9

RECLAMATION PLAN

KAISER CEMENT

PERMANENTE QUARRY

FOR:

SANTA CLARA COUNTY

OFFICE OF PLANNING

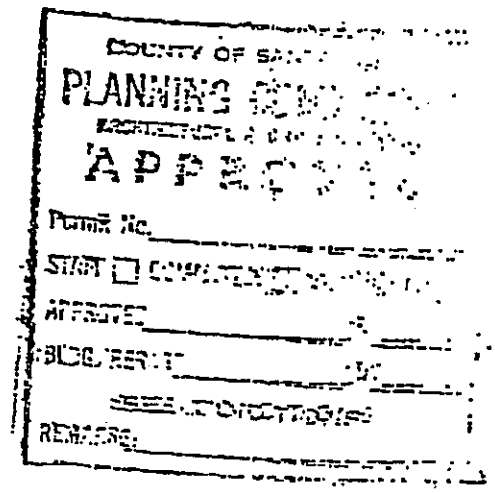
DEPARTMENT OF PLANNING AND DEVELOPMENT

PREPARED BY:

RUTH AND GOING, INC.

OCTOBER, 1984

JOB NO. 16803



RECLAMATION PLAN
KAISER CEMENT CORPORATION
PERMANENTE QUARRY

I. BACKGROUND AND INTRODUCTION:

Background:

Kaiser Cement Corporation's Permanente Quarry and Cement plant is the major supplier of cement to the northern California area and major source of aggregate for Santa Clara County. The limestone quarry produces approximately 4 million tons of rock annually providing for an annual production capacity of 1.6 million tons of cement, and significant quantities of aggregates for highway, residential and industrial construction.

In conformance with County directives, the California Surface Mining and Reclamation Act, 1975, and the 1982 Santa Clara County Mining Regulations, Kaiser Cement Corporation has been, and continues to be involved in the development of reclamation plans. These plans incorporate reclamation activities into ongoing quarry operations to provide short term visual protection, and eventual long term reclamation.

Past reclamation and scenic protection activities include a landscaping plan and Ridgeline Protection Easement which were undertaken in 1972. Kaiser Cement Corporation granted a permanent easement to the County of Santa Clara to ensure the protection of the view of Permanente Ridge from the Los Altos area. This easement, granted in the form of a deed dated August 18, 1972, states that the ridge will not be lowered below the elevation of

1500 feet for the majority of its length, and not below 1650 feet for a specified area. Permanent fixed monuments physically located the easement in the field, and have been checked periodically by County staff. Work in the ridge area was successfully completed in 1975.

Several months after the Ridgeline Protection Easement was granted, Kaiser Cement prepared and implemented a landscape plan to screen the most visible areas of the Permanente quarry, and to stabilize quarried slopes. This plan, a detailed rehabilitation study prepared by Royston, Hanamoto, Beck and Abey was accepted by the County Board of Supervisors on November 28, 1982. Planting under the guidance of this plan is presently ongoing.

Introduction:

At this time, Kaiser Cement Corporation has prepared another reclamation plan to address the next 25 years of the quarry's operation. This plan will be reviewed and adopted by the County prior to its implementation. In addition to the features of the reclamation plan, this report discusses the quarry's environmental setting, and the operating characteristics of the mining operation. The entire Kaiser Cement site encompasses over 3200 acres, but the discussion in this document is focused only on portions of the 330 acre quarry area -- the location of the reclamation activity.

II. LOCATION AND SETTING

A. Location

The Kaiser Cement site is located at the western end of Permanente Road, approximately 1-1/2 miles west of the corporate limits of the City of Cupertino. The Kaiser property, including the cement plant and quarry, consists of 3268 acres situated in Sections 17 and 18, Township 7 South, Range 2 West, Mt. Diablo Base and Meridian. Of this acreage, the quarried area and subsequent reclamation comprises approximately 330 acres. The site location is shown in Figures 1 and 2.

B. Environmental Setting

The Permanente Quarry is located in the eastern foothills of the Santa Cruz mountains at the western edge of the Santa Clara Valley. Elevations in the quarry area range from 950' to 1900' above sea level with terrain comprised of hilly grassland vegetated with oak and brush. The site experiences annual temperatures ranging from roughly 35 to 100 degrees (F), with precipitation averaging 32 inches a year. Permanente Creek, a perennial stream, is located on the Kaiser property but does not pass through the quarried area.

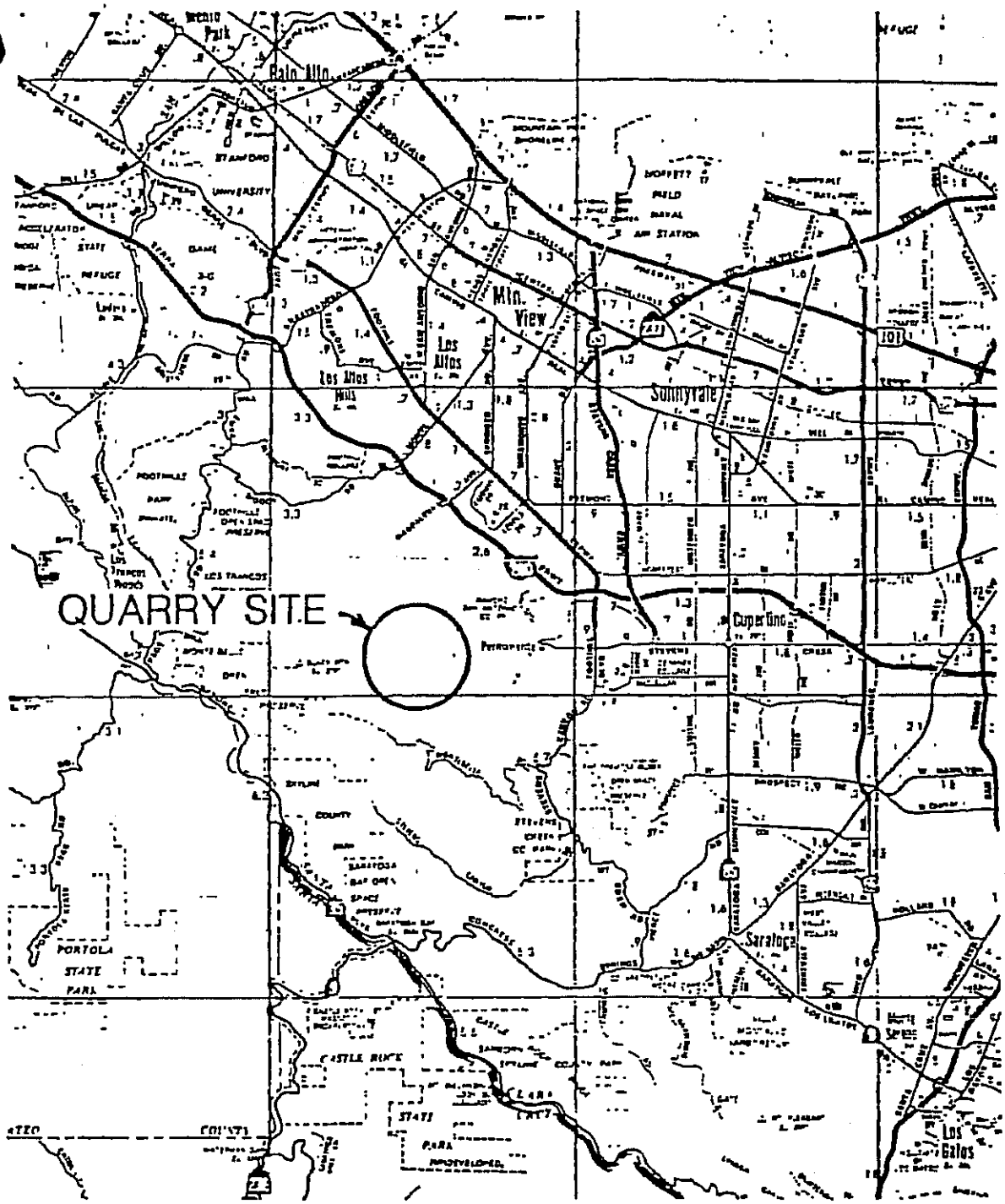
Vegetation: Varieties of vegetation on the site consist of oak woodland, oak savannah, woodland/chaparral, and chaparral habitats. The oak woodland habitat occurs on well drained slopes and flatlands, and consists of open to dense stands of oak trees with an understory of annual grasses, herbs, and low shrubs such as poison oak, coffee berry and coyote brush. The California live oak is one of the oak species on the site.

This species is a slow growing variety of oak, but one that can survive for hundreds of years.

There are no rare or endangered plant species expected to be present in the area. The nearest recorded location of rare and endangered plant species is in the coastal foothills of the Santa Cruz mountains, some 15 miles away.

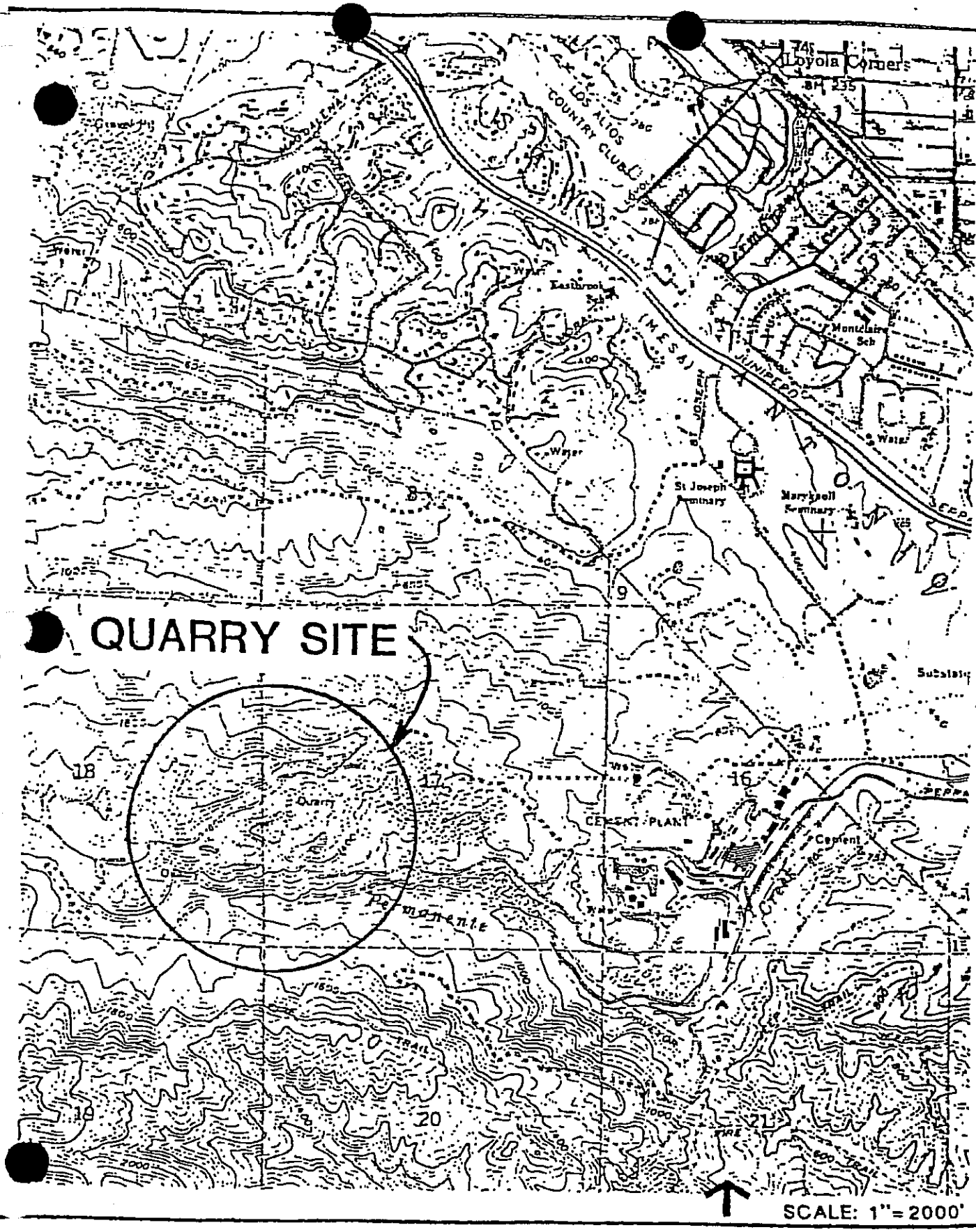
Wildlife: The oak woodland vegetative group provides a valuable habitat for a variety of birds, reptiles, and mammals, as well as refuge for larger animals such as deer and coyote. Known and expected wildlife on the site include the Mule deer, coyote, raccoon, bobcat, Red tailed hawk, California quail, Western fence lizard, and various snakes and amphibians.

