County of Los Angeles Department of Regional Planning, "Valencia Commerce Center Environmental Impact Report, Geotechnical Information" (April 1990)

III. ENVIRONMENTAL IMPACTS

A. Potential Significant Effects

1. Geotechnical

This section is a summary of the soils and geologic reports which have been prepared for the project site. Reports for the site include: "Geologic Report for Hasley Industrial Park", September 12, 1986 prepared by Allan E. Seward Engineering Geology, Inc.; and "Report of Foundation Investigation", March 12, 1986, and "Report of Soil Investigation", October 7, 1986, prepared by R.T. Frankian and Associates; "Geologic Report, Revised Tentative Parcel Map 18229", November 5, 1987 prepared by Allan E. Seward Engineering Geology, Inc.; "Addendum No. 3, Response to County Comments Tentative Parcel Map No. 18229", November 10, 1987 prepared by R.T. Frankian and Associates; "Addendum No. 4, Response to County Comments P.M. No. 18229", March 4, 1988 prepared by R.T. Frankian and Associates; "Geologic Report for Vesting Tentative Parcel Map 19784, Valencia Commerce Center", August 4, 1989 prepared by Allan E. Seward Engineering Geology, Inc.; and "Report of Geotechnical Investigation, Tentative Tract 19784, Hasley Industrial Center", August 11, 1989 prepared by R.T. Frankian and Associates. These studies are on file with the County of Los Angeles, Department of Regional Planning.

