APPENDICES

006413

A

006414

APPENDIX A

LETTER FROM ADVANCED CONCRETE TECHNOLOGIES

ADVANCED CONCRETE TECHNOLOGIES

11622 NEWPORT AVE. SANTA ANA, CA 92705
(714) 731-0906

July 24, 1995

Brian Mooney
Brian F. Mooney Associates
9903-B Buisinesspark Avenue
San Diego CA 92131-1120

RE: PERMEON color restoration on Palomar Aggregates, Rosemary's Mountain Project.

Gentlemen

Your facsimile transmission of July 24, 1995 advised County Planners have requested a description of Permeon and a statement from a "Permeon professional" verifying the methods of Permeon application described in the DEIR can work.

"PERMEON" is a registered trademark for technology developed and patented by Arizona State University and licensed exclusively to Advanced Concrete Technologies. (Patent # 5,308,646) A full description of Permeon is contained in the enclosed copy of the patent. The last paragraph of column 1 sums up the process.."a need still exists for providing means and methods to restore disturbed rock beds and mountainsides to a natural look in an environmentally friendly, economically viable manner."

The Permeon colors that develop in days are identical to those requiring thousands of years to form naturally. On Rosemary's Mountain, an on-site test program will help establish the Permeon formulation and application technique required to produce colors that will match or approximate the surrounding surfaces.

Federal Agencies now specifying Permeon as part of mine reclamation efforts include the Bureau of Land Management and the U.S. Forest Service. Other agencies specifying Permeon for use on rock and concrete surfaces include the National Park Service, Federal Highway Administration and Highway Departments of Washington, Oregon, Colorado, Utah, California and Arizona.

We hope this information will be useful and look forward to hearing from you if we can provide additional information or references.

Sincerely

Bill Reynolds
copy: Jim Marquardt

US005308646A

United States Patent [19]

Moore

[11] Patent Number: 5,308,646

[45] Date of Patent: May 3, 1994

[54] METHOD OF SIMULATING NATURAL DESERT VARNISH

[75] Inventor: Carleton B. Moore, Tempe, Ariz.

[73] Assignee: Arizona Board of Regents, Tempe, Ariz.

[21] Appl. No.: 572,194

[22] Filed: Aug. 23, 1990

[51] Int. Cl.^{5} B05D 1/02; C09C 1/22

[52] U.S. Cl. 427/136; 427/140; 428/919; 428/16; 428/15; 106/456; 106/459; 106/463; 106/500

[58] Field of Search 427/136, 140, 126.1, 427/126.3; 156/61; 428/919, 15, 16; 106/456, 459, 463, 500

[56] References Cited

U.S. PATENT DOCUMENTS

333,457	12/1885	Foster	427/283
3,650,708	3/1972	Gallagher	204/30
3,955,018	4/1976	Liberto et al.	427/16
4,082,871	4/1978	Peters	427/15
4,725,451	2/1988	Cripe	427/136
4,812,340	3/1989	Cripe	156/61

OTHER PUBLICATIONS

CA Abstract 112:10810j; "Aqueous Solution for Applying an Artificial Patina" Kato, K. (JP 01-062479) 8 Mar. 1989.

Primary Examiner—Karl Group
Assistant Examiner—Scott L. Hertzog
Attorney, Agent, or Firm—Richard R. Mybeck

[57] ABSTRACT

Means, methods and compositions for simulating natural desert varnish. A solution containing soluble metallic acetate salts selected from the group consisting of iron (II), manganese(II) and mixtures thereof and indigenous clay when appropriate is sprayed on distressed or abused natural or artificial rock to produce a preselected patina which is compatible to the indigenous area.

10 Claims, No Drawings

006417

A rock surface that is, a surface which has no natural desert varnish, or a surface which has had its natural desert varnish covering disturbed, is selected. The acetate solution, prepared as indicated, is applied to the disturbed rock surface in a single step as by brushing or spraying. As the applied solution begins to dry, it will oxidize and color will begin to develop. In a period of approximately ten days, the applied varnish solution will attain its desired color. The above solution may be utilized to produce a color ranging from light brown to black by varying the manganese:iron ratio in the solution and, when indicated, by the addition of indigenous clays to the solution.

Clay, when added to the solution, will further vary the color, texture and thickness produced when the solution is applied and cured thereby allowing the resulting patina to more nearly match the physical appearance of the natural aged rock disposed in close proximity to the surfaces selected to receive the application of the remedial solution. In practice, any chemical source of soluble manganese (II), iron (II), and acetate ions may be used to form the solution including the pure acetate salts of manganese(II) and iron(II).

The compositions and methodology hereof are especially useful for those builders who must comply with strict Hillside Building Regulations currently enforced by many desert and mountain communities such, for example, as Paradise Valley, Ariz.

To further assist in the understanding of the present invention and not by way of limitation, the following examples are presented:

EXAMPLE 1

A plurality of iron-II acetate solutions were prepared by mixing solutions of iron sulfate and sodium acetate. The resulting solutions were applied to scarred granitic and quartzite rocks in the concentrations listed below and allowed to age. The colors developed ranged from brown to light rusty orange, using the color code adopted in the Geological Society of America, Roche Color Chart, reprinted 1980.

The iron sulfate [heptahydrate] and sodium acetate are mixed in the ratio by weight of 1.9 sulfate to 1 of acetate. The mixture was mixed in water to form the concentrations shown in table I.

TABLE I

Weight of dry Mixture/Liter soln.	Color Obtained	Color Code
240 g	moderate brown	(5 YR 4/4)
120 g	moderate yellowish brown	(10 YR 5/4)
60 g	grayish orange	(10 YR 7/4)

EXAMPLE 2

Several manganese II acetate solutions were prepared in varying concentrations as shown in TABLE II and applied to concrete block walls and scarred granitic rocks. The colors developed successfully and ranged from black to grayish orange as shown.

TABLE II

Manganese II acetate tetrahydrate concentration (Molar)	grams/liter	Color Obtained	Color Code
2	500	blackish red	(5 RR 2/2)
1	245	dusky brown	(5 YR 2/2)
0.5	123	grayish brown	(5 YR 3/2)

TABLE II-continued

Manganese II acetate tetrahydrate concentration (Molar)	grams/liter	Color Obtained	Color Code
0.25	61	dark yellowish brown	(10 YR 4/2)
0.1	24.5	moderate yellowish brown	(10 YR 5/4)
0.05	13	grayish orange	(10 YR 7/4)

EXAMPLE 3

Various concentrations of mixture of iron and manganese sulfate in sodium acetate were prepared mixing 0.3 kg of manganese sulfate heptahydrate with 0.05 kg of iron sulfate heptahydrate and 0.22 kg of sodium acetate with one liter of water.

The colors developed successfully and ranged from dusky brown to grayish orange as shown in TABLE III.

TABLE III

Mixture (grams/liter)	Color Obtained	Color Code
250	dusky brown	(5 YR 2/2)
125	grayish brown	(5 YR 3/2)
62	dark yellowish brown	(10 YR 4/2)
30	grayish orange	(10 YR 7/4)

EXAMPLE 4

Approximately fifty square feet of freshly exposed (no desert varnish formed since disturbed) granite rock was sprayed with a mixture of 120 grams of manganese sulfate tetrahydrate and sodium acetate prepared accordingly to Example 2 and admixed in a liter of water. The entire area was sprayed with a portable hand-pressurized garden sprayer until a dark coating resulted from the treatment and within ten to fourteen days after the treatment, a moderate yellowish orange patina resembling naturally occurring desert varnish developed on the treated site.

The composition and process of this invention has been found effective on a variety of igneous, metamorphic, sedimentary and artificial rocks including: basalt, andesite rhyolite, diorite, gabbro, metarhyolite, quartzite, phyllite, schist, gneiss, hornfels, sandstone, conglomerate, graywacke, chert, siliceous carbonates and concrete. It should be noted, however, that readily soluble and unstable rock surfaces such as pure limestone and stone while accepting, will not maintain the surface over long periods of time because friable sedimentary rocks and unstable slopes will take, but not support, the coatings because of their propensity for continued erosion.

A number of specific examples of the preferred embodiments of the practice of this invention has been set forth above, and from the teachings of this disclosure persons ordinarily skilled in the art will appreciate that other and different embodiments may be devised without undue experimentation, all of which are within the spirit and scope of this disclosure and the invention covered thereby. For example, although the preferred embodiment of the process at present contemplates the application of the chemicals to the substrate by spraying, other methods of applying the chemicals may be used, such as brushing, dipping, and the like.

METHOD OF SIMULATING NATURAL DESERT VARNISH

INTRODUCTION

The present invention relates to a means and methods of simulating in a matter of days, the desert varnish produced by nature over decades and longer periods of time. The invention further relates to articles of manufacture simulating the surface appearance of natural desert varnish.

BACKGROUND OF THE INVENTION

Much of the desert areas, both valleys and mountains, found in arid and semi-arid regions of the United States and other parts of the world are covered by a thin coating of generally dark coloration commonly called "desert varnish". For example, in the Southern California and Arizona deserts, this varnish covers the majority of the coherent-stable rock surface including mountain ranges. In some areas of Southern California desert varnish has been reported to be formed in as little as twenty-five years after exposure of fresh rock. However, in other areas, such as Arizona, petroglyphs documented to have been formed four hundred to a thousand years ago by scraping away desert varnish coatings have not been covered by the re-establishment of the desert varnish. In Egypt desert varnish is barely perceptible on pyramids that have existed for more than 5,000 years.

In desert areas, man's activities, such as in the construction of dams, roads, preparation of sites for construction and other activities of a like nature have exposed large, unsightly areas of lightly colored glaring scarps of freshly exposed rock which are visible from great distances as unsightly anomalies on the desert landscape. The removal of the natural desert varnish in this fashion occurs in both urban and rural areas and is particularly objectionable in the highly visible mountain areas; for example, where large cuts and fills are made to accommodate building sites and major roadways.

Nature's timetable in restoring the desert varnish to the freshly exposed rock is much too long and in some cases extends over centuries. Therefore, a real and urgent need exists for means methods and products which can be used to restore the natural desert varnish or to cover the exposed areas with a suitable substance of manufacture which will at least engender or simulate desert varnish coated natural rock.

One prior art effort to realize a solution to this problem included shocking exposed rock with caustic solutions and thereafter painting the pre-treated rock with one or more metallic salts, preferably those of manganese and/or iron in the form of chlorides, sulfates and nitrates. While obtaining amelioration of the eyesores to a modest degree, this procedure was environmentally unfriendly, labor intensive and prone to washing if subjected to inclement weather during the cycle prescribed. Thus, the procedure was sometimes ineffectual in unequivocally obtaining the substantially permanent uniform visual repair desired.

Accordingly, a need still exists for providing means and methods to restore disturbed rock beds and mountainsides to a natural look in an environmentally friendly, economically viable manner. It is toward the satisfaction of these needs that the present invention is directed.

BRIEF SUMMARY OF THE INVENTION

The present invention relates generally to means, methods and compositions for restoring a natural patina to disturbed rock and hillside surfaces and to the creation of a natural patina on artificial rock such as concrete. More particularly, the present invention relates to means and methods of applying a specially formulated composition, herein called "desert varnish", to such surfaces which upon a limited period of oxidation will create a natural appearing surface. The composition hereof is prepared to simulate a natural texture, the color of which can be adjusted to produce a coating having shades ranging from a light brown to a reddish black, depending on the terrain onto which the restoration is carried out or the color desired. The color adjustments are obtained by varying the active components, and by varying relative proportions of the several components which are used to create the solution to be applied.

Specifically, the composition hereof comprises a blended solution of manganese acetate and iron acetate, each of which will range from about 0.01 to 2 molar in strength depending on the result desired. In one practice of the present invention, the manganese acetate and iron acetate solution is formulated by the addition, with stirring, of an ammonium, sodium, potassium or like salt of acetic acid to a soluble manganese or iron compound such as the sulfate, chloride or nitrate. The resulting solution is then applied to the selected surface in a single step by spray or brush, and allowed to dry. The acetates, when so formed and deployed proceed to oxidize and will achieve the desired patina in a period of about ten days. The solution may be augmented with indigenous clays to effectuate the precise color, texture or thickness desired which will match the indigenous color of the surroundings.

In another practice of the present invention the pure acetate salts, usually can be mixed directly into the water solvent.

Accordingly, a principal object of the present invention is to provide novel and unique methods and compositions for imparting or restoring a natural patina to disturbed or artificial rock without requiring the use of environmentally unfriendly caustic or acidic materials or time and labor consuming pretreatments.

Another object of the present invention is to provide a new and improved methodology for imparting or restoring a natural patina to disturbed or artificial rock which is simple to apply, resistant to weather, and chemically neutral relative to the environment.

These and still further objects as shall herein after appear are fulfilled by the present invention in a remarkably unexpected fashion as will be readily discerned from the following detailed description of the preferred embodiments hereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A 0.01 to 2 molar aqueous solution of metallic acetate selected from the group consisting of iron, manganese, and combinations thereof, is created using conventional mixing techniques. The solution may be made by introducing dry manganese acetate and/or iron acetate into water or by adding a preselected amount of an acetic acid salt such as ammonium, sodium or potassium acetate, to a solution containing a soluble manganese or iron compound such as a sulfate, chloride or nitrate.

From the foregoing, it is readily apparent that a useful embodiment of the present invention has been herein described and illustrated which fulfills all of the aforestated objectives in a remarkably unexpected fashion. It is of course understood that such modifications, alterations and adaptations as may readily occur to the artisan confronted with this disclosure are intended within the spirit of this disclosure which is limited only by the scope of the claims appended hereto.

Accordingly, what is claimed is:

1. A method of simulating natural desert varnish comprising preparing a solution containing metallic ions selected from the group consisting of iron (II) and manganese (II), having a molarity from about 0.01 to 2, and acetate ions; applying said solution to a selected rock surface upon which it is desired to form an artificial coloration; and allowing said solution to dry and oxidize to form said coloration.

2. A method according to claim 1 in which said metallic ion is selected from the group consisting of the chlorides, sulfates and nitrates of iron and manganese.

3. A method according to claim 1 in which said acetate ions are selected from the group consisting of ammonium, sodium, and potassium acetic acid salts.

4. A method according to claim 1 in which said solution contains ions of only one metal.

5. A method according to claim 1 in which clay is added to said solution in an amount sufficient to vary the color, texture and thickness of said coloration.

6. A method according to claim 1 in which said coloration ranges from light brown to black.

7. A method according to claim 1 in which said metallic ions include ions of both manganese and iron

8. The method of restoring a natural patina to a disturbed hillside comprising preparing a water solution of metallic ions selected from the group consisting of the chloride, sulfate and nitrate of manganese and iron admixed with an acetate selected from the group consisting of the acetic acid salts of ammonium, sodium and potassium; spraying said solution on said disturbed hillside; drying said solution; and oxidizing said solution to create said natural patina.

9. A method according to claim 8 in which said acetate ions are selected from the group consisting of ammonium, sodium, and potassium acetic acid salts.

10. A method according to claim 8 in which said coloration ranges from light brown to black.

* * * * *

006420

B

APPENDIX B

LETTER FROM CALIFORNIA DRILLING & BLASTING

CALIFORNIA DRILLING & BLASTING CO.,INC.
4144 N. ARDEN DRIVE • P.O. BOX 4607 • EL MONTE, CALIFORNIA 91731 • (818) 443-0310 • (213) 283-6770

EXPLOSIVES USE AND BLASTING PLAN

FOR

PALOMAR AGGREGATES QUARRY

APPLICANT : CALIFORNIA DRILLING & BLASTING CO., INC.
P O BOX 4607
EL MONTE, CA 91734

GENERAL LOCATION OF BLASTING

Rosemary's Mountain on Pankys Ranch East of Interstate 15, North of Highway 76 San Diego County Plot No. 87-021.

JUSTIFICATION FOR BLASTING

To conform with the current approved grading plan, rock has to be excavated, it is too hard and large for conventional grading equipment to rip. The request for explosive use and blasting on this site is required to create fractures in the rock for excavation.

BLASTING OBJECTIVES

The objective in blasting is to fracture the natural in-place rock to excavate, leaving a sculpted face to create an irregular rock surface resembling natural conditions. The final surface, as shown in Palomar Aggregates sculpting plan, is accomplished by using proven blasting techniques.

CONTROLLED BLASTING

Controlled blasting is used to ensure there will be no damage to property from excessive vibrations or flyrock. The primary responsibility is safety to all individuals in and near the blast site. Controlled blasting refers to limiting the amount of explosive detonated per millisecond delay period with regard to distance from existing utilities and structures. An additional consideration will be the stability of rock slopes created by the blasting.

The precise design of the blasts will be based on specific details existing at the site. Considerations including geological structure, rock type, distance to structures and the grading plan will govern hole size and depth of blasts. In order for blasting to be conducted within a specific set of guidelines, it has to be performed in a systematic manner so that the blasting effects can be predictable within reasonable limits. The State of California-Division of Occupational Safety and Health (OSHA) licensed Blaster is the responsible person in charge of the blasting operations. His work is monitored by the Federal Mine Safety and Health Administration, (MSHA), to ensure a hazard free work area and safe operating procedures.

All explosives and related blasting accessories used will be standard commercial products whose performance is predictable and established. Blasts will be initiated with a noiseless non electric controlled time delayed system. This system shall provide for a time delay interval of at least 9 milliseconds between detonation of individual blast holes and if necessary, a delay interval between individual charges in the same blast hole. A 9 millisecond delay complies with recommendations by the U.S. Bureau of Mines in Bulletin 656. Typically, the delay intervals will be from 25 to 50 milliseconds although delays as short as 9 milliseconds may be used. A millisecond is one-thousandth of a second. Millisecond delays provide improved fragmentation, control rock movement and reduce ground vibration and air blast when compared with multiple simultaneous hole detonations in the blast.

BLAST DESIGN - DRILLING

A) Burden: distance from the drill hole to nearest free face or the distance measured between holes perpendicular to the spacing. Burden will be 3 feet to 25 feet, depending on depth of cut.

B) Spacing: distance between holes parallel to the free face and perpendicular to the burden. Spacing will be 3 feet to 25 feet, depending on depth of cut.

C) Hole Diameter: will be 2 inches to - 6 1/2 inches.

D) Subdrilling: typically 10 to 15% of the burden measurement. No subdrilling on final face of cut slopes.

E) Hole depth: depth of holes will vary between 6 feet and 50 feet because of the uneven ground countour.

F) Inclination of holes: all drill holes will be approximately 90 degrees to a level horizontal line except on final cut slope where variable angles will be needed to obtain the rock sculpture objective.

G) Stemming: will be an inert granular material with a minimum length of 70% of the burden measurement.

EXPLOSIVES

All transportation and delivery of explosives to the jobsite will be through W.A. Murphy, Inc.. They have federal, state and county licenses, permits and insurance to transport explosives in the West. All transportation routes and stops are approved by the California Highway Patrol.

All explosives and detonators will be used in accordance with the technical recommendations of the manufacturer and Institute of Makers of Explosives.

There are four key items that must be assembled in proper order before the detonation of a blast can take place. A very small charge is required to propagate an incrementally larger and less sensitive product. Essentially, an explosive train is made where one part is dependent on the next in line to function. The components include an initiator, detonators, primers and blasting agent. All items are confined in the drill hole.

The initiator is a firing cap from a shotgun shell or Cal Osha approved equivalent. It is inserted into a device that makes contact with a noiseless trunkline that ties into the detonators. The shock wave from the firing cap will ignite a coating inside the noiseless trunkline and burn at a fixed rate of 6000 feet per second. The flame front then ignites the detonator. One initiator is required per blast.

The detonator (confined within the drill hole) will be a noiseless, nonelectric time delay device. It only works once, then is consumed in the detonation. A detonator weighs less than one ounce. The detonator is inserted into the primer. The primer will not detonate until the time delay in the detonator has burned and base charge initiated. Each hole requires one downhole detonator.

The primer (confined within the drill hole) can be a cartridge of dynamite or cast booster. The primer is required to initiate the blasting agent. Additionally a product power ditch E, a cap sensitive emulsion may be used.

The blasting agent (confined within the drill hole) is ammonium nitrate. The product is relatively insensitive and for this reason, the Institue of Makers of Explosives designates this material as a blasting agent and not an explosive. The product will be made insensitive with water, and detonation will not be possible. ANFO will provide 90 to 95 percent of all the energy to fracture the rock. When wet holes are encountered a water proof blasting agent must be used, similar to ICI Apex Ultra 40 or an emulsion product.

VIBRATION LIMITS

The amount of vibratory ground motion at any location in the vicinity of a blast site, as prescribed by the U.S. Bureau of Mines, is dependent on three variables:

1) The distance between the blast and the location of interest.

2) The quantity of explosive detonated per delay interval.

3) Scale distance: Is derived as a combination of distance and charge weight influencing the generation of seismic or air blast energy.

The U.S. Bureau of Mines prescribed limit to vibratory ground motion at the nearest private residential property to the blast site shall not exceed a peak particle velocity of 2.0 inches per second.

SEISMIC RECORDING

Prior to any drilling and blasting a licensed seismologist will establish guidelines and monitor initial blasts to establish the criteria to be followed. After this is accomplished California Drilling & Blasting will monitor and record each blast with an approved seismic machine and noise monitor. The machine used by California Drilling & Blasting is a Instatel 1100.

BLASTING COMPLAINTS

Any blasting complaints shall be accurately recorded by California Drilling & Blasting Co., Inc. as to the complaint, address, date, time, nature of the complaint, name of person receiving the complaint and the complaint investigation conducted. Follow up will be performed through Granger-Hanna Insurance Associates and Nobel Insurance Group in a timely manner.

BLASTING DURATION & SCHEDULE

It is anticipated that any blast will not exceed 2 seconds in duration. The blasting will be intermittent. A blasting schedule will be coordinated with Palomar Aggregates Quarry and the San Diego Sheriff's Department.

BLASTING HOURS

Actual blasting hours are normally permitted to occur between 8:00 a.m. and 4:00 p.m.. Exception to the 4:00 p.m. deadline may be made upon demonstration by California Drilling & Blasting Co., Inc. of extraordinary circumstances but under no circumstances shall blasting occur after 6:00 p.m. or dark, whichever is earlier.

SAFETY

All regulations in the State of California Construction Safety Orders will be followed. The division of Occupational Safety and Health is responsible for licensing of all powdermen. The Bureau of Alcohol, Tobacco and Firearms regulates our Federal License to receive, storage of explosives and record keeping. The San Diego Sheriff's Department is responsible on a yearly bais for issuing permits to receive and use explosives and blasting agents within the county.

QUALITY ASSURANCE

California Drilling & Blasting has dedicated more than 35 years in the heavy construction and mining industry conducting safe and professional blasting operations. Because of governmental agencies that control the use of explosives and regulate blasting, it was felt that a company specializing in only drilling and blasting would relieve the developer or general contractor of the burden of these operations. This company was created to fill the need for safe and controlled blasting in residential and urban areas. We have a performance record of successful and safe rock blasting in the California, Arizona, Hawaii and Nevada. California Drilling & Blasting Co., Inc. possesses the "state of the art" knowledge of blasting procedures, commercial blasting supplies and accessories for performing safe, controlled blasting.

California Drilling & Blasting Co., inc. current contractor's licenses:

California License #189455
Nevada License #011156
Hawaii License #C-5160
Arizona License #088237

All of our powdermen are licensed according to each states requirements and have a minimum of 10 years experience in controlled blasting in residential and urban areas.

LICENSED POWDERMEN EMPLOYED BY CD&B CO., INC.

M.E. Skip Marks	Lic. #208
Tony Cacho	Lic. #205
Bill Adair	Lic. #204
Dan Schad	Lic. #2331
Jim Marks	Lic. #3334
Luis Tellez	Lic. #4797
Eldon Smith	Lic. #2416
Earl Quinby	Lic. #7493

Very truly yours,

CALIFORNIA DRILLING & BLASTING CO., INC.

Robert L. Marks, President

RLM/epc

PALOMAR-AGGREGATES-QUARRY
file: blasting-plans
July 24, 1995

C

APPENDIX C

RECLAMATION PLAN APPLICATION

COUNTY OF SAN DIEGO

RECLAMATION PLAN
(COMPLIANCE WITH SECTION 2772 OF THE SURFACE MININGXANDRECLAMATION ACT OF 1975)
FOR
PALOMAR AGGREGATES QUARRY
(P87-021, RP87-001, Log #87-2-13)

Prepared for:

Palomar Aggregates, Inc.
2150 N. Centre City Parkway
Escondido, California 92026

Prepared by:

Brian F. Mooney Associates
9903-B Businesspark Avenue
San Diego, California 92131

September 1996

COUNTY OF SAN DIEGO

RECLAMATION PLAN
(COMPLIANCE WITH SECTION 2772 OF THE
SURFACE MINING AND RECLAMATION ACT OF 1975)

OWNER, OPERATOR, AND AGENT:

1. **Applicant:**

   Palomar Aggregates, Inc.
   c/o H.F. Jensen
   2150 N. Centre Parkway
   Escondido, California 92026
   (619) 743-3007

---

2. **Name (if any) of mineral property:**

   None

---

3. **Property owners, or owners of surface rights (list all owners):**

   Pankey Ranch
   5328 Highway 76
   Bonsall, California 92003

---

4. **Owners of mineral rights:**

   Same as above

---

5. **Lessee:**

   Palomar Aggregates, Inc.

---

6. **Operator:**

   Same as applicant

---

7. **Agent of process:**

   Bing Yen & Associates

LOCATION:

8. **Brief description, including legal, of the extent of the mined lands (to be) involved by this operation, including total acreage:**

TRA 57028 Assessor's Book 108, 125. Page 122, 061. Parcel Number 06, 06.

The proposed rock quarry project is located in the Pala area of northern San Diego county, approximately 1.25 miles east of Interstate 15. The irregularly shaped project site is situated north of SR-76 (Pala Road). Shearer Crossing and Couser Canyon Road lie to the west and east, respectively.

That portion of the East Half of Section 36, Township 9 South, Range 3 West, San Bernardino Meridian, according to official Plan thereof; that portion of the Monserate Rancho, according to Map thereof on file in the office of the Recorder of San Diego County in book 1, page 108 of Patents all in the unincorporated area of the County of San Diego, State of California.

Total acreage of the project is approximately 91 acres.

9. **Describe the access route to the operation site:**

Access to the site will be provided from Pala Road/SR 76 approximately 1.25 miles east of it's intersection with Interstate 15. Pala Road lies adjacent to the site's southern boundary. It is currently as east-west two-lane rural highway. The County of San Diego has designated this highway as a major road (four lanes, divided) east of I-15.

10. **Attach location and vicinity map:**

See Figures 1 and 2

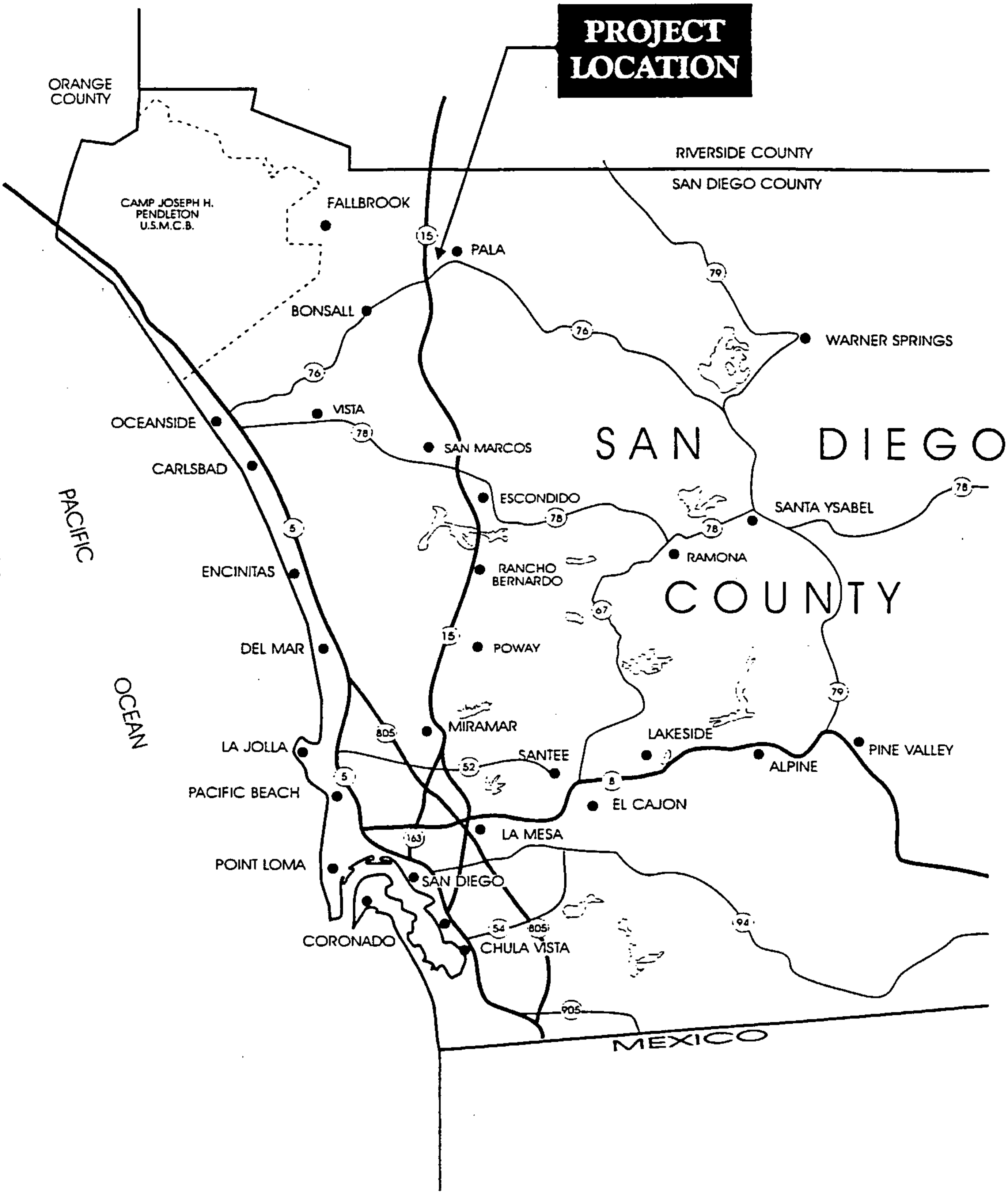
DESCRIPTION:

11. **Mineral commodity (to be) mined:**

Rock to be crushed for use in concrete and asphalt production and for road base.

12. **Geologic description, including brief general geologic setting, more detailed geologic description of the mineral deposit (to be) mined, and principal minerals or rock type present:**

The proposed mining site is located at the southern end of the Monserate Mountains within the Peninsular Range of Southern California. Directly south of the site lies the east-west trending San Luis Rey River Valley. Soil, slope wash and disintegrating boulders comprise the surfacial materials of the site. Bedrock consists of granitic igneous rock which intruded the once-overlaying rock approximately 110 million years ago. The following principal rock types are found at the site:



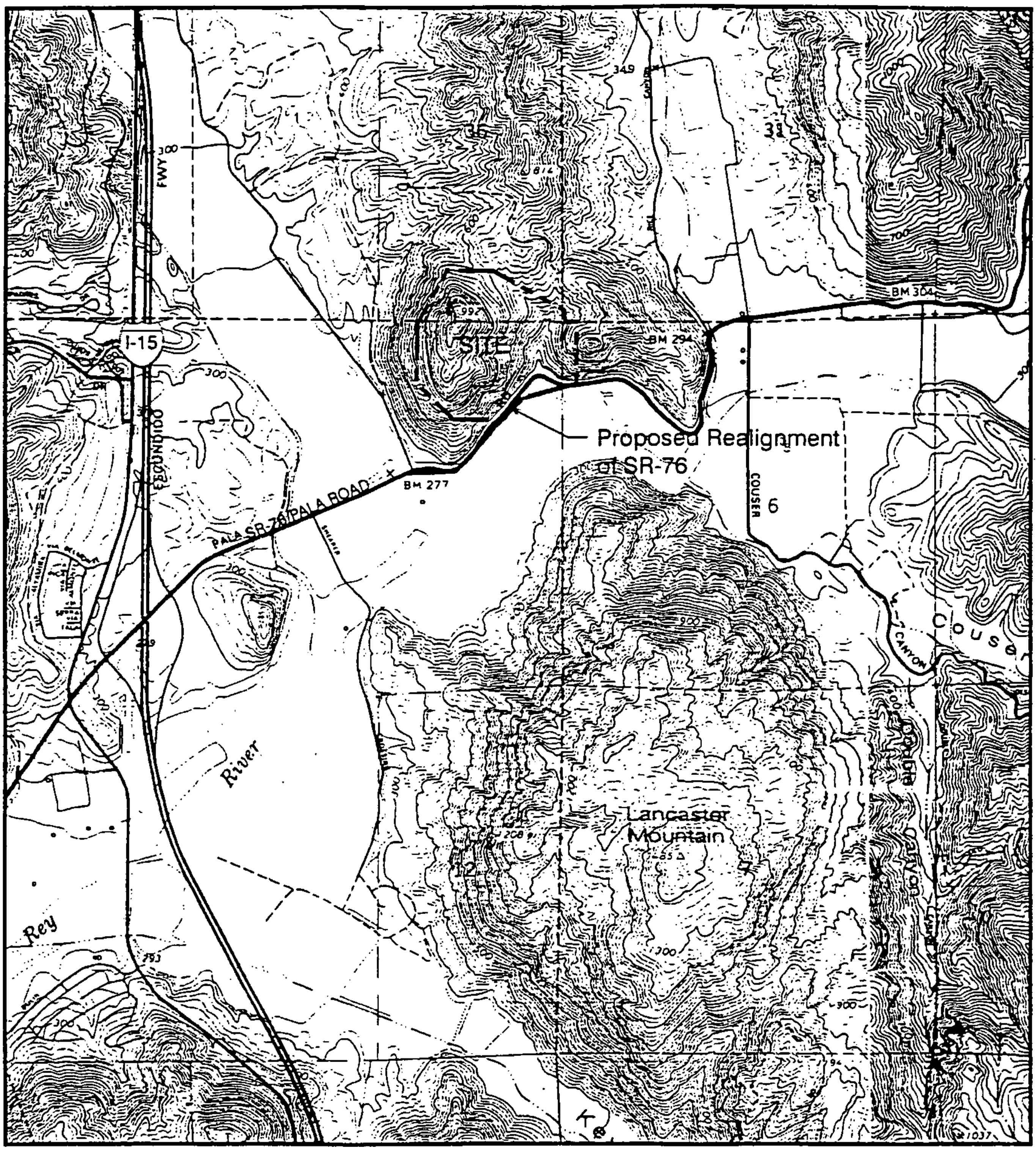
Brian F. Mooney Associates

North

Regional Location Map

006434

Figure 1



Brian F. Mooney Associates

N

0 1000' 2000'

Project Location Map

006435 Figure 2

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA BONSALL)

Granodiorite: Most abundant on site and proposed for mining. Average hand sample contains approximately 50 percent quartz, 40 percent plagioclase, 10 percent alkali feldspar, while mafic minerals ırnbiende biotite) comprise less than 5 percent. Rock is weakly foliated throughout the site and ..rfacial rock is spheroidally weathered, light gray to buff colored.

Tonalite: Exposed north of the granodiorite; average hand sample contains approximately 50 percent quartz, 47 percent plagioclase, 3 percent alkali feldspar, and mafics range from 25 to 50 percent, medium gray in color and very hard.

A band of strongly foliated granodiorite containing abundant dark-colored iron and magnesium-rich minerals occurs across the site on an approximate east-west trend. It is characterized by compositional banding similar to gneissic layering. The foliated zone appears to form an intrusive contact with the adjacent granodiorite.

Wells were not considered to monitor the nearby river do to the type of rock that is being mined. Since the mining will be located within this solid rock, any possible substances used which could cause contamination will be stored in containers placed in concrete containment basins, and site drainage will flow into a sedimentation basin with a grease trap through which any overflow must exit.

---

13. **Brief description of environmental setting of the site and surrounding areas. Describe existing area land use, soil, vegetation, ground water elevation and surface water characteristics, average annual rainfall and/or other factors pertaining to environmental impacts and their mitigation and reclamation.**

·e proposed site is a sparsely vegetated massive rock outcrop of huge granitic slabs and boulders, with ..rubs, grasses and some oaks around them. The majority of the site is presently undisturbed areas of Southern Mixed Chaparral and coastal sage scrub with approximately 3 percent of the site consisting of Coastal Live Oak Woodland. A small drainage swale on-site also contains Southern Cottonwood-Willow Riparian vegetation. Surrounding areas support citrus and avocado orchards as well as riparian habitat. The slopes are between 33 and 57 percent so there is only marginal topsoil. The San Luis Rey River passes just south of the mining project. No mining activity will take place in the riverbed.

The proposed site is currently vacant land. Surrounding land consists mainly of open space and agriculture. The residential density is very low in this part of the San Luis Rey River Valley.

Since the peak of the proposed site is approximately 650 feet above the river and the proposed quarry will be in solid rock, the project will not affect the groundwater characteristics in the area. The mean annual precipitation for the site is 13.7 inches. The mean rainfall occurring from Pacific storms in the months of November through April. All surface runoff from the proposed site drains into the San Luis Rey River.

PROPOSED SURFACE MINING OPERATION:

14.	**Proposed starting date of operation:**	90 days after permit approval (mid 1995)
	Estimated life of operation:	20 years
	Duration of first phase:	Site preparation = 12 to 18 months

006436

15. Operation will be (is): Continuous __X__, Seasonal _____, Intermittent ______.

Developed,
Not yet in operation __X__, Temporarily deactivated _____,
Stockpile in mine _____.

16. Operation will be (is):

Over 1,000,000 CU. YDS/YR.

17. Total anticipated production:

Mineral commodities to be removed 22,000,000 Tons
Waste retained on the site None anticipated
Waste disposal off site None anticipated
Maximum anticipated depth 715 FT.

18. Mining method: (Check all applicable)

Open Pit	X	Gravel/Sand Pit	
Single Bench		Drill and Blast	X
Quarry:			
Hill Top		Clay Top	
Multibench	X	Truck to Processing Plant (to RR)	
Side Hill	X		
Dragline		Borrow Pit	
Low Level		Trailing Pond	
Shovel		Slurry Pump	
Underground		Waste Dump	
Gravel Bar Skimming		Rail	

Mining would begin by drilling and blasting along the eastern slope working down from elevation 915 AMSL and working below the ridge line thereby minimizing the visual impact. Mining activities would begin at an elevation of approximately 915 feet AMSL and would be conducted from the top down and from south to north along the face being worked. The mining plan is designed for continuous operation (i.e. while one section is being drilled, the adjacent section will be scaled and loaded and the third section will be prepared for mining) with the exception of blasting which would be limited to once a week. The working face would have a maximum height of 33 feet and a minimum width of 66 feet, creating an interim benched slope configuration of 2:1 as mining proceeds downward at approximately 33 foot intervals. The interim benches enable the geotechnical engineer and/or engineering geologist to make weekly inspections and to map the rock face which has just been scaled. Inspection and mapping of the mining face may be more frequent as needed, depending on the field conditions.

Based on available geotechnical information, no gross stability problems are anticipated. However, if fracture and/or joints mapped by the engineer and/or geologist indicate potential future wedge type of failures that cannot be contained by wire mesh, rock anchors would be used to stabilize them. In addition, local isolated benches may be left in place in areas where geotechnical conditions warrant. The benches would then serve as a staging areas for rock anchoring operation. The local benches, if any, are not likely to be continuous because they would be needed only to enhance local stability. These benches would be sculpted to appear as natural rock ledges and would add additional variation to the face. Detailed information pertaining to long term rock stability can be found in the attached Geotechnical Report (Bing Yen & Associates, Inc. 1990).

Blasting will be done approximately once a week by a licensed blasting contractor who will bring all dynamite charges and blasting caps to the site for each day's work. No such material would be stored overnight on the site. Once a working face has been blasted, the loosened material will be moved by a power shovel into a mobile jaw crusher located near the face being worked. The jaw crusher will be mounted on a platform which moves on treads along the face being worked. It is 14 to 16 feet in height, and will crush blasted rock to 6-inch minus size, which will be conveyed to the cone crusher at the plant site. Figure 3 diagrams the rock crushing process.

Aggregate material, reduced by the portable jaw crusher to 6-inch minus size, will be delivered by conveyor to a stockpile (called a "surge pile") at the processing plant. The rock will then be conveyed to the highest level of the plant site to begin the crushing, screening and mixing process. The overall plant layout is shown on the major use permit plot plan.

A conveyor will feed the 6-inch rock over a screen and into the top of the cone crushers. These crushers will be mounted on steel or reinforced concrete platforms and be 12 to 14 feet in total height. The crushed rock will be discharged out the bottom of the cone crushers and onto another conveyor for transport onto a triple-deck vibrating screen where 1/2-inch, 3/8-inch, 3/4-inch and fine material will be sorted and conveyed to loading hoppers and to storage piles. The screens and loading bins will be 25 to 30 feet in height to permit drive-under loading of haul trucks. Oversize rock rejected by the screens will be conveyed to a "shorthead" cone crusher to be further reduced and returned to the screens.

19a. If processing of the ores or minerals mined is planned to be conducted at our adjacent to the site, briefly described the nature of the processing and explain disposal method of the tailings or waste from processing.

Crushed rock will be conveyed to on-site concrete and asphalt batch plants, where it will be mixed with imported sand and cement for concrete; and with sand and oil products for asphalt. No unusable tailings or waste from processing will occur.

19b. Estimate quantity (gallons per day) and quality of water required by the proposed operation, specifying proposed sources of this water, of method of its conveyance to this property and the quantity and method of disposal of used and/or surplus water.

Approximately 65,000 gallons of water per day will be used for dust control, concrete production and landscaping. Water will be purchased from existing Pankey Ranch wells adjacent to the site. Runoff will be retained in a sediment basin and exit through a riser pipe into the San Luis Rey riverbed. The sedimentation basin was designed to handle a 10 yr/6 hr storm event which exceeds the required SMARA 20 yr/1 hr storm requirements. Water will also be pumped from the basin for re-use in dust control, so very little off-site run-off is anticipated.

20. If the nature of the deposit and the mining method used will permit, describe and show the steps or phases of the mining operation that allow concurrent reclamation, and include a proposed time schedule for such concurrent activities.

The proposed mining method calls for continuous mining which would allow for concurrent reclamation of the mining face. During final blasting, the mining face shall be "sculpted" to create natural looking ledges, nooks and crannies. To avoid the horizontal lines typically associated with hard rock quarries, the ledges shall be irregular and no larger than 6-12 feet in width. The ledges should also be angled toward the rock face to trap and adhere soil to ledge. Approximately 12-18 inches of soil would be installed on the ledges and smaller amounts would be installed within the nooks and crannies (Figure 4). It is anticipated that the soil will be applied in a thick slurry application possibly in a similar manner as a hydroseed mixture or the soil will be applied by a powershovel and placing the soil on the ledges. A hydroseed mix shall be then be applied to those areas capable of supporting vegetation. If the hydroseed does not germinate after the first rainy season, a temporary irrigation system would be installed to ensure establishment of the vegetation. This irrigation system would be an overhead spray system that could be attached to the wire mesh.

With the above mentioned measures, approximately 5-10 percent of the mining face would be vegetated. However, it is the proposed combination of rock sculpting, rock staining and landscaping that would ultimately create a natural looking mined face.

The applicant will, also, provide landscaping at the entrance of the mining plant and off-site revegetation during the site preparation phase of project start-up as mitigation for biological and visual impacts. Mitigation measures are described in the Environmental Impact Report for Palomar Aggregates Quarry (P87-021, RP87-001, Log #87-2-13).

21. Attach a map of the mined lands and/or suitable aerial photograph showing:

(a) Boundaries and topographic details of the site;

(b) Location of all streams, roads, railroads, water wells, and utility facilities within 500 feet of the site;

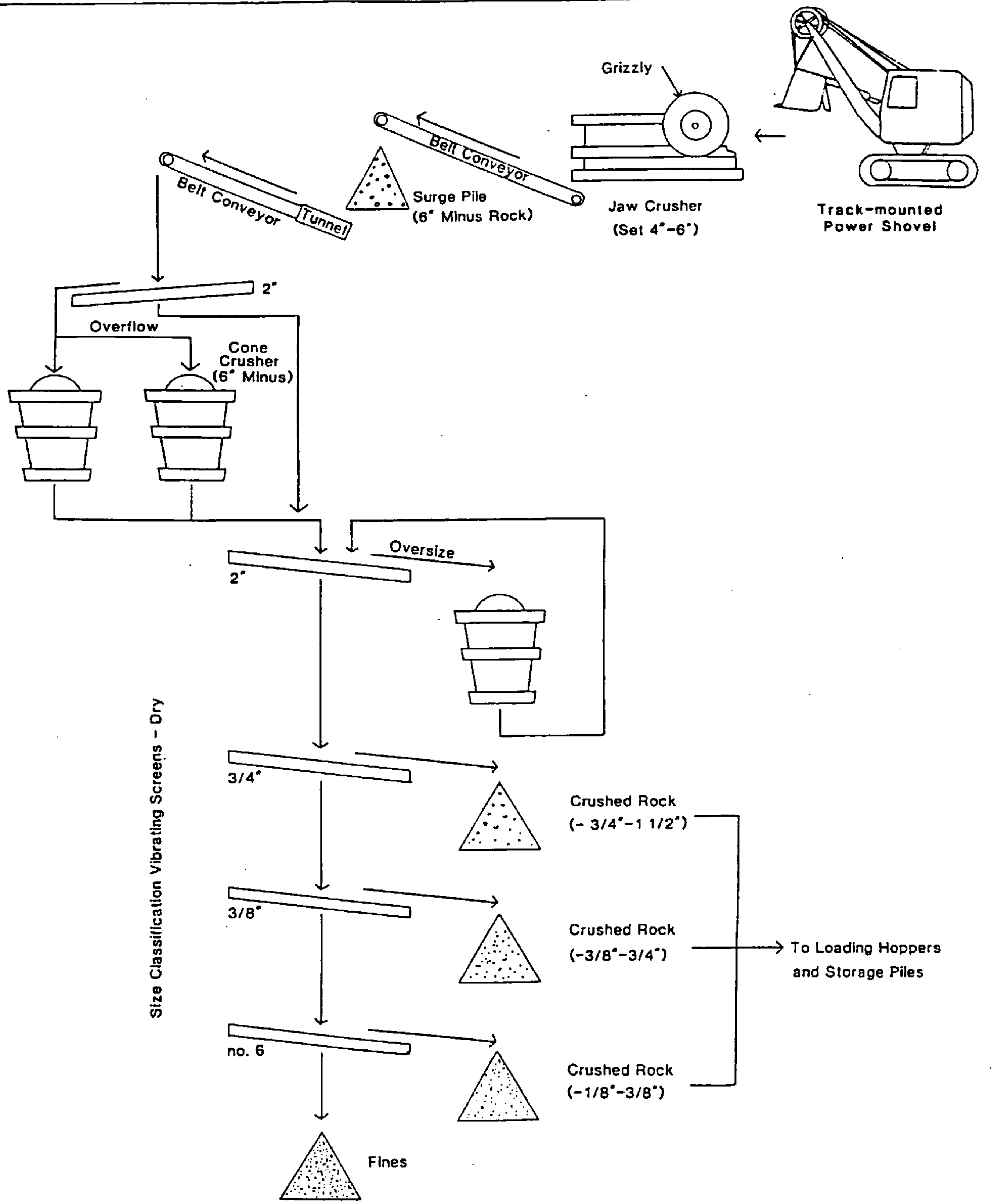
(c) Location of all currently proposed access roads to be used in conducting the surface mining operation(s);

(d) Location of area (to be) mined, and of waste dumps and tailing ponds;

(e) By use of overlay symbol or color, depiction of separate mining phases if applicable;

(f) Topography and cross-sections of excavation following reclamation.

This information has been provided on the attached Plot Plan.



Brian F. Mooney Associates

NOT TO SCALE

Typical Rock Crushing Process Diagram

006440

Figure 3

Figure 4

Plot Plan on file with
the County of San Diego DPLU

(Reader is referred to Figures 4 - 10 of the Draft EIR)

RECLAMATION PLAN:

22. Indicate on an overlay of map of item 21, or by color or symbol on map those areas to be covered by reclamation plan.

The entire MUP area is covered by the Reclamation Plan.

23. Describe the ultimate physical conditions of the site and specify proposed use(s) of the mined lands as reclaimed.

In its final configuration as a pit approximately 100 feet deep, the site would be suitable for use as a water storage reservoir.

Without a dam, the finished pit would have a water storage capacity of 2,500 acre-feet with a water surface level of 310 feet AMSL. If a dam were desired in order to increase water storage capacity, and earthen embankment could be constructed at the opening of the pit with a maximum elevation estimated to be 500 feet AMSL. Water surface elevation would be 475 feet AMSL with the dam, and storage capacity would be 5,800 acre-feet.

As a San Luis Rey Municipal Water District facility, the reservoir has potential use as a water reclamation storage facility for treated wastewater which would be re-used for golf course, landscape, or agricultural use. Emergency or surplus water storage is also a major concern by all water districts served by the San Diego County Water Authority. This reduces dependence on imported water during summer months. In addition, existing aqueducts are subjected to damage from a major earthquake. Local water storage capacity is important to provide water service while repairs to distribution systems are being made.

A large storage reservoir would allow storage of San Luis Rey River storm water run-off which has a lower salt content than groundwater. This would be better for crop production and reduce "burn" to fruit and foliage which is associated with spring and summer months.

An alternative reclamation plan is to use the site for agricultural related activities. This would include packing and processing facilities, ranch operations, including maintenance and storage areas for farm equipment currently located elsewhere on the Pankey property. Existing farm operation and storage areas could then be reclaimed for cultivation. Growing sheds for a variety of non-sunlight-dependent agricultural products would also be feasible. Mushrooms are an extremely high-value crop, and are grown in darkness. In addition, houseplants and some food products are grown under artificial light in to order to vary light/dark time periods, thereby accelerating growth. Agricultural sales from the property could include a plant nursery, feed and grain store, or garden tool and supply store subject to major or minor use permits. Roadside sales of agricultural products produced on Pankey Ranch or other property leased by the Ranch, would be a permitted use. Figure 6 shows a typical layout for agricultural re-use of the site.

The mining face shall be "sculpted" to create natural looking ledges, nooks and crannies. To avoid the horizontal lines typically associated with hard rock quarries, the ledges shall be irregular and no larger than 6-12 feet in width. The ledges should also be angled toward the rock face to trap and adhere soil to ledge. Approximately 12-18 inches of soil would be installed on the ledges and smaller amounts would be installed within the nooks and crannies. A hydroseed mix shall be then be applied to those areas capable of supporting vegetation. If the hydroseed does not germinate after the first rainy season, a temporary irrigation system would be installed to ensure establishment of the vegetation. This irrigation system would be an overhead spray system that could be attached to the wire mesh.

The site is presently designated Multiple Rural Use by the Fallbrook Community Plan. The complete zoning box is:

USE REGULATIONS	A-70
NEIGHBORHOOD REGS	L
DEVELOPMENT REGS:	
Density	.125
Lot Size	8 Ac
Building Type	C
Max Flr Area	–
Flr Area Ratio	–
Height	G
Coverage	–
Set Back	C
Open Space	–
SPECIAL AREA REGS	B

24. Describe relationship of the interim uses other than mining and the ultimate physical condition to:

(A) Zoning Regulations.

Zoning regulations are for limited agricultural use which is acceptable for the ultimate condition.

(B) General Plan and Plan Elements.

The site is designated for multiple rural use which is also acceptable for the ultimate condition.

25. Provide evidence that all owners of a possessory interest in the land have been notified of the proposed use(s) or potential uses identified in item 22. (Attach copy of notarized statement of acknowledgement, etc.)

Please see attached.

26. Describe soil conditions and proposed soil salvage plan.

There is a very shallow layer of topsoil on-site. It would be used primarily for areas to be landscaped, including berm adjacent to Pala Road, as fill for the planting areas of the plant site and for soil to be placed on the ledges and in the nooks and crannies on the mining face. Any vegetative cover that exists will also be mulched and used for incorporation into the topsoil. The topsoil for use on the mining face will be stockpiled on site.

006443

27. **Describe the methods, their sequence and timing, to be used in bringing the reclamation of the land to its end state. Indicate on map (This may be indicated directly on plot plan or on a separate attachment to applications). Include discussion of the pertinent items listed below.**

The final reclaimed rock face would be approximately 715 feet in height along the west side of the quarry tapering down to approximately 70 feet on the east side of the quarry. The resulting pit would reach approximately 200 feet AMSL (approximately 100 feet in depth below the adjacent street elevation). Reclamation of the rock face would be continuous. As the mining reaches the surface area which is to be the final reclaimed surface the method of blasting hole placement and gradient would change. Final blasting would be done under the supervision of a blasting engineer and a landscape architect who would design an irregular rock surface to resemble natural surfaces. This, in effect, will be a "sculpted" rock surface with ledges, nooks and crannies which would be able to receive and trap soil. Wire mesh would be draped over the surface and secured with rock bolts. Permeon, a non-toxic rock stain that has been developed by the University of Arizona would then be applied to the rock face. Permeon consists of iron salts, magnesium salts and trace elements, so as well as staining without environmental damage, the Permeon would release small amounts of nitrogen which would have a fertilization effect. Thus, the Permeon would actually enhance vegetative growth. The application which is colorless when first applied, is formulated to match the variation of colors of the adjoining rock surfaces. Full colors would develop in approximately one week, depending on temperature and exposure to sunlight. The project proponent would hire manufacturer trained personnel to apply the Permeon. After application of Permeon, soil would be placed on the ledges and within the nooks and crannies and a hydroseed mix of native vegetation would be applied. If the hydroseed does not germinate after the first rainy season, a temporary irrigation system would be installed to ensure establishment of the vegetation. This irrigation system would be an overhead spray system that could be attached to the wire mesh. No more than one bench would be exposed to mining process at any one time as all previous benches would be reclaimed.

Reclamation will also involve the removal of all mining equipment from the site and reuse of the pit as a water storage reservoir to be utilized by the San Luis Rey Municipal Water district or for agricultural use (Figure 5 and 6). If this reuse occurs additional permits will be required in association with the construction of a dam and reservoir. These permits and associated environmental review will include a bullfrog management plan to minimize or eliminate possible impacts to endangered species. See specifications on attached Plot Plan. Please refer to the mitigation monitoring program and to the geotechnical and hydrologic reports for additional mitigation measures specified in the plan.

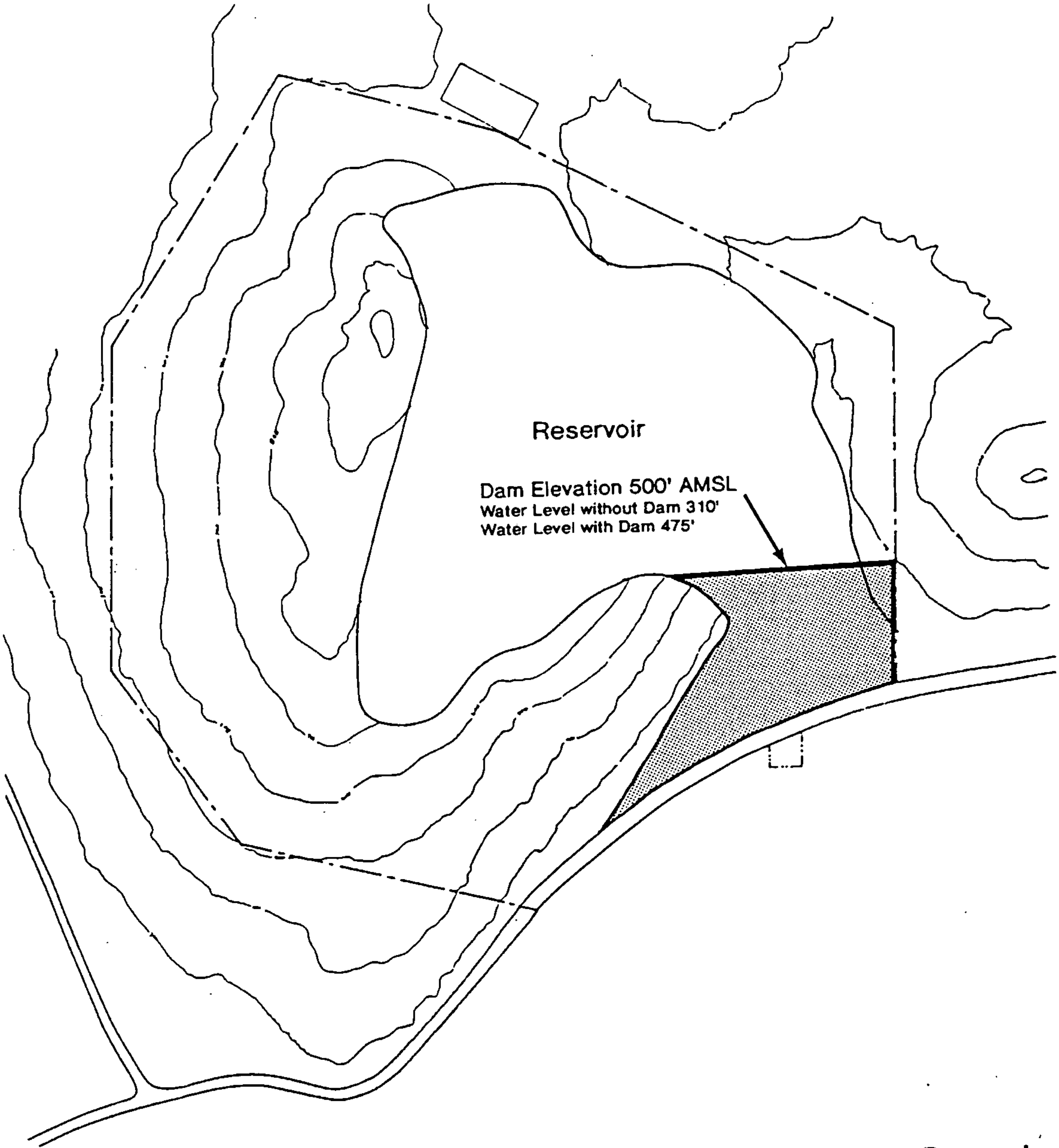
(a) Backfilling and grading

Upon completion of mining, final slopes shall be established per the plot plan. The plant area and quarry bottom shall be regraded to establish a uniform 1% grade. The proposed reclamation plan calls for use of the pit as a water storage reservoir or agricultural operations and therefore, the pit would not be backfilled.

(b) Stabilization of slopes

Several measures have been incorporated into the mining plan to mitigate slope stability problems. The mining plan as described under #18, calls for interim benched cuts of 65-feet in width and 35-feet in height, creating an interim equivalent slope of 2 to 1 (horizontal to vertical) or flatter for any freshly cut slopes. The interim bench can only be removed upon the approval of a qualified geotechnical engineer or engineering geologist. Prior to removal of the interim bench, the vertical slope shall be draped by heavy gauge wire mesh anchored to the rock. This mining plan has been reviewed and analyzed by Bing Yen and Associates in their October 1990 geotechnical report. With the proposed benching and draping

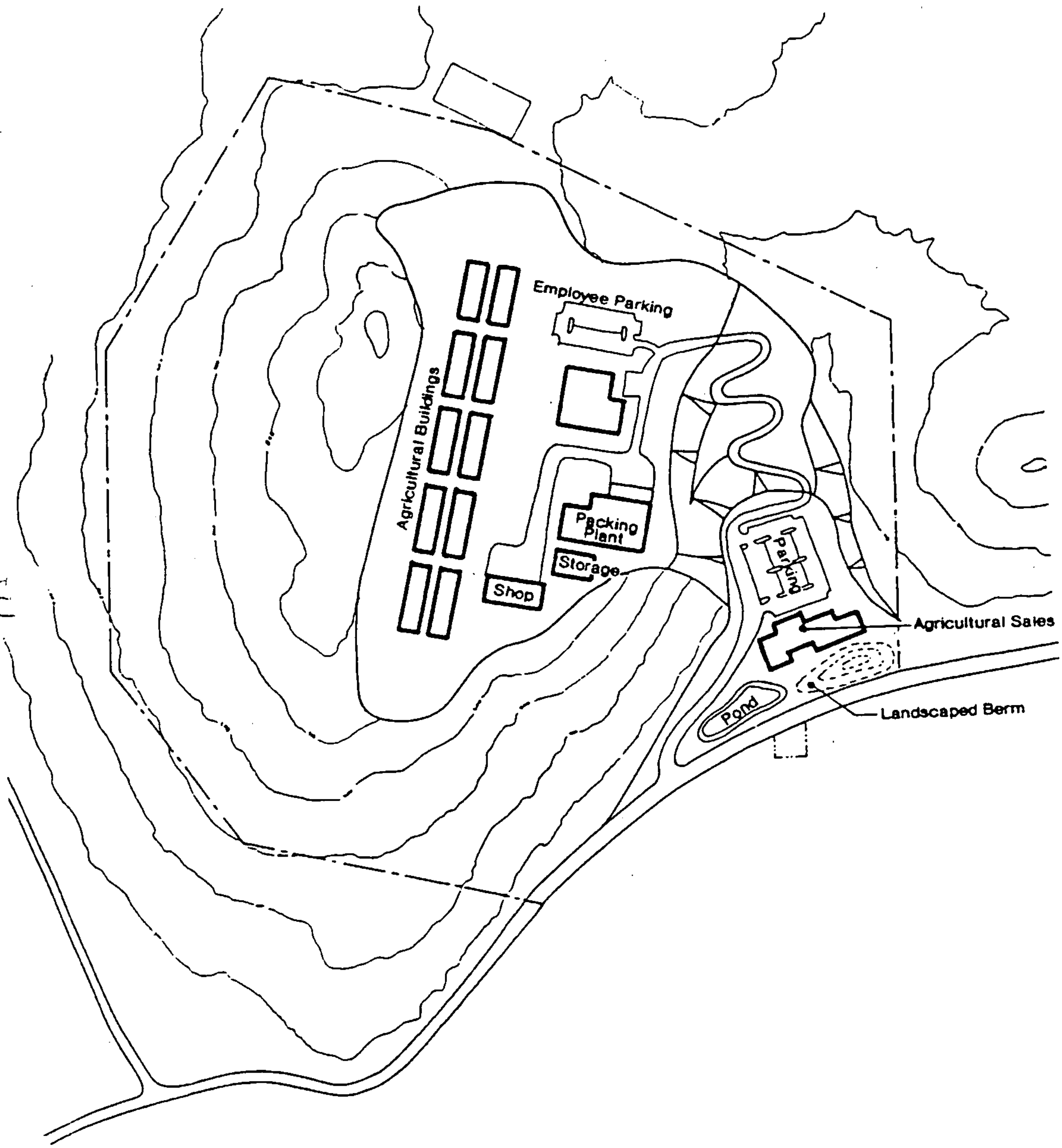
006444



Water Reservoir
Reclamation Plan

Brian F. Mooney Associates

006445 Figure 5



Brian F. Mooney Associates

N

0 200' 400'

Agricultural Reclamation Plan

006446 Figure 6

of wire mesh canopies, the mining plan was determined to be feasible. The mining plan has also been reviewed by the Division of Occupational Safety and Health (OSHA). In his letter dated November 9, 1990, Mr. Byron Ishkanian, Senior Engineer at OSHA, stated, "I concur with the feasibility of the latest mining development plan so long as the stipulations noted in the latest revision (October 1990) are carried out."

To insure the long term stability of the mining face a permanent fund for mesh and rock anchor maintenance will be established. An inspector will inspect the mining face on a semiannual base during the mining process and every two year there after. As a condition of the reclamation plan the property owner is to provide access to the inspector so that the inspector can repel down the mining face to inspect the mesh and rock anchors. A perpetual fund will be established to provide for the long-term maintenance of the wire mesh during operation of the facility and thereafter. The site would be inspected every six months during operations and every two years thereafter.

(c) **Stabilization of permanent waste dumps, tailings, etc.**

Site preparation will start with the removal of vegetation and soil overburden, which will be used in the construction of a landscaped berm along Pala Road/SR-76, and other areas to be landscaped such as the mining face and plant site landscaping. Decomposed rock and small boulders just below the surface will also be removed by conventional earth-moving equipment and used as fill for widening of SR-76.

During mining, crushed rock will be conveyed to on-site concrete and asphalt batch plants, where it will be mixed with imported sand and cement for concrete; and with sand and oil products for asphalt. No unusable tailings or waste will occur.

(d) **Rehabilitation of pre-mining drainage.**

The project proposes use of the pit as a water storage reservoir. Drainage would be collected within the pit, it would not be rehabilitated to pre-mining conditions. If the alternative reclamation plan is implemented (i.e. agricultural use) drainage would be collected in the sedimentation pond, to be constructed prior to mining, and then diverted beneath SR-76 to the San Luis Rey River.

(e) **Removal, disposal, or utilization of residual equipment, structures, refuse, etc.**

All equipment, structures, refuse shall be removed from the site upon completion of mining.

(f) **Control contaminants, especially with regard to surface runoff and groundwater.**

All runoff for the east slope currently drains into a small canyon which passes through a culvert beneath SR-76 into the San Luis Rey River. With implementation of the proposed quarry operations, drainage from this area would pass through a sediment retention basin to be constructed on the east boundary of the site. The sediment pond, to be constructed during site preparation, will be lined with a vinyl liner or concrete to avoid potential impact to groundwater from truck fuels or other petroleum products which might wash into the pond. This basin will also allow for any increase in sedimentation resulting from the mining to be trapped on-site. As the mine cut crosses the drainage boundaries, the excavation will be designed to cut into the western slope and alter the drainage boundary of the south slope. As a result, the existing area of the west slope would be decreased by one acre and the area of the south slope by two acres.

Normal concerns with groundwater pollution from aggregate washing (which requires Regional Water Quality Control Board approved) will not be a concern. Aggregate mining often involves washing of sand or rock in order to clean the product prior to sizing. In the proposed operation, no sand mining is involved, and the rock has virtually no waste product, so that washing is not required. Additional concerns include the effects of surfactants, run-off due to washing of concrete trucks and petroleum products; however, no impact to groundwater is anticipated. The surfactants to be used in the dust control program is an inert, biodegradable chemical which is approved by EPA (Johnson-Marsh Compound MR, or equivalent). Run-off due to rinsing of the drum of each concrete truck would be minimal. According to Lou Erlabough, Vice President of Standard Ready Mix in Santa Ana, water or a combination of water and chemicals is used to prevent cement from drying in the drums. The water or water/chemical mixture is left in the trucks overnight and mixed with the next days batch of concrete. It is not drained from the truck. Petroleum products would be used to produce asphalt at the proposed batching plant, however, all drainage from the area would be properly contained in the proposed sediment pond.

(g) Treatment of streambeds and streambanks to control erosion and sedimentation.

The project will impact the flood plain of the San Luis Rey River with the planned relocation of Pala Road/SR-76. An estimated 630,000 cubic yards of fill will be placed within the floodplain for the new roadbed. The road will be constructed with a 2:1 slope adjacent to the riverbed. The project proposes a riprap bank protection consisting of a 30-inch blanket of riprap with a median size of 18-inches and a 12-inch layer of gravel filter with a sheet of filter fabric underneath. To protect against degradation of the river bed, an 18-inch blanket layer of riprap and a 6-inch layer of gravel filter extending from the toe of the bank about 100 feet to the river would be constructed if warranted by HEC-2 analysis. Willow cuttings would be placed within the riprap as well as appropriate shrubs and ground cover.

The major new source of sediment runoff will be the processing plant and its slopes. Since the detention basin will intercept this runoff, there would be no net increase in sediment entering the San Luis Rey River. Detailed information on impacts to the San Luis Rey River have been addressed in a Hydrology, Drainage and Erosion Control Study prepared by Simons, Li & Associates (December 1988). A copy of this report has been and included as Appendix F of the Draft Environmental Impact Report.

(h) Removal or minimization of residual hazards.

Potentially significant residual hazards associated with implementation of the proposed mining and blasting plan include: rockfall and the creation of a 715 foot mining face.

As described for #18, several measures have been incorporated into the mining plan to mitigate the potential for rockfalls and small wedge type slope failures, including the creation of an interim cut bench and draping of wire mesh over the exposed vertical face. There is also a potential hazard for seismically induced rockfall along SR-76. To minimize this hazard, loose rock "floaters" shall be tied-down or removed. Standard roadside warning signs indicating potential rockfall area to the approaching motorist shall be installed. The project civil engineer for the SR-76 realignment shall incorporate these public safety measures on a plan to be submitted for review and recommendation by the County Department of Public Works; and for approval by Caltrans. Additional passive preventative measures including installation of barriers along the north side of the realigned SR-76 may be required by Caltrans for seismically induced rockfalls as a part of the highway realignment project.

As indicated on the plot plan, a six foot chain link fence topped with one foot of barbed wire would encompass the entire mining area. This fence is to be constructed during site preparation and is intended to prevent unauthorized access. A gate shall be constructed on the main access road. This gate shall be locked during non-operating hours.

Upon completion of mining and prior to reclamation of the site all equipment and structures shall be removed from the site. If the pit is to be used as a water-storage reservoir, a qualified geotechnical engineer shall submit a report to the County of San Diego Department of Planning and Land Use reporting on the effects of seepage and the stability of the earthen dam, if the dam is required. If the alternative reclamation plan (i.e. agricultural use) is implemented, the site shall be inspected by a qualified geologist/geotechnical engineer who shall determine the need for setbacks from the exposed mining face and/or the need for a soil berm or precast concrete barriers to ensure the safety of structures and employees from rockfalls/small wedge failures.

(i) Resoiling, revegetation with evidence that selected plants can survive given the site's topography, soil, and climate.

The final blast shall also be designed to allow for 6 to 12-foot wide irregular ledges that are no greater than 66 feet long with no greater than a 120 foot vertical separation. The ledges shall be irregularly located along the mining face to reduce the horizontal lines associated with hard rock quarries. These ledges shall also be of sufficient size as to allow for an 12-inch to 18-inch layer of soil to be installed. The ledges shall be angled toward the rock face to trap and adhere the soil to the ledge. It is anticipated that the soil will be applied in a thick slurry application possibly in a similar manner as a hydroseed mixture.

A hydroseed mix shall be applied for reclamation of the mining face after soil is placed on the ledges and in the "nooks and crannies." The hydroseed mix shall be installed where there is enough soil to allow for adequate root growth to occur. A hydroseed mix is proposed (see Plot Plan) that consists of native plant material, however, in order to insure that the appropriate seed mix can survive given the site's topography, soils and climate, baseline studies of the coastal sage scrub located within and adjacent to the mining area will be done and installed on the final mining slope. Hydroseed is proposed to avoid the necessity of accessing the established rock face to install any container plant material. A temporary irrigation system would be used on the mining face if after the first growing season the hydroseed has not established. A permanent irrigation system is proposed for the planting areas within the plant site and the berm along Highway 76. It is estimated that only 5 to 10 percent of the mining face would be able to be vegetated.

A conceptual landscape plan has been prepared by a qualified landscape architect and is included with this reclamation plan as Attachment 2.

---

28. If applicant has selected a short term phasing of his reclamation, describe in detail the specific reclamation to be accomplished during first phase.

Not applicable. Please see question #20.

---

29. Describe how reclamation of this site in this manner may affect future mining at this site and in the surrounding area.

The mining site will yield very high quality granodiorite. Although the mining project will remove a large amount of material, there will still be at least 30 million tons of the mineral deposit left. The final planned condition of the site would not preclude further mining. However, by the time the proposed project is finished, there is likely to have been substantial commercial and residential development in this part of the San Luis Rey River Valley. Because of this, continued mining at the site may not be permitted.

ATTACHMENT 1
GEOTECHNICAL REPORT

PRELIMINARY GEOTECHNICAL INVESTIGATION
FOR
PALOMAR AGGREGATES QUARRY SITE

Prepared for

PALOMAR AGGREGATES, INC.

2150 N. CENTRE CITY PARKWAY
ESCONDIDO, CA 92026

Prepared by

BING YEN & ASSOCIATES, INC.

OCTOBER 1990

006452

39 Musick Avenue, Irvine, CA 92718 Tel. (714)583-1919 FAX (714)583-1763

BING YEN & ASSOCIATES
Geotechnical Consultants, Established 1979

October 23, 1990 BYA Project No. 51-151

Mr. Harold Jensen
Chairman of the Board
Palomar Aggregates, Inc.
2150 North Centre City Parkway
Escondido, CA 92026

SUBJECT: GEOTECHNICAL ENGINEERING REPORT OF PALOMAR AGGREGATES QUARRY SITE

Dear Mr. Jensen:

Bing Yen & Associates (BYA) is pleased to submit the attached report which addresses the feasibility of the proposed mining plan and the quality of the aggregates.

The report culminates the results of BYA's involvement since 1987 and taking into consideration of recent constructive input from Cal/OSHA on MSHA. The proposed mining plan represents the results of an evaluation which, we believe, strike a balance between engineering viability and environmental sensitivity for a cost-effective development to meet the regional demand of quality construction aggregates.

Sincerely,
BING YEN & ASSOCIATES, INC.

Bing C. Yen, Ph.D.
Geotechnical Engineer #917

BCY:jt

cc: J. McLee (Brian Mooney & Assocs.)
B. Ishkanian (Cal/OSHA)

006453

39 Musick Avenue, Irvine, CA 92718 Tel. (714)583-1919 FAX (714)583-1763

LIST OF FIGURES

1.0 INTRODUCTION

This report summarizes the results of a preliminary geotechnical investigation for the proposed rock quarry site in the Pankey Ranch area located southwest of Pala, San Diego County, California. The site is adjacent to and north of State Highway Route 76 and the San Luis Rey River, and is approximately one mile east of Interstate 15 (see site location map, Figure 1 and aerial photograph, Figure 2).

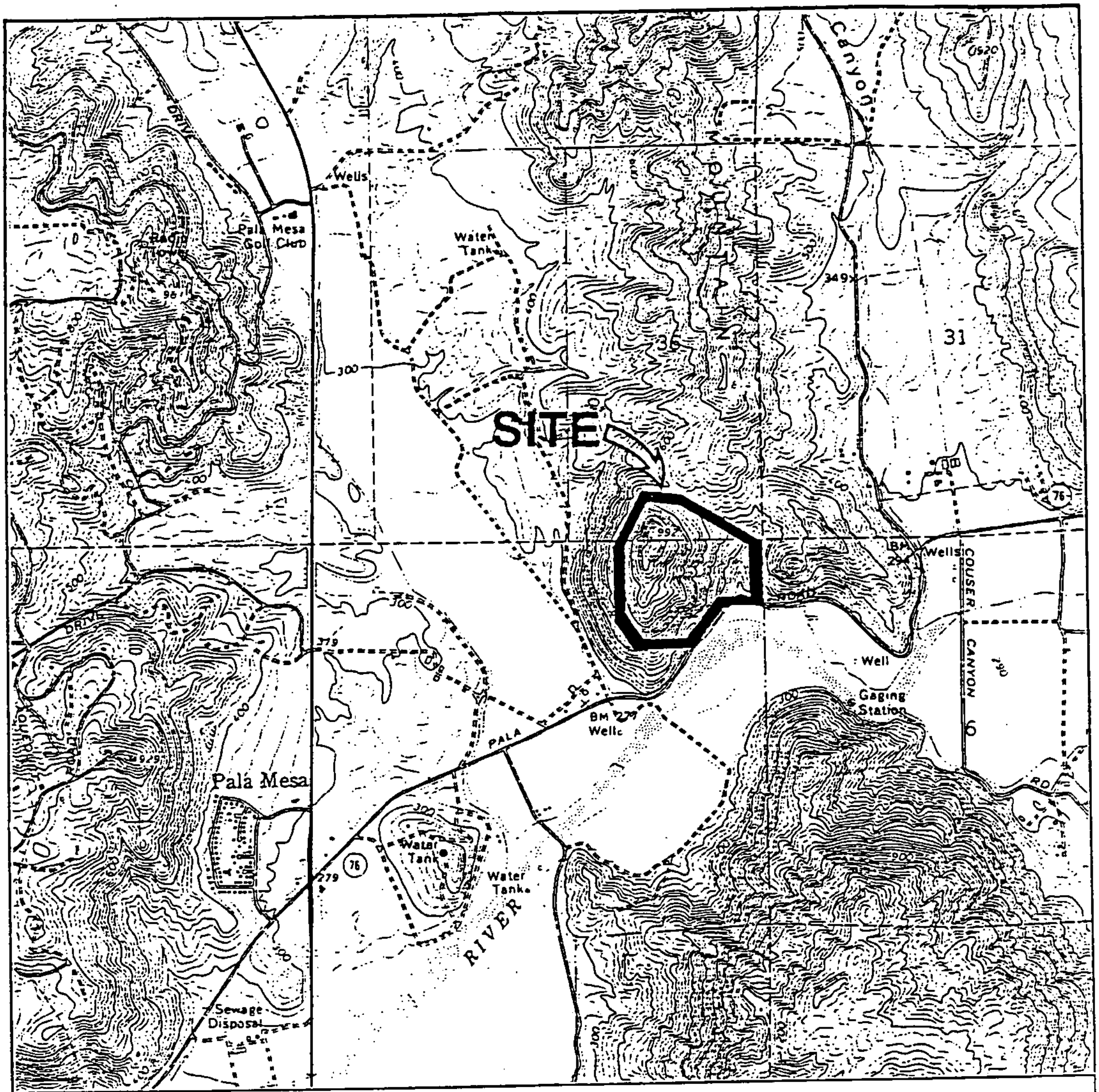
The proposed mining is to produce aggregates and riprap rocks to meet the regional construction demand, present and future. Since the inception of the project in 1985 and as the information accumulates, there have been a number of criteria and constraints associated with the mining plan development. The foremost environmental criterion is to minimize the visual impact of the proposed mining and to preserve the west-facing slope of the hill. In order to preserve the view shed from the valley which is located west of the project area as well as to minimize the line-of-sights from the surrounding area, a limit of mining boundary has been evolved as shown in Figure 3. If mined to the limits shown on Figure 3A, approximately 22 million tons of construction quality aggregates can be removed assuming an equivalent of 80 degrees excavation to elevation 200±. At an approximately average rate of 100,000 tons of extraction per month (about 25,000 tons per week), mining would be completed in about 20 years. Figure 3B shows a conceptual site configuration after mining. It is our understanding that as mining progresses, rehabilitation and reclamation plans will be implemented to comply with the State Surface Mining Act of 1975 (SMARA) as described in the Environmental Impact Report (EIR).