No rare or endangered animal species are expected to inhabit the areas near the Permanente Quarry.



LOCATION MAP

FIG. 1

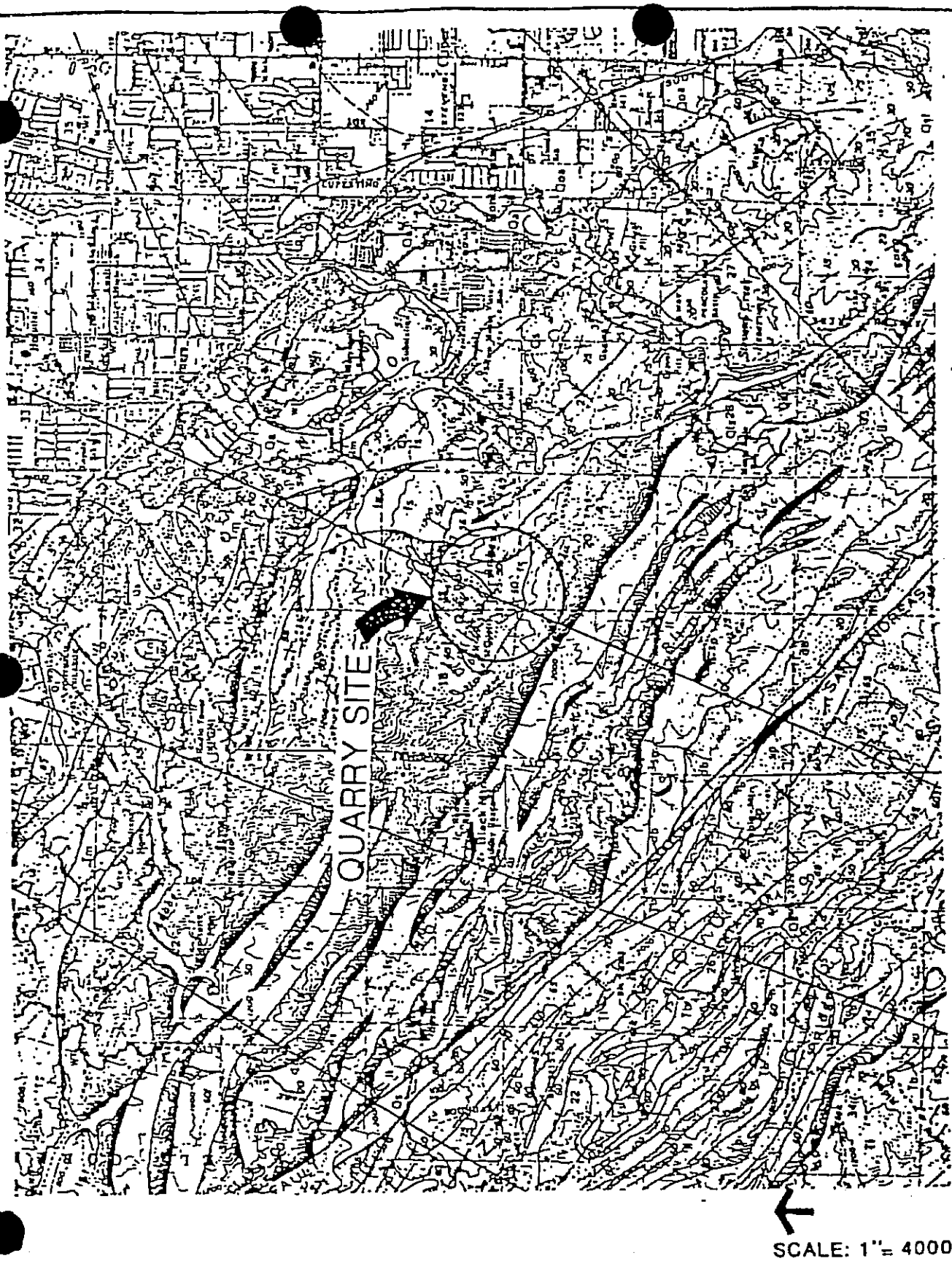


VICINITY MAP

FIG. 2

C. Geology

The limestone quarried at Permanente is considered to be one of the units of the Jurassic-Cretaceous age Franciscan Complex. The limestone unit is locally referred to as the Calera limestone. The Permanente deposit is by far the largest limestone body known to exist in a number of discontinuous masses of limestone that crop out along a northwest-southeast trending zone in the central and southern San Francisco peninsula area of the Coast Ranges. The limestone deposit in the quarry is associated with Franciscan graywacke, sandstone, red chert, diabase and greenstone, all of which are exposed in the quarry area. Further to the east, in the vicinity of the cement plant, the Franciscan is in contact with the younger Plio-Pleistocene Santa Clara Formation. As indicated on Figures 3A and 3B, the quarry areas pertaining to this reclamation plan are completely underlain by the Franciscan.



GENERAL GEOLOGY MAP

FIG. 3A

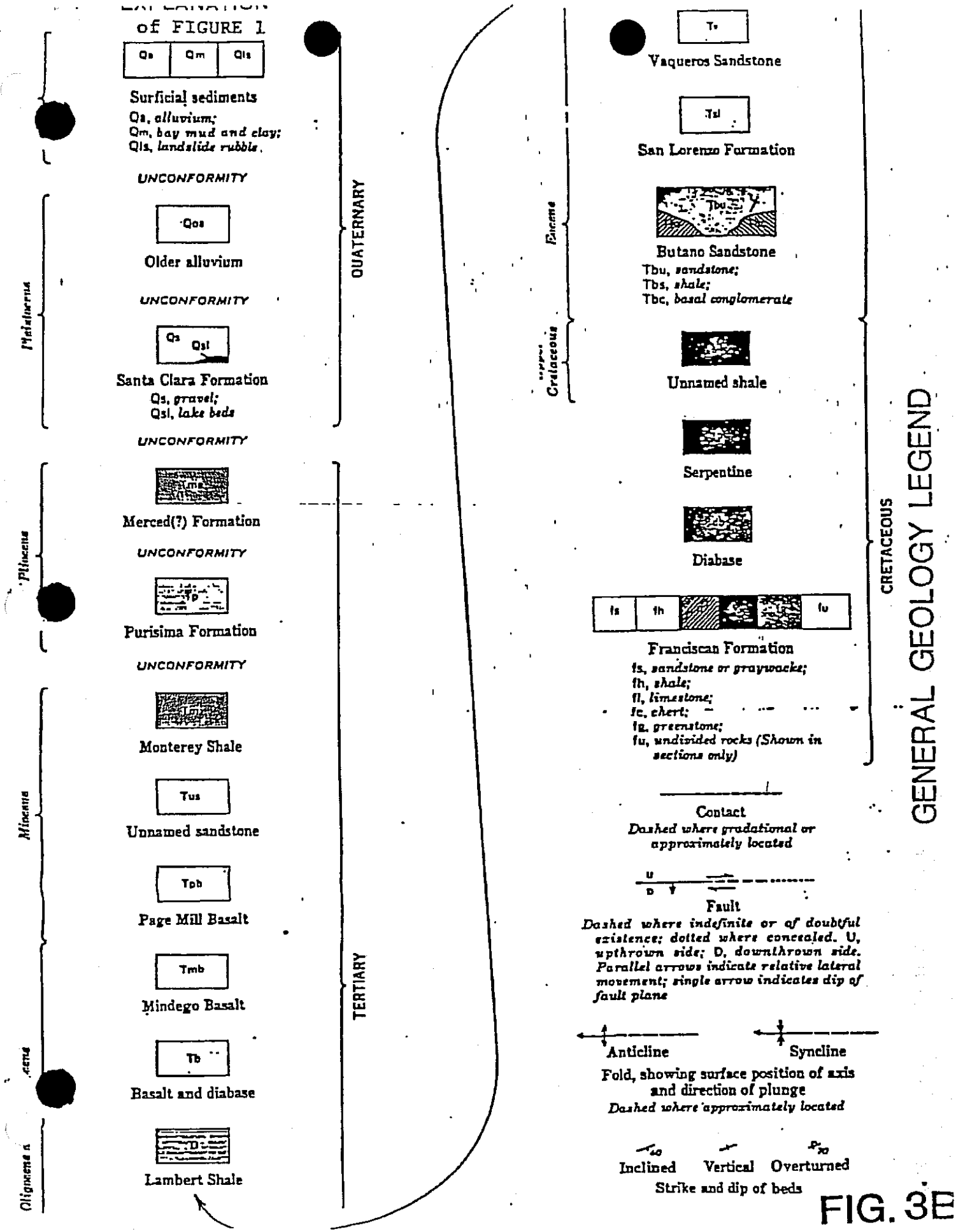

EXPLANATION of FIGURE 1
Qs
Qm
Qls
Surficial sediments
Qs, alluvium;
Qm, bay mud and clay;
Qls, landslide rubble.
UNCONFORMITY
Qos
Older alluvium
UNCONFORMITY
Qs
Qsl
Santa Clara Formation
Qs, gravel;
Qsl, lake beds
UNCONFORMITY
Tme
Merced(?) Formation
UNCONFORMITY
Tp
Purisima Formation
UNCONFORMITY
Tm
Monterey Shale
Tus
Unnamed sandstone
Tpb
Page Mill Basalt
Tmb
Mindego Basalt
Tb
Basalt and diabase
Tl
Lambert Shale
Pleistocene
Pliocene
Miocene
Oligocene
QUATERNARY
TERTIARY
Tv
Vaqueros Sandstone
Tsl
San Lorenzo Formation
Tbu
Butano Sandstone
Tbu, sandstone;
Tbs, shale;
Tbc, basal conglomerate
Eocene
Upper Cretaceous
Unnamed shale
Serpentine
Diabase
fs
fh
fu
Franciscan Formation
fs, sandstone or graywacke;
fh, shale;
fl, limestone;
fc, chert;
fg, greenstone;
fu, undivided rocks (Shown in sections only)
CRETACEOUS
Contact
Dashed where gradational or approximately located
U
D
Fault
Dashed where indefinite or of doubtful existence; dotted where concealed. U, upthrown side; D, downthrown side. Parallel arrows indicate relative lateral movement; single arrow indicates dip of fault plane
Anticline
Syncline
Fold, showing surface position of axis and direction of plunge
Dashed where approximately located
Inclined
Vertical
Overturned
Strike and dip of beds
GENERAL GEOLOGY LEGEND

FIG. 3E

Geologic work has been performed in the Permanente quarry and surrounding area by Kaiser personnel, consultants, and outside interests such as universities and state and federal geologic surveys. A complete reference listing of geologic reports, published is presented as Appendix A to this report. In addition, there have been more than 700 exploratory test holes drilled at Permanente along with numerous "in-house" geologic maps and cross sections prepared since Kaiser Cement Corporation began operating this deposit in 1939.

Table 1 indicates the location of the Permanente quarry relative to active and potentially active faults in the region. Of the faults listed, the strike-slip San Andreas fault is considered capable of producing a great earthquake equal to the 1906 San Francisco Earthquake.

Among the faults that may directly affect the subject area, the Sargent-Berrocal Fault Zone, as described in the literature, is a northwest trending zone of reverse and thrust faults extending from San Juan Bautista north to Permanente and then to Palo Alto, where it appears to join the San Andreas Fault. At Permanente, the main trace appears to trend northward under Permanente Creek where the creek forms a one-half mile N30W-trending, linear valley in a zone between the cement plant

ACTIVE AND POTENTIALLY ACTIVE FAULTS A[illegible] THEIR EARTHQUAKE CHARACTERISTICS

	Causative Faults	Distance and Direction from Permanente Quarry	Maximum Historical Earthquake Magnitude (Richter Magnitude)	Maximum Probable Earthquake Magnitude (Richter Magnitude)	Est. Recurrence Interval of Max. Prob. Earthquakes
San Andreas System	San Andreas	2 Miles West	8.3 (last event: 1906)	8.3	50-200 Years
	Hayward	16 Miles East	7.0+ (Last event: 1868)	7.0	10-100 Years
	Calaveras	19 Miles East	6.0+	7.0	10-100 Years
Hargent-Berrocal System	Berrocal	½ Mile East (Main segment) (Branch exposed in quarry)	3.7 to 5.0	6.5 to 7.0	Data insufficient for estimating
	Monta Vista	1½ Miles East	2.0 to 3.0	6.5 to 7.0	Data insufficient for estimating

TABLE 1

SOURCE: Seismic Safety E[illegible]ent
City of Cupertino

and the quarry. There is a significant difference between bedrock types on opposite sides of this linear valley, with the southeastern block predominantly Santa Clara formation and the northeastern block composed of Franciscan complex rocks. A northwesterly trending branch of this main Berrocal fault segment does appear to split off through the quarry. This is observed in the quarry as a series of northwest trending shear zones within the limestone.