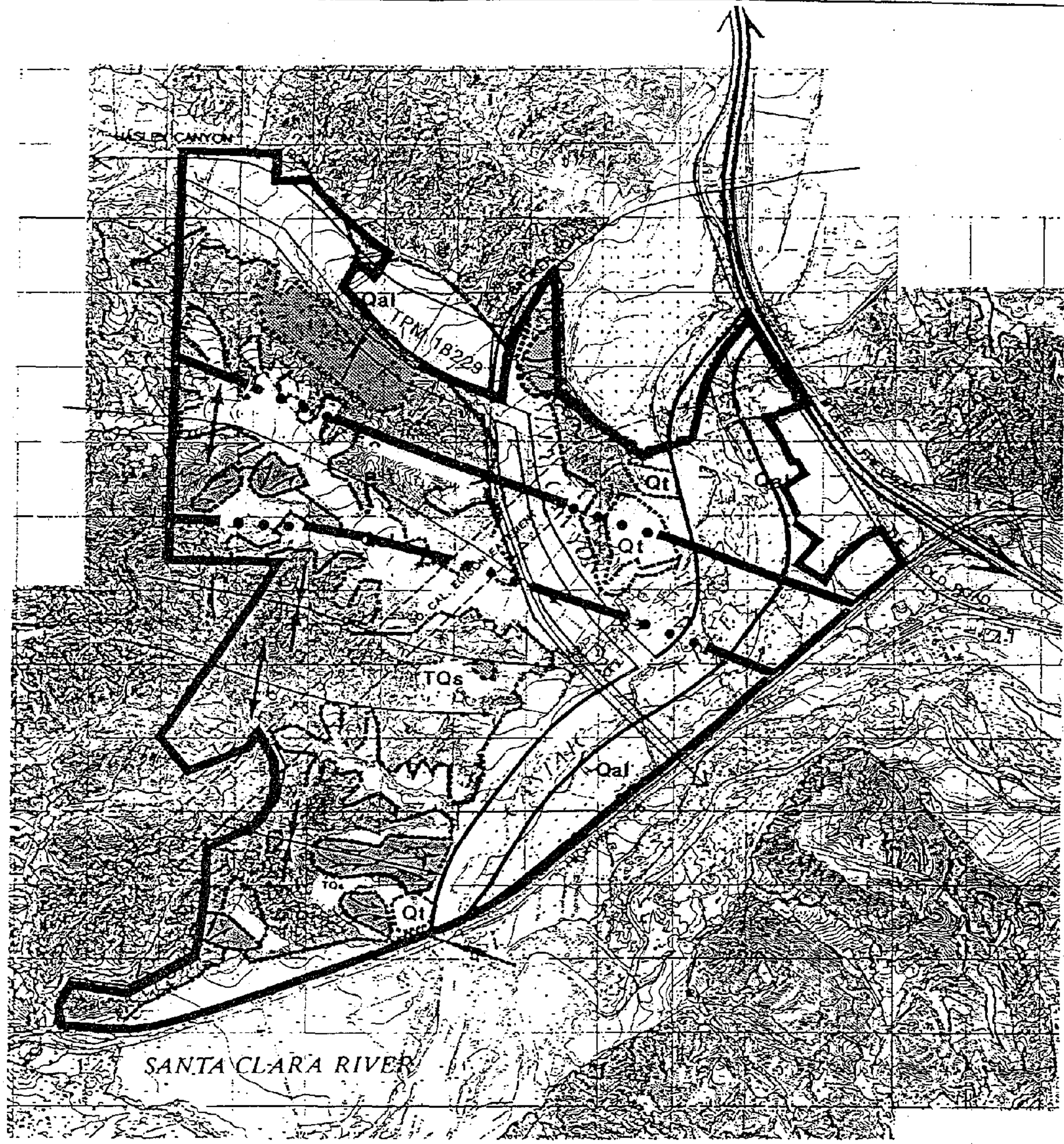
1.1 Environmental Setting

1.1.1 Earth Materials

The site is underlain by sedimentary bedrock of the Saugus Formation (see Geologic Map, Figure III-1A). This bedrock consists of sandstones, siltstones, and conglomerates. Overlying the bedrock are terrace deposits, alluvium, slopewash and artificial fill. Terrace deposits which consist of slightly consolidated sandstones, siltstones, and conglomerates form many of the flat-topped ridges. Alluvium consisting of silty sands, sands and gravels is located in canyon bottoms, Castaic Creek, and the alluvial flat east of Castaic Creek.

Reddish-brown clayey siltstone lenses in the Saugus formation are potentially expansive. Alluvial soils are nonexpansive and poorly to moderately consolidated to depths of 6-10 feet.

Portions of the site within the flood plains of Castaic Creek and Santa Clara River are designated under the State Surface Mining and Reclamation Act of 1975



LEGEND

LANDSLIDE

ANTICLINE

SYNCLINE

GEOLOGIC CONTACT

HOLSER FAULT
North and South Branch

Qal RECENT ALLUVIUM

Qt QUATERNARY TERRACE

TQs SAUGUS FORMATION

Geologic Map

VALENCIA
COMMERCE CENTER
VALENCIA COMPANY

SIKAND
Engineering
Planning
Surveying

FIGURE
III-1A

(SMARA) as MRZ-2, Sector A, areas containing aggregate resources of regional significance. Quarrying and utilization of this material (sand and gravel) in the past created erosion problems. As a result, the County's Road Department, Flood Control District and CALTRANS cited the area utilized as an aggregate mining resource for erosion dangers. Pursuit of these resources as a marketable product was ended approximately 20 years ago.

1.1.2 Geologic Structure and Landslides

The Hasley Canyon area has been deformed over the geologic past to produce a series of northwesterly trending anticlines and synclines (see Figure III-1A). The folded nature of the bedding planes has led to landslides, particularly where past stream erosion daylighted bedding planes. There are approximately 11 landslides on the site covering a total area of approximately 72 acres (see Figure III-1A). Phase I includes three landslides, covering a total area of approximately 37 acres.

1.1.3 Seismicity

Two branches of the Holser Fault traverse the central portion of the Hasley Industrial Center, including a portion of Phase I (see Figure III-1A). Existing data indicates that the Holser Fault has not caused surface rupture in Holocene time; therefore, it is not an active fault[1] as defined by the State of California.

The Holser Fault is classified as potentially active by Los Angeles County. Recent subsurface exploration on the Holser Fault noted no offset of Holocene sediments.

