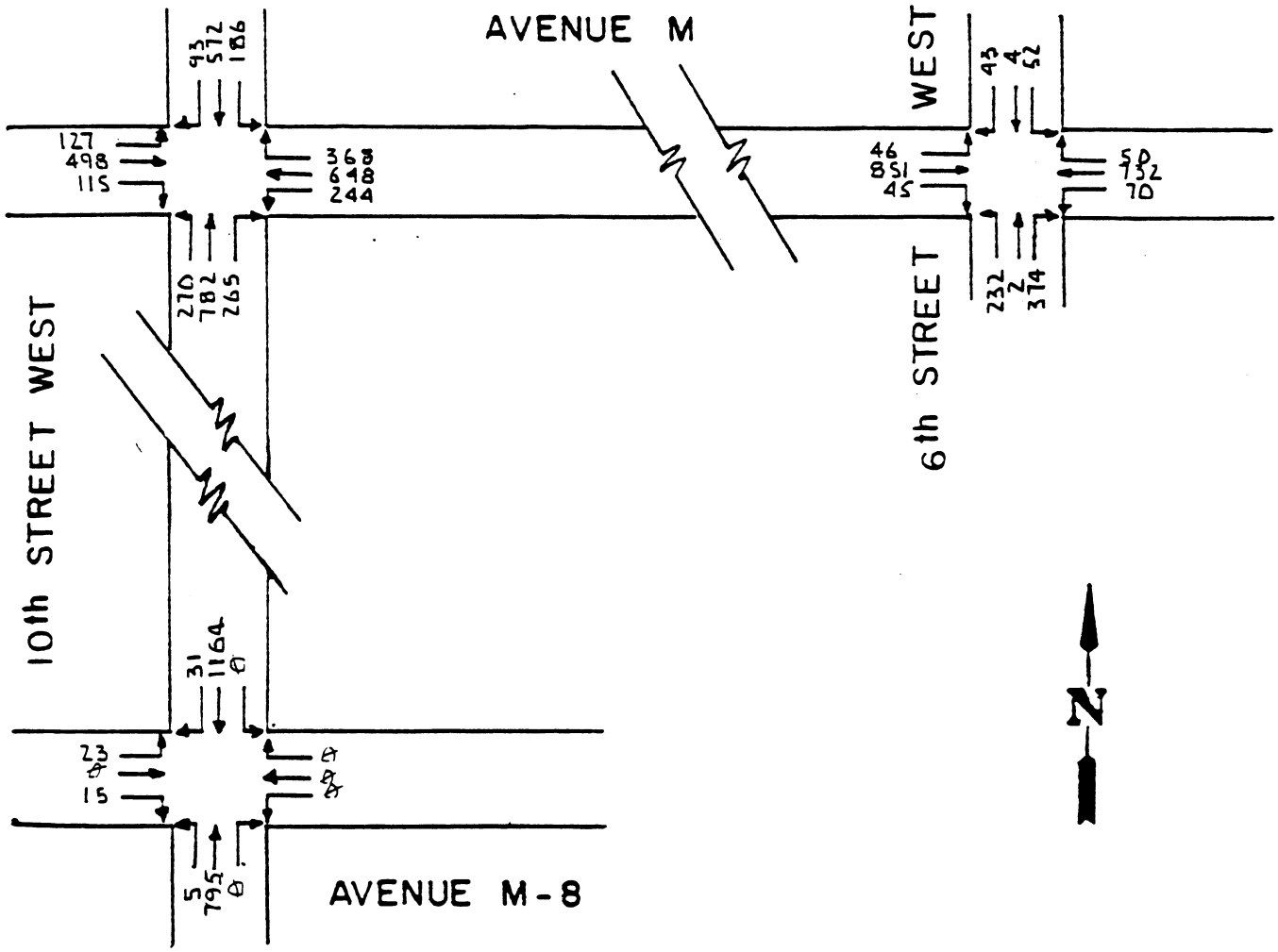
EXHIBIT 7B



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
FUTURE WITHOUT PROJECT

EXHIBIT 7C



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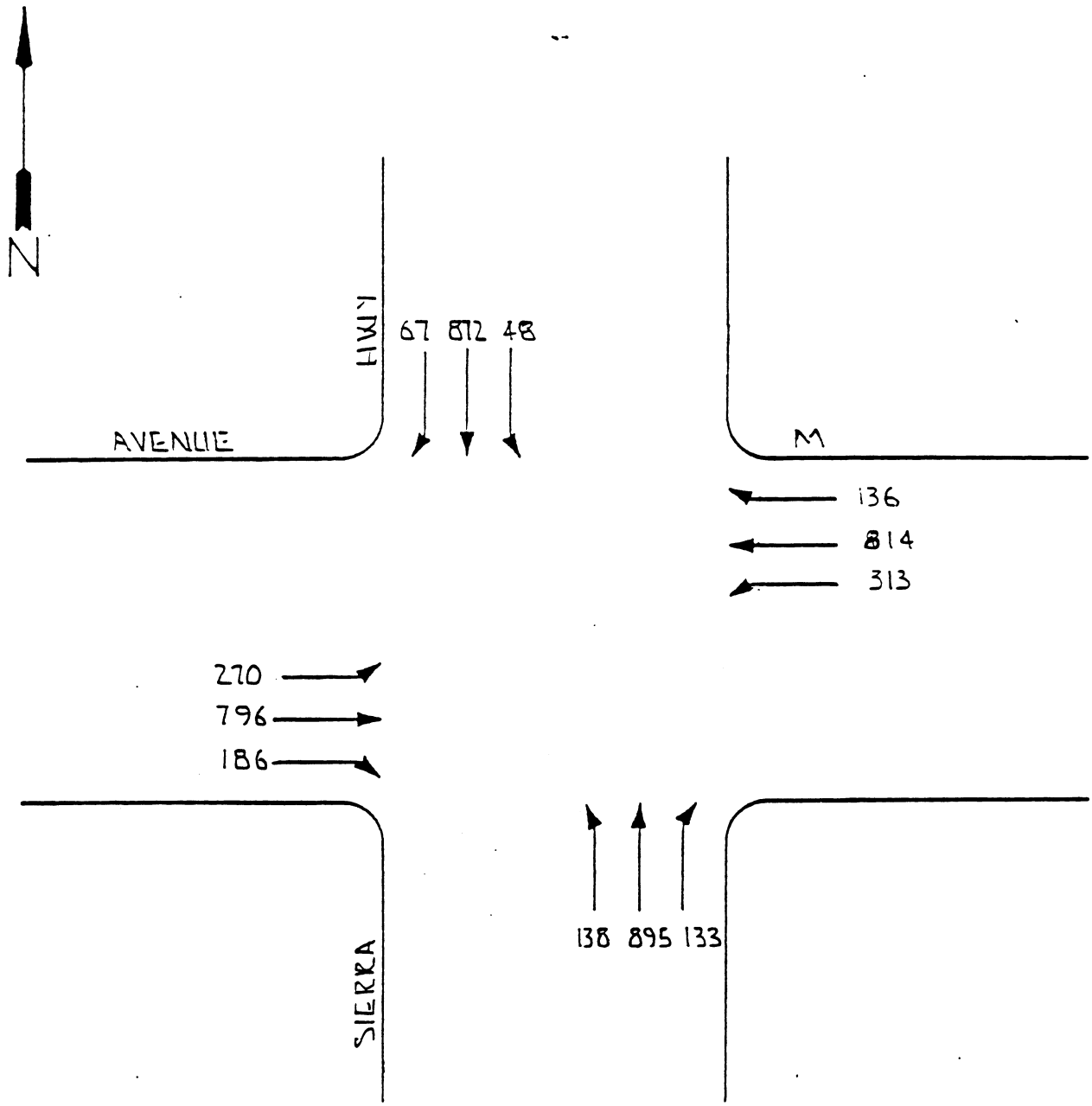
P.M. PEAK HOUR DISTRIBUTION
FUTURE WITH PROJECT

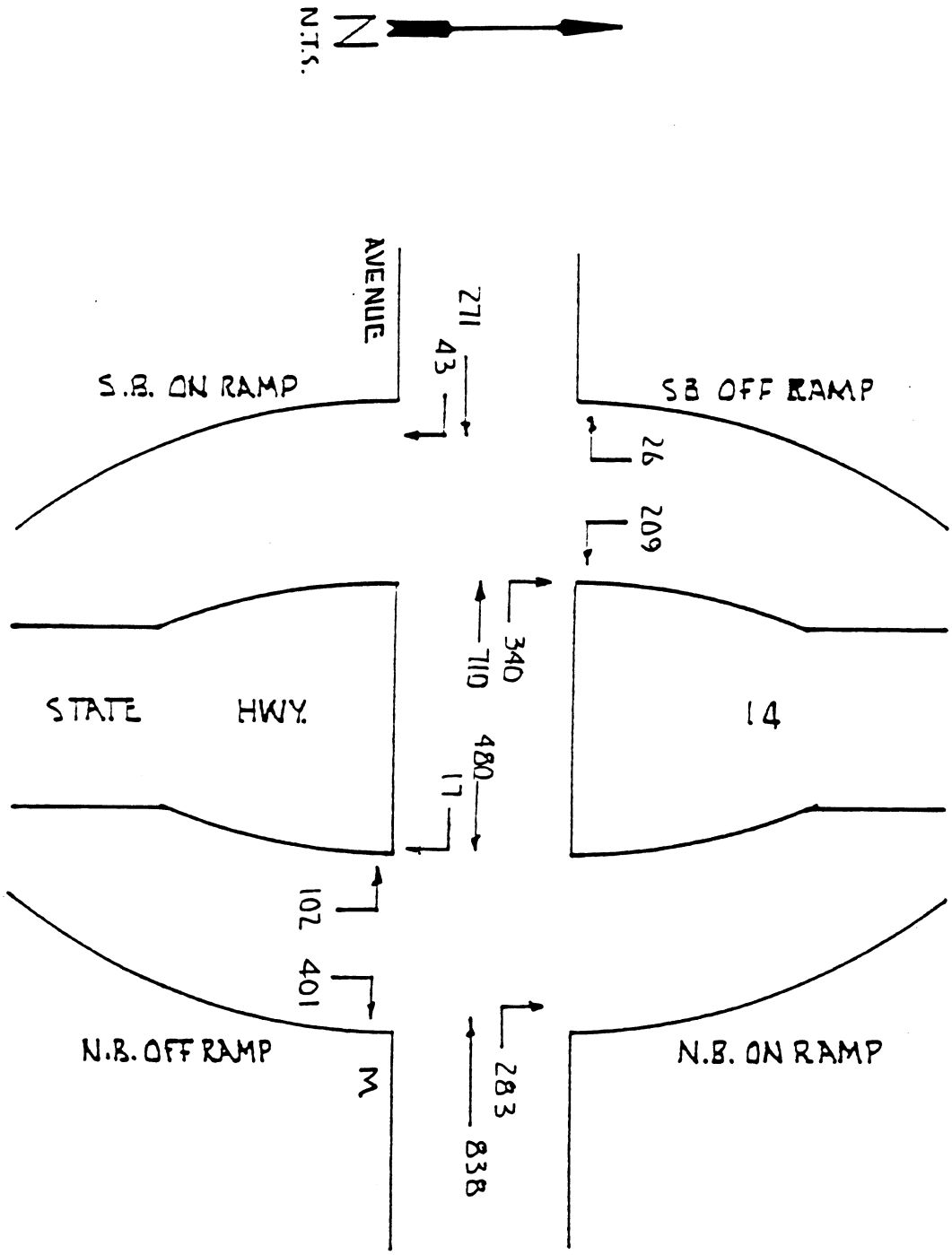
EXHIBIT 8



CRENSHAW TRAFFIC ENGINEERING
43434 SAHUAYO STREET
LANCASTER, CA 93535

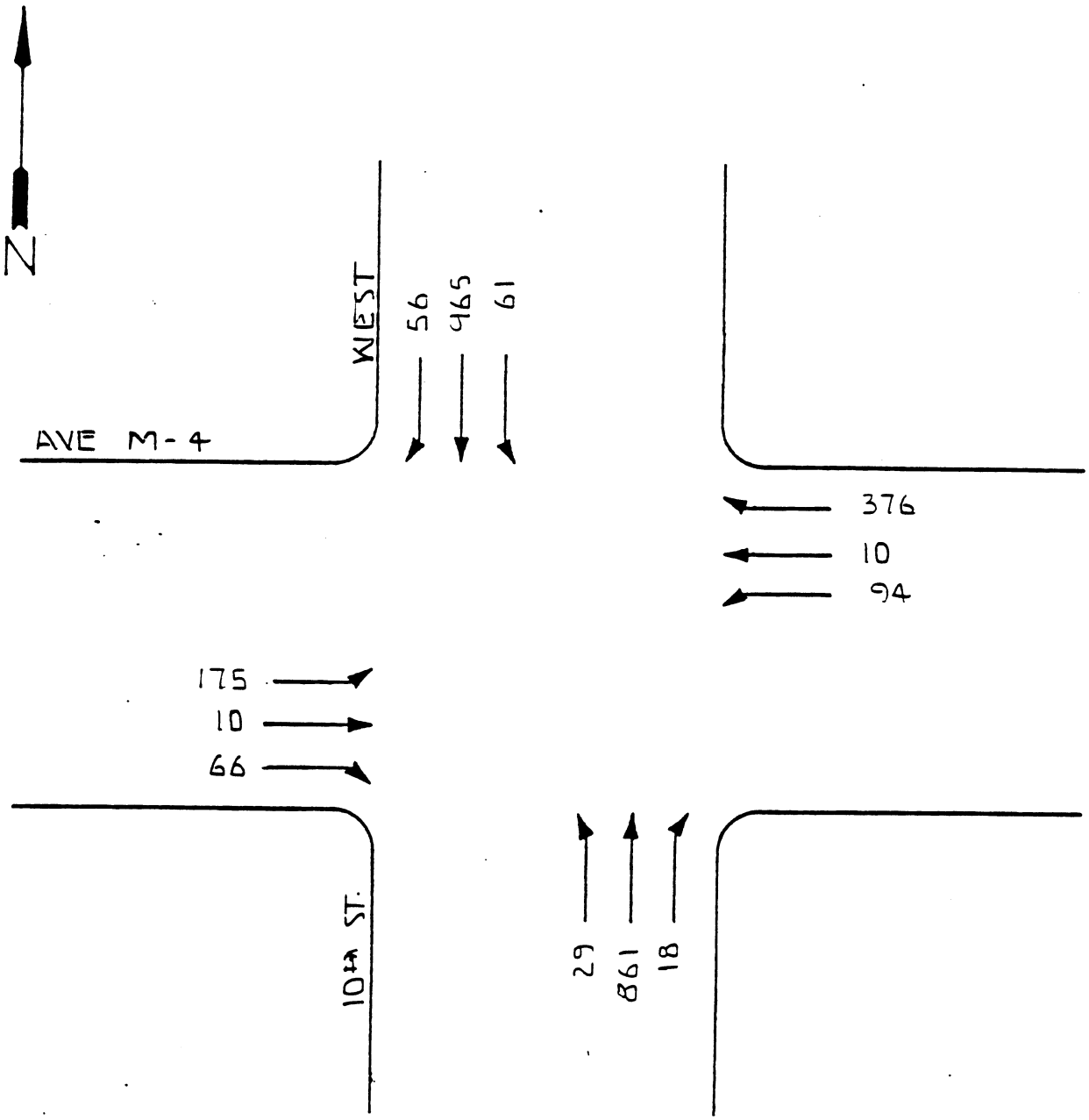
P.M. PEAK HOUR DISTRIBUTION
FUTURE WITH PROJECT

EXHIBIT 8A



PEAK HOUR DISTRIBUTION
FUTURE WITH PROJECT

EXHIBIT 3B

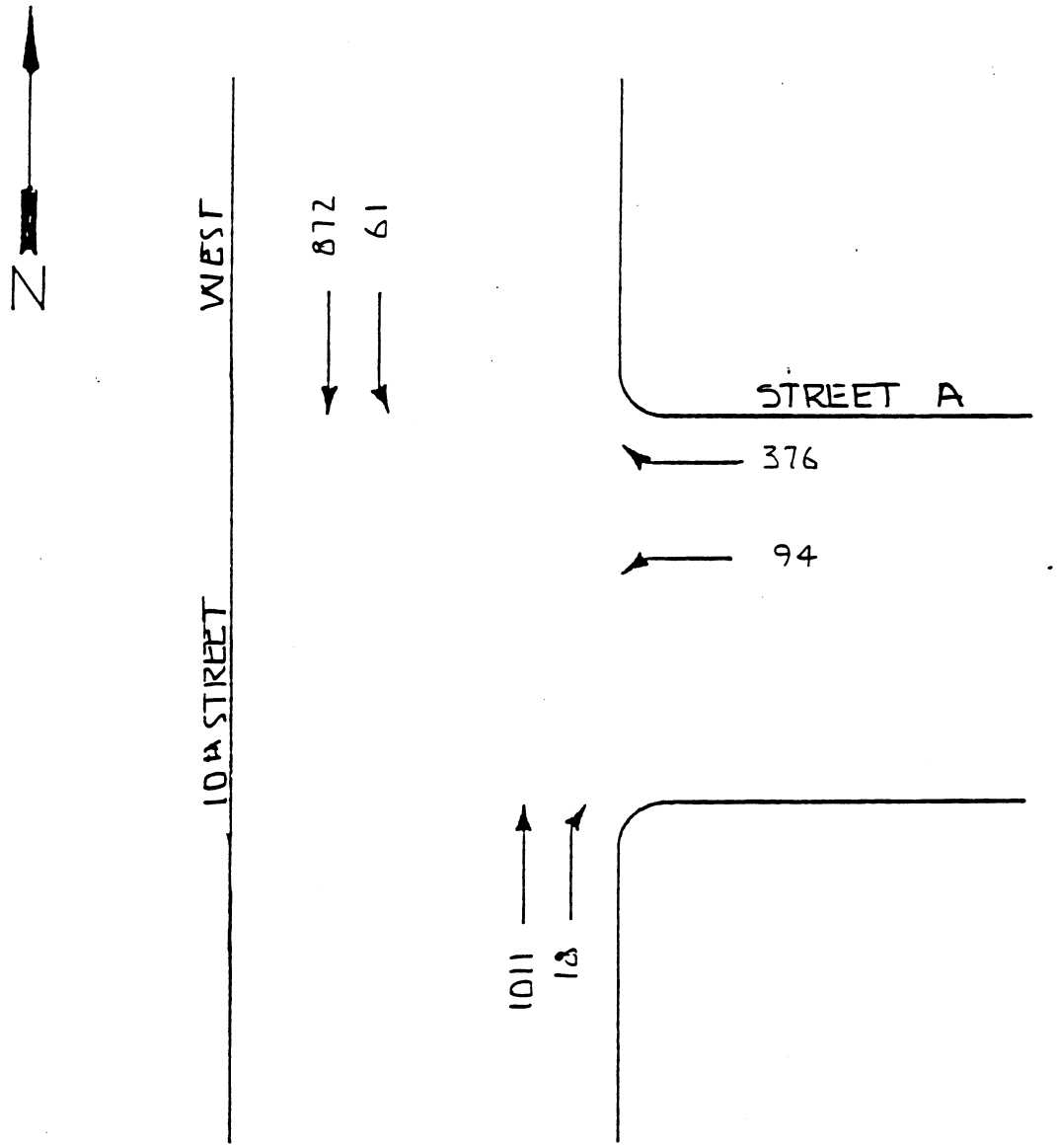


CTE CRENSHAW TRAFFIC ENGINEERING

41765 12th Street West
Suite A
Lancaster, CA 93534
(805) 949-7714

P.M. PEAK HOUR DISTRIBUTION
FUTURE WITH PROJECT

EXHIBIT 8C



CRENSHAW TRAFFIC ENGINEERING

P.M. PEAK HOUR DISTRIBUTION
FUTURE WITH PROJECT

EXHIBIT 8D

2. The primary access to and from the site will be 10th Street West and Avenue M, and will distribute north, south, east, and west along streets in the general vicinity of project.