The present activity of the Berrocal zone in the Permanente area is speculative. There is no evidence to date, that indicates the fault has offset recent sediments within the local area, although microseismicity near Stevens Creek Reservoir, about 2 miles southeast, suggest that the fault may be potentially active.

The possible seismic hazard to the Permanente quarry and surrounding area is the potential for severe ground shaking from a major event on the San Andreas. Secondary effects due to this strong ground motion would be ground failure such as landsliding, ground settlement, ground cracking and rock falls. Due to local differences in the geologic and topographic conditions, variations of ground shaking intensity are to be expected from place to place. If a significant earthquake event occurs on the San Andreas, effects in the quarry may include localized rock falls on quarry faces, ground cracking on benches close to adjacent quarry faces, or local slumping or sliding of less competent materials such as the serpentenized greenstone area in the upper northwest portion of the quarry. Due to the nature of the hard rock materials and existing pit slope angle of 45° in the quarry, it is unlikely that significant ground failure will occur. Effects to the

rock storage areas will most likely be ground settlement and local slumping of exposed faces. The very coarse rock material in these storage areas will preclude any failure due to liquefaction. Neither area (quarry or rock storage) supports any buildings or man-made structures.

D. Mineral Deposit

The Calera limestone at Permanente covers an irregular triangular area with an approximate exposed length of one mile and width of two-thirds of a mile. The limestone unit is tabular in nature with an exposed thickness of at least 800 feet. The section is composed of thin limestone beds and interbedded chert. The limestone is made up of continuous beds of uniform thickness that can be traced the entire length of outcrops. The thickness of most beds ranges from 2-6 inches. Chert lenses are of the same range in thickness but are not continuous. Over only a few feet of section, chert may be absent or form up to 50% of the rock.

The limestone deposit is divided into two units that include a lower black limestone and an upper white limestone. The lower unit is largely recrystallized and bituminous, with about 2% organic matter. Less recrystallized parts contain some nannofossils. Larger microfossils are radiolarian molds occurring in both limestone beds and chert lenses. The upper white limestone is stratigraphically above the lower black limestone (based on geopetal features and graded bedding). It is less recrystallized than the lower unit, lacks bituminous matter and contains more chert lenses, and has planktonic Foraminifera in addition to Radiolaria. No burrowing or primary sedimentary structures or megafossils are present. The

best estimate of the age range in the light limestone till now is mid-late Cretaceous (late Turonian, 88 million years) in the upper light limestone to late lower Cretaceous (Albian, 105 million years) in the lower part of the light limestone, based on recent work by the U.S. Geological Survey. Dateable fossils have not been found in the lower, black limestone.

Stratigraphic relations of the two limestone units have been extensively studied. Problems with interpretations have been related to extensive thrust and high angle faulting causing repetition and omission of strata. Recent work, as indicated on Figure 4, suggests that the two limestone units, the upper white and lower black limestones, are repeated by thrust faulting into two blocks. The upper limestone unit is split by a diabase sill, approximately 80 feet thick. The sill occurs only in the upper thrust block. A few volcanic ash horizons 20-40 cm thick are found interbedded with the upper white limestone, although recent interpretations suggest that these layers may be a clayey fault gouge related to thrust faulting. The limestones are in fault contact, both at the top and bottom of the section with Franciscan rocks, greenstones, graywacke, and serpentinized greenstone, which are exposed in the quarry.

STRATIGRAPHIC SECTION
PERMANENTE QUARRY

Geologic Map Symbol		Approximate Thickness (ft)	Rock Name	Geologic Description
Kjv / Kjs		50 - 75 (eroded)	Franciscan Volcanics, Sandstone	Altered calcareous basalt, greenstone, and graywacke sandstone.
K_{l_3}		25 - 30	Upper White, s/s chert	White to light gray, fine-medium crystalline limestone. Traces of chert lenses.
K_{l_2}		110 - 115	Upper White, s/chert	White to medium gray, very fine-fine crystalline limestone. Numerous lenses and bands of medium dark gray chert.
Kl		60 - 100	Diabase	Greenish gray, medium crystalline, massive diabase sill.
K_{l_3}		100 - 150	Lower White	Light gray to brownish gray, fine crystalline limestone with varying amounts of banded gray to dark gray chert.
K_{l_4}		200 - 250	Lower Black	Medium to dark gray, medium crystalline limestone with traces of dark gray chert bands. Bituminous odor.
		FAULT?		
K_{l_2}		100 - 110	Upper White.	White to medium gray, very fine-fine crystalline limestone. Light gray to dark gray chert bands parallel to bedding.
K_{l_4}		50 +	Lower Black	Medium to dark gray, medium crystalline bituminous limestone, with occasional chert bands.
		FAULT?		
Kjv / Kjs		Unknown thickness	Franciscan greenstone, sandstone, and serpentine	Basalt, buff, greywacke sandstone, and serpentinized peridotite.

STRATIGRAPHIC SECTION

FIG. 4

Structurally the limestone body is complicated by faults and folds, but generally dips 25^0 to 35^0 SE. The section is highly jointed and both types of limestone are strongly fractured. Joints are mostly perpendicular to bedding.

Exposures in the quarry indicate that at least three thrust faults roughly parallel to bedding slice the deposit. Subsequent high angle faulting, possibly related to the Berrocal Fault system trends generally NW.

The chemical quality of each limestone unit varies considerably. The upper, light limestone averages 80% calcium carbonate ($CaCO_3$) or more, but varying amounts of chert lenses lowers the bulk $CACO_3$ to 70% or less when mined. The upper portion of this unit has lesser amounts of chert and has higher carbonate values. The lower, black limestone averages 87% $CaCO_3$ ranging from more than 90% to less than 80% in individual layers. Variations also occur near contacts and where chert interbeds are common. Both limestone units exhibit a decrease in $CaCO_3$ values in shear and fault zones that bisect the deposit. Four grades of rock are presently used for quarry development: (1) high grade - dark gray limestone unit with $CaCO_3$ values greater than 85%; (2) medium grade - mixture of light and dark limestone running between 70 to 85% $CaCO_3$; (3) low grade - mainly light gray limestone with chert lenses ranging 50-70% $CaCO_3$; and (4) non-limestone rock types such as the diabase, Franciscan volcanics and sediments, fault gouge, and soil overburden. The high and medium grade limestone is principally used in the manufacture of cement while the low grade limestone and harder Franciscan rock types are used in the production of crushed rock for aggregate.

Small amounts of Franciscan volcanics and sedimentary rocks are used as a clay additive in the cement-making process, depending upon the respective chemistry of each rock type.

E. Historic Land Use

The earliest recorded activities on the site indicate that, by 1899, a wagon road had been constructed along much of the length of Permanente Creek to gain access to the limestone. The State Mineralogist's report of 1906 records that limestone quarrying along the creek took place at least as early as 1903. The sugar beet industry was an early stimulus for limestone extraction, later followed by the tremendous urban growth in the Bay Area.

The Kaiser Corporation acquired the site in the late 1930's and began quarrying and cement processing in 1939. The operation began as a two-kiln, wet process plant which expanded, after World War II to six kilns. In 1982, the original kilns were replaced with a single 1.6 million ton dry process kiln.

III. MINING OPERATIONS

A. Mined Lands

For the next 25 years, the existing and planned excavation and storage areas will encompass approximately 330 acres.

The materials storage areas are located just west and east of the quarry. The west site is used for maintaining a supply of material which currently is not used for the production of cement. This material includes low-grade limestone, and other rock types excavated from the quarry. It is expected that these lower grade limestone and rock materials will be used in the future when scarcity of the materials increase their marketability. The east site is comprised of an existing pile of rock materials which will be relocated further to the east and revegetated. This will allow the limestone beneath to be excavated while maintaining a knoll as a visual buffer between the quarried area and the Santa Clara Valley area. Figure 5 shows the quarry and both material storage areas.

QUARRY PIT AND STORAGE AREAS

FIG. 5

B. Operations

The Permanente Quarry utilizes an open pit technique to extract the limestone and associated rock materials. This procedure generally is: 1) any topsoil overburden is removed and stockpiled for future use, 2) haulage roads are developed to the planned benches, 3) blast holes are drilled in the rock with rotary blasthole drills, then controlled electric blasting loosens the rock at a benching interval of 50 feet, 4) front-end loaders and electric shovels load the broken rock into 65-ton off-highway haul trucks to be transported to the primary crusher located at the southeastern edge of the quarry. From there, the crushed rock is transported, for further processing, to the cement plant further to the east. Other rock types, and limestone not currently utilized in cement manufacture are either crushed and conveyed to the commercial rock plant or hauled directly to the materials storage area for potential use in the future.

The quarry operates year-round, five days a week, two shifts a day, although the schedule is subject to variations due to market conditions or maintenance periods.

The design for the reclamation plan is shown in Figure 6, which presents the excavation contours overlain on the existing topography. The overall pit slope for both the existing and future operations will be maintained at an angle of 45 degrees (1:1).

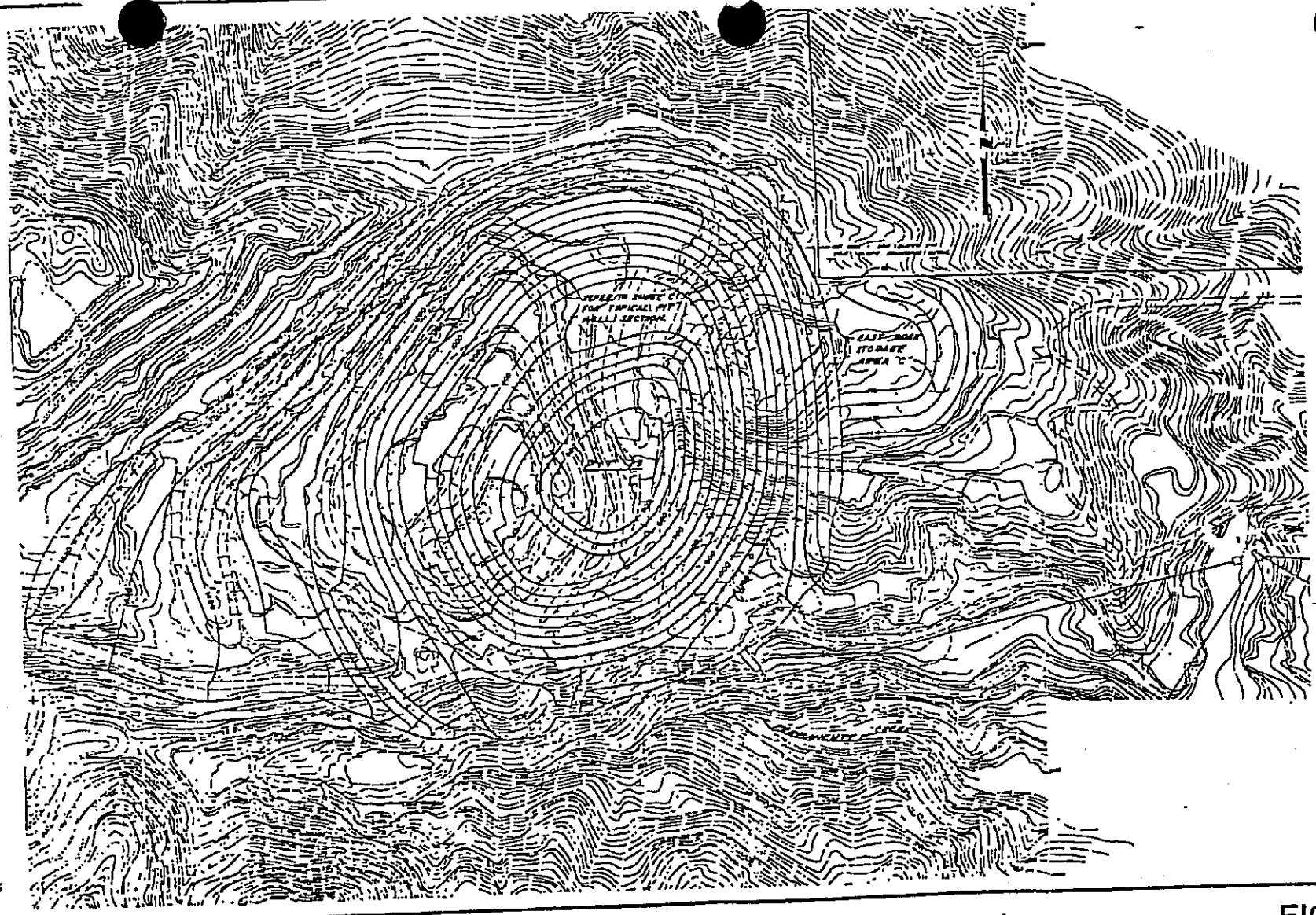


FIG. 6

QUARRY PIT DESIGN

A slope stability study for the quarry area, which is summarized in Appendix B, indicates that the 1:1 slope design is well within recommended features for slope stability.