The site is subject to shaking and associated ground motions from earthquakes on nearby and distant faults, which is characteristic of all Southern California. Neither the time, location, or magnitude of an earthquake can be accurately predicted at this time. However, assumptions have been made to evaluate potential ground shaking at the subject site, (see Appendix G). Based on these assumptions, the following active faults could have an impact on the subject site: (see Figure III-1B for fault locations)

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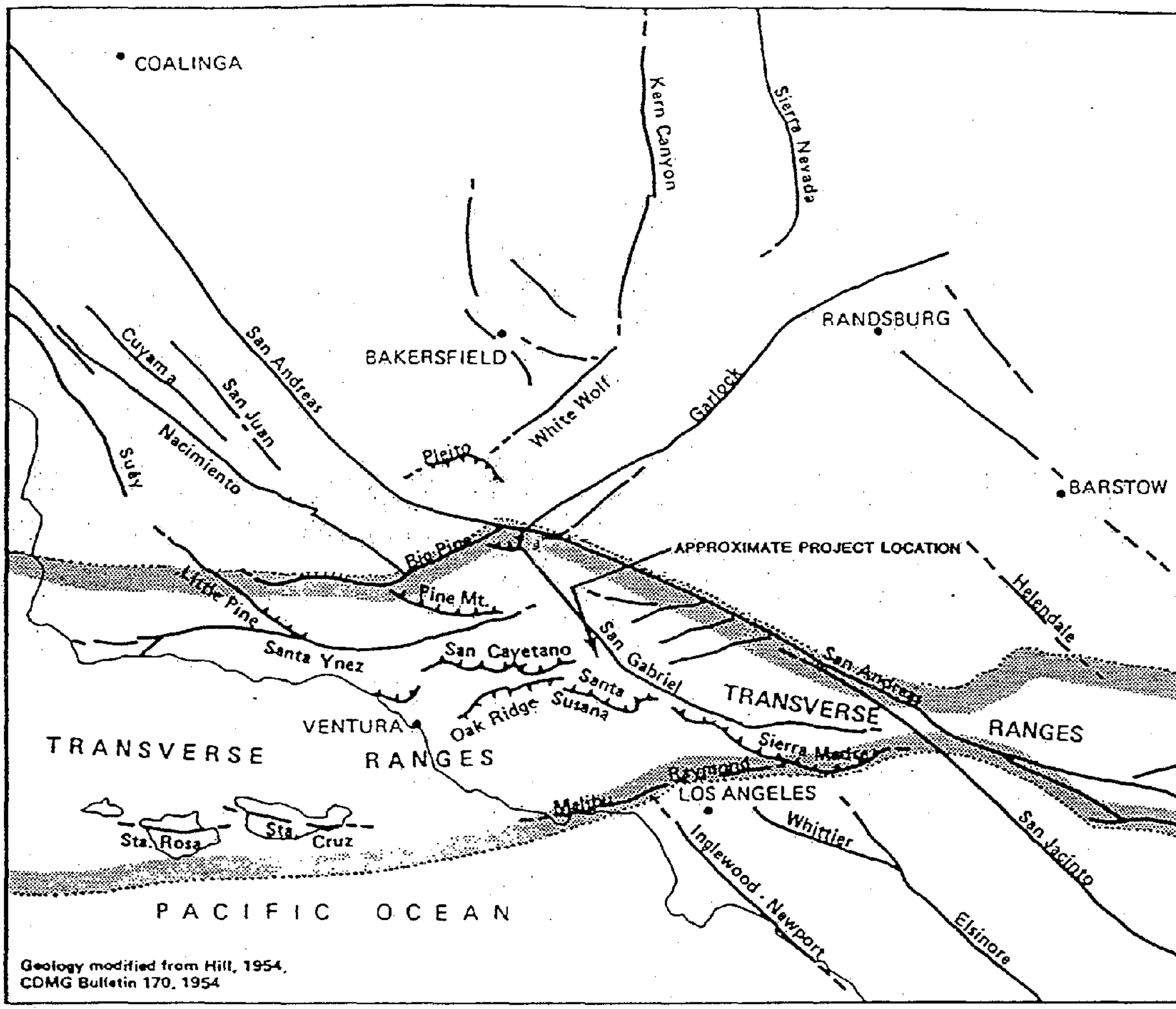
1 California State Law (Alquist-Priolo Special Studies Zone Act of 1972) defines an active fault as one which has had surface displacement within Holocene time (last 11,000 years).