The amphitheater-like configuration of the proposed mining will extend to a maximum about 715 feet in height on the west side of the quarry and decrease to about 70 feet on the east side as shown in Figure 3B. Consequently, the scope of work of this report includes:

1. Provide preliminary surface and subsurface geotechnical information of the proposed mining area to evaluate the competence of the rock from a geotechnical engineering perspective;

2. Evaluate the quality of the rocks to be mined from the perspective of using them as commercial aggregates;

006456



Base map from U.S.G.S. 7.5' series (topographic), Bonsall quadrangle, CA

0 2000 4000 FEET

N

BING YEN & ASSOCIATES

SITE LOCATION MAP
PALOMAR AGGREGATES QUARRY

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 DATE: JUNE 27, 1990

006457 FIGURE 1

BING YEN & ASSOCIATES

AERIAL PHOTOGRAPH SHOWING THE SITE AREA

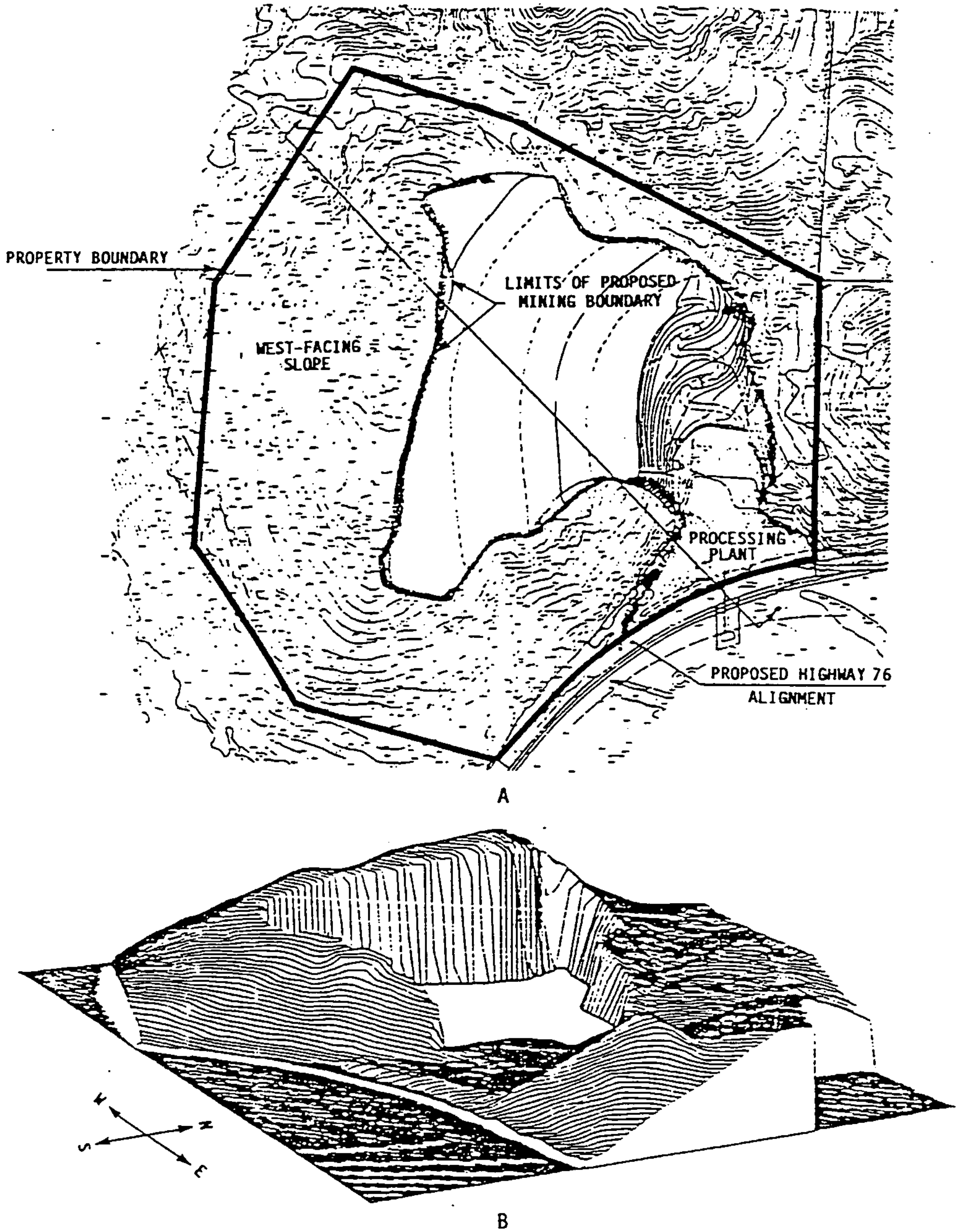
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151

DATE: JUNE 27, 1990

FIGURE 2

006458



BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 DATE: OCTOBER, 1990

A. LIMITS OF PROPOSED MINING.
B. CONCEPTUAL CONFIGURATION OF THE MINED AREA. SHOWING EXCAVATION OF MINED SLOPE.

006459

FIGURE 3

3. Develop a preliminary mining plan and extraction sequence which are geotechnically feasible and, economically viable while preserving the minimum visual impact on the surrounding area;

4. Provide geotechnical consultation and input to other consultants on an as-needed basis; and

5. Prepare this report.

006460

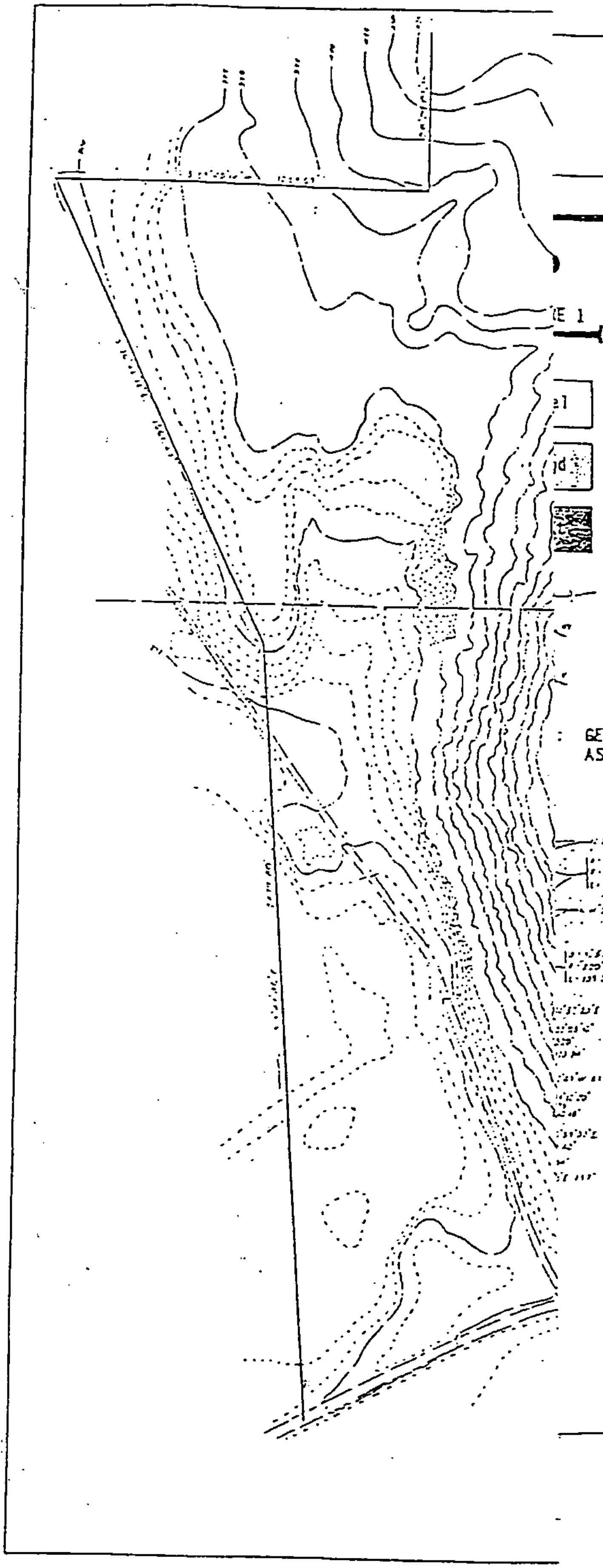
2.0 TECHNICAL DISCUSSION

2.1 Site Description

The project site contains approximately 91 acres, Figure 4. The steeply sloping West Hill is located in the Southern end of the Monserate Mountains within the Peninsular Range Province of California. Directly south of the site lies the east-west trending San Luis Rey River Valley. Relief between the peak of West Hill (Elevation 992) with respect to the River (Elevation 300 ±) is about 690 ft. The existing east facing slope is relatively gentle (approximately 2 to 1, horizontal to vertical) and reaches a saddle area relative to the East Hill, Figure 4. However, localized steep slopes (steeper than 1 to 1) exist. In several areas fronting Highway 76, nearly vertical cuts in excess of 50 ft. in height have apparently stood for many years, see Figure 5.

2.2 Field Explorations and Laboratory Tests

In order to provide information on the rock quality from an engineering perspective, a series of field and laboratory tests were performed. Figure 4 shows the locations of borings for which continuous rock cores were taken by Bing Yen & Associates in 1987 and 1988. The logs of these cores are included in Appendix A. Downhole gamma ray and sonic velocity loggings for Boring B-3 were also conducted and they are attached in Appendix A. Downhole video logging with gyro was also performed for the purpose of evaluating the in situ information of rock joints, fractures and beddings. Figure 6 shows the dip direction and dip angle plotted at various depths based on the video log. A total of 275 mapped surface joint and fracture attitudes at the site are shown in Figure 4 and tabulated according to areas of the project site, Appendix B. In addition, four seismic refraction survey lines were conducted by Goffman and McCormick in 1985. Their results are summarized in Table 1 and the locations of the seismic lines are shown in Figure 4. A preliminary engineering geology report by Slosson & Associates is included in Appendix C. Triaxial tests were performed on rock cores to evaluate their shear strength. Brazilian tests on rock cores were used to estimate the tensile strengths. These results are presented and discussed in Section 3.0.



EXPLANATION

APPROXIMATE PROJECT BOUNDARY

LOCATION OF BORING BY BING YEN & ASSOCIATES (1987, 1989)

SEISMIC REFRACTION SURVEY BY GOFFMAN & McCORMICK (1985)

QUATERNARY ALLUVIUM

CRETACEOUS LEUCOGRANODIORITE AND GRANODIORITE

CRETACEOUS TONALITE AND/OR GABBROIC ROCKS

INFERRED CONTACT

STRIKE AND DIP OF JOINT

STRIKE OF VERTICAL JOINT

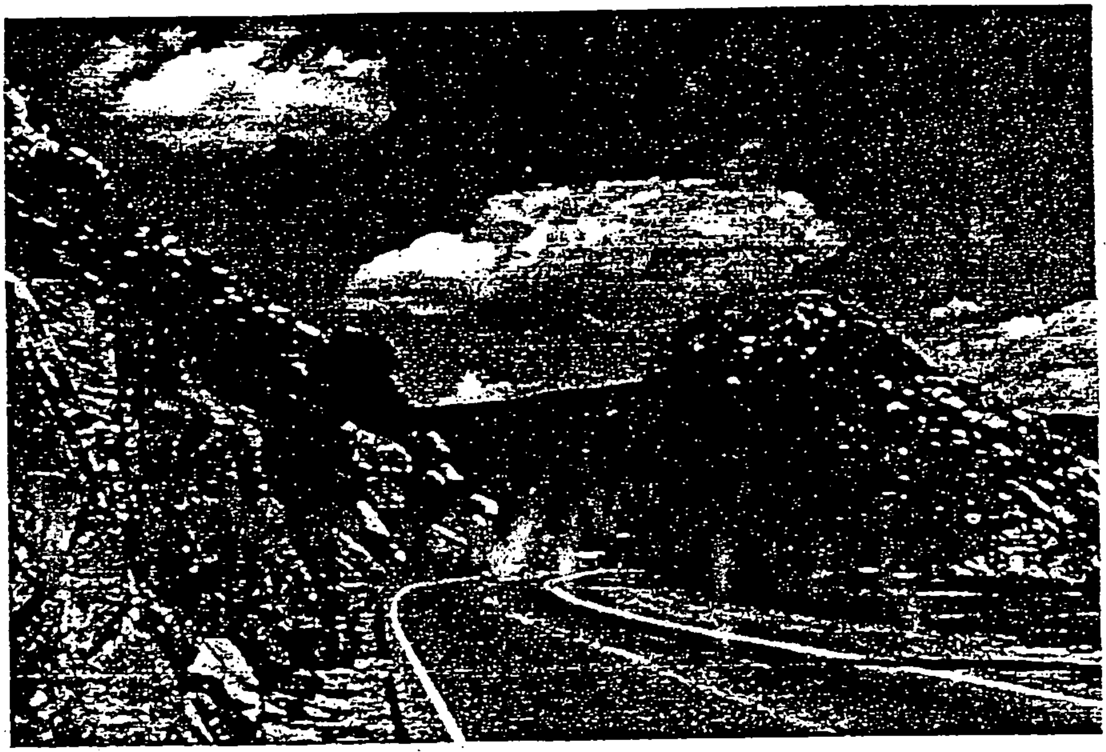
GEOLOGY BY SLOSSON AND ASSOCIATES, SEE APPENDIX C.

0 500 1000 FEET

GEOLOGY AND PLOT PLAN

006462

FIGURE 4



BING YEN & ASSOCIATES

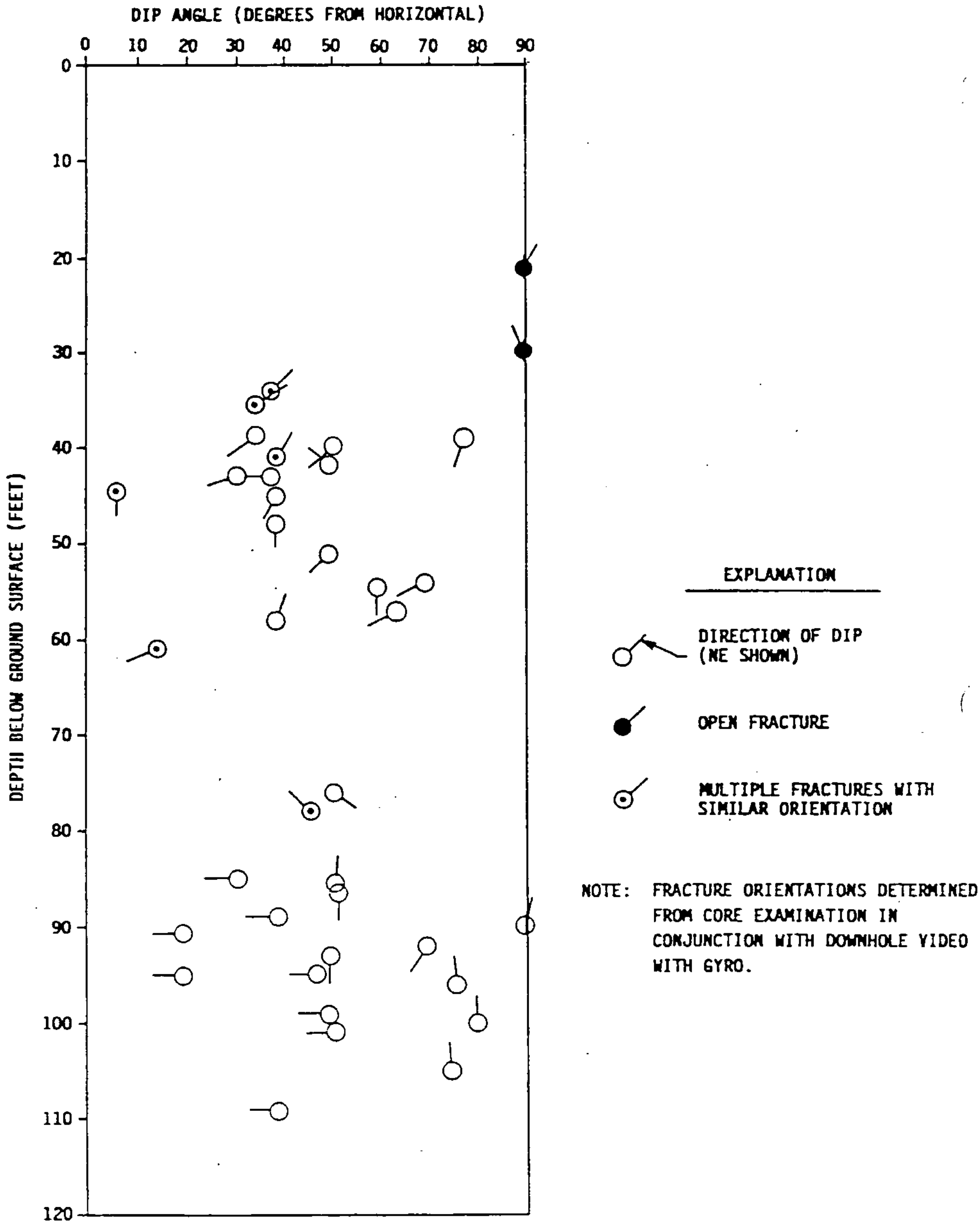
PROJECT NAME: PALOMAR AG[illegible]EGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

EXISTING STEEP CUT SLOPE OF
WEST HILL FRONTING HWY. 76

006463

FIGURE 5



NOTE: FRACTURE ORIENTATIONS DETERMINED FROM CORE EXAMINATION IN CONJUNCTION WITH DOWNHOLE VIDEO WITH GYRO.

006464

BING YEN & ASSOCIATES

LOCATION AND ORIENTATION OF FRACTURES FOR BORING B-3

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

FIGURE 6

TABLE 1. SUMMARY OF APPROXIMATE COMPRESSION P-WAVE VELOCITIES BASED ON SEISMIC REFRACTION SURVEY RESULTS (GOFFMAN & MCCORMICK, 1985)

SEISMIC LINE NO.*	APPROX. DEPTH FROM SURFACE FT.	APPROX. P-WAVE VELOCITY FT. PER SEC.
1	0 to 25± 25+	4,300 15,000
2	0 to 14± 14+	6,000 15,000
3	0 to 5± 5 to 60± 60	6,000 10,000 20,000
4	0 to 7± 7 to 30± 30 to 80±	3,000 4,500 10,500

* Note: Locations of seismic survey lines are shown in Figure 4.

006465

In order to evaluate the rock quality from the perspective of commercial aggregates, the following is a summary of the types of laboratory tests performed for selected samples:

- Rattler (ASTM C-131), soundness (ASTM C-88), durability index (CA 229E), sand equivalent, and R-value tests.
- P-wave velocity and rock density.
- Sulfate, reactivity and spectrographic analysis.
- Thin section petrographic analysis.

Analysis of these testing results is also presented in the following section.

2.3 Geotechnical Engineering Analysis

2.3.1 Earth Materials

Soil, slopewash, and disintegrating boulders comprise the surficial materials of the site. The soil mantle is well developed and is covered by slopewash in some areas. Total depths of soil and slopewash are estimated to be 1 to about 10 feet based on field observation and seismic refraction data of the West Hill area. Colluvium comprised of soil material, decomposed granitic rock and small boulders is present throughout the low areas in the canyon between the East and West Hills, however it is not defined well enough to be a mappable unit. Boulders rounded by spheroidal weathering occur and "float" on most slopes of the quarry site with some as large as 15 feet in diameter.

Based on field observations and the available field seismic refraction survey data (Table 1), laboratory rock core density and P-wave measurement (Table 2), and well log (Appendix D), the depth of weathering vary. The deepest zone is likely to be in the saddle area which may be as much as 30 feet. In order to gain a better understanding on the depth of weathered zone and rock quality, Borings B-1 and B-2 of 50 feet and 90 feet in depth, respectively, were drilled (for locations of seismic refraction lines and borings, see Figure 4). The location of Boring B-1 was chosen at the location where the weathered zone and soil mantle were expected to be the deepest. Boring B-2

TABLE 2. SUMMARY OF LABORATORY P-WAVE VELOCITIES OF SELECTED ROCK CORES

BORING	DEPTH FT.	DENSITY pcf	P-WAVE VELOCITY FT. PER SEC.	REMARKS
1	15	143	7,100	
	18	-	4,000	
	25	163	9,800	
	35	-	6,500	
	45	168	15,200	
	50	169	13,000	
	60	167	14,700	
2	22	166	8,500	Joint filled with gouge
	26	165	8,900	
	43	149	1,200	
	58	178	15,000	
	85	168	15,000	
3	-	-	-	See downhole sonic log, Appendix A

006467

was chosen where the tonalite or gabbroic rock appear to be in contact with the main mass of granodiorite. Boring B-3 located on the eastern flank of the West Hill was continuously cored to a depth of 80 feet. Boring B-3 was chosen to evaluate rock quality as well as to check joint and fracture orientations (dips and strikes) in an area where the bulk of main mass rock is to be extracted. The on-site granitic rock quality increases as the whethering decreases with depth. Generally speaking, the bedrock at the quarry site consists of granitic igneous rock which intruded the once overlying rock approximately 110 million years ago as a portion of the Southern California Batholith. This batholith trends from northwest to southeast and occupies a 1000 mile long region from Riverside, California to the tip of Baja, California. Classification of the on-site bedrock using the IUGS System yields the following rock types:

- Granodiorite: Most abundant on site and shown as Kgd in Figure 4; average hand sample (normalized) contains approximately 50% quartz, 42% Plagioclase, 8% alkali feldspar; mafic minerals (hornblende, biotite) comprise less than 5% of rock; zenoliths common, indicating possible proximity to an intrusive contact; rock is weakly foliated throughout site; very light gray to buff colored (weathered), (can also be named leucogranodiorite since mafics < 35%), fresh rock is very hard, surficial rock is spheroidally weathered.

- Tonalite: Exposed north of West Hill, and shown as Kt in Figure 4 comprises north portion of the East Hill; forms an apparently sharp contact with granodiorite; average hand sample (normalized) contains approximately 50% quartz, 47% plagioclase, 3% alkali feldspar; mafic minerals range from 25% to 50%; medium gray color (weathered), very hard.

- o A band of strongly foliated granodiorite containing abundant dark-colored iron and magnesium rich minerals (biotite and hornblende) occurs across the site on an approximate east-west trend (see Figure 4). In hand sample, rock from the foliated zone can be disintegrated by hand and is characterized by compositional banding between light and dark platy minerals (similar to gneissic layering). Because it is more erodible, this rock is geomorphically expressed as a topographic depression i.e. the saddle area between the West and East Hills.

  The foliated zone appears to form an intrusive contact with the adjacent granodiorite. The foliated zone is a source of decomposed granite. Decomposed granite itself can generally be used for fill material on-site or for realignment of Highway 76 as discussed in the project EIR.

2.3.2 Aggregate Quality.

In cooperation with the California Division of Mines and Geology (CDMG), laboratory testing of aggregate samples were conducted. The results are summarized in Table 3. For the purpose of comparison, a summary of aggregate standards commonly accepted in the U.S. is presented in Table 4. Aggregate samples used in the sand equivalent (S.E.) and R-value tests were obtained by crushing the rock cores to the specified particle sizes and followed by blending in proportion to the gradation specifications such as Class 1 or Class 2 for the base or subbase material, etc.. The gradation curves of the tested samples are shown in Figures 7, 8 and 9. The range of gradations limits specified by Caltrans are indicated by the shaded zones in Figures 7, 8, and 9. The rock cores used for testing were selected by CDMG personnel.

In addition, rock core samples at different depths were examined using thin section photomicrographs. All the photomicrographs were taken at the same magnification. The results are summarized in Appendix E.

TABLE 3

SUMMARY OF TESTING RESULTS

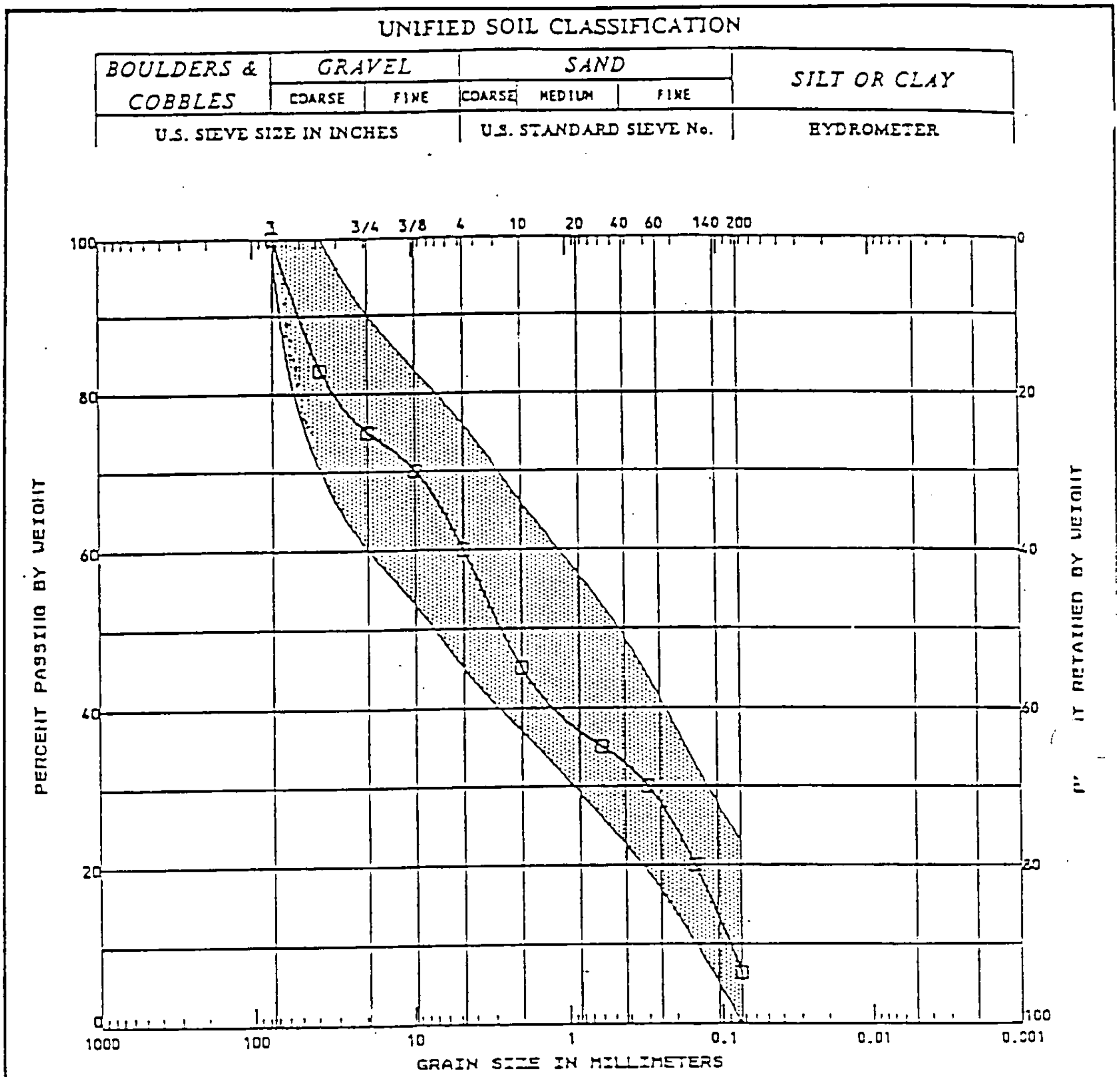
PALOMAR AGGREGATES QUARRY

SAMPLE TESTED			RATTLER ASTM C-131		SOUNDNESS ASTM C-88	D. I. CA 229E	S. E.	R-VALUE	REMARKS
BORING	DEPTHS FT	ELEV.	100 Rev.	500 Rev.					
B-1	15 – 20	360-355	25.3%	62.6%	4.9%	76*			*Samples
	43 – 50	332-325					70	80	
	50 – 55	325-320	9.9%	41%	0.8%				
B-2	65±	545±			1.3%				
	74 – 80	540-534	16.8%	54.6%			74	79	
B-3	36 – 42	594-588	6.7%	35%					
	51 – 59	579-571			1.95%	93	75	74	
	106 – 110	524-520	7.7%	38.6%					

TABLE 4
CURRENT U.S. STANDARDS

CRITERIA	ROAD CONST. Sec. 200-2.2.3	SOUNDNESS Sec. 200-1.5.3	DURABILITY INDEX CALTRANS Sec. 26	Aggr. Subbase Sec. 25-102A Class 1	Aggr. Subbase Sec. 25-102A Class 2	Aggr. Subbase Sec. 25-102A Class 3	Aggr. Base 25-102B Class 1	Aggr. Base 25-102B Class 2
Rattler ASTM C-131	15% max. (100 rev.) 52% max. (500 rev.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soundness ASTM C-88-76	10% max. (for P.C. Concrete)		N/A	N/A	N/A	N/A	N/A	N/A
Durability Index A-229E	35 min.			N/A	N/A	N/A	N/A	N/A
Sand Equivalent				18 min.	18 min.	18 min.	- min.	22 min.
R-Value				60 min.	50 min.	40 min.	-	78 min.

NOTE: N/A Not Applicable
- Not Specified



Symbol	Boring Number	Depth, ft	LL %	PI %	Description
□	B-1	46.3	NP	NP	

Note: Specification Limits
Shown by Shaded Area

006472

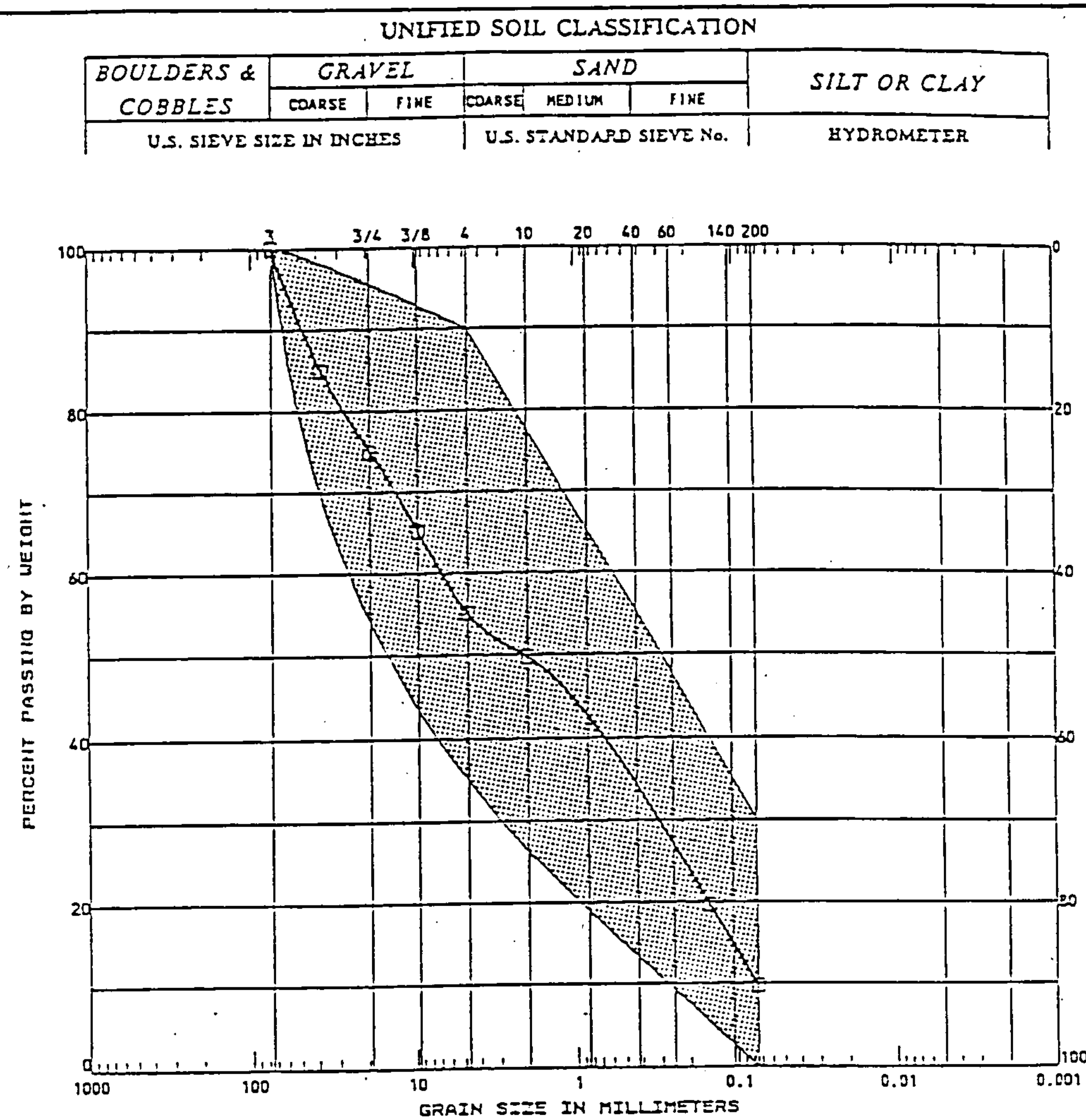
BING YEN & ASSOCIATES

GRAIN SIZE DISTRIBUTION
BORING B-1 AT 46.3 FEET

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

FIGURE 7



Symbol	Boring Number	Depth, ft	LL %	PI %	Description
□	B-2	77.0	NP	NP	

Note: Specification Limits
Shown by Shaded Area

BING YEN & ASSOCIATES

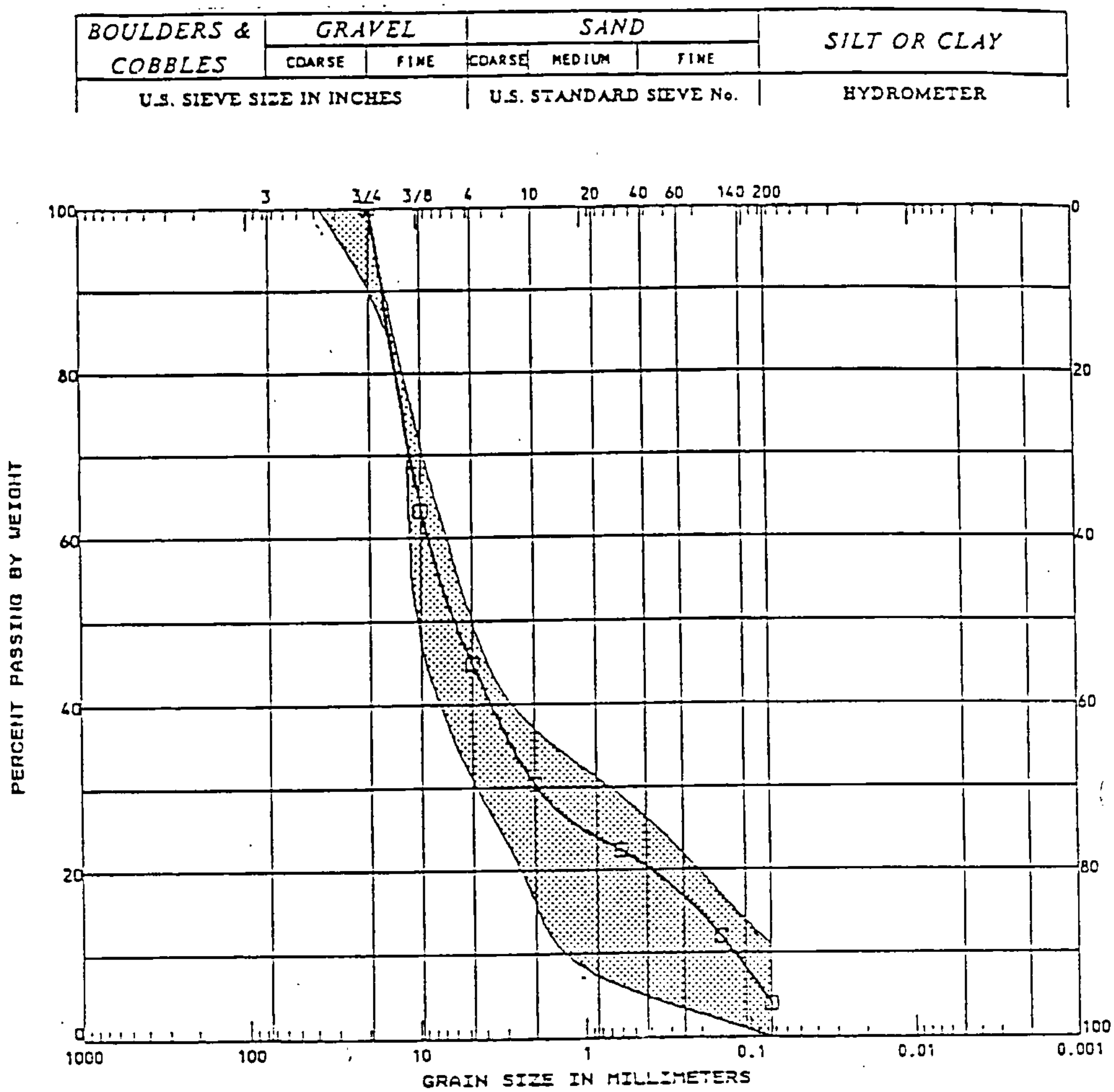
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

GRAIN SIZE DISTRIBUTION
BORING B-2 AT 77 FEET

006473

FIGURE 8



Symbol	Boring Number	Depth, ft	LL %	PI %	Description
□	B-3	55.0			

Note: Specification Limits
Shown by Shaded Area

BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

GRAIN SIZE DISTRIBUTION
BORING B-3 AT 55 FEET

FIGURE 9

006474

Based on the testing results, it is clear that, other than minor areas of soil overburden and weathered zone at shallow depth, the aggregate quality test results (Table 3) meet and exceed the current U.S. standards as summarized in Table 4. It should also be noted that, independent field mapping by the California Division of Mines and Geology as well as examining the rock cores and work completed by Bing Yen & Associates has resulted in a CDMG publication (see References 1; Clinkenbeard, 1989) which classifies the project site as MRZ-2 Area. Based on the guidelines adopted by the Board of State Mining & Geology and under the authority granted by the Surface Mining and Reclamation Act (SMARA) of 1975, MRZ-2 zoning refers to areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists.

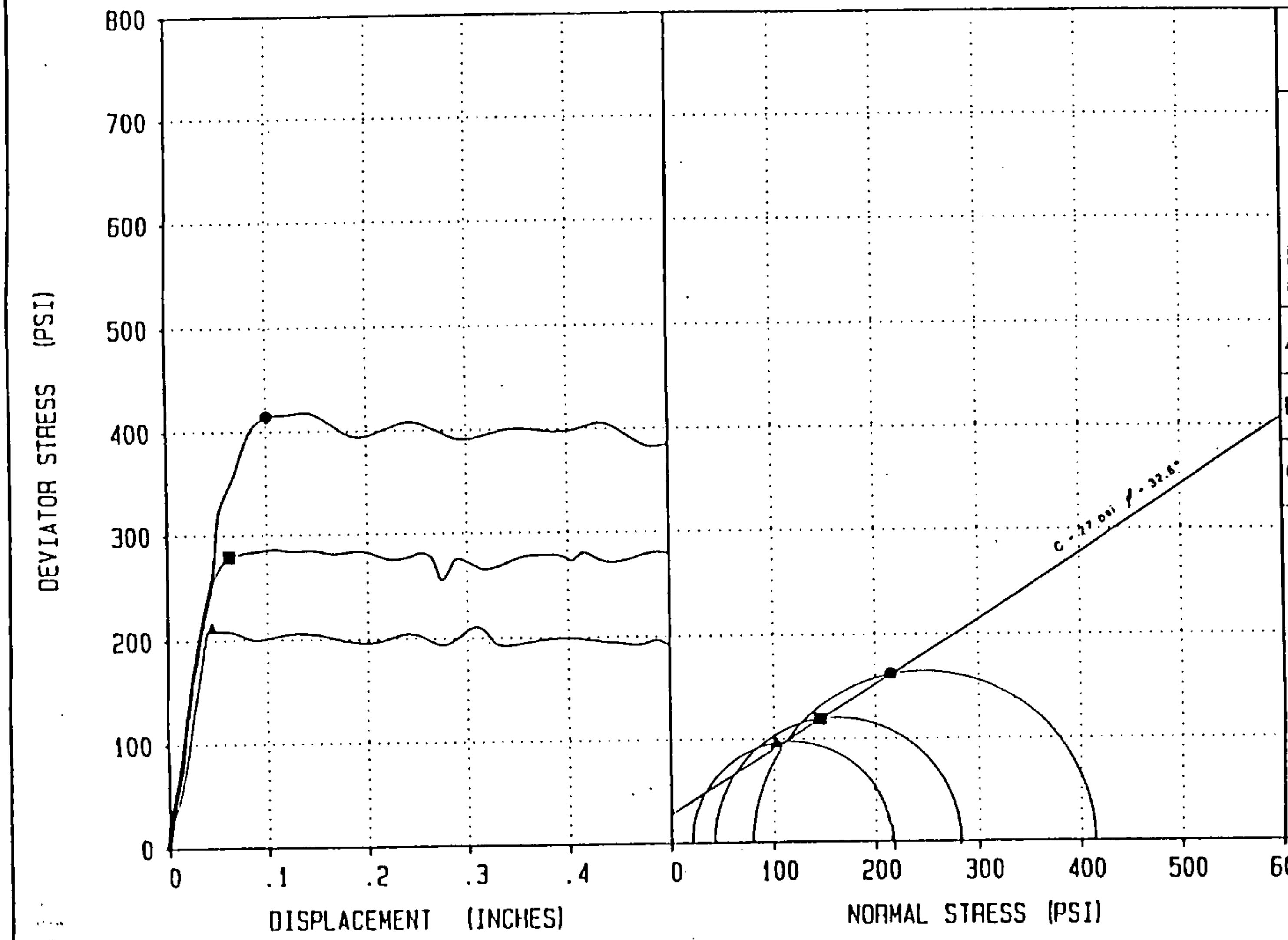
2.3.3 Analysis & Development of Mining Plan.

The requirements of preserving the west facing slope and minimizing visual impact of the proposed mining limit the boundaries of the mining limit is shown in Figure 3A. The economic and market considerations dictate the total extraction volume and the projected rate of production (about 22 million tons of quality rock for about 20 years of mining). Favorable geotechnical factors for this site include the rock quality improves consistently with depth as the rock becomes less weathered. This can be shown from both field and laboratory tests of the P-wave velocities of cored samples (Tables 1 and 2). Generally speaking, the average rock P-wave velocity reaches 10,000 fps or higher after about 30 to 40 feet below the ground surface. Even in the saddle area where a 380 feet deep well was drilled in 1981, the decomposed granite of the first 35 feet changes to "hard rock" according to the well log (Appendix D).

In addition, triaxial tests were performed to evaluate the rock joint strength on rock cores which have one pre-existing open joint. These results ar shown in Figures 10, 11 and 12. Rock tensile strengths were also evaluated using Brazilian tests on the cores next to the triaxial samples. They are tabulated below:

Boring No.	Depth Ft.	Tensile Strength, psi
B-3	50	380
B-3	79	320
B-3	102	460

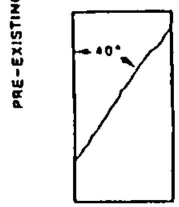
These testing results as well as the aggregate quality tests presented in the previous section suggest that the proposed mining operation is viable. However, geotechnical hazards and constraints exist and they have to be mitigated. These include potential small wedge failures and rockfall hazards. In this section, these hazards and the recommended mitigation measures incorporated into the mining operation plan are presented. It is noted that the selection of an equivalent 80 degree excavation slope is in accordance with the industry safety code (see Reference No. 2) governing excavation of sand, gravel and similar material where the face of the excavation is composed of "firmly cemented or consolidated material". In reality, the rock quality found at the site far exceeds as being firmly cemented or consolidated material. However, the Industrial code also stipulates that the height for the slope shall not be greater than can be reached by the equipment being used, which is much less than the proposed mining plan. This leads to the approach of a step-by-step mining plan that consists of benched vertical cut at 33 ft. intervals and the height of the cut will be increased if the field conditions warrant such an increase. This plan is discussed below.



TESTING CONDITIONS

SYMBOL	SAMPLE #	CELL PRESSURE (PSI)	STRAIN RATE (%/MIN.)	DRY DENSITY (PCF)	BEFORE TEST: MOISTURE CONTENT	BEFORE TEST: DEG. OF SATURATION	SPECIFIC GRAVITY	AFTER TEST: MOISTURE CONTENT	AFTER TEST: DEG. OF SATURATION
▲	83-79A	20	.62	157	2.1	78	2.7	2.8	100
■	83-79B	40	.61	157	2.1	78	2.7	2.8	100
●	83-79C	80	.75	157	2.1	78	2.7	2.8	100

PRE-EXISTING JOINT



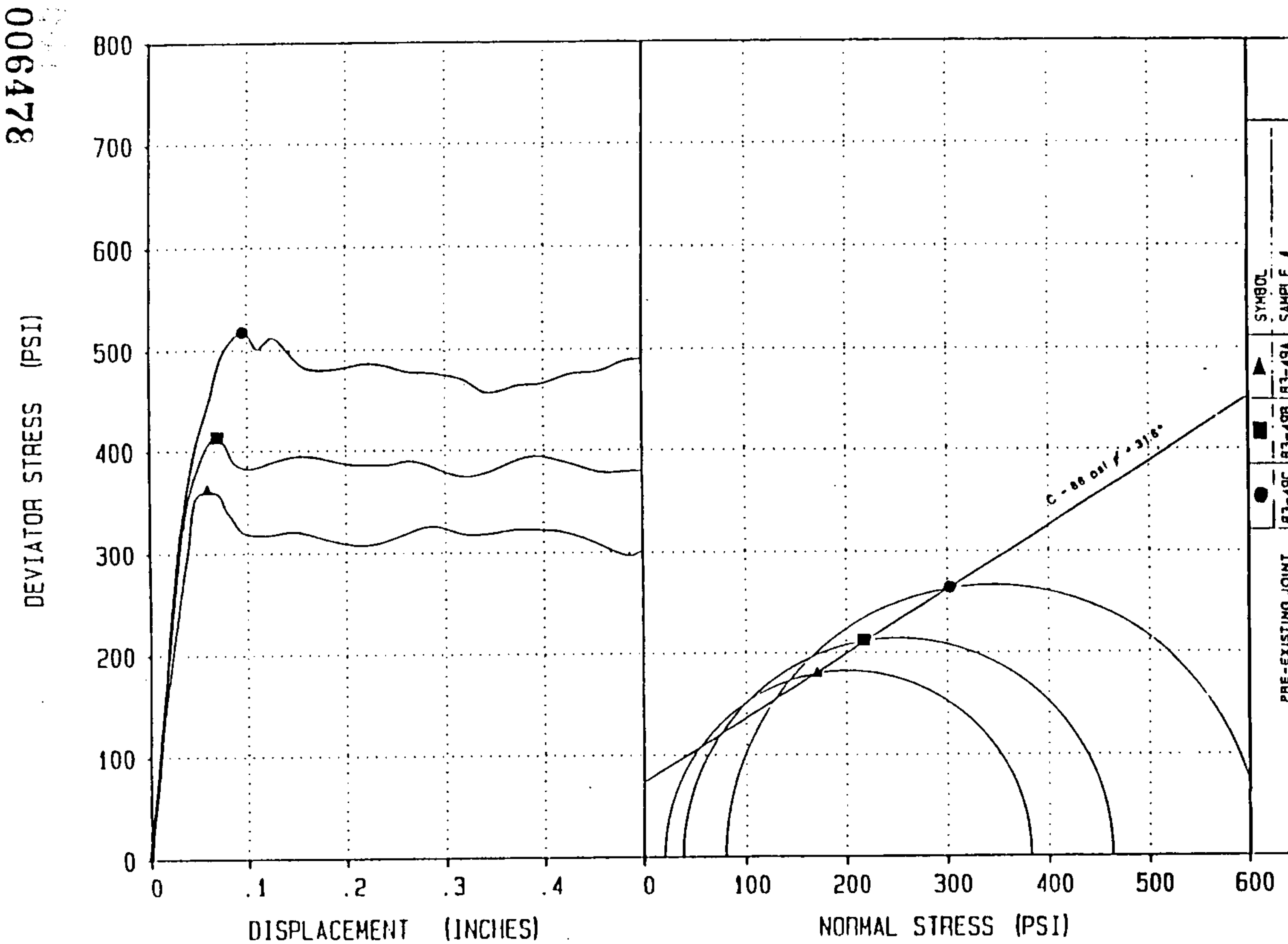
BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 DATE: JUNE 27, 1990

ROCK CORE TESTING RESULTS

FIGURE 10



TESTING CONDITIONS

SYMBOL	▲	■	●
SAMPLE #	83-49A	83-49B	83-49C
CELL PRESSURE (PSI)	20	40	80
STRAIN RATE (%/MIN.)	.57	63	58
BEFORE TEST: DRY DENSITY (PCF)	148	148	148
BEFORE TEST: MOISTURE CONTENT	3	3	3
BEFORE TEST: DEG. OF SATURATION	60	60	60
AFTER TEST: SPECIFIC GRAVITY	2.7	2.7	2.7
AFTER TEST: MOISTURE CONTENT	5.1	5.1	5.1
AFTER TEST: DEG. OF SATURATION	100	100	100

PRE-EXISTING JOINT

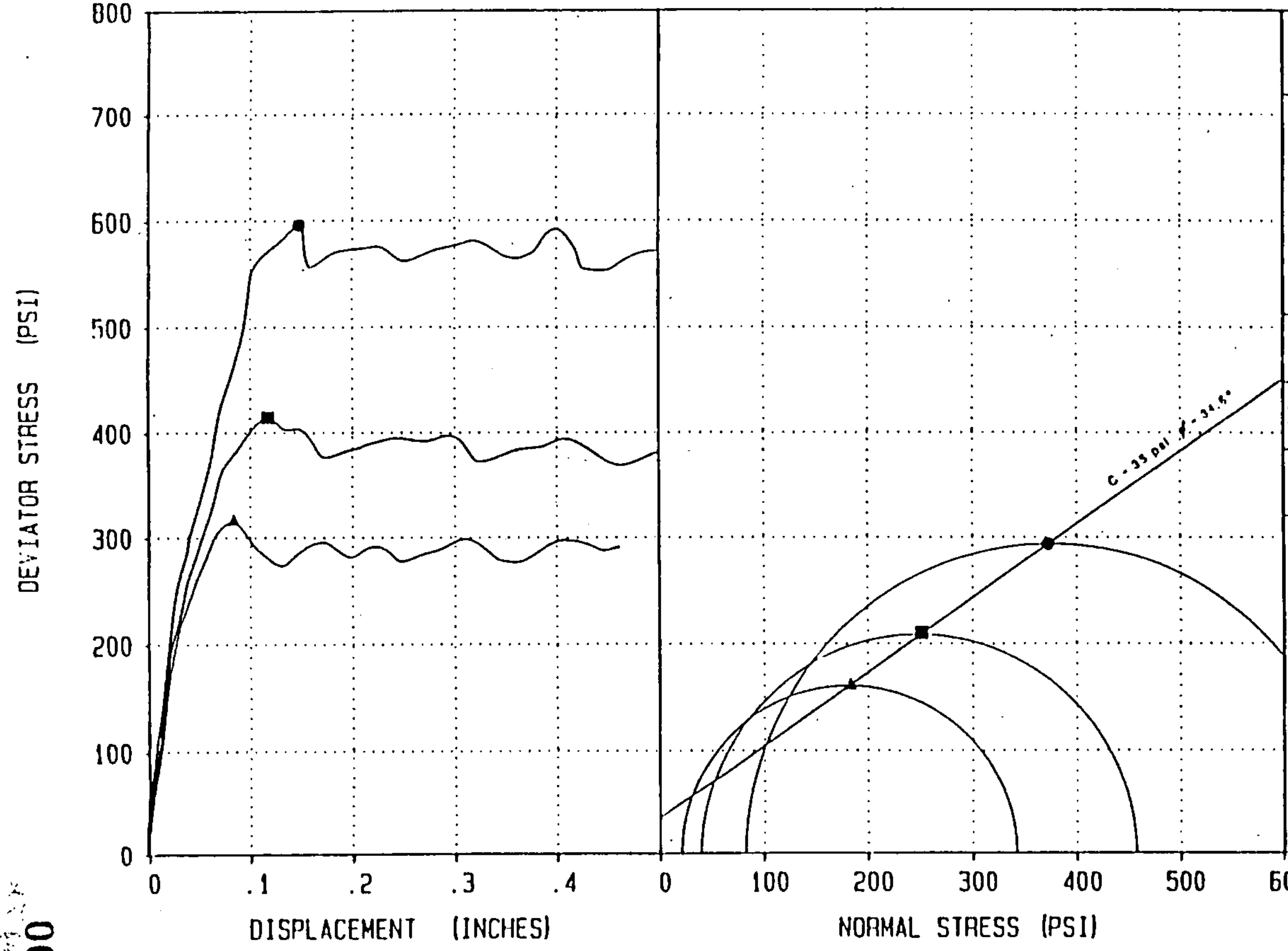
BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES [illegible]ARRY SITE

PROJECT NO.: 51-151 | DAT[illegible] [illegible]UNE 27, 1990

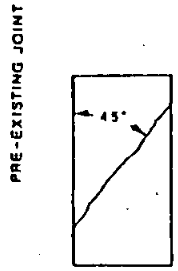
ROCK CORE TESTING RESULTS

[illegible]GURE 11



TESTING CONDITIONS

SYMBOL	SAMPLE #	CELL PRESSURE (PSI)	STRAIN RATE (%/MIN.)	BEFORE TEST: DRY DENSITY (PCF)	BEFORE TEST: MOISTURE CONTENT	BEFORE TEST: DEG. OF SATURATION	AFTER TEST: SPECIFIC GRAVITY	AFTER TEST: MOISTURE CONTENT	AFTER TEST: DEG. OF SATURATION
▲	B3-102A	20	.47	152	2.3	57	2.7	4	100
■	B3-102B	40	.53	152	2.3	57	2.7	4	100
●	B3-102C	80	.51	152	2.3	57	2.7	4	100



24

0064479

BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

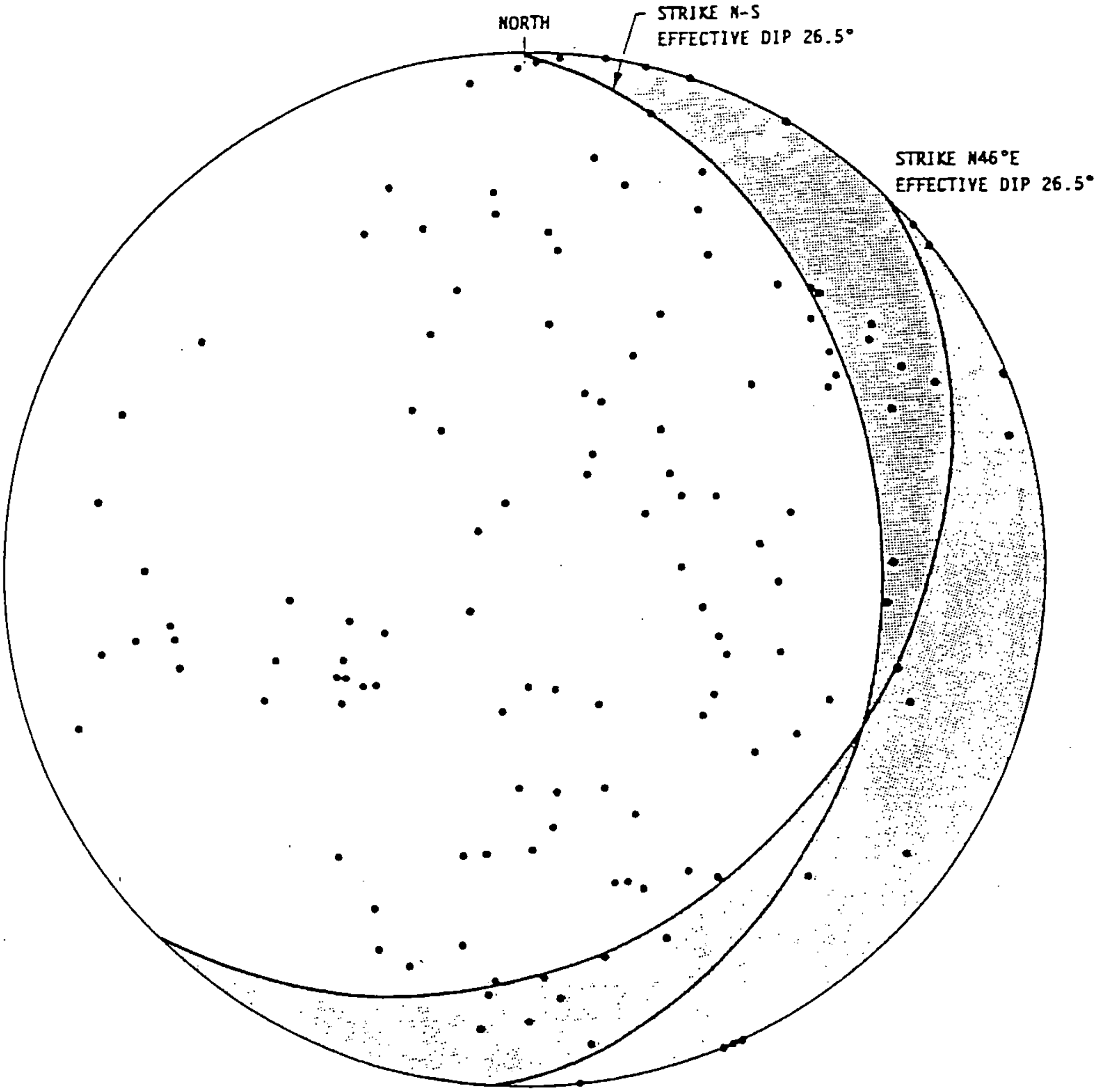
ROCK CORE TESTING RESULTS

FIGURE 12

2.3.3.1 Extractive Operation & Stability Considerations

Since the potential of rockfall and stability problems is highest in the weathered zone, the joints and fractures mapped at surface outcrops where there are more joints and fractures than at depth represent the worst condition that can be anticipated. Figures 13 and 14 present the joint and fracture orientations in stereonet projection, for the upper, middle and lower portions of the West Hills (for numerical values of the mapped joints and fractures in various areas of the West Hill, see Appendix B). The amphitheater-like mining pit will result in cut slopes in all directions. Figures 13 and 14 show two typical directions (strikes N-S and N45^{O}E) at an effective dip of 26.5^{O} (equivalent to 2 horizontal to 1 slope). These Figures indicate that, as a first step, a bench cut with an equivalent slope of 2 to 1 is highly unlikely to have gross stability problems according to the available data. This is the conceptual basis upon which the mining operation will be carried out initially on a 33 feet cut with a 66 feet bench. The exposed cut and bench surfaces will enable the geotechnical engineer or engineering geologist an unparalleled opportunity to observe and to evaluate the exposed rock conditions prior to recommending a cut greater than 33 feet in height.

Specifically, site preparation begins on the east side of the Hills at elevation approximately 825 by removal of vegetation and the soil overburden. The underlying decomposed granitic material will be removed using conventional earth moving equipment and can be used as fill for the Caltrans' proposed realignment of Highway 76 (see EIR regarding the road widening and "404" permit). As shown in Figure 15, the initial phase begins at elevation approximately 915 and working below the ridge line thereby minimizing the visual impact. The drill and blast operation will proceed from south to north. The working face shall be vertical and with a maximum of 33 feet in height having a minimum 66 feet bench above and below it, Figure 16. This will result in an



EXPLANATION

ZONE SHOWING FAILURE KINEMATICALLY POSSIBLE

BING YEN & ASSOCIATES

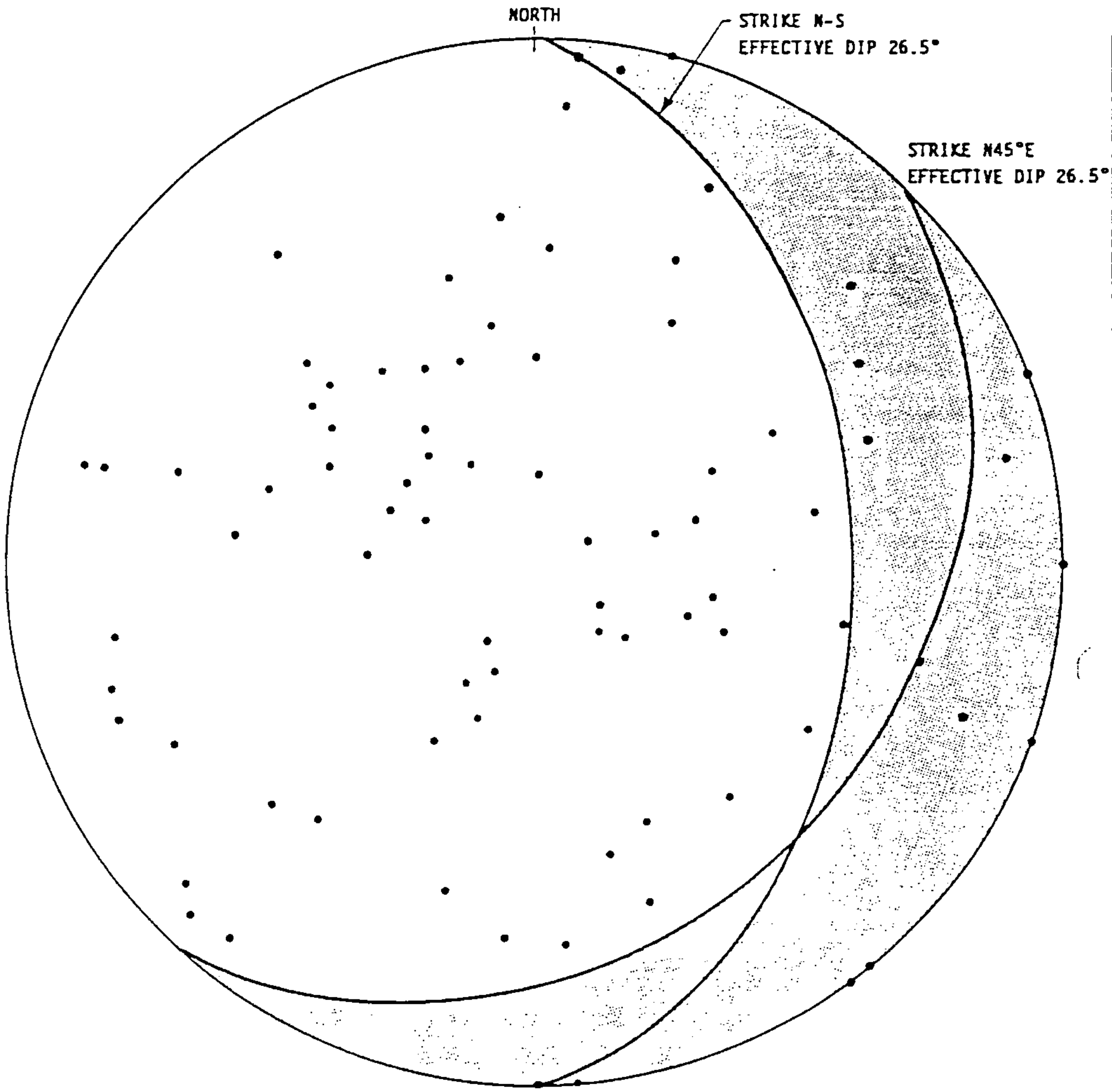
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

JOINT ORIENTATIONS FOR MIDDLE AND UPPER WEST HILL PORTIONS, STEREONET PROJECTION

FIGURE 13

006481



EXPLANATION

ZONE SHOWING FAILURE KINEMATICALLY POSSIBLE

BING YEN & ASSOCIATES

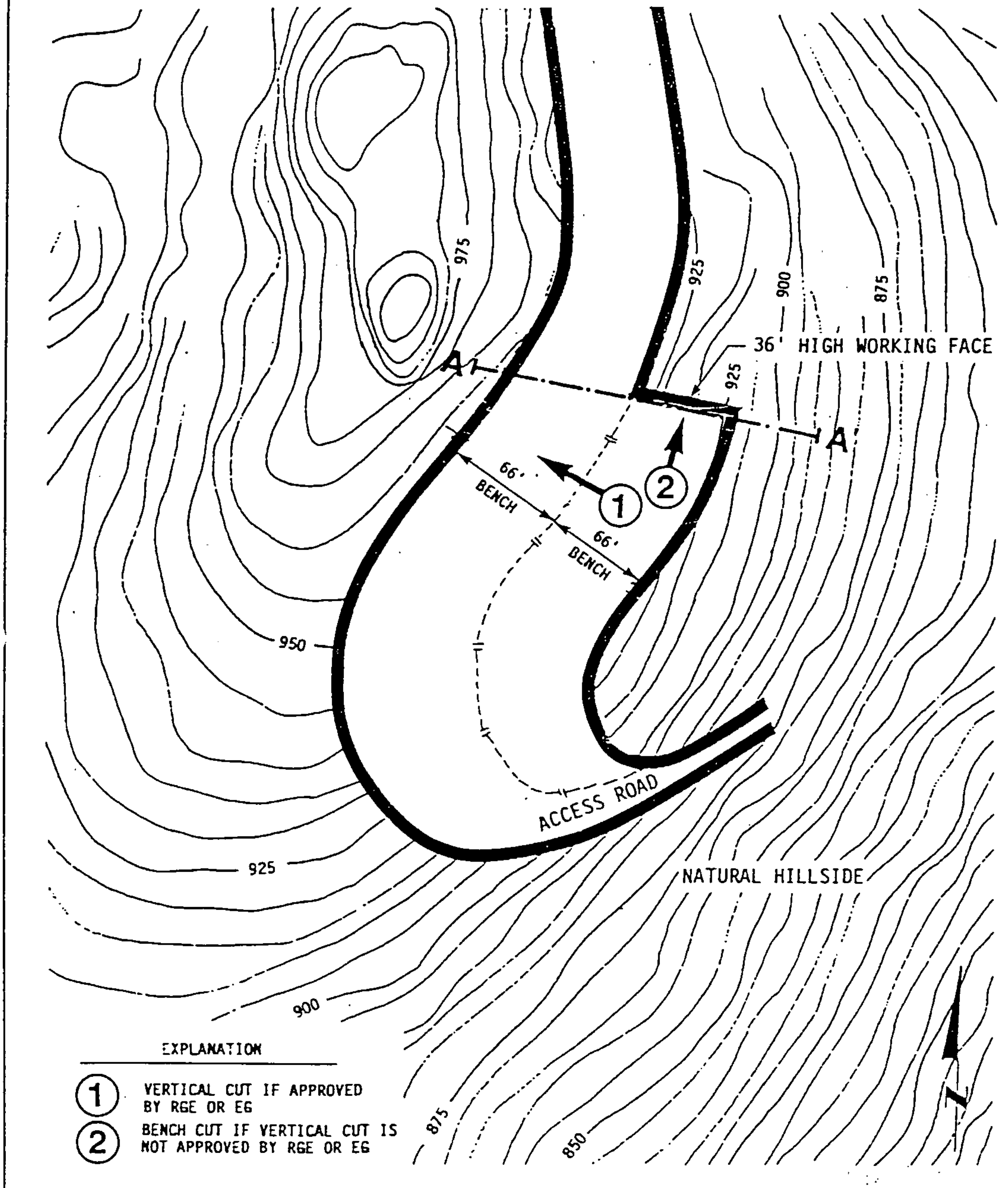
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

JOINT ORIENTATIONS FOR LOWER WEST HILL PORTION, STEREONET PROJECTION

FIGURE 14

006482



BING YEN & ASSOCIATES

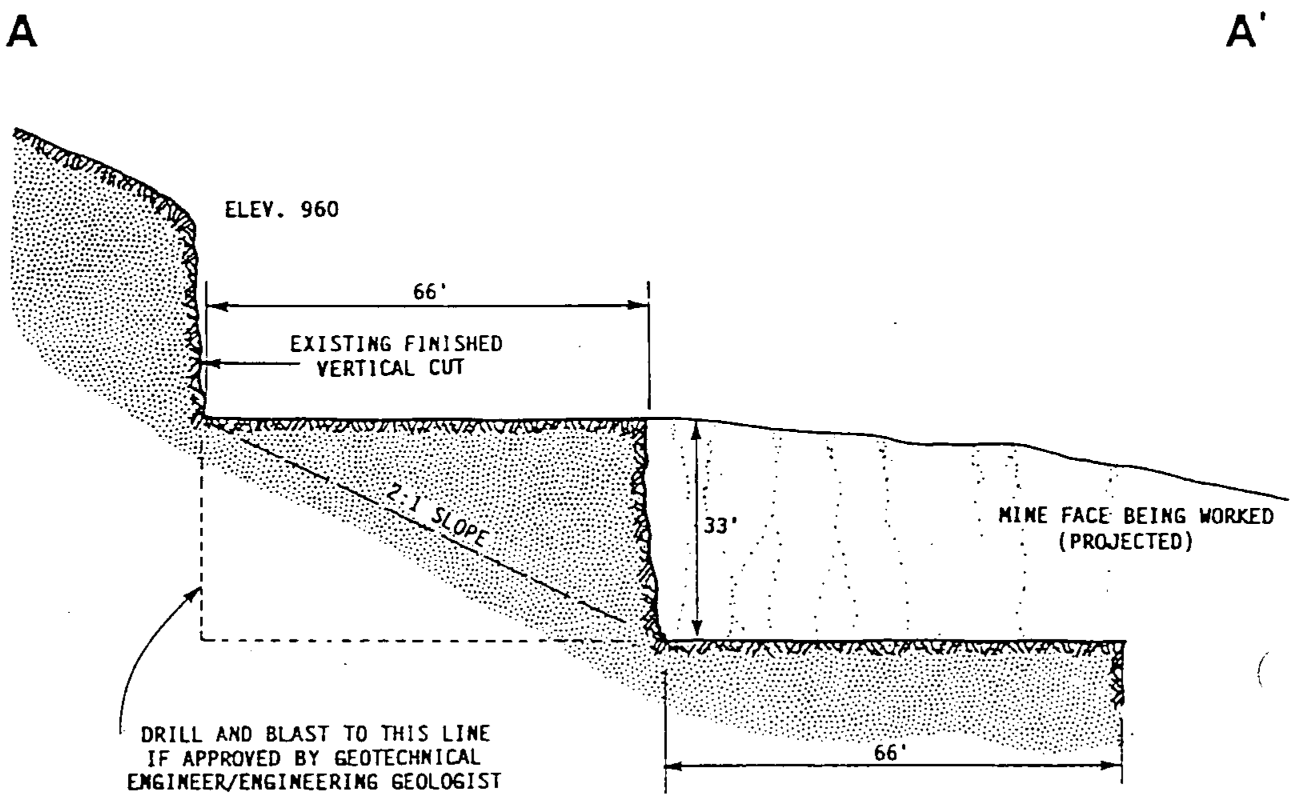
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: OCTOBER, 1990

MINING PLAN AND LOCATION OF CROSS SECTION A-A'

006483

FIGURE 15



006484

BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151

DATE: OCTOBER, 1990

CROSS SECTION A-A'

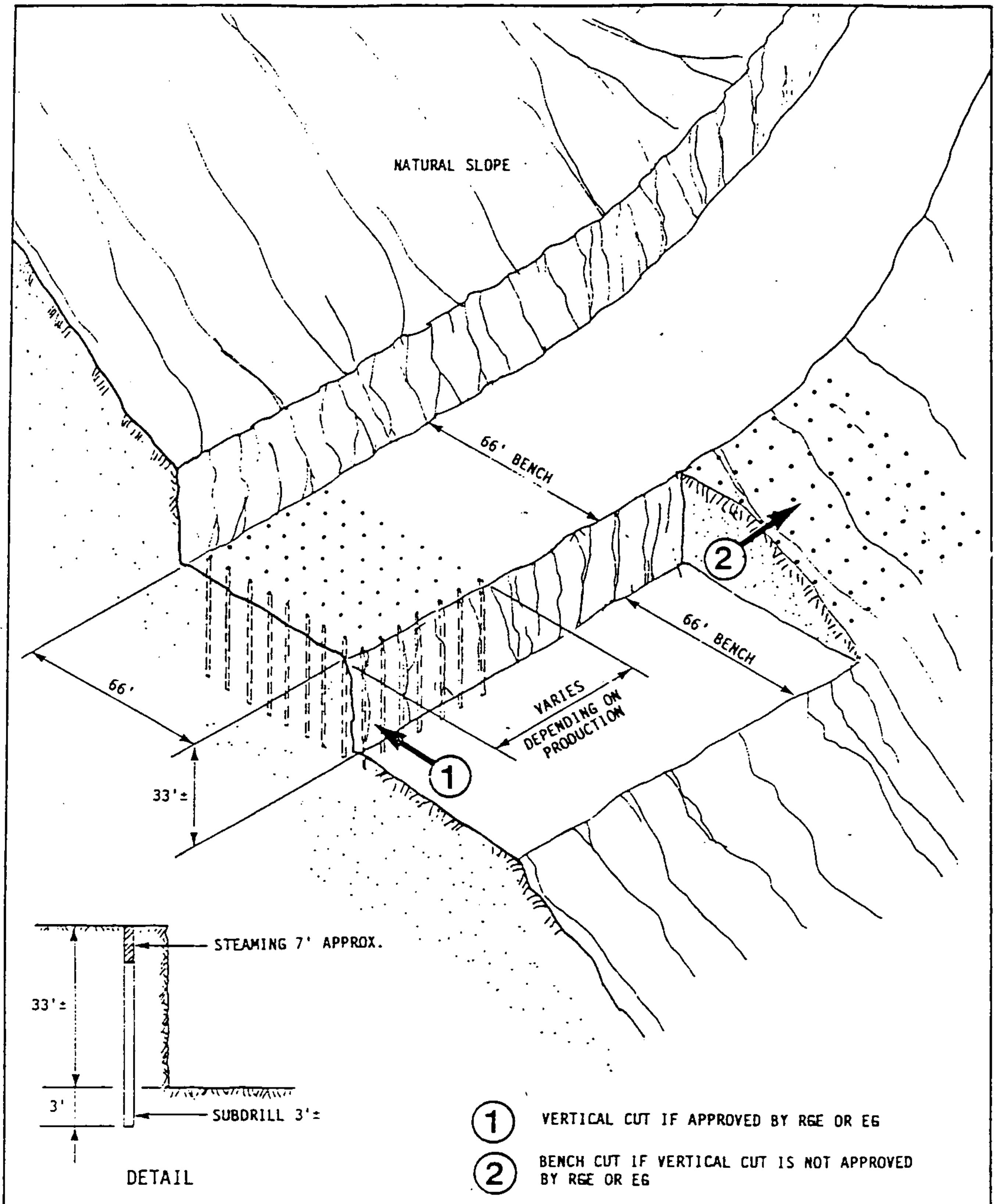
FIGURE 16

interim equivalent slope of 2 to 1 (horizontal to vertical) or flatter for any freshly cut slopes. The bench can only be removed upon the approval of geotechnical engineer or engineering geologist on a weekly basis (see blasting & removal schedule below) after inspection and mapping of the exposed 33 ft. high vertical face and the bench. The inspection and mapping may be more frequent as needed, depending on the field conditions. Should the geotechnical engineer or the engineering geologist decide that it is safe to remove the bench, the newly exposed 33 ft. high, vertical slope will be draped by heavy gauge wire mesh anchored to the rock to mitigate rock fall hazards (see Section 2.3.3.2). Figure 17 illustrates the versatility of the proposed mining process whether to keep the 66 feet bench width or to remove it using the drilling and blasting plan to be discussed further below.

For an average 25,000 tons per week production rate (see Section 1.0), the preliminary plan will probably require two units of track drill to drill about 150 blast holes 3 1/2 inch in diameter and 36 feet deep in a week's time. Assuming an equal distance of "burden" and "spacing" of 8 feet for the granitic rock, Figure 17 schematically shows a 66 feet wide face and the 33 bench height when the drill and blast operation is to deepen the excavation westward. Assuming 7 feet stemming of a 36 feet deep blast hole, the remaining 29 feet will require approximately 103 lbs. of ANFO per hole. For initial estimation purpose and assuming a powder factor of 1 1/4 lbs. of ANFO per cubic yard of granodiorite to be blasted, each hole will yield about 82 cubic yard of rock. The 150 holes will produce about 12,350 yards per week which is equivalent to about 25,000 tons of rock per week. When blasting northward along the bench, more blast holes may be required due to the sloping hillside. Using this information as a guide, there will be ample room for a continuous mining operation in either cases. That is, when one section is being drilled, the next section is being scaled and loaded by a power shovel to a portable crusher and conveyored to the surge pile in the processing area. In the meantime, a third section can be prepared for drilling. Blasting can therefore be done once a week (probably on weekends when the site has least workers present) by licensed blasting contractors who shall bring the charges and blasting caps to the site without on-site storage. This can also be the time for the weekly inspection and mapping of the freshed scaled bench by a geotechnical engineer or an engineering geologist to recommend if its removal is advisable for the vertical cut, i.e. mining westward to deepen the cut or mining northward to keep the benching. But in no case shall the removal of the bench cause the vertical face to exceed 100 ft. in height. A mandatory 18 ft. wide bench with berm is recommended. The bench serves for equipment passage which can also lower a cage for the geotechnical engineer or geologist to examine an exposed rock face or maintain the wire mesh. The maximum 100 ft. cut with the 18 ft. mandatory bench is equivalent to an average 80 degree slope of the prevailing industry safety code governing the sand and gravel extraction (see Section 2.3.3 of this report and Ref. No. 2).