3. That the actual PM peak hour traffic conditions are appropriate for this analysis.

4. The other known projects in the area will be completed by the time this development is completed.

5. That 10th Street West and Avenue M would be improved to ultimate half street width adjacent to this development.

6. No new street will be constructed from the development to the south to connect to Avenue M-8 or to the east connecting to Sierra Highway.

INTERSECTION ANALYSIS

The intersection analysis was based on information obtained from observation of traffic patterns and manual counts of turning movements at seven key intersections. The key intersections are:

10th Street West and Avenue M
10th Street West and Avenue M-4

10th Street West and Avenue M-8

6th Street West and Avenue M

Avenue M and Sierra Highway

Avenue M and Southbound Ramps, SR-14

Avenue M and Northbound Ramps, SR-14

LEVEL OF SERVICE

The capacity and level of Service (LOS) of these intersections was determined for existing conditions and future conditions with and without project, using the 1985 Highway Capacity Manual (Special Report 209) method for unsignalized and signalized intersections. Table 4 represents a summary of the results of this analysis for unsignalized intersections. Table 5 shows Level of Service for signalized intersections. (See Appendix for worksheet on these intersections).

In general, we have concluded that the Level of Service for the unsignalized intersections of Avenue M-4/10th Street West and Avenue M-8/10th Street West are now below acceptable level "C" and would be worsened by the addition of other developments in the future. Levels of Service for Avenue M and Northbound/Southbound Ramps SR-14 are generally acceptable at present, but left turns from these ramps will become LOS F in the future. (Mitigation measures are discussed later in the report).

TABLE 4

LEVEL OF SERVICE (LOS)

UNSIGNALIZED INTERSECTIONS	EXISTING	FUTURE W/O PROJECT	FUTURE W/PROJECT	FUTURE W/MITIGATIONS
Avenue M-8 and 10th Street West				Signalized
EB Left	E	E	E	B
Right	A	B	A	B
NB Left	A	A	D	A
Through	A	A	A	A
SB Through	A	A	A	A
Right	A	A	A	A
Street A and 10th Street West				Signalized
WB Left	N/A	N/A	E	B
Right	N/A	N/A	E	B
NB Through	N/A	N/A	A	A
Right	N/A	N/A	A	A
SB Left	N/A	N/A	D	A
Through	N/A	N/A	A	A
Avenue M-4 and 10th Street West				Signalized
EB Left	N/A	N/A	F	C
Through	N/A	N/A	E	B
Right	N/A	N/A	A	B
WB Left	N/A	N/A	F	B
Through	N/A	N/A	E	B
Right	N/A	N/A	C	B
NB Left	N/A	N/A	C	A
SB Left	N/A	N/A	C	A

TABLE 4 CONTINUED

LEVEL OF SERVICE (LOS)

UNSIGNALIZED INTERSECTIONS	EXISTING	FUTURE W/O PROJECT	FUTURE W/PROJECT	FUTURE W/MITIGATIONS
Avenue M and S/B Ramps, SR-14				Signalized
SB Left	D	D	F	B
Right	A	A	C	B
EB Through	A	A	A	A
WB Through	A	A	A	A
Avenue M and N/B Ramps, SR-14				Signalized
NB Left	D	F	F	A
Right	B	A	A	A
WB Through	A	A	A	A
EB Through	A	A	A	A

TABLE 5

LEVEL OF SERVICE (LOS)
SIGNALIZED INTERSECTIONS

	Existing Volumes	Future Without Project	Future With Project	Future With Mitigation
Avenue M and 10th Street West	B	B	F	B
Avenue M and 6th Street West	A	A	B	N/A
Avenue M and Sierra Highway	C	C	*F	C

V/C Ratio above 1.2 (Not Meaningful).

The existing signalized intersections would remain signalized. Avenue M and 10th Street West has an existing Level of Service of LOS B. When future project plus this development volume are added, the LOS becomes F. Avenue M and Sierra Highway presently has a LOS OF C. When future projects plus this development are added the LOS becomes F. (Mitigations are discussed later in the report.)

TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic Signal Warrants were prepared for the unsignalized intersections. Warrants used for these analyses were Warrant #1, and Warrant #2. (State Division of Highway Warrants). Results of these warrant analyses are shown in Table 6.

In general, we have concluded that traffic signal controls are <u>not presently</u> warranted at Avenue M-4/10th Street West, Avenue M-8/10th Street West, Avenue M/Southbound Ramps SR-14, but are warranted at Avenue M/Northbound Ramps SR-14.

At the completion of all other known projects in the area, traffic signals would be warranted at Avenue M-4 and 10th Street West and Avenue M/Northbound Ramps SR-14.

With the addition of this development to the other known projects in the area, the warrants for the intersection of

TABLE 6

SIGNAL WARRANT ANALYSIS

INTERSECTIONS	SIGNAL WARRANTS SATISFIED Warrant # 1	2
Existing Volumes		
Avenue M-4 and 10th Street West	No	Yes
Avenue M-8 and 10th Street West	No	No
Street A and 10th Street West	N/A	N/A
Avenue M and Southbound Ramps SR-14	No	No
Avenue M and Northbound Ramps SR-14	Yes	Yes
1992 Future Volumes Without Project		
Avenue M-4 and 10th Street West	Yes	Yes
Avenue M-8 and 10th Street West	No	No
Street A and 10th Street West	N/A	N/A
Avenue M and Southbound Ramps SR-14	No	Yes
Avenue M and Northbound Ramps SR-14	Yes	Yes
1992 Future Volumes With Project		
Avenue M-4 and 10th Street West	Yes	Yes
Avenue M-8 and 10th Street West	No	No
Street A and 10th Street West	Yes	Yes
Avenue M and Southbound Ramps SR-14	No	Yes
Avenue M and Northbound Ramps SR-14	Yes	Yes

Avenue M-4/10th Street West and Avenue M/Northbound Ramps SR-14 would be strengthened.

Avenue M-4 will be developed as a part of this project. The intersection of Avenue M-4/10th Street West will warrant traffic signals. See recommendation section for a discussion of this intersection.

Left turn phasing would be warranted at Avenue M and 10th Street West when this project plus all other known projects are developed. Additional mitigation will be needed at these locations when all of these projects are developed. (See mitigation section herein.)

Left turn phasing will be warranted at Avenue M/Sierra Highway for East/Westbound traffic when other projects and this development volumes are added. (See mitigation section herein.)

STREET SEGMENT ANALYSIS

Descriptions of Assumed Roadway Capacities

The capacity of a roadway is affected by a number of factors, including the width of the roadway, the number of crossing arterials and collectors, the amount of green time given to the street at each signal, the presence or absence of on-street parking, the number of turning lanes at each

TABLE 7

DAILY CAPACITIES FOR MAJOR AND MINOR ARTERIALS STREET SEGMENTS

Facility Geometrics	Level E Capacities
8-lane Divided Major Arterial	72,000
6-lane Divided Urban Major Arterial	60,000
6-lane Divided Major Arterial	54,000
4-lane Divided Urban Major Arterial	40,000
4-lane Divided Major Arterial	36,000
2-lane Divided Major Arterial	18,000
4-lane Undivided Major Arterial	30,000
2-lane Undivided Major Arterial	15,000
4-lane Divided Minor Arterial	28,000
2-lane Divided Minor Arterial	14,000

TABLE 8

LEVEL OF SERVICE INTERPRETATION
STREET SEGMENTS

Level of Service	Volume To Capacity Ratio
A	0 - .60
B	.61 - .70
C	.71 - .80
D	.81 - .90
E	.91 - 1.00
F	Over 1.00

intersection, and the number of driveways.

Daily traffic capacity standards for arterials are reflected in Table 7. An urban major arterial, as stated in Table 7 provides higher capacity than a normal major arterial does. The higher capacity accounts for higher geometric standards, fewer access points to abutting properties, greater running speed as a result of signal coordination, raised median island, and wider travel lanes. The table shows daily capacities for operating level of service E, which is considered to be the ultimate capacity of the street. By policy for daily traffic analysis, level of service C is the basis for identifying whether a capacity problem exists at a midblock location. For the purposes of this evaluation, the top of level C is defined as 80 percent of the capacity of level E. A complete definition of levels of service, as they relate to various ranges of volume-to-capacity ratios, are indicated in Table 8.

Arterial Operations

Table 9 contains a complete capacity analysis of existing volumes for all of the major and minor arterials in the general vicinity of the project. For each arterial and its various distinct segments, this table identifies current geometrics, facility type, the existing ADT, the existing capacity, the volume-to-capacity ratio and the level of service.

10th Street West, from Avenue M to Avenue M-4 presently operates at a Level of Service D; between Avenue M-4 and Avenue M-8 the Level of Service is C. Avenue M, from 10th Street West to 6th Street West, presently operates at a Level of Service of A. (See Table 9.)

FUTURE CAPACITIES, WITHOUT PROJECT

This section describes the future circulation and operating conditions, and potential capacity deficiencies in the study area, based on the forecast volumes to buildout, with other known projects that may affect the street system added to the scenario but without the study project.

The future other known projects generated volumes were added to the existing volumes and a capacity analysis was conducted. Table 9 depicts this analysis.

As noted on Table 9, several street sections are deficient and operating below the acceptable level of C. The following paragraphs further discuss these segments and suggest geometrics which would be required on the facilities to improve the quality of traffic operation and provide an acceptable level of service.

TABLE 9

DAILY TRAFFIC VOLUMES AND LEVELS OF SERVICE STREET SEGMENTS

	STRIPING/ GEOMETRICS	FACILITY TYPE	CAPACITY	VOLUME	V/C	LOS
EXISTING TRAFFIC VOLUMES						
10th Street West from Avenue M to M-4	*2 lane	Major Arterial	15,000	12,180	0.81	D
10th Street West from Avenue M-4 to M-8	2 lane	Major Arterial	15,000	11,660	0.77	C
Avenue M from 10th St. West to 6th St. West	4 lane	Major Arterial	30,000	13,210	0.44	A

* Portion Widened on West Side

FUTURE WITHOUT PROJECT						
10th Street West from Avenue M to M-4	*2 lane	Major Arterial	15,000	12,960	0.86	D
10th Street West from Avenue M-4 to M-8	2 lane	Major Arterial	15,000	13,150	0.88	D
Avenue M from 10th St. West to 6th St. West	4 lane	Major Arterial	30,000	13,810	0.46	A

* Portion Widened on West Side

FUTURE WITH PROJECT						
10th Street West from Avenue M to M-4	*3 lane	Major Arterial	22,500	22,480	0.999	F
10th Street West from Avenue M-4 to M-8	*2 lane	Major Arterial	15,000	25,120	1.004	F
Avenue M from 10th St. West to 6th St. West	4 lane	Major Arterial	30,000	22,670	0.75	C

* Widened on East Side With This Project

10th Street West from Avenue M to Avenue M-4;

This segment of street needs to be widened to four lanes of travel way to bring the level of service to Level A.

10th Street West from AVenue M-4 to Avenue M-8;

This segment shows a deficiency when future volumes are added. This segment requires an additional travel lane be added in each direction to accommodate the projected traffic load.

FUTURE CAPACITIES WITH PROJECT

In order to assess the effect of developing Tract 44769 on the highway system, the volumes generated by the project were added to the future without project volumes.

The capacity analysis for this scenario is shown in Table 9 entitled "Future With Project". This table identifies two street segments that are deficient under these conditions. The following statements are presented to identify these sections, and suggest means to mitigate these impacts.

10th Street West from Avenue M to Avenue M-8;

This segment becomes a LOS of F when project volumes are added. In order to minimize the project volume impact, 10th Street West would have to be increased to the equivalent of a 4 lane undivided arterial. The level of service for the

segment of 10th Street West from Avenue M to Avenue M-4 would be improved by the development of this project, as added capacity would be available because the street will be widened on the east side. See mitigation measures herein.

DISCUSSION

The expected volume of traffic would increase on all of the streets in the area, should all of the contemplated projects develop, and would require widening and upgrading.

All of the intersections tested in the report would require some type of mitigation. See the mitigation section herein.

The intersections of Avenue M/10th Street West and Avenue M/Sierra Highway will warrant left turn phasing. The intersections of Avenue M-4/10th Street West and Avenue M/Northbound Ramp SR-14 will warrant traffic signals to bring the Level of Service to above level C, as shown in the report.

If the signal at Avenue M-4/10th Street West is installed, sufficient breaks in traffic flow will be created along 10th Street West to allow safe movements at other driveway along 10th Street West for this project. The signals that now exist at 10th Street West/Avenue M and 6th Street

West/Avenue M should afford sufficient breaks in traffic flow to allow safe movements from lots fronting Avenue M.

In the future, Avenue M-8/10th Street West would not warrant traffic signals until such time as development occurs westerly of 10th Street West that would utilize Avenue M-8 for ingress and egress. No such developments are contemplated at this time.

The Level of Service at Avenue M and Sierra Highway would reduce to level of F when this development volume and other projects volume is added to existing traffic.

Adding phasing for east and westbound will not by itself raise the LOS above "C". If the intersection were upgraded to allow two left turn lanes, one exclusive through lane and one through/right turn lane on each leg, then the Level of Service would become an acceptable level "C" or better.

When this project volume and all other known project volumes are added to the intersection of Avenue M and 10th Street West, the Level of Service reduces to Level F. Left turn phasing is required as well as widening the intersection on all four legs. The existing signal would have to be relocated on the northwest and southeast quadrants, and additional travel lane added.

MITIGATION MEASURES

As this project and all other projects in the area develop, certain project related impacts occur, and are identified in this report. The following measures are recommended to mitigate these impacts:

1. Install ultimate improvements along 10th Street West, east sides, adjacent to subject project. Install ultimate improvements along south side of Avenue M adjacent to project.

2. Improve street within project to City of Palmdale standards.

3. Install traffic signal at M-4 alignment and 10th Street West.

4. Install left turn phasing on signals at Avenue M and 10th Street West. Relocate and upgrade signal facilities at the southeast and northwest quadrants of the intersection. Upgrade the intersection to accommodate a left turn pocket, one through lane and one through/right lane in each direction.

5. Install left turn pocket on Avenue M at 6th Street West for westbound traffic. Install left turn pockets on 10th Street West at Street A and M-4 for

northbound and southbound traffic.

6. Develop 6th Street West to provide a left turn pocket, a through lane and a right turn lane for northbound traffic. Relocate traffic signal poles on southeast and southwest quadrants.

7. This development should pay its fair share of the cost to add additional travel lanes along 10th Street West. 10th Street West should be upgraded to a minimum 4 lane undivided arterial highway between south of Avenue K to north of Avenue P, to join already upgraded 4 lane segments of 10th Street West.

8. This development should also pay it's fair share of upgrading Avenue M/Sierra Highway to dual left turn lanes and left turn phasing on all legs, and pay it's fair share of the future signalization of Avenue M/Northbound Ramps SR-14.

CONCLUSION

Although this project and all other known projects in the immediate area are planned to be build out in the near future, there would still remain further developable areas within the City's General Plan for this vicinity of Palmdale. Buildout of these areas would undoubtedly add

more traffic to the circulation system. Several segments of the area's street network would most likely require further capacity improvements due to additional traffic at the full buildout of the area. Further analysis of these areas should be accomplished as buildout occurs, to determine all future additional right-of-way needs, especially on arterials most heavily impacted by through traffic. Timing of the construction of these additional lanes should be determined based on future analysis of the demand as projected developments within the area are implemented.

A P P E N D I X

TURN MOVEMENT COUNTS

Code : 01742001
S : 10TH STREET WEST
W : AVENUE M
ATOR : JC

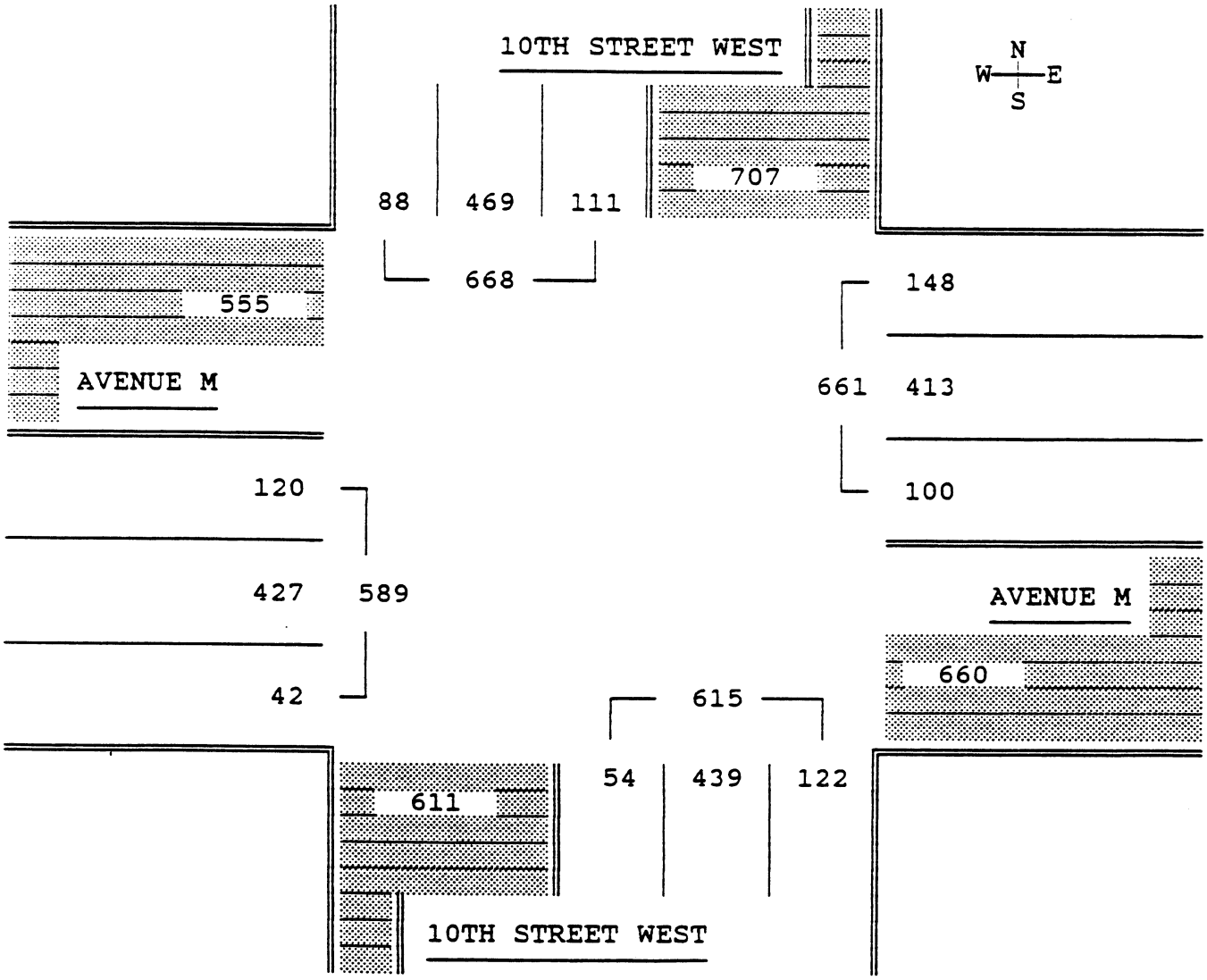
Movements by: Primary

PAGE: 1
FILE: 01742001

DATE: 12/20/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:00 PM	0.84	88	469	111	668	13	70	17
East	4:15 PM	0.93	144	432	99	675	21	64	15
South	4:15 PM	0.89	135	430	63	628	21	68	10
West	4:00 PM	0.96	42	427	120	589	7	72	20
Entire Intersection									
North	4:00 PM	0.84	88	469	111	668	13	70	17
East		0.91	148	413	100	661	22	62	15
South		0.92	122	439	54	615	20	71	9
West		0.96	42	427	120	589	7	72	20