The West Materials Storage area, contains the stockpiled rock materials and currently nonmarketable limestone. This material is maintained at a 3:1 gradient in order to achieve slope stability. Beyond the timeframe of this reclamation plan, it may eventually be sold or utilized in the reclamation process.

The East Materials Storage area will be similarly established.

C. Public Health and Safety

On-site dust related to mining operations is controlled by spraying the haul roads with water mixed with a commercial dust suppressant. Runoff collected in the quarry supplies some of the water for this use.

Blasting operations are conducted only by state licensed personnel to ensure that the procedures meet or exceed the requirements of Cal-OSHA.

For safety and security reasons, the public is barred access to the site by gates located on Permanente Road at the cement plant area.

IV. RECLAMATION

A. Timeframe

The reclamation plan presented is intended for a 25 year period. It addresses erosion control and maintenance of the West Materials Storage area, and reclamation and revegetation of the East Materials Storage area, allowing this area to serve as a visual buffer between the quarry and the Santa Clara Valley. Ultimate reclamation of the pit area, or treatment of future quarry operations, will be addressed in a revised reclamation plan to be submitted around the year 2005 when this reclamation phase nears completion. Since market demand for cement partly determines the rate of limestone extraction, this estimate may be subject to some modification in the future, in response to demand for the product.

Present mining plans for the quarry call for a 25 year period of operation. Inferred limestone reserves are estimated to support an operation of this magnitude for up to 50 years. Beyond this period the quarry could continue to operate as a crushed stone source for construction aggregate. Thus, the time span of the total life of the operation is only an estimate and is subject to future modification in response to actual market and quality conditions.

B. Phasing

West Materials Storage Area

The West Materials Storage area will be built up, contoured, and revegetated as quarrying operations generate overburden and

excess rock material. Within the storage area, the build up of material is expected to occur roughly in three phases: Phase 1 will bring the material pile up to the 1800 foot contour; Phase 2 will add another 100 feet in elevation to reach the 1900 foot level; Phase 3 will bring portions of the material to elevations of 1950 to 1975 feet, contoured to achieve both slope stability and a natural appearance in relation to the surrounding terrain.

All surfaces will be revegetated when they reach their ultimate grade. Phase 1, 2 and 3 are expected to be executed in 10, 20 and 25 years, respectively. Some modifications to the timing may result in relation to the rate of quarrying activity.

Runoff in the storage area is currently directed to catchment areas which collect sediment. The high percentage of rocks and granular material in the storage area allow rapid percolation by the runoff. As Phase 1 of the material storage nears final grade, the runoff will be directed along the new access road. The runoff will be caught in a sedimentation basin as shown on the reclamation plan. The basin and outfall will be constructed prior to the completion of Phase I.

East Materials Storage Area (Area C)

In this area the slope between contours 1400 and 1420 will be revegetated first, other areas will be planted as material becomes available for placement.

After the proposed grades have been reached for an area, 4 inches of soil will be added where practical and plant materials installed. The plant materials and planting

techniques used will be tailored to the specific area to be revegetated.

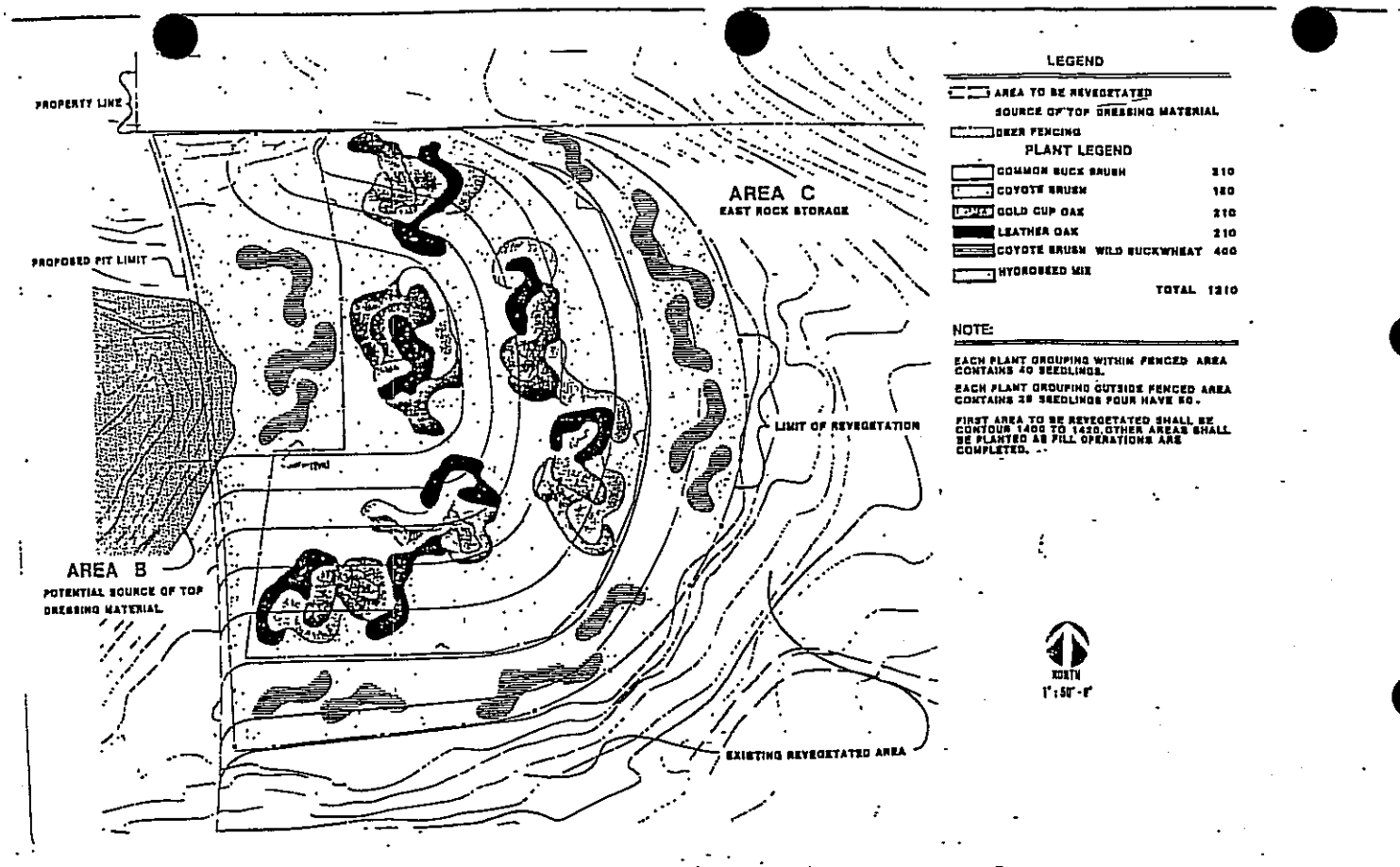
West Materials Storage Area (Area A)

The West Storage Area, because the rock material here may be used in the future, will be revegetated using seed material applied within a hydromulched slurry mixed together with fertilizer. No woody tree or shrub materials will be used in this mix, however tree species found on-site will establish themselves naturally over the 25 year period.

The purpose of the seven species of grass and wildflower seed within this mix is to stabilize the slopes and prevent erosion. Use of the seed materials selected promotes reseeding and does not require the use of supplemental irrigation.
Revegetation of the East Storage Area will utilize significantly more plant materials and different planting techniques. More extensive tree and shrub plantings will be used to incorporate the new hill into the surrounding natural setting. These plantings will include two types of oak seedlings, coyote brush, ceanothus and buckwheat seedlings, as well as a seed mix containing four different grass and wildflower species. Figure 7 presents the proposed revegetation scheme in this area.

To insure survival of the tree and shrub seedlings, protective screening is proposed to protect the vegetation from deer and rodents. Six-foot high "Poultry Net" fencing will be used to protect seedlings from deer. In addition, a portion of the oak seedlings will be protected individually by fine mesh screening to prevent damage from rodents.

Although native plant species have been selected for revegetation, some supplemental, temporary irrigation will be required due to conditions at this particular location. The high porosity of the soil, and the predominance of southern and western exposures contribute to a very dry environment for seedlings to develop. Therefore, supplemental irrigation will be provided for approximately 5 years, until the plants are fully established. An existing irrigation system will be expanded and utilized to provide water to the East Storage Area revegetation.



REVEGETATION PLAN EAST MATERIALS STORAGE AREA

FIG. 7

In addition to fencing protection and irrigation, all revegetation materials will be fertilized. For hydroseeded/mulched materials a totally organic, water soluble fertilizer will be used within the slurry. In the case of seedlings, slow release, long term tablets will be placed within the root zone to provide fertilization over the following two years.

The overall intent of the revegetation plan proposed is to provide the proper conditions to promote healthy mature plantings that will be similar to the surrounding native vegetation.

To further insure that the revegetated plantings will survive and grow to mature sizes, the Kaiser Cement Corporation intends to monitor all installations and conduct periodic maintenance. In this way the proper plant materials, irrigation and fertilization will be insured any potential problems can be addressed early on, providing every chance for the successful revegetation of these areas.

C. Ultimate Conditions

At the end of this 25 year reclamation program the following conditions will exist. The West Materials Storage area will have reached a maximum elevation of 1975 feet. Its slopes will be established at a 3:1 gradient and planted with native grasses to control erosion.

The East Materials Storage area will have reached a maximum elevation of 1475 feet, with slopes at a 3:1 gradient. It will be revegetated with native grasses, shrubs, and trees.

The quarry pit area will be excavated at an overall gradient of 1:1 in conformance with the slope stability investigation. Any future alternatives, including revegetation and continued operation, will be addressed in another reclamation plan to be prepared in approximately 20 years.

APPENDIX A

BIBLIOGRAPHY

Contents of fi[illegible] kept in Permanente [illegible] Office
-Revised August 2[illegible] to include additions indicated by *.

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDUM ON PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
1888	Eighth Annual Report of the State Mineralogist,"Santa Clara County"	California State Mining Bureau	Historical notes on Guadalupe deposit. Mentions bituminous limestone.
1890	Tenth Annual Report of the State Mineralogist,"Santa Clara County"	California State Mining Bureau	Historical notes: Guadalupe and Los Gatos deposits.
1894	Twelfth Annual Report of the State Mineralogist,"Santa Clara County"	California State Mining Bureau	Historical notes: Los Gatos, Guadalupe, and Wright's Ranch deposits.
1896	Thirteenth Annual Report of the State Mineralogist,"Santa Clara County"	California State Mining Bureau	Historical notes: Guadalupe and Los Gatos deposits.
1906	Structural and Industrial Materials of California, "Santa Clara County"	California State Mining Bureau	Historical notes: El Dorado Sugar Company's Quarry (=Permanente) and Los Gatos Lime Quarry.
1908	Map showing distribution of apparent intensity, known faults, routes examined	Lawson, A.C., ed., 1908 Atlas, U. S. G. S.	1:125,000 scale
Jan 1921	Report XVII of The State Mineralogist "Santa Clara County"	California State Mining Bureau Huguenin, E. & Catello, W.O.	Historical notes: Winship Property.
Jan 1930	San Francisco Field Division Santa Clara County	California Division of Mines Franke, H.A.	Brief Regional Description - Historical Notes - Bond and Winship Properties.
1933	Limestone Deposits of the San Francisco Region	California Division of Mines Eckel, E.C.	Distribution, Composition, Historical Notes.
1933	Limestone Weathering and Plant Associations of the San Francisco Region	California Division of Mines Kelly, J.W.	Limestone soils, Plants, Vegetation.