SOURCE: CDMG Bulletin 170, 1954.

Regional Fault Locations

NOT TO SCALE

VALENCIA COMMERCE CENTER

VALENCIA COMPANY

SIKAND Engineering Planning Surveying

FIGURE III-1B

1. San Andreas Fault
2. San Fernando/Santa Susanna/Sierra Madre Fault Zone
3. San Gabriel Fault

The maximum credible earthquake is defined as "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" (California Division of Mines and Geology (CDMG), 1975). Maximum credible magnitudes are shown in Table III-1A, Geo-Seismic Parameters.

The maximum probable earthquake is defined (CDMG - 1975) as "the maximum earthquake that is likely to occur during a 100-year interval". Maximum probable magnitudes are shown in Table III-1A. A maximum probable magnitude is not given for the San Gabriel Fault. A seismic event along the San Gabriel Fault is not considered likely in the next 100 years[1].

Table III-1A summarizes the horizontal peak bedrock accelerations that could be anticipated on the subject site. There is currently a 60% probability of a major earthquake along the San Andreas Fault system in Southern California during the next 30 years (USGS OF 81-115). The ground motions generated by a major seismic event along the San Andreas Fault will be the controlling factor in the design of structures within the subject site. (See Appendix G for definition of terms.)

Many studies have indicated that a single peak acceleration of a seismic event is not indicative of the associated ground motion[2]. Therefore, the peak acceleration is of little value in structural design. Studies by Ploessel (1974) indicate that the Repeatable High Ground Acceleration (RHGA) will more closely approximate a "design acceleration" than a maximum peak acceleration. The RHGA is calculated as 65% of the peak bedrock acceleration (see Table III-1A).

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1 Source: Letter from Allan E. Seward Engineering Geology, Inc. to Valencia Company dated February 13, 1989

2 Report by State Geologist, Dr. James E. Slosson, 1974, California Geology, "Repeatable High Ground Associations from Earthquakes - Important Design Criteria".

TABLE III-1A
Geo-Seismic Parameters

Classification	Fault	Distance To Fault (km)	Maximum Historical Earthquake Magnitude	Estimated Maximum Earthquakes: Maximum Credible Magnitude	Estimated Maximum Earthquakes: Maximum Probable Magnitude	Peak Bedrock Acceleration*** At Subject Site: Maximum Credible	Peak Bedrock Acceleration*** At Subject Site: Maximum Probable	RHGA Peak Bedrock Acceleration*** At Subject Site: Maximum Credible	RHGA Peak Bedrock Acceleration*** At Subject Site: Maximum Probable
Active	San Andreas	33*	8.0+0.5 (1875)	8.25	8.25	0.62+	0.62+	0.40+	0.40+
Active	San Fernando, Santa Suzanna, Sierra Madre Fault Zone	13*	6.4 (1971)	7.7	6.4	0.6	0.4	0.39	0.26
Active	San Gabriel	15**	---(1)	6.6	---(2)	0.5	---(2)	0.33	---(2)

* CDMG Preliminary Report 13 (1973) - Distance is to the closest Epicenter of Energy Release.
** Distance to estimated Focus.
*** Can be modified by structural design and/or thickness of surficial alluvial sediments.
\+ Mean plus 2 standard deviations.
(1) There is no historical record of faulting associated with the San Gabriel Fault.
(2) A seismic event along the San Gabriel Fault is not considered likely in the next 100 years.
Source - Allan E. Seward Engineering Geology, Inc. Based upon methods of Leeds (1972) which are the present standard of the practice.

1.1.4 Groundwater

Water flows within Castaic Creek following periods of precipitation. Historic high ground water levels within the Castaic Creek drainage ranges from elevations of 960 feet to 980 feet. These elevations correlate to depths of 10 to 20 feet below the ground surface of Castaic Creek.