TURN MOVEMENT COUNTS

e Code : 01742001
S : 10TH STREET WEST
W : AVENUE M
RATOR : JC

PAGE: 1
FILE: 01742001

Movements by: Primary

DATE: 12/20/90

e n	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
0 PM	23	136	39	35	109	21	33	124	7	14	115	23	679
.5	23	102	25	44	105	23	35	115	17	8	110	36	643
.0	22	111	21	36	115	31	20	91	13	9	104	26	599
5	20	120	26	33	84	25	34	109	17	11	98	35	612
OTAL	88	469	111	148	413	100	122	439	54	42	427	120	2533
0 PM	26	115	30	31	128	20	46	115	16	7	98	25	657
.5	23	110	13	24	96	19	29	112	10	11	89	19	555
0	25	107	19	16	58	14	35	72	10	6	111	18	491
5	12	102	21	22	60	18	22	78	7	4	75	11	432
OTAL	86	434	83	93	342	71	132	377	43	28	373	73	2135
TOTAL	174	903	194	241	755	171	254	816	97	70	800	193	4668

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	VOLUMES Thru	VOLUMES Left	VOLUMES Total	PERCENTS Right	PERCENTS Thru	PERCENTS Left
North	4:00 PM	0.84	88	469	111	668	13	70	17
East	4:15 PM	0.93	144	432	99	675	21	64	15
South	4:15 PM	0.89	135	430	63	628	21	68	10
West	4:00 PM	0.96	42	427	120	589	7	72	20

Entire Intersection

North	4:00 PM	0.84	88	469	111	668	13	70	17
East		0.91	148	413	100	661	22	62	15
South		0.92	122	439	54	615	20	71	9
West		0.96	42	427	120	589	7	72	20

TURN MOVEMENT COUNTS

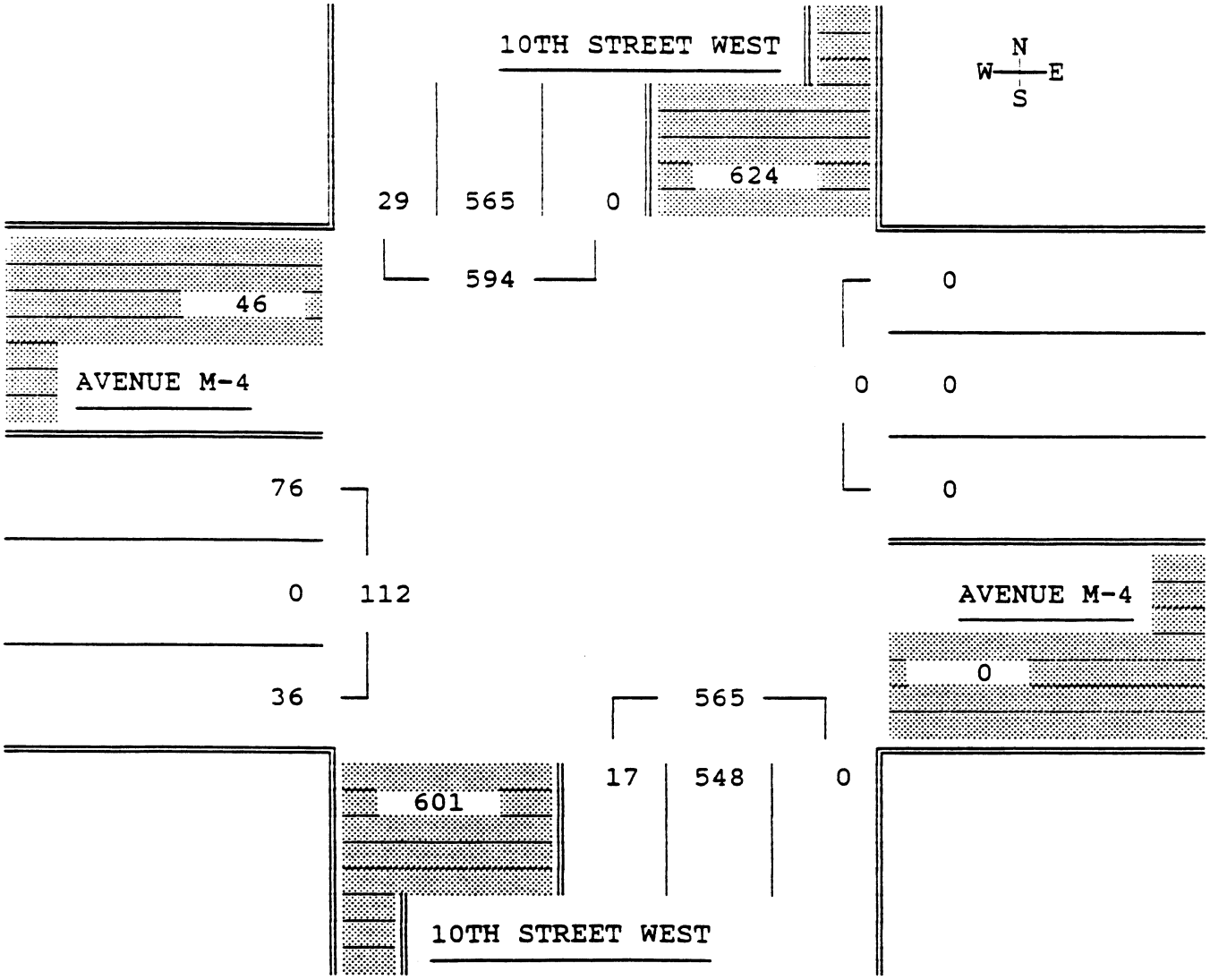
e Code : 01742002
S : 10TH STREET WEST
W : AVENUE M-4
RATOR : MM

Movements by: Primary

DATE: 12/20/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:00 PM	0.96	29	565	0	594	5	95	0
East	4:00 PM	0.00	0	0	0	0	0	0	0
South	4:00 PM	0.92	0	548	17	565	0	97	3
West	4:15 PM	0.85	33	0	83	116	28	0	72
Entire Intersection									
North	4:00 PM	0.96	29	565	0	594	5	95	0
East		0.00	0	0	0	0	0	0	0
South		0.92	0	548	17	565	0	97	3
West		0.82	36	0	76	112	32	0	68



TURN MOVEMENT COUNTS

Code : 01742002
S : 10TH STREET WEST
W : AVENUE M-4
ATOR : MM

PAGE: 1
FILE: 01742002

Movements by: Primary

DATE: 12/20/90

n	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
0 PM	10	141	0	0	0	0	0	147	4	11	0	16	329
5	9	140	0	0	0	0	0	112	7	10	0	18	296
0	6	149	0	0	0	0	0	138	3	5	0	18	319
5	4	135	0	0	0	0	0	151	3	10	0	24	327
OTAL	29	565	0	0	0	0	0	548	17	36	0	76	1271
0 PM	1	137	0	0	0	0	0	134	5	8	0	23	308
5	2	138	0	0	0	0	0	109	2	8	0	6	265
0	5	120	0	0	0	0	0	102	0	10	0	8	245
5	2	93	0	0	0	0	0	118	1	4	0	3	221
OTAL	10	488	0	0	0	0	0	463	8	30	0	40	1039
TOTAL	39	1053	0	0	0	0	0	1011	25	66	0	116	2310

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	4:00 PM	0.96	29	565	0	594	5	95	0
East	4:00 PM	0.00	0	0	0	0	0	0	0
South	4:00 PM	0.92	0	548	17	565	0	97	3
West	4:15 PM	0.85	33	0	83	116	28	0	72

Entire Intersection

North	4:00 PM	0.96	29	565	0	594	5	95	0
East		0.00	0	0	0	0	0	0	0
South		0.92	0	548	17	565	0	97	3
West		0.82	36	0	76	112	32	0	68

TURN MOVEMENT COUNTS

Code : 01742003
: 10TH STREET WEST
: AVENUE M-8
ATOR : WC

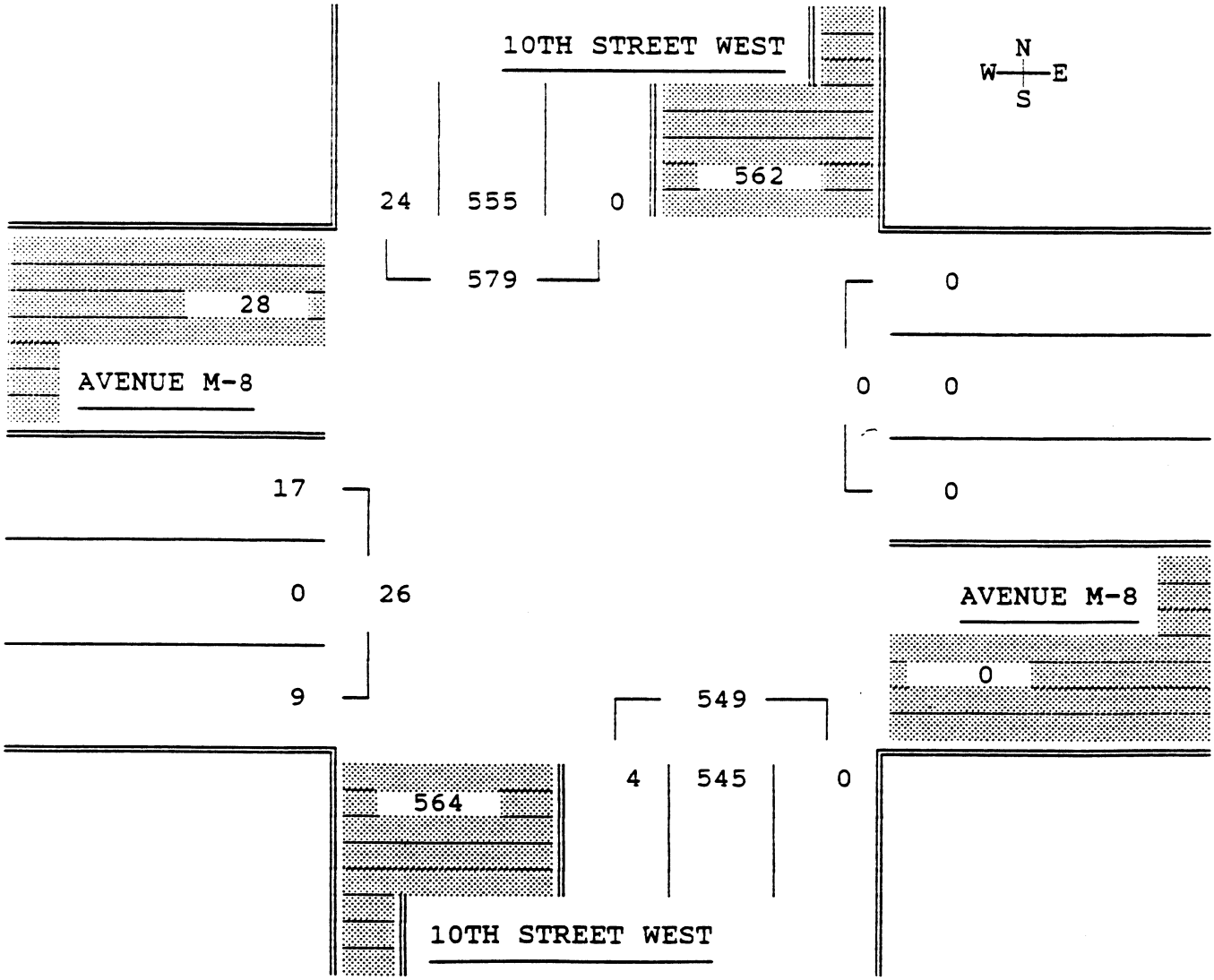
Movements by: Primary

PAGE: 1
FILE: 01742003

DATE: 12/20/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:30 PM	0.94	23	562	0	585	4	96	0
East	4:30 PM	0.00	0	0	0	0	0	0	0
South	4:00 PM	0.94	0	545	4	549	0	99	1
West	5:00 PM	0.63	12	0	21	33	36	0	64
Entire Intersection									
North	4:00 PM	0.89	24	555	0	579	4	96	0
East		0.00	0	0	0	0	0	0	0
South		0.94	0	545	4	549	0	99	1
West		0.50	9	0	17	26	35	0	65



TURN MOVEMENT COUNTS

Code : 01742003
S : 10TH STREET WEST
W : AVENUE M-8
ATOR : WC

PAGE: 1
FILE: 01742003

Movements by: Primary

DATE: 12/20/90

n	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
0 PM	7	155	0	0	0	0	0	144	2	7	0	6	321
5	4	116	0	0	0	0	0	145	0	1	0	5	271
0	4	143	0	0	0	0	0	112	0	1	0	2	262
5	9	141	0	0	0	0	0	144	2	0	0	4	300
OTAL	24	555	0	0	0	0	0	545	4	9	0	17	1154
0 PM	3	153	0	0	0	0	0	136	2	5	0	8	307
5	7	125	0	0	0	0	0	131	1	2	0	6	272
0	4	133	0	0	0	0	0	95	1	1	0	3	237
5	0	127	0	0	0	0	0	92	1	4	0	4	228
OTAL	14	538	0	0	0	0	0	454	5	12	0	21	1044
TOTAL	38	1093	0	0	0	0	0	999	9	21	0	38	2198

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	4:30 PM	0.94	23	562	0	585	4	96	0
East	4:30 PM	0.00	0	0	0	0	0	0	0
South	4:00 PM	0.94	0	545	4	549	0	99	1
West	5:00 PM	0.63	12	0	21	33	36	0	64
Entire Intersection									
North	4:00 PM	0.89	24	555	0	579	4	96	0
East		0.00	0	0	0	0	0	0	0
South		0.94	0	545	4	549	0	99	1
West		0.50	9	0	17	26	35	0	65

TURN MOVEMENT COUNTS

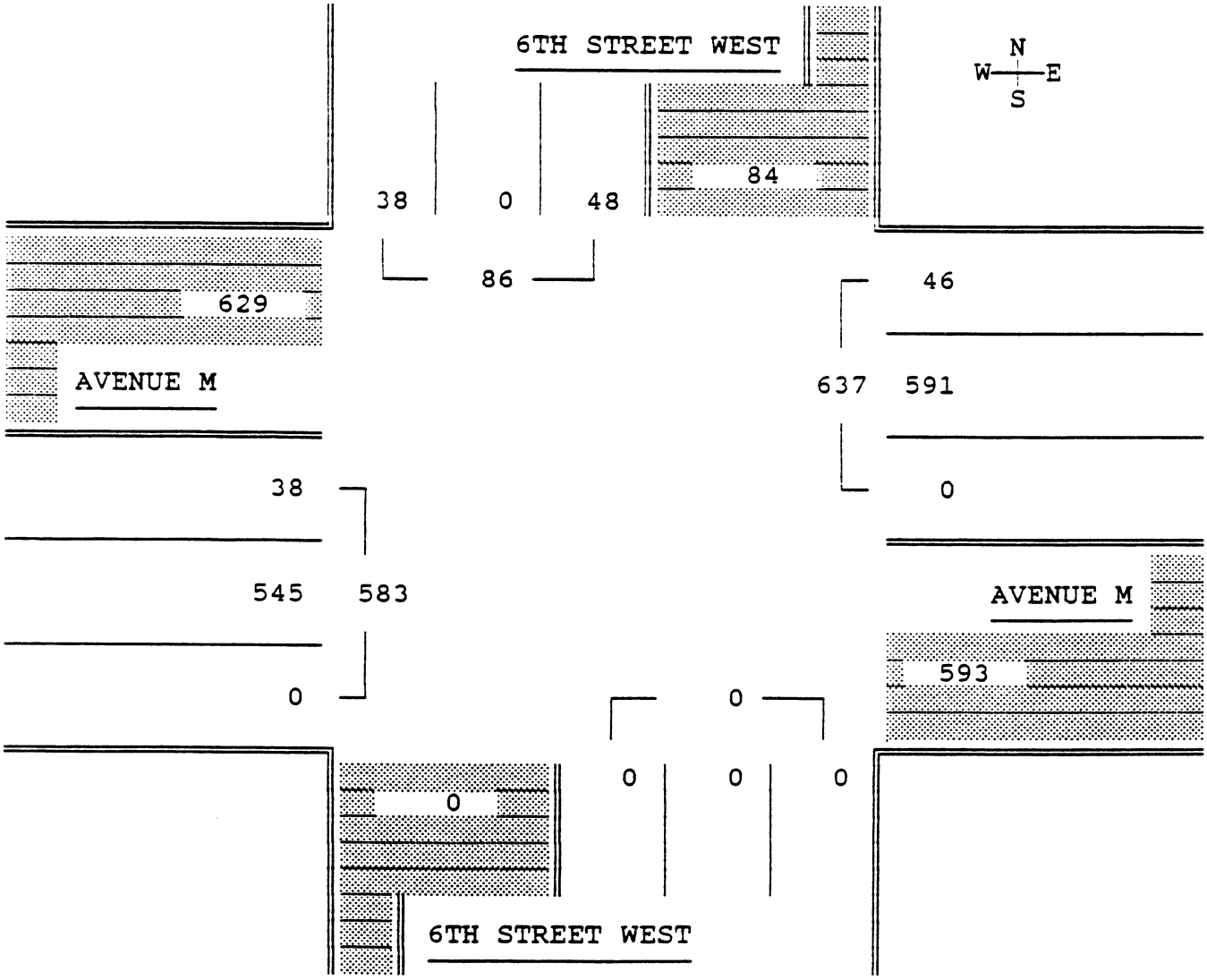
Code : 01740904
S : 6TH STREET WEST
W : AVENUE M
ATOR : AR

Movements by: Primary

FILE: 01740904
DATE: 1/09/91

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:15 PM	0.82	38	0	57	95	40	0	60
East	4:00 PM	0.76	46	591	0	637	7	93	0
South	4:00 PM	0.00	0	0	0	0	0	0	0
West	4:30 PM	0.92	0	606	17	623	0	97	3
Entire Intersection									
North	4:00 PM	0.74	38	0	48	86	44	0	56
East		0.76	46	591	0	637	7	93	0
South		0.00	0	0	0	0	0	0	0
West		0.89	0	545	38	583	0	93	7