To further evaluate the feasibility we have analyzed the downhole joint/fracture records of Boring B-3, drilled at elevation about 650. Below the weathered zone, all but one (at depth of 75 ft) are favorably dipping into the N-S cut face. Consistent west dipping was noted at greater depth (85 to 102 ft depth where data are available).

The rock compressive strength, as implied from Tables 1 and 2 (P-wave velocity) are good. The thin section micrographs showed that the mineral grains are relatively tightly interlocked. However, for hardrock mining, it is not the compressive strength of the rock that controls the factors of safety of a slope but the wedge failure governed by the joints and fissures. The triaxial testing results of jointed rock cores are also good (Figures 10, 11 and



1 VERTICAL CUT IF APPROVED BY RGE OR EG

2 BENCH CUT IF VERTICAL CUT IS NOT APPROVED BY RGE OR EG

BING YEN & ASSOCIATES	SCHEMATIC DRAWING ILLUSTRATION DRILL-AND-BLAST SEQUENCE THAT MAINTAINS THE VERSATILITY OF BENCHING OR VERTICAL CUT OPTIONS
PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE	
PROJECT NO.: 51-151 DATE: OCTOBER, 1990	006487 FIGURE 17

12) suggesting the viability of the vertical cut as an option. With respect to the wedge type failure which could be bounded by open joints or fractures, it can best be assessed in the field when the surface is exposed. No amount of work at this time can justify with certainty when or where the wedge failure will or will not occur. Using field mapping and experience to adjust open pit mining slope has been the state-of-practice in the field of rock mechanics. If the rock quality and the joint spacing and tightness are as indicated from this preliminary field & lab investigation, it appears feasible to adopt the mining plan as presented. It should also be recognized by all parties concerned that the final configuration may not be an evenly terraced slope. Based on the available data at this time, more frequent benching is likely to be on the south facing slopes in the northwestern part of the plot plan. For example, clayey gauge material was noted in Boring B-2 at 53 feet depth. On the other hand, in this particular location, the observed Rock Quality Designation (RQD) was in the range of 80 to 90 which is considered good. The decision on the mining slope, as illustrated herein, can only be assessed during the weekly inspection by knowledge professionals.

In summary, the above extraction operation and mining plan from a geotechnical perspective is targeted for versatility adjustable to the local rock conditions. It should also be noted that the initial daily production rate will probably be lower than 25,000 tons per week (hence, less blasting) because of the steep West Hill and the short front length. As mining progresses, the production rate will be greatly increased because there will be increasingly more area to work with.

2.3.3.2 Blasting Induced Vibration and Rockfall.

Blasting induced vibration and noise can be controlled by the blasting engineer by varying delay, stemming, satellite holes, etc. It is also important to recognize that vibrations noticeable to humans are frequency dependent and the amplitude is generally several hundred times smaller than the threshold vibrations to cause damage to the structure. The closest structure is the owner's (William Pankey) residence, about 500 feet to the nearest mining boundary. Estimated particle velocity using the empirical formula developed by the U.S. Bureau of Mines and other references suggest that the ground motion will be noticeable but far from causing structural damage. Adjustment of blasting schedule and quantity of rock extraction should take into consideration the response of the nearby residence.

The concrete-lined pond near the northern portion of the project site should be monitored for potential leakage and should be drained as the mining operation is advanced to within 400 feet of the pond, unless advised otherwise by the blasting engineer.

The most probable hazard as discussed earlier is rockfall. Heavy gauged wire mesh draped over steep rockface to prevent rockfalls has been a general practice for many years (Reference 3). Cal/OSHA and MSHA (Mining Safety & Health Administration) have recommended that the wire mesh canopies be installed for all slopes.

Rockfall can also be induced by earthquakes. As described before, loose rock "floaters" up to 10 to 15 feet were found in the slopes. It is uncertain as to the effectiveness of wire mesh to arrest floaters during a severe earthquake. Approximately 11 kilometers northeast of the site lies the Elsinore fault zone. As estimated by the California Department of Mines and Geology (CDMG), the maximum probable earthquake (magnitude of 7) could cause a peak ground acceleration approaching 0.5 g. Literature (Appendix C) has estimated that the maximum recurrence interval (slippage) for this fault zone is 250 years with the slip rate for that period being 3 to 7 millimeters per year. Displacement in the form of creep has not been recognized on the Elsinore fault zone. Thus, the equivalent of 3 to 7 millimeters per year is likely to occur as sudden ruptures every few hundred years. Earthquake with magnitudes of 6 to 7.5 can cause surface displacements of 1 to 7 feet on the fault. Much of the energy released from a 1 to 7 foot displacement will affect the entire region including the quarry site.

To mitigate the rockfall hazard induced by earthquakes, it is recommended that all the floaters facing Highway 76 in the West Hill area be removed or tied down. Due to the steepness of the natural slope, it is difficult to remove the floaters by equipment at the beginning of the operation. Those that cannot be removed but are perched precariously above the highway should be tied down with drilled holes and grouted dowels or blasted with small charges then removed. In addition, it is recommended that the project civil engineer for the realignment of Highway 76 consider constructing a soil berm or installing precast concrete barriers along the north side of the highway to prevent fallen rocks from reaching to roadway. Standard roadside warning signs indicating potential rockfall area to the approaching motorist should also be installed.

2.3.3.3 Grading of the Process Plant Site

A conceptual process plant site is shown in Figure 18. The site will involve cut-and-fill grading for which the 1 to 1 cut slope in the slopewash material will need stabilization and the setback distance should be determined at a later date.

Since the site is located at a natural drainage course from the saddle area further north, perforated subdrain of appropriate diameter and depth should be embedded in gravel and/or geofabric filter and placed under the fill. Total fill volume, including processing plant site and road fill is estimated to be approximately 20,000 cubic yards. Detailed grading specifications, which is not a part of this study, will be provided at a later date. A culvert discharging de-silted water will be placed under Highway 76. It is our understanding that the culvert will be large enough to convey the storm flow and to serve as a tunnel housing a conveyer belt transporting dredged sand from San Luis Rey River to the processing plant for mixing. The embankment settlement over the river deposits, soil bearing capacity, and lateral pressure for the wingwalls of the culvert will be needed in the design phase of the project.

3.0 SUMMARY & CONCLUSIONS

On the basis of the field exploration and laboratory testing data and the analysis presented, a summary of findings and conclusions with respect to the proposed mining plan is given below:

3.1 The proposed mining of the West Hill area consists principally of granodiorite. The surficial rock is spheroidally weathered. Below the weathered zone, the fresh rock samples tested are of good quality for aggregates. The depth of the weathered zone vary but mostly ranging from 10 to 30 feet.

3.2 A band of strongly foliated granodiorite containing dark-colored iron and magnesium rich minerals occurs across the northern portion of the West Hill on an approximate east-west trend. This zone is characterized by compositional banding and easily disintegrated which is a source of the decomposed granite.

3.3 There is no known fault transect the project site. The nearest active fault is the Elsinore fault zone about 11 km northeast of the site. The Elsinore fault is capable of generating an earthquake up to 7 in magnitude with a return period of several hundred years. Should it occur, a peak acceleration up to 0.5g can be expected at the site and rockfall is considered to be the most probable seismically induced hazard.

3.4 The proposed mining boundary is designed to preserve the western slope view shed and to minimize visual impact from the surrounding areas. The proposed mining plan has an amphitheater-like shape with a maximum of 715 feet in height on the west side of the quarry and decrease to about 70 feet on the east side. The proposed mining plan will yield approximately 22 million tons of quality aggregates and riprap rocks for a projected period of about 20 years of operation.

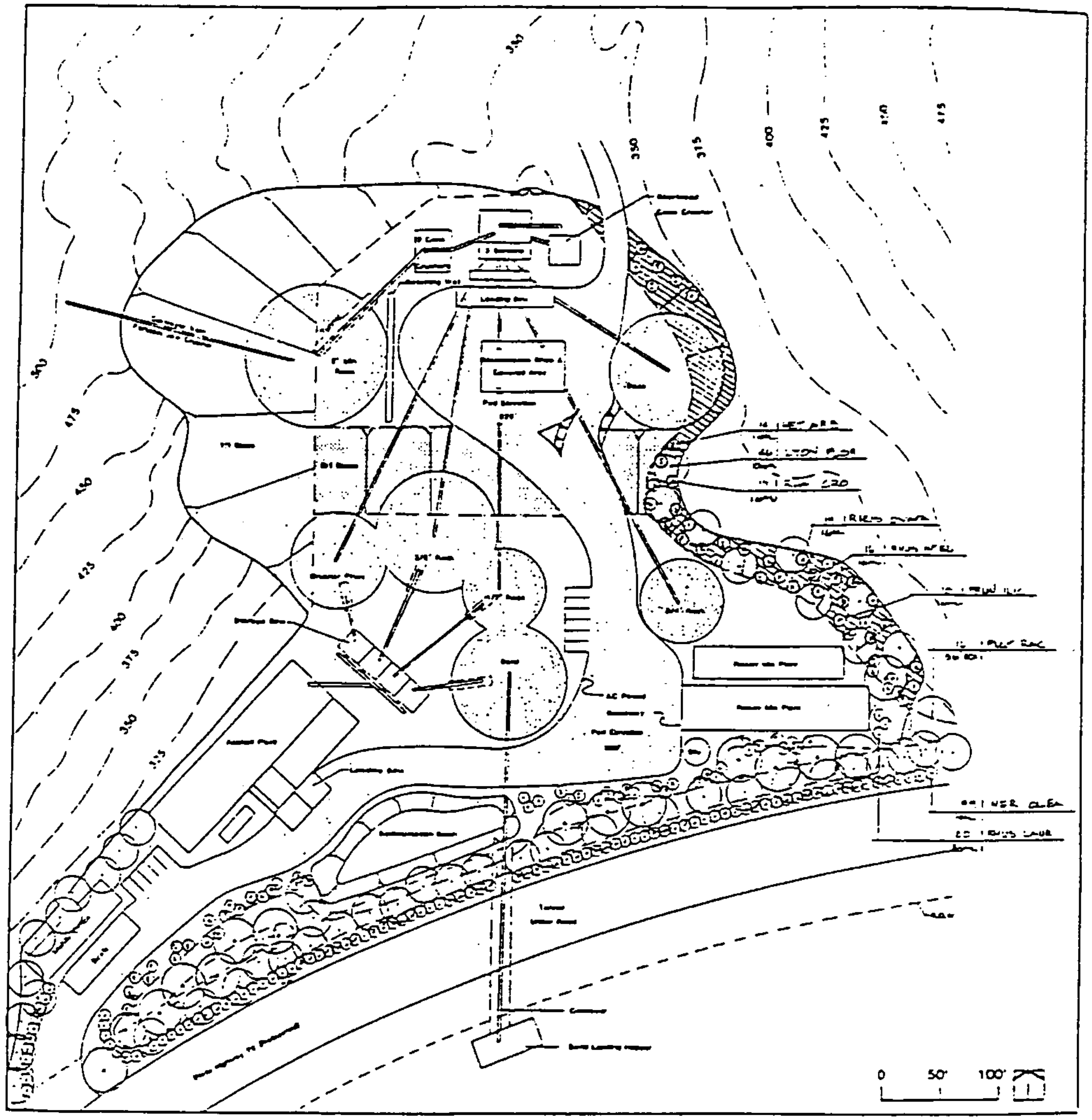
3.5 A total of 275 surface rock joint and bedding attitudes were mapped and analyzed. Joint spacing ranging from 2 to 10 feet. The shallow dipping joints (less than 40^{o}) are generally parallel to ground surface and are probably related to exfoliation of the bedrock.

Triaxial tests of rock cores with joints suggest good frictional and interlocking (cohesion) resistance. However, due to the amphitheater-like orientation of cut faces, small wedge type of slope failure controlled by the joint system and rockfall of weathered rock are the predominating modes of stability problems. These problems can be mitigated by:

A. Use heavy gage wire mesh canopy draped over the vertical rockface at the request of Cal/OSHA and MSHA; and

B. Use bench configurations (66 feet in width and 33 vertical feet in height) to create an equivalent 2 horizontal to 1 vertical slope in areas where intersecting joints posing a stability concern. Gross stability of the maximum cut defies reliable and cost-effective analysis nor is it consistent with the hardrock open pit mining practice. A drill-and-blast sequence has been developed to provide the flexibility enabling the geotechnical engineer or engineering geologist to map the exposed rock surface and decide if continuous vertical cut or benching can be made in local areas.

The developed drill-and-blast sequence is generally for blasting once a week. The rest is designed for continuous operation, i.e., while one section is being drilled, the adjacent section will be scaled and loaded and the third section is being prepared for blasting. This enables the geotechnical engineer or engineering geologist to make the weekly inspection and mapping of the rock face which has just been scaled. Should the geotechnical engineer or engineering geologist decide that the rock face is safe and free from wedge type of failure and after the 33 ft. freshly exposed vertical face is draped with anchored wire mesh, the bench may be removed for another 33 ft. cut. But in no case shall the removal of the bench cause the vertical face in excess of 100 ft. in height. A mandatory minimum 18 ft. wide bench with berm is recommended for a maximum 100 ft. height slope. The bench will serve as a platform for equipment to lower a cage for the inspectors to examine the exposed rock face and to maintain the wire mesh. The recommended benching is equivalent to an average 80 degree slope of the Industry Safety Code (Article 12, Section 6.9 (e)) governing the extraction of sand and gravel.



BING YEN & ASSOCIATES

PROJECT NAME: PALOMAR AGGREGATES QUARRY SITE

PROJECT NO.: 51-151 | DATE: JUNE 27, 1990

PROCESSING PLANT SITE

006493

FIGURE 18

3.6 It is anticipated that the mined pit will not be an evenly benched slope. Current downhole geophysical test results suggest that the east facing slope, where the maximum cut is located, has favorable dipping into the slope once the weathered zone is removed. Current data also suggest that one or two tiers of additional benching will probably be required in the northwest portion of the pit (south-east facing slope).

3.7 Crushed rock core samples were blended to the gradation within Caltran's specifications to test the aggregate quality. The results suggest good quality and that the quality improves with depth as the weathering and thermal alteration process decreases. As a result of these tests, and independent studies by the California Division of Mines & Geology, the site has been classified as MRZ-2 in accordance with the Surface Mining and Reclamation Act (SMARA). MRZ-2 designation is given to areas where adequate information indicates that significant mineral deposits are present.

3.8 There will be no significant amount of waste fines for off site disposal. Most soil mantle is estimated ranging from one to 10 feet thick in the West Hill area and can be in excess of 30 ft. thick at the saddle area. After removal of vegetation and deleterious material, the soil can be used and compacted with available D.G. for road base and fills for the processing plant.

3.9 The potential hazard of rockfall induced by seismic shaking was discussed. Methods of mitigating this hazard including removal and tie-down of "floaters" are recommended. Passive preventive measures such as installing barriers along the north side of the realigned Highway 76 and standard warning signs for rockfall to the approaching motorists are also recommended.

3.10 Blasting induced vibrations will be noticeable only by the closest residents who are owners of the quarry and lives about 500 feet north of the mining boundary. However, the magnitude of the vibration in the drill-and-blast operation described herein is anticipated to be far below the threshold magnitude to cause any structural damage. However, considerations should be given in scheduling for and design of the blasting to minimize its effects to the residents.

The concrete lined pond located north of the mining boundary should be monitored for potential leakage. It is recommended also that the pond be drained when the blasting operation is advanced to within 400 feet from the pond.

By:

Bing Yen & Associates, Inc.

Bing C. Yen, Ph.D.
Registered Geotechnical Engineer #917

REFERENCES

1. Clinkenbeard, J.P. "Mineral Land Classification of the Pan Key Ranch Site" San Diego County, CA. Open File Report No. 89-15. California Division of Mines and Geology, 1989

2. Industry Safety Code, Title 8, Article 12 Ground Control Section 6985 (e).

3. Hoek, E. and Bray, J. W. "Rock Slope Engineering", The Institute of Mines and Metallurgy, London, 3rd Edition, 1981.

APPENDIX A

LOGS OF BORINGS, GAMMA RAY AND SONIC LOGS

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		GRANODIORITE, medium to coarse grained, highly weathered, friable, dirty, light brown.			NA		NA		Medium brown cuttings.
		Hard, slightly weathered, fine grained. Pink/grey with 15% mafic inclusions at 2-3mm in size, 35% quartz. Good recovery. Fractures appear to have occured primarily along pre-existing joints. Joint surfaces generally irregular. 15-35% K-SPAR/Plag.							Light grey cuttings
	5				1 3 min/ ft.		100%		
	10	Abrupt change, rock highly weathered, medium grained, friable, occassional zones of rust colored foliation (1/4") visible in recovered core. Rock darker (stained) below 11 feet.			2 2 min/ ft.	1	50%		Medium brown cuttings. core barrel became stuck (temporarily) at this depth (i.e. cave-in).
	15	Better recovery. Rock highly foliated with steeply dipping rust stained fractures every 2 inches. Most fractures still intact. 1/4 inch light brown clay gouge in one joint. Rock becoming coarser, typical grain size 3mm at 25 feet. Increasing mafics to 20% with abundant mafic inclusions generally parallel to fracturing. K-spar gone.			3 2 min/ ft.		60%		
	20	Decreasing grain size. Fewer fractures less staining, less friable.			4 3 min/ ft.	2	40%		
	25	Hard, slightly weathered, fine grained, pink/grey with 15% mafic. Inclusions 2-3mm in size, joints (open) rust stained and spaced at 6 inches.			5 3 min/ ft.	3	85%		Light grey cuttings.
		Dark inclusion 8 inches thick, soft and friable. Very fine grained but non-plastic when wet. Abrupt change to foliated coloration(from speckled above) continued next sheet.							
	30								

Bore Number: B-1 Elevation: 375 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 March 1987 Finish: 16 March 1987 Logged By: MFH

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid: ______

Direction and Inclination: Southwest @ 25° Off Vertical

BING YEN & ASSOCIATES

Project Name: Palomar Aggregate

Project No.: 51-151 Date: June 1990

006498

LOG OF BORING B-1

Figure A-1

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		closely spaced convoluting dark bands within fine grained light grey rock. Joint spacing as above. Open and rust stained at 6 inches.			6 3 min/ft.	3	70%		
	35	Highly weathered and fractured zone, medium dense to coarse grained. Joints at 2 inch spacing. Occassional thin (1/16") light brown, CL/ML gouge on joints.			7 3 min/ft.	4	85%		
	40	Joint spacing decreasing to 3 inches at 37 feet. Rock moderately weathered, lighter in color. (Off-white and black banding). More competent rock. Open joints at 8 inches. Joints appear fresh with little or no weathering or discoloration. Rock is now light to medium grey with thin (1mm to 4mm) convulatory black banding accounting for 30% of the matrix.			8 2 min/ft.		95%		Cuttings light blue-grey in color.
	45				9 2 min/ft.	5	100%		
	50	Good quality rock. Intact core lengths range from 5" to 20", joints are fresh. Banding still present but less well defined.			10 2 min/ft.	6	100%		
	55	Thin (1/16") layer of soft, plastic, light green gouge within joint at 54 feet. Joint inclined 20° to core axis. Good quality rock. Core lengths of 5" to 20", with fresh joints. **BORING TERMINATED AT 60 FEET** Approximately 6 hours drilling time, loss of approximately 100 gallons of circulation water.			11 2 min/ft.	7	100%		
	60								

Bore Number: B-1 Elevation: 375 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 March 1987 Finish: 16 March 1987 Logged By: MFH

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid: ____

Direction and Inclination: Southwest @ 25° Off Vertical

006499

BING YEN & ASSOCIATES	LOG OF BORING B-1	Figure A-1
Project Name: Palomar Aggregate		
Project No.: 51-151 / Date: June 1990		SHEET 2 OF 2

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
3/17 0840	0–5	GRANODIORITE, highly weatherd, fine grained, highly fractured, foliated witr alternating white and grey/brown banding (1/4 to 3mm). Fractures open and closely spaced (1/2" to 4"), both parallel and perpendicular to core axis. Joints highly weathered and stained (rust). Material resembles thinly bedded fine grained sandstone.					Surface Casing (No Recovery)		Brown cuttings, some mica flakes (Quartz and feldspar)
	5			30°	1 2 min/ ft.	1	40%		
	10	18 inch section of speckled (white and black) GRANODIORITE. Rock is highly weathered, medium grained (1/2 to 1mm) and friable. Cores are more intact with less fracturing than above. Joint spacing is 2" to 5". Layer (1/2") of soft, medium brown, gouge (ML) in joint at 10 feet. Joint Perpendicular to core axis. Weathered ML, CL at 12.5 feet.		70°	2 2 min/ ft.		80%		Light brown cuttings
	15	Abrupt change to fine grained banded rock with alternating 1/2 to 2mm white and dark grey layers, dark grey bands, account for 70% of rock. Rock is highly fractured in joints spaced at 3 inches. Joint surfaces are stained (rust) and weathered, soft, non-plastic, brecciated zone at 13" to 6" thick.			3 2 min/ ft.	2	80%		Light brown cuttings
	20	Thin layer (1/8") of soft, light grey, gouge (CL), in joint at 20 feet. Joint is perpendicular to core. Rock highly fractured at 20 to 22 feet		70°	4 2 min/ ft.		85%		
	25	At 23 feet abrupt decrease in amount and consistency of dark grey banding very thin, less than 1/2mm in size and discontinuous, accounts for less than 15% of the rock. Giving the rock and almost speckled appearance. Joints open, stained an spaced at 8 inches with occassional 8 inch zones of highly fractured rock.		5°	5 2 min/ ft.	3	90%		Material wedged in core cuttings
	30	As from 12 to 23 feet rock is moderately weathered and of relatively poor quality. Joints 6 inches in size.							

Bore Number: B-2 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 17 March 1987 Finish: 18 March 1987 Logged By: MFH

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid: ______

Direction and Inclination: Southeast @ 30° Off Vertical

006500

BING YEN & ASSOCIATES

Project Name: Palomar Aggregate

Project No.: 51-151 Date: June 1990

LOG OF BORING B-2

Figure A-2

Sheet 1 of 3

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B-Bedding S-Shear J-Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		Highly fractured from 30 to 35 feet. Gouge zone at 33 feet, 6 inch thick, stiff, grey brown (CL/ML).		80°	7 3 min/ ft.	3	90%		
	35			5°10°	8 4 min/ ft.	4	90%		
				45°	9 5 min/ ft.		80%		
	40	Joints space at 1 to 4 inches, stained (rust) but weathered.		45°	10 2 min/ ft.	5	95%		
		Joint spacing increased to 8 inches. Less weathering and discoloration of joints.		20°					
	45	44 feet to 48 feet, rock is highly fractured and brecciated with soft, light brown gouge present in most joints and fractures.			11 1 min/ ft.		90%		Clay and weathered material makes drilling slow
	50	Rock becomes less fractured at 49 feet, joints spaced at 4 inches and are generally stained and infilled with CL/MC. Rock is moderately weathered, stained (rust) and generally of poor quality. At 53 feet, 3 inch stiff, tan layer of CL/CH, moist., highly fractured 54 to 60 feet, joints spaced at 2 inches.			12 2 min/ ft.	6	95%		
	55	Well developed joints along core axis at 55 feet. 6 inch brecciated zone at 56 feet.			13 3 min/ ft.		80%		
	60								

Bore Number: B-2 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 17 March 1987 Finish: 18 March 1987 Logged By: MFH

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

006501

BING YEN & ASSOCIATES

Project Name: Palomar Aggregate

Project No.: 51-151 Date: June 1990

LOG OF BORING B-2

Figure A-2

Sheet 2 of 3

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B-Bedding S-Shear J-Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		Abrupt change to medium grained (2mm), black and white speckled texture (from fine grained layered texture). 30% mafics. Rock is friable and "dirty" joints are highly weathered and spaces at 5 inches. At 63 feet, 4 inch layer of soft dark brown, poorly graded, fine grained sand with fines, SP-SM.			15 3 min/ ft.				
	65	Highly fractured Gradual change to fine graded speckled (black and white) rock becomes considerably more competent, harder, less friable. Joints at 5 inches and slightly weathered. Joint spacing increases to 10 inches with little or no weathering at joint surfaces.			16 3 min/ ft.	7			Light brown cuttings.
	70	As from 60 to 63 feet.			17 4 min/ ft.	8			
	75	Transition back to fine grained rock with white patches and banding within a predominantly (80%) dark grey matrix. Joints are spaced at 3 inches and are moderately stained (rust) and weathered. At 74 Feet Gouge, 1/8" thick, light brown, ML. Inclined at 10° to core axis. At 76 feet joint spacing increases to 7 inches, some staining (rust) on joints. Rock is hard and of relatively high quality.			18 6 min/ ft.	9	100%		
	80	At 80 feet, transition to very hard, fine grained less than 1mm, speckled (black and white, 15% mafic) rock. Joints are spaced at 12 inches and appear to be fresh and unweathered.			19 6 min. ft.		100%		
	85	Joint spacing less than 24 inches.			20 15 min. ft.	10	100%		
	90	BORING TERMINATED AT 90 FEET							

Bore Number: B-2 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 17 March 1987 Finish: 18 March 1987 Logged By: MFH

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

BING YEN & ASSOCIATES

Project Name: Palomar Aggregate

Project No.: 51-151 | Date: June 1990

LOG OF BORING B-2

006502

Figure A-2

Sheet 3 of 3

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		No recovery (0 to 20 feet)							
	5								
	10								
	15								
	20	WEATHERED GRANITIC BEDROCK, brown, orange-brown and greenish grey; moist; firm to hard; well oxidized; moderately well-developed, subparallel fractures with clayey gouge (as noted in graphic log).		75° 65° 65°					
	25	At 29 feet bedrock becomes hard; fractures are oxidized along fracture surface except as indicated.		62° 58° 58° 52° 47°					
	30								

Bore Number: B-3 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 November 1988 Finish: 16 November 1988 Logged By: Pat Jenkins

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

006503

BING YEN & ASSOCIATES

LOG OF BORING B-3

Figure A-3

Sheet 1 of 4

Project Name: Palomar Aggregate

Project No.: 51-151 Date: June 1990

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		At 35 feet bedrock becomes essentially unoxidized except along fractures: bedrock is described as follows: Tonalite to granodiorite: light grey to grey: very hard: well developed schlieren banding, fine-grained; well fractured between 20 to 55 feet.		45° 32° 41° 45° 34° 30°					
	35			35° 37° 28° 20° 23° 30°					
	40			20° 55° 41° 24° 19° 15°					
	45	At 45.5 feet, first chloritized fracture.		39° 45° 47°					
	50	At 52 feet chloritized fracture cross cutting schlieren.		32° 50° 58° 23° 48°					
	55	At 56.2 feet, chloritized fracture cross cutting schlieren.		70°					
	60								

Bore Number: B-3 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 November 1988 Finish: 16 November 1988 Logged By: Pat Jenkins

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

BING YEN & ASSOCIATES	LOG OF BORING B-3	Figure A-3
Project Name: Palomar Aggregate	006504	Sheet 2 of 4
Project No.: 51-151 / Date: June 1990		

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		At 62.7 feet, oxidized fracture.							
	65								
	70								
	75								
		At 76.3 feet, chloritized fracture.		58° 45°					
		At 78 and 78.6 feet, chlorotized/oxidized fractures parallel to schlieren.		54°					Chloritized fractures are moist and have a "waxy" or "soapy" texture.
		At 79 feet, chloritized/oxidized fracture.		57° 48°					
	80								
		At 82 feet, slightly chloritized fracture.		43°					
	85								
		At 85.4 feet, chloritized fracture cross cutting schlieren.		20°					
	90								

Bore Number: B-3 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 November 1988 Finish: 16 November 1988 Logged By: Pat Jenkins

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

006505

BING YEN & ASSOCIATES	LOG OF BORING B-3	Figure A-3
Project Name: Palomar Aggregate		
Project No.: 51-151 Date: June 1990		Sheet 3 of 4

Date/Time	Depth (Feet)	DESCRIPTION (Lithology)	Graphic Log	Dip Data B=Bedding S=Shear J=Joint	Run Number	Box Number	Recovery (ft./%)	RQD	Remarks
		At 92.6 feet, chloritized fracture cross cutting schlieren.		22°					
	95	At 96.9 feet, slightly chloritized fracture cross cutting schlieren.		32°					
		At 99.4 feet, fracture cross cutting schlieren. At 100.3 chloritized fracture cross cutting schlieren.		35°					
	100	At 102.6 feet, chloritized fracture cross cutting schleren.		25° 44°					
		BORING TERMINATED AT 102.1 FEET							
	105								
	110								
	115								
	120								

Bore Number: B-3 Elevation: 600 Feet Location: Palomar Aggregate (20 Miles East of Oceanside)

Date: Start: 16 November 1988 Finish: 16 November 1988 Logged By: Pat Jenkins

Drilling Company: Datum Exploration, Inc. Rig Type: Longier 44 with Diamond NQ Drilling Fluid:

Direction and Inclination: Southeast @ 30° Off Vertical

BING YEN & ASSOCIATES

Project Name: Palomar Aggregate

Project No.: 51-151 Date: June 1990

LOG OF BORING B-3

006506

Figure A-3

Sheet 4 of 4

BARBOUR CORP

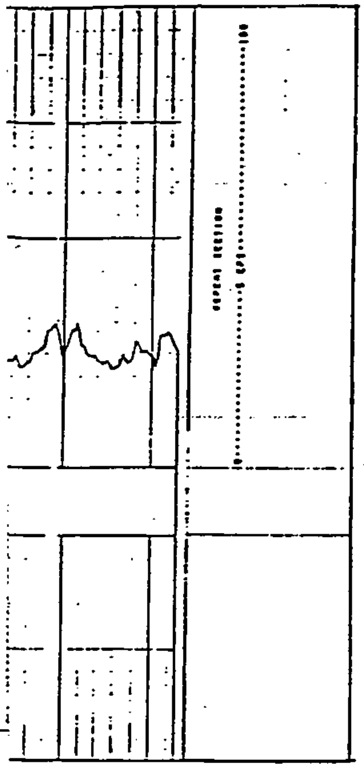
GAMMA RAY LOG

COMPANY

WELL

FIELD

COUNTY [illegible] STATE [illegible]



BARBOUR CORP

COMPENSATED SONIC

COMPANY

WELL

FIELD

COUNTY [illegible] STATE [illegible]

006507

ENSATED SONIC AND GAMMA RAY LOG
BORING B-3

FIGURE A-4

APPENDIX B

SURFACE JOINT ATTITUDES OF

ROCKS GROUPED ACCORDING TO AREA

PANKEY RANCH QUARRY SITE

JOINT ATTITUDES

Mapping Date: December 19, 1986

Mapping on West hill

Mapping on northeast and north slopes of hill:

N37W/40NE
N57W/67NE
N25W/29SW
N85W/67SW
N25W/82SW
N05W/49SW
N35W/41NE
N70E/77SE
N65W/39SW
N83E/87SE
N47E/78NW
M69E/49NW
N65E/V
N25W/37SW

Mapping on hill top, working south:

N70E/75NW
N35W/47NE
N35W/81Se
N30W/45NE
N58E/35SE
E-W/26N
N-S/83E
N60W/80SW
N67E/V
N35W/78SW
N80W/78SW
N20W/42SW
N85W/51SW
N43W/75SW
N45W/75SW
N73E/80SE
N67E/55NW
N37E/12SE
N10W/80NE
N33W/36SW
N63E/67NW
N86W/64SW
N15W/80NE
N26W/60NE
N59E/80NW
N70E/15SE
N-S/80W
N75E/65NW

Mapping on hill top, working south (continued):

N60W/V
N75E/59SE
N35W/16NE
N72W/39SW
N85E/54NW
N59W/24SW
N69E/V
N64E/82SE
N-S/33W
N79W/32NE
N25E/45NW

Mapping on south and southeast slopes of hill:

N69W/35NE
N50E/75SE
N50E/V
N15W/35SW
N41W/87SW
N60W/43NE
N84E/77SE
N50E/70NW
N60W/55SW
N60W/30NE
N-S/V
N50W/65NE
N50E/36SE
N65W/65SW
N65W/76SW
N59W/20NE
N20E/V
N52W/85NE
N70W/25NE
N14E/70SE
N-S/80E
N61E/V
N40E/25NW
N55E/72NW
N40E/55SE
N85E/72NW
N22W/13SW
N25E/47SE
N12W/27SW
N75E/60NW
N28W/54SW

006509

<u>Mapping on West hill</u>

Mapping on south and southeast slopes of hill (continued):

N31E/32SE
N89E/V
N22E/V
N41E/60SE
N10E/80SE
N22E/25SE
E-W/43S
N20W/V
N03E/35SE
N75W/66NE
N51E/50SE
N53E/V
N56E/57NW
N10E/38SE
N20E/34NW
N16E/55SE

Mapping on southeast and east sides of hill, near top:

N25W/V
N19W/85NE
N30W/46NE
N20W/55NE
N10E/80SE
N05W/V
N15E/V
E-W/V
N81W/V
N64W/75SW
N21E/80SE
N75W/75SW
N15W/40NE
N45W/40SW
N10W/80NE
N23W/34NE
N25W/43NE
E-W/V

Mapping on south/southeast facing roadcut, SR 76:

N80E/50SE
N70E/45SE
N73E/60SE
N35E/55SE
N34E/50SE
N58E/25SE

Mapping on south/southeast facing roadcut, SR 76 (continued):

N16W/80NE
N20E/41NW
N26W/75NE

Mapping Date: December 30, 1986

Mapping on east hill roadcut (south-facing), SR 76:

N80E/81NW
N35E/62SE
N68W/80SW
N10W/V
N42W/80SW
N60E/81NW
N22W/88SW
N20W/71SW
E-W/87S
N16W/V
N08W/33SW
N15W/85SW
N81E/80SE
N30W/88SW
N85W/85SW
N30W/85NE
N82W/72NE
N80E/72NW
N44W/V
E-W/25N
N82E/60NW
N20E/60NW
N73E/72NW
N45W/77SW
N30E/85SE
N56W/80NE
N80E/48SE
N35W/72SW
N75E/27NW
N35W/74SW
N74E/35NW
N69W/V

Mapping on east hill, traversing above roadcut, SR 76:

N53W/52SW
N58W/58NE
N15W/85SW
N06E/42NW
N25W/58NE
N79W/66SW
N43E/46SE
N40W/41SW
N5=40W/84SW
N82E/85SE
N14W/71SW

Mapping on east hill, traversing above roadcut, SR 76 (continued):

N88W/89SW
N44W/70SW
N22W/84SW
N23W/46NE

Mapping on west hill roadc
(southeast facing), SR 76:

N20E/V
N46E/32SE
N85W/71NE
N12E/82SE
N12W/84SW
N10W/56SW
N85E/V
N32E/62NW
N20E/33SE
N05E/60SE
N20W/80NE
N32E/16NW
N20E/81NW
N75W/V
N15E/74NW
N12E/61NW
N31W/71SW
N71E/68NW
N19W/67SW
N60E/47SE
N42W/84NE
N45W/86NE
N86W/82SW
N42W/68NE
N87W/62SW
N87W/19SW
N27W/41SW
N10W/78NE
N85W/88SW
N80W/87SW
N47E/20NW

Mapping on mid-slope traverse, west hill above SR 76, from northeast to southwest:

N30W/68SW
N84E/V
N84W/84NE
N28W/68SW
N39W/58SW
N33W/77SW
N68W/77NE
N28W/78SW
N32E/63NW
N40W/72SW
N72E/65NW
N48W/72SW
N06E/70NW
N82E/47NW
N63W/49SW
N39E/59NW
N41W/V
N85E/70SE
N35E/75SE
N55E/42SE
N78E/75NW
N60W/28SW
N12W/54SW
N77W/60NE
N88E/57NW
N62E/33NW
N82E/86NW
N68E/53SE
N80E/67NW
N62W/58SW
N12E/38NW
N70W/V
N87E/77NW
N73W/78NE
N31W/70SW
N88W/47NE
N85E/80NE
N20E/86NW
N74W/85SW
N38W/V
N65W/72NE
N24E/65NW
N23W/75SW
N84W/80NE
N40E/48NW
N85E/73SE
N65E/V
N20E/43NW
N07W/50NE
N81W/59NE
E-W/83S

N22W/V
N15W/88SW
N89W/88SW
N75E/27NW
N01E/V
N10W/75NE
N08W/70NE
N65W/80SW
N09E/V
N37E/85NW
N70W/V
N86W/V
N04E/52NW
N76W/V
N85W/89NE
N34E/47NW
N80W/74NE
N85W/78NE
N15E/73NW

APPENDIX C

ENGINEERING GEOLOGY REPORT

BY SLOSSON AND ASSOCIATES

SLOSSON AND ASSOCIATES

Consulting Geologists
14046 OXNARD STREET
VAN NUYS, CALIFORNIA 91401

AREA CODE 818 787-4555 785-0835

January 9, 1987

TO: Bing Yen
Department of Civil Engineering
California State University, Long Beach
1250 Bellflower Boulevard
Long Beach, California, 90840

SUBJECT: Geologic Review, Pankey Ranch Proposed Quarry Site, San Diego County, California.

INTRODUCTION

The following is a general geologic review of the proposed Pankey Ranch quarry, located southwest of Pala, in San Diego County, California. The site is adjacent to and north of State Highway Route 76 and the San Luis Rey River, and is approximately 3/4 of a mile eas of Interstate 15 (see vicinity map, Plate 1).

The proposed quarry area is comprised of two steeply sloping hills (hereafter referred to as the east hill or west hill) which comprise the southern end of the Monserate Mountains within the Peninsular Range Province of California. Directly south of the site lies th east-west trending San Luis Rey River valley. The north end of the property consists of several intersecting finger-like ridges with slope inclinations ranging from 3:1 (18°) to 4.5:1 (12°). Slopes on the east and west hills are inclined at approximately 2:1 (26°), however localized portions of these slopes become more rugged and are inclined steeper than 1½:1 (33°), with a few areas steeper than 1:1 (45°). Relief on the east and west hills is 390 feet and 685 feet respectively.

EARTH MATERIALS

Surficial

Soil, slopewash, and disintegrating boulders comprise the surficial materials of the site. Soil is well developed and is covered by slopewash in some areas. Total depths of soil and slopewash are estimated to be 1 to 8 feet based on field observation and seismi refraction data from Geffman & McCormick Inc. . Colluvium comprised of soil material, decomposed granitic rock and small boulders occurs throughout the low areas in the canyon between the east and west hills, however it is not defined well enough to be a mappable unit. Boulders rounded by spheroidal weathering occur as "float" on most slopes of the quarry site, with some as large as 15 feet in diamete

Bedrock

Bedrock at the quarry site consists of granitic igneous rock which intruded the once overlying rock approximately 110 million years ago as a portion of the Southern California Batholith. This batholith trends from northwest to southeast and occupies a 1000 mile long region from Riverside, California to the tip of Baja California in Mexico. Classification of on-site bedrock using the IUGS System (after Streckheisen, 1967) yields the following rock types:

> granodiorite: most abundant on site; average hand sample (normalized) contains approximately 50% quartz, 42% Plagioclase, 8% alkali feldspar, mafic minerals (hornblende, biotite) comprise less than 5% of rock; zenoliths common, indicating possible proximity to an intrusive contact; rock is weakly foliated throughout site; very light gray to buff colored (weathered) , (can also be named leucogranodiorite since mafics < 35%), rock is very hard, surficial rock is spheroidally weathered.

> tonalite: exposed north of west hill, comprises north portion of east hill; forms an apparently sharp cont-- with granodiorite; average hand sample (normalized) tains approximately 50% quartz, 47% plagioclase, 3% alkali feldspar; mafics (biotite, hornblende) range from 25% to 50%; medium gray color (weathered), very hard.

A band of strongly foliated granodiorite containing abundant dark-colored iron and magnesium rich minerals (biotite and hornblende occurs across the site on an approximate east-west trend (see Plate 1). In hand sample, rock from the foliated zone is easy to disaggregate by hand and is characterized by compositional banding between light and dark platy minerals (similar to gneissic layering). Because it is more erodable, this rock is geomorphically expressed as a topographic depression. The foliated zone appears to form an intrusive contact with the adjacent granodiorite. Additionally, the foliation seems to parallel the contact with the granodiorite.

The depth of weathering in the site bedrock may be as much as 35 feet, based on field observations, seismic data from Goffman & McCormick, Inc., and from a water well log (County of San Diego Department of Public Health test well). It is assumed that because of this depth, a rather large volume of decomposed granite will require excavation before fresh bedrock is encountered. Decomposed granite is a marketable resource used for playgrounds, walkways, maintenance roads etc.

GEOLOGIC HAZARDS

In addition to the seismic characteristics mentioned above, the effects of blasting on the site raises concern over the safety of State Highway Route 76. Depending on the amount of explosives used for each blast, a significant (and perhaps dangerous) amount of ground motion can be induced. Through field observations it was evident that many loose boulders are resting precariously above the highway on steep slopes. It also appeared that several small wedge-type failures have occurred along the Route 76 roadcut on the site. It is clear that boulder rolls and rockfalls can and will occur on Route 76 during significant ground shaking from earthquakes. Rockfalls and boulder rolls from blasting induced ground shaking can be avoided by using the proper size of blasting charge, thus a duly registered geologist, geophysicist, or civil engineer should be present at all times during blasting.

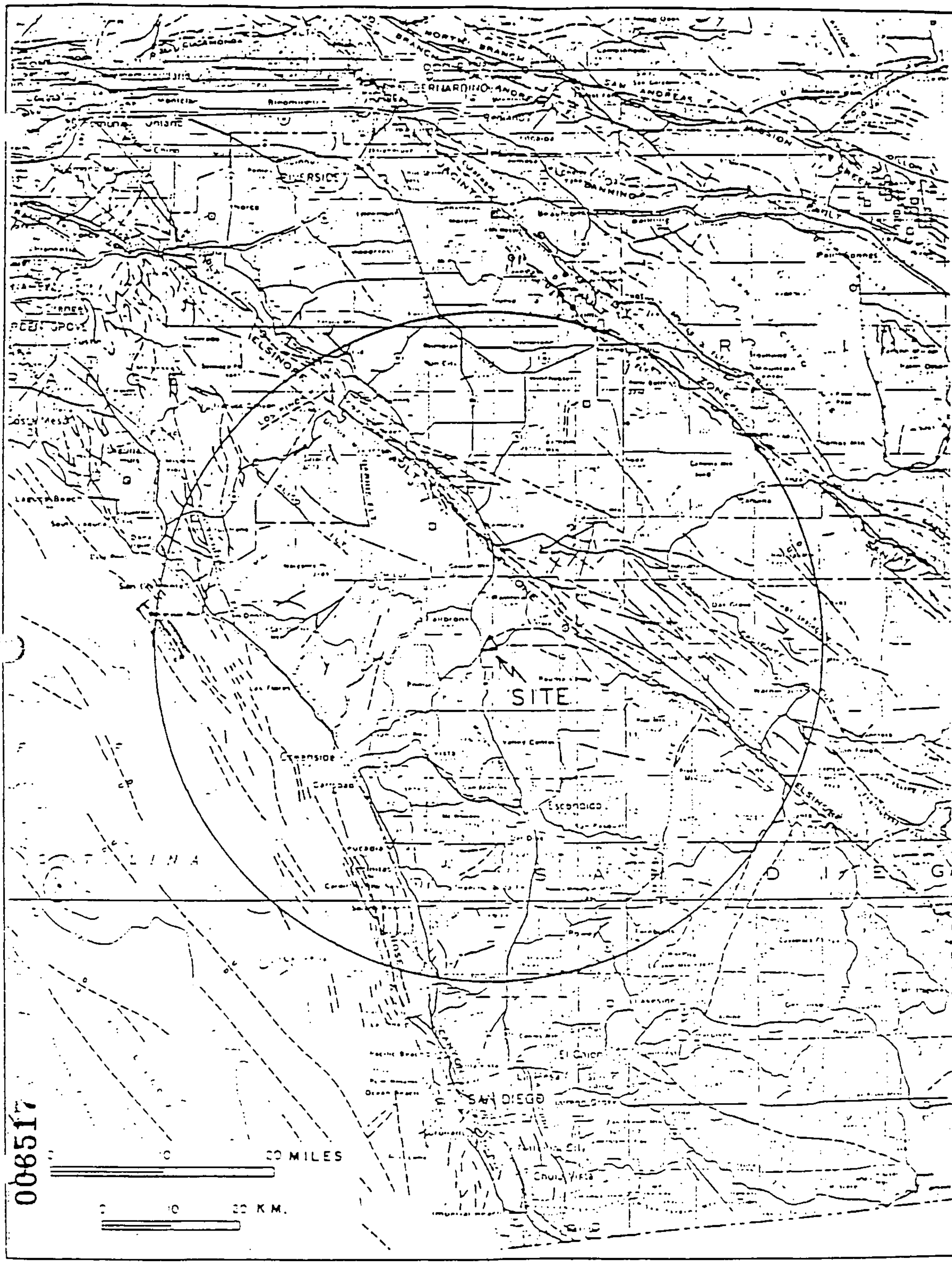
Additionally, once vegetation is removed for site development, the potential for mudflows during heavy rainfall is greatly increased and will further endanger the heavily travelled highway. The designed development and/or operation of the quarry site should give proper consideration for both foreseen and unforeseen hazards and appropriate mitigation must be planned.

Michael B. Phipps
Michael B. Phipps
Staff Engineering Geologist

Thomas L. Slosson
Thomas L. Slosson
Project Engineering Geologist
R.G. 4024, C.E.G. 1327

James E. Slosson
James E. Slosson
Chief Engineering Geologist
R.G. 46, C.E.G. 22, G.P. 629

MBP:TLS:JES/ts



006517

FAULT MAP OF A PORTION OF SOUTHERN CALIFORNIA

APPENDIX D

WELL LOG

Test Hole #2
of hill - overlooking hwy76

COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC HEALTH
1600 PACIFIC HIGHWAY, SAN DIEGO CA 92101

Do Not Fill In

State Well No. ______
Other Well No. ______

WATER WELL DRILLERS REPORT

OWNER:
Pankey Ranch
Address

LOCATION OF WELL: Owner's number if any
Township Range and Section
Distance from roads, railroads, etc.

TYPE OF WORK (Check)
Well ☐ Deepening ☐ Reconditioning ☐ Destroying ☐
destruction, describe material and procedure in Item 11.

PROPOSED USE (check): Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well X Other ☐

(5) EQUIPMENT: Rotary ☐ Cable ☐ Other ☐

CASING INSTALLED: Steel Other X Double

If gravel packed

To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
20	8	.188			

Size of well ring | Size of gravel
none

PERFORATIONS OR SCREEN:
Type of perforation or name of screen: none

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.

CONSTRUCTION:
Was a surface sanitary seal provided? Yes ☐ No ☐ To what depth ft.
Were any strata sealed against pollution? Yes ☐ No ☐ If yes, note depth of strata
From ft. to ft.
From ft. to ft.
Method of sealing

WATER LEVELS:
Depth at which water was first found, if known 80 ft.
Standing level before perforating, if known 30-40 ft.
Standing level after perforating and developing 30-40 ft.

WELL TESTS Airlift approx 20 GPM
Was a pump test made? Yes ☐ No X If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Temperature of water ukn Was a chemical analysis made? Yes ☐ No ☐
Was electric log made of well? Yes ☐ No X If yes, attach copy

(11) WELL LOG:
Total depth 380 ft. Depth of completed well 380 ft.
Formation: Describe by color, character, size of material and structure ft. to ft.

0-35 Hard decomposed granite with occassional granite nodule

35 - 380 hard rock, orenetic with some small fracturing salt & pepper color

Work started 10/15 19 91 Completed 19

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Fain Drilling & Pump Co. Inc.
(Person, firm, or corporation) (Typed or printed)

Address 12029 Old Castle Rd.
Valley Center, California 92082

[Signed] (Well Driller)

006519

License No. Dated 19

APPENDIX E

SUMMARY OF RESULTS OF THIN SECTION

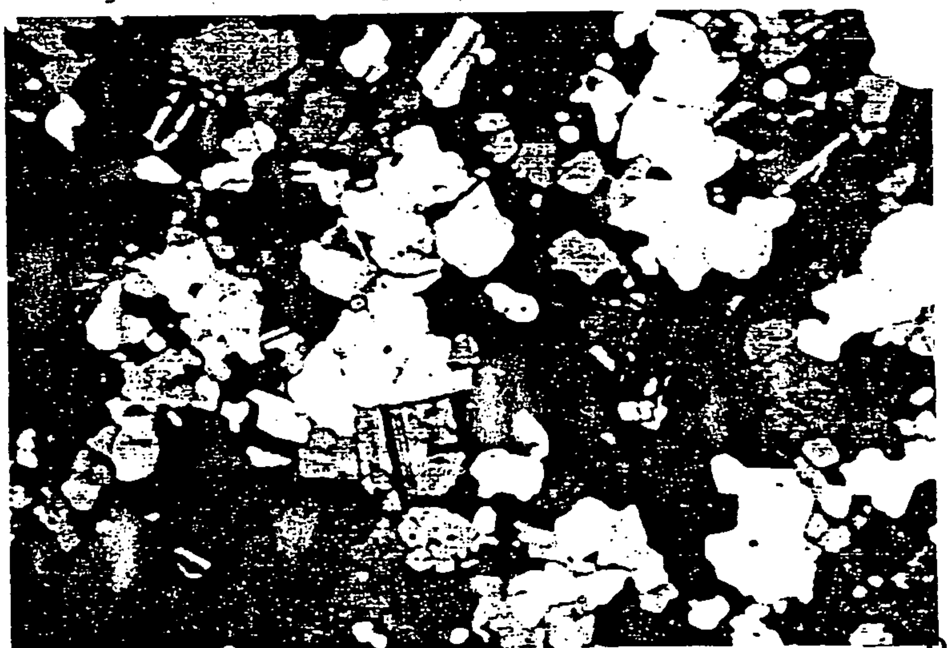
PHOTOMICROGRAPHS AND EVALUATION

1. Sample 1 P1 @ 21 ft. depth

The sample consists of granodiorite with high concentration of quartz. The feldspar is fresh with distinct striation marks, which show recent ingeous intrusion. There is some degree of weathering and liquid intrusion. There is an abundance of plagioclase. Some crystals of feldspar show considerable alteration, which may be due to weathering or liquid intrusion.

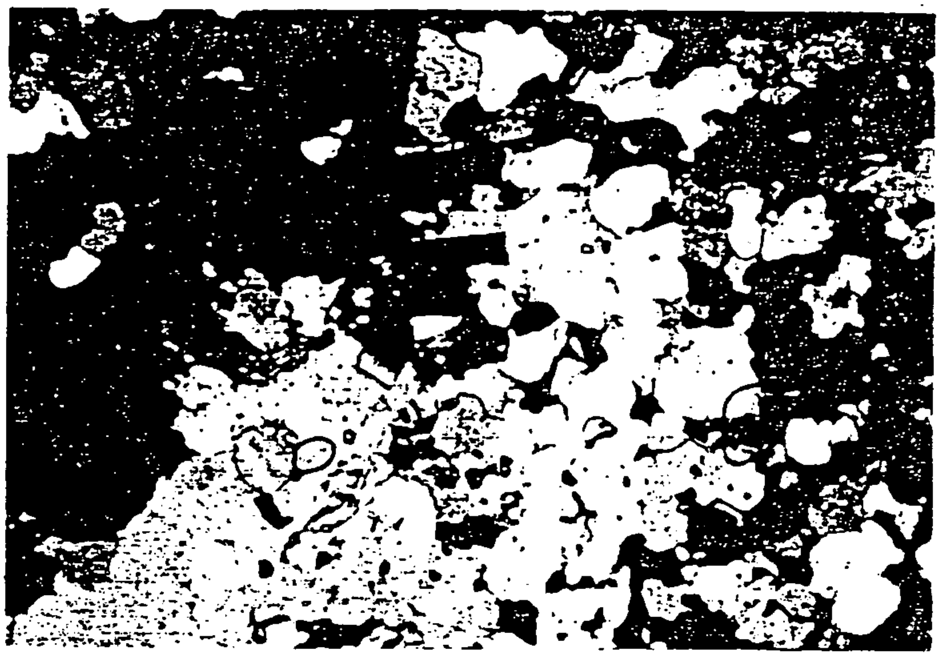
2. Sample 2 P1 @ 37 ft. depth

The significant change is finer grain. There is more biotite (brownish color). Feldspar is of finer grain size. In addition, there is a lot of quartz and hornblende. There is some degree of metamorphism.



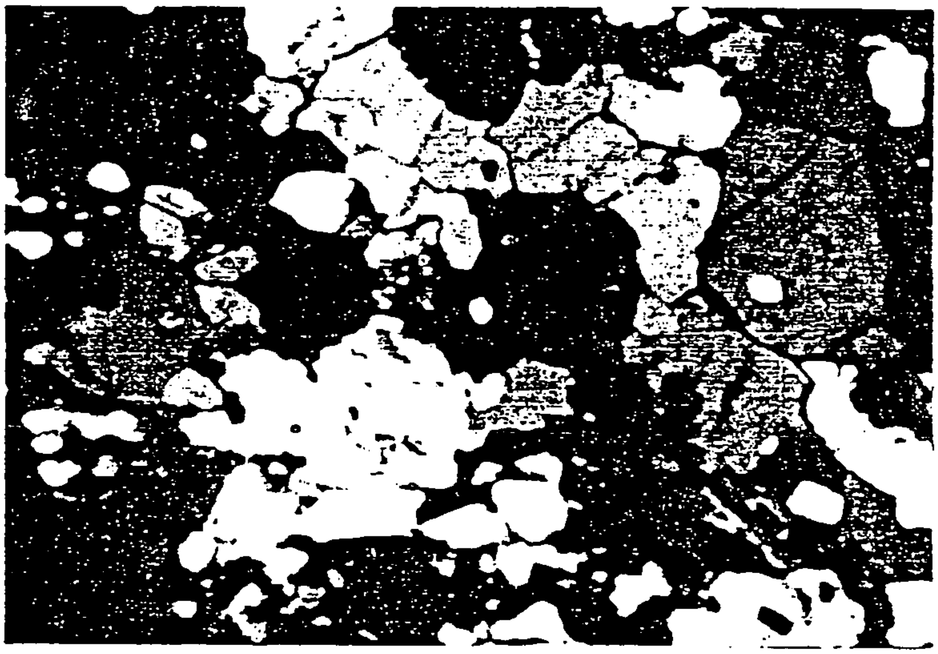
3. Sample 3 P1 @ 59 ft. depth

The sample has very little feldspar. It seems to consist of mainly hornlende and quartz. When compared to previous samples, it has more metamorphism.



4. Sample 4 P2 @ 40 ft. depth

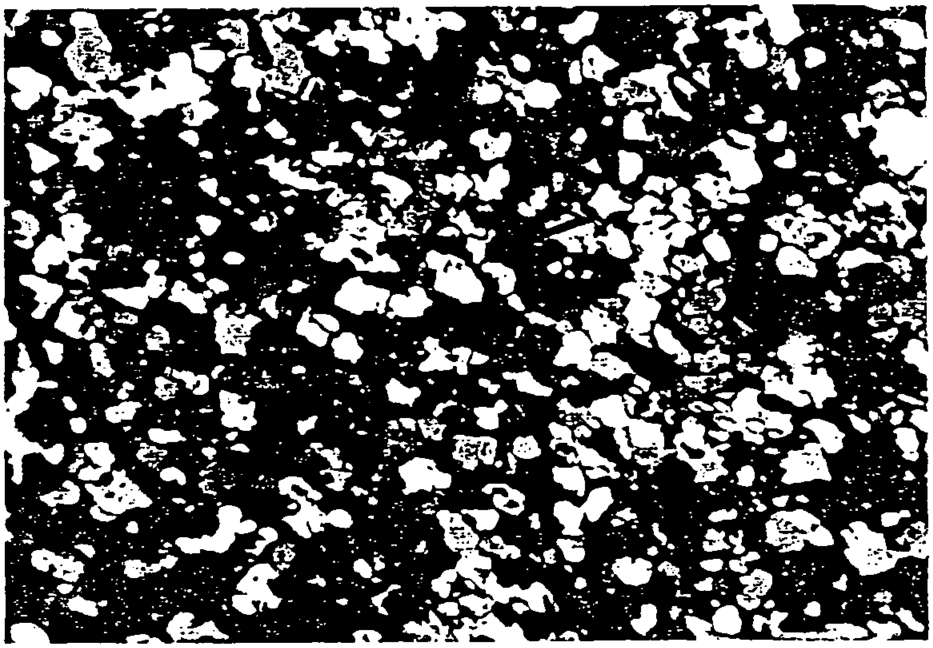
The sample consists mainly of hornblende, fledspar, and sandstone. There is a lot of hydrothermal intrusion and iron stain. It has a larger grain size than that at 75 feet It also shows more directive fabric than the deeper sample.



006522

5. Sample 5 P2 @ 75 ft. depth

The sample is rich in magnetite (yellowish-brownish color). It has a very fine grain size. There seems to be more metamorphic sandstone. When compared to the previous sample, it is definitely a more hybrid rock, which means it is formed through a mixing of materials or by assimilation of materials from several sources.



Based on the above description, an approximate cross-sectional diagram can be drawn as follows:

Depth ft.	Core Number	
	P1	P2
21	granodiorite w/weathering	------
37	fine grain	------
40	-----	hydrothermal intrusion
59	less feldspar, similar to 40' sample	------
75	-----	some evidence of metamorphism

006523

ATTACHMENT 2
REVEGETATION PLAN

PALOMAR AGGREGATES
REVEGETATION PLAN

Prepared for:

Palomar Aggregates, Inc.
2150 N. Centre City Parkway
Escondido, California 92026

Prepared by:

Brian F. Mooney Associates
9903-B Businesspark Avenue
San Diego, California 92131

March 1995

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 Location

The project site is located approximately one mile east of Interstate 15 (I-15), on the north side of State Route (SR) 76 (Pala Road), which in turn is bordered on the south by the San Luis Rey River channel. The site is within the unincorporated area of San Diego County, approximately 45 miles north of downtown San Diego (Figure 1.1).

1.2 Project Description and Purpose

The project proponent proposes to establish a rock quarry and processing plant for concrete and asphalt on a 96.4-acre site. In addition to the proposed mining and processing operations, a realignment of SR 76 is proposed, involving approximately 4,500 linear feet of the existing road. This realignment would take place primarily within the floodplain of the San Luis Rey River. The proponent also proposes a Reclamation Plan which proposes re-use of the site as a water storage reservoir after mining is completed.

The purpose of this report is to present a mitigation plan that meets the requirement of the County of San Diego Department of Planning and Land Use (DPLU), California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USF&WS). This mitigation plan provides compensatory mitigation measures for impacts to sensitive habitat subject to regulation by CDFG and USF&WS. In this report the project site or Major Use Permit (MUP) refers to the quarry and the road realignment.

1.3 Existing Conditions

Four native plant communities are found on the proposed project area (Figure 1.2): southern mixed chaparral (chaparral), coast live oak woodland (oak woodland), Diegan coastal sage scrub (sage scrub) and southern willow scrub (willow scrub). On the project site, the chaparral community comprises approximately 14.5 acres, oak woodland covers approximately 3.0 acres, sage scrub occurs over 40.1 acres, and disturbed southern willow scrub occupies a narrow drainage swale covering 0.3 acre. Native vegetation has been removed from parts of the quarry site and nearly all of the proposed road realignment, covering approximately 50.5 acres.

1.4 Project Impacts

The project would impact 88.3 acres. The area of chaparral would be reduced by 9.4 acres. The cumulative impact on the chaparral community would be considered significant since sensitive species may be found within this habitat. The oak habitat on the quarry site would be reduced by approximately 1.3 acres. The direct impact to this habitat type is regarded as significant. The loss of 27.3 acres of sage scrub would be considered a direct significant impact of a sensitive habitat. Approximately 0.3 acre of southern willow scrub would be lost as a result of the proposed project. This is considered a significant cumulative impact. The road realignment would impact 12.0 acres of previously disturbed habitat, of which 3.2 acres are within designated least Bell's vireo habitat. The increase in traffic noise due to project implementation may indirectly impact a total of 17.8 acres of existing and/or potential vireo habitat within and in the vicinity of the project site, of which 1.9 acres necessitate mitigation.

2.0 MITIGATION

2.1 Mitigation

Mitigation for impacts to sensitive habitats will include a combination of preservation and revegetation at several sites adjacent to and within the vicinity of the project site.

Impacts to chaparral, oak woodland and sage scrub would be mitigated by the preservation of existing habitat on and off-site. The preserved areas would be dedicated as open space.

Impacts to willow scrub will be mitigated by revegetation at two sites: in the San Luis Rey River west of Shearer Crossing (Figure 2.1) and north of the river along the future Pala Road realignment (Figure 2.2).

The recommended restoration at the site west of Shearer Crossing shall include the revegetation of approximately 9.8 acres. Approximately 11.7 acres of potential southern willow scrub restoration area will be available ~~subsequent to the purchase of the mitigation parcel~~ west of Shearer Crossing. The project also proposes some riparian plantings along the Pala Road slope bank and adjacent streambed to mitigate for impacts from the realignment of Pala Road. Tree and shrub species and a hydroseed mix would be planted at various elevations within the channel.

The willow scrub would be planted with willow cuttings salvaged from the disturbed willow scrub at the proposed quarry site, container plants and seed mixes in a mosaic of tree, shrub, and herbaceous zones. This mosaic is intended to produce 50 percent tree canopy cover, 80 percent shrub canopy cover (40 percent coincidental with the tree canopy), 5 percent herbaceous cover, and 5 percent open ground.

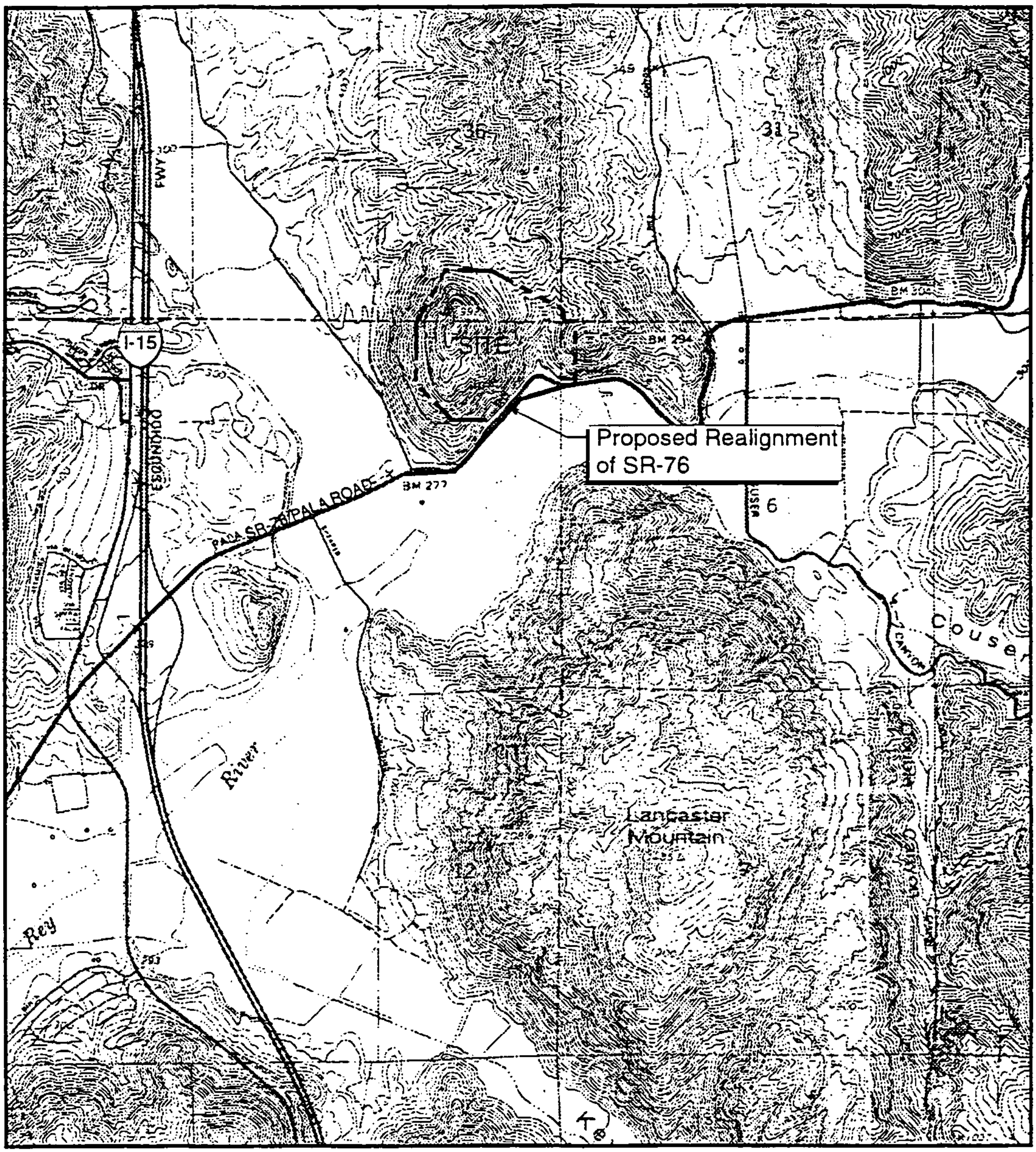
2.2 Implementation of Mitigation

2.2.1 Responsibility

Successful implementation of the revegetation program will require coordination between the property owner, revegetation specialist, landscape contractor and regulatory agencies. Each is listed below with a brief description of their responsibilities.

Entity	Responsibility
Property Owner/Operator	Directly responsible for the success of the revegetation program. Will post a bond with the County of San Diego Department of Planning and Land Use (DPLU) for the cost of construction and 5 year monitoring program or deed property to an environmental trust, acceptable to DPLU, that will assume monitoring and management of property. Will hire landscape contractor and revegetation specialist.

006529



Brian F. Mooney Associates

0 1000' 2000'

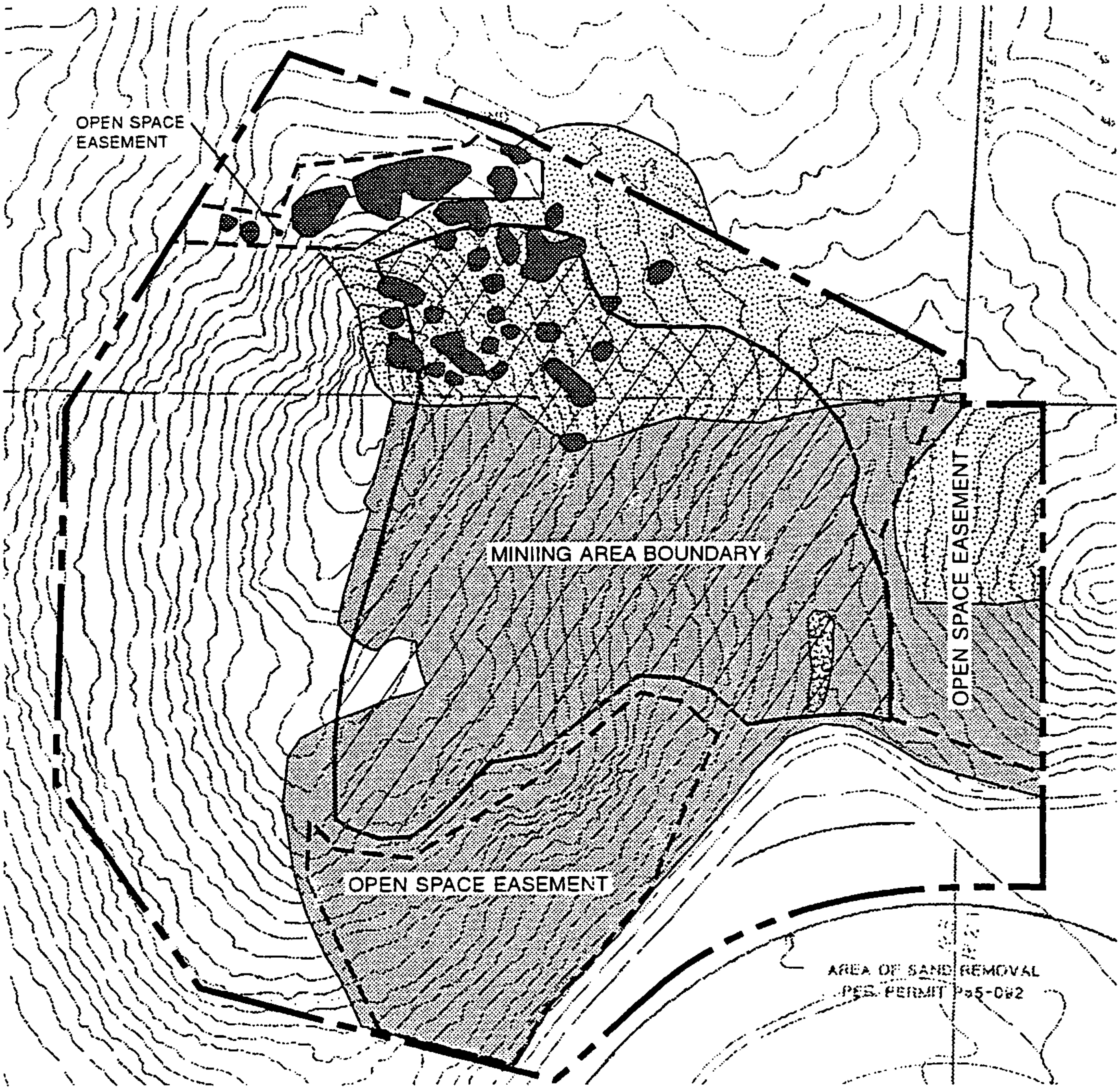
Project Location Map

006530

Figure 1.1

Palomar Aggregates Quarry reveg.

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA-BONSALL)



LEGEND

- Chaparral
- Coast Live Oak Woodland
- Diegan Coastal Sage Scrub
- Southern Willow Scrub
- Disturbed

Brian F. Mooney Associates

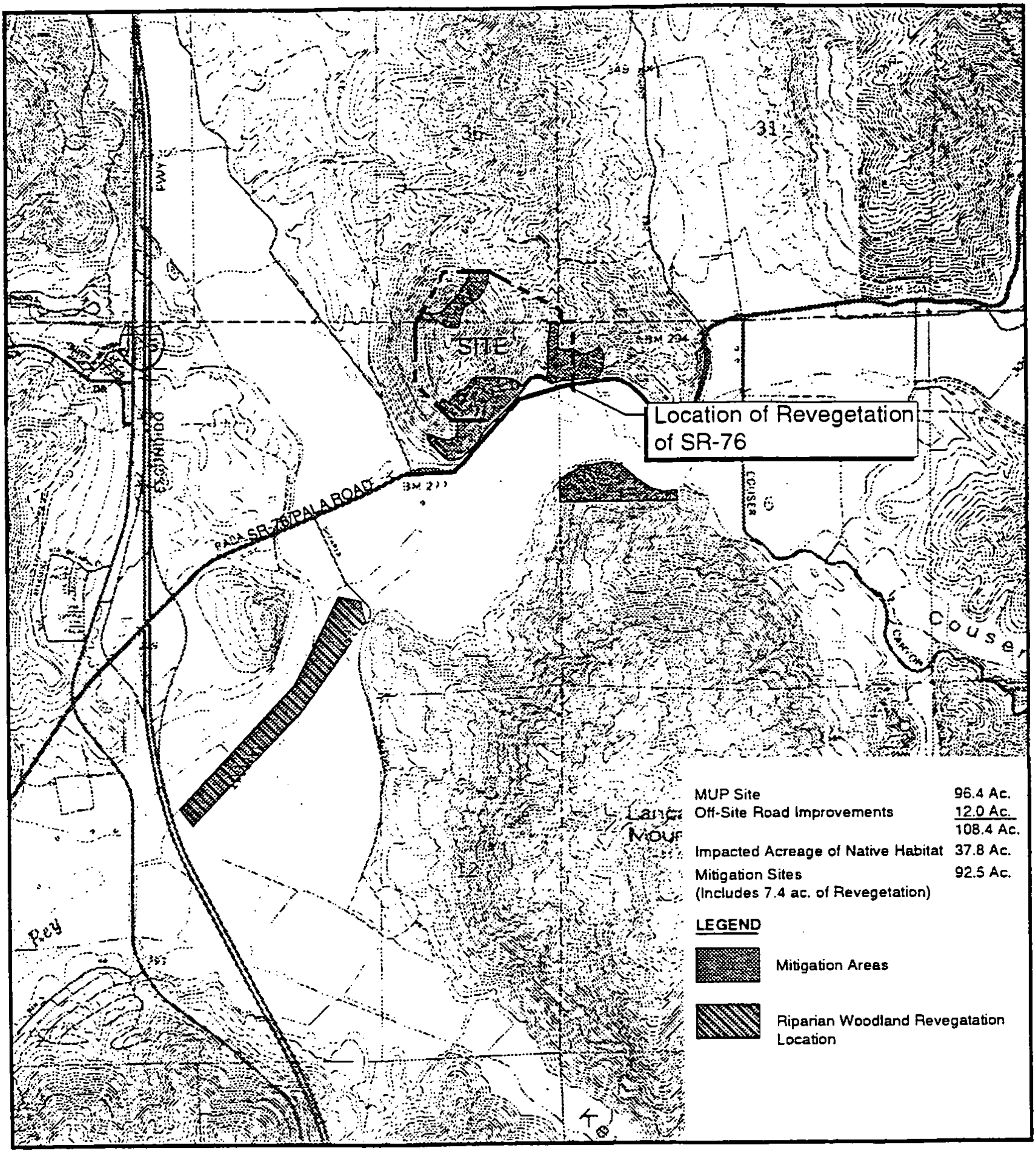
N

0 200' 400'

Vegetation Map of MUP Area

006531

Figure 1.2



Brian F. Mooney Associates

0 1000' 2000'

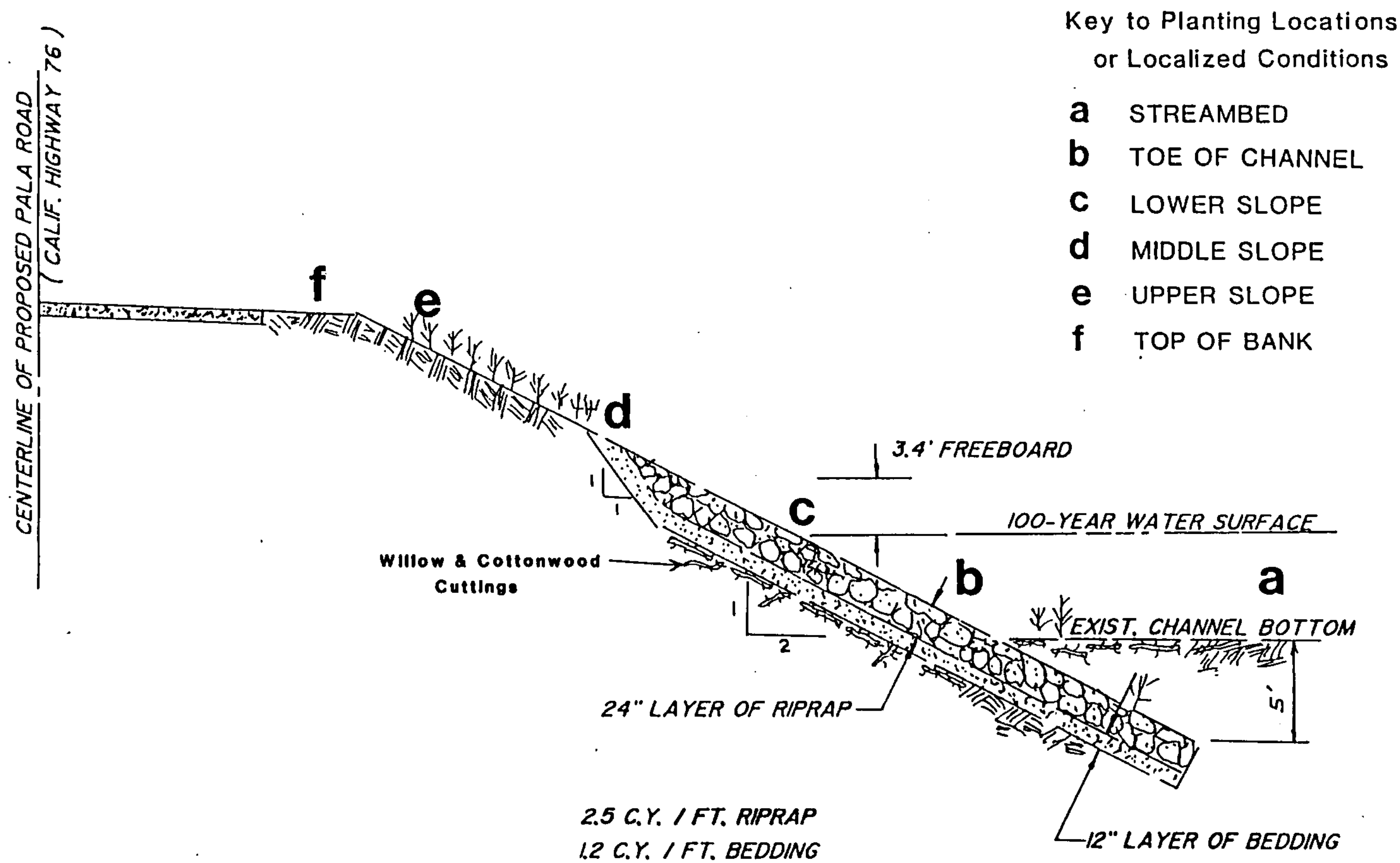
006532

Mitigation Locations

Figure 2.1

Palomar Aggregates Quarry reveg.