1.2 Environmental Impacts

1.2.1 Earth Materials

Reddish-brown clayey siltstone lenses in the Saugus Formation are potentially expansive and alluvial soils are poorly to moderately consolidated. Hazards resulting from the expansive and poorly consolidated materials could adversely impact development if not adequately mitigated. Approximately 19.1 million cubic yards of earth will be moved affecting roughly 922 acres of the site. Project engineers estimate that the highest cut slope will be 250± feet and the highest fill slope will be 45± feet.

1.2.2 Geologic Structure and Landslides

Natural slopes with unsupported bedding planes and landslides have been identified by the Engineering Geologist. In addition, the slopes and landslides have been analyzed by the Geotechnical Engineer. Mitigating measures are outlined in detail in the geotechnical reports and summarized in Section 1.3.2..

1.2.3 Seismicity

During a seismic event there are three common forms of geologic hazards that are related to the earthquake:

1. Ground rupture or displacement.
2. Ground failure (liquefaction, landslides, etc.).
3. Ground shaking.

The Holser Fault is an inactive fault, as currently defined by the State Geologist. However, the project geologist is recommending that habitable structures not be constructed over the Holser Fault due to the following:

- The Holser Fault may have a recurrence interval slightly longer than Holocene time.
- There is the potential for sympathetic movement

associated with seismic events on other faults.

- There is one period of deformation (probably caused by compression and displacement of a saturated sandy zone directly at the fault[1]) recorded in the Holocene stratigraphic record over the Holser Fault.

The potential for liquefaction has been reviewed and evaluated by the project soils engineer, R.T. Frankian and Associates. Studies based on the 1971 San Fernando Earthquake (see Geotechnical Appendix for "Basis of Method Used to Evaluate Liquefaction Potential") have shown that the liquefaction potential both east and west of the Castaic Creek is low to non-existent at the subject site.[2] Extensive subsurface testing of soils revealed that the types of soils at the site are not conducive to liquefaction. Examination of the Valencia area after the 1971 San Fernando earthquake revealed no signs of distress due to liquefaction phenomena.

Ground shaking from active faults that could impact the site is discussed in Section 1.1.3.

1.3 Mitigation Measures

All grading operations will be conducted in conformance with both the recommendations of the geotechnical consultant and the requirements of the Los Angeles County Department of Public Works. Specific mitigation measures are listed below.

1.3.1 Earth Materials

The expansive bedrock problem will be mitigated by designing special foundations or overexcavating the expansive bedrock and replacing it with certified fill. Special foundations include deepened footing excavations or increased reinforcing steel. Poorly consolidated materials in the alluvial flat will be removed and recompacted.

Fills should be designed at 2:1 gradients. All major canyon fills, buttresses, stability fills, shear keys, and retaining walls will require subdrains.

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1 Source: Letter from R.T. Frankian to Valencia Company dated February 15, 1989.

2 Letter from R.T. Frankian to Valencia Company dated February 15, 1989.

1.3.2 Geologic Structure and Landslides

All cut slopes will be designed at 2:1 gradients. If cut slopes are steeper than the bedding, then buttresses, retaining walls and/or stability equivalents will be provided.