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDA - PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
Apr 1944	Tonnage Available In The North Ridge of The Upper Quarry	Grimm, K.E., Chief Geologist, Knuth, W.J. Permanente Corporation	Notes on mining aspect.
Feb 21, 1945	Development and Operations Program For The Permanente Cement Company Quarries for the Years 1945, 1946, 1947, 1948, and 1949	Grimm, K.E., Chief Geologist, Knuth, W.J., Permanente Corporation	Mining plan, recommendations to strip and beneficiate to extend life of property.
Aug 27, 1945	Memo to J. W. Sharp	Jack, O.E., Permanente Laboratory	Drill hole analysis from Black Mountain
Sep 1945	Geological Report of McCaughern Property	Grimm, K.E., Chief Geologist Permanente Corporation	Report on surrounding properties, particularly Black Mountain region.
Nov 1946	Insoluble Residues of The Calera Limestone in Santa Clara County, California	Pantin, J.H., Stanford University M.S. Thesis	Stratigraphic correlations, Permanente geologic map and section.
Dec 4, 1946	Limestone Reserves of The Upper Quarry Area, Permanente, California	Hulin, C.D., Dept of Geology, University of California, Berkeley	Reserve study. Identifies "Andesite" as "Diabase," different structure intrepretation to Tolman ('39) based on new information.
Feb 28, 1947	Memo to Sharp, Hall, Jack, Knuth	Zimmerman, Jr., John, Chief Geologist, Permanente Corporation	Report on outside areas to supplement limestone supplies - Guadalupe Dam, Los Gatos, Monte Bello, etc.
Apr 14, 1947	Letter to Lewis Timpany	Zimmerman, Jr., John, Chief Geologist, Permanente Corporation	No interest.
Jun 1947	Insoluble Residues of the Calera Limestone from Its Type Locality, Calera Valley, San Mateo County, California.	Miranda, L.J., Stanford University M.S. Thesis	Stratigraphic correlations.

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDA ON PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
Jul 1947	California Journal of Mines and Geology, "Limestone in California"	California Division of Mines Logan, C.A.	Description of limestone deposits, Permanente's operations.
Aug 6, 1950	Letter to H. J. Kaiser	Timpany, Lewis	Promotional description of limestone on property south of Permanente.
Aug 22, 1950	Letter to Lewis Timpany	Marsh, W.A., General Manager, Permanente Corporation	No interest.
Dec 1950	The Calera Limestone in San Mateo and Santa Clara Counties, California	California Division of Mines Walker, G.W.	Special report on Calera limestone.
1952	Cretaceous Foraminifera from the Franciscan Calera Limestone of California	Church, C. C.	Assigns middle to basal upper Cretaceous age to Calera.
Dec 30, 1954	Memo to J. M. Garoutte	Covello, A., Geologist, Permanente Corporation	Black Mountain outcrops on Emment Burns, Crocker (now Kaiser) and Alves properties.
Nov 14, 1956 and Nov 12, 1957	Letters on Burns Property	Whitecliff Realty, W.A. Marsh, Carlton Hulin, and J.M. Garoutte	Black Mountain properties.
Jan 15, 1958	Memo to W. A. Marsh	Stilbolt, C.B.	Crocker lands.
Apr 6, 1961	Permanente Quarry Stratigraphic Section	Towse, D.	With $CaCO_3$ percent.
Jul 20, 1961	Memo to R. G. Hohnsbeen	Kennedy, J.R.	Ref to planning & development in Palo Alto/Foothills area.
Jan 9, 1963	Memo to E. B. Connors	Towse, D.	Ref to pit development to south.
1964	Floating Limestone at Permanente	Kleiber, J.C. & Meisel, G.M.	Beneficiation of low grade limestone.

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDA ON PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
Jun 26, 1939 and Oct 13, 1939	Report on Tonnage & Composition of Limestone Available in Proposed Quarries A and B, Permanente Corporation, and Superficial Residuary Clay on The Property of The Permanente Corporation	Tolman, Prof. C.F. and Neuman, Jr., J.V., Stanford University	Original evaluation Permanente property confined to area above 1500' el. although, limestone was recognized at lower elevations. First detail mapping of rock units and structures, description of sampling, and tonnage calculation.
1941	Milling at the Permanente Cement Plant	Kivari, A. M.	Early quarrying and milling; short summary of Tolman and Neuman report.
1942	Geologic History and Correlation of the Jurassic of Southwestern Oregon and California	Taliaferro, N. L.	Early ideas on origin and age of Franciscan and relationship to other formations of same age.
1942	Uppercretaceous Age of the "Franciscan" limestone near Laytonville, Mendocino County, California	Thalmann, H.E.	Assigns same age to Laytonville and Calera limestones.
Nov 1, 1942	Geological Report and Discussion of Reserve Rock Permanente Quarry Areas	Grimm, K.E., Chief Geologist, Permanente Corporation	Update on Tolman, Neuman report with new information available from operations. Further identification of limestone units. References to south side of creek.
Dec 5, 1942	Memo to Rhodes	Grimm, K.E., Chief Geologist, Permanente Corporation	Ref to Parcel 2 of Parrone Property.
1943	Franciscan-Knoxville Problem	Taliaferro, N.L.	Urges narrowing of definition of Franciscan. States that Knoxville is an upperphase of Franciscan. Discusses lithology.
Jul 1943	Black Mountain Prospect #1	Grimm, K.E. Chief Geologist, Permanente Corporation	Report - Geology, Economic Geology, plus map and section.
Oct 27, 1943	Geological Report & Discussion of Reserve In The Quarries of The Permanente Cement Company	Grimm, K.E., Chief Geologist, Permanente Corporation	Update and general confirmation of previous work.
Mar 15, 1944	Memo to Bill Sharp	Grimm, K.E., Chief Geologist, Permanente Corporation	Limestone on McCaughern Properties and adjacent area (Black Mountain).

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDA ON PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
1964	Franciscan and Related Rocks and Their Significance in The Geology of Western California	California Division of Mines and Geology, Bailey, E.H., Irwin,W.P., and Jones, D.L.	Distribution and characteristics of Franciscan limestones; relation to other rocks.
1966	Map - Geology of the Palo Alto 15' Quadrangle, Santa Clara and San Mateo Counties, California	California Division of Mines and Geology, Dibblee, Jr., T.W.	1:62,500 scale; descriptive text.
1967	Electron Microscopy of Limestones in the Franciscan Formation of California	U. S. Geological Survey Garrison, R.E. & Bailey, E. H.	Distribution, characteristics, and origins of Franciscan limestones. Recognized organic origins.
1969	Preliminary Report & Geologic Guide to Franciscan Melanges of the Morro Bay - San Simeon Area California	Hsu, K.J.	Description and distribution of melanges in San Luis Obispo County.
Aug 29, 1969	Mining Plan & Use Permit		For Kaiser Property in Palo Alto.
No Date	News		Fire Department access to Monte Bello Road.
1972	What is Franciscan?	Berkland, J.O., et.al.	Structural & lithologic definition of Franciscan Complex.
1973	Mixed Depositional Environments in the Franciscan Geosynclinal Assemblage	Matthews, Vincent III and Wachs, Daniel	Origin of Franciscan rocks.
1973	Preliminary Report 17 "Environmental Geologic Analysis of the Monte Bello Ridge Mountain Study Area Santa Clara County"Maps:Plate 1, 1-A, 2, 3, & 4	California Division of Mines and Geology, Rogers, T.H. and Armstrong, C.F.	Text: Areal geology, Permanente deposit rock descriptions. Maps: Bedrock, surficial, fault activity and mineral resources stability.
1973	Limestone and Dolomite Resources of California	California Division of Mines and Geology, Bowen, O.E.	Occurrences, characteristics, and economics.
1973	Petrology & Depositional History of Limestones in the Franciscan Formation of California	Wachs, Daniel, U.C. Santa Cruz, Ph.D.	Electron and Petrographic microscopy of Calera Limestone at Permanente, and Laytonville

SUMMARY - GEOLOGICAL REPORTS AND MEMORANDA ON PERMANENTE PROPERTY

DATE	TITLE	AUTHOR	CONTENT
1974	Petrography and Diagenesis of Franciscan-Limestones	Wachs, Daniel and Hein, J.R.	Detail on Calera limestone.
Mar 29, 1974	Letter to J. K. Walker	Ellis, W.C.	Review of J. F. Snell's quarry reserve estimates.
May 24, 1974	Memo to J. H. Lucas	McCloud, J.P.	Recommends geologic mapping of ridge across Permanente Creek from quarry.
1975	Geologic Map of the Sargent-Berrocal Fault Zone	U. S. Geological Survey, Sorg, D.H. & McLaughlin, R.J.	1:24,000 scale map; descriptions of faults, earthquakes, landslides, mineral springs.
Jan 1975	Franciscan Limestones and Their Environments of Deposition	U. S. Geological Survey, Wachs, D. & Hein, J.R.	Limestone characteristics and origin.
Jul 21, 1977	Cover Memo, Open File Report, Vicinity Map, Topographic Map, Geologic Map, and Use Permit	California Division of Mines and Geology, Stinson, Melvin C.	Evaluation of Permanente aggregate reserves.
1978	Limestone, Dolomite, and Shell Resources of the Coast Ranges Province, California	California Division of Mines and Geology, Hart, Earl W.	Includes descriptions of Monte Bello Ridge and Permanente deposits.
Feb 1980	Franciscan Limestone Geology and Resources at Permanente and New Almaden, Santa Clara County, California	Kupferman, Steven A., Geological Engineer, Kaiser-Cement Corporation	Stratigraphy, structure, origin, economic potential.
Dec. 1981	The Santa Clara Formation and Orogenesis of Monte Bello Ridge, Northwest Santa Clara County, CA	William L. Vandethurst San Jose State University MS Thesis	Stratigraphy and structure of Santa Clara Fm.
May 28 1982	Geology of the Permanente Property, KCC	Mathiesen, E.L., Associate Geologist, KCC	Geology of KCC's Permanente property, excluding quarry and plant areas.

APPENDIX B

SLOPE STABILITY STUDY

Slope Stability

Pit Area - Based upon a 1975 investigation of slope stability of the Permanente quarry by Golder, Brawner & Associates, recommended overall slope angles for the pit are listed below:

	Pit Area	Recommended Overall Slope Angle	Bench Angle (Min.)
1.	Slopes on south side Facing 00 ^{0} (North)	Theoretically stable up to 75 ^{0}.	62 degrees
	Facing 020 ^{0}	Theoretically stable up to 75^{0}.	62 degrees
	Facing 090^{0}	Theoretically stable up to 57^{0}.	----
2.	Northern slopes from western end of pit-eastern end of sepentine slide area		
	Facing 090^{0}	60 Degrees	----
	Facing 130^{0}	46 Degrees	----
3.	Northern slopes from eastern end of serpentine slide area to western end of pit		
	Facing 130^{0}	44 Degrees	

	Pit Area	Recommended Overall Slope Angle	Bench Angle (Min.)
4.	East face		
	Facing 130°	Theoretically stable up to 72°	52 Degrees
	Facing 200°	Theoretically stable up to 90°.	52 Degrees
5.	Southern and southeastern faces excluding 1. above		
	Facing 230°	48 Degrees	----
	Facing 295°	46 Degrees	----