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA-BONSALL)



006533

Typical Section - Pala Road Riprap Protection & Channel Planting Locations

Figure 2.2

Brian F. Mooney Associates

NOT TO SCALE

Revegetation Specialist	Will oversee the installation of the revegetation plans. Shall be experienced in the revegetation and monitoring of riparian habitats.
Landscape Contractor	Implementation of the plans and specifications. Under the direction of the revegetation specialist will maintain the revegetation sites in a healthy, weed-free state.
DPLU	Shall inspect all revegetated areas after installation to insure conformance with plans and specifications. Shall review quarterly and annual monitoring reports. Shall conduct a site visit at the end of each monitoring year.
CDFG	Pursuant to Section 1600 of the CDFG Code and a stream or lake alteration agreement, the proponent shall be responsible for satisfying all conditions of the agreement.
USF&WS	Pursuant to a Section 7 consultation, the proponent shall be responsible for satisfying all conditions of the agreement.

2.2.2 Qualifications of the Revegetation Specialist

The revegetation specialist shall possess a minimum of a bachelor's degree in biology, botany, ecology or a closely related field. In addition, the revegetation specialist shall demonstrate expertise in southern California native vegetation communities including recognition of the dominant plant species and the ecological requirements of those species. The revegetation specialist shall have a minimum of four years experience in the implementation of southern California native habitat revegetation projects. The revegetation specialist will monitor all revegetation activities including installation of container plants and seed mixes, post-installation monitoring, and assessing the attainment of the success criteria developed for each component of this revegetation plan.

2.2.3 Qualifications of the Revegetation Contractor

The implementation of the labor portions of this revegetation contract will be accomplished by a firm that has a landscape contractor's license (C27) and that employs, for the purpose of this plan, a person who has at least four years experience with revegetation and who can demonstrate a knowledge of techniques for growing and transplanting native vegetation. This person should be able to provide letters of evaluation if requested.

The Revegetation Contractor will also be responsible for maintenance of the revegetation area for five years following installation of plant materials. The maintenance personnel may be from the same firm as the revegetation contractor, or may be a subcontractor to the revegetation contractor. The persons responsible for maintenance shall be familiar with the identification of California native plant species. Maintenance personnel will remove weeds prior to the installation of plant materials and as directed by the revegetation specialist for remedial purposes during the five year post-revegetation monitoring period.

3.0 REVEGETATION GUIDELINES

3.1 Requirements for Construction Drawings

The following describes the revegetation guidelines for the proposed revegetation plan. The installation specifications will be incorporated into the final revegetation plan for the project, and will be included as part of all the construction documents. Final construction documents will be reviewed by a qualified revegetation specialist before they are let for bid. The details provided below may be modified if deemed necessary by further research in habitat restoration and if agreed to by the proponent, lead agency, resource agency, and revegetation specialist.

Prior to the beginning of any revegetation activities, all contractors who will be involved in completing any aspect of the revegetation plan shall meet at the site with the revegetation specialist. A copy of this document shall be provided to each contractor and the revegetation specialist will review all aspects of the plan which concerns the contractors; including site protection, adjacent habitat protection, inspections, landscape procedures, and guarantees. It shall be made clear that the revegetation specialist has final supervisory control over field installation and construction monitoring. The formal set of contract documents shall consist of plans and contract specifications with sufficient detail as to communicate the intent of this document and can be installed as per this document.

3.2 Open Space Easement Dedication

The revegetation area west of Shearer Crossing shall be dedicated to the County of San Diego or a County approved conservancy/agency that is accredited with the preservation of biological resources, preserved in perpetuity, as a biological open space easement. This easement shall prohibit grading, the placement of buildings, and vegetation removal or additions within the revegetation area unless specified otherwise in the Environmental Impact Report or this plan.

3.3 Bonding

The project proponent shall enter into a secured agreement with DPLU which will cover the success of this revegetation plan including money necessary to install, monitor, and report on the revegetation plan until the end of the monitoring period. This bond shall be a 100% bond and a 10% cash deposit for the total amount of the cost estimate (plus a 4% inflation factor per year) for materials and installation, maintenance and monitoring for five years. This bond shall be issued in favor of DPLU.

3.4 Planting Specifications

Modifications to the specifications shall require prior approval of the revegetation specialist.

3.4.1 Salvaged Plant Material

Willow cuttings shall be salvaged from the willow scrub at the quarry site. Each cutting shall be a minimum of twelve inches long and will have at least two side branches.

3.4.2 Container Stock Procurement

One factor in the successful implementation of this plan will be the revegetation specialist's selection of the nursery responsible for supplying all container and seed stock for revegetation as described in this plan. The nursery must be able to demonstrate the ability to produce California native plant species, and must have a valid California Nursery License and a business license for work within the County of San Diego.

The container stock shall be derived from seed and/or salvaged material taken from areas preferably within the project area.

3.4.3 Seed Procurement

Adequate quantities of seeds of the species specified for hand broadcast seed shall be ensured by collecting one to two seasons prior to the planting date. Seeds shall be collected from a 10 mile radius around the project site. The seed collector shall attempt to obtain equal amounts of seed from each collection site in an environmentally sensitive manner. Donor plants shall not be excessively degraded by the collection methods. Seeds shall be removed from site and stored in a cool, dry place free of rodents.

Seeds shall be tested for percent purity, percent germination, and the number of live seeds per pound. Testing costs shall be included in the seed costs per pound and shall be the responsibility of the seed supplier. Results of the seed tests shall be made available to the revegetation specialist prior to seed delivery. Seed collections, handling and storage techniques shall be observed by the revegetation specialist.

3.4.4 Soil Preparation

The proposed revegetation sites shall be surveyed to determine if any soil contaminants or pollutants are present. All contaminated soil shall be removed and replaced by similar clean sandy soil.

Soil testing will be performed to determine if any clay or hard pan soil horizons exist between the surface and water table. If a clay or hard pan horizon is found, then the planting holes will first be prepared by auguring with an eight-inch diameter auger to the water table and refilling with indigenous soil. If there is none, then each hole should be dug two times the depth and 1.5 times the width of the container.

An aggressive weed eradication program shall also be undertaken prior to any revegetation efforts (see Attachment A for further details).

3.4.5 Plant Materials

All container plants should be inoculated with mycorrhizal fungi indigenous to the site. This will aid in their adaption to the site. The plant materials shall be healthy, vigorous, of normal growth, free from disease, insects and insect eggs, and properly fertilized. No container plants shall have cracked or broken balls of earth when taken from the containers, and shall not be root or pot bound. The stock will conform to quality and size with the American Standard for Nursery Stock.

006536

3.4.6 Planting Details

Willow cuttings will be rototilled into the soil over a one-acre area west of Shearer Crossing. Willow cuttings will also be installed in the same manner along the Pala Road realignment in the streambed, toe of the channel, and lower and middle slope.

Pits for all container stock shall be dug square with bottoms level, and two times the width of the root ball and equal to the depth of the root ball. Compacted soils at sides and bottoms shall be loosened by scarifying or other approved methods. Pits shall be backfilled with "prepared soil" to the required grade, and the balance of the pit filled with "prepared soil" thoroughly settled by water application. Plants shall be centered in the pit, in a vertical position so the crown of the ball shall be level or slightly above (one-inch) the finished grade after allowing for watering and settling. All plantings shall be watered thoroughly and roots shall be backfilled with additional prepared planting mix. A small earth berm shall be placed around each plant.

The species, sizes, and spacing of the container stock are detailed in Tables 3.1 and 3.3. The plants shall be dispersed throughout the revegetation areas under the direction of the revegetation specialist. After installation of all container stock is complete and prior to final installation inspection, a planting plan shall be prepared which indicates the location of all planted container stock.

The seed mixes (Tables 3.2 and 3.4) should be hand broadcast over all the revegetation sites to avoid any impacts to the revegetation areas from hydroseeding (e.g., trampling and overspraying). The amount of each seed mix applied will be determined at the time of the final planting plan construction drawings are prepared. This will be determined by the revegetation specialist and regulatory agency personnel during the maintenance and monitoring phase following container stock installation.

3.4.7 Timing of Installation

The willow cuttings will be installed along the Pala Road realignment and over a one-acre area of the revegetation site west of Shearer Crossing. Container stock shall be installed one year after the salvaged willow cuttings have been installed.

The container planting over the remaining area west of Shearer Crossing shall be installed after the irrigation system is operational. The planting shall occur during a 30-day period, following the on-set of the winter rains. Planting may begin as late as February 15, if it is either a late or an unseasonably dry winter. However, the weed eradication program and irrigation system shall be completed prior to planting.

All of the seed mixes will be applied to the sites after installation of the container stock.

All materials shall be installed within one year of any use or reliance on the major use permit. If not, the permit and mining operations should be suspended until it has been satisfactorily installed.

Table 3.1 Container Stock Plant List for West of Shearer Crossing

Species	Size[1]	Spacing[2]	Plants/Acre
black willow (*Salix gooddingii*)	1	8-10	30
	5	8-10	9
arroyo willow (*Salix lasiolepis*)	1	10-15	115
	5	10-15	52
California sycamore (*Platanus racemosa*)	1	5	12
	5	15	2
red willow (*Salix laevigata*)	1	5	31
	5	8	13
sandbar willow (*Salix hindsiana*)	1	5-8	29
	5	5-8	12
western cottonwood (*Populus fremontii*)	1	10-15	10
	5	10-15	5
mule fat (*Baccharis salicifolia*)	1	5-8	140
	5	5-8	60
California rose (*Rosa californica*)	1	5-8	83
desert elderberry (*Sambucus mexicanus*)	5	12	14
Total Plants Per Acre			**617**

[1] Size container measured in gallons.
[2] Spacing measured in feet on center.

Table 3.2 Seed Mix for West of Shearer Crossing[1]

Species	% Purity/Germination
western ragweed (*Ambrosia psilostachya* var. *californica*)	N/A
rush grass (*Juncus acutus*)	90/40
toad rush (*Juncus bufonius*)	N/A
California evening primrose (*Oenothera hookeri*)	98/75
hoary nettle (*Urtica dioica holosericea*)	50/60
salt-marsh fleabane (*Pluchea odorata* var. *odorata*)	35/60
Douglas' mugwort (*Artemisia douglasiana*)	10/50

[1] The amount of seed mix applied (pounds per acre) will be determined at the time the final planting plan construction drawings are prepared.

Table 3.3 Container Stock Plant List for Pala Road Realignment Slope Planting

Species	Size[1]	Spacing[2]	Plants/Acre	Location[3]
sandbar willow (*Salix hindsiana*)	1	4	15	a,b,c
red willow (*Salix laevigata*)	5	8	34	a,b,c,d
arroyo willow (*Salix lasiolepis*)	5	8	83	a,b,c,d
black willow (*Salix gooddingii*)	5	8	77	a,b,c,d
western cottonwood (*Populus fremontii*)	5	12	15	b,c,d
coast live oak (*Quercus agrifolia*)	5	20	19	e,f
California sycamore (*Platanus racemosa*)	15	30	20	c,d
toyon (*Heteromeles arbutifolia*)	5	15	15	f
desert elderberry (*Sambucus mexicanus*)	5	12	7	c,d,e
mule-fat (*Baccharis salicifolia*)	1	4	140	a,b
California rose (*Rosa californica*)	1	4	21	e
California blackberry (*California blackberry*)	1	4	21	e

[1] Size container measured in gallons.
[2] Spacing measured in feet on center.
[3] Planting locations along the Pala Road realignment slope (Figure 2.3):
a = streambed d = middle slope
b = toe of channel e = upper slope
c = lower slope f = top of bank

Table 3.4 Seed Mix for Pala Road Realignment Slope Planting[1]

Species	% Purity/Germination	Location[2]
flat-top buckwheat (*Eriogonum fasciculatum*)	10/65	e,f
bush monkey flower (*Diplacus puniceus*)	2/55	e,f
California sagebrush (*Artemisia californica*)	15/50	e,f
mule fat (*Baccharis salicifolia*)	2/20	d
western ragweed (*Ambrosia psilostachya* var. *californica*)	N/A	d,e

[1] The amount of seed mix applied (pounds per acre) will be determined when the planting plan construction drawings are prepared.
[2] Planting locations along the Pala Road realignment slope (Figure 2.2):
a = streambed d = middle slope
b = toe of channel e = upper slope
c = lower slope f = top of bank

3.5 Irrigation

All plants shall be irrigated immediately after planting and continue until all plant material is sustainable without irrigation. The scheduling and length of irrigation applications shall be coordinated with the revegetation specialist to encourage deep rooting and prevent the occurrence of soil and plant diseases. The design of the irrigation system shall be approved by the revegetation specialist.

After the second summer, the plants shall be tested for establishment by withholding water to a defined block of several trees and shrubs. These shall be monitored daily and irrigation shall resume if wilting appears.

3.6 Site Protection

The revegetation sites should be fenced to prevent vehicles and activities from the orchards from "spilling" into the revegetation area. The fencing should be based on open space boundaries located in the field by licensed surveyors. The fencing should be in place within two weeks following the installation of the container stock and consist of four-foot high chain link or split rail materials. The revegetation area west of Shearer Crossing will be fenced only at the Shearer Crossing overpass. Fencing should not be needed around the other sides because they are inaccessible from the other directions.

3.7 Installation Maintenance and Monitoring

The installation maintenance period begins on the first day after all revegetation installation on this project is complete, checked, accepted and written approval from the revegetation specialist is given to begin the maintenance period. This period shall continue for no less than 90 continuous calendar days.

Regular maintenance shall begin immediately after the revegetation site is hydroseeded and planted. Plants and hydroseeded areas shall be kept in a healthy, growing condition and all areas shall be kept free of weeds, noxious grasses and other undesired vegetative growth. Weeding shall be conducted weekly. Plants found to be dead or in an impaired condition shall be replaced immediately. All work shall be conducted under the direction of the revegetation specialist.

Monitoring will be qualitative only and will focus on survivorship and maintenance. Monitoring will be conducted daily during installation, weekly during the second month and biweekly thereafter for a total of four months (120 days).

4.0 FIVE-YEAR MAINTENANCE AND MONITORING PROGRAM

4.1 Purpose and Time Frame

The need for maintenance of the revegetation area will be determined during the five-year monitoring program described in Section 4.2. The maintenance and monitoring program will be implemented for the revegetation site west of Shearer Crossing only. Repairs to the irrigation system, and other remedial actions to correct problems or damage resulting from natural causes, vandalism, or other reasons will be promptly performed on an as-needed basis. Quarterly monitoring reports (monthly during the first quarter) will identify additional maintenance needs. The quarterly reports will specifically address potential invasion by weedy species and identify corrective measures for their control. Required maintenance will be performed promptly, generally within two weeks of the identification of the problem.

A monitoring program will be implemented to determine if the revegetation site is functioning as expected. The overall success of the mitigation program will be evaluated by comparing the final year of monitoring data with the target values. Monitoring will be conducted over a five-year period to identify trends and progress toward the target. Monitoring will also assess whether any adjustments to the original plan are needed. If the revegetation effort does not meet the success criteria, the project proponent shall continue with the replacement plantings, weed control, and monitoring on a year-by-year basis until the criteria are met or three additional years, whichever occurs first. An annual report will be submitted to DPLU and CDFG each monitoring year that will cover plant monitoring as outlined below.

4.2 Monitoring Requirements

Functions to be provided by the restored plant community include wildlife habitat, sustained biological diversity and structural diversity. The compensatory mitigation is expected to be established in five years. This created habitat is expected to continue to mature for a substantial period afterwards.

The project proponent will be responsible for the implementation of this plan. This section describes the monitoring and reporting requirements to assist the project proponent in this effort and to evaluate the success of the mitigation and determine remedial actions where necessary.

The five-year monitoring plan will begin after the installation monitoring period has been completed. A "time zero" report shall be prepared at the completion of plant installation, detailing the installation effort. This report shall be submitted to DPLU. The report shall provide actual "as-built" drawings for the revegetation areas. Plantings will be compared to the original planting plan with any deviation from the plan mapped and noted. Major deviations will be inspected by the revegetation specialist and, if necessary, additional plantings will occur to conform to the plan. The map of the site will identify planting methods, species, densities, and spacing of plants. An inspection shall be conducted with the revegetation specialist and the regulatory agency staff. The five-year monitoring period will start when the project is accepted by all parties. This report and the annual reports shall be submitted to the regulatory agencies for their review. The as-built drawings shall be approved by the revegetation specialist and DPLU staff.

Monitoring will be conducted monthly for the first three months of the five-year plan, and quarterly thereafter for a total of 60 months (five years). The monthly monitoring surveys conducted during the first three months of the five-year plan will concentrate on qualitative observations to identify potential problems and recommend remedial actions, where necessary (i.e., plant die off, watering requirements and intrusion by unauthorized personnel). Remedial actions may include replacement of vegetation lost by disease, natural causes or other causes such that loss will jeopardize attainment of the criteria for success, as presented in Section 4.3. Replacement of vegetation should take place between October 1 and April 30.

The quarterly monitoring surveys will collect both qualitative and quantitative data. Qualitative information will be similar to that collected during the first three months including identification of potential problems and remediation alternatives. Quantitative data will include analysis of survivorship and growth, including height and per cent cover of tree and shrub species. Survival will be measured by direct counts. Vegetation growth and establishment will be quantitatively assessed through the use of belt transects. There will be two belt transects per acre in each of the mitigation sites. In each transect, height will be determined for each container stock in the transect. Each container stock will be labeled with its scientific name (or abbreviation) and identification number. These data will be recorded on standard field data forms and, along with notes of observations, kept on file by DPLU or their agent for documentation purposes.

Data to be collected during quarterly monitoring surveys are described in Table 4.1. Photographs of the mitigation area will be taken from standard locations during each survey. Annual reports will be produced at the end of each monitoring year. These reports will be submitted to DPLU and the regulatory agencies for their review and evaluation. Each annual report will address the criteria for success, as detailed in Section 4.3 below, and measures needed to meet those criteria. Additionally, at the end of each monitoring year, a field meeting will be held with the revegetation specialist and DPLU staff members to discuss the projects revegetation effort and success.

Table 4.1 Data Collection Requirements for Mitigation Monitoring

		Quarters Required			
Monitoring Requirement	**Monitoring Method/Location**	**1**	**2**	**3**	**4**
QUANTITATIVE DATA					
Trees and Shrubs:					
Average and Range of Heights	Calculate mean and standard deviation for planting types within transects	X	X	X	X
Density	Determine densities (mean and standard deviation) for planting types within transects	X	X	X	X
QUALITATIVE DATA					
Trees and Shrubs:					
Aerial Cover	Visually estimate percentage of cover for each planting type within subarea	X	X	X	X
Photos:	From standard locations	X	X	X	X

4.3 Criteria for Success

In order to determine if the goals of the revegetation program have been achieved, certain success criteria must be met. Quantitative measures of these criteria include percentage survival of plantings and percent of coverage as indicated in Table 4.1 and specifications described in this section and Section 4.4. Each monitoring report will evaluate if these criteria have been met and prescribe corrective measures if they have not.

First-Year Monitoring. One year after planting, the first report shall be submitted to DPLU and CDFG. This report shall describe and delineate on large-scale maps, the revegetation sites. The standard for the first year shall be: Establishment of all species; 20 percent cover for groundcover plantings; and 80 percent healthy container plantings. The "Time Zero" report shall be included with this report.

The one-acre site planted with willow cuttings will be qualitatively evaluated for the number of willow cuttings that have successfully rooted. The revegetation specialist will determine if the container stock palette will need to be modified based upon the success rate of the willow cuttings. The container stock will be planted and seed mix hand broadcast over the one-acre site.

Remedial Measures: If standards are not met, reseeding, replanting and possible substitution of plant material will be required.

Second-Year Monitoring. At two years after planting, a second similar report shall be submitted to DPLU and CDFG for their review and comment. Records shall be kept of mortality and other problems, such as invasion of the revegetation site by exotic vegetation. Standards for the second year shall be: all trees and shrubs shall be of acceptable growth rate and height; 100 percent survival of all plantings; and 30 percent cover for groundcover plantings.

Remedial Measures: Evaluate the cause of any stunted plants. Make necessary changes to rectify the problem. This may include replanting, soil amendments, regrading, etc.

Third through Fifth-Year Monitoring. From the third through fifth years after planting, similar similar reports shall be submitted to the regulatory agencies listed above for their review and comment. Tree and shrub standards shall be 100 percent survival of all trees and shrubs; 75 percent cover for the third year; and 90 percent cover after year five.

Remedial Measures: Replant if less than 100 percent survival rate for trees and shrubs. If less than 80 percent survival rate for groundcover, then additional seed or container plantings as recommended by the revegetation specialist shall be done.

Each year, the success of the revegetation effort shall be evaluated by comparing factors such as density, spacing and height; and overall species composition with those of the control area See Section 4.4 for a description of the control area. The purpose of such analyses is to evaluate the rate and direction at which the mitigation site is progressing as compared with the control area. It is important to view the growth of the revegetation area with the control area to account for uncontrollable factors such as fire or climate. If the revegetation does not meet the success criteria, the project proponent shall continue with the replacement plantings, weed control, and monitoring on a year-by-year basis until the criteria are met or three additional years, whichever occurs first.

4.4 Technical Measurements

Field observations and measurements shall be recorded on a standard form to be developed and copies of these shall be submitted as an appendix to each report prepared for DPLU. Two belt transects per acre within each mitigation site would be established to measure plant heights. Permanent photo-documentation stations shall also be established within each mitigation site to visually document the vegetational changes and community development. Representative photographs shall be taken during each assessment. Each container planting within the belt transects shall be permanently marked to facilitate survivorship assessment. Aluminum tags or similar tags shall be used. This is important in order to determine planted natural succession or integration during the monitoring period. A complete species list of all vascular plant species and vertebrate animal species encountered during the monitoring shall also be compiled.

Measurements. Included in the "time zero" report shall be baseline measurements of a selected area of riparian habitat adjacent to the revegetation site. This survey shall be conducted to serve as statistical control. Height, density and spacing shall be measured within this control area. Following installation of container stock, the following data collection shall be implemented:

Two belt transects per acre shall be randomly established and permanently located. Along the belt transects the height, density and spacing shall be measured for each species. From this data, the average height along each transect and within the entire revegetation area will be determined for each species. Completed field data forms shall be submitted as an appendix to each required report. Within the transects the following data shall be collected:

a. Survivorship: assessed by absolute counts within the entire mitigation site.

b. Plant height.

ATTACHMENT A

WEED ERADICATION SPECIFICATIONS

WEED ERADICATION SPECIFICATIONS

If extremely invasive and competitive weed species exist on-site they will out compete the native vegetation and shall therefore be eradicated prior to any installation of plant material. Seeds from these species can remain viable in the soil for many years. Therefore, a "grow and kill" weed eradication procedures may be necessary.

If the areas proposed for revegetation are surrounded by existing stands of weeds (especially mustard), that will not be removed, reinfestation is likely to occur. To circumvent reinfestation a clean "buffer zone" is recommended. Weeds adjacent to the revegetation area should be cut down regularly to remove seed stalks before the seeds ripen and redisperse into the revegetation area. Caution should be used in areas where existing oak trees are located to avoid any watering and pesticides under the oaks. The "grow and kill" weed eradication program should include:

1. Clear and remove from site all existing weedy vegetation from the proposed revegetation areas as directed by the revegetation specialist.

2. Prepare soil surface as described above.

3. Install irrigation system.

4. Fertilize with 150 pounds per acre of 15-5-7 Turf Supreme with Best-Cote®.

5. Commence irrigating. The frequency and duration of irrigations will depend on the time of year and the weather. The goal is to keep the soil surface (top 2-inch to 3-inch) moist but not wet. During the summer months, one to two irrigations per day should be sufficient. During other seasons adjust the irrigation schedule to maintain soil moisture.

6. Continue irrigating until a crop of weeds, 1-inch to 3-inch in height becomes evident. During fall months this should occur rapidly, in 2 to 3 weeks, since this is the normal time for germination and growth of cool season weeds.

7. Discontinue irrigating and apply a broad spectrum herbicide (i.e., Round-up®) which will translocate to roots to kill the entire plant. The herbicide shall be recommend by a licensed pest control advisor.

8. Fertilize with 150 pounds per acre of 15-5-7 Turf Supreme with Best Cote®.

9. Recommence irrigating as described in steps #5 and #6 and spray herbicide per step #7.

10. If after the second growing period dense weed infestation is still evident, then a repeat of the "grow and kill" procedure is recommended.

11. Once it has been determined that the weeds are under control then the planting may be performed. The soil surface should be disturbed as little as possible as this will bring additional weed seeds to the surface.

12. Regular monitoring, by the revegetation specialist, of the weed eradication procedures are recommended so that adjustments to the timing of irrigation. herbicide spraying and seeding can be made.

13. No fertilizer should be applied as this may stimulate growth of additional weedy species. The native species can grow without applications of fertilizer.

The "grow and kill" procedures will not remove all weed seeds from the soil, however, it can dramatically minimize the infestation. Regular hand weeding of the revegetation areas will be necessary until the native species are well established.

Many species of large invasive plants, such as giant reed and salt cedar, are difficult to eradicate using the "grow and kill" method. Any of these species that occur within the revegetation sites will be eradicated prior to revegetation. Eradication of both species is accomplished by cutting these species near ground level and immediately apply an herbicide that is approved for aquatic conditions. Removal must be conducted during the months of November through March when the plants are dormant or sap is flowing to the roots. In order for this method to be effective, the individual stems must be cut two to six inches from the ground and herbicide immediately applied to the entire cambium ring. The type of herbicide and timing of application will be directed by a licensed pest control advisor. A follow-up removal of missed or resprouted plants, using hand-clearing methods, will be conducted as part of the mitigation monitoring plan. Resprouted or missed plants shall be removed prior to the onset of flowering. Depending upon the effectiveness of the first treatment, the herbicide may need to be applied for two or three seasons to ensure the eradication of these persistent species.

D

APPENDIX D

PUBLIC SAFETY

February 14, 1995

Mr. Brian Mooney
Brian Mooney & Associates
9903-B Businesspark Ave.
San Diego CA 92131

Subj: Environmental Mitigation and Safety Inports for the Rosemary's Mountain Quarry

Dear Mr. Mooney:

I'm writing this letter at the request of Hal Jensen of Palomar Aggregates, Inc. Several years ago, in conjunction with the Mine Safety and Health Administration and the State Mine Safety Unit, Palomar Aggregates developed a mining plan for Rosemary Mountain that was in compliance with the federal and state regulations. It was a rare experience to see a mining operator approach these agencies for approval of the safety aspects of a developmental plan at such an early stage.

Even with the passing of time since that initial effort, I feel that the developed plan is still viable and a candidate for use today.

You have introduced an additional factor into the formula for activation of the quarry plan and operations, and that is the mitigation of the quarry faces as the mining progresses down the mountain.

I have studied the information transmitted to me regarding the updated quarry plans and ideas and procedures that may be initiated to reach the 100% mitigation goal at Rosemary's Mountain.

The original developmental safety plan called for steep faces, a benching system, wire mesh on the faces and rock anchors applied selectively where needed to control large erratics and clasts, for stability. So, now, how do we adapt this system, developed for the mining phase, and restructure it from employee safety to public <u>and</u> employee safety in the latter phases of mining and the early and continued use of the quarry site after mining.

A safe, viable, comprehensive mining plan has been developed for quarry operations. So too, can an equally safe plan be developed for the 100% mitigation of the quarried surfaces.

Sculpting and coloration of the exposed rock faces, associated with plantings on ledges, seams and cracks can be safely accomplished. These areas could support mulch and soil where plantings and natural growth could take place when the final sculpting is complete; wire mesh would be placed over the rock face and secured with rock bolts. Should any fractures and /or joints that are mapped by the engineer or geologist indicate potential for future wedge type failures that cannot be contained by wire mesh, rock anchors can be used for stabilization. Such steep face rock support and control and environmental enhancement has already taken place and been successful at many locations throughout the world.

Examples of pinned wire mesh on steep faces can be found throughout the U.S. An excellent example of this method of ground and rock control can be viewed on the Island of Maui along the northwest ocean highway on the way to Lahaina. Wire mesh has been applied in an aesthetic manner along this stretch of highway, where it also serves as an excellent control of raveling and rolling rock from the steep road cuts and tunnel portals.

Locally, one can view many examples of draped wire mesh that have been successful in controlling rock releases near public activities. One outstanding site is at the northbound CHP weigh station on U.S. Highway 101 at the crest of Conejo Grade in Ventura County.

An outstanding example of a sculpted face and rock coloration can be found in Glenwood Canyon near Glenwood Springs in South central Colorado, northwest of Aspen. High, steep, bare rock faces were cut and exposed as a prelude to excavation and construction of dual highway tunnels through a mountain section at a large river meander. The enhancement accomplished at this location, subsequent to the construction, most nearly serves as an example to the Rosemary Mountain mitigation plan.

Neither plantings nor wire mesh were used in this high wall mitigation, but the rock was safely and cleverly sculpted and colored to be in harmony with the weathered rock surrounding the high faces and tunnel location.

High work on this location was done from a man cage (drilling jumbo) hung from a specially outfitted crane for man hoisting. The drilling and explosives loading was done from the man cage which had wall anchors to stabilize the work platform and serve as a backing for the drilling operation as well as the coloration. In this case, the sculpting was done after the entire face was exposed. In the case of Rosemary's Mountain, the sculpting will take place during the final blasting sequence of each 33 foot cut. Wire mesh placement, rock coloration, soil placement and seeding will take place on no more than a 33 foot drop at any one time. Because of the sculpting, that drop area will have ledges and irregular surfaces. This in itself gives an added safety factor to the personnel working on the face. The work could also be accomplished by a simpler method of men working on vertical lifelines on the rock faces, in the same manner as highwall work. This type of operation would, of necessity, be in accordance with fall protection standards of the federal and state safety codes.

Information on this treatment of the walls in Glenwood Canyon can be obtained from the Colorado State Division of Highways office in Eagle, Colorado.

Hung wire mesh along with rock anchors has proved to be a safe and reliable method for stabilization of steep faces. With the cementatious nature of the rock at Rosemary's Mountain, it is possible that wire mesh will not be needed after completion of the mining phase. It may be eliminated provided a registered geologist or mining engineer would certify the soundness of the face after mining and reclamation. However, a viable method would have to be implemented to prevent public entry into the high risk zone if the wire mesh drape is eliminated. Warning signs would not be enough control to prevent public entry.

Some provision/procedure must be developed if the wire mesh drape is emplaced on a permanent basis, for the replacement of worn and damaged sections and rock relief when the need arises. For instance, biannual inspections could be made and a permanent fund established for any needed repairs.

In conclusion, I feel that the aesthetic mitigation effort in the Rosemary Mountain Quarry at the conclusion of each 33 foot vertical drop can be safely accomplished. The mining phase in the original mining plan developed by Bing Yen and Associates, is in compliance with the Mine Safety Orders of the State of California, specifically Section 6985 (e) and the federal regulations contained in the Mine Safety and Health Administration. With the use of wire mesh and rock anchors the working benches can be eliminated from the remaining rock face leaving natural appearing areas with random ledges and crevasses.

I have great confidence that a progressive, safe and environventally sensitive mining operation can be developed from the present plan. Please feel free to call on me for advice and assistance at any time.

Sincerely,

Byron M. Ishkanian, PE, CSP
Mine and Tunnel Safety Engineering Consultant
1480 San Leandro Park Road
Santa Barbara CA 93108
Phone: (805)969-6020 and (213)895-0224

Resume of

Byron M. Ishkanian
1480 San Leandro Park Road
Santa Barbara, California 93108
(805) 969-6020 - home

Employment Highlights

My professional history includes over thirty five years experience in tunneling, mining, heavy construction, explosives, diving technology, petroleum drilling-production-refining and related industries, with special emphasis on the aspects of safety and health.

Significant supervisory positions I have held include:

- Principal Safety engineer and Corporate Safety director for the Cordoba Corporation.

- Supervising Engineer-Construction Safety for the Southern California Rapid Transit District during the MOS-1 or initial phase of the Metro Rail Subway Project.

- Principal Safety Engineer for Mineral Industries Mining and Tunneling for the division of Occupational Safety and Health of the State of California, with safety responsibility for the entire State.

- Senior Safety Engineer for Mineral Industries Mining and Tunneling with safety responsibility for the southern half of the State of California.

- Committee Chairman for rewriting of the Administrative Code of the State of California regulations for: tunneling, mining, underwater work, explosives and avalanche control.

- Commendations have been received from three different governors and three chiefs of the Division of Occupational Safety and Health of the State of California for:

    - Significant mine and tunnel rescue efforts
    - Extinguishing of tunnel and mine fires
    - Providing accurate forensic geologic information in tunneling through gassy, extrahazardous and dangerous strata
    - Devising and teaching safety programs for offshore and onshore petroleum installations
    - Development of training programs for explosive gas detection and handling underground

- Providing positive leadership to the Metro Rail safety effort on the MOS-1 position and to the Mining and Tunneling Unit of the State of California. This Unit is recognized nationally and overseas. The Unit has received accolades for its work from private industry, labor organizations and governmental entities.

- Provided consultations upon request for organizations in other states and foreign nations in tunneling matters such as:

  - Baltimore RTD, Johns-Hopkins line extension
  - Wales-Dinorwic Power Scheme (work deck installation and operation in the main surge chamber construction)
  - England-Thames Water Authority (micro-tunneling techniques and explosive gas handling)
  - Republic of South Africa, Kloof Gold Mine (ventilation configuration and adaptation for high heat handling)
  - Panama-explosives use for airfield construction on offshore islands littered with large boulders
  - Austria-Aarlberg Tunnel (protection for employees at the heading using the New Austrian Tunneling Method, i.e., shotcrete and wire mesh in short-term stand-up ground)

- Revamped the blasters licensing and certification programs for underground safety representatives and gas testers for the State of California. Examinations were re-written and procedures for processing and assessing applicants for testing were improved. Training of those administering the tests was also upgraded.

- Severed on the Metro Rail Board of Review which assessed the feasibility of the Metro Rail in Los Angeles.

- Testified before the Waxman Committee as to the feasibility of tunnelling in gassy ground in the Los Angeles basin, specifically in the area between downtown Los Angeles along Wilshire Boulevard to Fairfax Avenue and then north to the Hollywood Hills.

- Made a presentation to the Los Angeles Technical Hazard Committee, convened by the City of Los Angeles to assess the specification changes needed for the Metro Rail to safely negotiate anticipated gassy ground.

- Assisted in writing the tunnel and station construction specifications for MOS-1 in regard to ventilation, gas testing and related items.

Education

University of California at Los Angeles, 1949 to 1952 then a hiatus for military service and again from 1956 to 1957. Graduated with a Bachelors of Science Degree in Geology.

University of Southern California, University of California Extension, attended night school accumulating approximately fifty units in graduate work. My field of study was directed at petroleum engineering, reservoir engineering, refinery processes and engineering, petroleum geology, hydrology and engineering geology.

During my military service, I attended the Army Language School in Monterey, California taking Spanish for six months. Later, in Oberammergau, Germany I took German in a six week course there. I finished first in both classes at both schools and consider myself fluent in German and fairly fluent in Spanish.

In 1963 I was selected to take the diving course sponsored by the Scripps Institute of Oceanography. I completed this course successfully, which included training in SCUBA, hard-hat and hooka breather diving. I still maintain my proficiency in these endeavors.

Since entering the underground business, I have taken courses in first aid, mine and tunnel rescue, industrial hygiene, physiology and various types of work, pulmonary function, diving decompression and dysfunction and associated underground rock bolting and ground control courses.

In 1974 I attended a United States Bureau of Mines course in underground ventilation and explosives use.

<u>Military Service</u>

From 1952 to 1956 I served in the U.S. Army in Europe as a member of the Counterintelligence Corps. My initial training was as a special agent at Fort Holabird, Maryland. After language training in Monterey, California, I was assigned as a special agent in the 66th CIC Group in Germany. After a familiarization course in the German language I was assigned counterintelligence, countersabotage and counter subversive duties in Lower Bavaria. For the balance of my tour of duty I was resident agent in Straubling with responsibilities in three kries (countries) along the Czech border.

During my service period I was introduced to explosives handling and use, dealing with plastics, dynamite, caps and detonating cord.

<u>Licenses, Certifications and Memberships</u>

- Registered Professional Safety Engineer, State of California (#1695)
- Certified Safety Professional, National (CSP #2061)
- Certified Underground Safety Representative, California (#72)
- Certified Underground Gas Tester, California (#87)
- Licensed California Blaster for general above and underground work (#1474)
- Member of the British Tunneling Society
- American Petroleum institute
- Society of Explosive Engineers
- American Society of Safety Engineers

Personal Data

I am a citizen of the USA, born in Pasadena, California with my present residence being Santa Barbara since 1961. I have been married over thirty years and have three children, one of whom still resides with me and my wife Judith. My hobbies include handball (member of the Southern California Handball Hall of Fame), swimming, body surfing, diving, foreign travel and collecting jazz records of the Big Bands.

During my college years, I was active in athletics as a member of the football, wrestling and track and field teams. I am in excellent health.

Professional References

J. Robert Singer, Assistant Chief of the Division of Occupational Safety and Health, of the State of California (retired) residing in Alamo, California.

Audrain Weatherl, former safety manager of the Laborers International Union (retired) residing in Orangevale, California.

Peter Shea, Vice President, J.F. Shea Construction co. of Walnut, California.

Arzell Hale, Safety manager formerly of the Kerr-Mcgee Corporation of Trona, California.

Larry Miller, previous safety superintendent of the Calmat Corporation, Los Angeles.

Stan Rhyu, Principal Safety Engineer of the Mining and Tunneling Unit of the Division of Occupational Safety and Health, Sacramento, California.

Victor Muniz, Chief of Engineering Services, Fairmont Insurance Co., Burbank, California.

Frand D' Orsai, Safety superintendent of the Calmat Corporation, Los Angeles, California.

Harold E. Storey, Systems and Construction safety, Southern California Rapid Transit District.

The addresses and telephone numbers of the above listed individuals will be furnished upon request.

Consultations

Over the years, I have provided consultation services to a multitude of entities other than those already mentioned. A complete listing is hereby provided:

- Metropolitan Water District
- Los Angeles County Flood Control
- Pacific Gas and Electric Co.
- L.A. Department of Water and Power
- L.A. County Sanitary Districts

- Orange County Sanitary Districts
- San Diego Gas and Electric
- U.S. Navy Construction Battalion
- J.F. Shea Construction Co.
- Koebig and Koebig Engineers
- Lewis Brothers Construction
- Glanville Construction
- Guy F. Atkinson Co.
- John A. Artukovich Co.
- Tomovich-Delorme
- Lockheed Shipbuilding co.
- S.J. Groves
- Fluor Corporation
- Boyle Engineering
- Montgomery Engineering
- Union Carbide Corp.
- U.S. Borax
- Connolly-Pacific
- Johns-Mansville Corporation
- Grefco
- Molycorp
- Kaiser Sand and Gravel
- Conrock
- Livingston-Graham
- SP Milling Co.
- Owl Rock
- Spaulding Equipment
- Mine Safety Appliances Co.
- U.S. Bureau of Mines
- Division of Highways
- UCLA
- Cal-Poly Pomona
- U.S. Geologic Survey
- State Department of Water Resources
- Milwaukee Sewerage District
- Baltimore Mass Transit District

In the petroleum industry, I have provided information and consultation services over the years to the following entities:

- Sun Oil Co.
- Chevron USA, Inc.
- Shell Oil Co.
- Getty Oil Co.
- California Production Service
- Atlantic Oil

- Halliburton Corp.
- Schlumberger Corp.
- Division of Oil and Gas, California
- McCullough Tool Co.
- Vetco Corp
- Mobil Oil
- Texaco Corp.

If further information and details are required on any facet of the subject matter discussed in this resume, please feel free to contact me at the telephone number listed.

E

APPENDIX E

TRAFFIC IMPACT ANALYSIS

006560

TRAFFIC ANALYSIS

FOR

PANKEY RANCH MINE

STATE ROUTE 76, PALA

December 1991
Revised: January 18, 1996

Prepared by:

Willdan Associates
Engineers, Planners, and Landscape Architects
6363 Greenwich Drive, Suite 250
San Diego, CA 92122-3939
(619) 457-1199

dk3\jn09888.rpt

TABLE OF CONTENTS

LIST OF FIGURES

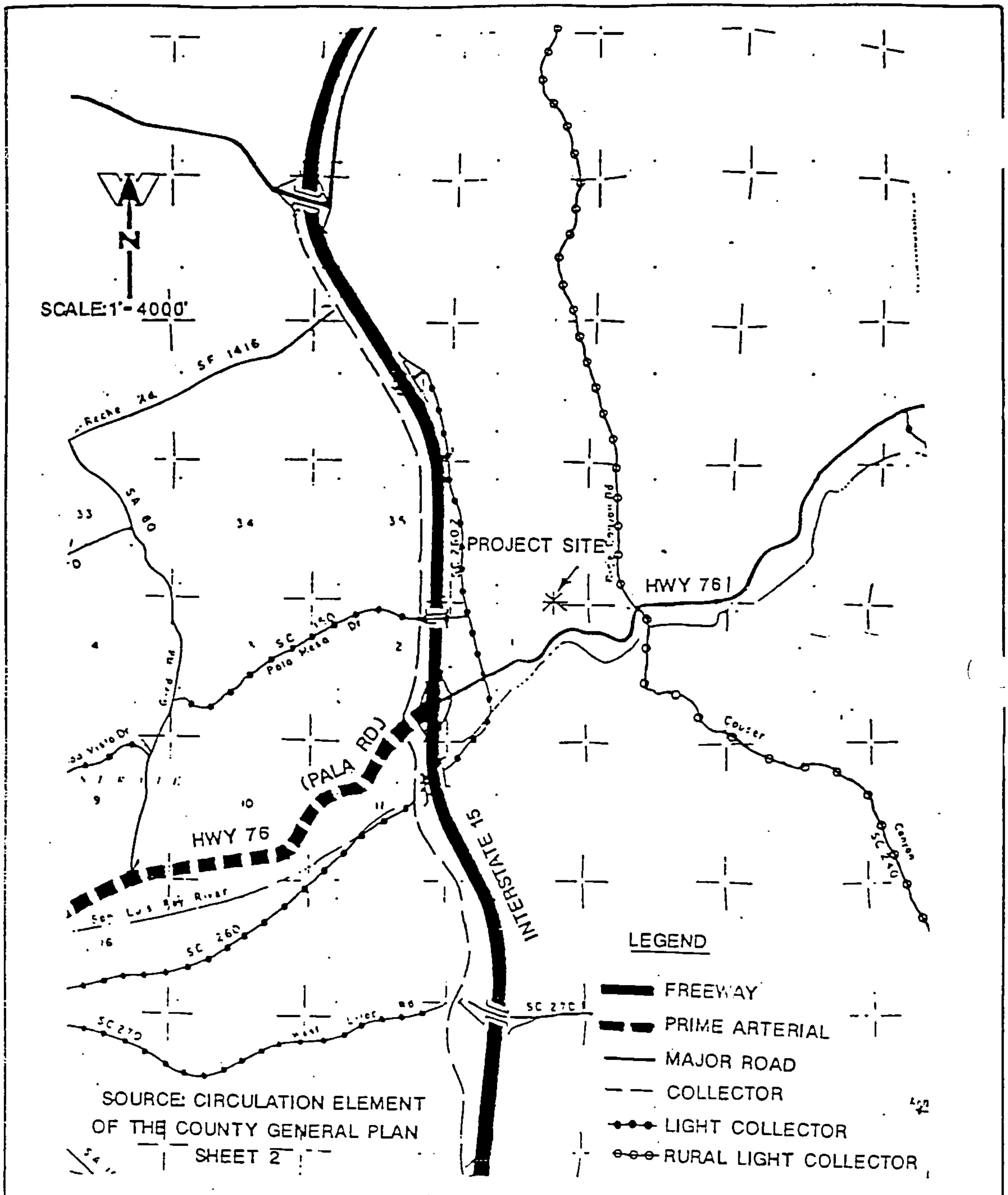
LIST OF TABLES

INTRODUCTION

The proposed Pankey Ranch Mine is located in north San Diego County, north of Pala Road (State Route 76) approximately 1 mile east of Interstate 15 (as shown in Figure 1). The project applicant is applying for a major use permit (P87-021) to allow extraction of hard rock material with an on-site crushing plant. The mining operation is expected to occur over a 20-year period. At full operation, 100,000 tons of material per month will be exported from the site.

Willdan Associates has been retained to analyze the potential transportation impacts which may be anticipated due to the completion of the project as proposed. The analysis reviews existing traffic conditions in the project vicinity, generates, distributes, and assigns project trips to the surrounding street system along with existing traffic to identify short-range impacts. Year 2010 conditions in the proposed project vicinity will be addressed to identify long-range cumulative impacts. The State Route 76 Corridor Studies prepared for Caltrans by Bankston-Pine Associates will be used to identify these impacts. Where potential adverse impacts are identified, measures to mitigate them are suggested.

006564



VICINITY MAP

006565

FIGURE 1

WILLDAN ASSOCIATES

EXISTING CONDITIONS

The proposed project site is located on Pala Road/State Route 76 approximately 1 mile east of Interstate 15. The site is currently vacant and is surrounded by agricultural uses and several sand mining operations along the San Luis Rey River. Direct access to the project from Pala Road/State Route 76 will be provided by a private access driveway.

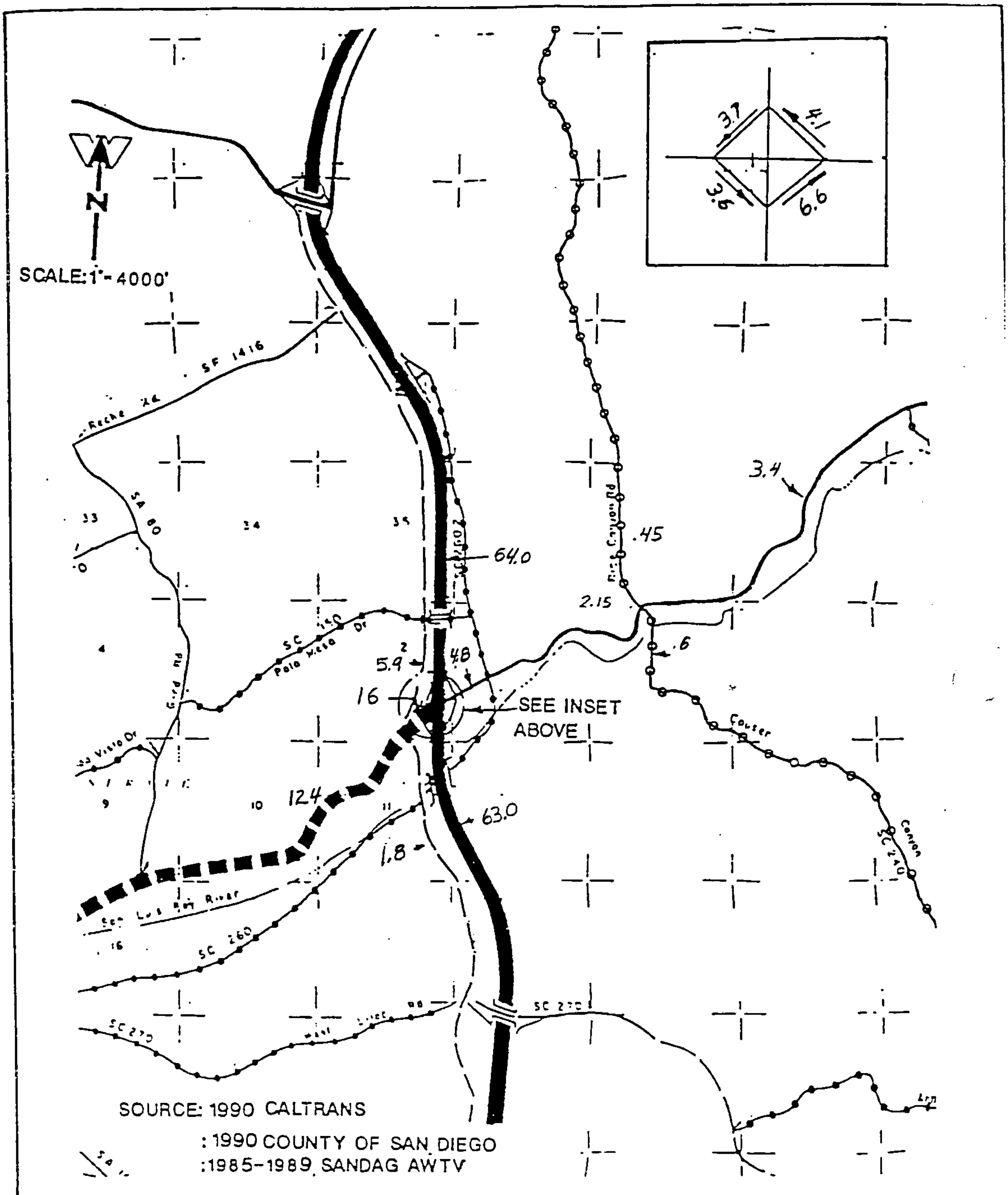
Regional access to the project is provided via Interstate 15 to Pala Road/State Route 76. Interstate 15 (an eight lane freeway) currently carries 64,000 average daily trips (ADT) north of its interchange with Pala Road/State Route 76 and 63,000 ADT south of the interchange (see Figure 2).

State Route 76 is an east/west two lane rural highway in the project vicinity, and runs from Interstate 5 (to the west) to State Route 79 east of Lake Henshaw. The County of San Diego Circulation Element (Sheet 2) of the General Plan designates State Route 76 as a prime arterial (6 lanes, divided) west of Interstate 15 and a major road (four lanes, divided) to the east. The latest available traffic counts (Caltrans, 1994) indicate Pala Road/State Route 76 carries 4,800 and 16,000 ADT east and west of Interstate 15, respectively. West of Old Highway 395, Pala Road/State Route 76 carries 12,400 ADT. Due to the number of sand mining operations along the San Luis Rey River, the heavy vehicle composition in the traffic stream is well above average. Caltrans has indicated a 15 percent heavy vehicle mixture in the traffic in 1990. It should be noted, this facility has several short radius curves just east of the project site.

Old Highway 395 runs north/south parallel to and west of Interstate 15, and serves as a frontage road to the freeway. Old Highway 395 is designated as a collector roadway (four lanes, undivided) on the County Circulation Element, but is currently a rural two lane highway. This facility forms a four-way intersection with Pala Road/State Route 76, with stop signs at both northbound and southbound approaches. This facility currently carries 5,900 and 1,800 ADT north and south of Pala Road/State Route 76, respectively.

Rice Canyon road runs north of Pala Road/State Route 76 just east of the proposed project site. This roadway is classified as a rural light collector on the County's Circulation Element (2 lanes, undivided). Currently, this roadway is narrow and has several short radius curves. The most recent traffic counts for Rice Canyon Road indicate this roadway carries 450 ADT.

Due to the rural and undeveloped nature of this area surrounding the project site, public transportation is not available. As the area builds out, it is likely public transportation will serve this area.



006567

FIGURE 2

EXISTING ADT IN THE PROJECT VICINITY
(IN THOUSANDS)

WILLDAN ASSOCIATES

IMPACTS

To evaluate the potential impacts of the project, we have estimated the trips that can be expected to be generated from the proposed project. The trips were then distributed and assigned to the street system. Critical street segment capacities were evaluated for project impacts. Since this project is the only currently proposed project in the vicinity, and other approved sand mining projects are operating (and generating traffic), the proposed project traffic will be added to existing traffic to determine short range impacts.

Trip Generation

Since there are no published or generally accepted trip generation rates for quarries, traffic generation will be calculated by adding the various components of operation of the proposed project. The proposed project involves extraction of 22 million tons of rock over a 20-year period with an on-site crushing plant. At full operation, 100,000 tons of material per month will be exported from the site. Based on the conversations with the project applicant, the project's daily trips were calculated as follows:

Sand Importation: 425 tons of sand per day @ 25 tons per truck load yields 17 truck trips per day.

Ready-Mix: 22,500 tons per month @ 15 tons per truckload = 1,500 trips per month. Dividing this by 22 working days per month yields 68 trips per day.

Aggregate and Asphalt: 77,500 tons per month @ 25 tons per truckload = 3,100 trips per month. Dividing this by 22 yields 141 trips per day.

Employees and Miscellaneous: This was derived by assuming 10 to 12 employees; total trips were estimated at 31 trips per day.

Totals:	Sand Importation	17	TE x 2	=	34 ADT
	Ready Mix	68	TE x 2	=	136 ADT
	Aggregate	141	TE x 2	=	282 ADT
	Employees	31	TE x 2	=	62 ADT
					514 ADT

Since the quarry will be providing rock products to construction projects, it is anticipated that the majority of their operation will occur between the hours of 7:00 a.m. and 3:00 p.m., in order for the product to arrive at construction sites and be handled prior to the shutdown of construction activities. On an average, each hour would account for 12.5 percent of the daily traffic volume. However, the traffic volumes would be higher during the morning hours, as trucks would be attempting to provide aggregate to the construction sites as quickly as possible. There is a limitation on the number of trucks which would be loaded during any one hour. It is assumed that the morning peak hour would be 1.5 times the average or 18.75 percent of the vehicle trips would occur between the hours of 7:00 a.m. and 8:00 a.m. (514 x .1875 = 96).

006568

Additionally, due to the potential postponement of construction activities due to weather, the possibility exists for daily trips related to this project to increase by as much as 100% on the one or two days following the postponement. In an attempt to analyze this worse case scenario, an additional analysis of 1028 trips (514 x 2) will be discussed along with the average daily analysis. This equates to 193 trips (1028 x .1875) in the AM peak hour. It should be noted that the 514 ADT includes 62 trips for employees, however the additional traffic will be comprised of trucks alone. For the sake of analyzing the worst possible case scenario and to help keep the analysis and discussion relatively simple, we will use 1028 trips (966 truck trips and 62 employee trips). This analysis is presented for the sole purpose of determining whether or not the critical intersections or segments will be suffer catastrophic failures due to this potential short-term increase in trips.

Trip Distribution and Assignment

The distribution of trips typically results from an estimate of ultimate travel destinations and which elements of the street system would be used to reach those destinations. The basis for this recognition is the drivers' consideration of time, distance, and convenience in choosing a route. A major element is access to Interstate 15 and the regional circulation system.

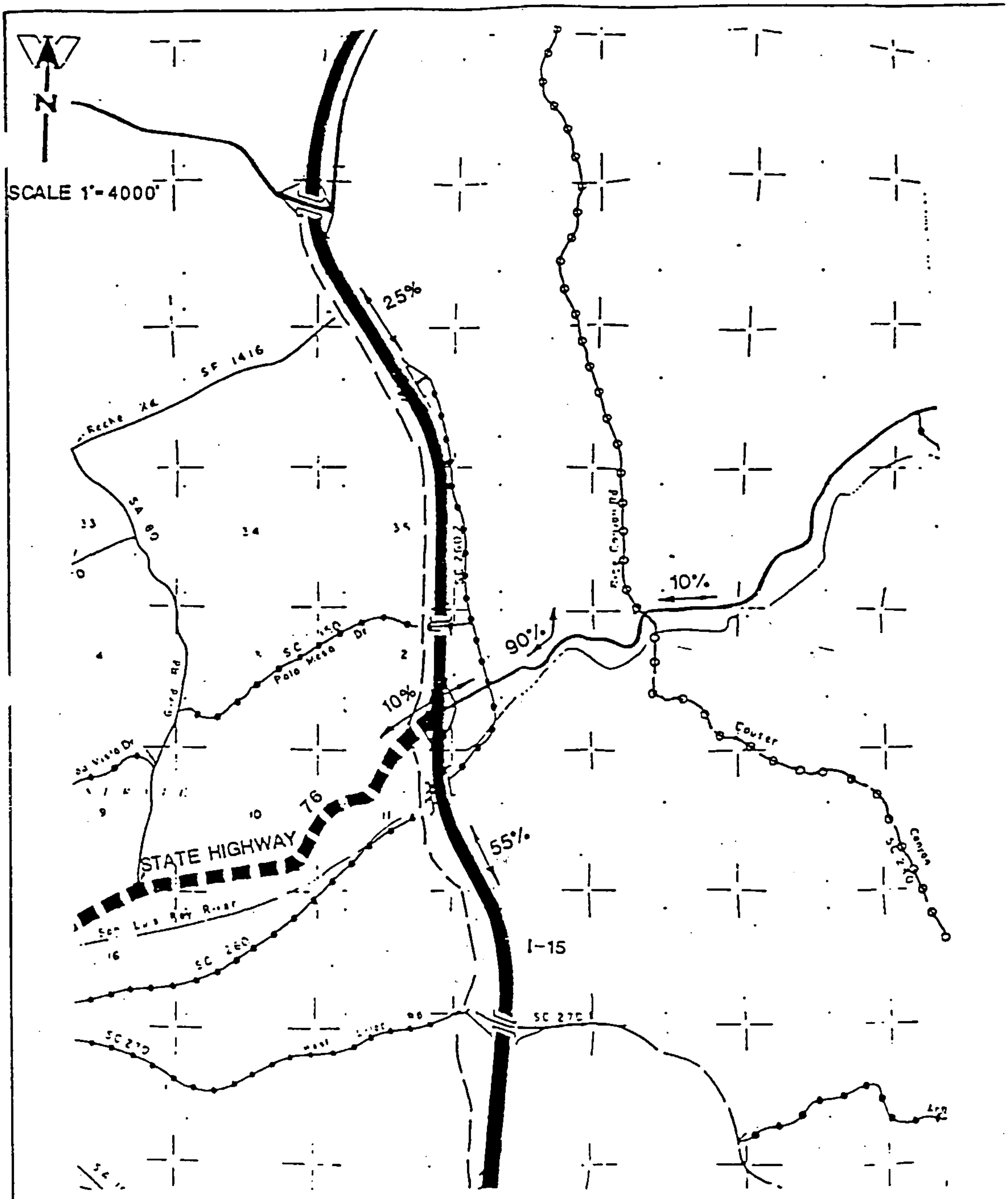
Due to the remote location of the proposed facility, it is reasonable to assume a 10/90 percent east/west split from the project access onto Pala Road/State Route 76. The 10 percent of trips orienting to and from the east would most likely be importation of sand, employee and miscellaneous trips, with most of the truck trips orienting to and from the west. After reaching the Interstate 15/Pala Road interchange, the trips will orient 55 percent south, 25 percent north, and 10 percent west (see Figure 3). The distribution of project-related trips was estimated based on discussions with the plant operators (September 1990) and by looking at existing and potential markets for the exported material from the project.

Street Segments (Existing + Project)

Figure 4 shows the assignment of the proposed project trips onto the surrounding street system. In order to assess the short-range impacts of the project on street segment capacities we have utilized Table 1, developed by the County of San Diego Public Works Department and compares ADT to levels of service for various classifications of roads.

The proposed project will have the greatest impact on Pala Road/State Route 76 between the project access and Interstate 15. The Interstate 15 on- and off-ramps (with Pala Road/State Route 76) will also be impacted. Although Pala Road/State Route 76 currently carries 4,800 ADT, approximately 15 percent (or 720) are trucks. Using the Transportation Research Board's *1994 Highway Capacity Manual, Special Report 209*, the truck volume was converted into passenger car equivalent (PCE) by multiplying the number of existing trucks by 2.2 as specified in Table 8.6. Therefore, by performing the calculation [4,800 - 720 + (720 x 2.2)], the existing adjusted ADT on Pala Road/State Highway 76 is 5,664.

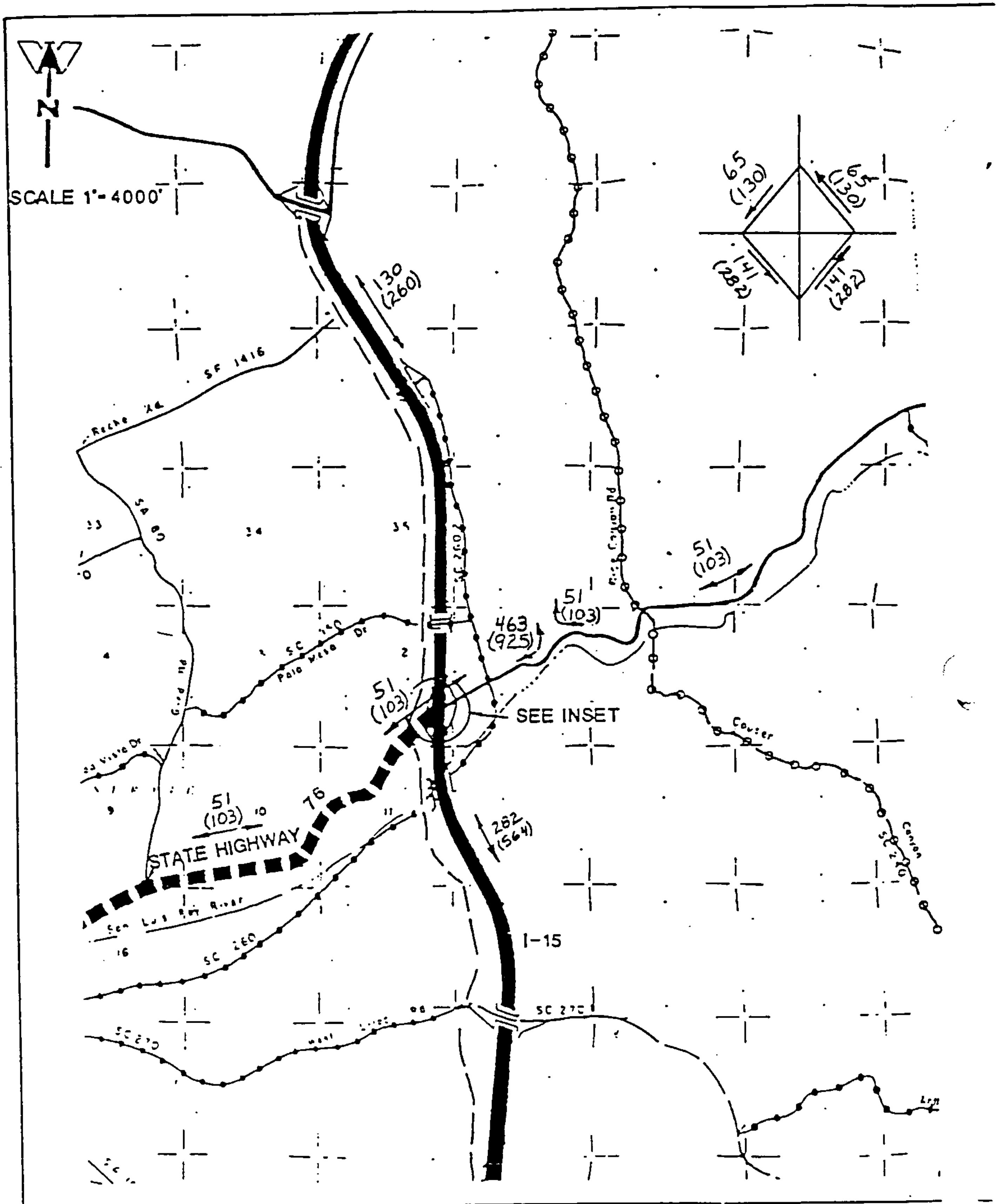
006569



PROJECT TRIP DISTRIBUTION
(TRUCK TRIPS ONLY)

006570 FIGURE 3

WILLDAN ASSOCIATES



006571 PROJECT ONLY ASSIGNMENT
ADT/(WORSE CASE)

FIGURE 4

WILLDAN ASSOCIATE

TABLE 1

SAN DIEGO COUNTY STANDARD STREET CLASSIFICATION
AVERAGE DAILY VEHICLE TRIPS

Road		Level of Service				
Class	X-Section	A	B	C	D	E
Prime Arterial	106/236	22,200	37,000	44,600	50,000	57,000
Major Road	82/102	14,800	24,700	29,600	33,400	37,000
Collector	64/84	13,700	22,800	27,400	30,800	34,200
Light Collector	40/60	1,900	4,100	7,100	10,900	16,200
Rural Collector	40/84	1,900	4,100	7,100	10,900	16,200
Rural Light Collector	40/100	1,900	4,100	7,100	10,900	16,200
Rural Mountain	40/100	1,900	4,100	7,100	10,900	16,200
Recreation Parkway	42/100	1,900	4,100	7,100	10,900	16,200
Residential Collector	40/60	*	*	4,500	*	*
Residential Street	36/56	*	*	1,500	*	*
Residential Cul-del-sac or Loop Street	32/52	*	*	200	*	*
Interim Road	28/40 or 60	*	*	2,800	*	*

* Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry though traffic. Levels of service normally apply to roads carrying though traffic between major trip generators and attractors.

When the proposed project traffic is added to the daily stream on Pala Road/State Route 76 between the project access and Interstate 15, the adjusted volume is 6,617 ADT [5,664 + 463 - 408 + (408 x 2.2)]. Comparing this project ADT to the Light Collector standards on Table 1, the level of service (LOS) on this segment is "C". This is consistent with field observations in the project vicinity. West of Interstate 15, ADT on Pala Road/State Route 76 will increase by 51 truck trips (or 112 PCE) as a result of the project. This represents an increase of less than one percent of the total daily traffic on this facility, thus will not cause any significant impact.

For the worse case scenario of the potential doubling of project trips, the adjusted volume on Pala Road/State Route 76 between the project access and Interstate 15 is 7,634 ADT [5,665 + 925 - 870 + (870 x 2.2)]. Again, comparing this worse case scenario ADT to the Light Collector standards on Table 1, the LOS on this segment is "D" only by a small amount. As for west of Interstate 15, ADT on Pala Road/State Route 76 will increase by 102 truck trips (or 224 PCE) as a result of the project. This represents an increase of less than two percent of the total daily traffic on this facility, thus will not cause any significant impact.

Intersections (Short Term)

The intersections most impacted by the proposed project are the Interstate 15 northbound and southbound on- and off-ramps with Pala Road/State Route 76. According to the latest Caltrans ramp volumes (October 19, 1994), the southbound on-ramp carried 3,600 ADT, with 356 vehicles occurring during the AM peak hour while the northbound on-ramp carried 4,100 ADT, with 385 vehicles occurring during the PM peak hour. These are well below the Caltrans design criteria (approximately 900 vehicles per hour) and will remain so with the addition of the proposed project trips. In order to evaluate the impacts of the proposed project on the Interstate 15/State Route 76 interchange during the AM peak hours, we utilized the 1994 Highway Capacity Software under existing conditions (December 14, 1995) and with the proposed project trips. Appendix A contains the AM and PM peak hour manual turning movement count summaries for the Interstate 15 ramp terminals with State Route 76. Appendix B contains a description of the various levels of service, ranges for the level of service, and calculations for existing and existing plus project conditions in the AM and PM peak hour. Table 2 summarizes the levels of service during the AM and PM peak hour under existing and existing plus project conditions. As shown on Table 2, left turning vehicles from the Interstate 15 northbound off-ramp experience long delays during the PM peak hour. However, the proposed project will add little or no traffic in the PM peak hour. Therefore, conditions would be similar to existing conditions.

TABLE 2 - INTERSECTION OPERATIONS

EXISTING - EXISTING/PROJECT

Intersection	Existing				Existing/Project			
	Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor	
	AM	PM	AM	PM	AM	PM	AM	PM
S/R 76/I-15 Northbound ramps	A	A	C	F	A	A	C	F
S/R 76/I-15 Southbound ramps	A	A	B	C	A	A	B	C

006573

For the worse case scenario, the only degradation evident is the left turn from minor movement for both the ramps. For the Northbound ramp intersection the LOS is D while the Southbound ramps operate at LOS C. Table 2A summarizes the results of the analysis for this worse case scenario. The analysis sheets are located in Appendix B.

TABLE 2A - INTERSECTION OPERATIONS

EXISTING - EXISTING/PROJECT

(WORSE CASE)

Intersection	Existing				Existing/Project			
	Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor	
	AM	PM	AM	PM	AM	PM	AM	PM
S/R 76/I-15 Northbound ramps	A	A	C	F	A	A	D	F
S/R 76/I-15 Southbound ramps	A	A	B	C	A	A	C	C

Short Term Cumulative Impacts

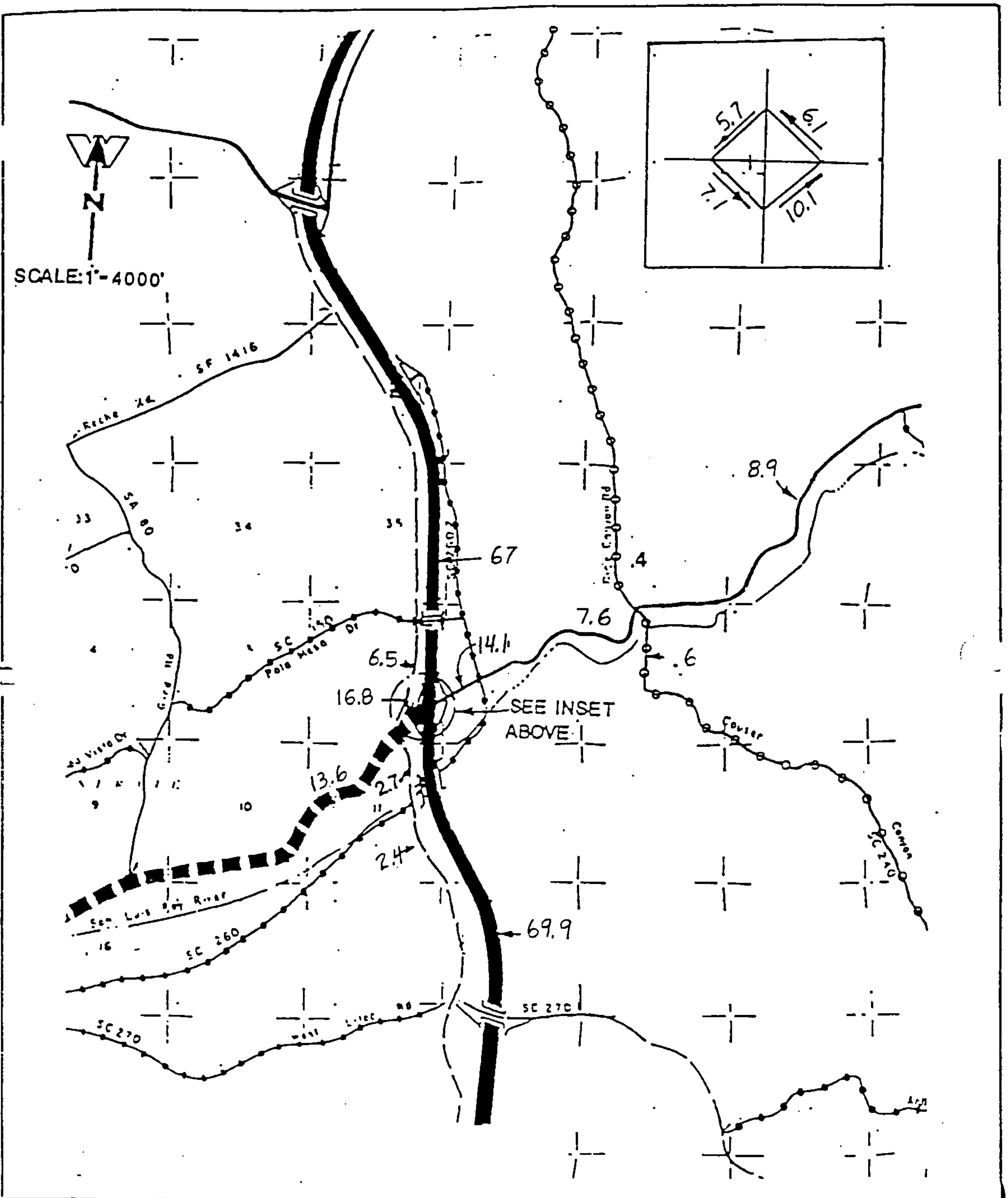
In order to determine the short-term cumulative impacts in the project vicinity, the Lake Rancho Viejo residential development traffic was added to the street system along with existing daily traffic and project-related traffic. At a trip generation rate of 10 trips per dwelling unit, the project is estimated to generate 8,160. The Lake Rancho Viejo traffic was assigned in the following manner:

Interstate 15 South	45%
Interstate 15 North	25%
State Route 76 West	10%
State Route 76 East	10%
Old Highway 395 North	5%
Old Highway 395 South	5%

Additionally, the proposed Pala Indian gaming facility east of the project area, is expected to generate approximately 4,202 ADT. The distribution of these trips, taken from the report prepared by Linscott, Law and Greenspan, June 15, 1995, adds 76 AM trips (48 inbound and 28 outbound) and 450 PM trips (191 inbound and 259 outbound). It should be noted that the PM peak for the gaming facility occurs 2 to 3 hours after the plant experiences it's PM peak.

Figure 5 depicts the existing plus short-term cumulative daily traffic volumes in the vicinity of the proposed project. As shown on Figure 5, State Route 76 between Pankey Road and the Interstate 15 ramps will experience significant increases in daily traffic volumes. The daily traffic volumes are projected to increase from 4,800 ADT under existing conditions to 15,100 ADT under existing plus short-term cumulative conditions. It should be noted that the proposed project will add less than 500 ADT to this segment.

In order to assess the short-term cumulative impacts at the Interstate 15 northbound and southbound ramp terminals with State Route 76, an analysis was performed under existing plus short-term cumulative development conditions with existing lane configurations and stop control on the Interstate 15 northbound and southbound off-ramps. Table 3 provides a comparison of the



EXISTING + PROJECT + SHORT TERM CUMULATIVE ADT
(IN THOUSANDS)

FIGURE 5

WILLDAN ASSOCIATES

006575

levels of service at these intersections under existing, existing plus project and existing plus short-term cumulative conditions. As shown on Table 3, it is evident that left turns from the Interstate 15 northbound and southbound off-ramps will experience congestion under existing plus short-term cumulative AM and PM peak hour conditions. If the northbound and southbound ramp terminals with State Route 76 were signalized, they would operate at LOS C under both AM and PM peak hour conditions.

Table 3A shows the results of the worse case analysis for the short term cumulative scenario. As can be seen between Tables 3 and 3A, there is no change in LOS for the doubling of project trips.

Street Segments (Long Term)

In order to assess the long-range impacts of the project on the surrounding street system, we have utilized the State Route 76 Corridor Traffic Studies prepared for Caltrans District 11 by Bankston-Pine Associates. It should be noted that recently approved projects along the State Route 76 corridor were built out and SANDAG Series 7 land use was assumed outside the study area. Recently approved projects (Hewlett Packard, Lake Rancho Viejo, etc.) were included in these forecasts. Figure 6 shows the Year 2010 daily traffic volumes on the street system surrounding the project. The Caltrans Route Concept Report for State Route 76 is included as Appendix E to this report.

TABLE 3 - INTERSECTION OPERATIONS

EXISTING - EXISTING/PROJECT - EXISTING/SHORT TERM CUMULATIVE

Intersection	Existing				Existing/Project				Existing/Short-Term Cumulative			
	Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SR 76/I-15 Northbound Ramps	A	A	C	F	A	A	C	F	B	B	F	F
SR 76/I-15 Southbound Ramps	A	A	B	C	A	A	B	C	A	A	D	F

Appendix A

Existing AM and PM
Manual Turning Movement Count Summaries

TABLE 3A - INTERSECTION OPERATIONS EXISTING - EXISTING/PROJECT - EXISTING/SHORT TERM CUMULATIVE (WORSE CASE)												
	Existing				Existing/Project				Existing/Short-Term Cumulative			
	Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor		Left Turn from Major		Left Turn from Minor	
Intersection	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SR 76/I-15 Northbound Ramps	A	A	C	F	A	A	C	F	B	B	F	F
SR 76/I-15 Southbound Ramps	A	A	B	C	A	A	B	C	A	A	D	F

As shown on Figure 6, Pala Road/State Route 76 was projected to carry approximately 55,000 ADT east of Interstate 15 to Pankey Road, then decreasing substantially to the east. Pala Road/State Route 76 would require six travel lanes between Interstate 15 and Pankey Road and four lanes to the east. West of Interstate 15, Pala Road/State Route 76 is projected to carry 36,900 ADT.

The proposed project is located in Traffic Analysis Zone (TAZ) No. 1175 which is comprised of rural estate, multiple rural, and intensive agricultural uses. Assuming four dwelling units (DUs) on the project site (one DU per 20 acres) in the forecast, the proposed project would add approximately 440 daily trips to the street system over what was forecast by the County. This is only a 1 to 2 percent increase over the Year 2010 projections.

Traffic Controls

In order to determine if Interstate 15 northbound and southbound ramp terminals with State Route 76 meet the minimum requirements for installation of traffic signals, signal warrants were conducted under existing conditions using Figure 9-1C from the Caltrans *Traffic Manual*.