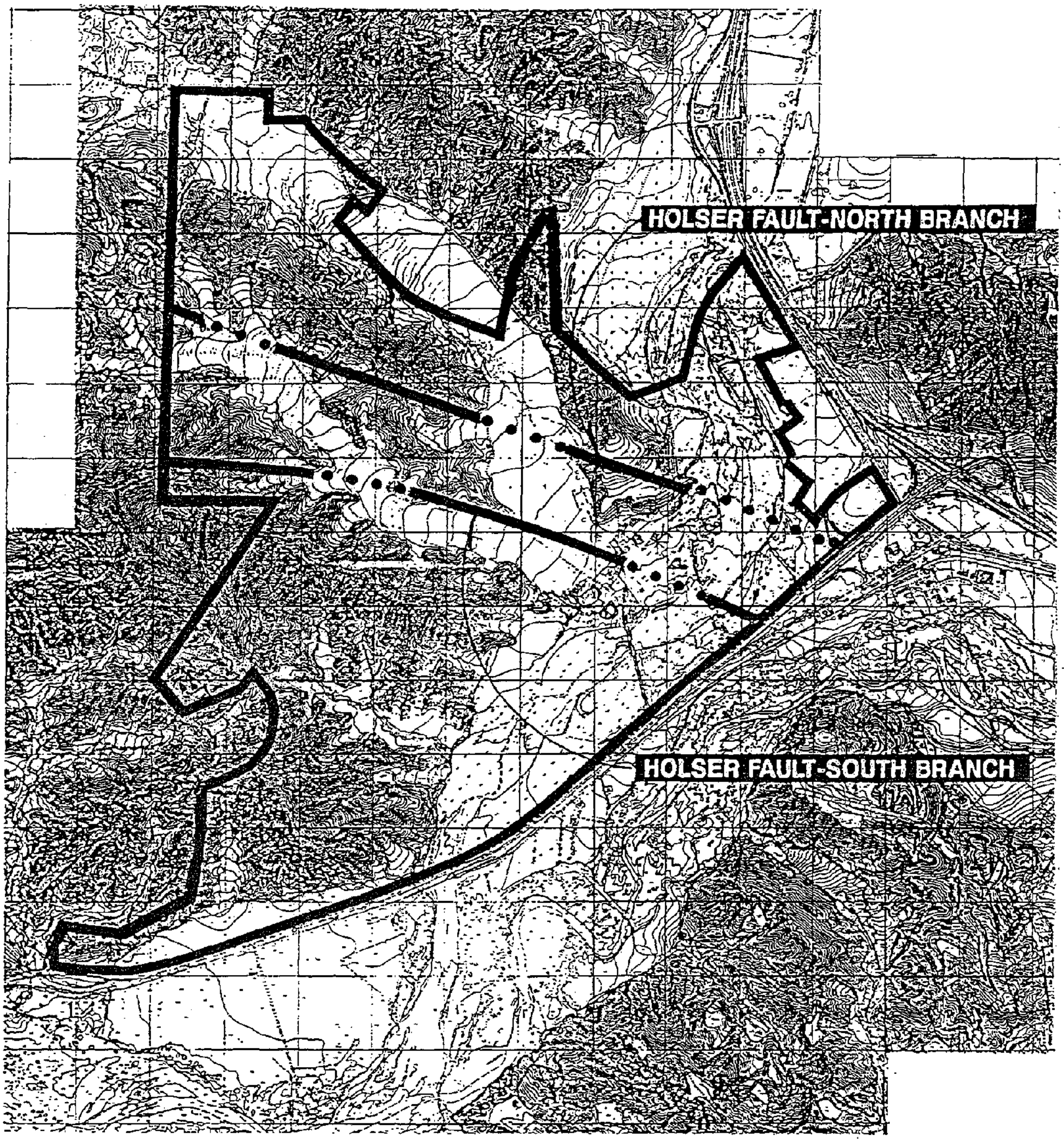
Methods utilized to stabilize landslides include: 1) cutting down ridges and filling the canyons; 2) constructing shear keys; and 3) removing unstable material and recompacting as certified fill. Portions of landslides may be left in place if they are essentially "block glide" failures and they are calculated stable in the final tract design. Additionally, if a landslide is not stabilized and does not pose a hazard to development, then it can be left in place and shown as a Restricted Use Area on the Record Map. The specific method of stabilization and/or removal of the landslides will be determined at the tentative map stage of development.

1.3.3 Seismicity

The Holser Fault is defined as inactive by California State Law, and the Los Angeles County Building Code permits construction of a building over an inactive fault. However, the project design will include a minimum 60-80 foot wide setback zone centered over the Holser Fault (Figure III-1C). The setback zone will be accurately defined during the grading stage.

Potential impacts from ground shaking will be mitigated by compliance with Section 2312(d) of the Los Angeles County Building Code. Section 2312(d) applies to one and two story structures, and the design parameters at this site will be the same as those used elsewhere in southern California, even in those areas closer to the San Andreas fault than the subject site.