TURN MOVEMENT COUNTS

:e Code : 11181803
S : SIERRA HIGHWAY
W : AVENUE M
:RATOR : AR

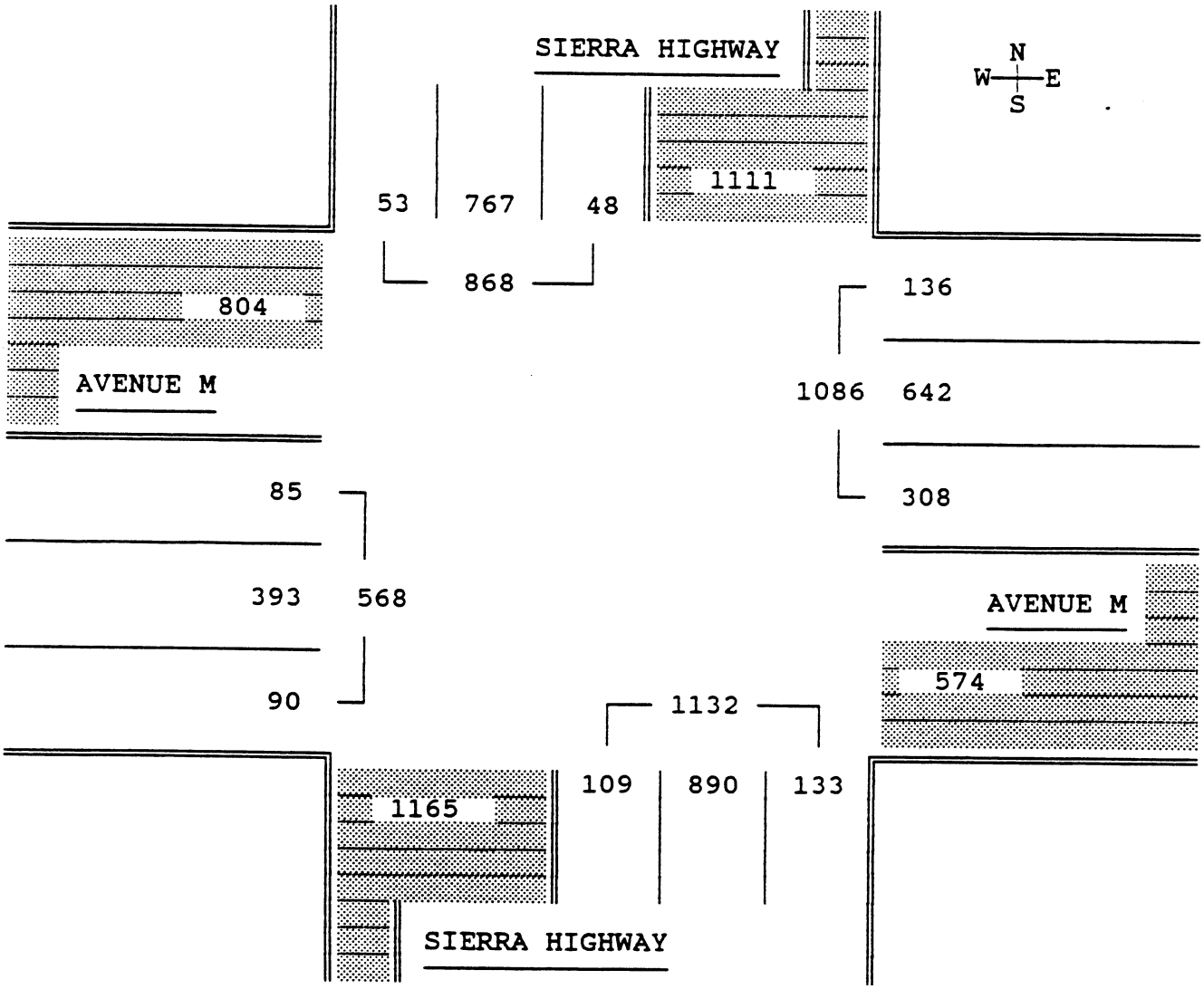
Movements by: Primary

PAGE: 1
FILE: 11181803

DATE: 4/18/91

PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:30 PM	0.97	70	842	55	967	7	87	6
East	3:00 PM	0.94	150	641	311	1102	14	58	28
South	3:15 PM	0.88	133	890	109	1132	12	79	10
West	4:15 PM	0.90	85	496	89	670	13	74	13
Entire Intersection									
North	3:15 PM	0.85	53	767	48	868	6	88	6
East		0.95	136	642	308	1086	13	59	28
South		0.88	133	890	109	1132	12	79	10
West		0.93	90	393	85	568	16	69	15



TURN MOVEMENT COUNTS

:e Code : 11181803
S : SIERRA HIGHWAY
W : AVENUE M
:RATOR : AR

PAGE: 1
FILE: 11181803

Movements by: Primary

DATE: 4/18/91

:e :in	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
00 PM	14	177	11	48	172	72	13	169	16	16	77	21	806
15	24	214	17	29	156	100	32	210	37	24	81	19	943
30	12	173	12	37	155	65	38	219	23	13	99	29	875
45	8	183	5	36	158	74	33	255	33	27	107	17	936
TOTAL	58	747	45	150	641	311	116	853	109	80	364	86	3560
00 PM	9	197	14	34	173	69	30	206	16	26	106	20	900
15	7	205	13	13	122	65	32	204	26	19	115	18	839
30	17	198	18	33	106	67	45	219	26	25	118	29	901
45	28	196	13	18	120	56	37	181	29	19	118	23	838
TOTAL	61	796	58	98	521	257	144	810	97	89	457	90	3478
00 PM	11	228	10	11	98	52	63	180	27	22	145	19	866
15	14	220	14	16	55	50	52	182	18	17	109	17	764
30	10	190	8	12	67	53	45	181	18	20	113	14	731
45	11	185	30	12	71	40	42	134	21	14	104	19	683
TOTAL	46	823	62	51	291	195	202	677	84	73	471	69	3044
TOTAL	165	2366	165	299	1453	763	462	2340	290	242	1292	245	10082

PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:30 PM	0.97	70	842	55	967	7	87	6
East	3:00 PM	0.94	150	641	311	1102	14	58	28
South	3:15 PM	0.88	133	890	109	1132	12	79	10
West	4:15 PM	0.90	85	496	89	670	13	74	13
Entire Intersection									
North	3:15 PM	0.85	53	767	48	868	6	88	6
East		0.95	136	642	308	1086	13	59	28
South		0.88	133	890	109	1132	12	79	10
West		0.93	90	393	85	568	16	69	15

TURN MOVEMENT COUNTS

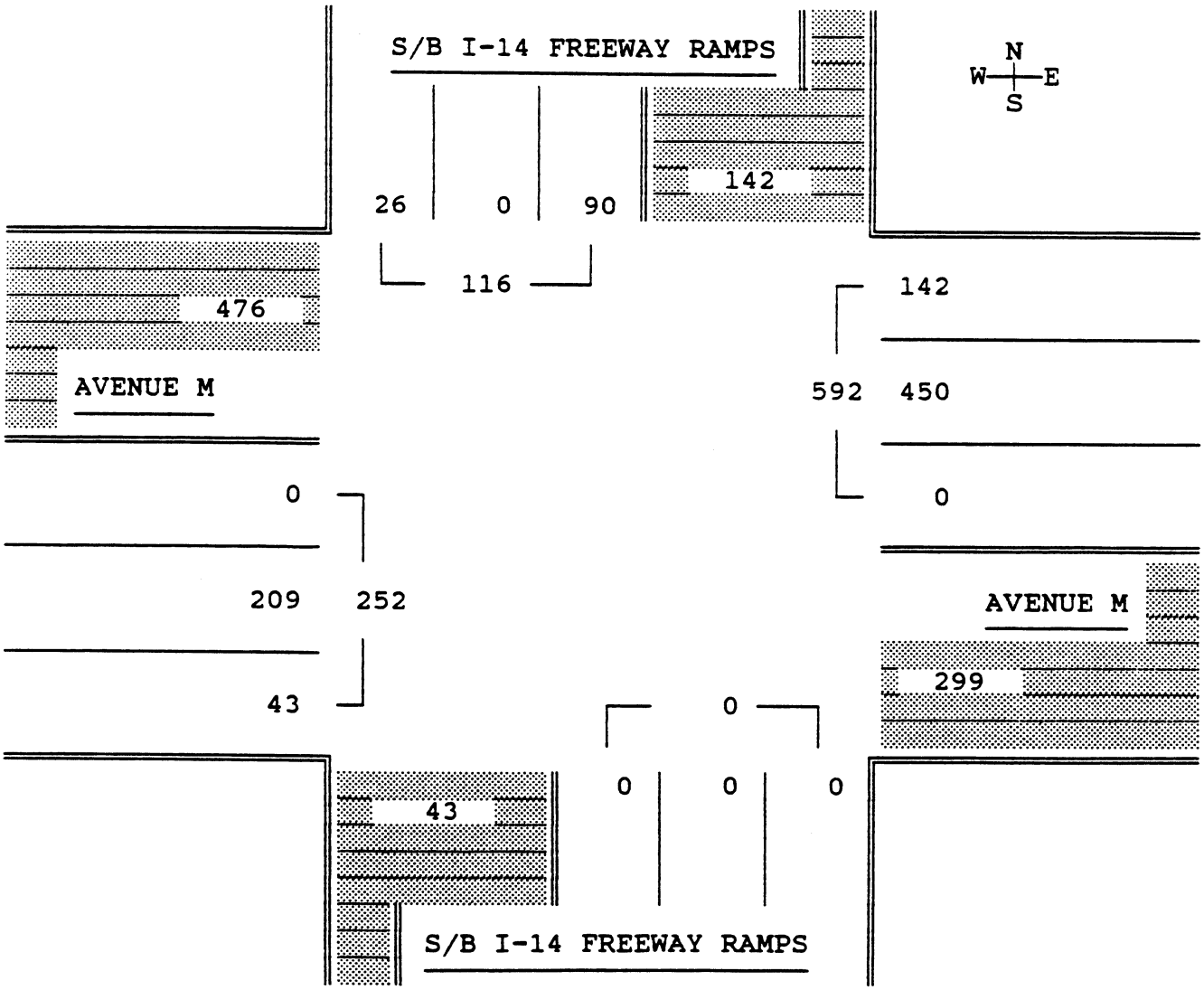
:e Code : 11181802
S : S/B I-14 FREEWAY RAMPS
W : AVENUE M
ERATOR : DP

Movements by: Primary

PAGE: 1
FILE: 11181802
DATE: 4/18/91

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:00 PM	0.83	26	0	90	116	22	0	78
East	4:00 PM	0.90	142	450	0	592	24	76	0
South	4:00 PM	0.00	0	0	0	0	0	0	0
West	4:00 PM	0.85	43	209	0	252	17	83	0
Entire Intersection									
North	4:00 PM	0.83	26	0	90	116	22	0	78
East		0.90	142	450	0	592	24	76	0
South		0.00	0	0	0	0	0	0	0
West		0.85	43	209	0	252	17	83	0



TURN MOVEMENT COUNTS

e Code : 11181802
S : S/B I-14 FREEWAY RAMPS
W : AVENUE M
RATOR : DP

PAGE: 1
FILE: 11181802

Movements by: Primary

DATE: 4/18/91

e in	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
00 PM	7	0	23	40	121	0	0	0	0	13	61	0	265
15	9	0	26	38	110	0	0	0	0	13	54	0	250
30	2	0	25	26	92	0	0	0	0	6	48	0	199
45	8	0	16	38	127	0	0	0	0	11	46	0	246
TOTAL	26	0	90	142	450	0	0	0	0	43	209	0	960
00 PM	11	0	19	26	123	0	0	0	0	18	45	0	242
15	7	0	15	24	118	0	0	0	0	4	39	0	207
30	5	0	16	27	95	0	0	0	0	9	47	0	199
45	7	0	14	23	92	0	0	0	0	5	41	0	182
TOTAL	30	0	64	100	428	0	0	0	0	36	172	0	830
TOTAL	56	0	154	242	878	0	0	0	0	79	381	0	1790

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	VOLUMES Thru	VOLUMES Left	VOLUMES Total	PERCENTS Right	PERCENTS Thru	PERCENTS Left
North	4:00 PM	0.83	26	0	90	116	22	0	78
East	4:00 PM	0.90	142	450	0	592	24	76	0
South	4:00 PM	0.00	0	0	0	0	0	0	0
West	4:00 PM	0.85	43	209	0	252	17	83	0

Entire Intersection

North	4:00 PM	0.83	26	0	90	116	22	0	78
East		0.90	142	450	0	592	24	76	0
South		0.00	0	0	0	0	0	0	0
West		0.85	43	209	0	252	17	83	0

TURN MOVEMENT COUNTS

te Code : 11181801
/ S : N/B I-14 FREEWAY RAMPS
/ W : AVENUE M
ERATOR : JC

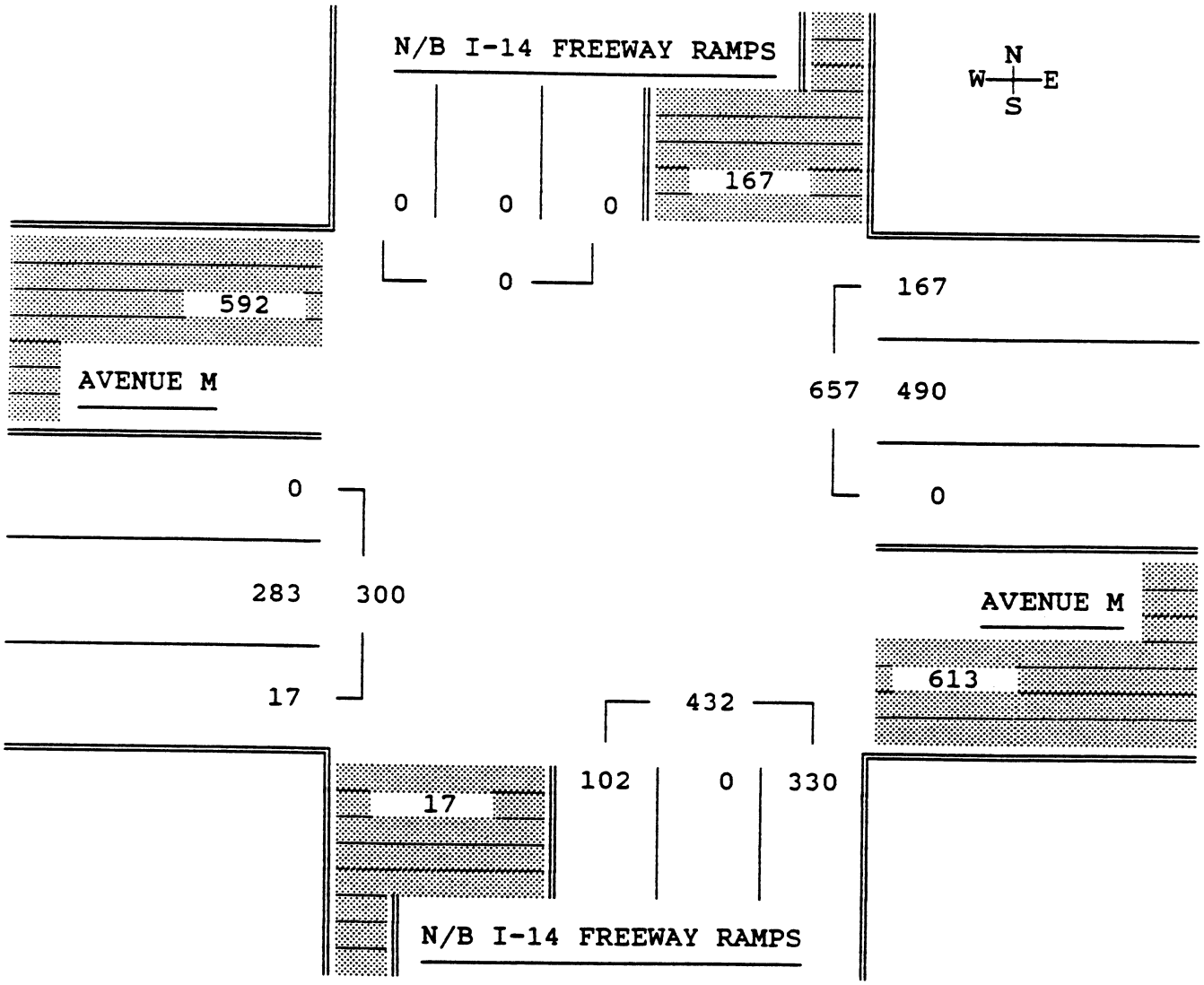
Movements by: Primary

PAGE: 1
FILE: 11181801

DATE: 4/18/91

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	4:00 PM	0.00	0	0	0	0	0	0	0
East	4:30 PM	0.87	188	481	0	669	28	72	0
South	4:00 PM	0.91	330	0	102	432	76	0	24
West	4:00 PM	0.89	17	283	0	300	6	94	0
Entire Intersection									
North	4:00 PM	0.00	0	0	0	0	0	0	0
East		0.85	167	490	0	657	25	75	0
South		0.91	330	0	102	432	76	0	24
West		0.89	17	283	0	300	6	94	0



TURN MOVEMENT COUNTS

e Code : 11181801
S : N/B I-14 FREEWAY RAMPS
W : AVENUE M
RATOR : JC

PAGE: 1
FILE: 11181801

Movements by: Primary

DATE: 4/18/91

e in	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
)0 PM	0	0	0	52	142	0	88	0	29	5	76	0	392
15	0	0	0	35	111	0	93	0	26	3	81	0	349
30	0	0	0	48	108	0	69	0	18	6	71	0	320
45	0	0	0	32	129	0	80	0	29	3	55	0	328
TOTAL	0	0	0	167	490	0	330	0	102	17	283	0	1389
)0 PM	0	0	0	68	124	0	79	0	19	3	58	0	351
15	0	0	0	40	120	0	84	0	30	2	50	0	326
30	0	0	0	24	85	0	66	0	29	6	53	0	263
45	0	0	0	19	77	0	83	0	29	2	47	0	257
TOTAL	0	0	0	151	406	0	312	0	107	13	208	0	1197
TOTAL	0	0	0	318	896	0	642	0	209	30	491	0	2586

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	VOLUMES Thru	VOLUMES Left	VOLUMES Total	PERCENTS Right	PERCENTS Thru	PERCENTS Left
North	12:00 AM	0.00	0	0	0	0	0	0	0
East	4:30 PM	0.87	188	481	0	669	28	72	0
South	4:00 PM	0.91	330	0	102	432	76	0	24
West	4:00 PM	0.89	17	283	0	300	6	94	0

Entire Intersection

North	4:00 PM	0.00	0	0	0	0	0	0	0
East		0.85	167	490	0	657	25	75	0
South		0.91	330	0	102	432	76	0	24
West		0.89	17	283	0	300	6	94	0

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .92

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVENUE M-8

NAME OF THE NORTH/SOUTH STREET..... 10 STRET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... EXISTING VOLUMES

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	17	--	4	0
THRU	0	--	545	555
RIGHT	9	--	0	24

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	--	1	1

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.30	5.30	0.00	5.30
MINOR LEFTS	EB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STRET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	20	118	117	117	97	E
RIGHT	11	460	460	158 460	127 449	D A
MAJOR STREET						
NB LEFT	5	566	566	566	561	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STRET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .92

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVENUE M-8

NAME OF THE NORTH/SOUTH STREET..... 10 STRET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITHOUT PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	19	--	5	0
THRU	0	--	635	638
RIGHT	15	--	0	27

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	--	1	1

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.30	5.30	0.00	5.30
MINOR LEFTS	EB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STRET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	23	85	84	84	61	E
				129	89	E
RIGHT	18	407	407	407	389	B
MAJOR STREET						
NB LEFT	6	505	505	505	499	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STRET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .92

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVENUE M-8

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	23	--	5	44
THRU	2	--	795	1164
RIGHT	15	--	52	31

NUMBER OF LANES

	EB	WB	NB	SB
LANES	2	--	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.80	5.80	0.00	5.80
MINOR LEFTS	EB	7.90	7.90	0.00	7.90

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	28	48	47	47	20	E
RIGHT	18	441	441	441	423	A
MAJOR STREET						
NB LEFT	6	197	197	197	191	D

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M-8
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M-8/10 STREET WEST
AREA TYPE.....OTHER
ANALYST.......WWC 0-174
DATE..........01-14-1991
TIME..........1600-1800
COMMENT.......FUTURE WITH PROJECT

	VOLUMES				:		GEOMETRY					
	EB	WB	NB	SB	:		EB	WB		NB		SB
LT	23	0	5	0	:	L	10.0	12.0	L	10.0	T	12.0
TH	0	0	795	1164	:	R	15.0	12.0	T	15.0	TR	15.0
RT	15	0	0	31	:		12.0	12.0		12.0		12.0
RR	0	0	0	0	:		12.0	12.0		12.0		12.0
					:		12.0	12.0		12.0		12.0
					:		12.0	12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	15.1	3
WB	0.00	2.00	N	0	0	0.90	50	N	15.1	3
NB	0.00	2.00	N	0	0	0.90	50	N	8.4	3
SB	0.00	2.00	N	0	0	0.90	50	N	8.4	3

SIGNAL SETTINGS CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD						PD				
WB	LT					SB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.160	0.233	14.0	B	13.0	B
	R	0.043	0.233	11.5	B		
NB	L	0.037	0.750	1.5	A	2.6	A
	T	0.601	0.750	2.6	A		
SB	TR	0.499	0.750	2.0	A	2.0	A