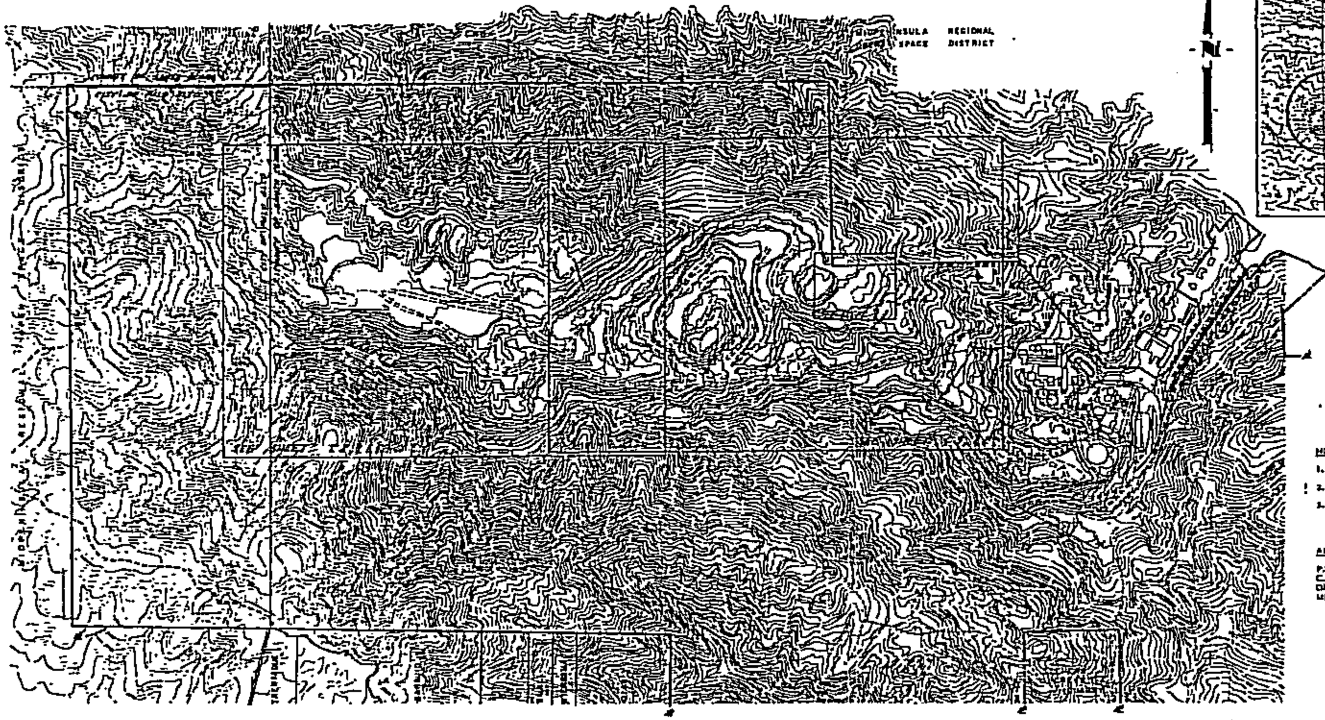
The existing and design overall pit slope angle of 45° (1:1) is within these recommendations.

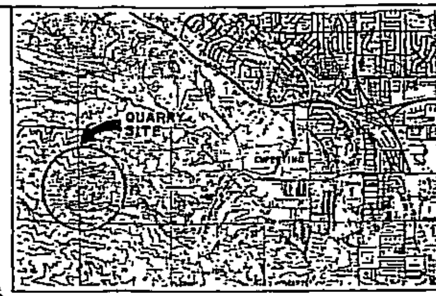
The 1975 study was primarily concerned with the stability of the "serpentine slide area" located on the north-northwest side of the pit. No final recommendations were made concerning stabilization of this "serpentine" slide mass. However, in 1978 and 1979 approximately 440,000 cubic yards of material was removed from this area. The slope was graded and cut back to an overall angle of approximately 26°. Terraces, drainage

ditches, and revegetation were installed for drainage and erosion control. The regrading work to remove the driving force on the slide along with the fact that a block of limestone remains in the pit below the "serpentine slide area" acting as a buttress, has mitigated the previous problem of gross instability in this area. Since 1979, and probably due to recent wet winters, an area of localized surface slumping has occurred in the lower portion of the "serpentine" slope. This area does not reflect any gross instability in the slope and will be re-graded in order to restore drainage along terraces.

Groundwater seepage has not been observed in quarry faces except for isolated seepage zones on the "serpentine" slope. This seepage occurs seasonally, during wet weather in the winter and usually dries up in the summer. There are no uniform geologic structures in the serpentine unit and it appears that seepage follows random fractures and shear zones.

Rock Storage Areas - Rock fill slopes of 3 (horizontal) :1 (vertical) in the rock storage areas are shallow and should be stable. Existing rock fill slopes at slope angles 1-1/2:1 located just east of the main pit shown no sign of instability. Design fill slopes in the rock storage areas will be terraced and revegetated in order to control drainage and erosion.





VICINITY MAP

NOTES

1. TOPOGRAPHY MAPS SUPPLIED BY KAISER CEMENT CORPORATION.
2. DATUM: ALL ELEVATIONS ARE BASED ON USC & GS DATUM.
3. FINISHED CONTOURS FOR PIT 29 AND ROCK STORAGE AREA ARE BASED ON DRAWINGS BY KAISER CEMENT CORPORATION.

ABBREVIATIONS

P.L. - PROPERTY LINE
C.M.P. - CORRUGATED METAL PIPE
DIA. - DIAMETER
MIN. - MINIMUM

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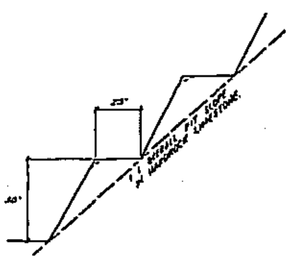
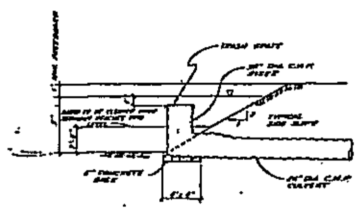
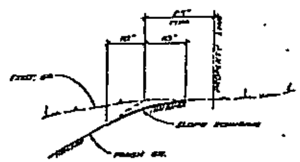
Office of Mine Reclamation



PIT WALL SECTION
N.T.S.



BASIN AND OUTLET SECTION
N.T.S.



TYPICAL SLOPE ROUNDING FOR TOP OF SLOPE

INDEX

SHEET	DESCRIPTION
C1	COVER SHEET
C2	RECLAMATION PLAN
C3	RECLAMATION PLAN
L1	REVEGETATION PLAN
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L4	REVEGETATION NOTES

91-43-0004

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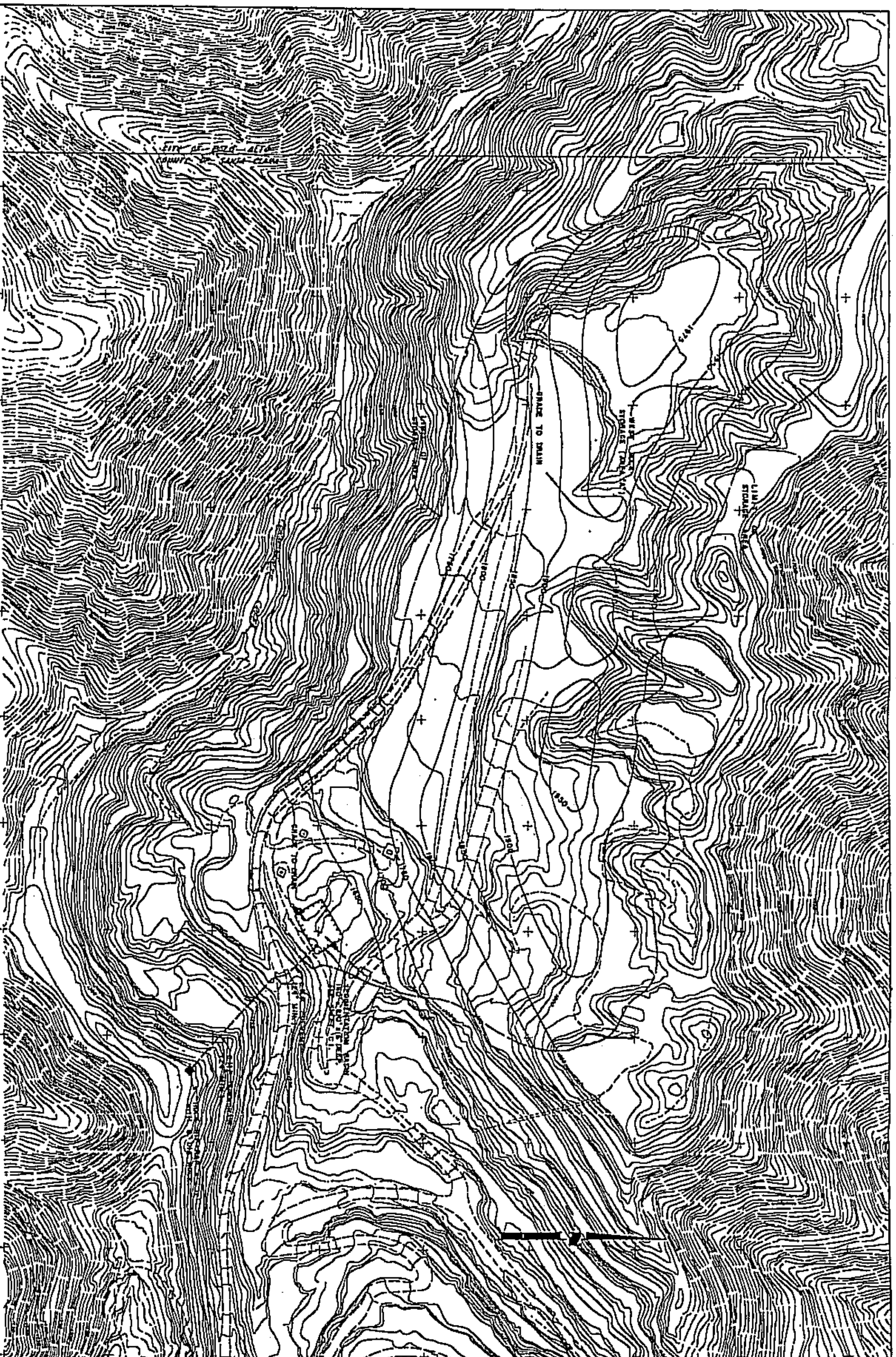
RECLAMATION PLAN
PERMANENTE QUARRY
KAISER CEMENT CORPORATION — SANTA CLARA COUNTY, CALIFORNIA

REVISIONS

SHEET 1
C1
OF 7 SHEETS



RECLAMATION PLAN

PERMANENTE QUARRY

KAISER CEMENT CORPORATION — SANTA CLARA COUNTY, CALIFORNIA

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SHEET C2 OF 7 SHTS.

REVISIONS			
MARK	DATE	BY	DESCRIPTION

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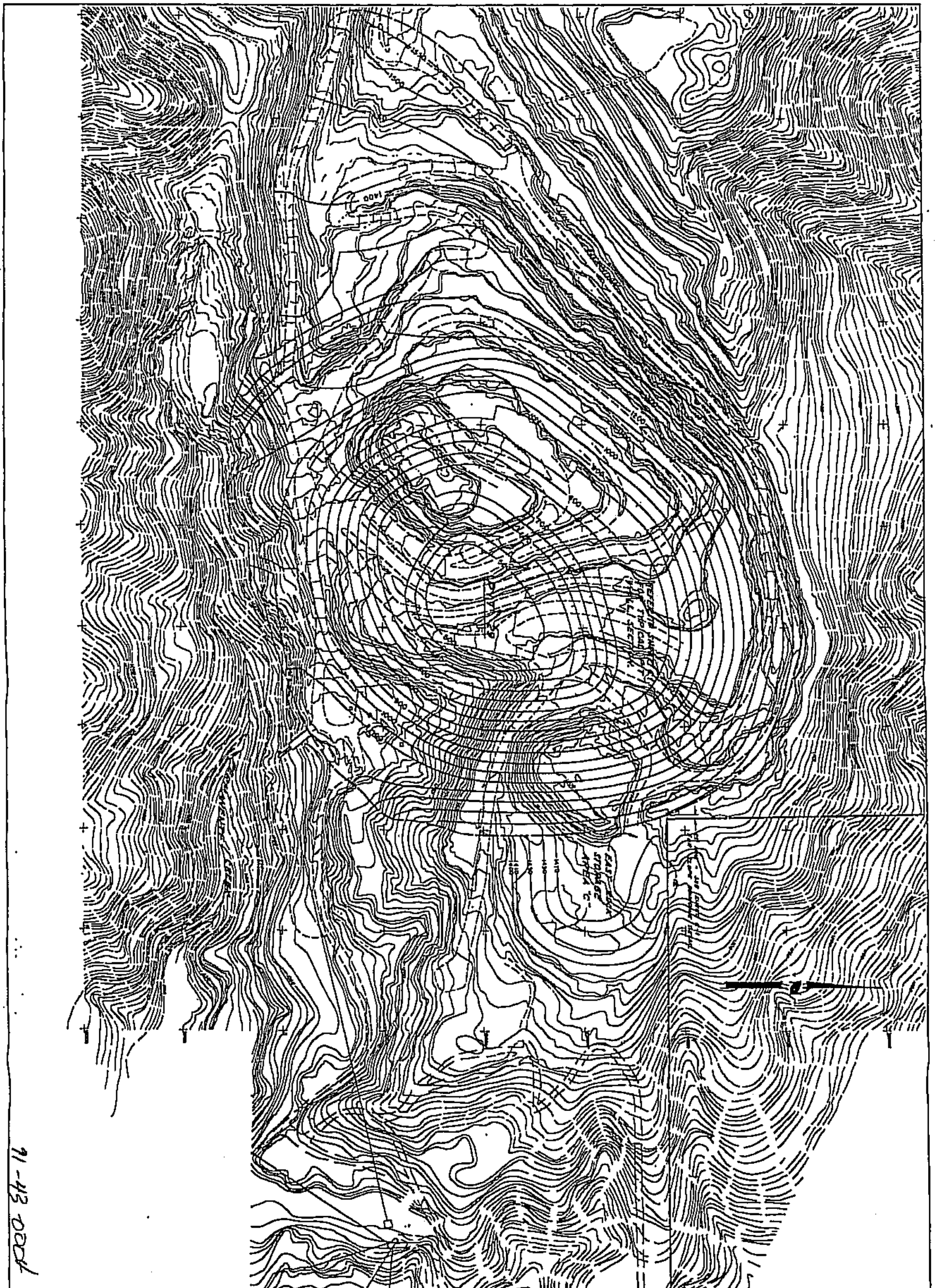