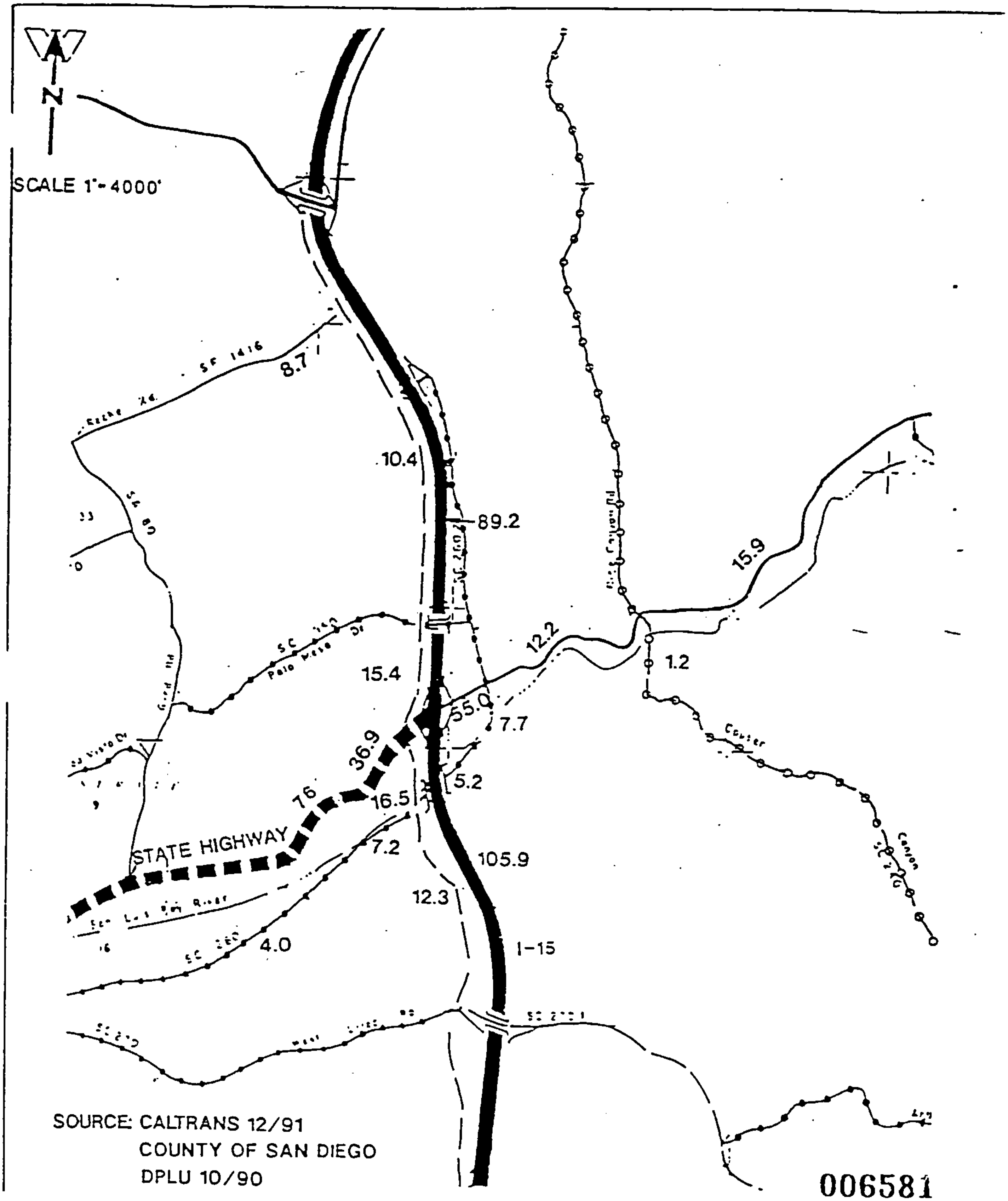
Both the northbound and southbound Interstate 15 ramp terminals with State Route 76 currently meet the minimum warrants for installation of traffic signals. The signal warrant calculation worksheets for these locations are contained in Appendix D.

Access

The project is proposing access to Pala Road/State Route 76 approximately 1 mile east of Interstate 15. The project, in conjunction with Caltrans, is proposing to realign a short radius curve along this segment of highway. Although a detailed site plan is not available at this time, we have analyzed access from conceptual drawings.

During the critical AM peak hour, approximately 96 vehicles will enter and exit the project site, splitting evenly between inbound and outbound movements. Since most project-related truck traffic will orient to and from the west, it will be necessary to widen Pala Road/State Route 76 at the project access to allow for a left-turn pocket (eastbound) and an acceleration lane (westbound) to minimize interruption of flow and enhance safety on this facility. Figure 7 shows a conceptual design for the project access driveway onto Pala Road/State Route 76. Upon project approval, actual design for the project access driveway onto Pala Road/State Route 76 should be prepared for Caltrans and the County Traffic Engineer review and approval. Appropriate warning signs and/or lights should also be installed on Pala Road/State Route 76 in advance of the project access to warn motorists of slower moving vehicles.

00658C



006581

YR 2010 TRAFFIC VOLUMES IN THE PROJECT VICINITY (IN THOUSANDS)

FIGURE 6

WILLDAN ASSOCIATES

006582

CONCEPTUAL ACCESS DESIGN
(DESIGN SPEED 55 MPH)

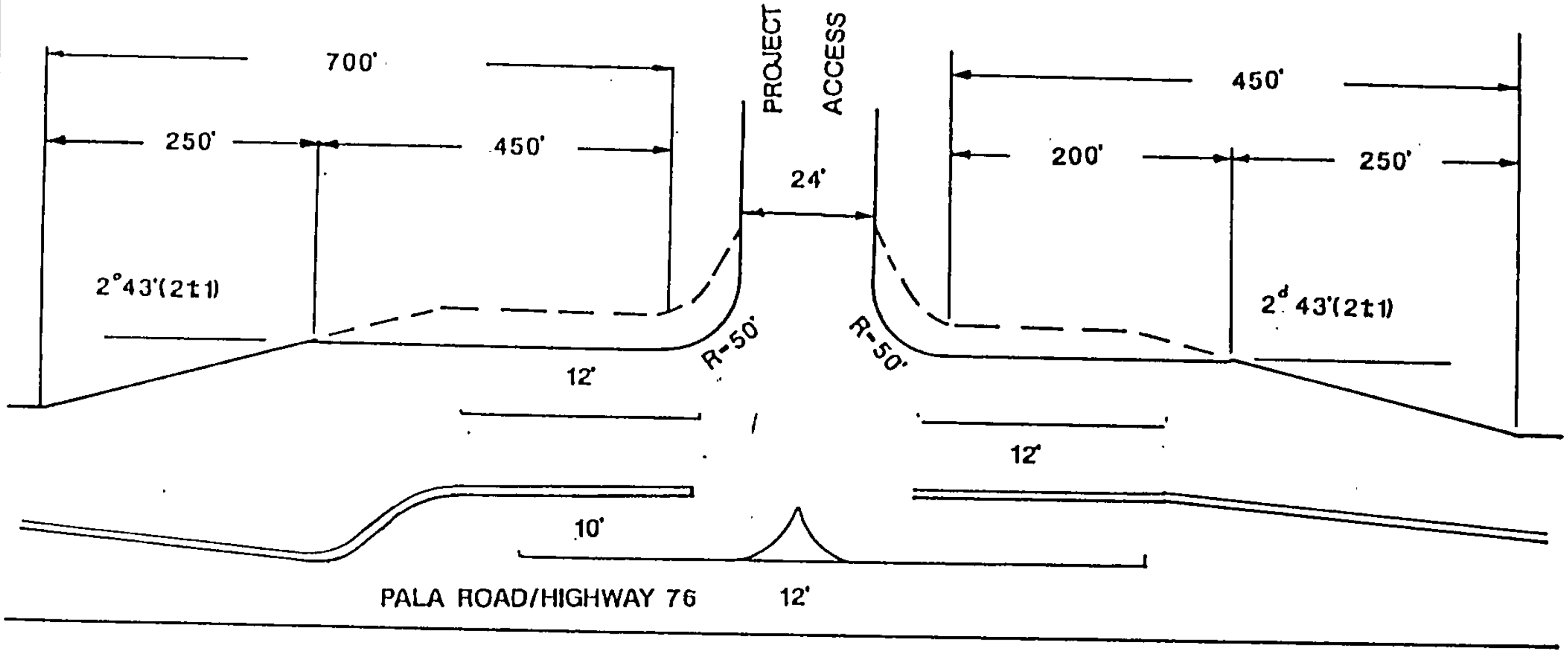


FIGURE 7

WILLDAN ASSOCIATES

Because traffic safety is a major concern on this segment of Pala Road/State Route 76, we have examined recent accident statistics compiled by Caltrans. In 1986, there were five accidents between Interstate 15 and Cole Grade Road (12 miles east of project access drive) with zero fatalities. According to Caltrans (Hughes, September 1987), the expected rate was 2.16 accidents per million vehicle miles (ACC/MVM) while the actual rate was 3.20 ACC/MVM. This appears to be substantial, however, only one of the five accidents involved more than one vehicle. This leads us to believe that the primary cause of the accidents was not vehicle volumes but other factors, such as travel speed, short radius curves, or other roadway conditions. Therefore, realigning the curve along the project frontage may help to decrease the overall accident rate and enhance safety on this roadway in the project vicinity.

006583

MITIGATION MEASURES

The proposed Pankey Ranch Mine will add 514 ADT including 452 truck trips (worse case: 1028 ADT including 966 truck trips) on Pala Road/State Route 76 east of Interstate 15. Although this facility currently carries an above-average percentage of heavy vehicles (15 percent), the level of service will continue at acceptable levels (LOS C) with the additional project trips. The Lake Ranch Viejo residential project (south of State Route 76 and east of Interstate 15) and the Pala Indian gaming facility will collectively add 12,364 ADT to the surrounding street system and cumulatively deteriorate levels of service along State Route 76 and the Interstate 15 ramps with State Route 65.

Also, the Interstate 15 northbound and southbound on- and off-ramps with Pala Road/State Route 76 will continue to operate within the capacity with and without the project. However, short-term cumulative and long-range forecasts (Year 2010) indicate the need for future improvements (including signalization of the ramps and widening of Pala Road/State Route 76), and the project should contribute to those on a fair-share basis in accordance with County policy. Short-term improvements, including lengthening of the left-turn pocket to southbound Interstate 15, shall be determined by Caltrans.

Since the project is proposing access onto a state highway, the necessary permits should be secured, and actual design coordinated with Caltrans and the County Traffic Engineer. Pala Road/State Route 76 will require widening to accommodate an eastbound left-turn pocket at the project access and a westbound acceleration lane. Appropriate warning signs should also be installed east and west of the project's access drive on Pala Road/State Route 76 to warn motorists of slow moving vehicles. There are no significant adverse unmitigable traffic-related impacts which have been identified resulting from the completion of this project and proposed under the assumptions made in this analysis.

006584

SOUTHLAND CAR COUNTERS
VEHICLE AND MANUAL COUNTS

N-S STREET: I-15 SB OFF RAMPS   DATE: 12/14/95   CITY: SAN DIEGO
E-W STREET: 76   DAY: THURSDAY
PROJECT# 0200002P

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:				0.5	0.5	1		1	1	1	1		
2:00 PM													
15 PM													
30 PM													
45 PM													
3:00 PM													
15 PM													
30 PM													
45 PM													
4:00 PM				1	0	72		100	73	15	120		381
15 PM				4	0	58		135	70	21	97		385
30 PM				2	0	59		105	67	18	111		362
5 PM				1	0	88		102	52	15	116		374
0 PM				4	0	104		156	57	12	124		457
15 PM				3	0	79		163	53	10	120		428
30 PM				3	0	82		90	59	7	124		365
45 PM				2	0	80		111	50	8	111		362
6:00 PM													
15 PM													
30 PM													
45 PM													
TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	0	0	20	0	622	0	962	481	106	923	0	3114

PM Peak Hr Begins at 445 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES =	0	0	0	11	0	353	0	511	221	44	484	0	1624

ADDITIONS:1-WAY STOP, SB

SOUTHLAND CAR COUNTERS
VEHICLE AND MANUAL COUNTS

N-S STREET: I-15 SB OFF RAMP   DATE: 12/14/95   CITY: SAN DIEGO
E-W STREET: 76   DAY: THURSDAY
PROJECT# 0200002A

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:				0.5	0.5	1		1	1	1	1		
6:00 AM													
15 AM													
30 AM													
45 AM													
7:00 AM				2	0	88		44	62	16	33		245
15 AM				3	0	87		71	73	21	49		304
30 AM				0	0	89		86	91	26	64		356
45 AM				2	0	59		69	77	19	54		280
8:00 AM				6	0	48		67	71	18	47		257
15 AM				4	1	62		65	65	16	65		278
30 AM				7	0	70		62	61	12	78		290
45 AM				7	0	63		64	60	11	63		268
00 AM													
15 AM													
30 AM													
45 AM													
10:00 AM													
15 AM													
30 AM													
45 AM													
TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	0	0	31	1	566	0	528	560	139	453	0	2278

AM Peak Hr Begins at 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES =	0	0	0	11	0	283	0	293	312	84	214	0	1197

ADDITIONS:1-WAY STOP, SB

006586

SOUTHLAND CAR COUNTERS
VEHICLE AND MANUAL COUNTS

N-S STREET: I-15 NB OFF RAMP
DATE: 12/14/95
CITY: SAN DIEGO

E-W STREET: 76
DAY: THURSDAY
PROJECT# 0200001A

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0.5	0.5	1				1	1			1	0	
6:00 AM													
15 AM													
30 AM													
45 AM													
7:00 AM	47	0	13				52	15			30	1	158
15 AM	58	0	14				61	18			33	2	186
30 AM	52	1	15				62	20			29	3	182
45 AM	42	0	19				54	22			25	5	167
8:00 AM	39	0	16				46	19			27	2	149
15 AM	36	0	8				46	16			32	4	142
30 AM	40	0	10				51	13			31	5	150
5 AM	44	0	15				49	11			37	8	164
0 AM													
15 AM													
30 AM													
45 AM													
10:00 AM													
15 AM													
30 AM													
45 AM													

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES =	358	1	110	0	0	0	421	134	0	0	244	30	1298

AM Peak Hr Begins at 700 AM

PEAK VOLUMES =	199	1	61	0	0	0	229	75	0	0	117	11	693

ADDITIONS: 1-WAY STOP, NB

SOUTHLAND CAR COUNTERS
VEHICLE AND MANUAL COUNTS

N-S STREET: I-15 NB OFF RAMPS   DATE: 12/14/95   CITY: SAN DIEGO
E-W STREET: 76   DAY: THURSDAY
PROJECT# 0200001P

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0.5	0.5	1				1	1			1	0	
2:00 PM													
15 PM													
30 PM													
45 PM													
3:00 PM													
15 PM													
30 PM													
45 PM													
4:00 PM	80	0	8				87	29			50	4	258
15 PM	74	0	7				89	30			45	2	247
30 PM	84	0	3				94	26			42	4	253
45 PM	86	0	4				99	28			41	4	26[illegible]
5:00 PM	94	0	3				119	30			40	4	29[illegible]
15 PM	97	0	6				86	32			41	3	265
30 PM	92	0	5				87	28			40	2	254
45 PM	76	0	4				98	24			32	0	234
6:00 PM													
15 PM													
30 PM													
45 PM													
TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	683	0	40	0	0	0	759	227	0	0	331	23	2063

PM Peak Hr Begins at 445 PM

PEAK VOLUMES =	369	0	18	0	0	0	391	118	0	0	162	13	1071

ADDITIONS:1-WAY STOP, NB

006588

Appendix B

Level of Service Concept

The *1994 Highway Capacity Manual* (Special Report No. 209) published by the Transportation Research Board establishes a system by which highway facilities are examined for their adequacy to handle traffic volumes. The terminology "Level of Service" is used to provide a "qualitative" evaluation based on certain "quantitative" calculations which are related to empirical values.

Level of Service for Unsignalized Intersections

The level of service for unsignalized intersections is a function of the average delay experience by the vehicles using the intersection. Table 1 describes the level of service criteria for unsignalized intersections as derived from the *1994 Highway Capacity Manual.*

Table 1
LEVEL OF SERVICE CRITERIA
FOR TWO WAY STOP CONTROLLED AND ALL WAY STOP CONTROLLED INTERSECTIONS

Level of Service	Average Total Delay (sec/veh)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤45
F	≥45

Level of Service for Signalized Intersections

Level of service for signalized intersections is also defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and loss of travel time. Specifically, level of service criteria are stated in terms of the Average Stopped Delay per vehicle for various movements within the intersection. The criteria for the various Level of Service designations are given in the following table.

Table 2
LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS

Level of Service	Average Total Delay (sec/veh)
A	5.0 or less
B	5.1 - 15.0
C	15.1 - 25.0
D	25.1 - 40.0
E	40.1 - 60.0
F	60.1 or greater

Level of Service Descriptions

Following are brief descriptions of the six Levels of Service designations as reported in the 1985 Highway Capacity Manual:

Level of Service A describes operations with very low delay i.e., less than 5.0 seconds per vehicle. This occurs when progression is extremely favorable and most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level of service. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.

Level of Service D describes operations with delay in the range of 25.1 to 40.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 40.1 to 60.0 seconds per vehicle and is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., arrival flow rates exceed the capacity of the intersection. It may also occur at high V/C ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Delay is a complex measure, and is dependent on a number of variables, including the intersection turning volumes, the number of lanes for each approach to the intersection, the quality of Traffic Signal progression, the cycle length, the Green time to Cycle length ratio (g/C), and the Volume to Capacity Ratio (V/C) for the lane group or approach in question. Intersection Capacity, Level of Service and delay are thus dependent upon a number of factors, including the following:

- Area type
- Intersection geometrics
- Parking conditions
- Bus stop location and activity
- Traffic signal operation
- Vehicle mix
- Peak hour factor

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection   Release 2.1   Page 1

****

File Name NBEXWOAM.HC0
Streets: (N-S) I-15 Northbound Ramp   (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing without Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	229	75			117	11	199	1	61			
PHF	62	22			33	5	58	1	19			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	75	
Potential Capacity: (pcph)	1269	
Movement Capacity: (pcph)	1269	
Prob. of Queue-free State:	0.93	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		128
Potential Capacity: (pcph)		1490
Movement Capacity: (pcph)		1490
Prob. of Queue-free State:		0.82

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	432	
Potential Capacity: (pcph)	647	
Capacity Adjustment Factor due to Impeding Movements	0.82	
Movement Capacity: (pcph)	528	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	426	
Potential Capacity: (pcph)	600	
Major LT, Minor TH Impedance Factor:	0.82	
Adjusted Impedance Factor:	0.82	
Capacity Adjustment Factor due to Impeding Movements	0.82	
Movement Capacity: (pcph)	490	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)		SharedCap Csh(pcph)	Avg.Total Delay		LOS	Delay By App
NB L	255	490			15.2		C	
NB T	1	528	>		>		>	11.6
NB R	84	1269	>	1248	>	3.1	> A	
EB L	273	1490			3.0		A	2.2

Intersection Delay = 5.4

006594

****

File Name NBEXWOPM.HC0
Streets: (N-S) I-15 Northbound Ramp   (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing without Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	391	118			162	13	369	0	18			
PHF	119	32			41	4	97	.95	6			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.15	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	118	
Potential Capacity: (pcph)	1207	
Movement Capacity: (pcph)	1207	
Prob. of Queue-free State:	0.98	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		175
Potential Capacity: (pcph)		1415
Movement Capacity: (pcph)		1415
Prob. of Queue-free State:		0.61

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	684	
Potential Capacity: (pcph)	477	
Capacity Adjustment Factor due to Impeding Movements	0.61	
Movement Capacity: (pcph)	293	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	678	
Potential Capacity: (pcph)	429	
Major LT, Minor TH Impedance Factor:	0.61	
Adjusted Impedance Factor:	0.61	
Capacity Adjustment Factor due to Impeding Movements	0.61	
Movement Capacity: (pcph)	263	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	427	263		*	F	
NB R	26	1207 >	1207	> 3.0	> A *	
EB L	547	1415		4.1	A	3.2

Intersection Delay = 396.8

* The calculated delay was greater than 999.9 sec.

****

File Name SBEXWOAM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing without Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		293	312	84	214					11	0	283
PHF		86	91	26	64					6	.95	89
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		214
Potential Capacity: (pcph)		1079
Movement Capacity: (pcph)		1079
Prob. of Queue-free State:		0.64

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	293	
Potential Capacity: (pcph)	1243	
Movement Capacity: (pcph)	1243	
Prob. of Queue-free State:	0.91	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		591
Potential Capacity: (pcph)		534
Capacity Adjustment Factor due to Impeding Movements		0.91
Movement Capacity: (pcph)		485
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		591
Potential Capacity: (pcph)		482
Major LT, Minor TH Impedance Factor:		0.91
Adjusted Impedance Factor:		0.91
Capacity Adjustment Factor due to Impeding Movements		0.91
Movement Capacity: (pcph)		438

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	26	438 >	438	> 8.7	> B	5.5
SB R	392	1079		5.2	B	
WB L	114	1243		3.2	A	0.9

Intersection Delay = 1.8

****

File Name SBEXWOPM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing without Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		511	221	44	484					11	0	353
PHF		163	59	15	124					4	.95	104
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		484
Potential Capacity: (pcph)		787
Movement Capacity: (pcph)		787
Prob. of Queue-free State:		0.42

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	511	
Potential Capacity: (pcph)	979	
Movement Capacity: (pcph)	979	
Prob. of Queue-free State:	0.93	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		1039
Potential Capacity: (pcph)		311
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		290
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		1040
Potential Capacity: (pcph)		265
Major LT, Minor TH Impedance Factor:		0.93
Adjusted Impedance Factor:		0.93
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		247

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	18	247	> 247	> 15.7	> C	
						11.1
SB R	458	787		10.9	C	
WB L	66	979		3.9	A	0.3

Intersection Delay = 2.8

006603

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1

****

File Name NBEXWAM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.................. D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing with Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	229	92			160	23	199	1	87			
PHF	62	.95			.95	.95	.95	1	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	92	
Potential Capacity: (pcph)	1244	
Movement Capacity: (pcph)	1244	
Prob. of Queue-free State:	0.92	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		183
Potential Capacity: (pcph)		1402
Movement Capacity: (pcph)		1402
Prob. of Queue-free State:		0.81

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	504	
Potential Capacity: (pcph)	593	
Capacity Adjustment Factor due to Impeding Movements	0.81	
Movement Capacity: (pcph)	478	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	492	
Potential Capacity: (pcph)	549	
Major LT, Minor TH Impedance Factor:	0.81	
Adjusted Impedance Factor:	0.81	
Capacity Adjustment Factor due to Impeding Movements	0.81	
Movement Capacity: (pcph)	442	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)		SharedCap Csh(pcph)	Avg.Total Delay			LOS	Delay By App
NB L	230	442			16.9			C	
NB T	1	478	>			>		>	12.3
NB R	101	1244	>	1225		>	3.2	> A	
EB L	273	1402			3.2			A	2.3

Intersection Delay = 5.4

Center For Microcomputers In Transportation
HCS: Unsignalized Intersection Release 2.1 Page 1
****

File Name NBEXWPM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing with Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	391	118			162	13	369	0	18			
PHF	119	32			41	4	97	.95	6			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	118	
Potential Capacity: (pcph)	1207	
Movement Capacity: (pcph)	1207	
Prob. of Queue-free State:	0.98	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		175
Potential Capacity: (pcph)		1415
Movement Capacity: (pcph)		1415
Prob. of Queue-free State:		0.63

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	684	
Potential Capacity: (pcph)	477	
Capacity Adjustment Factor due to Impeding Movements	0.63	
Movement Capacity: (pcph)	300	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	678	
Potential Capacity: (pcph)	429	
Major LT, Minor TH Impedance Factor:	0.63	
Adjusted Impedance Factor:	0.63	
Capacity Adjustment Factor due to Impeding Movements	0.63	
Movement Capacity: (pcph)	270	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	427	270		*	F	
NB R	26	1207 >	1207	> 3.0	> A *	
EB L	524	1415		4.0	A	3.1

Intersection Delay = 371.2

* The calculated delay was greater than 999.9 sec.

006609

****

File Name SBEXWAM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing with Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		298	312	110	219					23	0	283
PHF		.95	91	.95	.95					.95	.95	.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		219
Potential Capacity: (pcph)		1072
Movement Capacity: (pcph)		1072
Prob. of Queue-free State:		0.69

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	298	
Potential Capacity: (pcph)	1236	
Movement Capacity: (pcph)	1236	
Prob. of Queue-free State:	0.90	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		627
Potential Capacity: (pcph)		511
Capacity Adjustment Factor due to Impeding Movements		0.90
Movement Capacity: (pcph)		458
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		627
Potential Capacity: (pcph)		459
Major LT, Minor TH Impedance Factor:		0.90
Adjusted Impedance Factor:		0.90
Capacity Adjustment Factor due to Impeding Movements		0.90
Movement Capacity: (pcph)		411

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	26	411 >	411	> 9.4	> B	
						5.2
SB R	328	1072		4.8	A	
WB L	128	1236		3.2	A	1.0

Intersection Delay = 1.8

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1

****

File Name SBEXWPM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing with Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		511	221	44	484					11	0	353
PHF		163	59	15	124					4	.95	104
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		484
Potential Capacity: (pcph)		787
Movement Capacity: (pcph)		787
Prob. of Queue-free State:		0.42

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	511	
Potential Capacity: (pcph)	979	
Movement Capacity: (pcph)	979	
Prob. of Queue-free State:	0.93	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		1039
Potential Capacity: (pcph)		311
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		290
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		1040
Potential Capacity: (pcph)		265
Major LT, Minor TH Impedance Factor:		0.93
Adjusted Impedance Factor:		0.93
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		247

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	18	247 >	247	> 15.7	> C	
						11.1
SB R	458	787		10.9	C	
WB L	66	979		3.9	A	0.3

Intersection Delay = 2.8

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1

****

File Name NBEXW2AM.HCO
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing with Project (Worse Case)

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	229	109			204	35	199	1	114			
PHF	62	.95			.95	.95	.95	1	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	109	
Potential Capacity: (pcph)	1219	
Movement Capacity: (pcph)	1219	
Prob. of Queue-free State:	0.89	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		239
Potential Capacity: (pcph)		1319
Movement Capacity: (pcph)		1319
Prob. of Queue-free State:		0.79

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	577	
Potential Capacity: (pcph)	543	
Capacity Adjustment Factor due to Impeding Movements	0.79	
Movement Capacity: (pcph)	431	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	560	
Potential Capacity: (pcph)	502	
Major LT, Minor TH Impedance Factor:	0.79	
Adjusted Impedance Factor:	0.79	
Capacity Adjustment Factor due to Impeding Movements	0.79	
Movement Capacity: (pcph)	398	

006617

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	230	398		21.2	D	
NB T	1	431 >		>	>	14.1
NB R	132	1219 >	1202	> 3.4	> A	
EB L	273	1319		3.4	A	2.3

Intersection Delay = 5.8

006618

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1

`*****************************************************************`

File Name NBEXW2PM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing with Project (Worse Case)

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	391	118			162	13	369	0	18			
PHF	119	32			41	4	97	.95	6			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

006619

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	118	
Potential Capacity: (pcph)	1207	
Movement Capacity: (pcph)	1207	
Prob. of Queue-free State:	0.98	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		175
Potential Capacity: (pcph)		1415
Movement Capacity: (pcph)		1415
Prob. of Queue-free State:		0.63

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	684	
Potential Capacity: (pcph)	477	
Capacity Adjustment Factor due to Impeding Movements	0.63	
Movement Capacity: (pcph)	300	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	678	
Potential Capacity: (pcph)	429	
Major LT, Minor TH Impedance Factor:	0.63	
Adjusted Impedance Factor:	0.63	
Capacity Adjustment Factor due to Impeding Movements	0.63	
Movement Capacity: (pcph)	270	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	427	270		*	F	
NB R	26	1207 >	1207	> 3.0	> A *	
EB L	524	1415		4.0	A	3.1

Intersection Delay = 371.2

* The calculated delay was greater than 999.9 sec.

006621

****

File Name SBEXW2AM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... AM Peak - Existing with Project (Worse Case)

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		303	312	137	224					35	0	283
PHF		.95	91	.95	.95					.95	.95	.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		224
Potential Capacity: (pcph)		1066
Movement Capacity: (pcph)		1066
Prob. of Queue-free State:		0.69

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	303	
Potential Capacity: (pcph)	1229	
Movement Capacity: (pcph)	1229	
Prob. of Queue-free State:	0.87	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		664
Potential Capacity: (pcph)		489
Capacity Adjustment Factor due to Impeding Movements		0.87
Movement Capacity: (pcph)		426
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		664
Potential Capacity: (pcph)		437
Major LT, Minor TH Impedance Factor:		0.87
Adjusted Impedance Factor:		0.87
Capacity Adjustment Factor due to Impeding Movements		0.87
Movement Capacity: (pcph)		381

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	41	381 >	381	> 10.6	> C	5.6
SB R	328	1066		4.9	A	
WB L	158	1229		3.4	A	1.2

Intersection Delay = 1.9

006624

Center For Microcomputers In Transportation
HCS: Unsignalized Intersection Release 2.1

File Name SBEXW2PM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 12/14/95
Other Information......... PM Peak - Existing with Project (Worse Case)

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		511	221	44	484					11	0	353
PHF		163	59	15	124					4	.95	104
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		484
Potential Capacity: (pcph)		787
Movement Capacity: (pcph)		787
Prob. of Queue-free State:		0.42

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	511	
Potential Capacity: (pcph)	979	
Movement Capacity: (pcph)	979	
Prob. of Queue-free State:	0.93	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		1039
Potential Capacity: (pcph)		311
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		290
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		1040
Potential Capacity: (pcph)		265
Major LT, Minor TH Impedance Factor:		0.93
Adjusted Impedance Factor:		0.93
Capacity Adjustment Factor due to Impeding Movements		0.93
Movement Capacity: (pcph)		247

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	18	247 >	247	> 15.7	> C	11.1
SB R	458	787		10.9	C	
WB L	66	979		3.9	A	0.3

Intersection Delay = 2.8

006627

Appendix C

006628

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1

****

File Name NBFWAM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... AM Peak - Existing plus Cumulative plus Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	229	140			418	159	199	1	180			
PHF	62	.95			.95	.95	.95	1	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

****

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	140	
Potential Capacity: (pcph)	1176	
Movement Capacity: (pcph)	1176	
Prob. of Queue-free State:	0.82	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		577
Potential Capacity: (pcph)		910
Movement Capacity: (pcph)		910
Prob. of Queue-free State:		0.70

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	946	
Potential Capacity: (pcph)	348	
Capacity Adjustment Factor due to Impeding Movements	0.70	
Movement Capacity: (pcph)	244	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	866	
Potential Capacity: (pcph)	334	
Major LT, Minor TH Impedance Factor:	0.70	
Adjusted Impedance Factor:	0.70	
Capacity Adjustment Factor due to Impeding Movements	0.70	
Movement Capacity: (pcph)	234	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	230	234		165.7	F	
NB T	1	244 >		>	>	82.8
NB R	208	1176 >	1155	> 3.8	> A	
EB L	273	910		5.6	B	3.5

Intersection Delay = 24.7

C

006631

Center For Microcomputers In Transportation
HCS: Unsignalized Intersection   Release 2.1   Page 1
****

File Name NBFWPM.HC0
Streets: (N-S) I-15 Northbound Ramp   (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... PM Peak - Existing plus Cumulative plus Project

Two-way Stop-controlled Intersection

	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	391	318			479	126	369	0	409			
PHF	119	.95			.95	.95	97	.95	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

006632

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	318	
Potential Capacity: (pcph)	955	
Movement Capacity: (pcph)	955	
Prob. of Queue-free State:	0.50	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		605
Potential Capacity: (pcph)		883
Movement Capacity: (pcph)		883
Prob. of Queue-free State:		0.41

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	1314	
Potential Capacity: (pcph)	223	
Capacity Adjustment Factor due to Impeding Movements	0.41	
Movement Capacity: (pcph)	91	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	1251	
Potential Capacity: (pcph)	200	
Major LT, Minor TH Impedance Factor:	0.41	
Adjusted Impedance Factor:	0.41	
Capacity Adjustment Factor due to Impeding Movements	0.41	
Movement Capacity: (pcph)	81	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	427	81		*	F	
NB R	474	955 >	955	> 7.5	> B *	
EB L	524	883		10.0	B	5.5

Intersection Delay = 1271.2

* The calculated delay was greater than 999.9 sec.

006634

Center For Microcomputers In Transportation
HCS: Unsignalized Intersection Release 2.1 Page 1
****

File Name SBFWAM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... AM Peak - Existing plus Cumulative plus Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		303	312	365	222					66	0	283
PHF		.95	91	.95	.95					.95	.95	.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		222
Potential Capacity: (pcph)		1069
Movement Capacity: (pcph)		1069
Prob. of Queue-free State:		0.69

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	303	
Potential Capacity: (pcph)	1229	
Movement Capacity: (pcph)	1229	
Prob. of Queue-free State:	0.66	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		890
Potential Capacity: (pcph)		372
Capacity Adjustment Factor due to Impeding Movements		0.66
Movement Capacity: (pcph)		244
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		890
Potential Capacity: (pcph)		323
Major LT, Minor TH Impedance Factor:		0.66
Adjusted Impedance Factor:		0.66
Capacity Adjustment Factor due to Impeding Movements		0.66
Movement Capacity: (pcph)		212

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	76	212 >	212	> 26.4	> D	9.4
SB R	328	1069		4.9	A	
WB L	422	1229		4.5	A	2.7

Intersection Delay = 3.0

Center For Microcomputers In Transportation
HCS: Unsignalized Intersection   Release 2.1   Page 1
****

File Name SBFWPM.HC0
Streets: (N-S) I-15 Southbound Ramp   (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... PM Peak - Existing plus Cumulative plus Project

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		530	221	335	510					192	0	353
PHF		.95	.95	.95	.95					1	1	1
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		510
Potential Capacity: (pcph)		764
Movement Capacity: (pcph)		764
Prob. of Queue-free State:		0.49

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	530	
Potential Capacity: (pcph)	958	
Movement Capacity: (pcph)	958	
Prob. of Queue-free State:	0.59	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		1375
Potential Capacity: (pcph)		207
Capacity Adjustment Factor due to Impeding Movements		0.59
Movement Capacity: (pcph)		123
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		1376
Potential Capacity: (pcph)		169
Major LT, Minor TH Impedance Factor:		0.59
Adjusted Impedance Factor:		0.59
Capacity Adjustment Factor due to Impeding Movements		0.59
Movement Capacity: (pcph)		101

C

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	211	101 >	101	> *	> F	777.5
SB R	388	764		9.5	B	
WB L	388	958		6.3	B	2.5

Intersection Delay = 167.9

* The calculated delay was greater than 999.9 sec.

****

File Name NBFW2AM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... AM Peak - Existing plus Cumulative plus Project (Worse Case)
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	229	157			462	171	199	1	207			
PHF	62	.95			.95	.95	.95	1	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	157	
Potential Capacity: (pcph)	1153	
Movement Capacity: (pcph)	1153	
Prob. of Queue-free State:	0.79	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		633
Potential Capacity: (pcph)		856
Movement Capacity: (pcph)		856
Prob. of Queue-free State:		0.68

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	1019	
Potential Capacity: (pcph)	318	
Capacity Adjustment Factor due to Impeding Movements	0.68	
Movement Capacity: (pcph)	217	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	934	
Potential Capacity: (pcph)	305	
Major LT, Minor TH Impedance Factor:	0.68	
Adjusted Impedance Factor:	0.68	
Capacity Adjustment Factor due to Impeding Movements	0.68	
Movement Capacity: (pcph)	208	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	230	208		321.1	F	
NB T	1	217 >		>	>	147.4
NB R	240	1153 >	1133	> 4.0	> A	
EB L	273	856		6.2	B	3.7

Intersection Delay = 43.1

Center For Microcomputers In Transportation

****

File Name NBFW2PM.HC0
Streets: (N-S) I-15 Northbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... PM Peak - Existing plus Cumulative plus Project (Worse Case)
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	0	1	1<	0	0	0	0
Stop/Yield			N			N						
Volumes	391	318			479	226	369	0	409			
PHF	119	.95			.95	.95	97	.95	.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	0	0			
SU/RV's (%)	0	0			0	0	0	0	0			
CV's (%)	15	15			15	15	15	15	15			
PCE's	1.1	1.1			1.1	1.1	1.1	1.1	1.1			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

****

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	318	
Potential Capacity: (pcph)	955	
Movement Capacity: (pcph)	955	
Prob. of Queue-free State:	0.50	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		705
Potential Capacity: (pcph)		791
Movement Capacity: (pcph)		791
Prob. of Queue-free State:		0.34

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	1414	
Potential Capacity: (pcph)	198	
Capacity Adjustment Factor due to Impeding Movements	0.34	
Movement Capacity: (pcph)	67	
Prob. of Queue-free State:	1.00	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	1301	
Potential Capacity: (pcph)	187	
Major LT, Minor TH Impedance Factor:	0.34	
Adjusted Impedance Factor:	0.34	
Capacity Adjustment Factor due to Impeding Movements	0.34	
Movement Capacity: (pcph)	63	

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
NB L	427	63		*	F	
NB R	474	955 >	955	> 7.5	> B *	
EB L	524	791		13.4	C	7.4

Intersection Delay = 1638.8

* The calculated delay was greater than 999.9 sec.

****

File Name SBFW2AM.HC0
Streets: (N-S) I-15 Southbound Ramp   (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... AM Peak - Existing plus Cumulative plus Project (Worse Case)
Two-way Stop-controlled Intersection

	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		308	312	392	227					78	0	283
PHF		.95	91	.95	.95					.95	.95	.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		227
Potential Capacity: (pcph)		1062
Movement Capacity: (pcph)		1062
Prob. of Queue-free State:		0.69

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	308	
Potential Capacity: (pcph)	1223	
Movement Capacity: (pcph)	1223	
Prob. of Queue-free State:	0.63	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		927
Potential Capacity: (pcph)		356
Capacity Adjustment Factor due to Impeding Movements		0.63
Movement Capacity: (pcph)		224
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		927
Potential Capacity: (pcph)		308
Major LT, Minor TH Impedance Factor:		0.63
Adjusted Impedance Factor:		0.63
Capacity Adjustment Factor due to Impeding Movements		0.63
Movement Capacity: (pcph)		194

006646

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	90	194	> 194	> 34.4	> E	12.0
SB R	328	1062		4.9	A	
WB L	454	1223		4.7	A	2.9

Intersection Delay = 3.6

****

File Name SBFW2PM.HC0
Streets: (N-S) I-15 Southbound Ramp (E-W) SR 76/Pala Road
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst................... D. Krauth
Date of Analysis.......... 1/18/96
Other Information......... PM Peak - Existing plus Cumulative plus Project (Worse Case)
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	0	0	0	0>	1	1
Stop/Yield			Y			N						
Volumes		530	221	335	510					192	0	353
PHF		.95	59	.95	.95					.95	.95	104
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0	0	0
SU/RV's (%)		0	0	0	0					0	0	0
CV's (%)		15	0	0	15					0	0	0
PCE's		1.1	1.1	1.1	1.1					1.1	1.1	1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		510
Potential Capacity: (pcph)		764
Movement Capacity: (pcph)		764
Prob. of Queue-free State:		0.40

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	530	
Potential Capacity: (pcph)	958	
Movement Capacity: (pcph)	958	
Prob. of Queue-free State:	0.59	

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		1375
Potential Capacity: (pcph)		207
Capacity Adjustment Factor due to Impeding Movements		0.59
Movement Capacity: (pcph)		123
Prob. of Queue-free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		1376
Potential Capacity: (pcph)		169
Major LT, Minor TH Impedance Factor:		0.59
Adjusted Impedance Factor:		0.59
Capacity Adjustment Factor due to Impeding Movements		0.59
Movement Capacity: (pcph)		101

Intersection Performance Summary

Movement	FlowRate v(pcph)	MoveCap Cm(pcph)		SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
SB L	222	101	>	101	> *	> F	
							878.0
SB R	458	764			11.7	C	
WB L	388	958			6.3	B	2.5

Intersection Delay = 189.4

* The calculated delay was greater than 999.9 sec.

006652

Appendix D

URBAN ______ RURAL X

Minimum Requirements
EADT

1. MINIMUM VEHICULAR Satisfied X Not Satisfied ____	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor street approach (one direction only)	
Number of lanes for moving traffic on each approach				
Major Street *State Route 76* / Minor Street *I-15 N/B Offramp*	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 *7,600* / 2 or more *4,100*	9,600	6,720 *Sat.*	3,200	2,240 *Sat.*
1 ______ / 2 or more ______	8,000	5,600	3,200	2,240

2. INTERRUPTION OF TRAFFIC Satisfied ____ Not Satisfied X	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor street (one direction only)	
Number of Lanes for moving traffic on each approach				
Major Street *State Route 76* / Minor Street *I-15 N/B Offramp*	Urban	Rural	Urban	Rural
1 ______ / 1 ______	12,400	8,400	1,200	850
2 or more ______ / 1 ______	14,400	10,080	1,200	850
2 or more *7,600* / 2 or more *4,100*	14,400	10,080 *No*	1,600	1,120 *Sat*
1 ______ / 2 or more ______	12,000	8,400	1,600	1,120

3. COMBINATION

Satisfied ____ Not Satisfied ____ — 2 Warrants — 2 Warrants

No one warrant satisfied but following warrants fulfilled 80% or more...

______ 1 ______ 2

Source: CALTRANS Traffic Manual Figure 9-1C

SIGNAL WARRANT ANALYSIS

State Route 76/ I-15 N/B Ramps Existing Conditions

FIGURE *D-1*

006654

WILLDAN ASSOCIATES

URBAN ______ RURAL _X_

Minimum Requirements
EADT

1. MINIMUM VEHICULAR Satisfied _X_ Not Satisfied ___			Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor street approach (one direction only)	
Number of lanes for moving traffic on each approach						
Major Street *State Route 76*	Minor Street *I-15 S/B Offramp*		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 *12,800*	2 or more *3,700*		9,600	6,720*Sat.*	3,200	2,240 *Sat.*
1 ______	2 or more ______		8,000	5,600	3,200	2,240

2. INTERRUPTION OF TRAFFIC Satisfied _X_ Not Satisfied ___			Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor street (one direction only)	
Number of Lanes for moving traffic on each approach						
Major Street *State Route 76*	Minor Street *I-15 S/B Offramp*		Urban	Rural	Urban	Rural
1 ______	1 ______		12,400	8,400	1,200	850
2 or more ______	1 ______		14,400	10,080	1,200	850
2 or more *12,800*	2 or more *3,700*		14,400	10,080*Sat.*	1,600	1,120*Sat.*
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

Source: CALTRANS Traffic Manual
Figure 9-1C

SIGNAL WARRANT ANALYSIS
State Route 76/ I-15 S/B Ramps Existing Conditions

FIGURE
D-2

WILLDAN ASSOCIATES

006659

Appendix E

ROUTE CONCEPT REPORT
STATE ROUTE 76

11-SD-76 P.M. R0.0-52.3

JULY 1991

State of California
Department of Transportation
District 11 - System Planning Branch
2829 Juan Street
P.O. Box 85406
San Diego, California 92186-5406

006657

TABLE OF CONTENTS

LIST OF TABLES

Route Concept Summary
State Route 76 (SR-76)
11-SD-76 P.M. R0.0- 52.3

ROUTE CONCEPT (2010)

The components of the Route Concept include State highway, arterial street, and transit and rail service improvements. The State highway components are listed in Table S-1, while the others are discussed below and in the Concept Rationale section. The State highway component is comprised of the facility type and the number of lanes for 2010, the Average Daily Traffic (ADT) for 2010, the Demand to Capacity (D/C) Ratio for 2010, the Operating Level of Service (LOS) for 2010, the Concept LOS for 2010, and whether the segment is currently in the rural or urban area. The 2010 traffic projections for State Route 76 (SR-76) are based on Caltrans' traffic projections and consultant studies, and assume completion of the future regional transportation system. The forecasts incorporate a vehicle occupancy rate of 1.5 persons per vehicle, an increase over the existing 1.15 rate. This translates into a higher number of person trips within the corridor with fewer added vehicle trips.

The San Diego Association of Governments' (SANDAG) regional forecasts did not consider recent population growth patterns in the SR-76 and Interstate 15 (I-15) corridors. The Caltrans projections and consultant studies have modified the growth assumptions for the area. These forecasts are intended for interim use until the completion of the Tri-District Transportation Study. Caltrans' Districts 8, 11, and 12 are working on this study with a consultant to develop a forecasting model system that will provide detailed traffic analysis in portions of the contiguous areas of San Diego, Orange, and Riverside counties. This study will provide updated forecast volumes for the northerly reaches of Interstate 5 (I-5) and I-15 in San Diego County and for portions of SR-76. Accordingly, the results of this study may require future changes in the concept for SR-76.

The 2010 Operating LOS includes all proposed State highway and rail capital improvements. It also includes expansion and greater utilization of the existing arterial street network. Even with the inclusion of the proposed highway, rail, and arterial improvements, and the increased vehicle occupancy rate, the 2010 Operating LOS for SR-76 for Segment 1 through Segment 8 is deficient. The 2010 Concept LOS, where better than the 2010 Operating LOS, has been utilized to further reduce deficiencies by the use of additional improvements. These include full implementation of Transportation Control Measure (TCM) and Transportation System Management (TSM) improvements. The 2010 Concept LOS is consistent with the County Congestion Management Plan (CMP) in the urban areas. For the rural area in Segment 9, the 2010 Concept LOS is based on District System Planning LOS guidelines for rural highways.

TABLE S-1
2010 ROUTE CONCEPT REPORT

Segment	Post-Mile	Location	No. Lanes/ Facility Type	ADT	D/C Ratio	Operating LOS*	Concept LOS**	Urban Rural
1	SD R0.0 - R2.4	I-5 to Frontier Drive	4E	65,000	1.39	F_2	E	U
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	4E	61,000	1.25	F_0	E	U
3	SD R4.7 - R6.9	.2 miles W. of Old Grove Road to N. Santa Fe Ave.	4E	50,000	1.03	F_0	E	U
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	4C	43,000	1.01	F	E	U
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	4C	43,000	1.01	F	E	U
6	SD 12.4 - R17.3	Mission Road to I-15	4C	40,000	1.06	F	E	R
7	SD R17.3 - 17.9	I-15 to Pankey Road	4C	55,000	1.50	F	E	R
8	SD 17.9 - 19.4	Pankey Road to Rice Canyon Road	2C	20,000	1.23	F	E	R
9	SD 19.4 - 52.3	Rice Canyon Road to SR-79	2C	6,500	0.40	B	D	R

2/4C = Two or four lane conventional highway; 4E = Four lane expressway

ADT = Average Daily Traffic

D/C = Demand to Capacity ratio

LOS = Level of Service

* Operating level of service includes provision of State highway, arterial and rail improvements, and a vehicle occupancy rate of 1.5.

** Concept LOS, where better than the Operating LOS, includes provision of additional TCM, TDM, and TSM improvements.

ULTIMATE TRANSPORTATION CORRIDOR

The Ultimate Transportation Corridor (UTC) describes the long-term (beyond the 20-year Route Concept) right of way requirements for a particular segment. The long term needs are determined by Advanced Transportation System Development (ATSD) activities which include investigation and analysis of Community Plans, General Plans, Transportation Plans, Land Use Plans, Environmental Documents, and other planning documents. The intent is to take advantage of or develop opportunities for long term right of way acquisition and to work with local and regional agencies to implement corridor preservation measures.

The UTC proposes the number of lanes and the facility type for all segments. It also includes the minimum right of way width in feet for the conventional highway portions of the route. This width can be variable depending upon the dimensions of cross-sectional elements and specific circumstances which may require narrow widths. Minimum right of way width includes the roadbed, shoulder, clear recovery area, and minimum catch point distance to the cut or fill slope. Additional right of way may be required for structures, slope modifications, and drainage facilities.

The UTC number of lanes and facility type shown in Table S-2 are based on Caltrans' planning studies and the County of San Diego General Plan Circulation Element. The minimum right of way width is based on standards promulgated by the Caltrans Design Manual Section 7-306.1.

The expansion of SR-76 from I-5 to North Santa Fe Avenue to a four lane facility includes sufficient right of way for six lanes.

006661

TABLE S-2
ULTIMATE TRANSPORTATION CORRIDOR

Segment	Post-Mile	Location	No. Lanes/ Facility Type	Minimum Right of Way Width
1	SD R0.0 - R2.4	I-5 to Frontier Drive	6E	N/A
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	6E	N/A
3	SD R4.7 - R6.9	.2 miles West of Old Grove Road to N. Santa Fe Avenue	6E	N/A
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	6C	172'
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	6C	172'
6	SD 12.4 - R17.3	Mission Road to I-15	6C	172'
7	SD R17.3 - 17.9	I-15 to Pankey Road	6C	172'
8	SD 17.9 - 19.4	Pankey Road to Rice Canyon Road	4C	148'
9	SD 19.4 - 12.3	Rice Canyon Road to SR-79	4C	148'

4C/6C = Four or six lane conventional highway
6E = Six lane expressway

CONCEPT RATIONALE

A multimodal approach is necessary in order to provide for the projected increased person-trips in the SR-76 corridor. The highway component of the Concept for Segments 1 through 6 calls for the initial construction of a four lane facility. Caltrans traffic projections and SANDAG Series 7 Regional Traffic Forecasts show the need for a six lane facility for these segments by the year 2010. The facility expansion for Segments 1 through 3 includes right of way acquisition for a six lane expressway, however, it does not appear there will be sufficient funds available to construct the additional two lanes prior to the year 2010. Additional funds may not be available to acquire right of way beyond that required for the initial four lane facility in Segments 4 through 6. Another component of the Route Concept includes the expansion of existing transit service in the SR-76 corridor and the provision of nearby commuter and light rail service. An additional component of the Route Concept includes improvements to the arterial street system within the SR-76 corridor. Arterial street improvements such as additional lanes, preferential signal treatment, limitation and separation of left-turn movements, limited driveways and other access controls should also be provided where necessary to help achieve the 2010 Concept LOS. The Route Concept includes the provision of additional TCM, TDM and TSM improvements.

The concept for Segment 1 and Segment 2 is the construction of a new facility on a new alignment north and south of existing SR-76. The proposed facility will be constructed as a four lane expressway. For Segment 3, the 2010 Route Concept is to realign and widen SR-76 from a two lane conventional highway to a four lane expressway. For Segment 4 through Segment 7, the 2010 Route Concept is to realign and widen SR-76 from a two lane conventional highway to a four lane conventional highway. Special design considerations, such as minimizing access points, are being developed by Caltrans, local agencies, and adjacent landowners to "simulate" expressway conditions in Segments 4 through 6. For Segment 8 and Segment 9, no improvements are proposed as part of the Route Concept, however, Segment 8 will still operate at a deficient LOS. For all segments, operational and safety improvements should be considered where needed.

006662
[illegible]

EXISTING (1990) AND FUTURE (2010 NO BUILD) DEFICIENCIES

The following table shows existing and future (2010 No Build) operating conditions for SR-76 for the purpose of highlighting deficient segments. Existing conditions reflect 1990 data and are also shown graphically on the summary map page. Future No Build conditions assume completion of no projects other than those in the local transportation sales tax program (TransNet) and those in the 1990 State Transportation Improvement Program (STIP). Concerns include either deficient Operating LOS and/or where actual accident rates exceed the expected rates on similar facilities by one and a half times.

TABLE S-3
EXISTING AND FUTURE (NO BUILD) DEFICIENCIES

Segment	Post-Mile	No. Lanes/ Facility Type	ADT	D/C Ratio	Operating LOS	Concern
EXISTING (1990)*						
1	SD R0.0 - R2.4	4C	47,000	1.06	F	Deficient LOS F
2	SD R2.4 - R4.7	2C**	36,700	0.72	D	Not Deficient
3	SD R4.7 - R6.9	2C	29,100	1.13	F	Deficient LOS F
4	SD R6.9 - 12.0	2C	18,400	0.73	D	Not Deficient
5	SD 12.0 - 12.4	2C	24,800	1.01	F	Deficient LOS F/ACC
6	SD 12.4 - R17.3	2C	10,300	0.49	C	Not Deficient
7	SD R17.3 - 17.9	2C	6,100	0.29	B	Accidents
8	SD 17.9 - 19.4	2C	6,100	0.29	B	Not Deficient
9	SD 19.4 - 52.3	2C	2,800	0.20	B	Not Deficient
FUTURE (2010 POST-1990 STIP NO BUILD)						
1	SD R0.0 - R2.4	4E	65,000	1.39	F_0	Deficient LOS F_0
2	SD R2.4 - R4.7	4E	61,000	1.25	F_0	Deficient LOS F_0
3	SD R4.7 - R6.9	4E	50,000	1.03	F_0	Deficient LOS F_0
4	SD R6.9 - 12.0	4C	43,000	1.01	F	Deficient LOS F
5	SD 12.0 - 12.4	4C	43,000	1.01	F	Deficient LOS F
6	SD 12.4 - R17.3	4C	40,000	1.06	F	Deficient LOS F
7	SD R17.3 - 17.9	2C	40,000	2.47	F	Deficient LOS F
8	SD 17.9 - 19.4	2C	17,900	1.10	F	Deficient LOS F
9	SD 19.4 - 52.3	2C	5,600	0.34	B	Not Deficient

ACC = Accidents
ADT = Average Daily Traffic
D/C = Demand to Capacity ratio
LOS = Level of Service
STIP = State Transportation Improvement Program

* Analysis of existing conditions is based on traffic volumes and peak-hour factors. Speed characteristics based on observable conditions were not measured.
** 4C from PM R2.4 - PM R3.5

006663

2010 ROUTE CONCEPT FACILITY IMPROVEMENTS

The following table shows mainlane facility improvements to SR-76 that are proposed to approach or achieve the 2010 Route Concept. The D/C ratio and Operating LOS listed assume completion of the proposed mainlane facility improvements. These improvements are also shown on the following summary map page.

TABLE S-4
2010 ROUTE CONCEPT FACILITY IMPROVEMENTS

SEGMENT	POST-MILE	LOCATION	IMPROVEMENT DESCRIPTION	D/C RATIO	OPERATING LOS*	CONCEPT LOS**
1	SD R0.0 - R2.4	I-5 to Frontier Drive	Construct 4E	1.39	F_2	E
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	Construct 4E	1.25	F_0	E
3	SD R4.7 - R6.9	.2 miles West of Old Grove Road to North Santa Fe Ave.	Upgrade from 2C to 4E	1.03	F_0	E
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	Upgrade form 2C to 4C	1.01	F	E
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	Upgrade from 2C to 4C	1.01	F	E
6	SD 12.4 - R17.3	Mission Road to I-15	Upgrade from 2C to 4C	1.06	F	E
7	SD R17.3 - 17.9	I-15 to Pankey Road	Upgrade form 2C to 4C	1.50	F	E

D/C = Demand to Capacity ratio

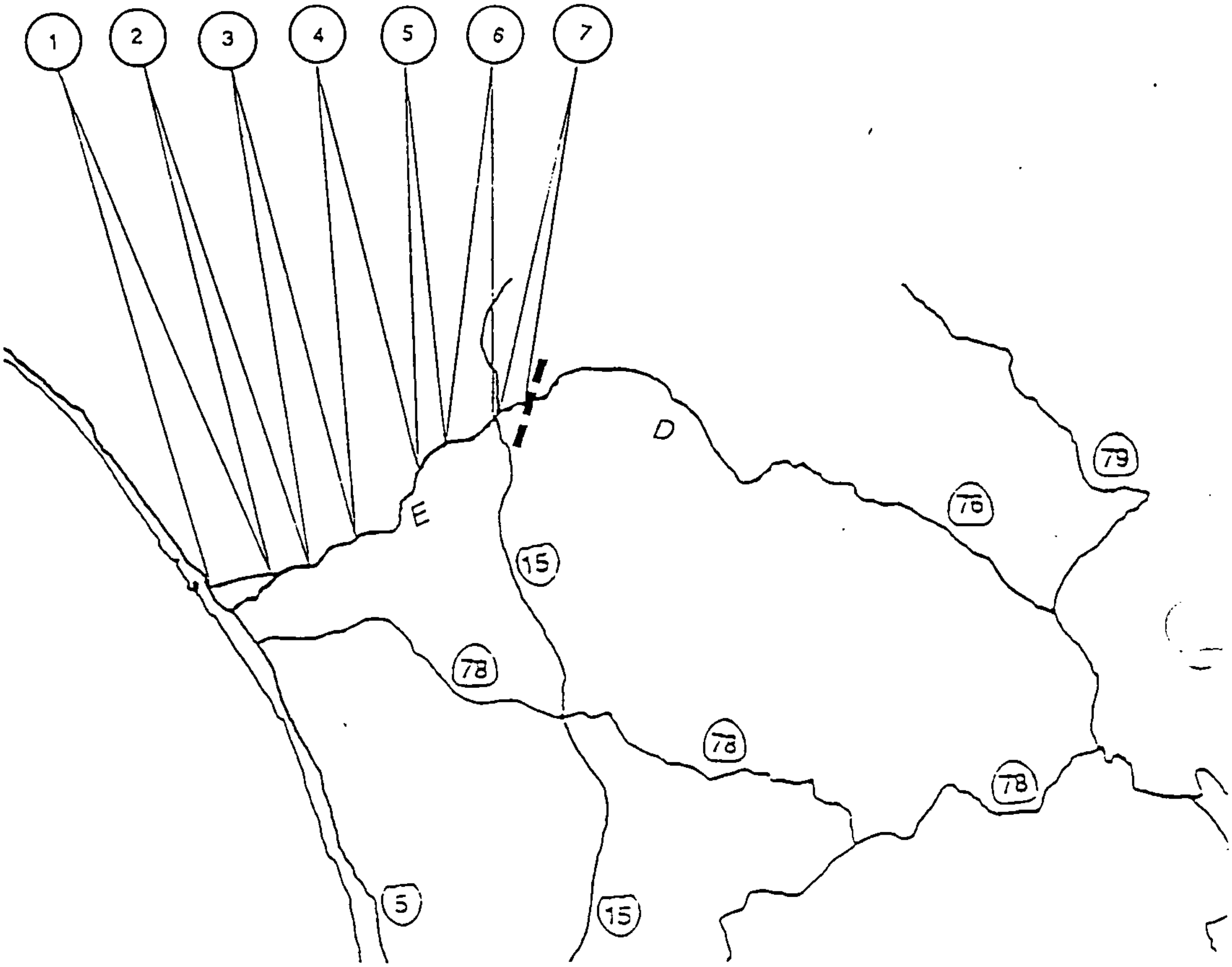
LOS = Level of Service

* Operating Level of Service includes provision of State highway, arterial, and rail improvements, and a vehicle occupancy rate of 1.5.

** Concept Level of Service, where better then the Operating LOS, includes provision of additional TCM, TDM, and TSM improvements.

006664

DISTRICT 11 ROUTE CONCEPT REPORT MAP
STATE ROUTE 76



2010 ROUTE CONCEPT FACILITY IMPROVEMENTS

SEGMENT	POST-MILE	LOCATION	IMPROVEMENT DESCRIPTION
1	SD R0.0 - R2.4	I-5 to Frontier Drive	Construct 4E
2	SD R2.4 - R4.7	Frontier Drive to 2 miles West of Old Grove Road	Construct 4E
3	SD R4.7 - R6.9	2 miles West of Old Grove Road to North Santa Fe Ave.	Upgrade from 2C to 4E
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	Upgrade from 2C to 4C
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	Upgrade from 2C to 4C
6	SD 12.4 - R17.3	Mission Road to I-15	Upgrade from 2C to 4C
7	SD R17.3 - 17.9	I-15 to Pankey Road	Upgrade form 2C to 4C

Letters shown are Concept Level of Service.

006668

ROUTE CONCEPT REPORT
STATE ROUTE 76 (SR-76)
11-SD-76 PM R0.0 - 52.3

INTRODUCTION AND STATEMENT OF PLANNING INTENT

The system planning process consists of three products: the District System Management Plan (DSMP), the Route Development Plan (RDP), and the Route Concept Report (RCR).

The DSMP describes how the District intends to manage, improve and maintain the District transportation system over the next 20 years. It integrates land use, modal opportunities, regional arterial plans, transportation system management, demand management strategies, State and local policies, highway system improvements, and the District highway network into a comprehensive transportation program. The DSMP serves as the foundation for the RDP and the RCR.

The RDP identifies 12 year future LOS deficiencies and proposes improvements that would be potential candidates for inclusion in the Districts' project candidate list and for further analysis and inclusion into a future State Transportation Improvement Program (STIP). The RDP also provides the basis for Project Study Reports. Improvements are based on various alternative funding scenarios.

The RCR is a planning document which describes the Department's basic approach to the development of a given route. Considering reasonable financial constraints and projected travel demand over a 20-year planning period, the RCR defines an appropriate type of facility and Level of Service (LOS) for the route. The RCR also considers potential long term needs for the route beyond the 20 year planning period. The long term needs are described as the Ultimate Transportation Corridor (UTC) and defined as the ultimate facility type and the number of lanes for routes that will require expansion beyond the year 2010. Minimum right of way widths are also established in the UTC for all conventional highway portions of the transportation system.

The RCR is a preliminary planning phase that leads to subsequent programming and the project development process. As such, the specific proposed nature of improvements (i.e., number of lanes, access control, etc.) may change in later project development stages, with final determinations made during the project report and design phases.

Each Route Concept must be viewed as an integral part of a planned system. The Route Concept is based on the completion of the 20 year system. The system has been developed to meet anticipated travel demand generated from regional growth forecasts. Removal of any portion of a route from the system will adversely affect travel on parallel or intersecting routes.

The RCR is prepared by Caltrans District staff in cooperation with local and regional agencies. It will be updated as necessary as conditions change or new information is obtained.

006666

ROUTE DESCRIPTION

The western terminus of State Route 76 (SR-76) is in San Diego County at the junction with Interstate 5 (I-5), Post-Mile (PM) SD R0.0. SR-76 extends 52.3 miles to the east, terminating at State Route 79 (SR-79) (PM SD 52.3) near Lake Henshaw in San Diego County.

SR-76 was added to the State Highway System in 1933. In 1959, the portion of the route from I-5 (PM SD R0.0) to Interstate 15 (I-15) (PM SD R17.3) was added to the Freeway and Expressway (F&E) System. The freeway routing for this portion was adopted in 1963, and freeway agreements with the City of Oceanside and the County of San Diego were executed in 1964 and 1965. However, recently constructed developments and environmental constraints appear to have precluded the freeway proposal as a viable alternative.

Purpose of Route

SR-76 is a principal east-west route which carries intraregional, commuter and recreational travel. In San Diego County, SR-76 traverses the city of Oceanside and the unincorporated communities of Bonsall, Fallbrook, Pala, Pauma Valley, Rincon, and Lake Henshaw. The western portion of the route in the city of Oceanside and easterly to Mission Road in Bonsall serves as a major commuter route. The remainder of the route in San Diego County serves outlying rural communities, the Pala and La Jolla Indian Reservations, and recreational areas.

SR-76 intersects a number of State routes, including I-5, I-15, and SR-79. The closest parallel State Route to SR-76 in San Diego County is State Route 78 (SR-78), which varies between three and 15 miles to the south.

Existing Facility Classifications

The functional classification for SR-76 is shown in Table 1 for each segment of the route. SR-76 is part of the Federal Aid Urban (FAU) road system from I-5 (PM SD R0.0) to North Santa Fe Avenue (PM SD R6.9). It is part of the Federal Aid Secondary (FAS) road system from North Santa Fe Avenue (PM SD R6.9) to I-15 (PM SD R 17.3). SR-76 is a part of the Federal Aid Primary (FAP) road system from I-15 (PM SD R17.3) to the eastern terminus of the route at SR-79 (PM SD 52.3).

SR-76 is not included as a part of the Interregional Road System (IRRS).

From I-5 (PM SD R0.0) to Mission Road (PM SD 12.4), SR-76 is designated as part of the national network for Surface Transportation Assistance Act (STAA) trucks. In accordance with the Truck Kingpin-to-Rear Axle Length State Highway System Evaluation Report dated December 1989, the portions of SR-76 from junction I-15 (PM SD R17.3) to Pala Mission Road (PM SD 23.0) and from Valley Center Road (PM SD 32.9) to junction SR-79 (PM SD 52.3) have been identified as geometrically inadequate for use by truck tractor-semitrailer combinations having a 40 foot kingpin to rear axle length.

The entire length of SR-76 is on the California State Scenic Highway System and is eligible to be designated as an official State Scenic Highway.

For maintenance programming purposes, the State Highway System has been classified as Class 1, 2, and 3 highways based on the Maintenance Service Level (MSL) descriptive definitions. MSL 1 contains route segments functionally classified as rural principal arterials (PA) and their urban extensions (P1P). MSL 2 contains route segments classified as principal arterials not in MSL 1, route segments functionally classified as minor arterials not in MSL 3, and route segments with a Route Concept of Maintain and Improve. MSL 3 indicates a route or route segment with the lowest maintenance priority. Typically, MSL 3 contains route segments with a Route Concept of Maintain Only, route segments functionally classified as collectors and local roads, route segments with relatively low traffic volumes and route segments being considered for relinquishment, rescission, or where a new alignment will replace the existing facility. Furthermore, route segments where the District does not anticipate spending money and route segments where route continuity is necessary are also assigned an MSL 3 designation.

SR-76 is classified as an MSL 2 route for its entire length.

Route Segments

SR-76 is examined in nine segments for traffic analysis and other purposes. Table 1 lists the segments and includes some of the information used as criteria for segment divisions. A map is attached at the end of this report which indicates the location and postmiles of the segments used in this analysis.

TABLE 1
ROUTE SEGMENTATION

Segment	Post-Mile	Location	Existing No. Lanes/Facility Type	Urban/ Rural	Functional Classification
1	SD R0.0 - R2.4	I-5 to Frontier Drive	4C	U	P4
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	4C*	U	P4
3	SD R4.7 - R6.9	.2 miles West of Old Grove Road to North Santa Fe Avenue	2C	U	P4
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	2C	R	CJ
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	2C	R	CJ
6	SD 12.4 - R17.3	Mission Road to I-15	2C	R	MA
7	SD R17.3 - 17.9	I-15 to Pankey Road	2C	R	MA
8	SD 17.9 - 19.4	Pankey Road to Rice Canyon Road	2C	R	MA
9	SD 19.4 - 52.3	Rice Canyon Road to SR-79	2C	R	MA

C = Conventional
CJ = Major collector entirely within a rural area
MA = Major Arterial
P4 = Principal arterial entirely within an urban area, without control

* 4C from PM R2.4 - PM R3.5

Existing Facility

SR-76 is a four lane conventional highway from I-5 (PM SD R0.0) to .1 mile east of Douglas Street (PM SD R3.5) and a two lane conventional highway from .1 mile east of Douglas Street (PM SD R3.5) to the end of the route at junction SR-79 (PM SD 52.3).

There are several arterial streets in north San Diego County within the SR-76 corridor that could provide an alternative to commuters wishing to avoid peak hour congestion on the state highway. They are listed in Table 2. However, some of these streets currently fail to provide an effective alternative due to physical inadequacies, numerous traffic signals, access conflicts, and general traffic congestion. Improvements may be required.

TABLE 2
PARALLEL ARTERIAL ROUTES

Segment	Arterial Name	Description
1-4	Oceanside Boulevard/Bobier Drive	I-5 to Vista Way
3-4	Douglas Drive/North River Road	SR-76 in Oceanside to SR-76 near East Vista Way
4-6	Gopher Canyon Road	East Vista Way to I-15
5-6	West Lilac Road/Camino Del Rey	SR-76 in Bonsall to I-15
6	Mission Road	SR-76 in Bonsall to I-15

There are no ramp meters currently in operation on SR-76.

There are two Park and Ride lots near or adjacent to SR-76. They provide a total of 152 spaces for use by ridesharing commuters. Park and Ride lots are located at the following locations along SR-76:

1. Maxson Street (PM SD R0.3)
2. Pala Road/I-15 (PM SD R17.3)

Existing fixed route bus service in the SR-76 corridor is provided by North County Transit District (NCTD) and is discussed below. Local bus service consists of Route 303, which operates on SR-76 from the Oceanside Transit Center (OTC) to Douglas Street (PM SD 3.4). Service is provided every 30 minutes from 4:00 A.M. to 2:00 A.M. Annual ridership for fiscal year 1990 is 1,121,396. Route 313 operates on SR-76 from the OTC to College Boulevard (PM SD R6.1), with the exception of the portion of SR-76 between Fireside Street and Rancho Del Oro. Service is provided on 45-50 minute headways between 5:15 A.M. and 8:57 P.M. Annual ridership for fiscal year 1990 is 338,055. Route 316 provides service on SR-76 from the OTC to El Camino Real (PM SD R3.1) and operates on a 60 minute headway from 6:00 A.M. to 9:00 A.M. Fiscal year 1990 annual ridership is 388,261 on this route. Route 388 operates on SR-76 between Pala Temecula Road (PM SD 23.6) and Valley Center Road (PM SD 32.9) three times daily between 5:45 A.M. and 7:35 P.M. Ridership for fiscal year 1990 is 23,229.

A physical description of the existing facility in a segment-specific format is shown in Table 3.

TABLE 3
EXISTING FACILITY

Segment	Post-Mile	No. Lanes/ Facility and Width	Shoulder Outside	Width Inside	Maximum R/W Width	Grade Line
1	SD R0.0 - R2.4	4C @ 12	8	0	80	Flat
2	SD R2.4 - R4.7	2C* @ 12	3 - 8	0 - 2	80	Flat
3	SD R4.7 - R6.9	2C @ 12	3 - 8	0 - 2	80	Flat
4	SD R6.9 - 12.0	2C @ 12	4 - 8	0	80	Flat
5	SD 12.0 - 12.4	2C @ 12	8	0	80	Flat
6	SD 12.4 - R17.3	2C @ 12	2 - 8	0	80	Flat
7	SD R17.3 - 17.9	2C @ 12	1 - 8	0	80	Flat
8	SD 17.9 - 19.4	2C @ 12	1 - 8	0	80	Flat
9	SD 19.4 - 52.3	2C @ 10 - 12	2 - 8	0	80	Varies

R/W = Right of Way
Notes: Widths are in feet
Varies in gradeline column indicates portions of flat, rolling, and moderate gradelines within the segment
*4C from PM R2.4 - PM R3.5

ROUTE ANALYSIS

This section further discusses SR-76 existing conditions and introduces future Post-1990 STIP/No Build conditions and deficiencies. This section also includes a land use and population analysis for existing and future conditions in the SR-76 corridor.

Existing and Future (2010 No Build) Operating Conditions

Table 4 shows existing and future operating conditions for SR-76. Existing conditions reflect 1990 data. The future conditions are based on Caltrans' traffic projections for the years 2000 and 2010. Future conditions assume the completion of only those projects in the local transportation sales tax (TransNet) program and those in the 1990 STIP.

TABLE 4
EXISTING AND FUTURE (NO BUILD) OPERATING CONDITIONS

Segment	Post-Mile	Year	No. Lanes/ Facility Type	ADT	PHV	D/C Ratio	Operating LOS
1	SD R0.0 - R2.4	1990*	4C	47,000	2,300	1.06	F
		2000	4E	48,000	2,700	1.03	F0
		2010	4E	65,000	3,800	1.39	F2
2	SD R2.4 - R4.7	1990	2C**	36,700	1,900	0.72	D
		2000	4E	45,000	2,500	0.93	E
		2010	4E	61,000	3,400	1.25	F0
3	SD R4.7 - R6.9	1990	2C	29,100		1.13	F
		2000	4E	45,000	2,500	0.93	E
		2010	4E	50,000	2,800	1.03	F0
4	SD R6.9 - 12.0	1990	2C	18,400		0.73	D
		2000	2C	35,000		1.37	F
		2010	4C	43,000	2,300	1.01	F
5	SD 12.0 - 12.4	1990	2C	24,800		1.01	F
		2000	2C	28,000		1.14	F
		2010	4C	43,000	2,300	1.01	F
6	SD 12.4 - R17.3	1990	2C	10,300		0.49	C
		2000	2C	15,000		0.85	D
		2010	4C	40,000	2,300	1.06	F
7	SD R17.3 - 17.9	1990	2C	6,100		0.29	B
		2000	2C	20,000		1.23	F
		2010	2C	40,000		2.47	F
8	SD 17.9 - 19.4	1990	2C	6,100		0.29	B
		2000	2C	15,000		0.83	D
		2010	2C	17,900		1.10	F
9	SD 19.4 - 52.3	1990	2C	2,800		0.20	B
		2000	2C	3,800		0.30	B
		2010	2C	5,600		0.34	B

ADT = Average Daily Traffic
D/C - Demand to Capacity ratio
LOS = Level of Service
PHV = Peak Hour Volume (one way)

* Analysis of existing conditions is based on traffic volumes and peak hour factors. Speed characteristics based on observable conditions were not measured.

**4C from PM R2.4 - PM R3.5

Source: Caltrans

006671

Average accident data for the three-year period from January 1, 1988 to January 1, 1991 is listed below in Table 5. The table includes only segments where actual rates exceed the expected rates on similar facilities by one-and-a-half times.

TABLE 5
ACCIDENTS PER MILLION VEHICLE MILES (FY 1988, 1989, 1990)

Segment	Actual Total	Expected Total
5	5.18	1.90
7	3.82	2.10

Existing and Future (No Build) Deficiencies

Table 6 shows existing and future operating conditions for all segments on SR-76 for purposes of highlighting existing and future deficiencies. The future conditions are based on Caltrans' traffic projections for the year 2010. Future conditions assume the completion of only those projects in the TransNet program and those in the 1990 STIP. A deficient condition is defined as an LOS worse than either the Route Concept LOS or LOS "D", and accident rates greater than one-and-a-half times the expected total.

TABLE 6
EXISTING AND FUTURE (NO BUILD) DEFICIENCIES

Segment	Post Mile	No. Lanes/ Facility Type	ADT	D/C Ratio	Operating LOS	Concern
Existing (1990)*						
1	SD R0.0 - R2.4	4C	47,000	1.06	F	Deficient LOS F
2	SD R2.4 - R4.7	2C**	36,700	0.72	D	Not Deficient
3	SD R4.7 - R6.9	2C	29,100	1.13	F	Deficient LOS F
4	SD R6.9 - 12.0	2C	18,400	0.73	D	Not Deficient
5	SD 12.0 - 12.4	2C	24,800	1.01	F	Deficient LOS F/Accidents
6	SD 12.4 - R17.3	2C	10,300	0.49	C	Not Deficient
7	SD R17.3 - 17.9	2C	6,100	0.29	B	Accidents
8	SD 17.9 - 19.4	2C	6,100	0.29	B	Not Deficient
9	SD 19.4 - 52.3	2C	2,800	0.20	B	Not Deficient
Future (2010 Post-1990 STIP No Build)						
1	SD R0.0 - R2.4	4E	65,000	1.39	F_2	Deficient LOS F_2
2	SD R2.4 - R4.7	4E	61,000	1.25	F_0	Deficient LOS F_0
3	SD R4.7 - R6.9	4E	50,000	1.03	F_0	Deficient LOS F_0
4	SD R6.9 - 12.0	4C	43,000	1.01	E	Deficient LOS E
5	SD 12.0 - 12.4	4C	43,000	1.01	E	Deficient LOS E
6	SD 12.4 - R17.3	4C	40,000	1.06	D	Not Deficient
7	SD R17.3 - 17.9	2C	40,000	2.47	F	Deficient LOS F
8	SD 17.9 - 19.4	2C	17,900	1.10	F	Deficient LOS F
9	SD 19.4 - 52.3	2C	5,600	0.34	B	Not Deficient

ADT = Average Daily Traffic
D/C = Demand to Capacity ratio
LOS = Level of Service
STIP = State Transportation Improvement Program

* Analysis of existing conditions is based on traffic volumes and peak hour factors. Speed characteristics based on observable conditions were not measured.
**4C from PM R2.4 - PM R3.5

Source: Caltrans

Land Use

The SANDAG Series 7 Regional Population and Employment Forecast anticipates an increase in population in the San Diego Region from 2.3 million people in 1988 to 3.15 million people in 2010. This represents a 37 percent increase in population. This large increase in population will create a demand for additional housing, employment, and public facilities. Complementary land use and transportation improvements will be required.

SR-76 traverses the North San Diego County area, including the rapidly growing city of Oceanside. It roughly parallels the southern boundary of the Camp Joseph H. Pendleton Marine Corps Base and provides access to the base via Vandegrift Boulevard. Land uses in the western portion of the city of Oceanside generally consist of a variable development mix of older single and multiple family residential units and strip commercial development along Mission Avenue (SR-76). Land uses in the eastern portion of the city of Oceanside include a mix of newer single and multiple family residential units and community and local shopping centers and services. East of this area, SR-76 passes through the community of Bonsall and a rural area which is currently developed with low density (one dwelling unit to 1-2+ acre lots) housing. There is limited potential for medium scale residential development in the currently undeveloped portions of this rural area due to expected lower densities in the future.

In the vicinity of the I-15/SR-76 junction, the southeast quadrant is currently being developed with new single family residential units. Future development in this area includes additional residential development and a large office/commercial/industrial park. This area will also be affected by the growth occurring in the I-15 corridor, especially by the growth in Riverside County in the Temecula/Rancho California and Elsinore Valley areas. Large planned communities are being developed that will increase housing from 20,220 units in 1990 to 63,400 units in 2010, a 214 percent increase. Due to an expected differential in the jobs/housing balance in these areas, it is likely that commute trips will increase in the southerly direction along the I-15 corridor, and to some extent, the SR-76 corridor.

East of I-15, the route proceeds through a sparsely populated rolling and mountainous region. The route provides access to several Indian reservations, and also provides access to recreational opportunities in the Cleveland National Forest and at Mount Palomar and Lake Henshaw.

Major employment areas within the SR-76 corridor can generate significant traffic volumes. Listed below are employment growth statistics for these employment areas:

TABLE 7
EMPLOYMENT GROWTH

Area	1985	2000	Percent Change from Base Year	2010	Percent Change from Base Year
Mission Avenue Business District	5,108	8,031	57.2	10,653	108.6
Oceanside Airport Industrial Area	566	1,162	105.3	1,242	119.4

Source: San Diego Association of Governments (SANDAG)

Table 8 shows estimated current population, 2010 projected population, and the resultant growth rate for the four statistical areas that SR-76 traverses within San Diego County and for the Temecula and Elsinore Valley areas of Riverside County.

006674

TABLE 8
POPULATION GROWTH

Jurisdiction	Current Year	2010	Percentage Change
Oceanside	107,900	172,000	59.4
Fallbrook Subregional Area	32,000	54,600	70.6
Valley Center Subregional Area	12,700	25,900	103.9
Pauma Subregional Area	3,900	8,900	128.2
Southwest Territory (Riverside County)	42,700	142,400	233.9

Sources: San Diego Association of Governments (SANDAG)
Riverside County

Note: The current year for San Diego County areas is 1988 and is 1990 for Riverside County areas.

Table 9 lists current and future housing, employment and population data for a four mile wide corridor over much of the length of SR-76 in San Diego County.