INTERSECTION: Delay = 2.5 (sec/veh) V/C = 0.503 LOS = A

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .9

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... STREET A

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-15-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	94	0	61
THRU	--	0	1011	872
RIGHT	--	376	18	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	2	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	35	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	WB	6.10	6.10	0.00	6.10
MAJOR LEFTS	SB	5.80	5.80	0.00	5.80
MINOR LEFTS	WB	7.90	7.90	0.00	7.90

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... STREET A
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-15-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	115	48	37	37	-78	F
RIGHT	460	489	489	489	29	E
MAJOR STREET						
SB LEFT	75	245	245	245	170	D

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... STREET A
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-15-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..STREET A/10 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-14-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB
LT	0	94	0	61	L 10.0	L	10.0	T	12.0	L	10.0
TH	0	0	1011	872	R 15.0	R	15.0	TR	15.0	T	15.0
RT	0	376	18	0	12.0		12.0		12.0		15.0
RR	0	0	0	0	12.0		12.0		12.0		12.0
					12.0		12.0		12.0		12.0
					12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	18.1	3
WB	0.00	2.00	N	0	0	0.90	50	N	18.1	3
NB	0.00	2.00	N	0	0	0.90	50	N	8.4	3
SB	0.00	2.00	N	0	0	0.90	50	N	8.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD						PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.305	0.500	6.9	B	6.8	B
	R	0.501	0.500	6.8	B		
NB	TR	0.429	0.750	1.8	A	1.8	A
SB	L	0.260	0.750	1.9	A	3.0	A
	T	0.659	0.750	3.1	A		

INTERSECTION: Delay = 3.2 (sec/veh) V/C = 0.798 LOS = A

TURN MOVEMENT COUNTS

Code : 01740904
S : 6TH STREET WEST
W : AVENUE M
ATOR : AR

PAGE: 1
FILE: 01740904

Movements by: Primary

DATE: 1/09/91

n	From North RT	From North THRU	From North LT	From East RT	From East THRU	From East LT	From South RT	From South THRU	From South LT	From West RT	From West THRU	From West LT	Vehicle Total
0 PM	7	0	10	20	189	0	0	0	0	0	125	13	364
5	14	0	15	9	139	0	0	0	0	0	135	13	325
0	11	0	13	15	149	0	0	0	0	0	156	8	352
5	6	0	10	2	114	0	0	0	0	0	129	4	265
OTAL	38	0	48	46	591	0	0	0	0	0	545	38	1306
0 PM	7	0	19	2	131	0	0	0	0	0	166	3	328
5	5	0	7	1	113	0	0	0	0	0	155	2	283
0	5	0	3	3	110	0	0	0	0	0	139	0	260
5	3	0	3	2	114	0	0	0	0	0	116	5	243
OTAL	20	0	32	8	468	0	0	0	0	0	576	10	1114
TOTAL	58	0	80	54	1059	0	0	0	0	0	1121	48	2420

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:00 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	VOLUMES Thru	VOLUMES Left	VOLUMES Total	PERCENTS Right	PERCENTS Thru	PERCENTS Left
North	4:15 PM	0.82	38	0	57	95	40	0	60
East	4:00 PM	0.76	46	591	0	637	7	93	0
South	4:00 PM	0.00	0	0	0	0	0	0	0
West	4:30 PM	0.92	0	606	17	623	0	97	3

Entire Intersection

North	4:00 PM	0.74	38	0	48	86	44	0	56
East		0.76	46	591	0	637	7	93	0
South		0.00	0	0	0	0	0	0	0
West		0.89	0	545	38	583	0	93	7

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/10 ST WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-11-1991
TIME.....1600-1800
COMMENT.....EXISTING VOLUMES

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB	
LT	120	100	54	111	L	10.0	L	10.0	L	10.0	L	10.0
TH	427	413	439	469	T	12.0	T	12.0	TR	12.0	TR	12.0
RT	42	148	122	88	TR	15.0	TR	15.0		15.0		15.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	26.3	3

SIGNAL SETTINGS CYCLE LENGTH = 68.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		30.0	0.0	0.0	0.0	GREEN		30.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.390	0.456	9.7	B	8.1	B
	TR	0.326	0.456	7.7	B		
WB	L	0.284	0.456	8.9	B	8.2	B
	TR	0.402	0.456	8.0	B		
NB	L	0.272	0.456	8.9	B	13.3	B
	TR	0.797	0.456	13.7	B		
SB	L	0.567	0.456	12.9	B	13.1	B
	TR	0.783	0.456	13.2	B		

INTERSECTION: Delay = 10.6 (sec/veh) V/C = 0.600 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/10 ST WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-11-1991
TIME.....1600-1800
COMMENT.....FUTURE WITHOUT PROJECT

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	127	106	58	115	L	10.0	L	10.0	L	10.0	L	10.0
TH	451	436	463	496	T	12.0	T	12.0	TR	12.0	TR	12.0
RT	44	156	129	93	TR	15.0	TR	15.0		15.0		15.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	26.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 68.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		30.0	0.0	0.0	0.0	GREEN		30.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.433	0.456	10.1	B	8.2	B
	TR	0.344	0.456	7.8	B		
WB	L	0.312	0.456	9.1	B	8.3	B
	TR	0.424	0.456	8.2	B		
NB	L	0.327	0.456	9.4	B	14.9	B
	TR	0.842	0.456	15.5	C		
SB	L	0.656	0.456	16.2	C	15.0	C
	TR	0.828	0.456	14.8	B		

INTERSECTION: Delay = 11.6 (sec/veh) V/C = 0.637 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/10 ST WEST
AREA TYPE.....OTHER
ANALYST.......WWC 0-174
DATE..........01-11-1991
TIME..........1600-1800
COMMENT.......FUTURE WITH PROJECT

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB
LT	127	244	270	186	L	10.0	L	10.0	L	10.0	L 10.0
TH	498	648	782	572	T	12.0	T	12.0	TR	12.0	TR 12.0
RT	115	368	265	93	TR	15.0	TR	15.0		15.0	15.0
RR	0	0	0	0		12.0		12.0		12.0	12.0
						12.0		12.0		12.0	12.0
						12.0		12.0		12.0	12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	26.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 68.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		30.0	0.0	0.0	0.0	GREEN		30.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.946	0.456	55.0	E	15.9	C
	TR	0.433	0.456	8.2	B		
WB	L	0.860	0.456	26.9	D	13.9	B
	TR	0.741	0.456	11.0	B		
NB	L	2.078	0.456	*	*	*	*
	TR	1.498	0.456	*	*		
SB	L	2.120	0.456	*	*	*	*
	TR	0.932	0.456	22.2	C		

INTERSECTION: Delay = * (sec/veh) V/C = 1.533 LOS = *

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/10 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174X
DATE.....01-14-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT MITIGATION

	VOLUMES				:	GEOMETRY							
	EB	WB	NB	SB	:		EB		WB		NB		SB
LT	127	244	270	186	:	L	10.0	L	10.0	L	10.0	L	10.0
TH	498	648	782	572	:	T	12.0	T	12.0	T	12.0	T	12.0
RT	115	368	265	93	:	TR	12.0	TR	12.0	TR	12.0	TR	12.0
RR	0	0	0	0	:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
WB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
NB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
SB	0.00	2.00	N	0	0	0.90	50	N	24.8	3

SIGNAL SETTINGS CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		
WB	LT	X				SB	LT	X			
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.359	0.500	7.2	B	6.4	B
	TR	0.415	0.500	6.2	B		
WB	L	0.689	0.500	12.2	B	9.1	B
	TR	0.710	0.500	8.4	B		
NB	L	0.673	0.567	9.7	B	4.7	A
	TR	0.538	0.667	3.5	A		
SB	L	0.463	0.567	6.4	B	3.6	A
	TR	0.335	0.667	2.8	A		

INTERSECTION: Delay = 6.1 (sec/veh) V/C = 1.133 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/6 STREET WEST
AREA TYPE.....OTHER
ANALYST.......WWC 0-174
DATE..........01-11-1991
TIME..........1600-1800
COMMENT.......EXISTING VOLUMES

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB
LT	38	0	0	48	L	10.0	L	10.0	L	12.0	L	10.0
TH	545	591	0	0	T	12.0	T	12.0	T	12.0	R	10.0
RT	0	46	0	38	TR	15.0	TR	15.0		12.0		12.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	10.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	10.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	26.3	3

SIGNAL SETTINGS CYCLE LENGTH = 58.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT				
	TH	X					TH				
	RT	X					RT				
	PD	X					PD				
WB	LT	X				SB	LT	X			
	TH	X					TH				
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		35.0	0.0	0.0	0.0	GREEN		15.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.094	0.621	3.4	A	3.3	A
	TR	0.274	0.621	3.3	A		
WB	L	0.000	0.621	0.0	A	3.4	A
	TR	0.324	0.621	3.4	A		
SB	L	0.141	0.276	12.0	B	11.2	B
	R	0.112	0.276	10.1	B		

INTERSECTION: Delay = 3.8 (sec/veh) V/C = 0.268 LOS = A

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/6 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-11-1991
TIME.....1600-1800
COMMENT.....FUTURE WITHOUT PROJECT

	VOLUMES				:	GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	42	0	0	52	:	L	10.0	L	10.0	L	12.0	L	10.0
TH	591	642	0	0	:	T	12.0	T	12.0	T	12.0	R	10.0
RT	0	50	0	41	:	TR	15.0	TR	15.0		12.0		12.0
RR	0	0	0	0	:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	10.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	10.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	26.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 58.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT				
	TH	X					TH				
	RT	X					RT				
	PD	X					PD				
WB	LT	X				SB	LT	X			
	TH	X					TH				
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		35.0	0.0	0.0	0.0	GREEN		15.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.112	0.621	3.4	A	3.3	A
	TR	0.297	0.621	3.3	A		
WB	L	0.000	0.621	0.0	A	3.5	A
	TR	0.352	0.621	3.5	A		
SB	L	0.153	0.276	12.1	B	11.2	B
	R	0.121	0.276	10.2	B		

INTERSECTION: Delay = 3.9 (sec/veh) V/C = 0.291 LOS = A

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/6 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-11-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB
LT	46	70	232	52	L	10.0	L	10.0	L	10.0	L	10.0
TH	851	732	2	4	T	12.0	T	12.0	TR	12.0	R	10.0
RT	45	50	374	43	TR	15.0	TR	15.0	R	12.0		12.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	16.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	16.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	20.6	3
SB	0.00	2.00	N	0	0	0.90	50	N	20.6	3

SIGNAL SETTINGS CYCLE LENGTH = 58.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
GREEN		35.0	0.0	0.0	0.0	GREEN		15.0	0.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		4.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.142	0.621	3.5	A	3.8	A
	TR	0.454	0.621	3.8	A		
WB	L	0.267	0.621	3.9	A	3.7	A
	TR	0.397	0.621	3.6	A		
NB	L	0.564	0.276	14.9	B	13.3	B
	TR	0.516	0.276	12.3	B		
	R	0.511	0.276	12.2	B		
SB	L	0.348	0.276	13.3	B	11.9	B
	R	0.126	0.276	10.2	B		

INTERSECTION: Delay = 6.3 (sec/veh) V/C = 0.488 LOS = B

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IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .9

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVE M-4

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... EXISTING VOLUMES

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	76	--	17	0
THRU	0	--	548	565
RIGHT	36	--	0	29

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	--	2	1

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.30	5.30	0.00	5.30
MINOR LEFTS	EB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	93	107	105	> 105	> 12	> E
				> 139	> 2	>E
RIGHT	44	444	444	> 444	> 400	> B
MAJOR STREET						
NB LEFT	21	546	546	546	525	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .9

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVE M-4

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITHOUT PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	138	--	24	0
THRU	0	--	595	690
RIGHT	66	--	0	42

NUMBER OF LANES

	EB	WB	NB	SB
LANES	2	--	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.80	5.80	0.00	5.80
MINOR LEFTS	EB	7.90	7.90	0.00	7.90

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	169	60	57	57	-111	F
RIGHT	81	603	603	603	523	A
MAJOR STREET						
NB LEFT	29	383	383	383	353	B

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .9

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVE M-4

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-11-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	175	--	29	0
THRU	0	--	861	965
RIGHT	66	--	0	56

NUMBER OF LANES

	EB	WB	NB	SB
LANES	2	--	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	-----	---	---	-
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	---	---	---
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	EB	6.10	6.10	0.00	6.10
MAJOR LEFTS	NB	5.80	5.80	0.00	5.80
MINOR LEFTS	EB	7.90	7.90	0.00	7.90

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
EB LEFT	214	48	43	43	-170	F
RIGHT	81	492	492	492	411	A
MAJOR STREET						
NB LEFT	35	248	248	248	212	C

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-11-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M-4/10 STREET WEST
AREA TYPE.....OTHER
ANALYST.......WWC 0-174
DATE..........01-14-1991
TIME..........1600-1800
COMMENT.......FUTURE WITHOUT PROJECT

	VOLUMES					GEOMETRY					
	EB	WB	NB	SB		EB	WB		NB		SB
LT	138	0	24	0	L	10.0	12.0	L	10.0	T	12.0
TH	0	0	595	690	R	15.0	12.0	T	15.0	TR	15.0
RT	66	0	0	42		12.0	12.0		12.0		12.0
RR	0	0	0	0		12.0	12.0		12.0		12.0
						12.0	12.0		12.0		12.0
						12.0	12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	15.1	3
WB	0.00	2.00	N	0	0	0.90	50	N	15.1	3
NB	0.00	2.00	N	0	0	0.90	50	N	8.4	3
SB	0.00	2.00	N	0	0	0.90	50	N	8.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD						PD				
WB	LT					SB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.448	0.500	8.0	B	7.0	B
	R	0.088	0.500	5.1	B		
NB	L	0.056	0.750	1.5	A	1.9	A
	T	0.450	0.750	2.0	A		
SB	TR	0.307	0.750	1.6	A	1.6	A

INTERSECTION: Delay = 2.4 (sec/veh) V/C = 0.481 LOS = A

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M-4/10 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WWC 0-174
DATE.....01-14-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT

	VOLUMES				:	GEOMETRY					
	EB	WB	NB	SB	:		EB	WB		NB		SB
LT	175	0	29	0	:	L	10.0	12.0	L	10.0	T	12.0
TH	0	0	861	965	:	R	15.0	12.0	T	12.0	TR	15.0
RT	66	0	0	56	:		12.0	12.0	T	15.0		15.0
RR	0	0	0	0	:		12.0	12.0		12.0		12.0
					:		12.0	12.0		12.0		12.0
					:		12.0	12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	20.6	3
WB	0.00	2.00	N	0	0	0.90	50	N	20.6	3
NB	0.00	2.00	N	0	0	0.90	50	N	8.4	3
SB	0.00	2.00	N	0	0	0.90	50	N	8.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD						PD				
WB	LT					SB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.655	0.433	13.8	B	11.8	B
	R	0.102	0.433	6.5	B		
NB	L	0.148	0.617	3.7	A	4.0	A
	T	0.435	0.617	4.0	A		
SB	TR	0.520	0.617	4.3	A	4.3	A

INTERSECTION: Delay = 5.0 (sec/veh) V/C = 0.496 LOS = A

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .9

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... AVE M-4

NAME OF THE NORTH/SOUTH STREET..... 10 STREET WEST

NAME OF THE ANALYST..... WWC 0-174

DATE OF THE ANALYSIS (mm/dd/yy)..... 01-15-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	175	94	29	61
THRU	10	10	861	965
RIGHT	66	376	18	56

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	2	2	3	2
LANE USAGE	L + TR	L + TR		

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	35	N
WESTBOUND	0.00	90	35	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	EB	6.10	6.10	0.00	6.10
	WB	6.10	6.10	0.00	6.10
MAJOR LEFTS					
	SB	5.80	5.80	0.00	5.80
	NB	5.80	5.80	0.00	5.80
MINOR THROUGHS					
	EB	7.40	7.40	0.00	7.40
	WB	7.40	7.40	0.00	7.40
MINOR LEFTS					
	EB	7.90	7.90	0.00	7.90
	WB	7.90	7.90	0.00	7.90

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-15-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)		SHARED CAPACITY c_{SH} (pcph)		RESERVE CAPACITY $c_R = c_{SH} - v$		LOS
MINOR STREET									
EB LEFT	214	48	12		12		-202		F
THROUGH	12	63	47	>	47	>	35	>	E
RIGHT	81	492	492	> 219	492	> 126	411	>D	A
MINOR STREET									
WB LEFT	115	48	28		28		-87		F
THROUGH	12	63	47	>	47	>	35	>	E
RIGHT	460	670	670	> 499	670	> 27	210	>E	C
MAJOR STREET									
SB LEFT	75	305	305		305		231		C
NB LEFT	35	248	248		248		212		C

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVE M-4
NAME OF THE NORTH/SOUTH STREET.... 10 STREET WEST
DATE AND TIME OF THE ANALYSIS..... 01-15-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M-4 /10 STREET WEST
AREA TYPE.....OTHER
ANALYST.....WC 0-174
DATE.....01-15-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB
LT	175	94	29	61	L	10.0	L	10.0	L	10.0	L 10.0
TH	10	10	861	965	TR	15.0	TR	15.0	T	12.0	T 12.0
RT	66	376	18	56		12.0		12.0	TR	15.0	TR 15.0
RR	0	0	0	0		12.0		12.0		12.0	12.0
						12.0		12.0		12.0	12.0
						12.0		12.0		12.0	12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
WB	0.00	2.00	N	0	0	0.90	50	N	26.3	3
NB	0.00	2.00	N	0	0	0.90	50	N	20.3	3
SB	0.00	2.00	N	0	0	0.90	50	N	20.3	3

SIGNAL SETTINGS CYCLE LENGTH = 60.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT	X			
	PD	X					PD	X			

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.805	0.350	25.4	D	20.3	C
	TR	0.145	0.350	8.6	B		
WB	L	0.211	0.350	10.4	B	13.6	B
	TR	0.753	0.350	14.4	B		
NB	L	0.156	0.583	4.4	A	4.7	A
	TR	0.471	0.583	4.7	A		
SB	L	0.244	0.583	4.7	A	5.1	B
	TR	0.551	0.583	5.2	B		

INTERSECTION: Delay = 7.8 (sec/veh) V/C = 0.646 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/SIERRA HWY
AREA TYPE.....OTHER
ANALYST.....WWC 1-118
DATE.....04-30-1991
TIME.....1600-1800
COMMENT.....EXISTING VOLUMES

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	85	308	109	48	:	L	10.0	L	10.0	L	10.0	L	10.0
TH	393	642	890	767	:	T	12.0	T	12.0	T	12.0	T	12.0
RT	90	136	133	53	:	TR	12.0	TR	12.0	TR	12.0	TR	12.0
RR	45	65	60	25	:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
WB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
NB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
SB	0.00	2.00	N	0	0	0.90	50	N	24.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 86.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
GREEN		35.0	0.0	0.0	0.0	GREEN		10.0	30.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		3.0	4.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.430	0.419	14.3	B	11.6	B
	TR	0.348	0.419	11.0	B		
WB	L	0.970	0.419	48.3	E	23.0	C
	TR	0.566	0.419	12.6	B		
NB	L	0.662	0.116	33.5	D	22.6	C
	TR	0.886	0.360	21.5	C		
SB	L	0.291	0.116	26.7	D	17.2	C
	TR	0.726	0.360	16.6	C		

INTERSECTION: Delay = 19.7 (sec/veh) V/C = 0.896 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/SIERRA HWY
AREA TYPE.....OTHER
ANALYST.....WWC 1-118
DATE.....04-30-1991
TIME.....1600-1800
COMMENT.....FUTURE WITHOUT PROJECT