It is the opinion of Allan E. Seward Engineering, Geology, Inc. that the Hasley Industrial Center is geologically feasible for industrial development, provided the mitigation measures listed above and other standard recommendations are incorporated in the design and construction.



LEGEND

HOLSER FAULT

60-80 FT. SETBACK

Holser Fault Setback

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FIGURE
III-1c

1.3.4 Economic Feasibility of Mitigation Measures

Mitigation measures to stabilize landslides or to remove and recompact earth materials will be implemented during the course of normal grading activities. Therefore, implementation of these measures will not incur significant costs beyond those customarily associated with project grading.

The 60-80 foot wide setback zone over the Holser Fault will result in the loss of building area. However, the loss of this building area will be minimized by placing streets and utilities within the setback area. The placement of utilities within the setback zone is permissible since the Holser Fault is classified as an inactive fault.

TPM 18229 - Geotechnical Impacts

Tentative Parcel Map 18229 is characterized by a broad, alluviated valley floor. The alluvial flat is flanked by relatively steep ridges towards the south and the north. Bedrock of the Saugus Formation underlies the alluvium of TPM 18229 and is exposed in the elevated ridges. The Saugus Formation contains lensing, isolated red-beds which are potentially very expansive. These red-beds could be exposed at final grade or in the footing excavations.

The project soils engineer has evaluated the alluvial material relative to liquefaction, and has determined the potential for liquefaction on TPM 18229 is nil to non-existent.

The bedrock of TPM 18229 has been gently-to moderately-tilted towards the northeast. There are no known faults which traverse the project site. The site is subject to impact from ground shaking from the following offsite active faults:

1. San Andreas Fault
2. San Fernando/Santa Susanna/Sierra Madre Fault Zone.
3. San Gabriel Fault.

Several landslides exist offsite to the east and to the south of TPM 18229. Development of this project and associated roadways could expose unsuitable landslide material and potential failure planes which occur within these landslides.

Groundwater levels in the area are closely related to those in the Castaic Creek drainage. Historic high ground water levels within the Castaic Creek drainage range from 10 to 20 feet below the ground surface. Ground water is not expected to pose a hazard on Tentative Parcel Map 18229.

The following mitigation measures are recommended for TPM 18229.

- Should "red-beds" of the Saugus Formation be exposed during grading operations, the beds will be evaluated by the project soils engineer. The beds may require special foundation designs and/or overexcavation and replacement with certified fill. Certified fills will be utilized within the alluvial area to construct suitable surfaces for the support of future structures.

- Potential impacts from ground shaking will be mitigated by compliance with Section 2312 of the Los Angeles County Building Code.

- Unsuitable landslide material exposed in cut-slopes will be removed and replaced with certified engineered fill. Exposed failure planes will be mitigated by construction of a buttress, retaining wall and/or other stability equivalents.

- One proposed cut-slope on the southeastern boundary of TPM 18229 will be designed at a 5.67:1 gradient and steepened to a 3:1 gradient. All other cut-slopes will be designed at 2:1 gradients.

Soil and geologic reports for TPM 18229 include:

- "Geologic Report, Tentative Parcel Map 18229, Castaic, California", March 6, 1987, prepared by Allen E. Seward Engineering Geology, Inc.;

- "Geologic Report - Addendum No. 1, Tentative Parcel Map 18229, Castaic, California", June 5, 1987, prepared by Allen E. Seward Engineering Geology, Inc.;

- "Geologic Report, Revised Tentative Parcel Map 18229, Castaic, California", November 5, 1987, prepared by Allen E. Seward Engineering Geology, Inc.;

- "Addendum No. 3, Response to County Comments, Tentative Parcel Map No. 18229, Hasley Canyon, California", November 10, 1987, prepared by R. T. Frankian & Associates;

- "Addendum No. 4, Response to County Comments, P.M. No. 18229, Hasley Canyon, California", March 4, 1988, prepared by R. T. Frankian & Associates.