91-43 000l

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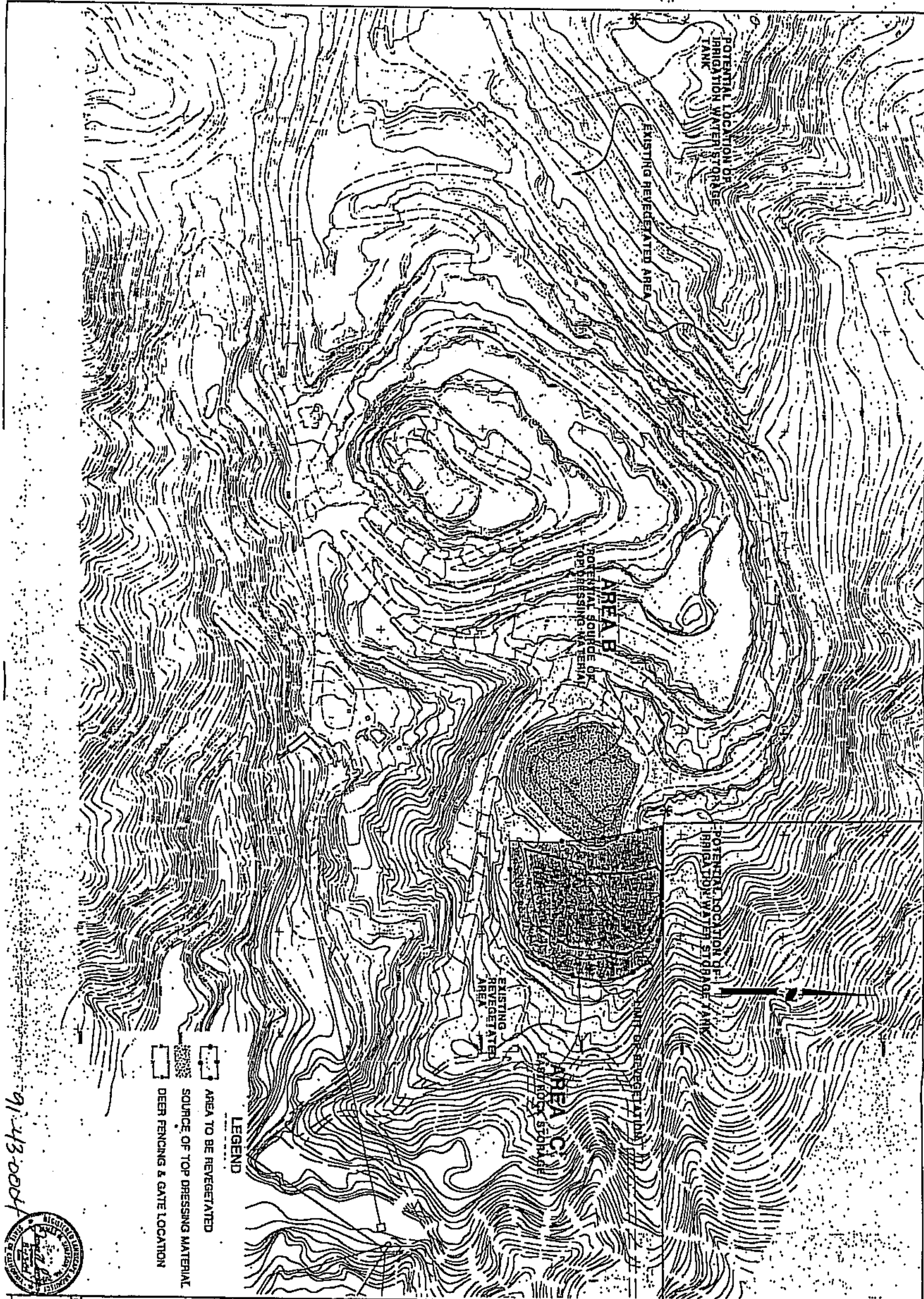
MARK	DATE	BY	DESCRIPTION

RECLAMATION PLAN

PERMANENTE QUARRY

KAISER CEMENT CORPORATION — SANTA CLARA COUNTY, CALIFORNIA

SHEET C3



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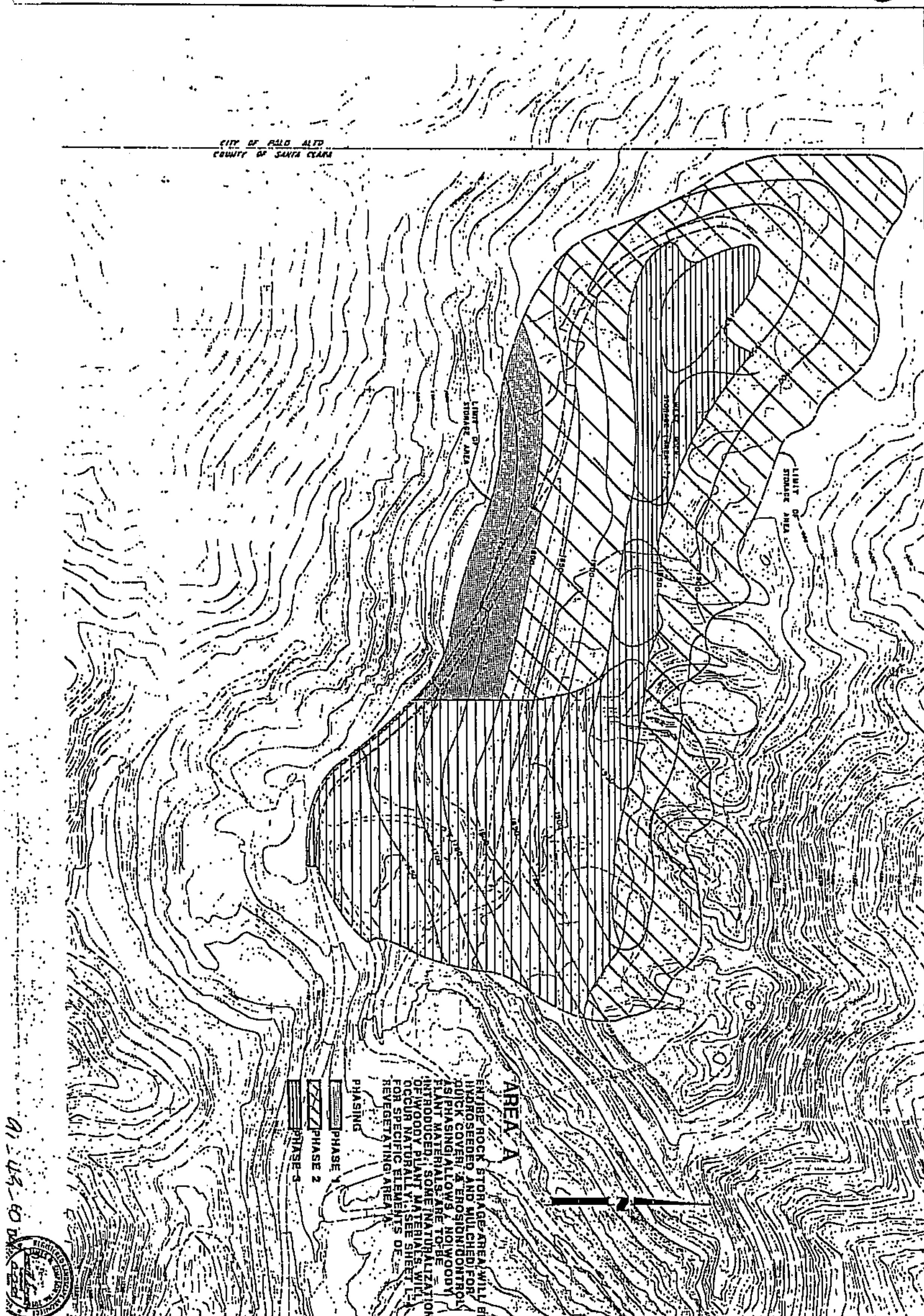
REVEGETATION PLAN

PERMANENTE QUARRY

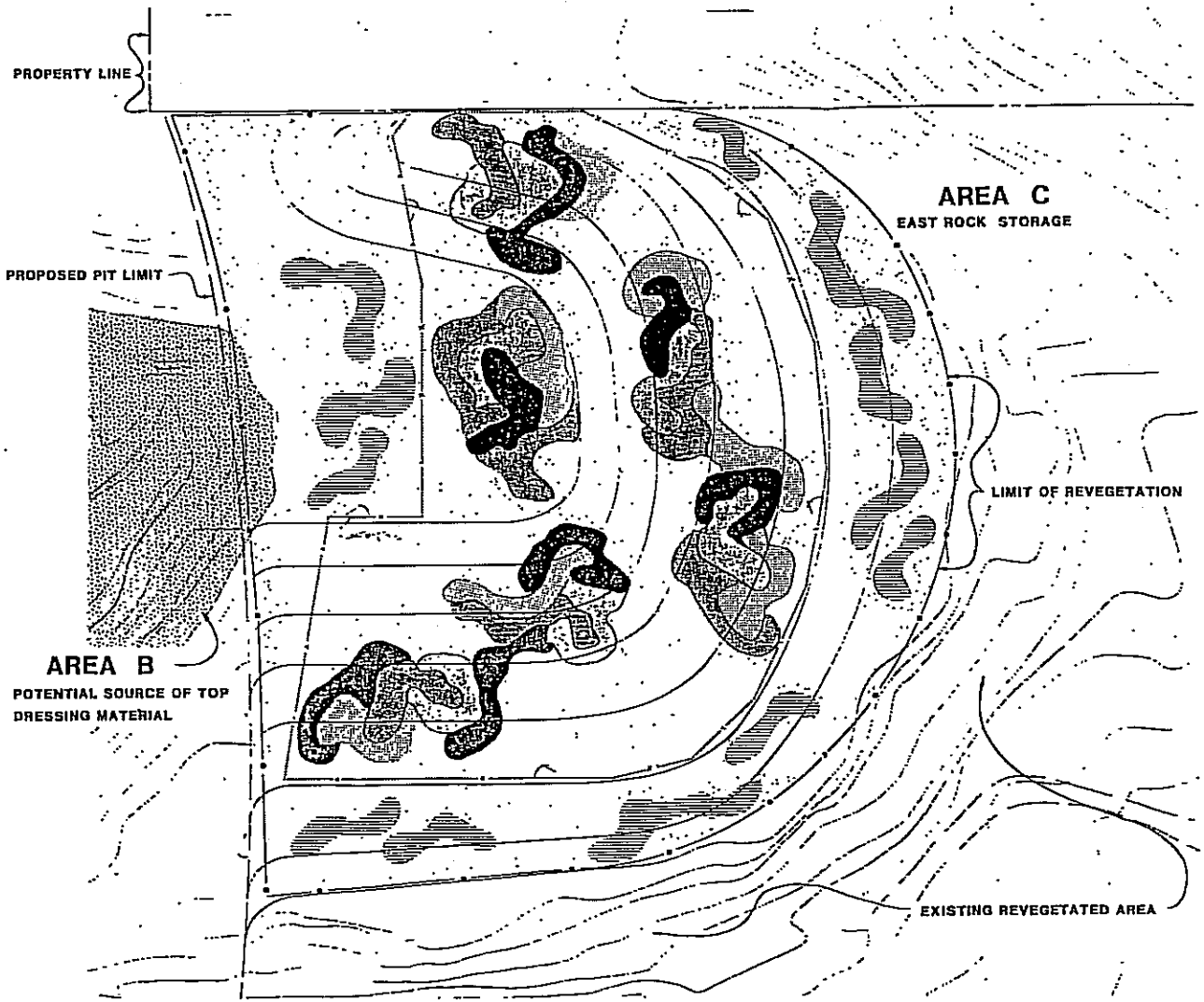
KAISER CEMENT CORPORATION — SANTA CLARA COUNTY, CALIFORNIA

REVISIONS			
MARK	DATE	BY	DESCRIPTION

L1



SHEET	DATE AUG. 15 1984	Ruth and Going, Inc. architecture engineering planning	REVEGETATION PLAN	REVISIONS
L2		DESIGN / CH'KD / DRAWN / SCALE / RES. NO.	PERMANENTE QUARRY — KAISER CEMENT CORPORATION — SANTA CLARA COUNTY, CALIFORNIA	MARK / DATE / BY / DESCRIPTION



LEGEND

AREA TO BE REVEGETATED

SOURCE OF TOP DRESSING MATERIAL

DEER FENCING

PLANT LEGEND

COMMON BUCK BRUSH	210
COYOTE BRUSH	180
GOLD CUP OAK	210
LEATHER OAK	210
COYOTE BRUSH WILD BUCKWHEAT	400
HYDROSEED MIX	
TOTAL	1210

NOTE:

EACH PLANT GROUPING WITHIN FENCED AREA CONTAINS 40 SEEDLINGS.