	VOLUMES				:	GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	92	313	116	48	:	L	10.0	L	10.0	L	10.0	L	10.0
TH	422	686	895	872	:	T	12.0	T	12.0	T	12.0	T	12.0
RT	104	136	133	57	:	TR	12.0	TR	12.0	TR	12.0	TR	12.0
RR	45	65	60	25	:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
WB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
NB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
SB	0.00	2.00	N	0	0	0.90	50	N	24.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 86.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
GREEN		35.0	0.0	0.0	0.0	GREEN		10.0	30.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		3.0	4.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.508	0.419	15.8	C	12.0	B
	TR	0.383	0.419	11.3	B		
WB	L	1.054	0.419	74.9	F	30.5	D
	TR	0.601	0.419	13.0	B		
NB	L	0.704	0.116	35.5	D	23.1	C
	TR	0.890	0.360	21.7	C		
SB	L	0.291	0.116	26.7	D	19.3	C
	TR	0.826	0.360	18.9	C		

INTERSECTION: Delay = 22.5 (sec/veh) V/C = 0.943 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/SIERRA HWY
AREA TYPE.....OTHER
ANALYST.......WWC 1-118
DATE..........04-30-1991
TIME..........1600-1800
COMMENT.......FUTURE WITH PROJECT

	VOLUMES				:	GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	270	313	138	48	:	L	10.0	L	10.0	L	10.0	L	10.0
TH	796	814	895	872	:	T	12.0	T	12.0	T	12.0	T	12.0
RT	186	136	133	67	:	TR	12.0	TR	12.0	TR	12.0	TR	12.0
RR	45	65	60	25	:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0
					:		12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
WB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
NB	0.00	2.00	N	0	0	0.90	50	N	24.8	3
SB	0.00	2.00	N	0	0	0.90	50	N	24.8	3

SIGNAL SETTINGS CYCLE LENGTH = 86.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X			
	TH	X					TH		X		
	RT	X					RT		X		
	PD						PD		X		
GREEN		35.0	0.0	0.0	0.0	GREEN		10.0	30.0	0.0	0.0
YELLOW		4.0	0.0	0.0	0.0	YELLOW		3.0	4.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	1.876	0.430	*	*	*	*
	TR	0.729	0.430	14.2	B		
WB	L	2.438	0.430	*	*	*	*
	TR	0.682	0.430	13.5	B		
NB	L	0.761	0.128	38.0	D	22.0	C
	TR	0.863	0.372	19.9	C		
SB	L	0.265	0.128	25.9	D	18.4	C
	TR	0.810	0.372	18.0	C		

INTERSECTION: Delay = * (sec/veh) V/C = 1.577 LOS = *

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVE M/SIERRA HWY
AREA TYPE.....OTHER
ANALYST.......WWC 1-118
DATE..........04-30-1991
TIME..........1600-1800
COMMENT..... FUTURE WITH MITIGATION

	VOLUMES EB	WB	NB	SB	GEOMETRY EB		WB		NB		SB	
LT	270	313	138	48	L	10.0	L	10.0	L	10.0	L	10.0
TH	796	814	895	872	L	10.0	L	10.0	L	10.0	L	10.0
RT	186	136	133	67	T	12.0	T	12.0	T	12.0	T	12.0
RR	90	65	60	35	TR	12.0	TR	12.0	TR	12.0	TR	12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.95	50	Y	21.0	5
WB	0.00	2.00	N	0	0	0.95	50	Y	21.0	5
NB	0.00	2.00	N	0	0	0.94	50	Y	21.0	5
SB	0.00	2.00	N	0	0	0.97	50	Y	21.0	5

SIGNAL SETTINGS — CYCLE LENGTH = 98.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X				NB	LT	X			
	TH		X				TH		X		
	RT		X				RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X			
	TH		X				TH		X		
	RT		X				RT		X		
	PD						PD		X		
GREEN		13.0	30.0	0.0	0.0	GREEN		13.0	30.0	0.0	0.0
YELLOW		2.0	4.0	0.0	0.0	YELLOW		2.0	4.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.738	0.133	35.8	D	21.6	C
	TR	0.861	0.327	17.3	C		
WB	L	0.855	0.133	42.9	E	23.8	C
	TR	0.851	0.327	17.0	C		
NB	L	0.381	0.133	29.8	D	22.5	C
	TR	0.941	0.327	21.4	C		
SB	L	0.128	0.133	28.5	D	17.4	C
	TR	0.846	0.327	16.8	C		

INTERSECTION: Delay = 21.5 (sec/veh) V/C = 0.819 LOS = C

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... SOUTUBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... EXISTING VOLUMES

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE SOUTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	--	90
THRU	209	450	--	0
RIGHT	43	142	--	26

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	--	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	-----	---	---	-
SOUTHBOUND	0.00	90	35	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	---	---	---
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	SB	6.10	6.10	0.00	6.10
MAJOR LEFTS	EB	5.30	5.30	0.00	5.30
MINOR LEFTS	SB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
SB LEFT	104	256	256	256	152	D
RIGHT	30	505	505	505	475	A
MAJOR STREET						
EB LEFT	0	570	570	570	570	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... SOUTUBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITHOUT PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE SOUTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	--	98
THRU	231	472	--	0
RIGHT	43	150	--	26

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	--	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	-----	---	---	-
SOUTHBOUND	0.00	90	35	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	---	---	---
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	SB	6.10	6.10	0.00	6.10
MAJOR LEFTS	EB	5.30	5.30	0.00	5.30
MINOR LEFTS	SB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
SB LEFT	113	234	234	234	120	D
RIGHT	30	486	486	486	456	A
MAJOR STREET						
EB LEFT	0	549	549	549	549	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... SOUTUBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE SOUTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	--	115
THRU	271	710	--	0
RIGHT	43	230	--	26

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	--	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	-----	---	---	-
SOUTHBOUND	0.00	90	35	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	---	---	---
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	SB	6.10	6.10	0.00	6.10
MAJOR LEFTS	EB	5.30	5.30	0.00	5.30
MINOR LEFTS	SB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
SB LEFT	133	131	131	131	-3	F
RIGHT	30	323	323	323	292	C
MAJOR STREET						
EB LEFT	0	361	361	361	361	B

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... SOUTUBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/SOUTHBOUND RAMPS 1-14
AREA TYPE.....OTHER
ANALYST.....WWC 1-118
DATE.....05-03-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH PROJECT (WITH MITIGATION)

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB
LT	0	0	0	115	TR	15.0	TR	15.0	L	15.0	L	12.0
TH	271	710	0	0		12.0		12.0		12.0	R	12.0
RT	43	230	0	26		12.0		12.0		12.0		12.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	Y	11.3	4
WB	0.00	2.00	N	0	0	0.90	50	Y	11.3	4
NB	0.00	2.00	N	0	0	0.90	50	N	0.0	4
SB	0.00	2.00	N	0	0	0.90	50	N	0.0	4

SIGNAL SETTINGS — CYCLE LENGTH = 56.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH	X					TH				
	RT	X					RT				
	PD	X					PD				
WB	LT					SB	LT	X			
	TH	X					TH				
	RT	X					RT	X			
	PD	X					PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	TR	0.252	0.804	0.7	A	0.7	A
WB	TR	0.770	0.804	2.9	A	2.9	A
SB	L	0.486	0.357	11.8	B	10.6	B
	R	0.053	0.357	5.6	B		

INTERSECTION: Delay = 3.2 (sec/veh) V/C = 0.732 LOS = A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... NORTHBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... EXISTING VOLUMES

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE NORTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	102	--
THRU	283	490	0	--
RIGHT	17	167	330	--

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	2	--

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	35	N
SOUTHBOUND	-----	---	---	-

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	---	---	---

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	NB	6.10	6.10	0.00	6.10
MAJOR LEFTS	WB	5.30	5.30	0.00	5.30
MINOR LEFTS	NB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
NB LEFT	118	233	233	233	114	D
RIGHT	382	689	689	689	307	B
MAJOR STREET						
WB LEFT	0	815	815	815	815	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... EXISTING VOLUMES

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... NORTHBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITHOUT PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE NORTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	340	--
THRU	313	520	0	--
RIGHT	17	177	102	--

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	2	--

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	35	N
SOUTHBOUND	-----	---	---	-

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	---	---	---

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	NB	6.10	6.10	0.00	6.10
MAJOR LEFTS	WB	5.30	5.30	0.00	5.30
MINOR LEFTS	NB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
NB LEFT	394	209	209	209	-185	F
RIGHT	118	662	662	662	543	A
MAJOR STREET						
WB LEFT	0	786	786	786	786	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITHOUT PROJECT

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 45

PEAK HOUR FACTOR..... .95

AREA POPULATION..... 20000

NAME OF THE EAST/WEST STREET..... AVENUE M

NAME OF THE NORTH/SOUTH STREET..... NORTHBOUND RAMPS 1-14

NAME OF THE ANALYST..... WWC 1-118

DATE OF THE ANALYSIS (mm/dd/yy)..... 05-02-1991

TIME PERIOD ANALYZED..... 1600-1800

OTHER INFORMATION.... FUTURE WITH PROJECT

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE NORTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	401	--
THRU	370	838	0	--
RIGHT	17	283	102	--

NUMBER OF LANES

	EB	WB	NB	SB
LANES	1	1	2	--

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	35	N
SOUTHBOUND	-----	---	---	-

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	---	---	---

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	NB	6.10	6.10	0.00	6.10
MAJOR LEFTS	WB	5.30	5.30	0.00	5.30
MINOR LEFTS	NB	7.40	7.40	0.00	7.40

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
NB LEFT	464	106	106	106	-358	F
RIGHT	118	609	609	609	491	A
MAJOR STREET						
WB LEFT	0	732	732	732	732	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... AVENUE M
NAME OF THE NORTH/SOUTH STREET.... NORTHBOUND RAMPS 1-14
DATE AND TIME OF THE ANALYSIS..... 05-02-1991 ; 1600-1800
OTHER INFORMATION.... FUTURE WITH PROJECT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..AVENUE M/NORTHBOUND RAMPS I-14
AREA TYPE.....OTHER
ANALYST.....WWC 1-118
DATE.....05-03-1991
TIME.....1600-1800
COMMENT.....FUTURE WITH MITIGATION

VOLUMES	EB	WB	NB	SB	GEOMETRY	EB		WB		NB		SB
LT	0	0	340	0	TR	15.0	TR	15.0	L	12.0	L	12.0
TH	313	520	0	0		12.0		12.0	R	12.0	R	12.0
RT	17	177	102	0		12.0		12.0		12.0		12.0
RR	0	0	0	0		12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	BUSES Nm	BUSES Nb	PHF	PEDS	PED. BUT. Y/N	min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.90	50	Y	11.3	4
WB	0.00	2.00	N	0	0	0.90	50	Y	11.3	4
NB	0.00	2.00	N	0	0	0.90	50	N	0.0	4
SB	0.00	2.00	N	0	0	0.90	50	N	0.0	4

SIGNAL SETTINGS — CYCLE LENGTH = 56.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT	X			
	TH	X					TH				
	RT	X					RT	X			
	PD	X					PD				
WB	LT					SB	LT				
	TH	X					TH				
	RT	X					RT				
	PD	X					PD				

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	TR	0.261	0.804	0.7	A	0.7	A
WB	TR	0.572	0.804	1.2	A	1.2	A
NB	L	0.718	0.714	6.8	B	5.5	B
	R	0.105	0.714	1.2	A		

INTERSECTION: Delay = 2.4 (sec/veh) V/C = 0.743 LOS = A

Figure 9-1A

TRAFFIC SIGNAL WARRANTS

DIST ___ CO ___ RTE ___ PM ___

CALC NWC DATE 1-15-91
CHK ___ DATE ___

Major St: 10th STREET WEST — Critical Approach Speed 45 mph
Minor St: AVE M-4 — Critical Approach Speed 45 mph

Critical speed of major street traffic ≥ 40 mph ..... ☒
In built up area of isolated community of < 10,000 pop. ..... ☐ RURAL (R)
☐ URBAN (U)

WARRANT 1 — Minimum Venicular Volume

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				/	/	/	/	/	/	/
	U	R	U	R							
APPROACH LANES			2 or more								Hour
Both Approchs. Major Street	500 (400)	350 (280)	600 (480)	420 (336)							695
Highest Approch Minor Street *	150 (120)	105 (84)	200 (160)	140 (112)							67

100% SATISFIED Yes ☐ No ☒
80% SATISFIED Yes ☐ No ☒

* NOTE. Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 2 — Interruption of Continuous Traffic

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				/	/	/	/	/	/	/
	U	R	U	R							
APPROACH LANES			2 or more								Hour
Both Approchs. Major Street	750 (600)	525 (420)	900 (720)	630 (504)							695
Highest Approch Minor Street *	75 (60)	53 (42)	100 (80)	70 (56)							67

100% SATISFIED Yes ☒ No ☐
80% SATISFIED Yes ☐ No ☐

* NOTE. Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 3 — Minimum Pedestrian Volume

100% SATISFIED Yes ☐ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)			/	/	/	/	/	/	/
		U	R							
										Hour
Both Approchs. Major Street Volume	No Median	600 (480)	420 (336)							
	Raised 4' Median	1000 (800)	700 (560)							
Ped's On Highest Volume X-Walk Xing Major Street		150 (120)	105 (84)							

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED CRWLK.	FULFILLED
150 Feet	N/E ____ ft S/W ____ ft	Yes ☐ No ☐

WARRANT 4 — School Crossings

Not Applicable ☐
See School Crossings Warrant Sheet ☐

Figure 9-1A

TRAFFIC SIGNAL WARRANTS

DIST ___ CD ___ RTE ___ PM ___

CALC WWC DATE 1-15-91
CHK ___ DATE ___

Major St: 10th ST WEST Critical Approach Speed 45 mph
Minor St: AVE M-8 Critical Approach Speed ___ mph

Critical speed of major street traffic ≥ 40 mph ..... ☒ OR
In built up area of isolated community of < 10,000 pop. ..... ☐ RURAL (R)
☐ URBAN (U)

WARRANT 1 — Minimum Vehicular Volume

100% SATISFIED Yes ☐ No ☒
80% SATISFIED Yes ☐ No ☒

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	/	/	/	/	/	/	/	Hour
			2 or more									
Both Apprchs. Major Street	500 (400)	350 (280)	600 (480)	420 (336)							676	
Highest Apprch Minor Street *	150 (120)	105 (84)	200 (160)	140 (112)							16	

* NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 2 — Interruption of Continuous Traffic

100% SATISFIED Yes ☐ No ☒
80% SATISFIED Yes ☐ No ☒

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	/	/	/	/	/	/	/	Hour
			2 or more									
Both Apprchs. Major Street	750 (600)	525 (420)	900 (720)	630 (504)							676	
Highest Apprch Minor Street *	75 (60)	53 (42)	100 (80)	70 (56)							16	

* NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 3 — Minimum Pedestrian Volume

100% SATISFIED Yes ☐ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)	U	R	/	/	/	/	/	/	/	Hour
Both Apprchs. Major Street Volume	No Median	600 (480)	420 (336)								
	Raised 4' Median	1000 (800)	700 (560)								
Ped's On Highest Volume X-Walk Xing Major Street		150 (120)	105 (84)								

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED CRWLK.	FULFILLED
150 Feet	N/E ___ ft S/W ___ ft	Yes ☐ No ☐

WARRANT 4 — School Crossings

Not Applicable ☐
See School Crossings Warrant Sheet ☐

TS-10A

AVE. M-4 & 10th ST WEST

TRAFFIC SIGNAL WARRANTS

FUTURE WITHOUT PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

RBAN _____ Rural ✓

Minimum Requirements EADT

Minimum Vehicular

Satisfied ✓ Not Satisfied ___

Number of lanes for moving traffic on each approach		13500 Vehicles per day on major street (total of both approaches)		2040 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,68[illegible]
2 or more...	1.....	9,600	6,720	2,400	1,680
2 or more...	2 or more...	9,600	6,720	3,200	2,24[illegible]
1.....	2 or more...	8,000	5,600	3,200	2,24[illegible]

Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied ___

Numbers of lanes for moving traffic on each approach		13500 Vehicles per day on major street (total of both approaches)		2040 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	12,000	8,400	1,200	85[illegible]
2 or more...	1.....	14,400	10,080	1,200	85[illegible]
2 or more...	2 or more...	14,400	10,080	1,600	1,1[illegible]
1.....	2 or more...	12,000	8,400	1,600	1,120

Combination

Satisfied ___ Not Satisfied ___

2 Warrants 2 Warrants

No one warrant satisfied but following warrants fulfilled 80% or more... ____ 1 ____ 2

TE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

STREET A 910 H ST WEST

TRAFFIC SIGNAL WARRANTS

FUTURE WITH PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

REAN _____ Rural ✓

Minimum Requirements EAST

. Minimum Vehicular

Satisfied ✓ Not Satisfied ___

Number of lanes for moving traffic on each approach		19680 Vehicles per day on major street (total of both approaches)		4700 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or more...	1.....	9,600	6,720	2,400	1,680
2 or more...	2 or more...	9,600	6,720	3,200	2,240
1.....	2 or more...	8,000	5,600	3,200	2,240

. Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied ___

Numbers of lanes for moving traffic on each approach		19620 Vehicles per day on major street (total of both approaches)		4700 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or more...	1.....	14,400	10,080	1,200	850
2 or more...	2 or more...	14,400	10,080	1,600	1,120
1.....	2 or more...	12,000	8,400	1,600	1,120

. Combination

Satisfied ___ Not Satisfied ___

No one warrant satisfied but following warrants fulfilled 80% or more... ___ ___
1 2

2 Warrants 2 Warrants

OTE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

AVE M-1 40TH ST WEST
TRAFFIC SIGNAL WARRANTS

FUTURE
WITH PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

REAN _____ Rural ✓

Minimum Requirements
ADT

. Minimum Vehicular

Satisfied ✓ Not Satisfied ___

Number of lanes for moving traffic on each approach		19100 Vehicles per day on major street (total of both approaches)		2410 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,68
2 or more...	1.....	9,600	6,720	2,400	1,68
2 or more...	2 or more...	9,600	6,720	3,200	2,24
1.....	2 or more...	8,000	5,600	3,200	2,24

. Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied __

Numbers of lanes for moving traffic on each approach		19100 Vehicles per day on major street (total of both approaches)		2410 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or more...	1.....	14,400	10,080	1,200	85
2 or more...	2 or more...	14,400	10,080	1,600	1,12
1.....	2 or more...	12,000	8,400	1,600	1,120

Combination

Satisfied __ Not Satisfied __

2 Warrants 2 Warrants

No one warrant satisfied but following warrants fulfilled 80% or more... _____ _____
1 2

TE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for **NEW INTERSECTIONS** or other locations where actual traffic volumes cannot be counted.