TABLE 9
HOUSING, EMPLOYMENT, AND POPULATION GROWTH

Post-Mile	Location	Year	Dwelling Units	Percent Change from Base Year	Employment	Percent Change from Base Year	Population	Percent Change from Base Year
SD R0.0 - 3.1	I-5 to El Camino Real	1985	8,686		8,806		25,277	
		2000	10,507	21.0	12,452	41.4	29,737	17.6
		2010	12,186	40.3	15,412	75.0	33,958	34.3
SD 3.1 - R6.9	El Camino Real to North Santa Fe Road	1985	9,481		3,098		21,668	
		2000	22,973	142.3	8,873	186.4	50,410	132.6
		2010	30,232	218.9	15,321	394.5	65,925	204.2
SD R6.9 - R17.3	North Santa Fe Road to I-15	1985	7,122		3,773		20,671	
		2000	10,102	41.8	5,561	47.4	27,365	32.4
		2010	13,995	96.5	6,792	80.0	37,017	79.1
SD R17.3 - 19.4	I-15 to Rice Canyon Road	1985	771		100		2,609	
		2000	1,735	125.0	100	00.0	5,141	97.0
		2010	2,263	30.4	100	00.0	6,509	149.5
Totals:		1985	26,060		15,777		70,225	
		2000	45,317	73.9	26,986	71.0	112,653	60.4
		2010	56,413	116.5	37,525	137.8	136,900	94.9

Source: San Diego Association of Governments (SANDAG)

00667[illegible]

Additional traffic generators in the SR-76 corridor will significantly increase congestion on area surface streets and SR-76. Proposed major developments that will generate at least 4,000 trips and significantly impact traffic on SR-76 are shown in Table 10.

TABLE 10
TRIP INDUCING MAJOR DEVELOPMENT PROJECTS

Segment	Proposed Development	D.U.	S.F./ Acreage	Trips Generated Daily
1	Ocean Pointe		1.7M S.F.	68,000
1	QRS Corporation		25,000 S.F.	10,000
1	Lawrence Canyon		100 Acres	22,600
1	Resnick, East	455	130 Acres	9,800
2	North City Annexation	1,196	308 Acres	36,600
2	Morro Hills Country Club	900		10,300
2	San Luis Rey Heights	654		5,200
2	Whalen Lake	419		4,200
4	Groves of San Luis Rey Downs		293 Acres	8,200
6	Pala Mesa Village		442 Acres	13,700
6	Sycamore Ranch	500		5,000
6	Dulin Ranch	444		4,100
7	Campus Park (Hewlett-Packard)	486	442 Acres	7,800
7	Rancho Viejo	1,481		11,200

D. U. = Dwelling Units
M = Million
S. F. = Square Footage

Source: Caltrans District 11 Planning Studies Branch

ROUTE CONCEPT (2010)

A Route Concept is composed of two parts; (1) a minimum tolerable LOS for the peak hours, and (2) a description of the physical facility necessary to accommodate that LOS. The 2010 Route Concept LOS is determined by a detailed analysis of each route. Factors that are influential in the selection process include land use, terrain, travel characteristics, relative importance of the route, relationship to other routes, urban or rural areas, functional classification, average daily traffic, safety, and cost of possible improvements. Additional components of the Route Concept include the future implementation of multimodal, Transportation Demand Management (TDM), Transportation System Management (TSM), and Transportation Control Measures (TCM) air quality improvement tactics. These items are discussed in subsequent sections of this report. The 2010 Route Concepts have been approved by District management and reflect a reasonable expectation of accomplishments rather than unattainable aspirations.

Table 11 shows the specific Route Concept facility type and LOS for each segment of SR-76. The 2010 Operating LOS shown reflects both main lanes and auxiliary lanes if applicable. It is also based on Caltrans' traffic projections and SANDAG Series 7 Regional Traffic Forecasts and assumes completion of the future regional transportation system and all proposed state highway, arterial street and transit improvements. The forecast incorporates a vehicle occupancy rate of 1.5 persons per vehicle.

006676

The SANDAG forecasts did not consider recent population growth patterns in the SR-76 and I-15 corridors. The Caltrans projections have modified the growth assumptions for the area. These forecasts are intended for interim use until the completion of the Tri-District Transportation Study. Caltrans' Districts 8, 11, and 12 are working on this study with a consultant to develop a forecasting model system that will provide detailed traffic analysis in portions of the contiguous areas of San Diego, Orange, and Riverside counties. This study will provide updated forecast volumes for the northerly reaches of I-5 and I-15 in San Diego County and for portions of SR-76. Accordingly, the results of this study may require future changes in the concept for SR-76.

Based on the Caltrans and SANDAG projections, the 2010 Operating LOS for SR-76 is deficient in Segments 1-8 even with the inclusion of the proposed highway, arterial and rail improvements and an increased vehicle occupancy rate. The 2010 Concept LOS, where better than the 2010 Operating LOS, has been utilized to further reduce deficiencies by the use of additional improvements. The 2010 Concept LOS has been set at LOS "E" for the urban portion of the route from I-5 to Mission Road. It has also been set at LOS "E" for the portion of the route from Mission Road to Rice Canyon Road due to expected future growth and urbanization. The full implementation of TCM, TDM and TSM improvements will aid in attaining the 2010 Concept LOS. The Route Concept has been set at LOS "D", based on District System Planning LOS Guidelines for rural areas, for the remainder of the route from Rice Canyon Road to SR-79.

In San Diego County, the Route Concept for the urban areas is consistent with the provisions of the County Congestion Management Program (CMP). The CMP will be updated annually to address congestion problems in a coordinated and cooperative manner with various county entities. The elements of the CMP include a Transportation Demand Management and trip reduction element, a transit standards element, an element defining LOS standards for the highway portion of the regional transportation system, a land use impact analysis program, and a seven-year capital improvement program.

TABLE 11

2010 ROUTE CONCEPT

Segment	Post-Mile	Location	No. Lanes/ Facility Type	ADT	D/C Ratio	Operating LOS*	Concept LOS**	Urban/ Rural
1	SD R0.0 - R2.4	I-5 to Frontier Drive	4E	65,000	1.39	F2	E	U
2	SD R2.4 - R4.7	Frontier Drive to 2 miles W. of Old Grove Road	4E	61,000	1.25	F0	E	U
3	SD R4.7 - R6.9	2 miles W. of Old Grove Rd. to N. Santa Fe Ave.	4E	50,000	1.03	F0	E	U
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	4C	43,000	1.01	F	E	U
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	4C	43,000	1.01	F	E	U
6	SD 12.4 - R17.3	Mission Road to I-15	4C	40,000	1.26	F	E	R
7	SD R17.3 - 17.9	I-15 to Pankey Road	4C	55,000	1.50	F	E	R
8	SD 17.9 - 9.4	Pankey Road to Rice Canyon Road	2C	20,000	1.23	F	E	R
9	SD 19.4 - 52.3	Rice Canyon Road to SR-79	2C	6,500	0.40	B	D	R

2/4C = Two or four lane conventional highway

4E = Four lane expressway

ADT = Average Daily Traffic

D/C = Demand to Capacity ratio

LOS = Level of Service

* The Operating LOS includes provision of State highway, arterial, and rail improvements and a vehicle occupancy rate of 1.5.

** The Concept LOS, where better than the Operating LOS, includes the provision of additional TCM, TDM, and TSM improvements.

006677

CONCEPT RATIONALE

A multimodal approach is necessary in order to provide for the projected increased person-trips in the SR-76 corridor. The highway component of the Concept for Segments 1 through 6 calls for the initial construction of a four lane facility. Caltrans traffic projections show the need for a six lane facility for these segments by the year 2010. The facility expansion for Segments 1 through 3 includes right of way acquisition for a six lane expressway, however, it does not appear there will be sufficient funds available to construct the additional two lanes prior to the year 2010. Additional funds may not be available to acquire right of way beyond that required for the initial four lane facility in Segments 4 through 6. As development occurs around Segments 4 through 6, it is expected that developers may contribute a portion of the additional right of way needed to add two lanes. Expansion to a six lane facility is discussed further in the Ultimate Transportation Corridor section. The traffic projections also indicate, that even with the Route Concept capacity improvements, significant levels of congestion will occur from Segment 1 to Segment 8 on SR-76 by the year 2010. Future (Build) Operating LOS on these segments will be "F_0" or "F".

Another component of the Concept for these segments is greater utilization of arterial streets in the corridor. Use of arterial streets can increase corridor mobility, reduce peak period demands on the facility, and provide alternative routes for relatively short intraregional trips. The existing arterial street network consists of two lane and four lane surface streets and has been previously listed in the Existing Facility section of this report. Arterial street improvements in the SR-76 corridor that are recommended for funding from local transportation sales tax (TransNet) revenues in accordance with the adopted 1990-97 Regional Transportation Improvement Program (RTIP) include two projects on Mission Road in the Fallbrook area. The first project extends from Pepper Tree Lane to Winterhaven Road and the second project extends from Winterhaven Road to Green Canyon Road. Both projects call for reconstruction of a four lane road.

Capacity of existing arterials within the corridor is affected by physical inadequacies, access conflicts, numerous traffic signals, and general traffic congestion. Arterial traffic flow can be increased by realignment and/or widening, correcting physical inadequacies and minimizing side friction. Improvements towards these ends include preferential signal treatment, limitation and separation of left-turn movements, limited driveway and other access controls, and High Occupancy Vehicle (HOV) lanes for ridesharing and transit.

Another component of the Concept for Segment 1 through Segment 6 is the provision of expanded transit service in the SR-76 corridor. Due to the rapid growth and increasing urbanization in the SR-76 corridor between I-5 and I-15, fixed bus route service should be extended easterly from its current terminus at College Avenue to I-15. The frequency of existing bus service should also be increased to accommodate the expected growth in person-trips in the SR-76 corridor. The use of bus zones or turnouts are recommended where conditions warrant. Specific locations should be developed in consultation with NCTD.

In addition to expanded bus service, commuter rail service will be provided on the existing Atchison, Topeka and Santa Fe (AT & SF) freight line right of way which currently parallels SR-78 from Oceanside to Escondido. This service will help to reduce expected traffic congestion levels in the Oceanside/Escondido corridor and should also help to alleviate future congestion in the SR-76 corridor. Ridership on the line is estimated to be nearly 10,000 per day upon its inception in 2000 and rise to an estimated 15,000 or more by the year 2005.

006678

The San Diego Metropolitan Transit Development Board (MTDB) is currently studying the extension of Light Rail Service in the I-15 corridor. The study parameters range to the SR-76/I-15 junction and will result in an alignment for planning purposes. The study is expected to be completed in early 1992. Rail service in this area could lessen the forecast congestion in this vicinity.

For Segment 1, the Route Concept calls for the construction of a four lane expressway on new alignment from I-5 (PM SD R0.0), at the Hill Street interchange, to Frontier Drive (PM SD R2.4) in Oceanside. This project is in the 1990 STIP. Construction is scheduled to begin in the 1991-92 fiscal year with completion expected to take 18 months.

For Segment 2, the Route Concept proposes construction of a four lane expressway on a new alignment from .3 miles east of Airport Road (PM SD R2.4) to .2 miles west of Old Grove Road (PM SD R4.7). This improvement will be funded by TransNet revenues, and it is included in the adopted 1990-97 RTIP. Funding is expected to be utilized beginning in fiscal year 1993-94.

For Segment 3, the Route Concept proposes construction of a four lane expressway from .2 miles west of Old Grove Road (PM SD R4.7) to North Santa Fe Avenue (PM SD R6.9). This improvement will be constructed in two parts; the first part will extend from .1 mile west of Academy Road (PM SD R4.5) to .1 mile west of College Boulevard (PM SD R6.2). The second part will extend from .1 mile east of College Boulevard (PM SD R6.4) to .3 miles east of North Santa Fe Avenue (PM SD R7.2). This improvement will be funded by TransNet revenues, and they are included in the adopted 1990-97 RTIP. Both projects are scheduled for construction in fiscal year 1993-94.

For Segment 4 and Segment 5, the Route Concept proposes to realign and widen SR-76 from a two lane conventional highway to a four lane conventional highway. Caltrans is working with city and county staff and adjacent land owners in Segments 4 through 6 to "simulate" expressway conditions. One of the techniques being proposed is to minimize access points on SR-76 in an attempt to increase the capacity of the road.

This widening will be constructed in two parts. The first section extends from North Santa Fe Avenue (PM SD R6.9) to East Vista Way (PM SD 9.5). The second part extends from East Vista Way (PM SD 9.5) to Mission Road (PM SD 12.4). These projects will be funded by TransNet Revenues, and they are included in the adopted 1990-97 RTIP.

For Segment 6, the Route Concept proposes to realign and widen SR-76 from a two lane conventional highway to a four lane conventional highway that "simulates" expressway conditions. This improvement will be funded by TransNet revenues.

For Segment 7, the Route Concept proposes to widen SR-76 from a two lane conventional highway to a four lane conventional highway. As previously discussed in the Land Use section, proposed residential, commercial, and industrial development in the vicinity of the SR-76/I-15 (PM SD R17.3) junction will substantially increase traffic within this segment. Widening from two lanes to four lanes will help to accommodate this increased traffic.

For Segment 8, no improvements are proposed within the 20 year Route Concept time frame. However, it is expected that this segment will operate at a deficient LOS.

For Segment 9, SR-76 will operate at an acceptable LOS and no major lane additions are proposed.

For all segments, operational and safety improvements will be implemented as necessary.

It is neither physically nor financially feasible to build ourselves out of congestion on portions of this route. Adding additional highway capacity by itself will not be sufficient to lessen congestion to reasonable and acceptable levels.

Congestion relief without major highway improvements can be achieved by a variety of methodologies. Some of these methodologies are incorporated in the Regional Air Quality Plan as Transportation Control Measures (TCM's). TCM's contribute to congestion relief and improvements to air quality. Another methodology separate from the Regional Air Quality Plan is the implementation of Transportation System Management improvements. These topics are discussed extensively in the following sections.

Air Quality

Because the region will not be in attainment with State and Federal air quality standards until after 1997, it is classified as a "severe" air basin. The 1988 California Clean Air Act requires the development of a new air quality plan from air districts that did not attain the State's standards in 1987. The San Diego County Air Pollution Control District (APCD) is scheduled to complete the plan by September 1991. The plan will incorporate strategies directed at reducing pollutants and increasing vehicle occupancy in an effort for the region to achieve the State's standards.

As part of this plan, SANDAG has developed strategies towards attainment of the plan's goals. These TCM strategies are planned to achieve the following requirements of the California Clean Air Act: a 1.5 minimum average vehicle occupancy during weekday commute hours by 1999, no net increase in emissions after 1997, and contribute to the required reduction in district-wide emissions of five percent per year, averaged every consecutive three-year period. The TCM's are comprised of the following: The Transportation Demand Management (TDM), Transportation Capacity Expansion , Traffic Systems Management, and Indirect Source Control (ISC) programs.

The <u>TDM Program</u> consists of four principal elements. The first element is the Commute Travel Reduction Program. It is composed of eight sub-elements. They are the employment trip reduction program and ordinance, employment rideshare program, parking management program, telecommuting, compressed work week, employer transit subsidy, flexible work hours, and staggered work hours.

An important sub-element as it relates to congestion relief is the employment trip reduction program and ordinance. The goal of this program is to reduce transportation source emissions by increasing the average number of persons per vehicle during peak weekday periods. Another important sub-element is the employment rideshare program. It provides for the establishment of Transportation Management Associations (TMA's) to encourage employees to commute by alternative modes. The North County Subregional TMA Network encompasses the SR-76 corridor from I-5 to Mission Road.

The second element in the TDM program is the College Travel Reduction Program. It is composed of two sub-elements. They are the college trip reduction program and ordinance, and the college transit subsidy program. The college trip reduction program and ordinance will have a similar impact on congestion relief as the employment trip reduction program.

The third element in the TDM program is the Goods Movement/Truck Operation Program. It is comprised of three sub-elements. They are the goods movement/truck travel reduction ordinance, the incident management and prevention program, and the motorist information system. An important sub-element as it relates to congestion relief is the provision of the motorist information system. Consistent with the goals of the sub-element, the District 11 Long Range Operations Plan (LROP) proposed a Traffic Operations Center (TOC) which is now in operation. The TOC will aid in the rapid identification of accidents and other non-recurrent freeway congestion and will issue appropriate information to motorists through the use of changeable message signs, highway advisory radio, and possibly by the use of in-vehicle computers.

00668C

The fourth element in the TDM program is the Non-Commute Travel Reduction Program. This program will educate drivers in ways to reduce or change the use of their automobiles with a goal of reducing auto emissions. The program's goal is a reduction equivalent to one trip per day per driver.

The second major TCM program is the Transportation Capacity Expansion Program. The purpose of the Transportation Capacity Expansion Program is to provide those services and facilities necessary for the success of the TDM Program. The Transportation Expansion Capacity Program consists of five elements. They are the replacement of the region's bus fleet with clean burning technology that utilizes compressed natural gas and expansion of light rail, commuter rail, and the clean bus fleet; a program for transit agencies to aid employers in the establishment of vanpool programs for use by their employees; expansion to 49 miles of the region's HOV lanes; increase the number of Park and Ride spaces; and add 75 miles of bikeways and other facilities.

The third major TCM program is the Traffic Systems Management Program. The goal of the Traffic System Management Program is to improve the flow of traffic through the coordination of traffic signals and computerized signal controls and to achieve a ten percent increase in speed on arterial streets by the year 2000. The LROP recommends that a plan be prepared for the systematic review of all signalized intersections on State highways. This plan will include a discussion of signalized local parallel routes.

The fourth major TCM program is the Indirect Source Control Program. The ISC is composed of two elements. The first element is the General Travel Reduction Program. Its goal is to develop policies within city and county general plans to change travel behavior to and from a specific indirect pollutant emission source, such as an employment or shopping center. It specifically aims at reducing noncommute travel by single occupant vehicles to an indirect source by improving accessibility for pedestrians, transit and bicycles. It consists of three sub-elements; the personal travel reduction, recreational and event travel reduction, and the airport travel reduction programs.

The second element of the ISC Program is the Land Use Program. The Land Use Program is designed to encourage zoning and project design to foster the use of alternative transportation modes. The three sub-elements of this program are jobs/housing balance, transit corridor development, and mixed use developments.

Transportation System Management Strategies

Transportation System Management (TSM) is a strategy whose goal is the accommodation of travel demand on existing transportation facilities without increasing congestion. Several TSM improvements have previously been mentioned in the air quality section. An additional TSM improvement is the provision of ramp metering systems. The District 11 LROP calls for ramp meters to be installed at 170 additional locations throughout San Diego County. However, no ramp meters are proposed for SR-76.

OTHER ITEMS

New methodologies can assist in providing better management of the future transportation system. Advanced technology research is one tool that can be used to improve the efficiency of the future transportation system. The "SMART" Corridor concept will employ a number of technological innovations, including in-vehicle navigation systems, computerized roadway sensors, changeable message signs, and television cameras.

006681

ALTERNATIVE ROUTE CONCEPTS CONSIDERED

The purpose of this section is to document alternative Route Concepts that were considered. The 1991 Route Concept for the year 2010 is compared with the 1984 RCR for the year 2005, the 1990 Regional Transportation Plan (RTP), the County of San Diego General Plan Circulation Element, and also with the alternative facility sizing analysis shown in Table 12.

In 1984, the Concepts were set based on the SANDAG Series 6 Population and Traffic Forecasts for the year 2005. Because traffic and population growth along the SR-76 corridor are increasing at a rate greater than the Series 6 projections, the original Route Concepts have been revised to reflect these increases.
The following table is comprised of a segment by segment comparison between the 1984 Route Concept Report and this current updated RCR.

TABLE 12
COMPARISON OF 2005 AND 2010 ROUTE CONCEPTS

1984 ROUTE CONCEPT FOR 2005			1991 ROUTE CONCEPT FOR 2010		
SEGMENT	POST-MILE	# LANES FACILITY TYPE/ CONCEPT LOS	SEGMENT	POST-MILE	# LANES FACILITY TYPE/ CONCEPT LOS
1A	SD 0.0 - 6.7	4E/B	1	SD R0.0 - R2.4	4E/E
			2	SD R2.4 - R4.7	4E/E
			3	SD R4.7 - R6.9	4E/E
1B	SD 6.7 - 12.0	4C/D	4	SD R6.9 - 12.0	4C/E
2	SD 12.0 - R17.3	4C/D	5	SD 12.0 - 12.4	4C/E
			6	SD 12.4 - R17.3	4C/E
3	SD R17.3 - 18.3	4C/D	7	SD R17.3 - 17.9	4C/E
		2C/C	8	SD 17.9 - 19.4	2C/E
4	SD 18.3 - 52.3	2C/C	9	SD 19.4 - 52.3	2C/D

2C/4C = Two or four lane conventional highway
4E = Four lane expressway
LOS = Level of Service

The Route Concept for SR-76 is consistent with the 1990 RTP and the County of San Diego General Plan Circulation Element.

Table 13 identifies the SR-76 segments where, with the initial Concept Facility in place, the 2010 Operating LOS remains at a deficient level. This table illustrates the LOS's that could be achieved by enlarging the mainlane facility beyond the initial Concept Facility size. For those segments the table lists increasingly larger mainlane facility sizes, starting with the initial number of lanes called for in the Route Concept and ending with the number of lanes required to achieve a nondeficient LOS "D". The resultant Operating LOS is listed to the right of the "Alternative No. of Lanes" column, with the "2010 Operating LOS" and "Concept LOS" highlighted. The table shows that larger facilities, as wide as eight lanes in some segments, would be necessary to reach a "D" LOS. Due to high costs and associated impracticalities, these facility sizes are not proposed as the Route Concept for these segments.

006682

TABLE 13

LANES REQUIRED TO ACHIEVE ALTERNATIVE LEVELS OF SERVICES (2010)

Segment	Post-Mile	Alternative No. Lanes/ Facility Type	D/C Ratio	Operating LOS
1	SD R0.0 - R2.4	4E	1.39	F_2 (2010 Operating LOS)
		6E	0.93	E (Concept LOS)
		8E	0.69	C
2	SD R2.4 - R4.7	4E	1.25	F_0 (2010 Operating LOS)
		6E	0.83	D (Concept LOS = E)
3	SD R4.7 - R6.9	4E	1.03	F_0 (2010 Operating LOS)
		6E	0.69	C (Concept LOS = E)
4	SD R6.9 - 12.0	4C	1.01	F (2010 Operating LOS)
		6C	0.68	C (Concept LOS = E)
5	SD 12.0 - 12.4	4C	1.01	F (2010 Operating LOS)
		6C	0.67	C (Concept LOS = E)
6	SD 12.4 - R17.3	4C	1.06	F (2010 Operating LOS)
		6C	0.70	C (Concept LOS = E)
7	SD R17.3 - 17.9	4C	1.50	F (2010 Operating LOS)
		6C	1.00	E (Concept LOS)
		8C	0.75	C
8	SD 17.9 - 19.4	2C	1.23	F (2010 Operating LOS)
		4C	0.55	B (Concept LOS = E)

D/C = Demand to Capacity ratio

LOS = Level of Service

2010 ROUTE CONCEPT FACILITY IMPROVEMENTS

In the urban areas it is not always possible to attain the Route Concept solely by the provision of physical improvements to the roadway. Alternative means to achieve the Concept have been discussed extensively in prior sections.

Table 14 displays mainlane facility improvements that are proposed in order to approach or attain the Route Concept. The D/C ratio and Operating LOS listed assume completion of the proposed improvement.

TABLE 14
2010 ROUTE CONCEPT FACILITY IMPROVEMENTS

Segment	Post-Mile	Location	Improvement Description	D/C Ratio	Operating LOS*	Concept LOS**
1	SD R0.0 - R2.4	I-5 to Frontier Drive	Construct 4E	1.39	F2	E
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	Construct 4E	1.25	F0	E
3	SD R4.7 - R6.9	.2 miles W. of Old Grove Rd. to N. Santa Fe Ave.	Upgrade form 2C to 4E	1.03	F0	E
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	Upgrade form 2C to 4C	1.01	F	E
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	Upgrade from 2C to 4C	1.01	F	E
6	SD 12.4 - R17.3	Mission Road to I-15	Upgrade from 2C to 4C	1.06	F	E
7	SD R17.3 - 17.9	I-15 to Pankey Road	Upgrade from 2C to 4C	1.50	F	E

D/C = Demand to Capacity Ratio

LOS = Level of Service

* Operating Level of Service includes provision of State highway, arterial and rail improvements, and a vehicle occupancy rate of 1.5.

** Concept Level of Service, where better than the Operating LOS, includes provision of additional TCM, TDM, and TSM improvements.

ULTIMATE TRANSPORTATION CORRIDOR

The Ultimate Transportation Corridor (UTC) describes the long-term (beyond the 20-year Route Concept) right of way requirements for a particular segment. The long term needs are determined by Advanced Transportation System Development (ATSD) activities which include investigation and analysis of Community Plans, General Plans, Transportation Plans, Land Use Plans, Environmental Documents, and other planning documents. The intent is to take advantage of or develop opportunities for long term right of way acquisition and to work with local and regional agencies to implement corridor preservation measures.

Table 15 shows the number of lanes and the facility type. It also includes the minimum right of way width in feet for the conventional highway portions of the route. This width can be variable depending upon the dimensions of cross-sectional elements and specific circumstances which may require narrow widths. Minimum right of way width includes the roadbed, shoulder, clear recovery area, and minimum catch point distance to the cut or fill slope. Additional right of way may be required for structures, slope modifications, and drainage facilities.

The minimum right of way width for the six lane conventional facility is 172 feet. The minimum right of way width for the four lane conventional facility is 148 feet. These right of way widths are Caltrans recommendations and are based on Caltrans Highway Design Manual Section 7-306.1.

The UTC for SR-76 is a six lane expressway from I-5 (PM SD R0.0) to North Santa Fe Avenue (PM SD R6.9) and a six lane conventional facility from North Santa Fe Avenue (PM SD R6.9) to Pankey Road (PM SD 17.9). The expansion of SR-76 from I-5 to North Santa Fe Avenue to a four lane facility, as previously discussed in the Concept Rationale section, includes sufficient right of way for six lanes. The UTC calls for a four lane conventional facility from Pankey Road (PM SD 17.9) to SR-79 (PM SD 52.3) based on the County of San Diego General Plan Circulation Element. However, a four lane conventional facility within this segment may not be feasible due to environmental constraints.

006684

TABLE 15
ULTIMATE TRANSPORTATION CORRIDOR

Segment	Post-Mile	Location	# Lanes/ Facility Type	Minimum Right of Way Width
1	SD R0.0 - R2.4	I-5 to Frontier Drive	6E	N/A
2	SD R2.4 - R4.7	Frontier Drive to .2 miles West of Old Grove Road	6E	N/A
3	SD R4.7 - R6.9	.2 miles West of Old Grove Rd. to N. Santa Fe Ave.	6E	N/A
4	SD R6.9 - 12.0	North Santa Fe Avenue to Olive Hill Road	6C	172'
5	SD 12.0 - 12.4	Olive Hill Road to Mission Road	6C	172'
6	SD 12.4 - R17.3	Mission Road to I-15	6C	172'
7	SD R17.3 - 17.9	I-15 to Pankey Road	6C	172'
8	SD 17.9 - 19.4	Pankey Road to Rice Canyon Road	4C	148'
9	SD 19.4 - 52.3	Rice Canyon Road to SR-79	4C	148'

006685

LIST OF SYSTEM PLANNING ACRONYMS

ADT	Average Weekday Traffic
APCD	Air Pollution Control District
CBD	Central Business District
CMP	Congestion Management Plan
CTC	California Transportation Commission
D/C	Demand Volume to Capacity Ratio
DSMP	District System Management Plan
FAI	Federal Aid Interstate
FAS	Federal Aid Secondary
FAP	Federal Aid Primary
FAU	Federal Aid Urban
HOV	High Occupancy Vehicle
IRRS	Interregional Route System
LOS	Level of Service
LROP	Long Range Operations Plan
LRT	Light Rail Transit
MSL	Maintenance Service Level
MTDB	Metropolitan Transit Development Board
NCTD	North County Transit District
PHV	Peak Hour Volume
PM	Post Mile
PSR	Project Study Report
RCR	Route Concept Report
RDP	Route Development Plan
RTP	Regional Transportation Plan
R/W	Right-of-Way
SANDAG	San Diego Association of Governments
SHELL	Subsystem of Highways for the Movement of Extra Legal Permits Loads
STAA	Surface Transportation Assistance Act
STIP	State Transportation Improvement Program
TASAS	Traffic Accident Surveillance and Analysis System
TDM	Transportation Demand Management
TMA	Transportation Management Association
TOC	Traffic Operations Center
TSM	Transportation Systems Management
UTC	Ultimate Transportation Corridor

SMART CORRIDOR — (Author's Definition) Employs technology to improve the operating efficiency of all the roadways within a corridor in order to reduce congestion

00668E

LEVEL OF SERVICE (LOS) DEFINITIONS

Level of Service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A Level of Service definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort and convenience, and safety. Levels of service definitions can generally be categorized as follows:

LOS	D/C	Congestion/Delay	Traffic Description
		(Used for two and four lane freeways and expressways)	
"A"	<.34	None	Free Flow
"B"	0.35-0.52	None	Free to stable flow, light to moderate volumes
"C"	0.53-0.69	None to Minimal	Stable flow, moderate volumes freedom to maneuver noticeably restricted
"D"	0.70-0.92	Minimal to Substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuver-ability and psychological comfort extremely poor
		(Used for six lane freeways and expressways)	
"A"	<.39	None	Free Flow
"B"	0.40-0.59	None	Free to stable flow, light to moderate volumes
"C"	0.60-0.74	None to Minimal	Stable flow, moderate volumes freedom to maneuver noticeably restricted
"D"	0.75-0.92	Minimal to Substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuver-ability and psychological comfort extremely poor
		(Used for freeways with eight or more lanes)	
"A"	<.42	None	Free Flow
"B"	0.43-0.62	None	Free to stable flow, light to moderate volumes
"C"	0.63-0.79	None to Minimal	Stable flow, moderate volumes freedom to maneuver noticeably restricted
"D"	0.80-0.92	Minimal to Substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuver-ability and psychological comfort extremely poor

006687

(Used for all freeways and expressways)

"F_0"	1.01-1.25	Considerable, 0-1 hour delay	Forced flow,heavy congestion, long queues form behind breakdown points, stop and go
"F_1"	1.26-1.35	Severe, 1-2 hour delay	Very heavy congestion, very long queues
"F_2"	1.36-1.45	Very severe, 2-3 hour delay	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods
"F_3"	> 1.46	Extremely severe, 3+ hours of delay	Gridlock

(Used for all conventional highways)

"B"	< 0.45	None	Free to stable flow, light to moderate volumes
"C"	0.46-0.65	None to Minimal	Stable flow, moderate volumes freedom to maneuver noticeably restricted
"D"	0.66-0.85	Minimal to Substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver
"E"	0.86-1.00	Significant	Extremely unstable flow, maneuver-ability and psychological comfort extremely poor
"F"	> 1.00	Considerable, delay measured in average travel speed (MPH). Signalized segments experience delays >60.0 seconds per vehicle	Forced or breakdown flow

006688

I approve this Route Concept Report as the guide for development of State Route 76 over the next 20 years.

Submitted By:

Carol L Boland

Carol Boland, Chief
System Planning Branch

July 12, 1991
Date

Recommended By:

Carl R West

Carl R. West
Deputy District Director
Planning and Public Transportation

7-12-91
Date

Approved By:

J Garcia

Jesus Garcia
District Director

7-12-91
Date

006689

006690

APPENDIX F

BIOLOGY ADDENDUMS

ADDENDUM TO BIOLOGICAL STUDIES COMPLETED FOR PALOMAR AGGREGATES DEIR

November 21, 1995

INTRODUCTION

The purpose of this document is to summarize changes to the original Biology Report and Environmental Impact Report (EIR) for the Palomar Aggregates Quarry Project. Changes include those detailed in the two additional information documents as well as any changes subsequent to their completion, such as the listing of the arroyo toad as a federally listed endangered species. A study to determine the presence or absence of the species was conducted by Joseph Copp and is included in the Biological Resources Addendum. Please refer to the Palomar Aggregates DEIR for revised figures of the original Biology Report.

EXISTING CONDITIONS

The project site includes 108.4 acres (96.4 acres for the quarry and processing plant and 12.0 acres associated with the road widening and realignment). Four native plant communities are found on the proposed project area: coast live oak woodland (oak woodland), southern mixed chaparral (chaparral), southern willow scrub (willow scrub) and Diegan coastal sage scrub (sage scrub). The oak woodland covers approximately 3.0 acres of the site. Chaparral habitat occurs in the northern portion of the site, comprising approximately 14.5 acres of the site. This habitat is relatively undisturbed. Large portions of this habitat have been converted to avocado groves in the surrounding areas.

Disturbed willow scrub occupies a narrow drainage swale that is located near the eastern boundary of the site. The willow scrub extends approximately 300 feet from the southern terminus of the drainage, covering about 0.3 acre of the site. Sage scrub covers approximately 40.1 acres of the site. The vegetation within this community is regarded as low quality sage scrub. Approximately 50.5 acres (38.5 acres from the quarry itself and 12.0 acres of which are associated with the road realignment) of the project site is cleared of native vegetation. These areas can be classified as one of three types: cultivated, ruderal vegetation, or bare ground.

No sensitive plant species was observed on the site. The status of the three sensitive plant species reported in the project vicinity have been updated: thread-leaved brodiaea is a Federal Candidate Category 1 species, is listed by the state as endangered and is also a California Native Plant Society (CNPS) List 1B species. Lakeside lilac is a Federal Candidate Category 2 species and is a CNPS List 1B species. Orcutt's dudleya is a Federal Candidate Category 2 species as well as a CNPS List 2 species.

Status changes for sensitive wildlife species include the designation of critical habitat for the least Bell's vireo (vireo) in March 1994. In addition, the Habitat Conservation plan for the San Luis Rey River is no longer under consideration. The coastal California gnatcatcher (gnatcatcher) inhabits sage scrub. The gnatcatcher is a state species of special concern and was listed as a federal threatened species in June 1994. A gnatcatcher was identified on-site by a Caltrans biologist during the interim between the publication/review of the draft EIR and the First Additional Information Document. However, no gnatcatchers were observed during focused surveys in 1992 and 1993. The arroyo southwestern toad (arroyo toad) is a state species of special concern and was listed as a federal endangered species in January 1995. Evidence of arroyo toads was detected in the spring of 1994 near the Highway 395 bridge, approximately

1.25 miles west of the site. Several presence/absence surveys were conducted for Caltrans rock slope protection projects located adjacent to the project site in the spring of 1995. No arroyo toads were detected during these surveys.

Although no arroyo toads were detected on the project site, a juvenile was observed approximately 1,000 feet southeast of the project site adjacent to the San Luis Rey River during a habitat suitability survey conducted for the proposed project in July 1995. This habitat suitability study further determined that appropriate habitat does not exist on the project site, inclusive of the drainage swale located north of SR-76 near the eastern edge of the site.

IMPACTS

The project would impact 88.3 acres including 27.3 acres of sage scrub, 8.9 acres of chaparral, 1.3 acres of oak woodland, 0.3 acres of southern willow scrub, and 50.5 acres of previously disturbed areas. Included in the impacts to the disturbed areas are 12.0 acres that will be impacted by the road realignment, of which 3.2 acres are within designated vireo critical habitat. Although direct impacts to the vireo are not anticipated, the loss of critical habitat (3.2 acres) is significant and necessitates consultation with the U.S. Fish and Wildlife Service under the Federal Endangered Species Act (FESA). In order to comply with the FESA and the Natural Community Conservation Planning program (NCCP), a Habitat Loss Permit was prepared to assess impacts to sage scrub.

The following findings were based on the Habitat Loss Permit pursuant to Section 4(d) of the FESA: 1) the proposed habitat loss is consistent with the interim loss criteria in the NCCP Conservation Guidelines and with any subregional process established by the subregion; 2) the habitat loss will not appreciably reduce the likelihood of the survival and recovery of listed species in the wild; and 3) the habitat loss is incidental to otherwise lawful activities.

Traffic generated noise will increase as a result of the proposed project. However, adjacent sage scrub will not be significantly impacted by noise or other indirect impacts. The increase in traffic noise due to project implementation may indirectly impact a total of 15.6 acres of existing and/or potential vireo habitat within and in the vicinity of the project site. All of the approximately 13.1 acres of potential vireo habitat directly south of the site that could be indirectly impacted by noise occurs within designated vireo critical habitat. However no vireos have been reported in the immediate project vicinity, likely because the area, for the most part, has been cleared and/or is disturbed. Therefore, no vireos will be impacted in the vicinity of the project by noise generated by project operations.

Vireos have been observed to the west, between the project site and Interstate 15 (I-15) in riparian vegetation along Horse Ranch Creek. The increase in noise would extend the peak hour 60 dB L_{eq} approximately 100 feet (0.7 acre) further into the potential vireo habitat area. However, this increase in noise is well outside of the locations where vireos were observed historically. Therefore, no impacts will occur to occupied vireo habitat although 0.7 acre of unoccupied vireo habitat would be affected.

With implementation of the project, the existing peak hour 60 L_{eq} east of the project site would extend 50 feet (1.8 acres) further into the area where vireos were recorded by RECON (1989).

MITIGATION

Mitigation for impacts to sensitive habitats will include a combination of preservation and revegetation at several sties adjacent to and within the vicinity of the project site. The oak woodland will be mitigated by dedicating the woodland outside the mining area but within the Major Use Permit (MUP) to open space (1.7 acres) and dedicating a hillside south of the San Luis Rey River that supports oak woodland to open space (7.4 acres).

Most of the chaparral at the quarry site (5.1 acres) will be dedicated as open space. Direct impacts to southern willow scrub and vireo critical habitat, and indirect impacts to vireo habitat will be mitigated by dedication of open space (6.7 acres) and revegetation (6.2 acres). The project also proposes some riparian plantings along the SR-76 slope bank and adjacent streambed. The impact to 27.3 acres of sage scrub shall be mitigated by the preservation of 54.6 acres of sage scrub both on and off-site, including the non-impacted on-site sage scrub (12.8 acres).

HABITAT LOSS PERMIT EVALUATION FOR THE PALOMAR AGGREGATES QUARRY

Prepared for:

County of San Diego
Department of Public Works
5555 Overland Avenue
San Diego, California 92123

Prepared by:

Brian F. Mooney Associates
9903-B Businesspark Avenue
San Diego, California 92131

July 1995

SUMMARY

The Palomar Aggregates Quarry Project will impact 27.3 acres of low quality coastal sage scrub. The habitat value and a 2:1 mitigation ratio were determined to be appropriate for the project through use of the Southern California Coastal Sage Scrub Natural Community Conservation Planning Process Guidelines (November 1993). Focused studies for the California gnatcatcher and a review of sensitive species maps prepared by the Multiple Habitat Conservation Program (MHCP) have indicated that California gnatcatchers are not present in the vicinity of the project. Mitigation for the 27.3 acres impact consists of the on and off-site preservation of 54.6 acres of coastal sage scrub.

The proposed habitat loss is consistent with the interim loss criteria in the Natural Community Conservation Planning (NCCP) Guidelines and with the North County Wildlife Forum's MHCP for the subregion. As required by the NCCP Guidelines for the issuance of a Habitat Loss Permit, the following findings can be made:

- The habitat loss does not cumulatively exceed the 5% guideline nor does it preclude connectivity between areas of high habitat value.
- The habitat loss will not preclude or prevent preparation of the subregional NCCP. The project does not occur within a "core" habitat area.
- The habitat loss will not preclude or prevent linkages to core habitat areas.
- The proposed mitigation will preserve 54.6 acres of coastal sage scrub within, adjacent to and nearby the project site. Therefore, implementation of the project as proposed would not preclude the preparation of the subregional NCCP.
- The habitat loss has been minimized and mitigated to the maximum extent practicable in accordance with Section 4.3 of the NCCP Guidelines.
- The habitat loss will not appreciably reduce the likelihood of the survival and recovery of listed species in the wild. The habitat loss is incidental to otherwise lawful activities.

The selection of an off-site mitigation area and all negotiations required to provide legal assurance that the mitigation site is adequately protected shall be completed prior to the issuance of the Habitat Loss Permit.

INTRODUCTION

This report section has been prepared in response to requirements set forth for the issuance of a Habitat Loss Permit (Permit) by the County of San Diego for the Palomar Aggregates Quarry project. The project will impact 27.3 acres of coastal sage scrub (sage scrub). The Permit is a component of an interim strategy to allow impacts to sage scrub prior to the finalization of the

Natural Community Conservation Planning (NCCP) program. For this project, issuance of the Permit requires a finding that the habitat loss of 27.3 acres of sage scrub will not preclude the realization of the goals of the NCCP, particularly the preservation and linkage of areas containing high quality sage scrub habitat. Sage scrub that integrades with other habitat types may provide habitat for a wide variety of species of special concern.

The project site occupies 96.4 acres on the north side of State Route 76 (SR-76), approximately 1.25 miles east of Interstate 15 (Figure 1). The project proposes to establish a rock quarry and processing plants for concrete and asphalt, which would impact approximately 36.0 acres of the 96.4 acre Major Use Permit site. Mining would take place primarily on the east-facing slopes of a hill known as Rosemary's Mountain, over a period of approximately 20 years. An estimated 22 million tons of rock would be mined.

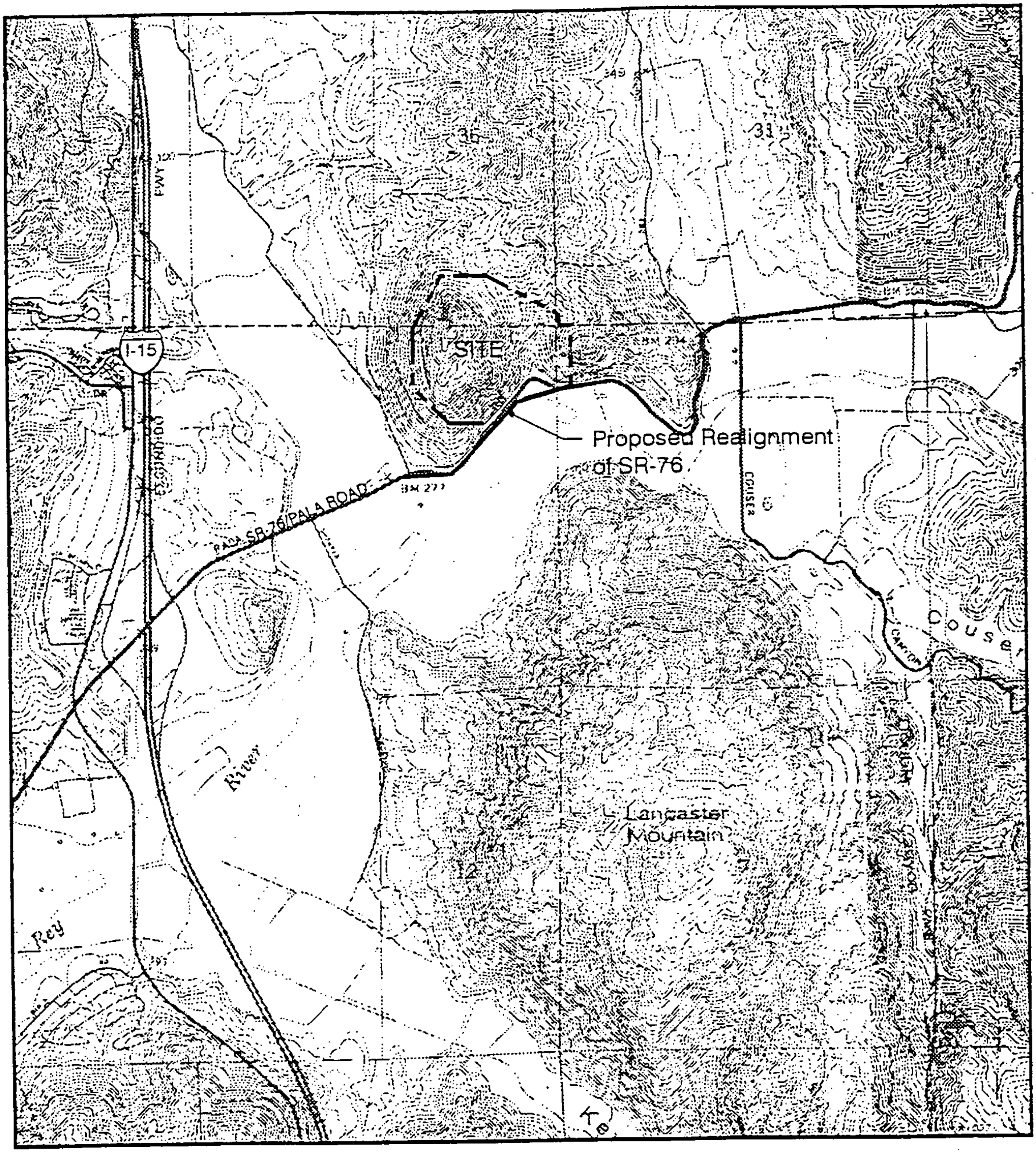
The project will also require the realignment and widening of State Route 76 from the project site west to Interstate 15. A reclamation plan is also included as part of the proposed project which would prepare the lower portion of the site for use as a water storage reservoir at the completion of all mining activities. Impacts to sage scrub associated with the proposed project have been minimized to the maximum extent possible. The 27.3 acres of low quality sage scrub will be fully mitigated by the purchase and preservation of 54.6 acres of sage scrub habitat.

METHODS

Information used to prepare this habitat evaluation include biological surveys prepared by Brian F. Mooney Associates (BFMA) (County of San Diego 1994). Three focused California gnatcatcher surveys were conducted in the fall of 1992 by BFMA. Sweetwater Environmental Biologists conducted four additional gnatcatcher surveys in the summer of 1993. Additional supplementary information used for the evaluation include Multiple Habitat Conservation Program (MHCP) maps for the area and adjoining lands, and a 1 inch = 400 feet scale aerial photograph showing lands within a two-mile radius of the project site. Figure 2 shows the central portion of the aerial photograph.

The NCCP logic flow chart contained within the NCCP Guidelines (1993) was used to rank the sage scrub by assessing its long-term conservation value based on habitat patch size, proximity, linkages and endemic species. The NCCP guidelines were established by the Natural Community Conservation Planning Act of 1991 (California Fish and Game Code Section 2800). They were created to enable local, state, and federal government to provide regional conservation of listed and other sensitive species under Section 4(d) of the Federal Endangered Species Act (FESA).

According to the NCCP guidelines, large relatively dense areas of sage scrub are considered to have High Potential Value with potential as core areas for a reserve system. Intermediate Potential Value lands are those that cannot be managed as independent reserves, but consist of high quality habitat, or are in close proximity or linkage to the High Potential Value areas.

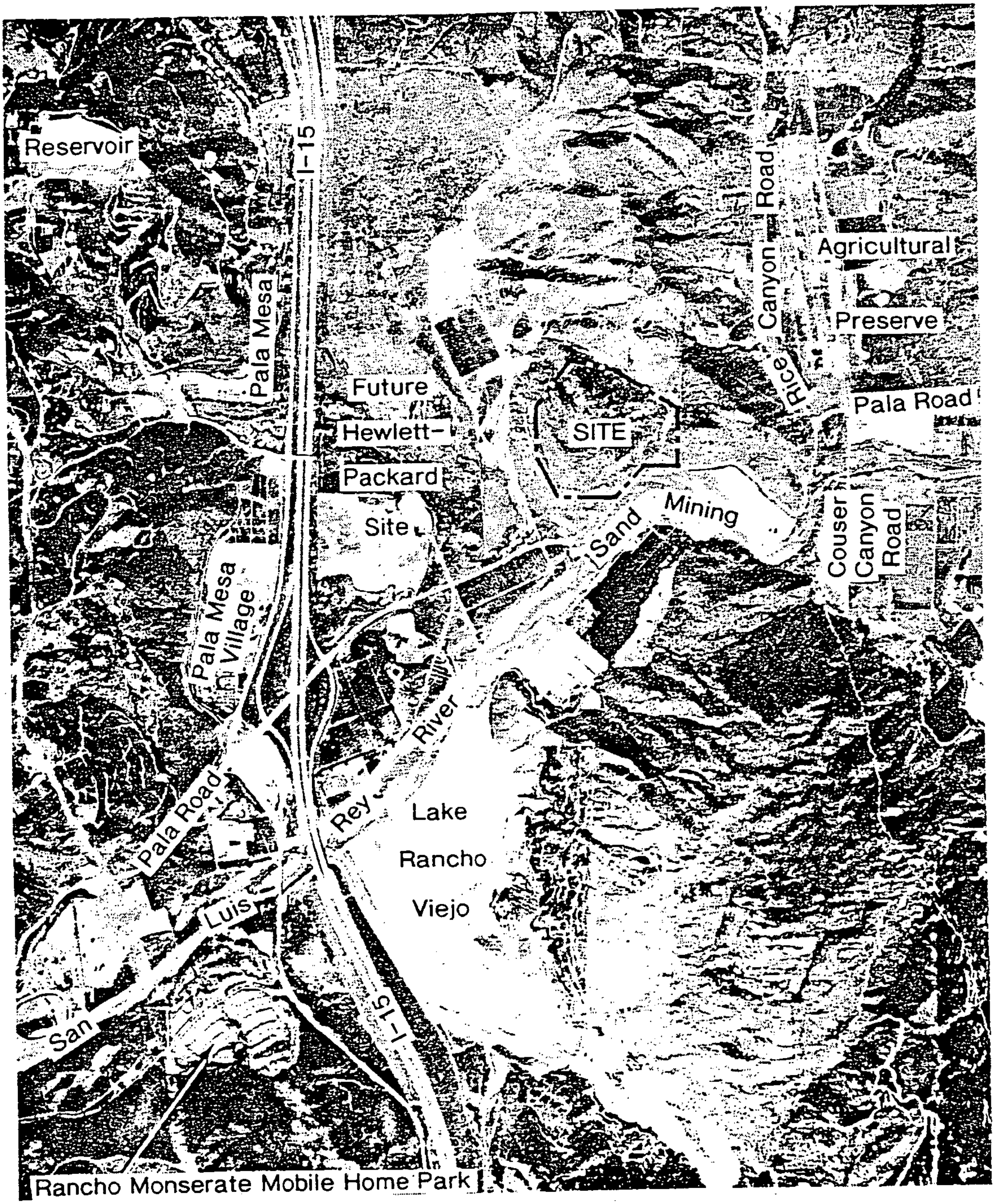


006698 Project Location Map

Figure 1

Brian F. Mooney Associates

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA-BONSALL)



Brian E. Mooney Associates

NOT TO SCALE

006700

Aerial Photo

Figure 2

These areas are treated as potentially significant for subregional conservation planning. Small isolated patches of sage scrub are considered to have Low Potential Value.

HISTORY OF NATURAL COMMUNITY CONSERVATION PLANNING PROGRAM

The NCCP program was initiated by the State of California to provide protection and perpetuation of natural wildlife diversity on a regional basis while allowing compatible land use and appropriate development. The primary directive of the planning process is to shift focus from a single species conservation effort to effectively protecting species and habitats on a natural community level. The southern California sage scrub NCCP program is the first NCCP program and is viewed as a model for which conservation will be accelerated at a regional scale and other NCCP programs will follow. This first NCCP program provides for the long-term protection of species in the sage scrub community in southern California.

The regional sage scrub planning area consists of approximately 6,000 square miles and includes parts of San Diego, Orange, Riverside, Los Angeles, and San Bernardino counties. The five-county planning area is divided into several large subregions to better facilitate the planning efforts. Participants, including numerous local jurisdictions and both public and private landowners, agree voluntarily to protect sage scrub habitat on enrolled lands and lands within their jurisdiction.

Sage scrub is a community that supports a wide range of native California plants and wildlife, many of which are considered sensitive by various agencies and/or interest groups. Sage scrub in southern California has been severely degraded by past urbanization, and conversion to agriculture has severed connections among remnant habitat patches resulting in their increased isolation. Connections among habitat patches are critical to the long-term survival of sage scrub inhabiting species (NCCP Guidelines 1993).

The most publicized sensitive species inhabiting sage scrub is the coastal California gnatcatcher (gnatcatcher) (*Polioiptila californica californica*). The gnatcatcher is a California Department of Fish and Game (CDFG) Species of Special Concern. In March 1993, the U.S. Fish and Wildlife Service (USF&WS) listed the gnatcatcher as a Threatened species under the FESA. This action was reversed by the courts in April 1994. However, the gnatcatcher was relisted as a Federal Threatened species in June 1994.

At the time the gnatcatcher was listed as Threatened, the USF&WS proposed a special rule under Section 4(d) of the FESA that defined the conditions under which take of the species would not be considered in violation of Section 9 of the FESA. The special rule supports the NCCP efforts and closely ties the NCCP program to federal actions under the FESA. Under the special rule, the USF&WS will permit take of the gnatcatcher associated with land use activities covered by an approved plan prepared under the NCCP program in accordance with the guidelines established under the NCCP process.

During the interim period in which the subregional NCCP programs are completed and adopted, agencies with jurisdiction over subregional planning areas will strive to protect areas of higher long-term conservation value as defined by the extent of sage scrub habitat, proximity of the sage scrub habitat to other habitat, value as wildlife corridors, or presence of species of concern. Development should, therefore, be directed toward areas that have lower long-term conservation value such as areas that are smaller in extent, are more isolated, have limited value as corridors, and support comparatively fewer individuals of species of special concern.

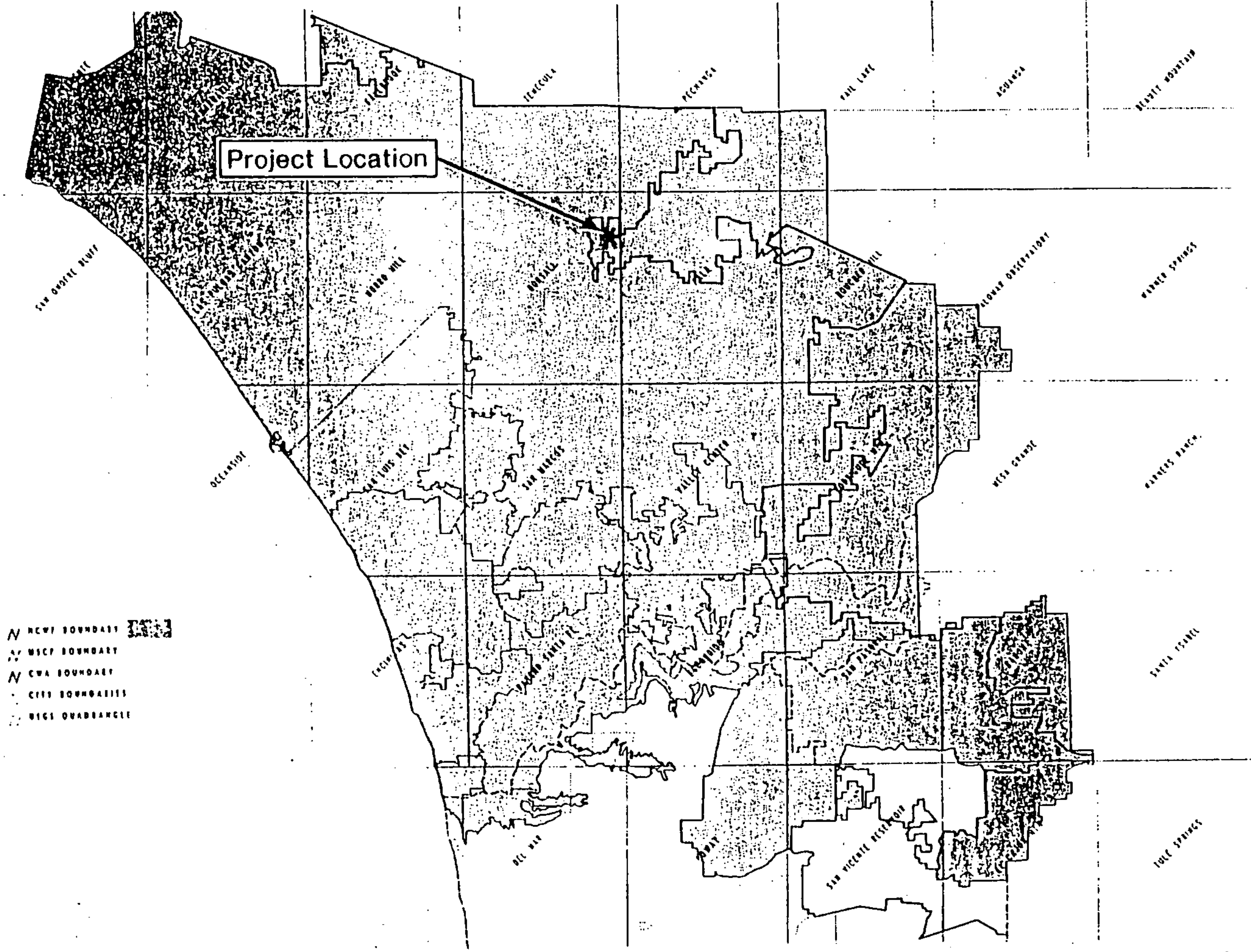
COUNTY OF SAN DIEGO'S CONSERVATION PLANNING AREAS

San Diego County jurisdictions have devised several local plans to protect against the increasing loss of wildlife and native habitats while allowing compatible land use. The programs have been accepted by the state as meeting the requirements of the NCCP. Historic attempts at conservation of native environments have been addressed on a project-by-project basis. Fragmented habitat preserves have resulted, compounding impacts to the sensitive species these preserves are intended to protect. In addition, the conservation plans of state and federal agencies often address one species at a time and only after the species has become a listed species. Conservation efforts in the San Diego region have been designed to accelerate planning efforts for protection of species before their listing by a state and/or federal agency is warranted and to provide interconnected open space preserves.

The original goal of the San Diego programs was to provide for a joint conservation plan for the San Diego area based on the characteristics of the habitats rather than jurisdictional boundaries. For political reasons, however, the current division of the County is based on jurisdictional boundaries rather than biological ones. Land values, local plans and the need for economic development are also being taken into account.

Three primary programs within the County have been working jointly to map vegetation and wildlife and to create plans to preserve native habitats. The programs include the Multiple Species Conservation Program (MSCP) prepared by the City of San Diego, the Wildlife Habitat and Open Space Conservation Plan (WH&OSCP) prepared by the County of San Diego, and the North County MHCP prepared by the San Diego Association of Governments (SANDAG). The MHCP incorporates within its boundaries several additional programs, including the Carlsbad Habitat Management Plan (HMP).

The MSCP includes 10 cities and portions of the unincorporated county of San Diego in addition to the City of San Diego. The goal of the WH&OSCP is to identify resources of greatest value in all unincorporated areas of the County. This program overlaps the MHCP and the MSCP in the western portions of the County. The goal of the MHCP is to cooperatively plan and implement a wildlife and habitat preserve system for the north county. The MHCP program will be closely coordinated with the MSCP plan in the southern part of the region, and with the WH&OSCP in the remainder of the unincorporated area of the County. The State of California recognizes the programs sponsored by SANDAG, the City of San Diego and the County as on-going, multi-species plans that follow the NCCP guidelines and accepts them as NCCPs.



0006703

Brian F. Mooney Associates

N

NOT TO SCALE

Multiple Habitat Conservation Program Area

Figure 3

Each of these programs is identifying biologically based planning areas to target as potential preservation areas. Each area will include large, manageable sage scrub habitat and suitable peripheral corridor and buffer habitat areas. Corridor and buffer areas may consist of habitats other than sage scrub. Lands consisting of remaining biological resources are presently being identified by these programs, and conservation areas and wildlife corridors are being designed. The efforts are being coordinated to create a regional habitat conservation system, although each plan is tailored to its specific area.

Habitat Loss Permit. In order to comply with the FESA and the NCCP program, the County adopted Ordinance 8365 to regulate sage scrub while regional habitat conservation programs are completed. Ordinance 8365 allows the County Board of Supervisors to issue a Permit for projects impacting sage scrub. This process is intended to provide a streamlined procedure for complying with Federal regulations and will be used in lieu of the cumbersome mechanism available under Sections 7 and 10(a) of the FESA.

RESULTS OF HABITAT LOSS PERMIT EVALUATION

Existing Conditions. Several vegetative associations were identified on the project site including, coast live oak woodland, southern mixed chaparral, southern willow scrub and Diegan sage scrub. Diegan coastal sage scrub covers approximately 40.1 acres of the site, of which, the proposed project would impact 27.3 acres. No direct impacts will occur to adjacent sage scrub. Dominant species within this community include California sagebrush, flat-top buckwheat and laurel sumac. Other species include slender wild oats and ladies-fingers.

Recognizing that sage scrub is generally regarded as a sensitive habitat, the direct impacts to on-site sage scrub are significant. However, based upon the biological survey conducted for the EIR and upon the subsequent directed searches for gnatcatchers, no federal or state listed plants, birds, reptiles, mammals, or other species will be affected by the proposed project.

Although the 27.3 acres of sage scrub impacted by the project is large enough to support a pair of gnatcatchers, whose territories range in size from 6 to 45 acres (with inland territories typically larger than those found in coastal areas), adequate area alone does not guarantee the presence of the species. The hillsides of the subject property are covered with huge granitic slabs with vegetation between them, and the slope of the subject property is approximately 50%. Statistical data suggests that California gnatcatchers prefer slopes with less than a 40% gradient (Pat Mock personal communication). Therefore, while potentially suitable for foraging and dispersal, the site is considered to have only low to moderate potential for nesting.

Since no gnatcatchers reside on the project site, no impacts to gnatcatchers would occur with implementation of the proposed project.

Surrounding land uses include agriculture and undeveloped land to the west and agriculture to the north. The land to the east is undeveloped. Sand mining within the San Luis Rey River borders the site to the south. This sand mining operation, covered by a Major Use Permit

(#P87-021/RP87-001) which was subject to the EIR and 404 Permit review process (EAD Log #87-2-13), is currently not in operation. A riparian revegetation program would be required as condition for this major use permit. The proposed quarry and road realignment is not expected to impact the J.W. Sands riparian mitigation area.

CONCLUSION

The project will impact 27.3 acres of sage scrub that may be regarded as low quality based upon the site's steep terrain, relative small size, isolation due to agricultural uses to the immediate north and west, agricultural and former sand mining operations to the south, and lack of sensitive species. Further, the impact to 27.3 acres of sage scrub that would occur under the proposed project shall be mitigated by the preservation of 54.6 acres of sage scrub both on and off-site providing a 2:1 mitigation ratio for this habitat. No significant impacts to any sensitive plant or animal species are anticipated.

Using the NCCP flow chart, the MHCP maps showing Regional Location and Biological Core and Linkage areas, the aerial photograph and taking into account the project design, an evaluation of the site's value for long-term conservation was made. Sage scrub that will be impacted by the project represents the southwesternmost end of strip of sage scrub and does not offer connectivity to core areas. The sage scrub on-site does not support significant populations of highly sensitive species.

According to the MHCP maps, the on-site sage scrub represents the southwesternmost end of a strip of predominantly sage scrub that extends north nearly to Rainbow along the northern edge of San Diego County. This strip is interspersed with chaparral. However, site visits and aerial photographs show that with the exception of a strip of chaparral and sage scrub, approximately 1,400 feet wide which runs in a north/south direction just east of the site, the project is generally surrounded by agricultural development. The eastern portion of the site adjacent to this strip will be dedicated for preservation as part of the proposed project.

In conclusion, the sage scrub on-site is considered to be of low potential value for long-term conservation. The loss of 27.3 acres is consistent with the interim loss criteria in the NCCP Guidelines and will not in any way preclude the attainment of the goals of the MHCP and the NCCP. With the proposed 2:1 mitigation of on-site, adjacent and nearby sage scrub this project will not result in a net loss of sage scrub habitat value.

MITIGATION

Any impacts to sage scrub must be mitigated as required by the California Environmental Quality Act (CEQA). The proposed project, with 27.3 acres of relatively isolated, low quality habitat, will not represent significant and unmitigable cumulative impacts. The selection of a mitigation site and all negotiations required to provide legal assurance that the mitigation site is adequately protected shall be completed prior to the certification of the Environmental Impact Report and the issuance of the Permit.

FINDINGS

As required by the Natural Communities Conservation Planning program, the following Draft Findings are proposed.

1. The proposed habitat loss is consistent with the interim loss criteria in the NCCP Guidelines and with any subregional process established by the subregion.

   a. The habitat loss does not cumulatively exceed the 5% guideline.

The following chart tabulates the sage scrub cumulative loss history in both the unincorporated area of San Diego County and within the Northern Subregion.

Sage Scrub	County-Wide	Northern Subregion
Total loss allowed under 5%:	6,825.1 acres	1,876.9 acres
Cumulative loss to this date:	179.16 acres	18.1 acres
Net loss due to this project:	27.3 acres	27.3 acres
Total cumulative loss:	206.46 acres	45.4 acres
Remaining loss allowed under 5% guideline	6,618.64 acres	1831.50 acres

As shown in the above table, when added to the total loss to date (subsequent to the March, 1993 listing of the California gnatcatcher) of 157.8 acres, the net loss of 27.3 acres due to this project will bring the total county-wide loss to 206.46 acres and the total northern subregion loss to 45.4 acres, which will not result in the loss of greater than 5% of sage scrub within the County's jurisdiction, or within the northern subregion.

   b. The habitat loss does not preclude connectivity between areas of high habitat values.

   According to the MHCP, the on-site sage scrub represents the southwesternmost end of a strip of predominantly sage scrub that extends north nearly to Rainbow along the northern edge of San Diego County. This strip is interspersed with chaparral. The area that the project would impact is considered to be of low value due to the site's steep terrain, relative small size, isolation due to agricultural uses to the immediate north and west, and lack of sensitive species. The sage scrub to be impacted is of low value and does not provide connectivity between areas of high habitat value.

   c. The habitat loss will not preclude or prevent preparation of the subregional NCCP.

   The project does not occur within a "core" habitat area, and it does not provide linkages to core habitat areas (California Dept. of Fish and Game 1993). The proposed mitigation will preserve 54.6 acres of on-site, adjacent and near-by sage scrub habitat. Therefore, implementation of the project as proposed would not preclude the preparation of the subregional NCCP.

d. The habitat loss has been minimized and mitigated to the maximum extent practicable.

The area that the project would impact is considered to be of low value due to the site's steep terrain, relative small size, isolation due to agricultural uses to the immediate north and west, and lack of sensitive species. Further, the impact to 27.3 acres of sage scrub that would occur under the proposed project shall be mitigated by the preservation of 54.6 acres of sage scrub both on and off-site providing a 2:1 mitigation ratio for this habitat. Therefore, habitat loss has been minimized and mitigated to the maximum extent practicable in accordance with Section 4.3 of the NCCP Guidelines.

2. The habitat loss will not appreciably reduce the likelihood of the survival and recovery of listed species in the wild.

Based on the biological survey conducted for this EIR and upon the subsequent directed searches for gnatcatchers, no federal or state listed plants, birds, reptiles, mammals, or other species will be affected by the proposed project.

3. The habitat loss is incidental to otherwise lawful activities because an EIR is being completed in compliance with CEQA, and all required approvals will be brought before the County Board of Supervisors in public hearings.

An EIR has been prepared and is being completed in compliance with CEQA, and all required approvals will be brought before the County Board of Supervisors in public hearings.

REFERENCES

California Department of Fish and Game & California Resources Agency

1993 *Southern California Coastal Sage Scrub Natural Community Conservation Planning Process Guidelines.* November.

County of San Diego

1994 *Biological Resource Survey Report, Mission Road Widening, Fallbrook, San Diego County, California.* Prepared by Brain F. Mooney Associates. August.

Sweetwater Environmental Biologists

1993 *Mission Road Spring Surveys Report.* July.

ARROYO TOAD REPORT
COMPLETED FOR PALOMAR AGGREGATES DEIR

Project Number 441 July 27, 1995

Results of a Survey for the Arroyo Toad in the Vicinity of the Palomar Aggregates Quarry Project

by Joseph Copp*

Introduction and Methods. The federally endangered arroyo toad (*Bufo microscaphus californicus*) has been known to occur along the San Luis Rey River upstream (foot of Cole Grade Road) and downstream (three miles west of Bonsall) from the subject site since the late 1920s. This past spring, their presence was detected much closer to the planned Palomar Aggregates Quarry project at the bridge on Couser Canyon Road (Copp, 1995a: 2; 5) and at Shearer Crossing (Copp, 1995b: 2).

When viewed from a distance along State Route 76, the northwestern terrace of the San Luis Rey River, located just southeast of the project site, appeared to possess all of the critical habitat components necessary to support a viable population of this highly specialized toad (Sweet, 1992: 7). Consequently, closer inspection of this segment of the river for evidence of the presence or absence of arroyo toads was recommended.

While actively foraging adults may still be encountered by night surveys in late July, their numbers on the surface have usually diminished significantly from those found in the spring and early summer. Since July is the time of year when recently transformed juvenile arroyo toads occupy the damp sand bars on clear, sunny days, the fieldwork for this project was conducted by the writer on the afternoon of July 24, 1995 between 2:30 and 4:00 p.m. PDT. During the survey, the weather was clear and sunny, with air temperatures ranging from 81° to 84° F. Winds ranged subjectively from breezy to windy and the river had subsided greatly from its flood stages of earlier this year.

The northwestern side of the San Luis Rey River, including the river itself and the contiguous damp and dry sand-and-gravel terraces, were examined along the curve from the extension of the J.W. Sand & Material, Inc. access road to a point approximately opposite the peak of Rosemary's Mountain. In addition, four stranded islets and a larger island in the damp riverbed were explored. A steep drainage situated between Rosemary's Mountain and the lower hill immediately to the east was inspected as well. The survey was executed on foot, with slow progression and careful placement of each footstep on the damp sand-terrace so as to avoid trampling any cryptic juveniles that might be present.

Four days earlier, on July 20, this worker encountered nine postmetamorphic arroyo toads active on the damp sand bar at another site west of Interstate 15 between 4:40 and 5:10 p.m. This population served as a reference in selection of the survey schedule.

---

* **Research Associate, Department of Herpetology, California Academy of Sciences, San Francisco, CA 94118; 1441 Muirlands Drive, La Jolla, CA 92037**

Results. Upon close examination of the river, the overall habitat south of the project site was found to be optimal for occupation by arroyo toads. Exceptions were a large triangular plot in the bight of State Route 76 that had been plowed and graded; and the drainage between Rosemary's Mountain and the hill directly to the east. Both of these features were evaluated as uninhabitable by arroyo toads. A deleterious density of young castor beans was noted on the dry sand-and-gravel terrace. No tadpoles were observed in the waters.

On the first dry, open sand bar that was inspected, seven arroyo toad scats 14 to 20 mm. in length were found. These feces displayed the shape and size of arroyo toad feces. One of these scats was crushed for detailed examination which revealed a disproportionate amount of beetle parts instead of ants. These combined features are consistent with the characteristics of scats produced by yearling, subadult arroyo toads (Sweet, 1992; 11; 99).

Immediately adjacent to the same sand bar, a juvenile arroyo toad approximately 17mm. in length was encountered on the damp sand of the riverbed. This sighting occurred at 2:54 p.m., air temperature 84° F., with strong breezes. The locality of this enclave of observations was 50 yards by pacing west of the J.W. Sand access road (before it turns eastward) and east of the J.W. Sand mitigation area.

The only other evidence of toads detected in this survey was a large scat from a California toad (*Bufo boreas halophilus*) sighted on the dry sand-and-gravel terrace opposite the drainage between the two hills, south of State Route 76. No toad tracks were noted, perhaps due to the effect of the afternoon wind in partially obliterating tracks in dry sand.

Regarding evidence of potential predators, the sound of a diving bullfrog was heard at four scattered locations along a small, heavily vegetated stream that flowed along the arc of the dry-to-damp sand interface. A single killdeer was heard and seen near the location of the juvenile arroyo toad. Raccoon tracks in the damp sand were extremely numerous. No All Terrain Vehicle tracks were noticed.

Conclusions. Although no evidence of suitable arroyo toad habitat was found on the project site and no arroyo toads were present along the river directly south of the project site, the habitat along the river appears to be ideal for imminent occupation by them. Measures should be taken to preserve this habitat, which appears to have been recently created following curtailment of sand-mining operations and episodes of significant flooding along the San Luis Rey River.
Variable winds experienced during the course of this survey may have exerted an inhibitory influence on the activity of recently transformed arroyo toads, although many of the microhabitats examined on damp sand were sheltered from the prevailing westerly wind and yet still exposed to direct sunlight. The presence of a small reproducing population of this taxon, as represented by putative scats and a single 17 mm. juvenile, was detected off-site to the east of the planned Palomar Aggregates Quarry project.

A series of surveys conducted earlier this year under the auspices of Caltrans strengthens the reliability of the present findings that arroyo toads are currently absent from the subject site. On three nights during the peak of the season for male vocalization, as established by concurrent behavior in reference populations, the writer listened for trilling toads under optimal conditions from vantage points along the southeastern foot of Rosemary's Mountain, south of State Route 76. Details of two of these prior efforts were reported by Copp (1995a: 4). The third listening period took place on May 2 from 12:35 to 12:45 a.m. under clear, calm conditions, with no moon and an air temperature of 60° F. The nighttime listening positions were immediately adjacent to the river and southwest of the project site. No toads were heard vocalizing on any of these occasions. It should be pointed out that the arroyo toad trill is audible at a maximum distance of 450 yards (Sweet, 1992; 12), which is the straightline distance from the listening sites to the small extant population reported herein.

References.

Copp, Joseph F. 1995a. Report on arroyo toad surveys on Caltrans SR 76 Site 6 (Pankey Farms) and Site 7 (mouth of Rice Canyon Creek). Contract Report to Caltrans, District 11, San Diego, California, 6 pp. April 17

Copp, Joseph F. 1995b. Occurrence of arroyo toad tadpoles in the vicinity of Shearer Crossing. Contract Report to Brian F. Mooney Associates, San Diego, California, 3 pp. May 20.

Sweet, Samuel S. 1992. Initial report on the ecology and status of the arroyo toad (*Bufo microscaphus californicus*) on the Los Padres National Forest of southern California, with management recommendations. Contract Report to USDA Forest Service, Los Padres National Forest, Goleta, California, ii + 198 pp. Revised 15 March 1992.

G

006712

APPENDIX G

REVEGETATION PLAN

PALOMAR AGGREGATES
REVEGETATION PLAN

Prepared for:

Palomar Aggregates, Inc.
2150 N. Centre City Parkway
Escondido, California 92026

Prepared by:

Brian F. Mooney Associates
9903-B Businesspark Avenue
San Diego, California 92131

March 1995

006714

TABLE OF CONTENTS

Section | **Page**

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 Location

The project site is located approximately one mile east of Interstate 15 (I-15), on the north side of State Route (SR) 76 (Pala Road), which in turn is bordered on the south by the San Luis Rey River channel. The site is within the unincorporated area of San Diego County, approximately 45 miles north of downtown San Diego (Figure 1.1).

1.2 Project Description and Purpose

The project proponent proposes to establish a rock quarry and processing plant for concrete and asphalt on a 96.4-acre site. In addition to the proposed mining and processing operations, a realignment of SR 76 is proposed, involving approximately 4,500 linear feet of the existing road. This realignment would take place primarily within the floodplain of the San Luis Rey River. The proponent also proposes a Reclamation Plan which proposes re-use of the site as a water storage reservoir after mining is completed.

The purpose of this report is to present a mitigation plan that meets the requirement of the County of San Diego Department of Planning and Land Use (DPLU), California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USF&WS). This mitigation plan provides compensatory mitigation measures for impacts to sensitive habitat subject to regulation by CDFG and USF&WS. In this report the project site or Major Use Permit (MUP) refers to the quarry and the road realignment.

1.3 Existing Conditions

Four native plant communities are found on the proposed project area (Figure 1.2): southern mixed chaparral (chaparral), coast live oak woodland (oak woodland), Diegan coastal sage scrub (sage scrub) and southern willow scrub (willow scrub). On the project site, the chaparral community comprises approximately 14.5 acres, oak woodland covers approximately 3.0 acres, sage scrub occurs over 40.1 acres, and disturbed southern willow scrub occupies a narrow drainage swale covering 0.3 acre. Native vegetation has been removed from parts of the quarry site and nearly all of the proposed road realignment, covering approximately 50.5 acres.

1.4 Project Impacts

The project would impact 88.3 acres. The area of chaparral would be reduced by 9.4 acres. The cumulative impact on the chaparral community would be considered significant since sensitive species may be found within this habitat. The oak habitat on the quarry site would be reduced by approximately 1.3 acres. The direct impact to this habitat type is regarded as significant. The loss of 27.3 acres of sage scrub would be considered a direct significant impact of a sensitive habitat. Approximately 0.3 acre of southern willow scrub would be lost as a result of the proposed project. This is considered a significant cumulative impact. The road realignment would impact 12.0 acres of previously disturbed habitat, of which 3.2 acres are within designated least Bell's vireo habitat.

The increase in traffic noise due to project implementation may indirectly impact a total of 17.8 acres of existing and/or potential vireo habitat within and in the vicinity of the project site, of which 1.9 acres necessitate mitigation.

2.0 MITIGATION

2.1 Mitigation

Mitigation for impacts to sensitive habitats will include a combination of preservation and revegetation at several sites adjacent to and within the vicinity of the project site.

Impacts to chaparral, oak woodland and sage scrub would be mitigated by the preservation of existing habitat on and off-site. The preserved areas would be dedicated as open space.

Impacts to willow scrub will be mitigated by revegetation at two sites: in the San Luis Rey River west of Shearer Crossing (Figure 2.1) and north of the river along the future Pala Road realignment (Figure 2.2).

The recommended restoration at the site west of Shearer Crossing shall include the revegetation of approximately 9.8 acres. Approximately 11.7 acres of potential southern willow scrub restoration area will be available subsequent to the purchase of the mitigation parcel west of Shearer Crossing. The project also proposes some riparian plantings along the Pala Road slope bank and adjacent streambed to mitigate for impacts from the realignment of Pala Road. Tree and shrub species and a hydroseed mix would be planted at various elevations within the channel.

The willow scrub would be planted with willow cuttings salvaged from the disturbed willow scrub at the proposed quarry site, container plants and seed mixes in a mosaic of tree, shrub, and herbaceous zones. This mosaic is intended to produce 50 percent tree canopy cover, 80 percent shrub canopy cover (40 percent coincidental with the tree canopy), 5 percent herbaceous cover, and 5 percent open ground.