EACH PLANT GROUPING OUTSIDE FENCED AREA CONTAINS 25 SEEDLINGS FOUR HAVE 50.

FIRST AREA TO BE REVEGETATED SHALL BE CONTOUR 1400 TO 1420. OTHER AREAS SHALL BE PLANTED AS FILL OPERATIONS ARE COMPLETED.

NORTH

1":50'-0"

91-45-00043

REVEGETATION PLAN

PERMANENTE QUARRY

KAISER CEMENT CORPORATION SANTA CLARA COUNTY, CALIFORNIA

REVISIONS

DESCRIPTION | BY | DATE

R+G Ruth and Going, Inc.

SHEET L3

PLANT LIST

The proposed revegetation plan incorporates elements to help establish successful growth of native and naturalized plant materials on the cut and filled slopes. [illegible] By incorporating plant materials indigenous to the site [illegible] supply, nutrient supply and protection from deer browsing are addressed.

Each area to be revegetated possesses unique qualities which require specific recommendations. The recommendations follow these general comments regarding the plant pallet, water and nutrient supply and protection from deer browsing.

Each area to be revegetated shall be planted with herbaceous perennials and woody plant materials to provide both short and long term plant establishment. This can be broken down into three groups of plant materials which may be used amongst:

1. Permanent woody plant species which will eventually provide the dominant vegetative forms. These species may take 8-10 years to fill significant amounts of area. These materials should be planted from containers, preferably leach-tube grown seedlings. These seedlings would have approximately 1 years growth at the time of installation. Plants with an asterisk * are not native, however are [illegible] plant materials are listed.

<u>Trees</u>

Pinus muricata*
    Bishop Pine
Populus fremontii 'Nevada'*
    Male Fremont Cottonwood
Quercus agrifolia
    Coast Live Oak
Quercus chrysolepis
    Gold Cup Oak
Quercus dumosa
    Scrub Oak
Quercus durata
    Leather Oak

Quercus kelloggii
    Black Oak

<u>Shrubs</u>

Acacia redolens*
    Prostrate Acacia (Non-reseeding)
Arctostaphylos crustacea
    Brittle-leaf Manzanita
Ceanothus cuneatus dubius
    Common Buck Brush
Ceanothus [illegible]
    Jim Bush
Fremontodendron
    California Flannel Bush
Hybrid Flannel Bush
    California Sunset or San Gabriel
Pickeringia montana
    Chaparral Pea

In addition to these plants Adenostoma fasciculatum, Chamise and Toxicodendron diversiloba, Poison Oak would be included in this category and are found naturalizing on the site.

2. Woody plants which will produce significant growth in approximately 3 years and can compete with other species to remain as permanent members of the plant community. These materials are the most deer browse resistant found on the site.

<u>Shrubs</u>

Baccharis pilularis consanguinea
    Coyote Brush
Eriogonum fasciculatum
    Wild Buckwheat

3. Plant species which may be hydroseeded over large areas to provide cover during the first year and help prevent erosion. In addition, these species will self sow and reseed as long as they are able to compete with woody plants.

Achillea millefolium californicum
    Yarrow
Briza minor*
    Little Quaking Grass
Briza maxima*
    Rattlesnake Grass
Bromus mollis*
    Soft Chess
Clarkia concinna
    Red Ribbons
Clarkia unguiculata
    Elegant Clarkia
Diplacus aurantiacus
    Sticky Monkeyflower
Eriodictyon californicum
    Yerba Santa
Limnanthes grandiflora
    California Phlox
Lotus scoparius
    Deerweed
Lupinus albifrons collinus
    Hilly Bush Lupine
Lupinus bicolor
    Lindley's Annual Lupine
Lupinus hirsutissimus
    Nettle Annual Lupine
Lupinus succulentus
    Succulent Annual Lupine
Oenothera argillicola
    Shale Evening Primrose
Oenothera hookeri hookeri
    Hookers Evening Primrose
Oenothera pallida
    White Evening Primrose
Rudbeckia hirta
    Black Eyed Susan
Stylomecon heterophylla
    Wind Poppy
Zauschneria californica
    California Fuchsia

The following native species which are found in the surrounding plant communities or on-site are not used for the stated reasons.

Adenostoma fasciculatum, Chamise is difficult to produce from seed and cuttings. Once a vegetative cover is established this species will appear naturally.

Aesculus californica-Buckeye, Heteromeles arbutifolia-Toyon, Rhamnus californica-Cascara Berry, Toxicodendron diversiloba-Poison Oak. These species do not naturally appear on open slopes without some woody plant cover. Once the main develop sufficient canopies they may be introduced. They could be introduced on-site once the seedlings planted reach mature size and they will probably establish themselves naturally once conditions for survival are appropriate.

The preceding list of plant materials is a master list. It is not intended that every species or variety listed will be used on-site. It acts as the approved plant list from which selections will be made for the specified recommendations. When a species specifically called out is not available the master plant list shall be consulted to provide a suitable substitution.

IRRIGATION

The site has undergone revegetation programs in the past. One provision of this program has been the installation of an extensive irrigation supply and watering system. This existing system is proposed to be repaired and extended to cover the areas shown to be revegetated with seedlings on these plans. To further insure adequate supply and efficiency two water storage tanks may be located as shown on the plans. These would be used to create proper pressure without the constant operation of pumping equipment. The irrigation delivery will utilize drip or other appropriate low gallonage application. Planting is proposed to take place in the early fall of each year undertaken. These plant materials and seeds will receive the full winter rains and should not need any supplemental irrigation. Once spring rains have stopped, the on-site irrigation will be operated on a monthly basis. Given the extremes of the site's soils and exposure this supplemental water is anticipated to continue for at least 3 years.

DEER PROTECTION

Deer protection may be provided by physical barriers such as fencing or by the use of commercially available chemical repellents.

Given the low effectiveness of the repellents and scale of the subject site repellents are not considered an effective means of protecting the revegetated areas. A system of fencing and screening is proposed to provide the best possible protection for both individual plants/seedings and for large enclosed areas.

The type of fencing proposed utilizes a 8' wire fencing. This type will provide protection and is easier to install on the terrain found on-site. Gates will be provided to allow maintenance of the planted areas and irrigation system.

In areas where it is not feasible to fence or for plant materials given a higher priority for survival individual protective screening is proposed. This screening would consist of low mesh fiberglass shade cloth or aluminum window screen staked around the plant or groups of plants. This screening while protecting against deer browsing also acts to protect against small rodent browsing. This screening would be provided for approximately 1/3 of the tree seedlings within the enclosed fence area to further ensure the survival of the major woody materials. Both the fencing and screening are shown in more detail on the [illegible] plans.

NUTRITION

Existing mature plant materials which have been used in previous revegetation programs on-site show signs of stress due to lack of nutrients. The site is very poor in nutrient value, however the existing plant materials have survived. To increase the survival of the proposed revegetated plants and for the healthy growth of existing materials the following fertilization schedule and application is proposed.

1. New seedlings or specially planted seed areas shall receive (2) slow release planting tablets installed within the root zone. Agriform 9 gram 20-10-5 Forest Starter or equal.

2. All existing mature plant materials and newly planted seedlings shall be fertilized with a water soluble solution. Southern California Organic Fertilizer 300 lbs/Ac. 17-5-5 CRD Power or equal.

3. All hand broadcast or hydroseeded areas shall be fertilized with a water soluble solution. Southern California Organic Fertilizer 300 lbs./Ac. 12-5-5 CRD Power and 300 lbs./Ac. 12-5-5 controlled release CRD Power or equal.

AREA C

This area encompasses one of the most visible of the sites many areas. Fortunately, the soil materials found in this area are suitable for planting with little reworking. The following tasks and elements are proposed to establish a heavy vegetative coverage of this area.

A.

1. Placement of approximately 6 inches of top dressing from AREA B on slopes and plateaus.

2. Fenced enclosure of approximately 400 feet x 430 feet to provide protection for planted materials from browsing deer.

3. Plantings of the following materials at the quantities shown in random groupings within the enclosure.

		Grouping	Total
a.	Baccharis pilularis consanguinea Coyote Brush	60	180
b.	Ceanothus cuneatus dubius Common Buck Brush	60	210
c.	Quercus chrysolepis Gold Cup Oak	60	210
d.	Quercus dumosa Leather Oak	60	210

4. Plantings of the following materials below and outside the enclosure in random groupings spaced approximately 6 feet apart.

		Grouping	Total
a.	Baccharis pilularis consanguinea Coyote Brush	25/30	200
b.	Eriogonum fasciculatum Wild Buckwheat	25/30	200

5. Seeding of the entire slope area with the following seed mix:

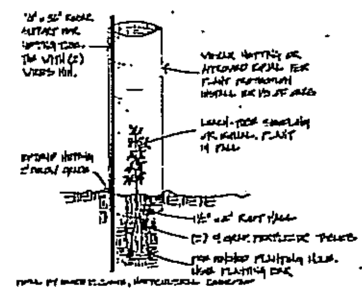
a.	Briza maxima Rattlesnake Grass	3 lbs./Ac.
b.	Clarkia concinna Red Ribbons	1 lb./Ac.
c.	Lotus scoparius Deerweed	1 lb/Ac.
d.	Oenothera argillicola	2 lb./Ac.

AREA A

This area is located to the west from the previously discussed area. It is primarily used for storage of surplus rock materials. The revegetation proposed for this area is to establish quick cover and erosion control. Seeding will be phased as each portion is revegetated as it becomes possible. No permanent woody plants will be planted however naturalization by existing on-site plant materials will take place. These plant materials to be used in the seed mix are:

a.	Briza Minor Little Quaking Grass	3 lbs./Ac.
b.	Bromus mollis Soft Chess	10 lbs./Ac.
c.	Clarkia unguiculata Elegant Clarkia	1 lb/Ac.
d.	Lupinus bicolor Lindley's Annual Lupine	3 lbs/Ac.
e.	Oenothera argillicola Shale Evening Primrose	1 lb./Ac.
f.	Rudbeckia hirta Black Eyed Susan	1 lb./Ac.
g.	Stylomecon heterophylla Wind Poppy	6 lbs./Ac.

All seed mixes shall be applied with 2000 lbs./Ac. of wood cellulose fiber mulch and Terra Tack III stabilizer when hydroseeded. When hand seeded, mix seed and fertilizer with sand to facilitate even dispersement.



SEEDLING PLANTING DETAIL   NTS

BARRIE D. COATE

91-43-000A

REVEGETATION PLAN

PERMANENTE QUARRY

KAISER CEMENT CORPORATION   SANTA CLARA COUNTY, CALIFORNIA

MARK	DATE	BY	DESCRIPTION

REVISIONS

R+G Ruth and Going, Inc.
architecture engineering planning
San Jose California

DESIGN ___ DRAWN ___ CH'KD ___ SCALE ___ RES.NO. ___

DATE ___

SHEET L4 OF ___ SHEETS