AVE M-8 + 10th ST WEST

TRAFFIC SIGNAL WARRANTS

FUTURE WITH PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

BAN _____ Rural ✓

Minimum Requirements EADT

Minimum Vehicular

Satisfied ___ Not Satisfied ✓

Number of lanes for moving traffic on each approach

Major Street	Minor Street	19950 Vehicles per day on major street (total of both approaches) Urban	Rural	380 Vehicles per day on higher-volume minor-street approach (one direction only) Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or more...	1.....	9,600	6,720	2,400	1,680
2 or more...	2 or more...	9,600	6,720	3,200	2,240
1.....	2 or more...	8,000	5,600	3,200	2,240

Interruption of Continuous Traffic

Satisfied ___ Not Satisfied ✓

Numbers of lanes for moving traffic on each approach

Major Street	Minor Street	19950 Vehicles per day on major street (total of both approaches) Urban	Rural	380 Vehicles per day on higher-volume minor-street approach (one direction only) Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or more...	1.....	14,400	10,080	1,200	850
2 or more...	2 or more...	14,400	10,080	1,600	1,120
1.....	2 or more...	12,000	8,400	1,600	1,120

Combination

Satisfied ___ Not Satisfied ✓

No one warrant satisfied but following warrants fulfilled 80% or more... ___ 1 ___ 2

2 Warrants 2 Warrants

TE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

AVE M-S & 10 TH WEST
TRAFFIC SIGNAL WARRANTS

FUTURE
WITHOUT PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

BAN _____ Rural ✓

	Minimum Requirements EADT			
Minimum Vehicular				
Satisfied ___ Not Satisfied ✓	12960 Vehicles per day on major street (total of both approaches)		340 Vehicles per day on higher-volume minor-street approach (one direction only)	
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 ..... / 1	8,000	5,600	2,400	1,68
2 or more... / 1	9,600	6,720	2,400	1,680
2 or more... / 2 or more...	9,600	6,720	3,200	2,24
1 ..... / 2 or more...	8,000	5,600	3,200	2,24
Interruption of Continuous Traffic	12960		340	
Satisfied ___ Not Satisfied ✓	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)	
Numbers of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 ..... / 1	12,000	8,400	1,200	840
2 or more... / 1	14,400	10,080	1,200	84
2 or more... / 2 or more...	14,400	10,080	1,600	1,12
1 ..... / 2 or more...	12,000	8,400	1,600	1,120
Combination				
Satisfied ___ Not Satisfied ✓	2 Warrants		2 Warrants	
No one warrant satisfied but following warrants fulfilled 80% or more... ___ 1 ___ 2				

TE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

Figure 9-1A

TRAFFIC SIGNAL WARRANTS

CALC [illegible] DATE 5-3-91
CHK _____ DATE _____

DIST CO RTE PM

Major St: Avenue M — Critical Approach Speed 41 mph
Minor St: SB Ramp I-14 — Critical Approach Speed 35 mph

Critical speed of major street traffic ≥ 40 mph ☒
OR
In built up area of isolated community of < 10,000 pop. ☐

☐ RURAL (R)
☐ URBAN (U)

WARRANT 1 — Minimum Vehicular Volume

100% SATISFIED Yes ☐ No ☒
80% SATISFIED Yes ☐ No ☒

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
	U	R	U	R										
APPROACH LANES	1		2 or more											
Both Apprchs. Major Street	500 (400)	350 (280)	600 (480)	420 (336)									506	+
Highest Apprch Minor Street *	150 (120)	105 (84)	200 (160)	140 (112)									70	+

* NOTE. Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 2 — Interruption of Continuous Traffic

100% SATISFIED Yes ☐ No ☒
80% SATISFIED Yes ☒ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
	U	R	U	R										
APPROACH LANES	1		2 or more											
Both Apprchs. Major Street	750 (600)	525 (420)	900 (720)	630 (504)									506	+
Highest Apprch Minor Street *	75 (60)	53 (42)	100 (80)	70 (56)									70	+

* NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 3 — Minimum Pedestrian Volume

100% SATISFIED Yes ☐ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
			U	R										
Both Apprchs. Major Street Volume	No Median		600 (480)	420 (336)										
	Raised 4' Median		1000 (800)	700 (560)										
Ped's On Highest Volume X-Walk Xing Major Street			150 (120)	105 (84)										

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED CRWLK.	FULFILLED
150 Feet	N/E _____ ft S/W _____ ft	Yes ☐ No ☐

WARRANT 4 — School Crossings

Not Applicable ☐
See School Crossings Warrant Sheet ☐

TS-10A

Factored from P.M. Peak Hr Count

Figure 9-1A

TRAFFIC SIGNAL WARRANTS

DIST ___ CO ___ RTE ___ PM ___

CALC WUC DATE 5-3-91
CHK ___ DATE ___

Major St: Auburn M — Critical Approach Speed 45 mph
Minor St: NB Ramp I-14 — Critical Approach Speed 35 mph

Critical speed of major street traffic ≥ 40 mph ☒
In built up area of isolated community of < 10,000 pop. ☐ OR ☐ RURAL (R) ☐ URBAN (U)

WARRANT 1 – Minimum Vehicular Volume

100% SATISFIED Yes ☒ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
	U	R	U	R										
APPROACH LANES	1		2 or more											
Both Apprchs. Major Street	500 (400)	350 (280)	600 (480)	420 (336)									571	+
Highest Apprch Minor Street *	150 (120)	105 (84)	200 (160)	140 (112)									259	+

* NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 2 – Interruption of Continuous Traffic

100% SATISFIED Yes ☒ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
	U	R	U	R										
APPROACH LANES	1		2 or more											
Both Apprchs. Major Street	750 (600)	525 (420)	900 (720)	630 (504)									571	+
Highest Apprch Minor Street *	75 (60)	53 (42)	100 (80)	70 (56)									259	+

* NOTE: Heavier of left turn movement from Major Street included when LT-phasing is proposed ☐

WARRANT 3 – Minimum Pedestrian Volume

100% SATISFIED Yes ☐ No ☐
80% SATISFIED Yes ☐ No ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)													Hour
		U	R											
Both Apprchs. Major Street Volume	No Median	600 (480)	420 (336)											
	Raised 4' Median	1000 (800)	700 (560)											
Ped's On X-Walk Xing Major Street	Highest Volume	150 (120)	105 (84)											

IF MIDBLOCK SIGNAL PROPOSED ☐

MIN. REQUIREMENT	DISTANCE TO NEAREST ESTABLISHED CRWLK.	FULFILLED
150 Feet	N/E ___ ft S/W ___ ft	Yes ☐ No ☐

WARRANT 4 – School Crossings

Not Applicable ☐
See School Crossings Warrant Sheet ☐

TS-10A

Factored from P.M. Peak Hour Counts

Ave M & SB Ramps I-41

TRAFFIC SIGNAL WARRANTS

FUTURE Without PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

RBAN _____ Rural ✓

Minimum Requirements EADT

.. Minimum Vehicular

Satisfied ___ Not Satisfied ✓

Number of lanes for moving traffic on each approach		9000 Vehicles per day on major street (total of both approaches)		1240 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or more...	1.....	9,600	6,720	2,400	1,680
2 or more...	2 or more...	9,600	6,720	3,200	2,240
1.....	2 or more...	8,000	5,600	3,200	2,240

. Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied __

Numbers of lanes for moving traffic on each approach		9000 Vehicles per day on major street (total of both approaches)		1240 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or more...	1.....	14,400	10,080	1,200	850
2 or more...	2 or more...	14,400	10,080	1,600	1,120
1.....	2 or more...	12,000	8,400	1,600	1,120

. Combination

Satisfied __ Not Satisfied ✓

2 Warrants 2 Warrants

No one warrant satisfied but following warrants fulfilled 80% or more... No (1) Yes (2)

OTE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

Ave M & SB Ramps I-40

TRAFFIC SIGNAL WARRANTS

FUTURE WITH PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

RBAN _____ Rural ✓

Minimum Requirements EADT

. Minimum Vehicular

Satisfied ___ Not Satisfied ✓

Number of lanes for moving traffic on each approach		12,500 Vehicles per day on major street (total of both approaches)		1410 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,6[illegible]
2 or more...	1.....	9,600	6,720	2,400	1,6[illegible]
2 or more...	2 or more...	9,600	6,720	3,200	2,240
1.....	2 or more...	8,000	5,600	3,200	2,2[illegible]

. Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied ___

Numbers of lanes for moving traffic on each approach		12500 Vehicles per day on major street (total of both approaches)		1410 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rura[illegible]
1.....	1.....	12,000	8,400	1,200	8[illegible]
2 or more...	1.....	14,400	10,080	1,200	8[illegible]
2 or more...	2 or more...	14,400	10,080	1,600	1,1[illegible]
1.....	2 or more...	12,000	8,400	1,600	1,1[illegible]

. Combination

Satisfied ___ Not Satisfied ✓

2 Warrants 2 Warrants

No one warrant satisfied but following warrants fulfilled 80% or more... No 1 Yes 2

OTE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

Avenue M & N.B. Ramps I-14

TRAFFIC SIGNAL WARRANTS

FUTURE Without PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

URBAN _____ Rural ✓

Minimum Requirements EADT

1. Minimum Vehicular

Satisfied ✓ Not Satisfied ___

Number of lanes for moving traffic on each approach		10,270 Vehicles per day on major street (total of both approaches)		4420 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	8,000	5,600	2,400	1,680
2 or more...	1.....	9,600	6,720	2,400	1,680
2 or more...	2 or more...	9,600	6,720	3,200	2,240
1.....	2 or more...	8,000	5,600	3,200	2,240

2. Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied ___

Numbers of lanes for moving traffic on each approach		10,270 Vehicles per day on major street (total of both approaches)		4420 Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street	Minor Street	Urban	Rural	Urban	Rural
1.....	1.....	12,000	8,400	1,200	850
2 or more...	1.....	14,400	10,080	1,200	850
2 or more...	2 or more...	14,400	10,080	1,600	1,120
1.....	2 or more...	12,000	8,400	1,600	1,120

3. Combination

Satisfied ___ Not Satisfied ___

No one warrant satisfied but following warrants fulfilled 80% or more... ____ 1 ____ 2

2 Warrants 2 Warrants

NOTE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for **NEW INTERSECTIONS** or other locations where actual traffic volumes cannot be counted.

Avenue M & NB Ramps I-10

TRAFFIC SIGNAL WARRANTS

FUTURE With PROJECT

(Based on Estimated Average Daily Traffic - See Note 2)

RBAN _____ Rural ✓

	Minimum Requirements EADT			
	15,000 Vehicles per day on major street (total of both approaches)		5030 Vehicles per day on higher-volume minor-street approach (one direction only)	
. Minimum Vehicular Satisfied ✓ Not Satisfied ___ Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1..... / 1.....	8,000	5,600	2,400	1,68
2 or more... / 1.....	9,600	6,720	2,400	1,68
2 or more... / 2 or more...	9,600	6,720	3,200	2,240
1..... / 2 or more...	8,000	5,600	3,200	2,24
. Interruption of Continuous Traffic Satisfied ✓ Not Satisfied ___ Numbers of lanes for moving traffic on each approach	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)	
Major Street / Minor Street	Urban	Rural	Urban	Rural
1..... / 1.....	12,000	8,400	1,200	850
2 or more... / 1.....	14,400	10,080	1,200	85
2 or more... / 2 or more...	14,400	10,080	1,600	1,12
1..... / 2 or more...	12,000	8,400	1,600	1,120
. Combination Satisfied ___ Not Satisfied ___ No one warrant satisfied but following warrants fulfilled 80% or more... ___ 1 ___ 2	2 Warrants		2 Warrants	

OTE:

1. Left turn movements from the major street may be included with minor street volumes if a separate signal phase is to be provided for the left-turn movement.

2. To be used only for **NEW INTERSECTIONS** or other locations where actual traffic volumes cannot be counted.

APPENDIX I

CULTURAL RESOURCE SURVEY OF THE PROPOSED ANTELOPE VALLEY BUSINESS PARK CITY OF PALMDALE, CALIFORNIA

Prepared for

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RECON NUMBER 2262A
JANUARY 18, 1991

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FIGURES

1: Project vicinity map 2
2: Project location as shown on the 7.5 minute U.S.G.S. map 3

I. INTRODUCTION

In response to a proposal to develop the Antelope Valley Business Park property, RECON archaeologists conducted a pedestrian survey of 40 acres of the proposed project area (Figures 1 and 2). The purpose of the survey was to locate and record any cultural resources not previously identified or investigated. No cultural resources were recorded as a result of this survey.

Institutional site record searches were requested from the Archaeological Survey Institute at the University of California, Los Angeles. These searches indicate that no prehistoric or historic era cultural resources have been recorded on the property.

The 40-acre survey was conducted on November 6, 1990 by RECON archaeologists. No prehistoric or significant historic era resource sites or isolates were encountered on the 120-acre property. Two historic era trash scatters were examined and one warrants further archaeological work. While only recent (post-1940s) historic materials were observed on the surface, it is possible that earlier materials could be located subsurface. For this reason monitoring the topsoil removal and grading in the immediate area of the scatter is recommended.

II. PREVIOUS INVESTIGATIONS

Three cultural resource surveys have been conducted within portions of the proposed Antelope Valley Business Park; Love 1988, Norwood 1989, and Love 1989 (University of California, Los Angeles [UCLA] 1990). One, Love 1988, was a survey for the Avenue M right-of-way adjacent to the project's northern boundary and included some areas within the proposed project along this boundary. The other two were conducted specifically for the Antelope Valley Business Park project.

The survey of the Avenue M right-of-way by Love in 1988 encountered no cultural resources within the project property (UCLA 1990). The survey of a 50-acre parcel in the southern portion of the Antelope Valley Business Park by Norwood in 1989 was also negative, no cultural resources were found within the proposed project boundaries (UCLA 1990).

During Love's 1989 survey he covered the northern 80 acres of the currently proposed 120-acre project area. Within this area he encountered no prehistoric cultural resources. He did locate two areas of scattered trash, one in a small drainage west of the Amargosa drainage, and the second in the southwest portion of the 1989 survey area. Love describes both of these scatters as ". . . too recent to be considered 'historical'," (Love 1989:4). Since no resources were found which required investigation, Love determined that the proposed Antelope Valley Business Park would not impact on cultural resources.

III. SUBJECT INVESTIGATION

The investigation of the subject property by RECON archaeologists covered the 40 acres at the southern portion of the 120-acre property. Additional investigations at this time included a check of the two trash scatters located by Love in 1989. The RECON investigation was conducted on November 6, 1990.

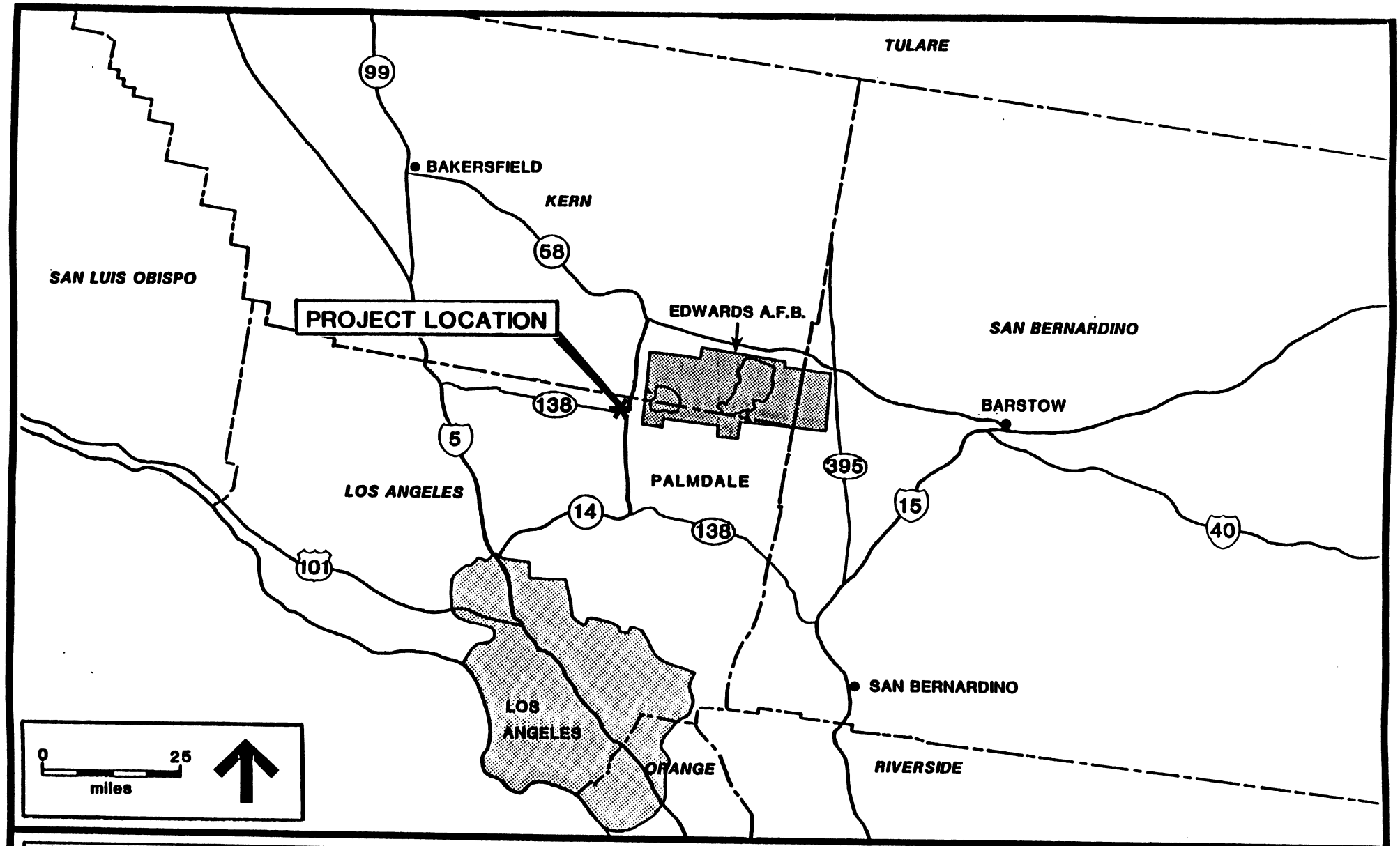

FIGURE 1. THE LOCATION OF THE PROPOSED PROJECT RELATIVE TO THE COUNTY OF LOS ANGELES

R-2262A 11/90

RECON

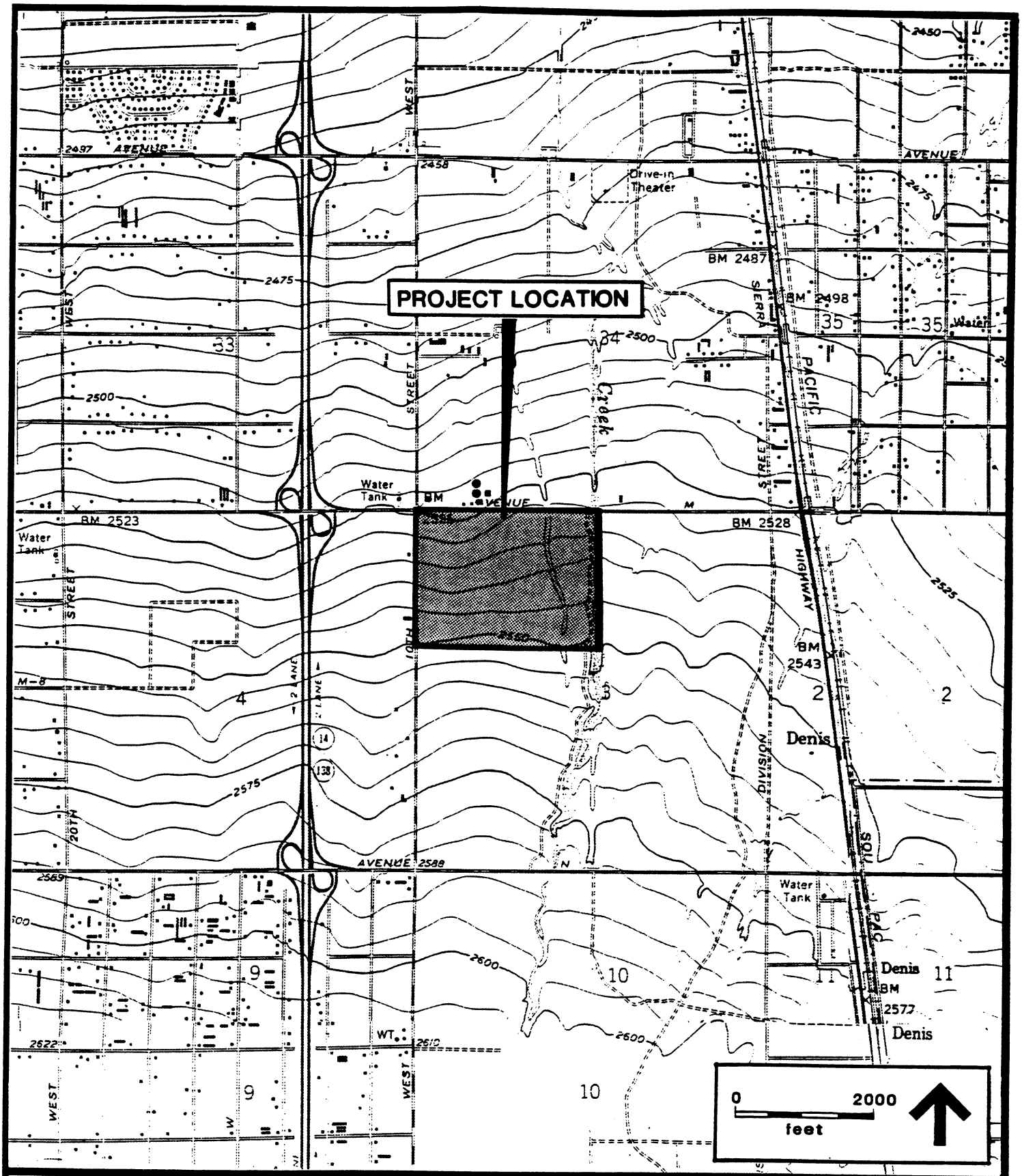

FIGURE 2. PROJECT LOCATION ON U.S.G.S. 7.5 MINUTE TOPOGRAPHIC MAPS, LANCASTER EAST, LANCASTER WEST, PALMDALE, AND RITTER RIDGE QUADRANGLES

RECON

R-2262A 11/90

The 40-acre survey was conducted by two archaeologists walking at 5 to 10-meter transect intervals, beginning at the eastern edge and working to the west then returning until the project had been covered. The sparse ground cover allowed excellent visibility. No prehistoric or historic cultural resources were found during the survey of the southern 40-acre portion.