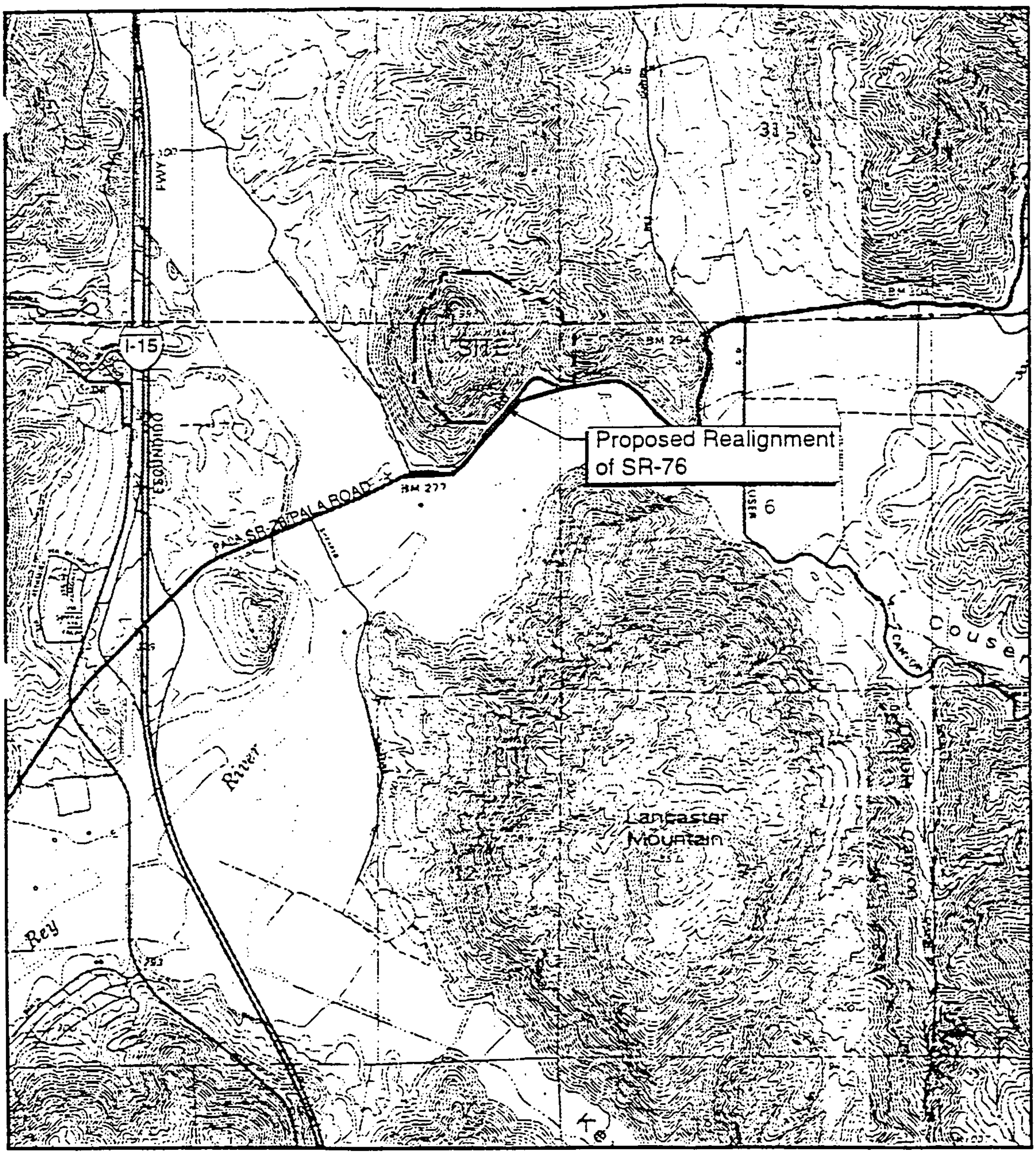
2.2 Implementation of Mitigation

2.2.1 Responsibility

Successful implementation of the revegetation program will require coordination between the property owner, revegetation specialist, landscape contractor and regulatory agencies. Each is listed below with a brief description of their responsibilities.

Entity	Responsibility
Property Owner/Operator	Directly responsible for the success of the revegetation program. Will post a bond with the County of San Diego Department of Planning and Land Use (DPLU) for the cost of construction and 5 year monitoring program or deed property to an environmental trust,

	acceptable to DPLU, that will assume monitoring and management of property. Will hire landscape contractor and revegetation specialist.
Revegetation Specialist	Will oversee the installation of the revegetation plans. Shall be experienced in the revegetation and monitoring of riparian habitats.
Landscape Contractor	Implementation of the plans and specifications. Under the direction of the revegetation specialist will maintain the revegetation sites in a healthy, weed-free state.



Brian F. Mooney Associates

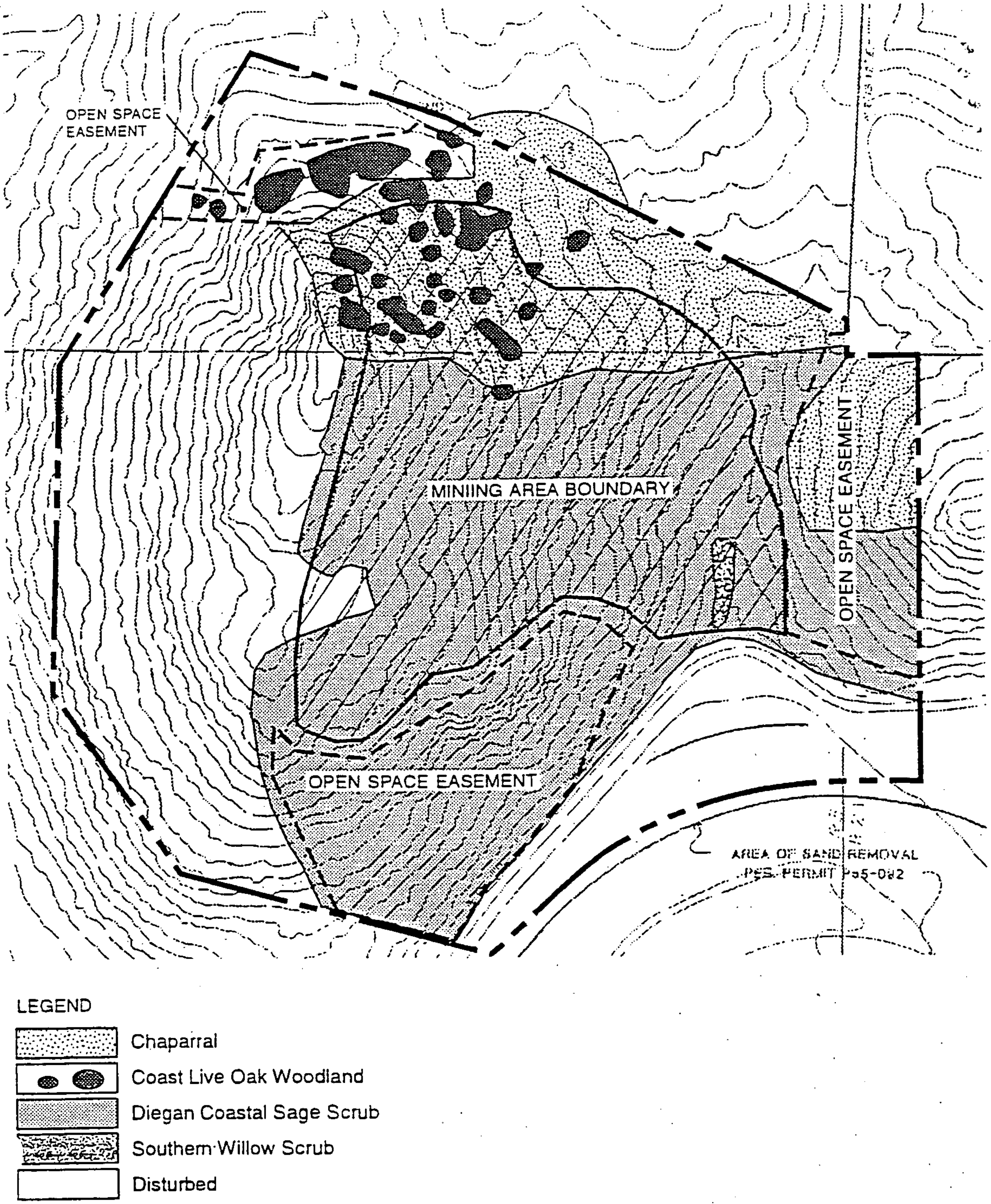
0 1000' 2000'

0067 Project Location Map

Figure 1.1

Palomar Aggregates Quarry reveg.

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA-BONSALL)



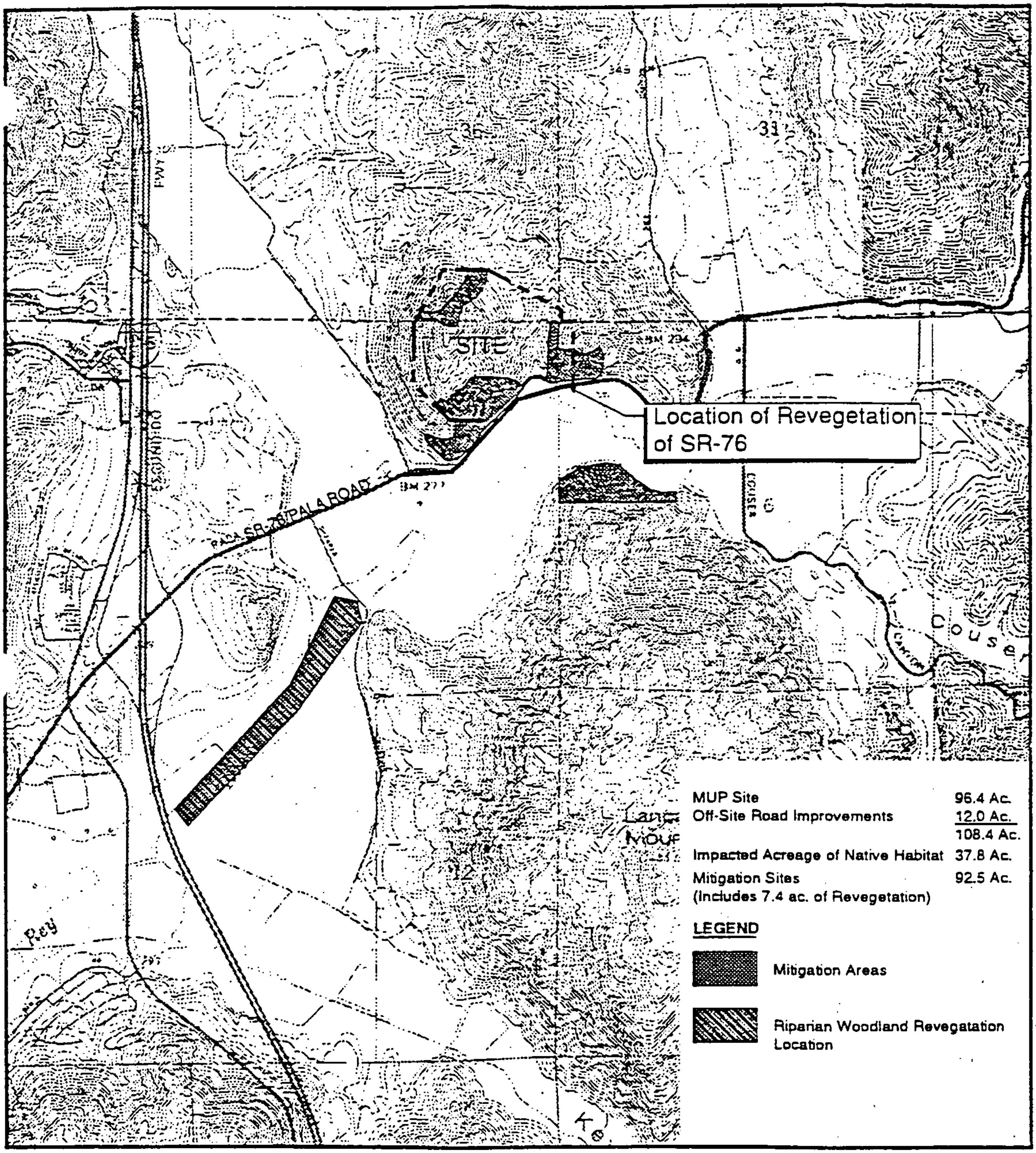
Brian F. Mooney Associates

Vegetation Map of MUP Area

006721

Figure 1.2

Palomar Aggregates Quarry reveg.



Brian F. Mooney Associates

N

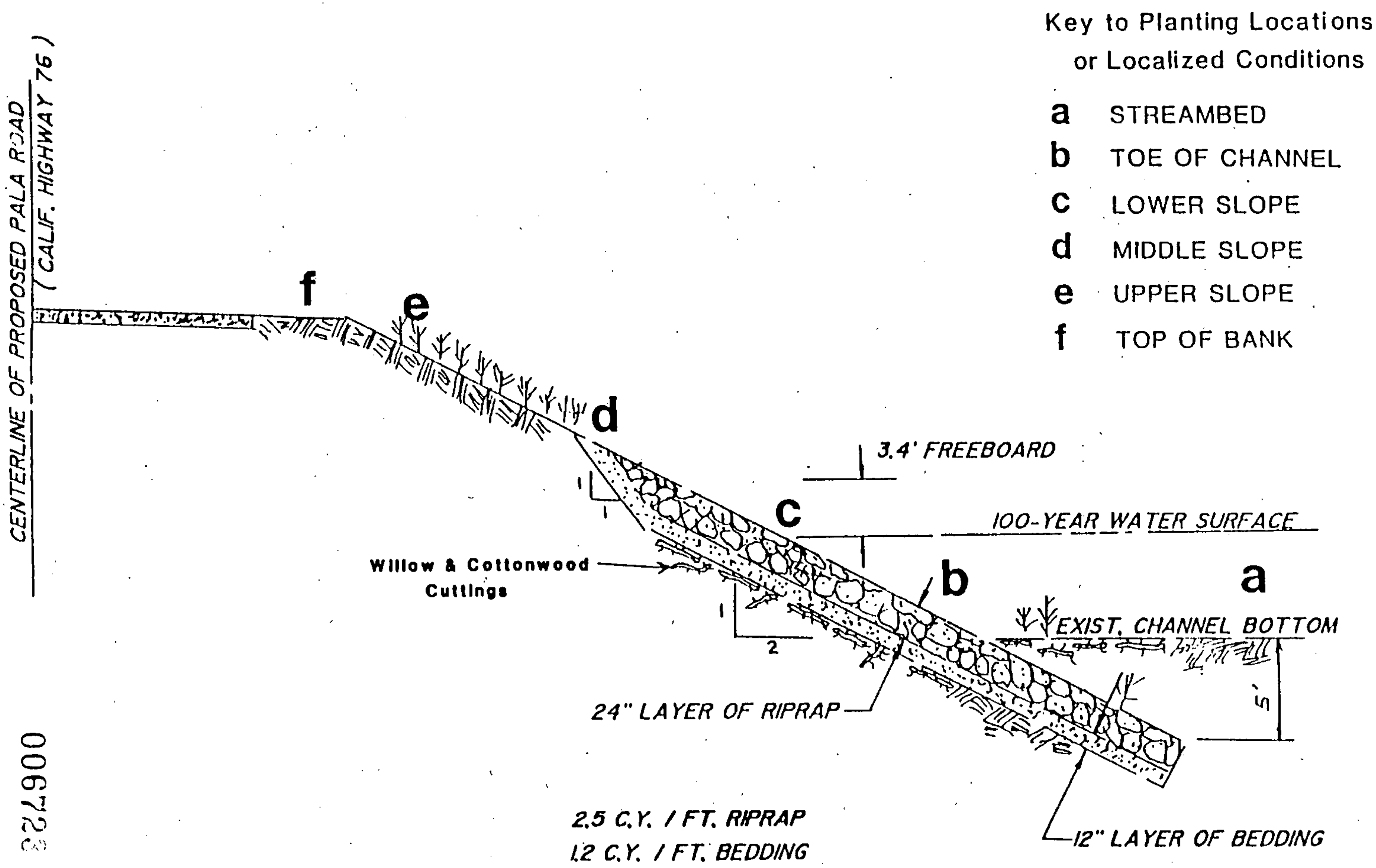
0 1000' 2000'

006722 Mitigation Locations

Figure 2.1

Palomar Aggregates Quarry reveg.

SOURCE: U.S.G.S. 7.5 MIN QUAD (PALA-BONSALL)



Typical Section - Pala Road Riprap Protection & Channel Planting Locations

Figure 2.2

NOT TO SCALE

Brian F. Mooney Associates

DPLU	Shall inspect all revegetated areas after installation to insure conformance with plans and specifications. Shall review quarterly and annual monitoring reports. Shall conduct a site visit at the end of each monitoring year.
CDFG	Pursuant to Section 1600 of the CDFG Code and a stream or lake alteration agreement, the proponent shall be responsible for satisfying all conditions of the agreement.
USF&WS	Pursuant to a Section 7 consultation, the proponent shall be responsible for satisfying all conditions of the agreement.

2.2.2 Qualifications of the Revegetation Specialist

The revegetation specialist shall possess a minimum of a bachelor's degree in biology, botany, ecology or a closely related field. In addition, the revegetation specialist shall demonstrate expertise in southern California native vegetation communities including recognition of the dominant plant species and the ecological requirements of those species. The revegetation specialist shall have a minimum of four years experience in the implementation of southern California native habitat revegetation projects. The revegetation specialist will monitor all revegetation activities including installation of container plants and seed mixes, post-installation monitoring, and assessing the attainment of the success criteria developed for each component of this revegetation plan.

2.2.3 Qualifications of the Revegetation Contractor

The implementation of the labor portions of this revegetation contract will be accomplished by a firm that has a landscape contractor's license (C27) and that employs, for the purpose of this plan, a person who has at least four years experience with revegetation and who can demonstrate a knowledge of techniques for growing and transplanting native vegetation. This person should be able to provide letters of evaluation if requested.

The Revegetation Contractor will also be responsible for maintenance of the revegetation area for five years following installation of plant materials. The maintenance personnel may be from the same firm as the revegetation contractor, or may be a subcontractor to the revegetation contractor. The persons responsible for maintenance shall be familiar with the identification of California native plant species. Maintenance personnel will remove weeds prior to the installation of plant materials and as directed by the revegetation specialist for remedial purposes during the five year post-revegetation monitoring period.

3.0 REVEGETATION GUIDELINES

3.1 Requirements for Construction Drawings

The following describes the revegetation guidelines for the proposed revegetation plan. The installation specifications will be incorporated into the final revegetation plan for the project, and will be included as part of all the construction documents. Final construction documents will be reviewed by a qualified revegetation specialist before they are let for bid. The details provided below may be modified if deemed necessary by further research in habitat restoration and if agreed to by the proponent, lead agency, resource agency, and revegetation specialist.

Prior to the beginning of any revegetation activities, all contractors who will be involved in completing any aspect of the revegetation plan shall meet at the site with the revegetation specialist. A copy of this document shall be provided to each contractor and the revegetation specialist will review all aspects of the plan which concerns the contractors; including site protection, adjacent habitat protection, inspections, landscape procedures, and guarantees. It shall be made clear that the revegetation specialist has final supervisory control over field installation and construction monitoring. The formal set of contract documents shall consist of plans and contract specifications with sufficient detail as to communicate the intent of this document and can be installed as per this document.

3.2 Open Space Easement Dedication

The revegetation area west of Shearer Crossing shall be dedicated to the County of San Diego or a County approved conservancy/agency that is accredited with the preservation of biological resources, preserved in perpetuity, as a biological open space easement. This easement shall prohibit grading, the placement of buildings, and vegetation removal or additions within the revegetation area unless specified otherwise in the Environmental Impact Report or this plan.

3.3 Bonding

The project proponent shall enter into a secured agreement with DPLU which will cover the success of this revegetation plan including money necessary to install, monitor, and report on the revegetation plan until the end of the monitoring period. This bond shall be a 100% bond and a 10% cash deposit for the total amount of the cost estimate (plus a 4% inflation factor per year) for materials and installation, maintenance and monitoring for five years. This bond shall be issued in favor of DPLU.

3.4 Planting Specifications

Modifications to the specifications shall require prior approval of the revegetation specialist.

3.4.1 Salvaged Plant Material

Willow cuttings shall be salvaged from the willow scrub at the quarry site. Each cutting shall be a minimum of twelve inches long and will have at least two side branches.

3.4.2 Container Stock Procurement

One factor in the successful implementation of this plan will be the revegetation specialist's selection of the nursery responsible for supplying all container and seed stock for revegetation as described in this plan. The nursery must be able to demonstrate the ability to produce California native plant species, and must have a valid California Nursery License and a business license for work within the County of San Diego.

The container stock shall be derived from seed and/or salvaged material taken from areas preferably within the project area.

3.4.3 Seed Procurement

Adequate quantities of seeds of the species specified for hand broadcast seed shall be ensured by collecting one to two seasons prior to the planting date. Seeds shall be collected from a 10 mile radius around the project site. The seed collector shall attempt to obtain equal amounts of seed from each collection site in an environmentally sensitive manner. Donor plants shall not be excessively degraded by the collection methods. Seeds shall be removed from site and stored in a cool, dry place free of rodents.

Seeds shall be tested for percent purity, percent germination, and the number of live seeds per pound. Testing costs shall be included in the seed costs per pound and shall be the responsibility of the seed supplier. Results of the seed tests shall be made available to the revegetation specialist prior to seed delivery. Seed collections, handling and storage techniques shall be observed by the revegetation specialist.

3.4.4 Soil Preparation

The proposed revegetation sites shall be surveyed to determine if any soil contaminants or pollutants are present. All contaminated soil shall be removed and replaced by similar clean sandy soil.

Soil testing will be performed to determine if any clay or hard pan soil horizons exist between the surface and water table. If a clay or hard pan horizon is found, then the planting holes will first be prepared by auguring with an eight-inch diameter auger to the water table and refilling with indigenous soil. If there is none, then each hole should be dug two times the depth and 1.5 times the width of the container.

An aggressive weed eradication program shall also be undertaken prior to any revegetation efforts (see Attachment A for further details).

3.4.5 Plant Materials

All container plants should be inoculated with mycorrhizal fungi indigenous to the site. This will aid in their adaption to the site. The plant materials shall be healthy, vigorous, of normal growth, free from disease, insects and insect eggs, and properly fertilized. No container plants shall have cracked or broken balls of earth when taken from the containers, and shall not be root or pot bound. The stock will conform to quality and size with the American Standard for Nursery Stock.

006726

3.4.6 Planting Details

Willow cuttings will be rototilled into the soil over a one-acre area west of Shearer Crossing. Willow cuttings will also be installed in the same manner along the Pala Road realignment in the streambed, toe of the channel, and lower and middle slope.

Pits for all container stock shall be dug square with bottoms level, and two times the width of the root ball and equal to the depth of the root ball. Compacted soils at sides and bottoms shall be loosened by scarifying or other approved methods. Pits shall be backfilled with "prepared soil" to the required grade, and the balance of the pit filled with "prepared soil" thoroughly settled by water application. Plants shall be centered in the pit, in a vertical position so the crown of the ball shall be level or slightly above (one-inch) the finished grade after allowing for watering and settling. All plantings shall be watered thoroughly and roots shall be backfilled with additional prepared planting mix. A small earth berm shall be placed around each plant.

The species, sizes, and spacing of the container stock are detailed in Tables 2.1 and 2.3. The plants shall be dispersed throughout the revegetation areas under the direction of the revegetation specialist. After installation of all container stock is complete and prior to final installation inspection, a planting plan shall be prepared which indicates the location of all planted container stock.

The seed mixes (Tables 2.2 and 2.4) should be hand broadcast over all the revegetation sites to avoid any impacts to the revegetation areas from hydroseeding (e.g., trampling and overspraying). The amount of each seed mix applied will be determined at the time of the final planting plan construction drawings are prepared. This will be determined by the revegetation specialist and regulatory agency personnel during the maintenance and monitoring phase following container stock installation.

3.4.7 Timing of Installation

The willow cuttings will be installed along the Pala Road realignment and over a one-acre area of the revegetation site west of Shearer Crossing. Container stock shall be installed one year after the salvaged willow cuttings have been installed.

The container planting over the remaining area west of Shearer Crossing shall be installed after the irrigation system is operational. The planting shall occur during a 30-day period, following the on-set of the winter rains. Planting may begin as late as February 15, if it is either a late or an unseasonably dry winter. However, the weed eradication program and irrigation system shall be completed prior to planting.

All of the seed mixes will be applied to the sites after installation of the container stock.

All materials shall be installed within one year of any use or reliance on the major use permit. If not, the permit and mining operations should be suspended until it has been satisfactorily installed.

Table 2.1 Container Stock Plant List for West of Shearer Crossing

Species	Size[1]	Spacing[2]	Plants/Acre
black willow (*Salix gooddingii*)	1	8-10	30
	5	8-10	9
arroyo willow (*Salix lasiolepis*)	1	10-15	115
	5	10-15	52
California sycamore (*Platanus racemosa*)	1	5	12
	5	15	2
red willow (*Salix laevigata*)	1	5	31
	5	8	13
sandbar willow (*Salix hindsiana*)	1	5-8	29
	5	5-8	12
western cottonwood (*Populus fremontii*)	1	10-15	10
	5	10-15	5
mule fat (*Baccharis salicifolia*)	1	5-8	140
	5	5-8	60
California rose (*Rosa californica*)	1	5-8	83
desert elderberry (*Sambucus mexicanus*)	5	12	14
Total Plants Per Acre			617

[1] Size container measured in gallons.
[2] Spacing measured in feet on center.

Table 2.2 Seed Mix for West of Shearer Crossing[1]

Species	% Purity/Germination
western ragweed (*Ambrosia psilostachya* var. *californica*)	N/A
rush grass (*Juncus acutus*)	90/40
toad rush (*Juncus bufonius*)	N/A
California evening primrose (*Oenothera hookeri*)	98/75
hoary nettle (*Urtica dioica holosericea*)	50/60
salt-marsh fleabane (*Pluchea odorata* var. *odorata*)	35/60
Douglas' mugwort (*Artemisia douglasiana*)	10/50

[1] The amount of seed mix applied (pounds per acre) will be determined at the time the final planting plan construction drawings are prepared.

Table 2.3 Container Stock Plant List for Pala Road Realignment Slope Planting

Species	Size[1]	Spacing[2]	Plants/Acre	Location[3]
sandbar willow (*Salix hindsiana*)	1	4	15	a,b,c
red willow (*Salix laevigata*)	5	8	34	a,b,c,d
arroyo willow (*Salix lasiolepis*)	5	8	83	a,b,c,d
black willow (*Salix gooddingii*)	5	8	77	a,b,c,d
western cottonwood (*Populus fremontii*)	5	12	15	b,c,d
coast live oak (*Quercus agrifolia*)	5	20	19	e,f
California sycamore (*Platanus racemosa*)	15	30	20	c,d
toyon (*Heteromeles arbutifolia*)	5	15	15	f
desert elderberry (*Sambucus mexicanus*)	5	12	7	c,d,e
mule-fat (*Baccharis salicifolia*)	1	4	140	a,b
California rose (*Rosa californica*)	1	4	21	e
California blackberry (*California blackberry*)	1	4	21	e

[1] Size container measured in gallons.
[2] Spacing measured in feet on center.
[3] Planting locations along the Pala Road realignment slope (Figure 2.3):

a = streambed	d = middle slope
b = toe of channel	e = upper slope
c = lower slope	f = top of bank

Table 2.4 Seed Mix for Pala Road Realignment Slope Planting[1]

Species	% Purity/Germination	Location[2]
flat-top buckwheat (*Eriogonum fasciculatum*)	10/65	e,f
bush monkey flower (*Diplacus puniceus*)	2/55	e,f
California sagebrush (*Artemisia californica*)	15/50	e,f
mule fat (*Baccharis salicifolia*)	2/20	d
western ragweed (*Ambrosia psilostachya* var. *californica*)	N/A	d,e

[1] The amount of seed mix applied (pounds per acre) will be determined when the planting plan construction drawings are prepared.
[2] Planting locations along the Pala Road realignment slope (Figure 2.2):

a = streambed	d = middle slope
b = toe of channel	e = upper slope
c = lower slope	f = top of bank

3.5 Irrigation

All plants shall be irrigated immediately after planting and continue until all plant material is sustainable without irrigation. The scheduling and length of irrigation applications shall be coordinated with the revegetation specialist to encourage deep rooting and prevent the occurrence of soil and plant diseases. The design of the irrigation system shall be approved by the revegetation specialist.

After the second summer, the plants shall be tested for establishment by withholding water to a defined block of several trees and shrubs. These shall be monitored daily and irrigation shall resume if wilting appears.

3.6 Site Protection

The revegetation sites should be fenced to prevent vehicles and activities from the orchards from "spilling" into the revegetation area. The fencing should be based on open space boundaries located in the field by licensed surveyors. The fencing should be in place within two weeks following the installation of the container stock and consist of four-foot high chain link or split rail materials. The revegetation area west of Shearer Crossing will be fenced only at the Shearer Crossing overpass. Fencing should not be needed around the other sides because they are inaccessible from the other directions.

3.7 Installation Maintenance and Monitoring

The installation maintenance period begins on the first day after all revegetation installation on this project is complete, checked, accepted and written approval from the revegetation specialist is given to begin the maintenance period. This period shall continue for no less than 90 continuous calendar days.

Regular maintenance shall begin immediately after the revegetation site is hydroseeded and planted. Plants and hydroseeded areas shall be kept in a healthy, growing condition and all areas shall be kept free of weeds, noxious grasses and other undesired vegetative growth. Weeding shall be conducted weekly. Plants found to be dead or in an impaired condition shall be replaced immediately. All work shall be conducted under the direction of the revegetation specialist.

Monitoring will be qualitative only and will focus on survivorship and maintenance. Monitoring will be conducted daily during installation, weekly during the second month and biweekly thereafter for a total of four months (120 days).

4.0 FIVE-YEAR MAINTENANCE AND MONITORING PROGRAM

4.1 Purpose and Time Frame

The need for maintenance of the revegetation area will be determined during the five-year monitoring program described in Section 4.2. The maintenance and monitoring program will be implemented for the revegetation site west of Shearer Crossing only. Repairs to the irrigation system, and other remedial actions to correct problems or damage resulting from natural causes, vandalism, or other reasons will be promptly performed on an as-needed basis. Quarterly monitoring reports (monthly during the first quarter) will identify additional maintenance needs. The quarterly reports will specifically address potential invasion by weedy species and identify corrective measures for their control. Required maintenance will be performed promptly, generally within two weeks of the identification of the problem.

A monitoring program will be implemented to determine if the revegetation site is functioning as expected. The overall success of the mitigation program will be evaluated by comparing the final year of monitoring data with the target values. Monitoring will be conducted over a five-year period to identify trends and progress toward the target. Monitoring will also assess whether any adjustments to the original plan are needed. If the revegetation effort does not meet the success criteria, the project proponent shall continue with the replacement plantings, weed control, and monitoring on a year-by-year basis until the criteria are met or three additional years, whichever occurs first. An annual report will be submitted to DPLU and CDFG each monitoring year that will cover plant monitoring as outlined below.

4.2 Monitoring Requirements

Functions to be provided by the restored plant community include wildlife habitat, sustained biological diversity and structural diversity. The compensatory mitigation is expected to be established in five years. This created habitat is expected to continue to mature for a substantial period afterwards.

The project proponent will be responsible for the implementation of this plan. This section describes the monitoring and reporting requirements to assist the project proponent in this effort and to evaluate the success of the mitigation and determine remedial actions where necessary.

The five-year monitoring plan will begin after the installation monitoring period has been completed. A "time zero" report shall be prepared at the completion of plant installation, detailing the installation effort. This report shall be submitted to DPLU. The report shall provide actual "as-built" drawings for the revegetation areas. Plantings will be compared to the original planting plan with any deviation from the plan mapped and noted. Major deviations will be inspected by the revegetation specialist and, if necessary, additional plantings will occur to conform to the plan. The map of the site will identify planting methods, species, densities, and spacing of plants. An inspection shall be conducted with the revegetation specialist and the regulatory agency staff. The five-year monitoring period will start when the project is accepted by all parties. This report and the annual reports shall be submitted to the regulatory agencies for their review. The as-built drawings shall be approved by the revegetation specialist and DPLU staff.

Monitoring will be conducted monthly for the first three months of the five-year plan, and quarterly thereafter for a total of 60 months (five years). The monthly monitoring surveys conducted during the first three months of the five-year plan will concentrate on qualitative observations to identify potential problems and recommend remedial actions, where necessary (i.e., plant die off, watering requirements and intrusion by unauthorized personnel). Remedial actions may include replacement of vegetation lost by disease, natural causes or other causes such that loss will jeopardize attainment of the criteria for success, as presented in Section 4.3. Replacement of vegetation should take place between October 1 and April 30.

The quarterly monitoring surveys will collect both qualitative and quantitative data. Qualitative information will be similar to that collected during the first three months including identification of potential problems and remediation alternatives. Quantitative data will include analysis of survivorship and growth, including height and per cent cover of tree and shrub species. Survival will be measured by direct counts. Vegetation growth and establishment will be quantitatively assessed through the use of belt transects. There will be two belt transects per acre in each of the mitigation sites. In each transect, height will be determined for each container stock in the transect. Each container stock will be labeled with its scientific name (or abbreviation) and identification number. These data will be recorded on standard field data forms and, along with notes of observations, kept on file by DPLU or their agent for documentation purposes.

Data to be collected during quarterly monitoring surveys are described in Table 4.1. Photographs of the mitigation area will be taken from standard locations during each survey. Annual reports will be produced at the end of each monitoring year. These reports will be submitted to DPLU and the regulatory agencies for their review and evaluation. Each annual report will address the criteria for success, as detailed in Section 4.3 below, and measures needed to meet those criteria. Additionally, at the end of each monitoring year, a field meeting will be held with the revegetation specialist and DPLU staff members to discuss the projects revegetation effort and success.

Table 4.1 Data Collection Requirements for Mitigation Monitoring

Monitoring Requirement	Monitoring Method/Location	Quarters Required			
		1	2	3	4
QUANTITATIVE DATA					
Trees and Shrubs:					
Average and Range of Heights	Calculate mean and standard deviation for planting types within transects	X	X	X	X
Density	Determine densities (mean and standard deviation) for planting types within transects	X	X	X	X
QUALITATIVE DATA					
Trees and Shrubs:					
Aerial Cover	Visually estimate percentage of cover for each planting type within subarea	X	X	X	X
Photos:	From standard locations	X	X	X	X

4.3 Criteria for Success

In order to determine if the goals of the revegetation program have been achieved, certain success criteria must be met. Quantitative measures of these criteria include percentage survival of plantings and percent of coverage as indicated in Table 4.1 and specifications described in this section and Section 4.4. Each monitoring report will evaluate if these criteria have been met and prescribe corrective measures if they have not.

First-Year Monitoring. One year after planting, the first report shall be submitted to DPLU and CDFG. This report shall describe and delineate on large-scale maps, the revegetation sites. The standard for the first year shall be: Establishment of all species; 20 percent cover for groundcover plantings; and 80 percent healthy container plantings. The "Time Zero" report shall be included with this report.

The one-acre site planted with willow cuttings will be qualitatively evaluated for the number of willow cuttings that have successfully rooted. The revegetation specialist will determine if the container stock palette will need to be modified based upon the success rate of the willow cuttings. The container stock will be planted and seed mix hand broadcast over the one-acre site.

Remedial Measures: If standards are not met, reseeding, replanting and possible substitution of plant material will be required.

Second-Year Monitoring. At two years after planting, a second similar report shall be submitted to DPLU and CDFG for their review and comment. Records shall be kept of mortality and other problems, such as invasion of the revegetation site by exotic vegetation. Standards for the second year shall be: all trees and shrubs shall be of acceptable growth rate and height; 100 percent survival of all plantings; and 30 percent cover for groundcover plantings.

Remedial Measures: Evaluate the cause of any stunted plants. Make necessary changes to rectify the problem. This may include replanting, soil amendments, regrading, etc.

Third through Fifth-Year Monitoring. From the third through fifth years after planting, similar similar reports shall be submitted to the regulatory agencies listed above for their review and comment. Tree and shrub standards shall be 100 percent survival of all trees and shrubs; 75 percent cover for the third year; and 90 percent cover after year five.

Remedial Measures: Replant if less than 100 percent survival rate for trees and shrubs. If less than 80 percent survival rate for groundcover, then additional seed or container plantings as recommended by the revegetation specialist shall be done.

Each year, the success of the revegetation effort shall be evaluated by comparing factors such as density, spacing and height; and overall species composition with those of the control area See Section 4.4 for a description of the control area. The purpose of such analyses is to evaluate the rate and direction at which the mitigation site is progressing as compared with the control area. It is important to view the growth of the revegetation area with the control area to account for uncontrollable factors such as fire or climate. If the revegetation does not meet the success criteria, the project proponent shall continue with the replacement plantings, weed control, and monitoring on a year-by-year basis until the criteria are met or three additional years, whichever occurs first.

4.4 Technical Measurements

Field observations and measurements shall be recorded on a standard form to be developed and copies of these shall be submitted as an appendix to each report prepared for DPLU. Two belt transects per acre within each mitigation site would be established to measure plant heights. Permanent photo-documentation stations shall also be established within each mitigation site to visually document the vegetational changes and community development. Representative photographs shall be taken during each assessment. Each container planting within the belt transects shall be permanently marked to facilitate survivorship assessment. Aluminum tags or similar tags shall be used. This is important in order to determine planted natural succession or integration during the monitoring period. A complete species list of all vascular plant species and vertebrate animal species encountered during the monitoring shall also be compiled.

Measurements. Included in the "time zero" report shall be baseline measurements of a selected area of riparian habitat adjacent to the revegetation site. This survey shall be conducted to serve as statistical control. Height, density and spacing shall be measured within this control area. Following installation of container stock, the following data collection shall be implemented:

Two belt transects per acre shall be randomly established and permanently located. Along the belt transects the height, density and spacing shall be measured for each species. From this data, the average height along each transect and within the entire revegetation area will be determined for each species. Completed field data forms shall be submitted as an appendix to each required report. Within the transects the following data shall be collected:

a. Survivorship: assessed by absolute counts within the entire mitigation site.

b. Plant height.

ATTACHMENT A

WEED ERADICATION SPECIFICATIONS

WEED ERADICATION SPECIFICATIONS

If extremely invasive and competitive weed species exist on-site they will out compete the native vegetation and shall therefore be eradicated prior to any installation of plant material. Seeds from these species can remain viable in the soil for many years. Therefore, a "grow and kill" weed eradication procedures may be necessary.

If the areas proposed for revegetation are surrounded by existing stands of weeds (especially mustard), that will not be removed, reinfestation is likely to occur. To circumvent reinfestation a clean "buffer zone" is recommended. Weeds adjacent to the revegetation area should be cut down regularly to remove seed stalks before the seeds ripen and redisperse into the revegetation area. Caution should be used in areas where existing oak trees are located to avoid any watering and pesticides under the oaks. The "grow and kill" weed eradication program should include:

1. Clear and remove from site all existing weedy vegetation from the proposed revegetation areas as directed by the revegetation specialist.

2. Prepare soil surface as described above.

3. Install irrigation system.

4. Fertilize with 150 pounds per acre of 15-5-7 Turf Supreme with Best-Cote®.

5. Commence irrigating. The frequency and duration of irrigations will depend on the time of year and the weather. The goal is to keep the soil surface (top 2-inch to 3-inch) moist but not wet. During the summer months, one to two irrigations per day should be sufficient. During other seasons adjust the irrigation schedule to maintain soil moisture.

6. Continue irrigating until a crop of weeds, 1-inch to 3-inch in height becomes evident. During fall months this should occur rapidly, in 2 to 3 weeks, since this is the normal time for germination and growth of cool season weeds.

7. Discontinue irrigating and apply a broad spectrum herbicide (i.e., Round-up®) which will translocate to roots to kill the entire plant. The herbicide shall be recommend by a licensed pest control advisor.

8. Fertilize with 150 pounds per acre of 15-5-7 Turf Supreme with Best Cote®.

9. Recommence irrigating as described in steps #5 and #6 and spray herbicide per step #7.

10. If after the second growing period dense weed infestation is still evident, then a repeat of the "grow and kill" procedure is recommended.

11. Once it has been determined that the weeds are under control then the planting may be performed. The soil surface should be disturbed as little as possible as this will bring additional weed seeds to the surface.

12. Regular monitoring, by the revegetation specialist, of the weed eradication procedures are recommended so that adjustments to the timing of irrigation, herbicide spraying and seeding can be made.

13. No fertilizer should be applied as this may stimulate growth of additional weedy species. The native species can grow without applications of fertilizer.

The "grow and kill" procedures will not remove all weed seeds from the soil, however, it can dramatically minimize the infestation. Regular hand weeding of the revegetation areas will be necessary until the native species are well established.

Many species of large invasive plants, such as giant reed and salt cedar, are difficult to eradicate using the "grow and kill" method. Any of these species that occur within the revegetation sites will be eradicated prior to revegetation. Eradication of both species is accomplished by cutting these species near ground level and immediately apply an herbicide that is approved for aquatic conditions. Removal must be conducted during the months of November through March when the plants are dormant or sap is flowing to the roots. In order for this method to be effective, the individual stems must be cut two to six inches from the ground and herbicide immediately applied to the entire cambium ring. The type of herbicide and timing of application will be directed by a licensed pest control advisor. A follow-up removal of missed or resprouted plants, using hand-clearing methods, will be conducted as part of the mitigation monitoring plan. Resprouted or missed plants shall be removed prior to the onset of flowering. Depending upon the effectiveness of the first treatment, the herbicide may need to be applied for two or three seasons to ensure the eradication of these persistent species.

H

006738

APPENDIX H

LETTER FROM LANDSCAPE ARCHITECT

Brian F. Mooney Associates

Environmental Studies
Resource Management
Community Planning
Landscape Architecture

August 5, 1996

In review of the newly revised blasting plan which proposes to transform the mining face into a fractured, craggy surface with ledges, nooks and crannies that would hold soil for plant growth, it is my professional opinion that the following should also occur:

The final blast shall also be designed to allow for 6 to 12-foot wide irregular ledges that are no greater than 66 feet long with no greater than a 120 foot vertical separation. The ledges shall be irregularly located along the mining face to reduce the horizontal lines associated with hard rock quarries. These ledges shall also be of sufficient size as to allow for an 12-inch to 18-inch layer of soil to be installed. The ledges shall be angled toward the rock face to trap and adhere the soil to the ledge.

The following hydroseed mix shall be applied for reclamation of the mining face after soil is placed on the ledges and in the "nooks and crannies." The hydroseed mix shall be installed where there is enough soil to allow for adequate root growth to occur.

Hydroseed Mix		Lbs/Acre	Purity/Germ
Atriplex canescens	Four wing saltbush	4	90/40
Atriplex semibaccata	Creeping saltbush	10	90/80
Baccharis sarothroides	Broom baccharis	8	5/40
Cistus corsicus	Rockrose	4	98/75
Eriogonum fasciculatum	California buckwheat	8	10/65
Eriophyllum confertiflorum	Golden yarrow	3	30/60
Festuca megalura	Zorro fescue	5	90/80
Lotus scoparius	Deerweed	5	90/60
Plantago insularis	Plantain	40	98/75
Total		87	

The seed mixture as represented above may be modified if baseline studies of the surrounding coastal sage scrub conclude a different seed mixture should be applied.

006740

Also, a design professional such as an artist, landscape architect, rock sculptor or architect shall be involved with the final blasting to ensure that it meets the specifications and intentions of the Environmental Impact Report.

It is anticipated that even with the above mentioned measures, only approximately 5 to 10% of the mining face will be able to support vegetation. A temporary irrigation system shall be installed if after the first rainy season the hydroseeding has not germinated. The system shall be an overhead spray and can be attached to the wire mesh that is draped over the rock face.

The establishment of plant material on the finished sculpted mining face is not in and of itself what reduces the visual impact, however, it is the combination of the final blasting (sculpting blast), the placement of soil and the rock coloring that reduces the visual impact.

Respectfully submitted,

Thomas M. Cherry

Thomas M. Cherry
Landscape Architect #3660

APPENDIX I

NOISE ADDENDUM

January 19, 1996

Mr. Hal Jensen
Palomar Grading & Paving, Inc.
2150 North City Parkway
Escondido, California 92026-1338

PROJECT *Palomar Aggregates Quarry*
RE: *Supplemental Traffic and Quarry Noise Study*

Dear Mr. Jensen:

Subsequent to the preparation of the Palomar Aggregates Quarry Final EIR (Brian F. Mooney Associates, December 8, 1993), a revised project description has been prepared. The purpose of this letter report is to provide additional noise information and analysis based on the revised project description and the County's Comment Letter (Alexander Segal, 9/15/95) regarding the screen check Draft EIR (Brian F. Mooney Associates, August 1, 1995).

In summary, assuming the project is approved as an extractive industry, the proposed quarry would generate a worst case one-hour average noise level which would meet the County's quarry noise ordinance limit of 75 dB along the permit boundary. Noise abatement measures including the use of resilient materials on the screens and crushers, building enclosures and selecting quieter types of equipment would feasibly mitigate the noise impacts.

BACKGROUND

The previous Final EIR (12/8/93) described the existing conditions at the site and determined future noise levels associated with quarry activities and traffic along State Route 76 (SR-76). This supplemental noise analysis is based on the revised project description information contained within the current screen check Draft EIR and revised Major Use Permit plot plan (4/13/95).

The proposed project design revisions include enclosing the rock processing plant's secondary cone crushers, screens and shorthead cone crusher; installing resilient materials such as rubber on the impact surfaces of the crushers and screens; constructing a 30-foot high berm, as measured from the asphalt and concrete plant's pad elevations, along SR-76; installing resilient materials inside the portable rock crusher; using an electric power shovel instead of a diesel power shovel; constructing an asphalt plant which includes the most recent equipment and technology similar to an asphalt plant in Irvine, CA. Also, the proposed permit boundary has been extended by 50 feet to the north and 150 feet to the east. These design changes would

605 Third Street • Encinitas, CA 92024 • (619) 436-9677

affect the project generated noise level and noise impacts previously analyzed for the project.

EQUIPMENT SOURCE NOISE LEVELS

To determine equipment noise levels associated with the various design changes, noise measurements and published information were obtained for various types of equipment and materials. This information is discussed below and summarized in Table 1.

Rock Processing Equipment

The applicant proposes to enclose the sizing screens, secondary cone crushers and shorthead cone crusher. The screens and crushers would be fully enclosed except for openings to accommodate the conveyor belts. Also, the screens and crushing units would have resilient materials, most likely rubber linings, installed on the impact surface areas.

Noise measurements were conducted adjacent to a five-foot secondary cone crusher by Pacific Noise Control at the South Coast Materials Quarry in San Marcos, CA. The noise level measurements were conducted using a Type 1 Larson-Davis Laboratories Model 700B integrating sound level meter. The measured secondary cone crusher is the same size cone crusher as proposed by the applicant. When operating continuously, the measured noise level was 86 dB L_{eq} at 25 feet from the cone crusher. The cone crusher was not enclosed and according to the quarry operator did not have resilient materials on the impact surface areas. Noise measurements were also conducted for the unenclosed sizing screens at the quarry. The measured noise level was also 86 dB L_{eq} at 25 feet. These screens are larger than the screens proposed by the applicant and, therefore, provide a worst case analysis.

The cone crushers and screens would be housed in separate 14-gauge steel enclosures. The enclosures would have sound absorbing material placed on the walls and ceilings of the enclosures. The theoretical insertion loss of the cone crushers and screen enclosures would be approximately 17 and 19 dB, respectively. This assumes that there are no flanking paths along the enclosures which would reduce the sound attenuating performance of the enclosures. Table 2 depicts the insertion loss calculations for the enclosures. Attachments 1 and 2 show the conceptual building designs for the enclosures.

Flanking paths such as poor seals between walls and ceilings or floors, and vibrations of machinery propagating along the structure, as well as panel resonance can reduce the effectiveness of enclosures. Therefore, several case studies were reviewed to determine the approximate noise attenuation that can be expected in actual use. Several studies have been conducted for the U.S. Bureau of Mines assessing the effectiveness of enclosures, barriers and resilient materials (*Demonstration of Noise Control Techniques for the Crushing and Screening of Nonmetallic Minerals*, Foster-Miller, December 1981; *Taconite Crusher Noise Reduction-Study of Acoustical Enclosure for Symons 7 Foot Standard Head, Extra Duty Cone Crusher*, Industrial Acoustics Company, September 1980). These studies generally showed noise attenuation of 10 to 15 dB using an acoustical enclosure and an overall 3 to 7 dB noise attenuation using resilient materials. The acoustical enclosure was custom designed and manufactured by an acoustical noise control manufacturer and used sound absorbing materials on the inside surfaces.

Consequently, based on review of a limited amount of empirical data, it appears that the practical insertion loss of enclosures is approximately 10 to 15 dB. Therefore, based on this empirical data and assuming the crushers and screens are enclosed and resilient materials are used, the one-hour L_{eq} associated with the enclosed secondary cone crushers, screens and shorthead cone crusher would be approximately 71 to 76 dB at 25 feet.

C

Asphalt Plant

Noise measurements were conducted at the All-American Asphalt Plant in Irvine, CA which is similar to the proposed project. However, the All-American Asphalt Plant is larger than the proposed asphalt plant and, therefore, most likely generates noise levels slightly higher than would the proposed asphalt plant. The primary noise sources were the burner/dryer and also the exhaust from the bag house. The noise was directional depending on the orientation to the primary sources. The worst case direction resulted in a noise level of 72 dB L_{eq} at 150 feet from the burner/dryer.

Excavation/Drilling Equipment

An electric power shovel is proposed to be operated within the excavation area. Electric equipment is typically quieter than a similar size diesel powered equipment. Several manufacturers were contacted to obtain noise level data for the proposed electric power shovel/excavator, however, this information was not currently available for the size of power shovel required for this project. Therefore, manufacturers of diesel powered power shovels were contacted. Based on noise level data provided for a John Deere model 992 excavator, the maximum sound level would be 75 dB at 50 feet (*Telephone conversation with John Deere Equipment, January 24, 1995*).

The applicant proposes to install resilient materials such as rubber linings inside the portable primary rock crushing unit. As previously discussed, approximately 5 dB of noise attenuation would be expected by using the resilient materials. Therefore, with the resilient materials the portable crushing unit is expected to generate a one-hour average sound level of approximately 75 dB at 100 feet.

According to the project's geotechnical consultant, Mr. Bing Yen, the drilling equipment is expected to use a 3.5-inch diameter drill bit. Noise measurements for 3.5-inch diameter drills have been measured and reported in the Final EIR (12/8/93). The measured noise level for a 3.5-inch drill bit was 79 dB L_{eq} at 100 feet.

Concrete Plant

The noise level generated by a concrete plant has been previously measured and reported in the Final EIR (12/8/93). The measured noise level was 82 dB L_{eq} at 100 feet from the concrete batch plant.

State Route 76 Traffic Noise

A long-term noise measurement was conducted adjacent to SR-76 between October 10, 1995 and October 12, 1995 to assess changes to the existing noise conditions since November, 1990. The long-term noise measurement site was along the same segment of SR-76 as previously measured (*Palomar Aggregate Acoustical Assessment Report*, Illingworth and Rodkin, June 5, 1991). The sound level meter was positioned approximately 50 feet south from the center line of the road (Figure 1). The highest one-hour noise level was 70 dB L_{eq} and occurred between 7:00 to 8:00 am on October 12, 1995. The CNEL was approximately 69 dB. Table 3 depicts the hourly L_{eq}, maximum and minimum noise levels.

The approximate distances to the existing and existing plus project noisiest (i.e., peak hour) 60 dB one-hour L_{eq} are depicted in Table 4 based on the traffic volume and mix counted during the noisiest hour. The noise contour distances were calculated using Caltrans' SOUND32 traffic noise prediction model and are shown for both hard and soft site conditions. Also, it should be noted that SR-76 has been realigned with a s-curve slightly west of Pankey Road. The s-curve was constructed after the long-term noise measurement conducted in 1990. The vehicle speeds along this segment of road have decreased to negotiate the s-curve since the 1990 noise measurement was made. The s-curve is a detour route, therefore, existing noise contour distances have been provided for both with and without the s-curve conditions. The noise contour distances do not account for the noise attenuation effect of any intervening structures, barriers or topography.

NOISE IMPACTS

Quarry Operations

Noise levels will increase substantially at the project's north, south and east permit boundaries. If approved as an extractive industry, noise generated by the quarry would comply with the County's allowable sound level limit of 75 dB at the permit boundary. Figure 2 depicts the 60 dB one-hour L_{eq} contour at the beginning of Phase 1 assuming the excavation equipment is located approximately at the center of the Phase 1 area. The noise contour is generally located within the permit boundary limits except along the eastern portion of the site. The noise contour at the eastern portion of the site primarily results from the concrete plant, rock processing plant and excavation equipment. The top of the hill would attenuate noise from the excavation area and batch plants to the west of the site.

C

Figure 3 depicts the approximate location of the 60 dB one-hour L_{eq} contour during the initial surface excavation of Phase 2. This assumes that the excavation equipment is located near the center portion of the Phase 2 area. The location of the 60 dB L_{eq} noise contour would extend beyond both the northern and eastern permit boundary areas. The intervening ridge line would attenuate the noise to the west so that the 60 dB L_{eq} contour is located within the permit boundary area.

At the beginning of Phase 3 the excavation equipment would be located at an elevation of approximately 330 to 350 feet above msl. The 60 dB L_{eq} contour shown in Figure 4 is located along the eastern permit boundary and primarily results from the concrete batch plant.

The approximate location of the worst case 60 dB L_{eq} noise contour is depicted in Figure 5. This noise contour assumes all the excavation equipment is operating at the existing ground elevation, and at the limits of grading adjacent to the closest permit boundary line. Also, all the processing site equipment is assumed to be operating. Noise attenuation associated with the intervening topography beyond the limits of grading is included. Because excavation operations would continuously be moving lower in elevation, transmission of noise beyond the permit boundary and exceeding 60 dB L_{eq} will gradually be eliminated adjacent to most of the excavation areas. This worst case noise contour location is only applicable until the ground elevation is lowered to the point where an intervening ridge is developed providing noise attenuation at the adjacent locations. It should be further noted that sound levels exceeding 60 L_{eq} dB would not be constant, but rather intermittent.

/ Table 5 depicts an example of the worst case quarry noise levels as well as the effectiveness of the proposed processing area berm at various locations. Figure 6 depicts the receiver locations.

State Route 76 Traffic Noise

The project would widen and realign a portion of SR-76 from the proposed project entrance to Interstate 15. The proposed project would typically generate 514 ADT (*Traffic Analysis for the Pankey Ranch Mine*, Willdan Associates, December 22, 1995). The total traffic would typically consist of 452 heavy trucks and 62 automobiles. It is estimated that 18.75 percent of the heavy truck traffic would operate during the 7:00 to 8:00 am peak hour (Willdan Associates 1995). Ninety percent of the truck traffic would be oriented towards Interstate 15.

Additionally, due to the potential postponement of construction activities due to weather, the possibility exists for daily trips related to this project to increase by as much as 100 percent on the one or two days following the postponement. Therefore, during this worst-case scenario the daily traffic volume would be approximately 1,028 ADT (Willdan Associates 1995)

There are three homes located in relative close proximity to SR-76 between the project site and Interstate 15. One home is located on top of a knoll approximately 1,000 feet east of Interstate 15 and 400 feet south of SR-76, and two existing farm homes are located on Pankey Ranch approximately 50 feet north of SR-76. After the proposed realignment of SR-76, the two closest farm homes would be located approximately 135 feet and 250 feet north of SR-76.

The current traffic volume on SR-76 east of the Interstate 15/SR-76 interchange is 4,800 ADT (Willdan Associates 1995). Table 6 depicts the existing and existing plus project CNEL noise contours west of the project site. The noise contours are based on the results of the long-term noise measurement and assume vehicle speeds of 55 mph, without the s-curve, and no intervening topography or barriers.

The existing plus project CNEL associated with traffic along SR-76 would increase by one dB or less at the existing home on the knoll and decrease at the two existing farm homes adjacent to SR 76, between the project site and Interstate 15. The noise level increase at the home on the knoll is not significant.

As compared to the existing conditions, the peak hour L_{eq} along SR-76 would increase by approximately three dB from west of the project site to Interstate 15. The approximate distance to the typical existing plus project peak hour 60 dB L_{eq} contour is depicted in Table 4. During the worst-case scenario, the peak hour L_{eq} would increase by approximately five to six dB west of the project site to Interstate 15. The approximate distance to the worst-case scenario existing plus project peak hour 60 dB L_{eq} contour is depicted in Table 4. East of the site, adjacent to the least Bell's vireo habitat area, the typical and worst-case scenario peak hour L_{eq} would increase by less than one dB (Table 4). The noise contour distances do not account for the noise attenuation effect of any intervening structures, barriers or topography.

The alignment currently proposed for SR-76 adjacent to the project site is the Wetlands Impact Reduction alignment (Telephone conversation with Ms. Roma Jones, Brian Mooney Associates, January 24, 1995). This alignment is similar to the alignment proposed in the Final EIR (12/8/93) except the road would be aligned slightly north of the previously proposed alignment.

MITIGATION

Mitigation consists of three general measures. The measures required would include the installation of noise control treatments, conducting noise tests on the equipment prior to start-up to ensure successful implementation of the noise abatement treatments, and implementing a noise monitoring plan for the ongoing operation. The following measures should be made a condition of the Major Use Permit:

Noise Control Treatments

Install resilient materials such as rubber impact pads on the impact surfaces of the portable primary crusher, screens and secondary cone crushers. When installing the materials the attachment bolts should be below the pad surface.

Install sound absorbing materials on the inside surfaces of the enclosures. The material shall have minimum sound absorption coefficients as shown in Table 2.

Require that the siding material used for enclosing the secondary crushers and screens be a minimum of 14-gauge steel or have a similar surface density of approximately 3.0 lb/ft^2.

The enclosures shall be designed so that the screens and cone crushers, as well as their support structures shall not contact the enclosure walls or ceilings. All wall to wall, wall to roof, wall to floor joints, and holes cut for control and power lines shall be sealed.

The doors for the enclosures should be metal with an insulating foam core. The door frames shall have gaskets and seals to provide a tight seal.

Construct a minimum 30-foot high berm adjacent to SR-76 as measured from pad elevations of the asphalt and concrete batch plant.

Design Noise Levels and Noise Testing Prior to Start-Up

Prior to the project being placed in operation, noise testing shall be conducted for the proposed equipment. The design noise levels shall be attained for the individual pieces of equipment as shown in Table 1. For the excavation/drilling equipment, the individual design noise levels shall be met; or the cumulative noise level associated with the excavation equipment including the portable primary crusher shall not exceed a one-hour noise level of 81 dB L_{eq} at 100 feet.

Alternatively, it may be possible that even though an individual piece of equipment may exceed the noise design criteria, that with all of the equipment operating the cumulative on-site operation noise level would still meet the County's noise ordinance limits at the permit boundary. This would result if greater than anticipated noise attenuation is achieved due to intervening topography and structures, or other individual pieces of equipment are quieter than the design criteria. Therefore, if all the equipment is operating, and the cumulative noise level with equipment that does not meet the individual design criteria would still not exceed the County's noise standard at the permit boundary, then the nonconforming individual piece(s) of equipment would not be required to meet the specific design noise levels in Table 1. This must be shown to the satisfaction of the Department of Planning Land Use.

Noise Monitoring Plan for Ongoing Operations

To maintain the design noise levels throughout the life of the project requires regular maintenance of the equipment and timely replacement of worn-out parts and materials. Therefore, to ensure that the design noise levels are maintained during ongoing operations, noise testing shall be conducted along the permit boundary every three months for the first year of operation and every six-months thereafter. The noise testing protocol shall be conducted in accordance with the County's noise ordinance and performed by a County certified acoustical consultant.

The results of the noise tests shall be submitted in a written report to the County Department of Planning and Land Use within one week after conducting the noise tests. If the design noise levels are not met, the quarry operator will have 60 days to correct the problem. If after 60 days the problem has not been corrected, the quarry operator will only be allowed to operate the remaining equipment which will meet the design noise levels. The quarry operator shall fund the noise testing and County's staff time to review the results of the noise tests.

The resilient materials on the screens, primary crushers and secondary crushers should be included as part of the regular maintenance schedule. Gaskets and seals around the doors should be routinely checked and repaired.

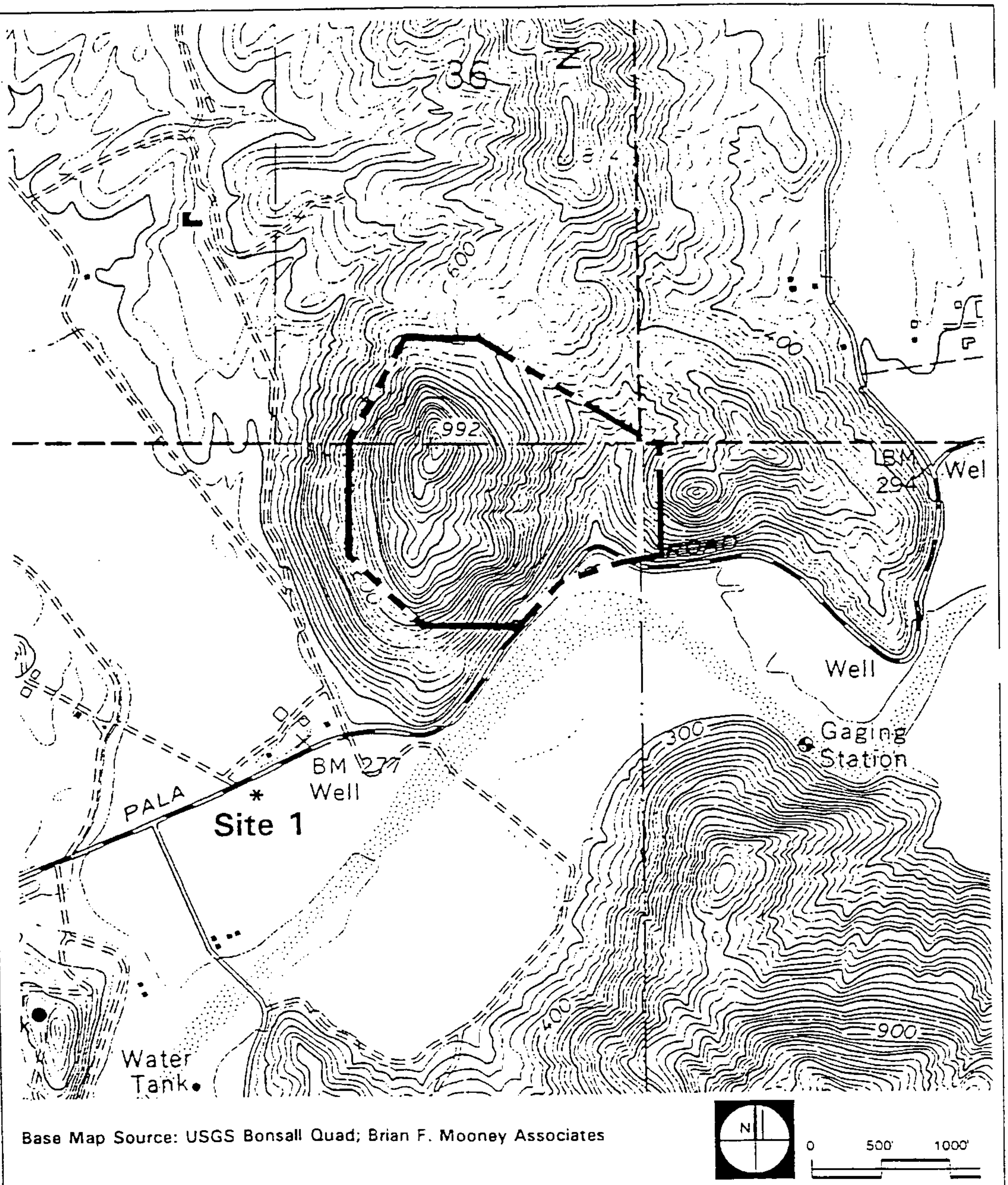
Additional noise abatement measures which could be employed as appropriate include: applying damping material to the enclosure panels; installing loaded vinyl barrier curtains around the exterior of the crusher main frames--a layer of absorptive material should be placed on the interior side; install lined ducting along the conveyor belt entrances and exits; install appropriate vibration isolators and/or provide a structural break in the floor between the equipment and enclosure walls; and construct a wall adjacent to the asphalt burner/dryer.

The proposed mitigation measures are based on the Major Use Permit Plot/Grading plan (revised 4/13/95) and project description contained within the Draft EIR (8/1/95). If changes are made to the grading elevations, facility locations or designs, a noise study shall be required to evaluate any potential noise impacts associated with the design revisions.

This concludes the noise assessment. If you have any questions, please call.

Sincerely,

Mike Komula
Principal

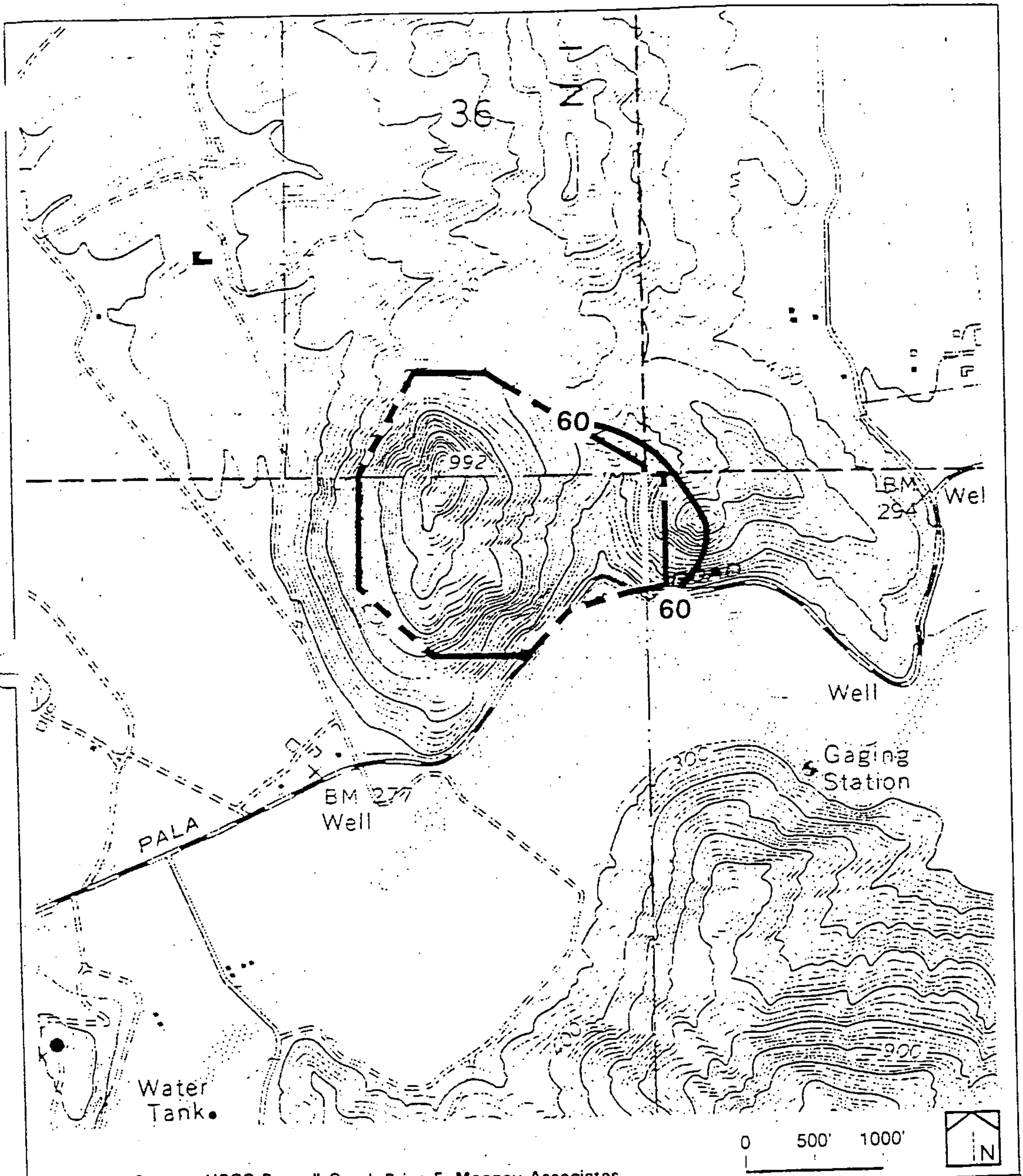


Base Map Source: USGS Bonsall Quad; Brian F. Mooney Associates

006753 NOISE MEASUREMENT LOCATION

FIGURE 1

Pacific Noise Control



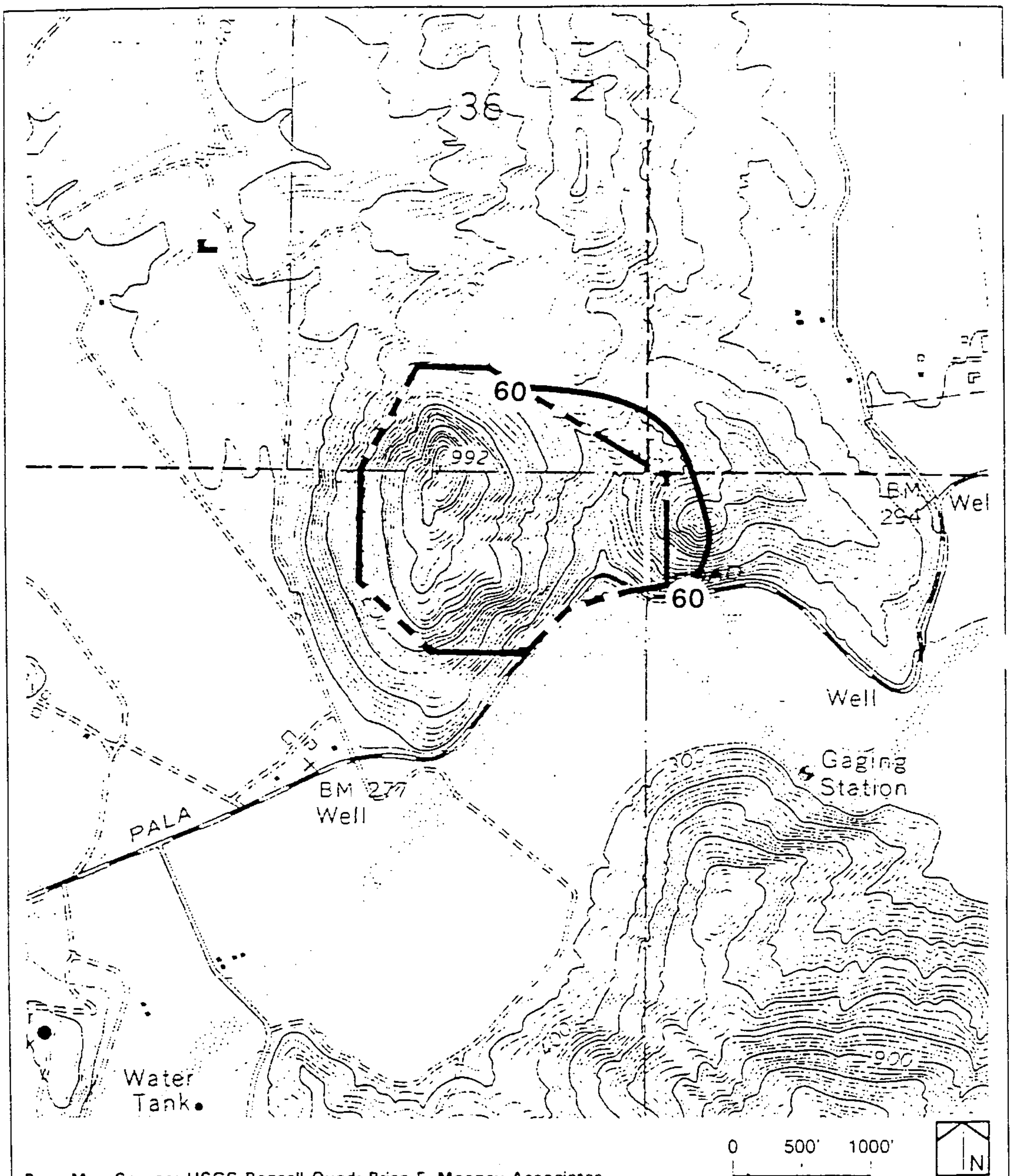
Base Map Source: USGS Bonsall Quad; Brian F. Mooney Associates

PHASE 1 ONE-HOUR AVERAGE NOISE LEVEL 60 dB CONTOUR

FIGURE
2

Pacific Noise Control

006754



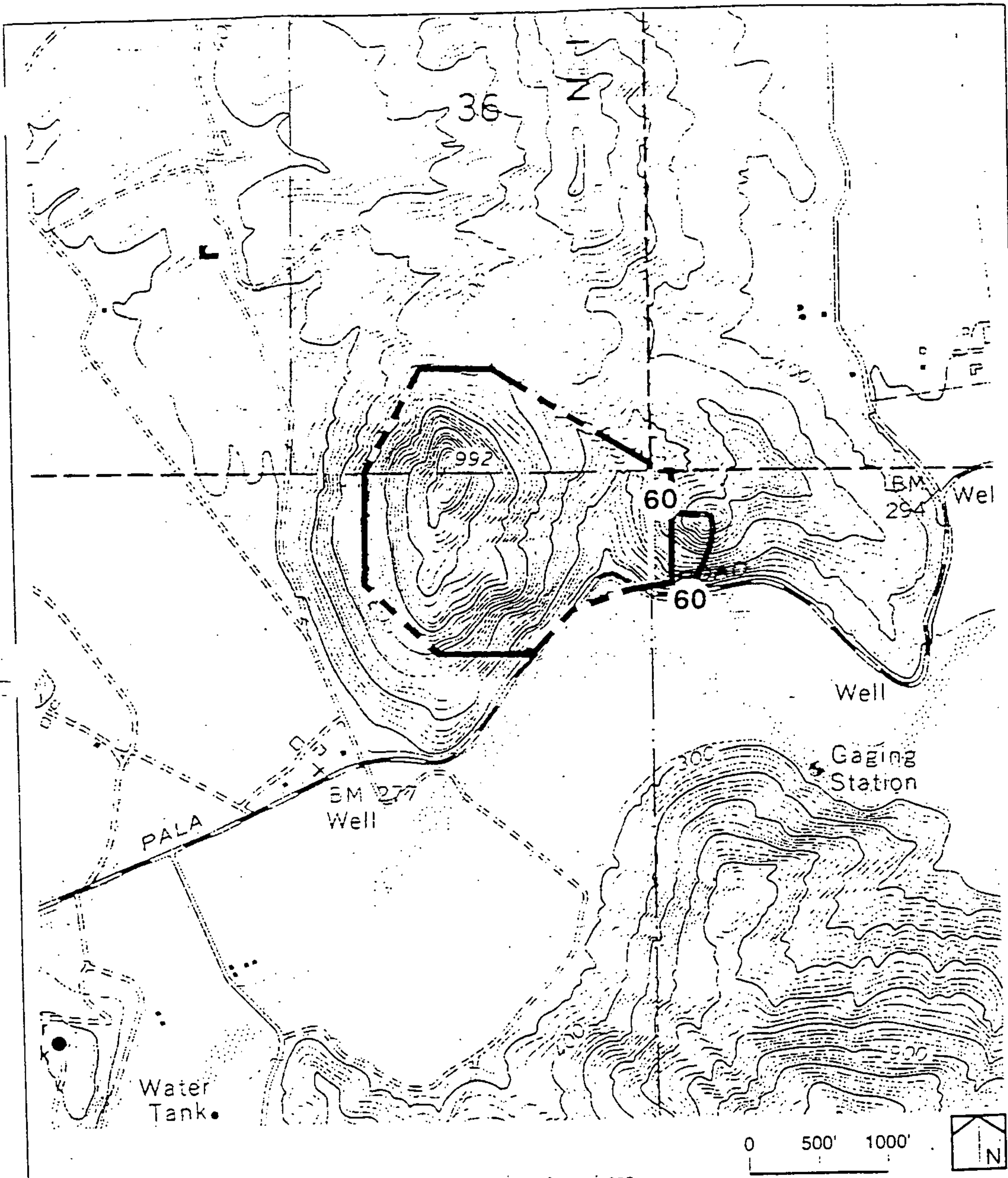
Base Map Source: USGS Bonsall Quad; Brian F. Mooney Associates

006755

PHASE 2 ONE-HOUR AVERAGE NOISE LEVEL 60 dB CONTOUR

FIGURE
3

Pacific Noise Control



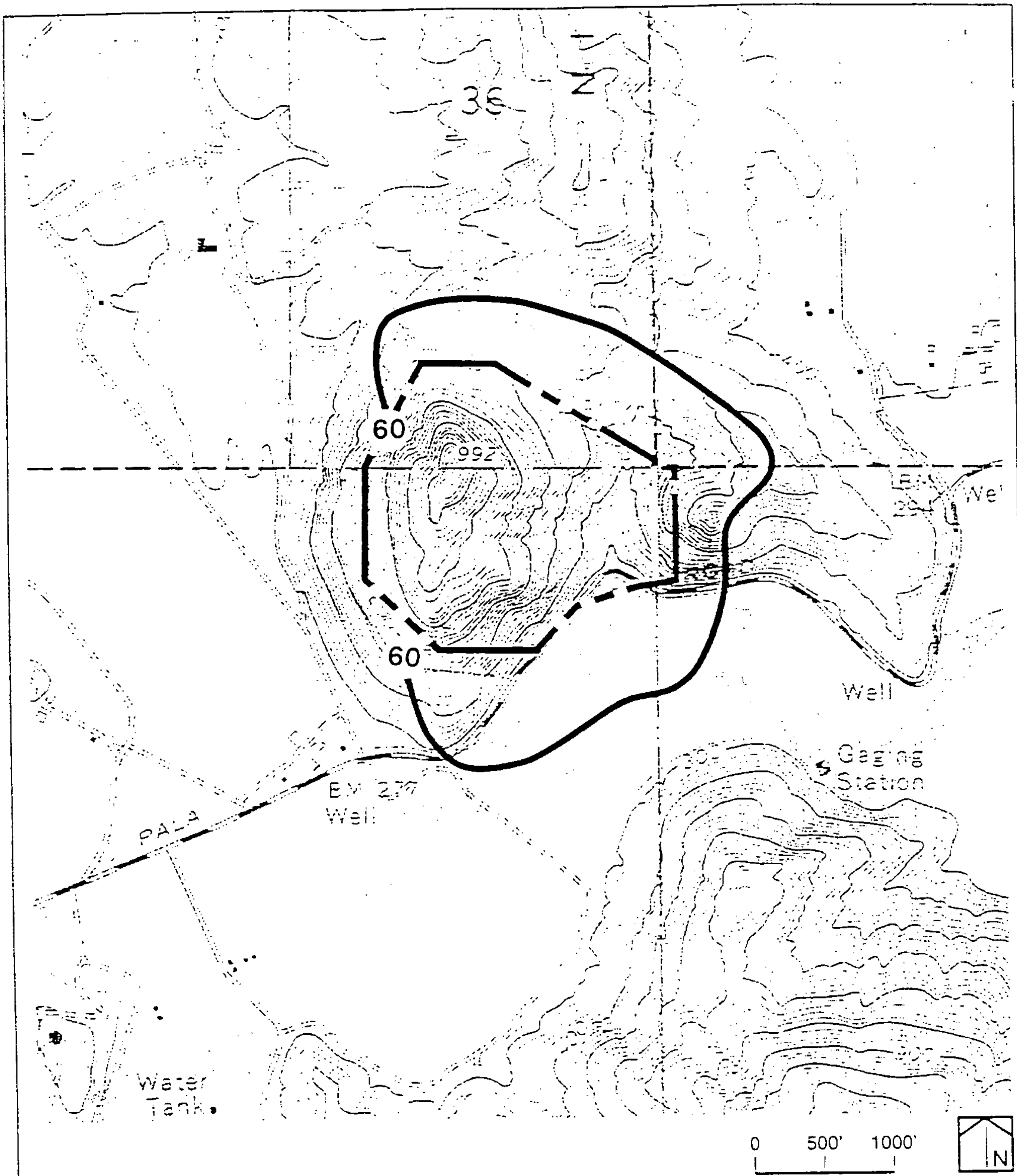
Base Map Source: USGS Bonsall Quad; Brian F. Mooney Associates

FIGURE 4

PHASE 3 ONE-HOUR AVERAGE NOISE LEVEL 60 dB CONTOUR

006756

Pacific Noise Control



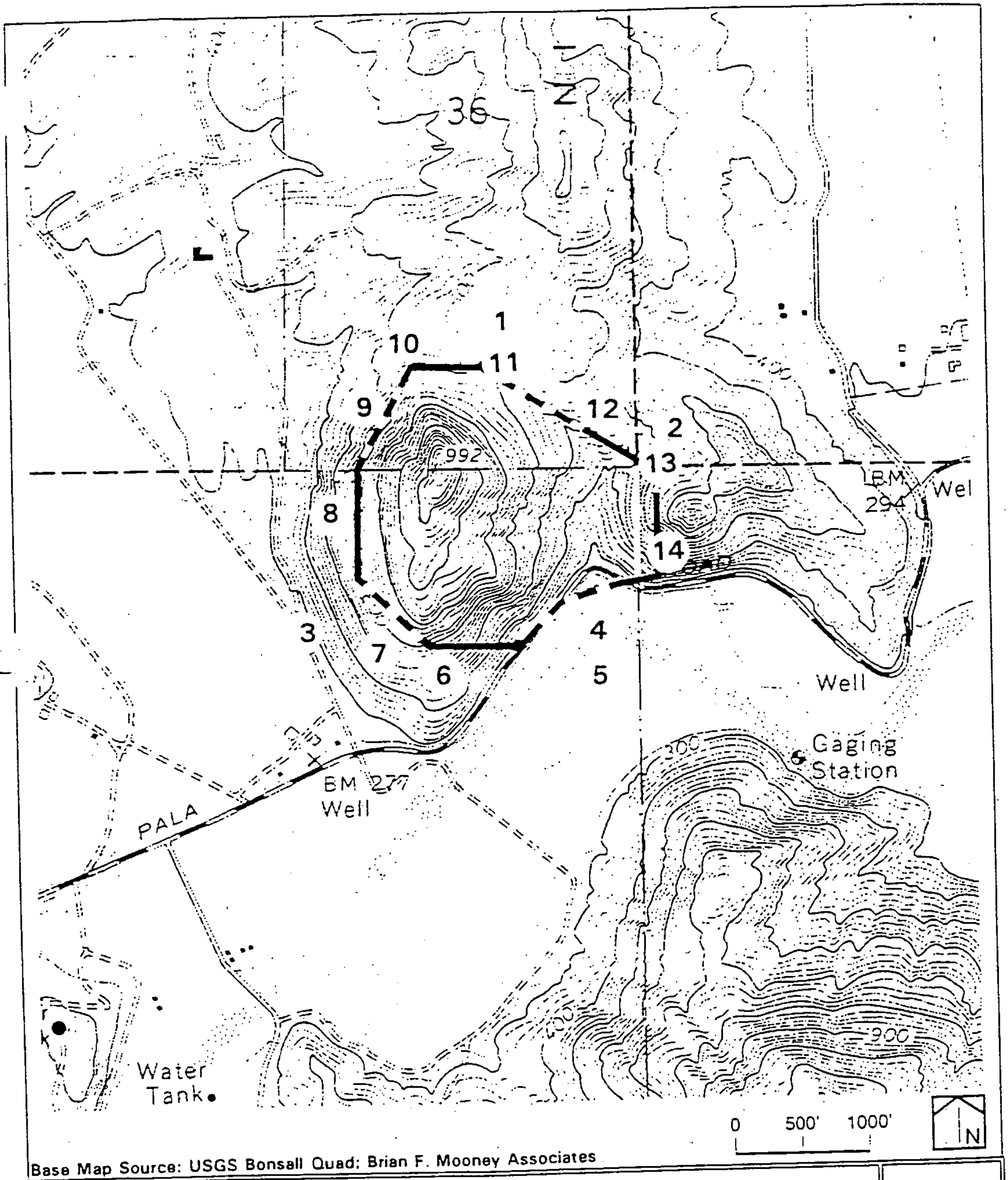
Base Map Source: USGS Bonsall Quad; Brian F. Mooney Associates

WORST CASE 60 dB ONE-HOUR AVERAGE NOISE LEVEL CONTOUR

006757

FIGURE 5

Pacific Noise Control



NOISE RECEPTOR LOCATIONS

006752

FIGURE 6

Pacific Noise Control

TABLE 1

QUARRY EQUIPMENT SOURCE NOISE LEVELS

Source	Source Level (L_{eq})
Rock Processing Area	
Secondary Crushers (2)	86 dB per crusher at 25 ft.
Screens	86 dB at 25 ft.
Shorthead Crusher	86 dB at 25 ft.
(With Proposed Enclosure)	
Secondary Crushers[1] (2)	76 dB per crusher at 25 ft.
Screens[1]	76 dB at 25 ft.
Shorthead Crusher[1]	76 dB at 25 ft.
Asphalt Plant[2]	72 dB at 150 ft.
Concrete Plant	82 dB at 100 ft.
Excavation/Drilling[3]	
Power Shovel	75 dB at 50 ft.
Drill Rig	79 dB at 100 ft.
Primary Crusher	75 dB at 100 ft.
(Cumulative)	81 dB at 100 ft.