Following the survey the crew inspected the two trash scatters reported by Love. The trash scatters are in different physical settings. One is within a drainage channel which parallels the Amargosa Drainage. The second is on an open flat at the approximate west central edge of the 120-acre project. Neither of the two scatters showed indications of depth greater than 20 centimeters below the surface.

The drainage channel contains a scatter of items along almost its entire length within the project area. The items are from three broad functional categories: automotive, household, and consumer. The identified automotive items include 4 to 5 metal one-quart oil cans having the brand names of Signal, Pennzoil, and Sta-Lube, 3 Atlas tires, and 6 to 8 deteriorated rubber hoses. Household items include broken glassware, none of which is manganese glass, 4 to 6 solid color enamelware items such as a plate, bowl, sauce pan, and a colander, and up to 20 pieces of assorted broken "china" without maker's marks. Identified consumer items include 50 to 100 beer cans of two types. The most common having aluminum ends and disposable pull tabs, the other has tin ends and requires an opener. There are 100 to 150 brown glass beer bottles with crowns for twist off caps. Brand names identified were Brown Derby, Lucky, both embossed, and paper label bottles from Coors, Budweiser, and Michelob. Other identified consumer items were 4 broken bleach bottles, 10 to 12 coffee cans, 3 soft drink mix bottles, 3 Pepsi and 2 Coca Cola bottles, 12 to 14 embossed and paper labeled Heinz catsup bottles and 7 to 10 sardine cans. All of the totals given are approximate and based on cursory inspection.

A general date of circa 1955 to present is suggested. This is based on the condition of the items and the known dates for some (such as aluminum top beer cans). These were introduced in the late 1950s and combined with the popularity of twist off bottle caps introduced sometime afterward, tend to support such an estimation.

The second trash scatter is in the open flat and appears to be dispersed over a wide area. Whether scattered upon original deposition, by wind or other subsequent disturbance is not clear. The items within this scatter are among two functional categories, consumer and household. Consumer items include 4 embossed Heinz catsup bottles, 20 to 30 condensed milk cans, 40 to 50 beer cans of the types mentioned above, 6 sardine cans, 8 to 12 tobacco tins with hinged lids, and 16 to 20 vegetable or fruit cans. One of the fruit cans has an embossed top with a solder hole in the bottom. It has been opened with a knife on the embossed end. Interestingly, the can's basic construction is typical of a double seam sanitary can (Berryman 1983:59-61). The other 15 to 19 cans are of the standard sanitary type. Household items include 4 "china" fragments without marks and 1 fragment with a mark. The single fragment was collected for identification of the maker's mark. The maker is listed as the C.C. Thompson Pottery Co. East Liverpool, OH U.S.A., the use of the mark is described as for a semivitreous tableware. The mark was used from 1916 to 1938 when the company went out of business (Kovel and Kovel 1986:214).

This westernmost trash scatter appears older than the scatter in the drainage described above. Although no diagnostic artifacts other than the dated tableware fragment have been found within this shallow scatter, the absence of automotive items and legible product labels tends to support this conclusion. Furthermore, the 1915 USGS 15-minute topographic map of the Elizabeth Lake quadrangle shows a structure near this scatter.

Richard Norwood recorded historic site CA-LAn-1692H based on an historic map location and features identified in the field (University of California, Los Angeles Record Search). Norwood found the site to be not significant and made no further recommendations (Gomes, pers. comm., 12/20/90). He noted a number of household artifacts and hardware items which he determined were not older than 50 years, in addition to a concrete pad and well cap (Gomes, pers. comm. 12/20/90). Such a general date is consistent with the age estimate for the westernmost trash scatter.

IV. CULTURAL BACKGROUND

A. PREHISTORY

The following prehistoric culture information was taken from Love (1989:4-5).

> The ethnic identities and language groups of the prehistoric peoples in the areas surrounding the Antelope Valley, but not for the interior of the valley itself are known from historical sources and early ethnological studies. In the peripheral areas there were, and still are in some cases, the Tataviam in the Leona Valley/Santa Clarita Valley region (King and Blackburn 1978), the interior Chumash of the Frazier Park and Gorman mountains (Grant 1978), the Kitanemuk of the Tehachapis (Blackburn and Bean 1978), the Kawaiisu of the desert regions east of the Tehachapis and southern Sierras (Kroeber 1925, Bean and Smith 1978). But for the wide expanse of desert in between there were very few early Spanish visitors or later anthropological surveys to inform us of the desert cultures of that area. Today, there are no Native American groups claiming descent from inhabitants of the Antelope Valley.
>
> Sutton (1987:79) has suggested a "proto-Kitanemuk" (see also Blackburn and Bean 1978) occupation for most of the Antelope Valley, perhaps with a Tataviam occupation (see also King and Blackburn 1978) in the area of present day Palmdale. But there is mounting evidence for a Serrano or Vanyume affiliation (the Indians of the Mojave River and San Bernardino Mountain areas) based on a tentative Serrano occupation of Big Rock Creek and Little Rock Creek during protohistoric times (Kroeber 1925:616) coupled with Serrano style rock art found at Big Rock Creek and Lake Los Angeles (Charles LaMonk, personal communication), and recent ethnohistorical research into the early Spanish accounts for this area (David Earle 1988).

B. HISTORY

The following historic era cultural information was taken from Ritz (1989:4-5).

The Spanish period spans the years 1540 to 1822. There are no documented activities during this period that may have resulted from Spanish exploration of the area. Pedro Fages may have entered the Antelope Valley while searching for deserters in 1772 and 1773. Jesuit Friar Francisco Garces explored routes to the San Gabriel Mission across the Mojave in 1775 and 1776. No sites or locations have been identified with these explorations.

During the Mexican period (1822 to 1846), most desert activities followed the patterns established during the Spanish period. With the exception of a commercial pack train from Santa Fe to Los Angeles, established by Antonio Armijo in 1830, most exploits in the Mojave Desert during the Mexican period were made by Americans interested in trapping.

The American phase dates from 1846 to the present. A growing number of Americans traveled the Mojave Desert in the 1840s on their way to the west coast. During the 1850s, as the population of California grew and the movement to build a transcontinental railway gained popularity, numerous railway surveys were undertaken, in particular one along the 35th parallel. Nearly all surveys turned southwest at Barstow to head into Los Angeles via Cajon Pass (Coombs 1979:23, Von-Till Warren and Roske 1981:171-177). In the late 1860s and 1870s, mining in the desert reached major proportions. New discoveries of gold and silver were made in areas north and northeast of Antelope Valley. These activities stimulated further railroad development.

The joint trends of growth in desert mining areas and railroad construction continued through the 1880s, with development in the mining of mineral ores and the appearance of new rail lines. For the Antelope Valley, these trends meant substantial new growth. Lancaster, Palmdale, and Rosamond were founded as a result of the railroad from Tehachapi to Los Angeles. Irrigation projects were undertaken, dry farming techniques were introduced, utopian communities sprung up, and land speculation in the Antelope Valley became more attractive. Cattle and sheep ranching were common in the region during the late 1800s and early 1900s. The drought years, from 1893 to 1904, brought a constriction in growth to the Antelope Valley, but farmers responded by drilling wells and pumping water into earthen reservoirs. Water was only a few hundred feet below the surface, and combined with improved rainfall after 1905, the production of alfalfa became a major industry (Greenwood and McIntyre 1980:128-129; Stickel and Weinman-Roberts 1980:170).

V. CONCLUSIONS AND RECOMMENDATIONS

Three cultural resource surveys have been conducted for the proposed Antelope Valley Business Park. Two surveys performed by Pyramid Archaeology of Palmdale found no prehistoric or significant historic cultural resources within the project area (Love 1989:4; UCLA Record Search). The third survey was performed by RECON and also found no prehistoric or significant historic cultural resources within the project area. Site record searches indicate that one historic structure site, CA-LAn-1692H was recorded on the west side of 10th Street West, at the west edge of the project and approximately 100 meters from one of the trash scatters located within the project area.

Based on the results of the surveys and the record search results, no archaeological testing is necessary. However, it is possible that the westernmost trash scatter and site CA-LAn-1692H are contemporary. Neither trash scatter location appears to warrant further archaeological study based on surface indications alone. However, it is possible that additional earlier materials could be uncovered during grading. In light of this possibility, it is recommended that monitoring of the topsoil removal by a professional archaeologist be a condition of project approval.

A professional archaeologist should attend the pre-grade meeting and be present during grading in the trash scatter areas. Should additional early materials be uncovered grading will halt in the area to allow recovery of a representative sample. Material recovered will be analyzed and a report prepared documenting the findings. If these measures are completed, no significant impacts to cultural resources will occur as a result of development of the Antelope Valley Business Park.

VI. PROJECT STAFF

Sue A. Wade	Senior Archaeologist
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Kristina A. Winchester	Field Archaeologist
Harry J. Price	Technical Illustrator
Stacey Tomlinson	Production Specialist

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APPENDIX J

PALEONTOLOGIC RESOURCES ASSESSMENT
120 ACRE PARCEL, SOUTH OF LANCASTER
LOS ANGELES COUNTY, CALIFORNIA

PREPARED FOR:

RECON
7460 MISSION VALLEY ROAD
SAN DIEGO, CALIFORNIA 92108

PREPARED BY:

RMW PALEO ASSOCIATES
23352 MADERO, SUITE J
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RODNEY RASCHKE
CERTIFIED PALEONTOLOGIST

11 DECEMBER 1990

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INTRODUCTION

This report presents the results of RMW Paleo Associates' paleontological resources assessment of a rectangular parcel of approximately 120 acres situated in T6N, R12W, NW 1/4 of Section 3 south of Lancaster, Los Angeles County, California. It is bounded by Avenue M on the north, 10th Street on the west, open ground south, and a seasonal creek drainage on the east (Figure 1).

The locality records of the Los Angeles County Museum of Natural History (which includes California Institute of Technology data) and the San Bernardino County Museum were reviewed. Pertinent paleontologic and geologic literature, including but not limited to, a previous environmental impact study done in the immediate vicinity were reviewed. A field survey of the property was conducted 24 November 1990 by Mr. B. Patrick Heald and Ms. Diana Weir of RMW Paleo Associates.

FIELD SURVEY

The study site is relatively flat and typical of alluvial fan deposits found throughout the area. The vegetation ranges from scrub with sparse grasses to scrub and occasional Joshua Trees on the western part of the property. Recent alluvium was observed throughout the site. Observations along the east end of the site revealed a three foot vertical section that was scoured into the recent alluvium. The underlying older alluivum was not exposed in the scoured channel. No fossils were observed during the survey.

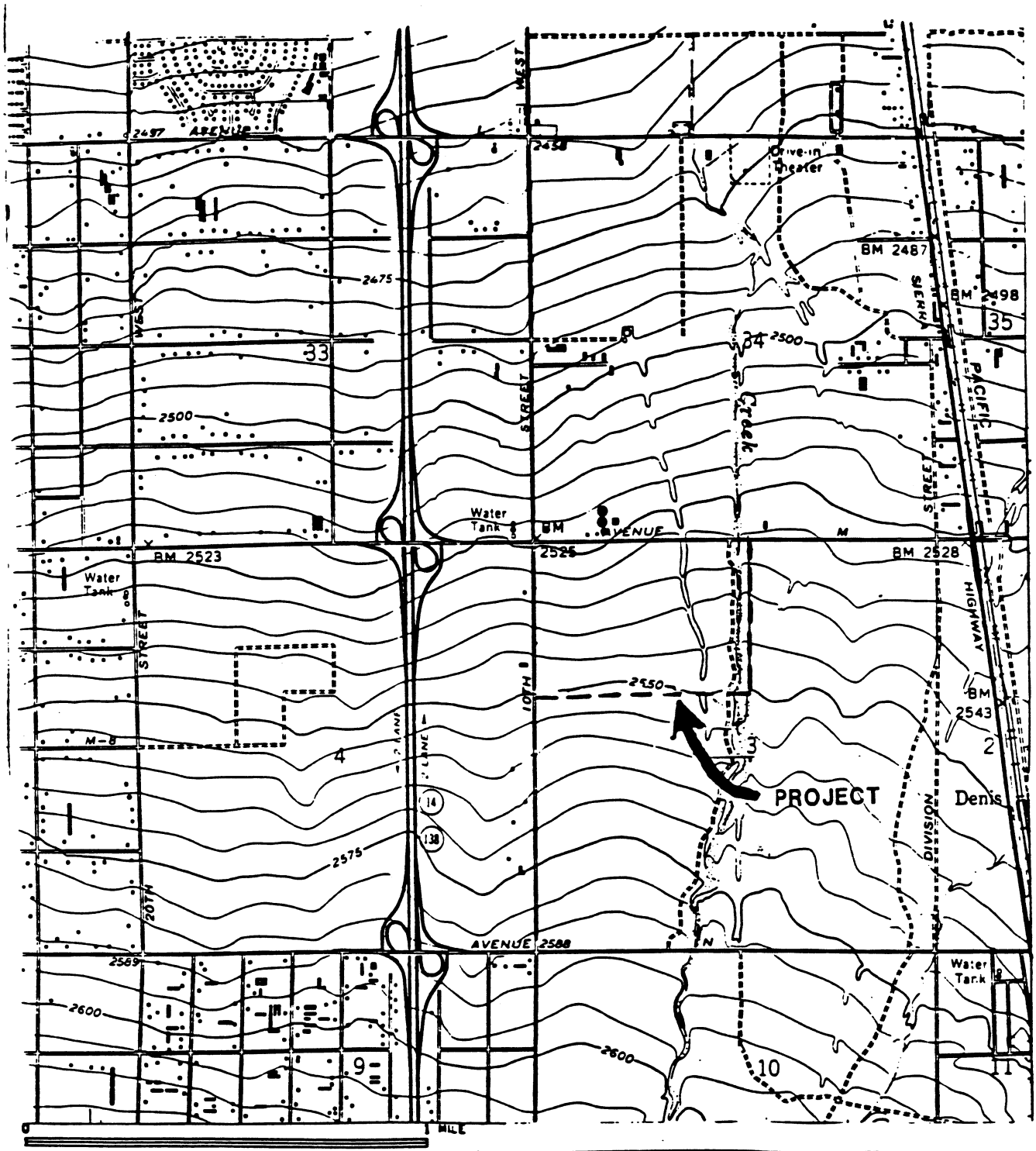

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FIGURE 1. INDEX MAP
APPROXIMATE LOCATION OF STUDY PARCEL
USGS 7.5 MIN. LANCASTER WEST 1958
PHOTOREVISED 1974

STRATIGRAPHY

The stratigraphy and geology followed in this report are from Dibblee (1967) and Bortugno and Spittler (1986). The geologic units in the area as well as their geographic distribution have been influenced by the San Andreas and associated faults. The only stratigraphic unit exposed on the site is recent alluvium of undetermined thickness. Others have reported that the recent alluvium exposed in excavations is a thin veneer underlain by older Pleistocene alluvial fan deposits. Since the study site appears to be part of a larger alluvial fan, it can be assumed that similar conditions exist. A thin residual soil mantle has developed over portions of the study area.

Pleistocene to Recent Alluvium (Qoa & Qal)

The alluvium (Pleistocene to Recent; approximately 1.8 million years to present) was laid down primarily as a piedmont or plane at the base of, and derived directly from, the San Gabriel Mountains (Noble, 1953). Although no fossils have been found within the study parcel,

> "Several important Pleistocene ("Ice Age") fossil faunas, all correlative of the Rancholabrean North American Land Mammal Age, (circa 10000 - 400,000 years ago), have been recovered near this study area. The specimens in our collections from these terrestrial units include animals such as mammoth, mastodon, camel, horse, bison, birds and reptiles. For this reason, all surficial excavations should be expected to occasionally produce Pleistocene fossils." (Diveley-White 1990).

Sediments mapped as alluvium of this age elsewhere within the Mojave Desert have yielded Pleistocene terrestrial vertebrate fossils (Woodburne and Golz, 1972; Reynolds, 1989; Jefferson, 1989). Two paleontologic resource localities where Pleistocene mastodon have been recovered are relatively close to the study parcel. One mastodon occurrence is located to the southwest on Avenue S; the other was located north of Lancaster near Sierra Highway. Important small vertebrates including fish, amphibians,

reptiles, birds, and mammals, have been located near Avenue E and Sierra Highway in Lancaster. This indicates that Pleistocene Lake Thompson was very extensive, according to Robert E. Reynolds (San Bernardino County Museum 1990). However the recent alluvial veneer masks any evidence of lake sediments within the site.

CONCLUSIONS AND PALEONTOLOGICAL SENSITIVITIES

Due to the thin nature of the Recent alluvium, it does not have an affect on the paleontological potential of the site. Because of the presence of numerous vertebrate fossils near the site, the Pleistocene alluvial deposits are considered to have a moderate to high potential for the future discovery of significant fossils. Grading operations associated with the development of the site are likely to expose and destroy these fossils. This would represent an adverse impact on the region's paleontological resources. The adverse impact would result from the destruction of information in the timing of events that shaped the region and the biologic history of the region. Proper mitigation measures can reduce the adverse impact of development to an acceptable level.

MITIGATION MEASURES

The following measures can reduce the adverse impact of development to an accepable level. These measures have protected paleontological resources while allowing the timely completion of paleontological resources at numerous developments in southern California.

1. A qualified paleontologist shall be retained to perform inspections of the site during grading. Initially, inspections should be half-time, if fossils are located it should be full-time.

2. Matrix samples may be collected at the discretion of the paleontologist during grading. These materials can be stockpiled to one side of the project so not to delay development activity.
3. The paleontologist should have the power to temporarily divert or direct grading to facilitate evaluation, and if necessary, salvage of any exposed fossils.
4. Any matrix samples collected, should be processed at the Los Angeles County Museum, or another facility, for microfossils.
5. Any fossils collected should be identified and donated to a public institution with a research and/or educational interest in the materials, such as the Los Angeles County Museum or the San Bernardino County Museum.
6. A final report summarizing findings, including an itemized inventory and contextual stratigraphic data, should accompany the fossils to the designated repository with an additional copy sent to the appropriate Lead Agency.

If you have any questions, or if we can be of further assistance, please contact us.

Respectfully,

B. Patrick Heald
Geologist

Rodney E. Raschke
Certified Paleontologist

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