Notes:

[1] Assumes crushing and screening equipment is enclosed and resilient materials are placed on the impact surfaces of the screening and secondary crushing units.

[2] Equipment assumed to be similar to the All-American Asphalt Plant in Irvine, CA.

[3] Assumes either electric power shovel/excavator or diesel power shovel with maximum noise level of 75 dB or less at 50 feet; drill rig with noise level of 79 dB at 100 feet; and resilient materials would be placed on the impact surfaces of the portable crusher.

TABLE 2
ENCLOSURE INSERTION LOSS

SOURCE: Screens Proposed Enclosure (12 x 35 x 16 to 30 ft.; 3.7 x 10.7 x 4.9 to 9.1 m)	Octave Band Center Frequency, Hz 125	250	500	1000	2000	4000
Source Sound Level, (dB); 86 dBA at 25 feet (7.6 m)	73[1]	76[1]	80[1]	80[1]	82[1]	77[1]
Field Incidence Transmission Loss, (dB); 14 gauge steel	18	24	30	36	42	48
Transmission Loss, (dB); typical steel door (STC 26)	25	27	29	27	35	28
Absorption Coefficients (typical)	.3	.7	.9	.9	.9	.9
Insertion Loss, (dB)	10.9	17.2	19.2	19.5	19.6	19.6
A-Weighting, (dB)	-16.1	-8.6	-3.2	0	+1.2	+1.0
A-Weighted Sound Level, (dB)	46	50.2	57.6	60.5	63.6	58.4
Overall A-Weighted Sound Level, (dB)	67					

SOURCE: Cone Crushers Proposed Enclosures (12 x 12 x 20 ft; 3.7 x 3.7 x 6.1 m)	Octave Band Center Frequency, Hz 125	250	500	1000	2000	4000
Source Sound Level, (dB); 86 dBA at 25 feet (7.6 m)	71[1]	77[1]	82[1]	82[1]	81[1]	73[1]
Field Incidence Transmission Loss, (dB); 14 gauge steel	18	24	30	36	42	48
Transmission Loss, (dB); typical steel door (STC 26)	25	27	29	27	35	28
Absorption Coefficients (typical)	.3	.7	.9	.9	.9	.9
Insertion Loss, (dB)	10.3	15.9	17.7	17.9	17.9	17.9
A-Weighting, (dB)	-16.1	-8.6	-3.2	0	+1.2	+1.0
A-Weighted Sound Level, (dB)	44.6	52.5	61.1	64.1	64.3	56.1
Overall A-Weighted Sound Level, (dB)	69					

[1] Frequency spectrum information based on Foster Miller, December 1981; and adjusted to correlate with 86 dB.

Field Incidence Mass Law: 20 log $(p_s f)$ - 47
- p_s is mass per unit area, kg/m^2
- f is frequency, Hz

$$IL = 10 \log ((S_w \times \bar{\alpha})/(\sum_i S_{wi} \times 10^{-R_{wi}/10} + \sum_j S_{Gj} \times 10^{-R_{Gj}/10}))$$

- S_w is the total interior wall surface, m^2
- S_{wi} is the surface area of the ith wall, m^2
- R_{wi} is the sound transmission loss of the ith wall
- S_{Gj} is the area of the jth leak or opening, m^2
- R_{Gj} is the sound transmission loss of the jth leak or opening

006760

Insertion loss assumes no structure-borne connections; and power lost due to dissipation in panels and due to sound radiation are small compared with power dissipate in the sound absorbing material on the interior surfaces.

TABLE 3

MEASURED ONE-HOUR AVERAGE NOISE LEVEL ADJACENT TO SR-76

Date/Time	L_{eq}[1]	L_{max}[2]	L_{min}[3]
10/10/95 1:00-2:00 pm	68 dB	85 dB	40 dB
2:00-3:00 pm	67.5 dB	88 dB	39 dB
3:00-4:00 pm	67 dB	87 dB	41 dB
4:00-5:00 pm	67.5 dB	85 dB	42 dB
5:00-6:00 pm	67 dB	85 dB	42 dB
6:00-7:00 pm	66 dB	86 dB	41 dB
7:00-8:00 pm	63.5 dB	86 dB	39 dB
8:00-9:00 pm	61.5 dB	80 dB	37 dB
9:00-10:00 pm	59.5 dB	78 dB	35 dB
10:00-11:00 pm	58.5 dB	78 dB	34 dB
11 pm-12 midnight	60.5 dB	87 dB	31 dB
10/11/95 12:00-1:00 am	54 dB	76 dB	29 dB
1:00-2:00 am	41.5 dB	73 dB	28 dB
2:00-3:00 am	46 dB	71 dB	28 dB
3:00-4:00 am	49.5 dB	77 dB	28 dB
4:00-5:00 am	59.5 dB	81 dB	29 dB
5:00-6:00 am	64.5 dB	86 dB	30 dB
6:00-7:00 am	67.5 dB	83 dB	33 dB
7:00-8:00 am	68.5 dB	87 dB	35 dB
8:00-9:00 am	68 dB	85 dB	34 dB
9:00-10:00 am	67 dB	85 dB	34 dB
10:00-11:00 am	67.5 dB	89 dB	33 dB
11:00 am-12 noon	67.5 dB	84 dB	33 dB
12:00-1:00 pm	67 dB	84 dB	34 dB

Date/Time	L_{eq}[1]	L_{max}[2]	L_{min}[3]
1:00-2:00 pm	68 dB	87 dB	38 dB
2:00-3:00 pm	67.5 dB	83 dB	39 dB
3:00-4:00 pm	66.5 dB	83 dB	39 dB
4:00-5:00 pm	67 dB	86 dB	43 dB
5:00-6:00 pm	66.5 dB	87 dB	43 dB
6:00-7:00 pm	65 dB	84 dB	42 dB
7:00-8:00 pm	62.5 dB	83 dB	36 dB
8:00-9:00 pm	60.5 dB	80 dB	35 dB
9:00-10:00 pm	60 dB	81 dB	32 dB
10:00-11:00 pm	57 dB	76 dB	31 dB
11:00-12 midnight	55 dB	78 dB	31 dB
10/12/95 12:00-1:00 am	54 dB	80 dB	31 dB
1:00-2:00 am	54.5 dB	84 dB	31 dB
2:00-3:00 am	47 dB	76 dB	30 dB
3:00-4:00 am	50.5 dB	77 dB	30 dB
4:00-5:00 am	58 dB	81 dB	30 dB
5:00-6:00 am	66 dB	89 dB	32 dB
6:00-7:00 am	68 dB	85 dB	33 dB
7:00-8:00 am	69.5 dB	86 dB	33 dB
8:00-9:00 am	68.5 dB	86 dB	32 dB
9:00-9:40 am	68.5 dB	86 dB	33 dB

[1] L_{eq} The average A-weighted sound level during the measurement period.
[2] L_{max} The maximum A-weighted sound level during the measurement period.
[3] L_{min} The minimum A-weighted sound level during the measurement period.

TABLE 4

PEAK HOUR EXISTING AND EXISTING PLUS PROJECT 60 DB LEQ DISTANCES

Traffic Scenario	West of Site (Adjacent to IBv's habitat)	East of Site (Adjacent to IBv's habitat)
Existing (With S-Curve) (Hard Site) (Soft Site)	370 feet[1] 180 feet[1]	-- --
Existing (Without S-Curve) (Hard Site) (Soft Site)	410 feet[1] 195 feet[1]	425 feet[2] 195 feet[2]
Existing Plus Project (Hard Site) (Soft Site)	680 feet[1] 295 feet[1]	470 feet[2] 210 feet[2]
Worst-Case Scenario Existing Plus Project (Hard Site) (Soft Site)	920 feet[1] 390 feet[1]	500 feet[2] 220 feet[2]

Parameter	Existing–West of Site (with s-curve)	Existing (without s-curve)	Existing Plus Project (west of site)	Existing Plus Project (east of site)
Cars	169[3]	169	179	170
Medium Trucks	14[3]	14	14	14
Heavy Trucks (typical/worst case)	60[3]	60	136/224	69/78
Speed (mph)	50	55	55	55
Number of Lanes	2	2	4	2
Median Width (feet)	0	0	14	0
L_{eq} at 50 feet (dB)	70	70	73	71
Worst Case L_{eq} at 50 ft.	--	--	76	71

[1] From center line of road; assumes finite roadway length of 3,000 feet.
[2] From center line of road; assumes finite roadway length of 4,000 feet.
[3] Traffic volume count east of Pankey Road from 7:00 to 8:00 am on 10/12/95.

Soft site conditions occur when the intervening ground between the source and receiver is relatively flat and the ground cover is grass, loose dirt or soft ground. Hard site conditions occur when the intervening ground surface is reflective such as a parking lot or hard ground; or the average elevation difference between the source and receiver is approximately 10 feet or more.

006763

TABLE 5

WORST CASE ONE-HOUR AVERAGE NOISE LEVELS AT VARIOUS LOCATIONS

Location	Description	Source	Source Elevation[1]	Receiver Elevation[2]	Source to Barrier	Receiver to Barrier[3]	Barrier Height	L_{eq}
1	Pankey Residence	Secondary Crush	325	680	--	1645	L/S[4]	41.6
		Screen	330	680	--	1660	L/S	38.6
		Shorthead Crush	325	680	--	1695	L/S	38.4
		Asphalt Plant	315	680	--	1910	L/S	48.9
		Concrete Plant	315	680	--	2005	L/S	54.0
		Excavation	715	680	--	650	L/S	64.7
		Cumulative						65
2	Hodges Property	Secondary Crush	325	530	--	945	L/S	47.5
		Screen	330	530	--	900	L/S	44.9
		Shorthead Crush	325	530	--	885	L/S	45
		Asphalt Plant	315	530	--	1225	L/S	52.8
		Concrete Plant	315	530	760	390	465	53.1
		Excavation	440	530	--	600	L/S	65.4
		Cumulative						66
3	Future Residential	Secondary Crush	325	300	1305	1085	825	17.4
		Screen	330	300	1365	1085	825	14.2
		Shorthead Crush	325	300	1410	1085	825	14.0
		Asphalt Plant	315	300	1180	1055	790	26.5
		Concrete Plant	315	300	1420	1075	780	32.1
		Excavation	740	300	120	1040	770	38.7
		Cumulative						40
4	S/O SR-76	Secondary Crush	325	275	495	335	330	31.3
		Screen	330	275	475	365	330	29.3
		Shorthead Crush	325	275	460	365	330	28.9
		Asphalt Plant	315	275	175	375	330	43.2
		Concrete Plant		275	140	370	330	50.2
		Excavation		275	--	860	L/S	62.3
		Cumulative						63
5	S/O SR-76	Secondary Crush	325	275	495	640	330	31.2
		Screen	330	275	475	665	330	29.4
		Shorthead Crush	325	275	460	660	330	28.6
		Asphalt Plant	315	275	175	670	330	41.6
		Concrete Plant	315	275	140	665	330	48.2
		Excavation	690	275	--	1070	L/S	59.4
		Cumulative						60
6	Southern Permit Boundary	Secondary Crush	325	480	660	965	500	21.7
		Screen	330	480	1270	400	525	18.5
		Shorthead Crush	325	480	1305	400	520	18.3
		Asphalt Plant	315	480	1000	350	500	31.9
		Concrete Plant	315	480	1215	355	475	41.8
		Excavation	740	480	195	365	655	59.7
		Cumulative						60

Location	Description	Source	Source Elevation[1]	Receiver Elevation[2]	Source to Barrier	Receiver to Barrier[3]	Barrier Height	L_{eq}
7	SW Permit Boundary	Secondary Crush	325	500	1345	510	780	20.6
		Screen	330	500	1405	510	780	17.3
		Shorthead Crush	325	500	1450	510	775	17.1
		Asphalt Plant	315	500	1180	485	750	30.1
		Concrete Plant	315	500	1425	500	740	35.3
		Excavation	740	500	120	480	760	45.4
		Cumulative						46
8	Western Permit Boundary	Secondary Crush	325	560	1165	685	880	20.6
		Screen	330	560	1230	685	880	17.3
		Shorthead Crush	325	560	1280	685	880	17.1
		Asphalt Plant	315	560	1095	700	835	29.4
		Concrete Plant	315	560	1370	685	840	33.7
		Excavation	845	560	110	680	860	43.0
		Cumulative						44
9	NW Permit Boundary	Secondary Crush	325	545	1215	590	960	20.8
		Screen	330	545	1265	590	960	17.6
		Shorthead Crush	325	545	1315	590	960	17.4
		Asphalt Plant	315	545	1235	670	975	28.9
		Concrete Plant	315	545	1495	630	980	33.5
		Excavation	865	545	80	470	850	46.4
		Cumulative						47
10	NW Permit Boundary	Secondary Crush	325	600	1305	530	720	20.7
		Screen	330	600	1350	525	710	17.5
		Shorthead Crush	325	600	1395	525	705	17.3
		Asphalt Plant	315	600	1510	505	750	27.4
		Concrete Plant	315	600	1660	530	725	33.2
		Excavation	840	600	--	550	L/S[4]	66.2
		Cumulative						66
11	Northern Permit Boundary	Secondary Crush	325	600	810	350	575	24.7
		Screen	330	600	785	390	570	21.6
		Shorthead Crush	325	600	820	395	560	22.4
		Asphalt Plant	315	600	1065	345	595	31.5
		Concrete Plant	315	600	1160	360	575	39.9
		Excavation	650	600	--	200	L/S	75.0
		Cumulative						75
12	Northern Permit Boundary	Secondary Crush	325	515	665	165	505	31.7
		Screen	330	515	665	165	500	30.8
		Shorthead Crush	325	515	700	160	495	33.2
		Asphalt Plant	315	515	980	155	510	38.3
		Concrete Plant	315	515	1020	160	500	49.4
		Excavation	575	515	--	200	L/S	75.0
		Cumulative						75
13	NE Permit Boundary	Secondary Crush	325	450	--	650	L/S[4]	50.7
		Screen	330	450	--	605	L/S	48.3
		Shorthead Crush	325	450	--	585	L/S	48.6
		Asphalt Plant	315	450	--	960	L/S	55.9
		Concrete Plant	315	450	--	860	L/S	63.3
		Excavation	415	450	--	325	L/S	70.8
		Cumulative						72

Location	Description	Source	Source Elevation[1]	Receiver Elevation[2]	Source to Barrier	Receiver to Barrier[3]	Barrier Height	L_{eq}
14	Eastern Permit Boundary	Secondary Crush	325	380	--	640	L/S	50.8
		Screen	330	380	--	595	L/S	48.5
		Shorthead Crush	325	380	--	545	L/S	49.2
		Asphalt Plant	315	380	--	640	L/S	59.4
		Concrete Plant	315	380	--	370	L/S	70.6
		Excavation	390	380	--	700	L/S	64.1
		Cumulative						72

Notes:
1 Source elevation includes 15 feet for source height except for screens which includes 20 feet.
2 Receiver elevation includes 5 feet for receiver height.
3 Receiver to barrier distance is also receiver to source distance if L/S is indicated in barrier height column.
4 (L/S) Line of Sight

Distances are in feet, average noise level in dB.
Noise attenuation at 500 Hz for berm.
Excess atmospheric absorption was calculated at the rate of 1 dB per 1,000 feet of distance to a maximum of 5 dB.

TABLE 6

EXISTING AND EXISTING PLUS PROJECT CNEL NOISE CONTOURS WEST OF PROJECT SITE

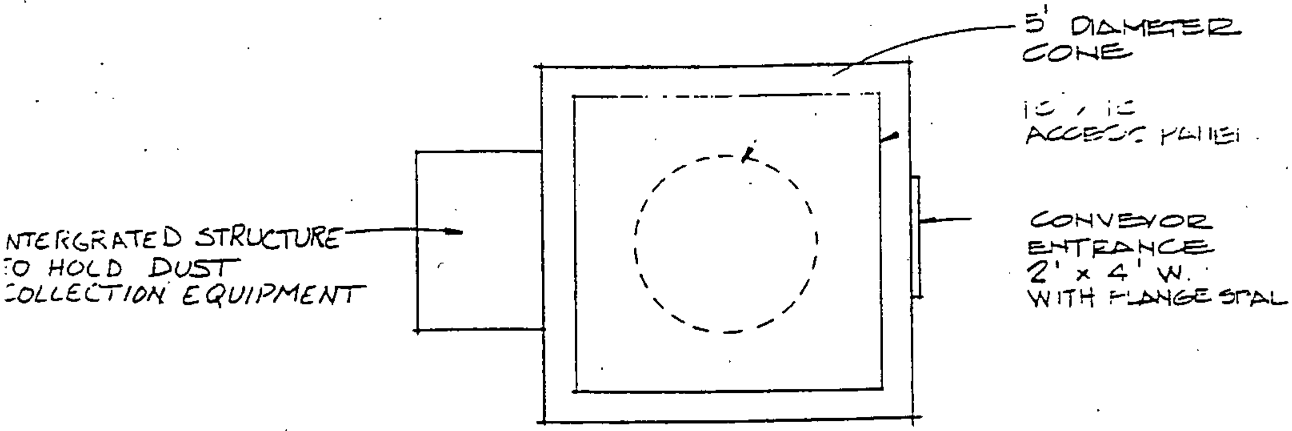
Traffic Scenario	CNEL 70	65	60
Existing (Without S-Curve)			
(Hard Site)	50	135	370[1]
(Soft Site)[2]	50	85	180[1]
CNEL at 50 feet = 70 dB			
Existing Plus Project			
(Hard Site)	70	185	495[3]
(Soft Site)[2]	60	110	225[3]
CNEL at 50 feet = 71 dB			

[1] Distance in feet from center line of road; assumes finite roadway length of 3,000 feet.
[2] Soft site assumed to begin at 50 feet.
[3] The existing + project CNEL was calculated by adding 3 dB to the measured hourly Leq's from 7:00 am to 3:00 pm.

Peak hour L_{eq} measured on 10/12/95 is approximately .5 dB greater than CNEL.

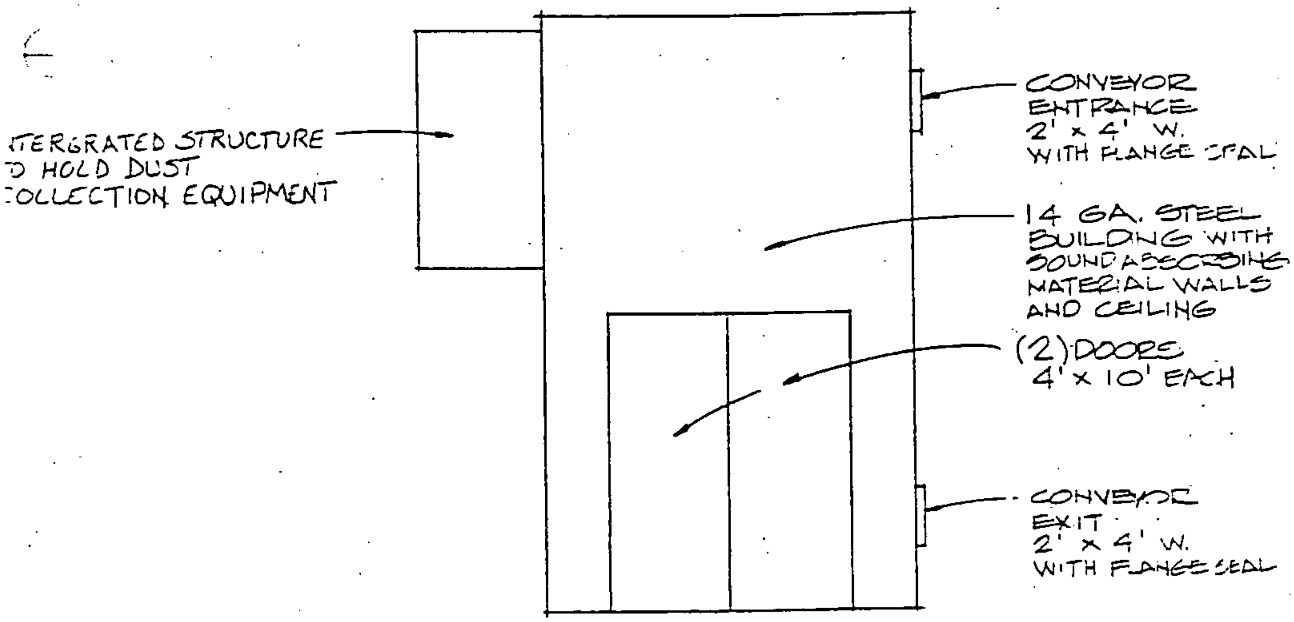
00676

ATTACHMENT 1



CONE BUILDING (TOP VIEW) 12' x 12' x 20' H.

NOTE:
REVERSE OF BUILDING 14 GA. STEEL WITH NO OPENINGS

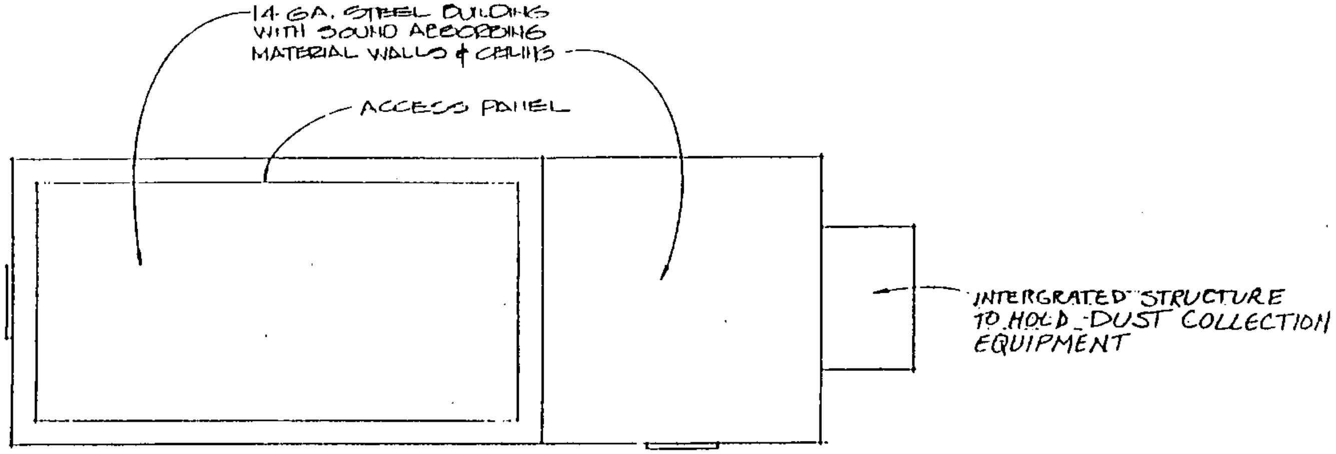


CONE BUILDING (SIDE ELEVATION)
12' x 12' x 20' HIGH

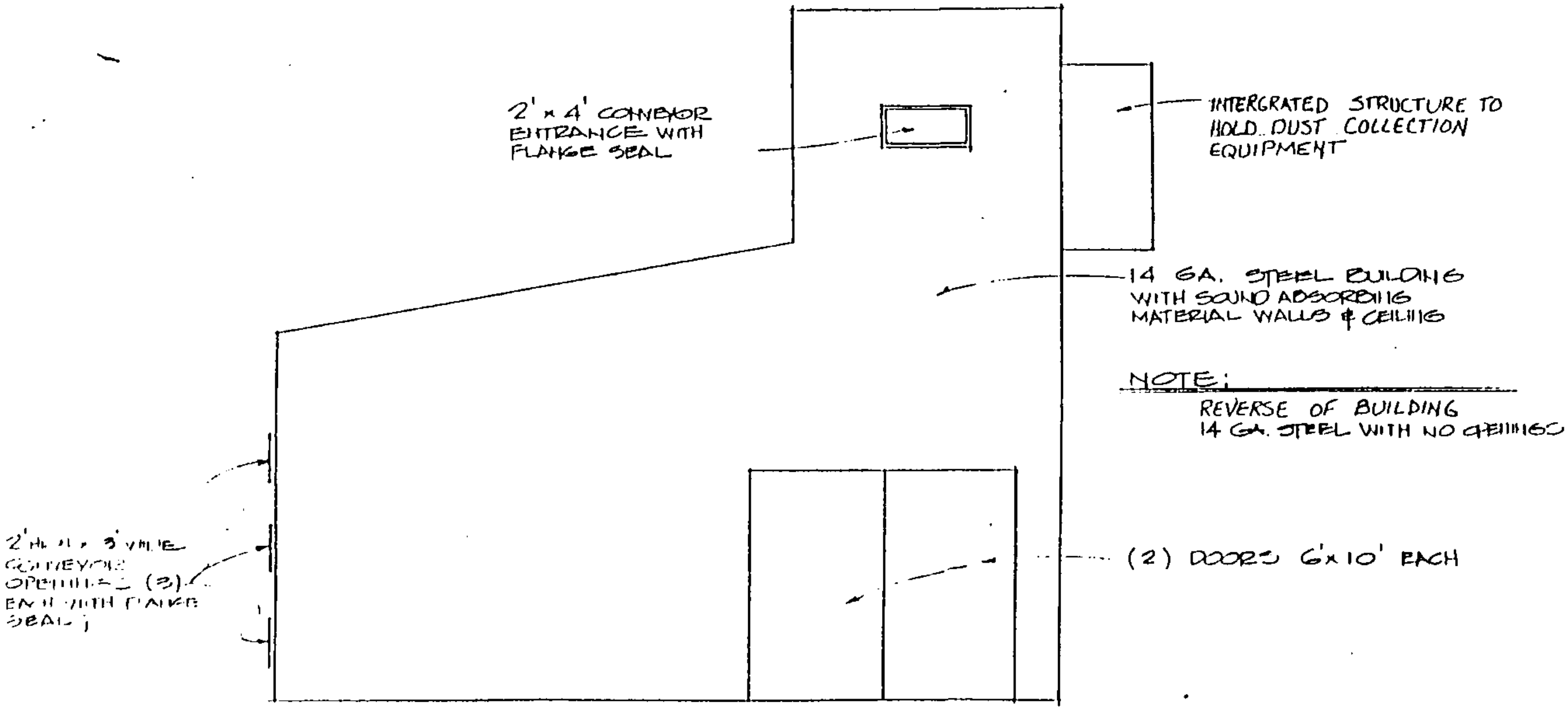
NOTE: 2 cones will have a left side conveyor exit and 1 cone a right side exit.

ATTACHMENT 2

000676



SCREEN ENCLOSURE BUILDING (TOP VIEW)
12' x 35' x 30' HIGH



SCREEN ENCLOSURE BUILDING (SIDE ELEVATION)

TABLE 1

QUARRY EQUIPMENT SOURCE NOISE LEVELS

Source	Source Level (L_{eq})
Rock Processing Area	
Secondary Crushers (2)	86 dB per crusher at 25 ft.
Screens	86 dB at 25 ft.
Shorthead Crusher	86 dB at 25 ft.
(With Proposed Enclosure)	
Secondary Crushers[1] (2)	76 dB per crusher at 25 ft.
Screens[1]	76 dB at 25 ft.
Shorthead Crusher[1]	76 dB at 25 ft.
Asphalt Plant[2]	72 dB at 150 ft.
Concrete Plant	82 dB at 100 ft.
Excavation/Drilling[3]	
Power Shovel	75 dB at 50 ft.
Drill Rig	79 dB at 100 ft.
Primary Crusher	75 dB at 100 ft.
(Cumulative)	81 dB at 100 ft.

Notes:

[1] Assumes crushing and screening equipment is enclosed and resilient materials are placed on the impact surfaces of the screening and secondary crushing units.

[2] Equipment assumed to be similar to the All-American Asphalt Plant in Irvine, CA.

[3] Assumes either electric power shovel/excavator or diesel power shovel with maximum noise level of 75 dB or less at 50 feet; drill rig with noise level of 79 dB at 100 feet; and resilient materials would be placed on the impact surfaces of the portable crusher.

TABLE 5

WORST CASE ONE-HOUR AVERAGE NOISE LEVELS AT VARIOUS LOCATIONS

Location	Description	Source	Source Elevation[1]	Receiver Elevation[2]	Source to Barrier	Receiver to Barrier[3]	Barrier Height	L_{eq}
1	Pankey Residence	Secondary Crush	325	680	–	1645	L/S[4]	41.6
		Screen	330	680	–	1660	L/S	38.6
		Shorthead Crush	325	680	–	1695	L/S	38.4
		Asphalt Plant	315	680	–	1910	L/S	48.9
		Concrete Plant	315	680	–	2005	L/S	54.0
		Excavation	715	680	–	650	L/S	64.7
		Cumulative						65
2	Hodges Property	Secondary Crush	325	530	–	945	L/S	47.5
		Screen	330	530	–	900	L/S	44.9
		Shorthead Crush	325	530	–	885	L/S	45
		Asphalt Plant	315	530	–	1225	L/S	[illegible]
		Concrete Plant	315	530	760	390	465	
		Excavation	440	530	–	600	L/S	6[illegible]
		Cumulative						66
3	Future Residential	Secondary Crush	325	300	1305	1085	825	17.4
		Screen	330	300	1365	1085	825	14.2
		Shorthead Crush	325	300	1410	1085	825	14.0
		Asphalt Plant	315	300	1180	1055	790	26.5
		Concrete Plant	315	300	1420	1075	780	32.1
		Excavation	740	300	120	1040	770	38.7
		Cumulative						40
4	S/O SR-76	Secondary Crush	325	275	495	335	330	31.3
		Screen	330	275	475	365	330	29.3
		Shorthead Crush	325	275	460	365	330	28.9
		Asphalt Plant	315	275	175	375	330	43.2
		Concrete Plant		275	140	370	330	50.2
		Excavation		275	–	860	L/S	62.3
		Cumulative						63
5	S/O SR-76	Secondary Crush	325	275	495	640	330	31.2
		Screen	330	275	475	665	330	29.4
		Shorthead Crush	325	275	460	660	330	28.6
		Asphalt Plant	315	275	175	670	330	41.6
		Concrete Plant	315	275	140	665	330	48.2
		Excavation	690	275	–	1070	L/S	59.4
		Cumulative						
6	Southern Permit Boundary	Secondary Crush	325	480	660	965	500	18.5
		Screen	330	480	1270	400	525	18.3
		Shorthead Crush	325	480	1305	400	520	31.9
		Asphalt Plant	315	480	1000	350	500	41.8
		Concrete Plant	315	480	1215	355	475	59.7
		Excavation	740	480	195	365	655	60

006771

006772

APPENDIX J

LETTER FROM HODGE BROTHERS RANCH

000772

Hodge Brothers Ranch
9256 Pala Road
Pala California, 92059

25 July, 1987

County of San Diego
Department of Planning and Land Use
5201 Ruffin Road
San Diego California, 92123

Re: Pankey Ranch Major Use Permit

Gentlemen:

The Hodge Brothers Ranch and the Pankey Ranch share a common boundary 1/2 mile North from the Southeast corner of Section 36 T9S Range 3 West and 3/8 of a mile East from this corner to Highway 76.

Hodge Brothers Ranch understands that the Pankey Ranch has applied for a major use permit immediately West of the above common corner for a rock mining operation.

The Hodge Borthers Ranch does not object to the above application and supports granting of the major use permit.

Sincerely,

R. Hodge

[illegible] Hodge
Hodge Brothers Ranch.

Incl: Map Hodge Ranch
Pankey Ranch
Major Use Permit Site

C00774

K

APPENDIX K

AIR QUALITY ANALYSIS

AWR ENGINEERING GROUP

Energy and Environmental Engineers

Telephone (619) 232-7004 | 3385 Sunrise Street, San Diego, CA 92102 | Fax (619) 232-9541

TECHNICAL REPORT NUMBER 1211 (REVISED)

ANALYSIS OF AIR POLLUTION EMISSIONS FROM THE PROPOSED PALOMAR AGGREGATES QUARRY

REPORT PREPARED FOR

BRIAN F. MOONEY ASSOCIATES
9903 Businesspark Avenue
San Diego, CA 92131-1120

REPORT REVISED BY:

PAUL A. WEIR
Senior Engineer

January 19, 1996

006777

TABLE OF CONTENTS

PREFACE

This report represents a second revision to AWR ENGINEERING GROUP's Technical Report Number 1211, which was originally issued on January 4, 1988. The original report analyzed the air pollution emissions from the proposed PALOMAR AGGREGATES QUARRY. The proposed QUARRY consisted of an aggregate plant, hot-mix asphalt batch plant, and concrete batch plant.

This revised report analyzes the same proposed aggregate, asphalt and concrete batch plants in light of significant changes which have occurred over the last several years in the Regulations of the San Diego Air Pollution Control District (SDAPCD).

The most significant changes in the SDAPCD's Regulations involve stricter New Source Review (NSR) Rules, including lowering the emissions thresholds for requiring Best Available Control Technology (BACT), an Air Quality Impact Analysis (AQIA), and Emission Reduction Credits (ERCs) to be provided to offset proposed emissions.

In addition, all of the emission factors and calculation techniques utilized in the original report have been reviewed and updated to those currently in use by the SDAPCD.

The overall conclusions of the report remain the same. The proposed facility, when constructed using the required BEST AVAILABLE CONTROL TECHNOLOGY, will comply with all of the standards of the San Diego Air Pollution Control District.

006779

SECTION 1: INTRODUCTION

The PALOMAR AGGREGATES QUARRY will provide sized aggregates for several uses in the North County, including rock for the on-site hot-mix asphalt and concrete batch plants, and aggregates and base material for off-site use.

The proposed locations of the aggregate plant, hot-mix asphalt plant and concrete batch plant are shown in Figure 1. Each of the three plants will require a separate Permit to Operate from the San Diego Air Pollution Control District (SDAPCD).

Figure 2 shows the flow of material through the aggregate plant. The maximum 1.1 MILLION TON/YEAR of rock which will be quarried annually at the site can be divided into various categories of use:

ROCK USED in Asphalt Batch Plant	355,000 TONS
ROCK USED in Concrete Batch Plant	185,000 TONS
ROCK SOLD as Sized Aggregate	510,000 TONS
ROCK STOCKPILED on-site for later use	50,000 TONS
MAXIMUM YEARLY ROCK PRODUCTION:	**1,100,000 TONS**

The proposed plants have production rates as note below:

AGGREGATE PLANT

MAXIMUM HOURLY PRODUCTION	625 TONS
MAXIMUM DAILY PRODUCTION	5,000 TONS
MAXIMUM YEARLY PRODUCTION	1,100,000 TONS

HOT-MIX ASPHALT PLANT

MAXIMUM HOURLY PRODUCTION	350 TONS
MAXIMUM DAILY PRODUCTION	2,100 TONS
MAXIMUM YEARLY PRODUCTION	420,000 TONS

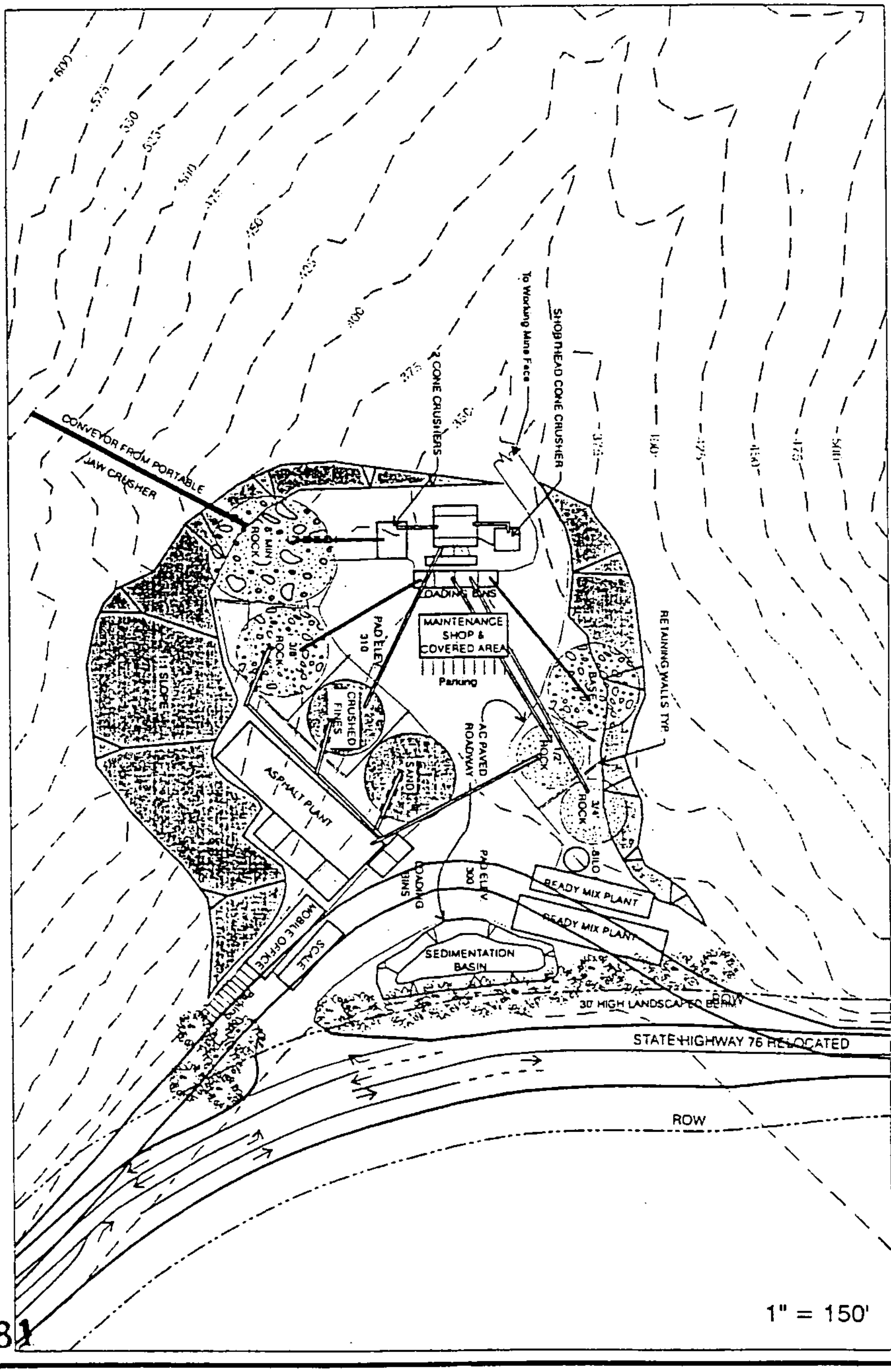
CONCRETE BATCH PLANT

MAXIMUM HOURLY PRODUCTION	100 CYD	200 TONS
MAXIMUM DAILY PRODUCTION	800 CYD	1,600 TONS
MAXIMUM YEARLY PRODUCTION	135,000 CYD	270,000 TONS

This report identifies the SDAPCD standards which will apply to the proposed plants, calculates the emissions from each of these plants, and describes the extent of air pollution controls which will be required on each plant.

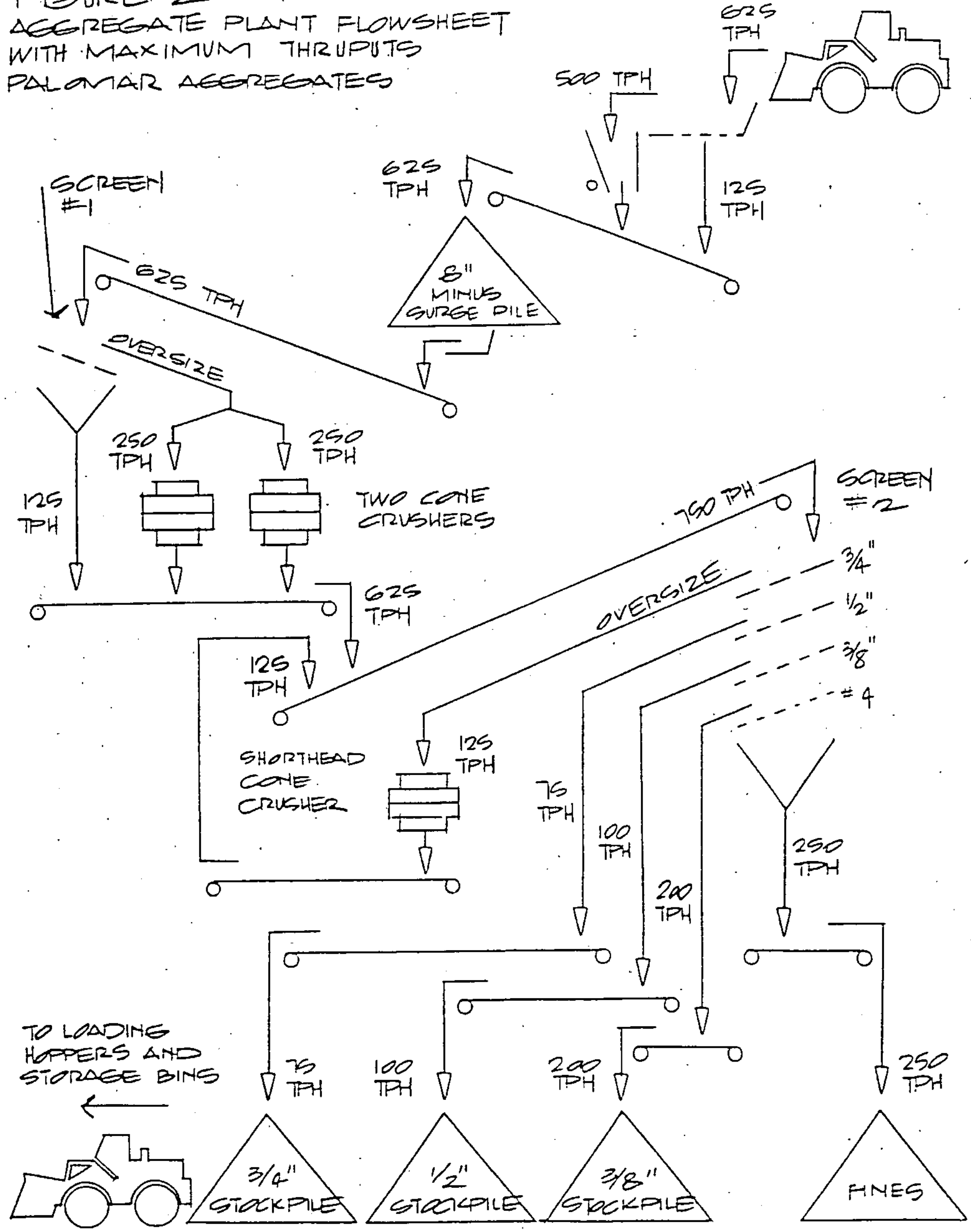
FIGURE 1

PROPOSED PLANT LAYOUT



006781

FIGURE 2
AGGREGATE PLANT FLOWSHEET
WITH MAXIMUM THRUPUTS
PALOMAR AGGREGATES



SECTION 2: REGULATORY SETTING

The San Diego Air Pollution Control District (SDAPCD) is the agency responsible for the permitting and regulation of facilities such as the proposed PALOMAR AGGREGATES QUARRY.

Currently, four separate sets of SDAPCD Regulations would be applied to the proposed aggregate plant, hot-mix asphalt plant and concrete batch plant. Each of the four Regulations has a specific purpose, as detailed below:

1) **Prohibitive Standards**, which limit the amount or extent of emissions from each process.

2) **New Source Performance Standards,** which require stricter controls for the proposed hot-mix asphalt and aggregate plants as compared to existing facilities.

3) **New Source Review Standards,** which require that Best Available Control Technology (BACT) be applied to all portions of the proposed facility, that the Air Quality Impacts of all proposed quarry operations be fully evaluated if emissions exceed certain hourly and daily limits, and that Emission Offsets be provided if emissions exceed certain annual limits.

4) **Title V Federal EPA Permit Standards,** which require a comprehensive, federally enforceable operating permit if annual potential emissions exceeds certain thresholds.

The APCD's Rules forbid any construction of the plant until the entire facility demonstrates that it will comply with all three sets of standards.

1. Prohibitive Standards

District Regulation IV contains the Prohibitive Standards which all facilities in San Diego County must comply with. SDAPCD Prohibitive Rule 50, 51, 54 and 68 will all apply to the proposed facility.

- Rule 50 limits the amount of visible emissions (opacity) arising from all source within the plant.

- Rule 51 prohibits the discharge of any air contaminant which causes injury, nuisance or annoyance to the public.

- Rule 54 limits the discharge of process emissions from the proposed aggregate, asphalt and concrete plants to 40 pounds/hour for each plant.

- Rule 68 limits the emissions of oxides of nitrogen in the exhaust of the hot-mix asphalt plant.

006783

2. New Source Performance Standards

District Regulation X contains the New Source Performance Standards (NSPS) for facilities constructed anywhere in San Diego County. Most of the regulations governing New Sources specify emission standards two to three times more stringent than District Prohibitive Rules. In addition, no "exemptions" or "variances" can be granted by the local agency.

- SDAPCD Rule 260.90 requires that new asphalt concrete plants, such as the proposed hot-mix asphalt plant, meet stricter standards than existing plants for both visible emissions and particulate emissions from the stack.

- SDAPCD Rule 260.670 requires that new non-metallic mineral processing plant, such as the proposed aggregate plant, meet stricter standards than existing aggregate plants for visible emissions from crushing operations, screening operations, conveyor transfer points and stockpiling, and for stack emissions from control devices.

3. New Source Review Standards

District Regulation II contains the New Source Review (NSR) Rules which subject the proposed facility to the requirements of providing additional pollution control technology whenever certain threshold limits are exceeded.

- SDAPCD Rule 20.2 (d)(1) requires that a new facility must be constructed using BEST AVAILABLE CONTROL TECHNOLOGY (BACT), whenever an emissions unit exceeds 10 POUNDS/DAY. BACT is defined as the "maximum degree of air contaminant reduction which the Air Pollution Control District determines is achievable".

- SDAPCD Rule 20.2 (d)(2) requires that a facility complete an Air Quality Impact Analysis (AQIA) if emissions of individual gaseous pollutants from the facility exceed 25 POUNDS/HOUR or 250 POUNDS/DAY, or process particulate emissions exceed 100 POUNDS/DAY.

- SDAPCD Rule 20.2 (d)(5) requires that a facility provide EMISSION REDUCTION CREDITS (ERCs) to be used as EMISSION OFFSETS, if annual process emissions from the site exceed certain thresholds.

4. Title V Permit Standards

District Regulation XIV contains the Rules which implement the requirements for certain facilities to obtain a Federal Operating Permit under Title V of the Clean Air Act Amendments. These rules apply if the facility's potential to emit exceeds certain annual thresholds.

006784

SECTION 3: EMISSION CALCULATIONS

Air pollution emissions from the proposed PALOMAR AGGREGATES QUARRY can be divided into three categories.

3-1 **Process Emissions** - Associated with equipment requiring APCD permits - rock crushing, screening and transfer operations conducted in the aggregate plant, as well as operation of the hot-mix asphalt and concrete batch plants.

3-2 **Fugitive Emissions** - Associated with the quarrying, handling, conveying and stockpiling of rock and sized aggregate at the site.

3-3 **Haul Road Emissions** - Associated with the use of front-end loaders hauling quarried material to the aggregate plant, and heavy duty (15 - 25 ton capacity) trucks hauling sized aggregate, raw materials, hot-mix asphalt and concrete at the site.

Emissions of particulate matter calculated in this report are based on US EPA emission factors and predictive equations for:

PM_{10} - Particulate matter less than 10 micron in diameter, unless a specific Rule or Regulation requires the calculation to be performed for total particulate emissions.

EPA emission factors are generally available for the "uncontrolled" case - without air pollution control equipment or mitigation techniques. Emissions in this report have been calculated based on "controlled emission factors", which incorporate the efficiency of any air pollution mitigation measures.

Emissions of individual gaseous pollutants calculated in this report are based on EPA emission factors and predictive equations, as well as the District's prohibitive and New Source Review (NSR) standards.

3-1 PROCESS EMISSIONS

A. AGGREGATE PRODUCTION - CRUSHING, SCREENING AND TRANSFER

Aggregate production involves crushing, screening, and transfer operations necessary to produce rock of various sizes suitable for sale, or for use in the asphalt or concrete batch plants. Aggregate production rates, based on the flow sheet found in Figure 2, may be used along with emission factors from the U.S. EPA to accurately predict process emissions.

AGGREGATE PLANT PRODUCTION RATES

625 TONS/HOUR
5,000 TONS/DAY
1,100,000 TONS/YEAR

Crushing Emission Factors from EPA AP-42 Table 8.19.2-1

CRUSHING EMISSION CALCULATIONS	THRUPUTS TON/HOUR	UNCONTROLLED EMISSION FACTOR (LB/TON) PM_{10}	CONTROLLED EMISSION FACTOR (LB/TON) PM_{10}
JAW CRUSHER	500	0.017	0.0017
CONE CRUSHERS	500	0.017	0.0009
RECRUSHING	125	1.850	0.0185

Notes on Control Efficiencies (Based on BACT Requirements):

Jaw Crusher : 90% with fabric filter on discharge
Cone Crusher: 95% with fabric filter on discharge
Recrushing : 99% with insertable fabric filter on discharge

Screening Emission Factors from EPA AP-42 Table 8.19.1-1

SCREENING EMISSION CALCULATIONS	THRUPUTS TON/HOUR	UNCONTROLLED EMISSION FACTOR (LB/TON) PM_{10}	CONTROLLED EMISSION FACTOR (LB/TON) PM_{10}
PRIMARY SCREENING	625	0.12	0.0012
PRODUCT SCREENING	750	0.12	0.0012

Notes on Control Efficiencies (Based on BACT Requirements):

Primary Screening: 99% with covered screens and surfactant
Product Screening: 99% with covered screens and surfactant

Transfer Point Emissions Factors from AP-42 Table 11.19.2-2

TRANSFER POINT CALCULATIONS	THRUPUTS TON/HOUR	UNCONTROLLED EMISSION FACTOR (LB/TON) PM_{10}	CONTROLLED EMISSIONS FACTOR (LB/TON) PM_{10}
PRIMARY TRANSFER			
BELT #1	625	0.0014	0.001400
BELT #2	625	0.0014	0.001400
SECONDARY TRANSFER			
BELT #3 (Tunnel)	625	0.0014	0.000700
BELT #4 (Wet)	625		0.000048
BELT #5 (Oversize)	125	0.0014	0.001400
PRODUCT TRANSFER			
BELT #6 (3/4")	75	0.0014	0.001400
BELT #7 (1/2")	100	0.0014	0.001400
BELT #8 (3/8")	200	0.0014	0.000048
BELT #9 (Fines)	250	0.0014	0.001400

The above referenced emission factors can be utilized with the aggregate plant production rates to accurately characterize particulate emissions, as shown below:

SUMMARY OF CONTROLLED CRUSHING, SCREENING AND TRANSFER EMISSIONS

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
JAW CRUSHER	0.85	6.8	0.75
CONE CRUSHERS	0.43	3.4	0.37
RECRUSHING	2.31	18.5	2.04
PRIMARY SCREENING	0.75	6.0	0.66
PRODUCT SCREENING	0.90	7.2	0.79
PRIMARY TRANSFER	1.75	14.0	1.54
SECONDARY TRANSFER	0.64	5.1	0.57
PRODUCT TRANSFER	0.60	4.8	0.53
TOTAL EMISSIONS	8.23	65.8	7.25

006787

3-1 PROCESS EMISSIONS

B. ASPHALT PLANT

The asphalt batch plant will combine various sized aggregates, sand and asphaltic cement into hot-mix asphalt. All annual calculations will be based on a production rate of 420,000 TON.

The plant will require a fabric filter (baghouse) system for control of particulate emissions. The baghouse exhaust is required to meet the Federal NSPS limitation of 0.04 grains/dry standard cubic foot (0.04 gr/DSCF).

At 350 TONS/HOUR, a volumetric flow rate of 28,000 DSCFM will be required for the stack exhaust. This exhaust volume results in maximum hourly emissions of:

$$\frac{0.04\ gr}{DSCF} \times \frac{1\ LB}{7000\ gr} \times \frac{28{,}000\ DSCF}{MIN} \times \frac{60\ MIN}{HOUR} = \frac{9.6\ LB}{HOUR}$$

As shown in EPA AP-42, Section 11.1, Table 11.1-2 PM_{10} emissions are 45% of the TSP emissions.

CONTROLLED EMISSIONS	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
ASPHALT PLANT	4.36	26.2	2.62

In addition, burning liquid fuel in the dryer will cause emissions of the following gaseous pollutants:

Oxides of Nitrogen (NOx)
Carbon Monoxide (CO)
Oxides of Sulfur (SOx)

Accurate estimates of exhaust concentrations for these pollutants are available from recent testing of similar sources. Emissions can be calculated using the following equation:

(CONC in PPM) * (MOL WT) * (0.0044) = POUNDS/HOUR

The following table details the expected concentrations and the hourly, daily and yearly emission rates:

GASEOUS POLLUTANT	MOL WT	STACK GAS CONC. (PPM)	MAXIMUM POUNDS PER HOUR	MAXIMUM POUNDS PER DAY	MAXIMUM TONS PER YEAR
NOx	46	65	13.16	78.9	7.89
CO	28	200	24.64	147.8	14.78
SOx	64	40	11.26	67.6	6.76

3-1 PROCESS EMISSIONS

C. CONCRETE PLANT

Particulate emissions associated with the concrete batch plant consist primarily of cement dust, but some emissions also occur during batching operations. There is also a potential for dust emissions during the conveying of aggregates at the plant.

Control techniques include the enclosure of loading areas, filters on storage bin vents, the use of water sprays, and venting both the weigh hopper and truck loading to a fabric filter.

With the concrete batch plant capacity of 100 CYD/HOUR, emissions can be calculated based on 1 CYD = 2 TON.

MAXIMUM HOURLY RATE	=	200 TON/HOUR
MAXIMUM DAILY RATE	=	1600 TON/DAY

Emissions of total particulate matter are based on EPA AP-42, Section 8.10.3

1. Transfer of sand and aggregate to elevated bins (95% control)

$$.79 \times \frac{200\ TON}{HOUR} \times \frac{0.04LB}{TON} \times 0.05 = \frac{0.32\ LB}{HOUR}$$

2. Cement Unloading to elevated storage silos (99% control)

$$.13 \times \frac{200\ TON}{HOUR} \times \frac{0.24LB}{TON} \times 0.01 = \frac{0.06\ LB}{HOUR}$$

3. Weigh hopper loading of cement, sand and aggregate (95% control)

$$.92 \times \frac{200\ TON}{HOUR} \times \frac{0.02LB}{TON} \times 0.05 = \frac{0.18\ LB}{HOUR}$$

4. Loading of transit mix trucks (95% control)

$$1.00 \times \frac{200\ TON}{HOUR} \times \frac{0.02LB}{TON} \times 0.05 = \frac{0.20\ LB}{HOUR}$$

AP-42, Appendix C-2, Table C-2-2, Category 3 identifies PM_{10} emissions as 51% of overall particulate emissions, therefore, the emissions profile for the concrete plant is:

CONCRETE PLANT EMISSIONS

PRODUCTION RATE	100 CYD/HOUR	800 CYD/DAY	135,000 CYD/YEAR
	LB/HOUR	LB/DAY	TON/YEAR
CONTROLLED EMISSIONS (PM_{10})	0.39	3.1	0.26

006785

3-2 FUGITIVE PARTICULATE EMISSIONS

Fugitive emissions associated with operation of the rock plant are identified with the following four areas:

A. Drilling in the quarry area.
B. Rock handling in the quarry area.
C. Stockpiling and loadout operations in the plant.
D. Wind erosion of stockpiles.

A. QUARRY OPERATIONS - DRILLING

Calculations based on EPA AP-42 Table 8.19.2-2

EMISSION FACTORS

OPERATION	PM_{10}
DRILLING:	.0001 LB/TON

Emissions associated with drilling are calculated based on

625 TONS/HOUR
5,000 TONS/DAY
1,100,000 TONS/YEAR

PM_{10} EMISSIONS FROM DRILLING

LB/HOUR	LB/DAY	TON/YEAR
0.07	0.8	0.06

NOTE REGARDING EMISSIONS FROM BLASTING

The U.S. EPA AP-42 document does not present an emission factor for blasting. The EPA cites the sparsity and unreliability of available test data, and specifies that the use of previous estimation techniques is to be discontinued.

Blasting will be an infrequent source of fugitive emissions at the facility. Emissions which occur on an irregular basis are not included in the SDAPCD's summation of hourly, daily and yearly emissions for determining the applicability of New Source Review Rules.

3-2 FUGITIVE PARTICULATE EMISSIONS

B. QUARRY OPERATIONS - MATERIAL HANDLING

Assuming that quarried material is transferred by front-end loader onto the grizzly feeding the jaw crusher, emissions calculations should be based on the following material handling rates:

625	TONS/HOUR
5,000	TONS/DAY
1,100,000	TONS/YEAR

Calculations of PM_{10} emissions will be based on the predictive equation found in EPA AP-42 Section 11.2.3

$$E = k\,(0.0032)\left(\frac{U}{5}\right)^{1.3} / \left(\frac{M}{2}\right)^{1.4} \quad LB/TON$$

E = Emissions factor
k = Particle Size multiplier: .35 for PM_{10}
U = Mean wind speed: 6 mph
M = Material moisture content: 1.0%

$$E = 0.0011\left(\frac{6}{5}\right)^{1.3} / \left(\frac{1}{2}\right)^{1.4}$$

$$E = 0.0011\ (1.2)^{1.3} / (0.5)^{1.4}$$

$$E = 0.0011 \times 1.2675 / 0.3789$$

Emission factor for PM_{10}: 0.0037 LB/TON

CONTROLLED QUARRY HANDLING EMISSIONS

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
QUARRY HANDLING	2.30	18.4	2.02

006791

3-2 FUGITIVE PARTICULATE EMISSIONS

C. AGGREGATE AND LOAD OUT OPERATIONS

Emission calculations are again based on EPA-42 Section 11.2.3

$$E = k\,(0.0032)\left(\frac{U}{5}\right)^{1.3} \Big/ \left(\frac{M}{2}\right)^{1.4} \quad LB/TON$$

E = Emissions factor
k = Particle Size multiplier: .35 for PM_{10}
U = Mean wind speed: 6 mph
M = Moisture content (varies by product)

$$E = 0.0014 \Big/ \left(\frac{M}{2}\right)^{1.4}$$

Product	M = Moisture %	Emission Factor POUNDS/TON PM_{10}
3/4" AGGREGATE	0.50	0.0099
1/2" AGGREGATE	0.75	0.0056
3/8" AGGREGATE	1.50	0.0021
CRUSHED FINES	2.50	0.0010

The moisture contents specified above are achieved by water sprays located on each stockpiling conveyor.

Based on 3 separate continuous loading operations (all of a similar nature) for each product, involving transfer into a stockpile, a load-out bin, and a haul truck, controlled emissions are calculated as:

PARTICULATE EMISSIONS FROM LOAD OUT OPERATIONS

Product	TOTAL THRUPUT TON/HOUR	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
3/4" AGGREGATE	75 x 3 = 225 TPH	2.23	17.8	1.96
1/2" AGGREGATE	100 x 3 = 300 TPH	1.68	13.5	1.48
3/8" AGGREGATE	200 x 3 = 600 TPH	1.27	10.2	1.12
CRUSHED FINES	250 x 3 = 750 TPH	0.78	6.2	0.69
CONTROLLED LOAD OUT EMISSIONS		**5.96**	**47.7**	**5.25**

3-2 FUGITIVE PARTICULATE EMISSIONS

D. PARTICULATE EMISSION FROM STOCKPILES (WIND EROSION)

The main causes of particulate (dust) emissions from active storage piles are wind erosion and equipment traffic in and around the storage areas. The storage piles accounted for in these emission calculations include the primary surgepile, the four stockpiles of sized aggregate, and the base material stockpile.

Based on EPA AP-42 Table 8.19.1-1

E = 6.3 LBS/ACRE/DAY for active(*) days

E = 1.7 LBS/ACRE/DAY for inactive(*) days

E = Emission factor (LB/DAY)/ACRE

* Active days are defined as days when activity in the stockpile area is taking place; either by material being placed in the stockpile by conveyor belt, or removed from the stockpile by front-end loader. Inactive days are those days when no activity occurs in the stockpile area.

Total area of stockpiles	:	2.5 acres
Maximum active days per year	:	250
Inactive days per year	:	115

Yearly emissions = (6.3 x 250 + 1.7 x 115) x 2.5
Yearly emissions = (1,575 + 196) x 2.5
Yearly emissions = 4,426 LBS = 2.21 TONS

Daily emissions = 6.3 LBS/DAY/ACRE x 2.5 ACRE
= 15.8 LBS/DAY

Worst case hourly emissions are assumed to be 25% of the daily emissions.

Hourly emissions = (0.25) (15.8 LBS) = 3.94 LBS/HOUR

SUMMARY OF WIND EROSION STOCKPILE EMISSIONS

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
EMISSIONS FROM WIND EROSION	3.94	15.8	2.21

006793

3-3 PARTICULATE EMISSIONS FROM HAUL ROADS

General Notes

Haul road emissions arise from five sources at the plant:

A. The front-end loader operating from the quarry face to the mobile jaw crusher.

B. Trucks hauling sized aggregate from the site.

C. Trucks bringing raw materials (asphaltic cement, portland cement and import sand) to the hot-mix and concrete batch plants.

D. Trucks hauling hot-mix asphalt from the site.

E. Trucks hauling ready-mix concrete from the site.

The first source (the front-end loader at the quarry face) operates on an unpaved surface. The other four sources utilize haul routes which are paved.

Emission Factor for the Unpaved Haul Route

Calculations for unpaved haul roads are based on based on EPA AP-42, Section 13.2.1.2, using the following equation:

$$E = K\,(5.9)\left(\frac{s}{12}\right)\left(\frac{S}{30}\right)\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\left(\frac{365-p}{365}\right)\ LB/VMT$$

E = Emissions factor
K = Particle size multiplier: 0.36 for PM_{10}
s = Silt content of road surface material: assume 15%
S = Mean vehicle speed: 10 mph
W = Mean vehicle weight: 24 TONS
w = Mean number of wheels: 4
p = Number of days with ≥ 0.01 in of precipitation per year: 40

Substituting known values in the equation produces:

$$E = 0.7880\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\ LB/VMT$$

$$E = 3.38\ LB/VMT$$

Emission Factors for the Paved Haul Routes

Calculations for paved haul roads are based on EPA AP-42 Section 13.2.4, Equation 13.2.4.3

$$E = k \left(\frac{sL}{2}\right)^{0.65} \left(\frac{W}{3}\right)^{1.5}$$

Sl	=	Silt loading of road (g/m^2)
k	=	0.016 for lb PM_{10}/VMT
W	=	Average weight of vehicle: 27 TONS

The APCD's default value for paved road silt loading (14 g/m^2) will be used for calculating emissions from the site.

UNCONTROLLED PM_{10} EMISSION FACTOR = 1.53 lbs/VMT

Recent field investigations at similar mineral products industry facilities have shown an 80% efficiency in controlling particulate emissions when the road surface is routinely wet swept, coupled with frequent watering of the paved surface tc further suppress airborne dust emissions.

CONTROLLED PM_{10} EMISSION FACTOR = 0.306 lbs/VMT

This emission factor will be used for haul road calculations for the following sources:

B. Trucks hauling sized aggregate from the site.

C. Trucks bringing raw materials (asphaltic cement, portland cement and import sand) to the hot-mix asphalt and concrete batch plants.

D. Trucks hauling hot-mix asphalt from the site.

E. Trucks hauling ready-mix concrete from the site.

006795

3-3 PARTICULATE EMISSIONS FROM HAUL ROADS

A. FRONT-END LOADER IN QUARRY AREA (UNPAVED ROAD)

Quarried material is transported an average of 200 feet from the quarry face to the mobile jaw crusher by front-end loader. The front-end loader has a 15 TON net capacity.

Vehicle Miles traveled per ton hauled, with 400 foot round-trip.

$$\frac{400\ FEET}{ROUND\ TRIP} \times \frac{1\ MILE}{5280\ FEET} \times \frac{1\ TRIP}{15\ TON} = 0.0051\ MILE/TON$$

$$0.0051\ MILE/TON \times 3.38\ lbs/VMT = 0.0171\ LBS/TON$$

Emissions are based on the following transportation rates:

625 TON/HOUR   5,000 TON/DAY   1,100,000 TON/YEAR

Unpaved quarry haul road emissions are:

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
QUARRY HAUL ROADS	10.67	85.4	9.39

NOTES ON PAVED HAUL LENGTHS

The following TABLE describe the ROUND-TRIP paved haul distances at the proposed facility:

B.	SIZED AGGREGATES	:	0.25 MILE	ROUND TRIP
C.	RAW MATERIALS	:	0.15 MILE	ROUND TRIP
D.	HOT-MIX ASPHALT	:	0.15 MILE	ROUND TRIP
E.	READY MIX CONCRETE	:	0.15 MILE	ROUND TRIP

3-3 PARTICULATE EMISSIONS FROM HAUL ROADS

B. HAULING OF SIZED AGGREGATE ON PAVED ROADS

Controlled emission factor for PM_{10} = 0.306 lb/VMT

Vehicles Miles traveled, with 0.25 mile round-trip.

$$\frac{0.25\ MILE}{ROUND\ TRIP} \times \frac{1\ TRIP}{25\ TON} = 0.010\ MILE/TON$$

$$\frac{0.010\ MILE}{TON} \times \frac{0.306\ LB}{VMT} = 0.00306\ LBS/TON\ hauled$$

Emissions are based on the following material shipping rates:

625 TON/HOUR 5,000 TON/DAY 510,000 TON/YEAR

Controlled emissions associated with aggregate being hauled off-site over paved haul roads:

MAXIMUM HOURLY	650 x 0.00306	=	1.99	LBS/HOUR
MAXIMUM DAILY	5,000 x 0.00306	=	15.3	LBS/DAY
MAXIMUM YEARLY	510,000 x 0.00306	=	1,561	LBS/YEAR

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
AGGREGATE HAULED OFF-SITE	1.99	15.3	0.78

006797

3-3 PARTICULATE EMISSIONS FROM HAUL ROADS

C. IMPORT OF RAW MATERIALS FOR BATCH PLANTS ON PAVED ROADS

Operation of the hot-mix asphalt and concrete batch plants requires that certain raw materials be imported.

For the hot-mix asphalt plant, the required materials are:

1)	Asphaltic cement	125 TON/DAY and 25,000 TON/YEAR
2)	Import sand	200 TON/DAY and 40,000 TON/YEAR

For the concrete batch plant, the required materials are:

1)	Portland cement	200 TON/DAY and 35,000 TON/YEAR
2)	Import sand	300 TON/DAY and 50,000 TON/YEAR

Sand and both type of cement materials are brought on-site in 25 TON loads traveling over paved haul roads. Calculation of the number of vehicle trips needed to supply these raw materials is performed below; hourly emissions were calculated assuming a maximum of two trucks of each type of raw material arriving in any one hour.

The Vehicle Miles travelled to import raw materials for both the hot-mix asphalt batch plant and the concrete batch plant are based on a 0.15 mile ROUND TRIP:

$$\frac{0.15\ MILE}{ROUND\ TRIP} \times \frac{1\ ROUND\ TRIP}{25\ TON\ HAULED} \times \frac{0.306\ LB}{MILE} = 0.0018\ LB/TON\ HAULED$$

RAW MATERIALS	100 TON/HOUR	@ 0.0018 LB/TON	=	0.18 LB/TON
ASPHALT PLANT	325 TON/DAY	@ 0.0018 LB/TON	=	0.60 LB/DAY
	65,000 TON/YEAR	@ 0.0018 LB/TON	=	0.06 TON/YEAR
RAW MATERIALS	100 TON/HOUR	@ 0.0018 LB/TON	=	0.18 LB/TON
CONCRETE PLANT	500 TON/DAY	@ 0.0018 LB/TON	=	0.90 LB/DAY
	85,000 TON/YEAR	@ 0.0018 LB/TON	=	0.08 TON/YEAR

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
TOTAL EMISSIONS FROM RAW MATERIAL HAUL	0.37	1.5	0.14

3-3 PARTICULATE EMISSIONS FROM HAUL ROADS

D. HAULING OF HOT-MIX ASPHALT ON PAVED ROADS

Controlled emission factor for PM_{10} = 0.306 lb/VMT

$$\frac{0.15\ MILE}{ROUND\ TRIP} \times \frac{1\ ROUND\ TRIP}{25\ TON\ HAULED} \times \frac{0.306\ LB}{MILE} = 0.0018\ LB/TON$$

Emissions are based on the following production rates:

350 TON/HOUR   2,100 TON/DAY   420,000 TON/YEAR

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
EMISSIONS FROM HAUL OF HOT-MIX ASPHALT	0.64	3.9	0.39

E. HAULING OF READY MIX CONCRETE ON PAVED ROADS

Controlled emission factor for PM_{10} = 0.306 lb/VMT

$$\frac{0.15\ MILE}{ROUND\ TRIP} \times \frac{1\ ROUND\ TRIP}{15\ TON\ HAULED} \times \frac{0.306\ LB}{MILE} = 0.0031\ LB/TON$$

Emissions are based on the following production rates:

100 CYD/HOUR   800 CYD/DAY   135,000 CYD/YEAR
200 TON/HOUR   1,600 TON/DAY   270,000 TON/YEAR

	LB/HOUR PM_{10}	LB/DAY PM_{10}	TON/YEAR PM_{10}
EMISSIONS FROM HAUL OF READY-MIX CONCRETE	0.61	4.9	0.41

006799

3-4 SUMMARY OF ALL EMISSION SOURCES

PM_{10} = Particulate less than 10 micron

	LB/HOUR	LB/DAY	TON/YEAR
3-1 PROCESS EMISSIONS			
A. AGGREGATE PLANT	8.23	65.8	7.25
B. ASPHALT PLANT	4.36	26.2	2.62
C. CONCRETE PLANT	0.39	3.1	0.26
TOTAL PROCESS EMISSIONS	12.98	95.1	10.13
3-2 FUGITIVE EMISSIONS			
A. DRILLING	0.07	0.8	0.06
B. QUARRY HANDLING	2.30	18.4	2.02
C. AGGREGATE TRANSFER	5.96	47.7	5.25
D. WIND EROSION	3.94	15.8	2.21
TOTAL FUGITIVE EMISSIONS	12.27	82.7	9.54
3-3 HAUL ROAD EMISSIONS			
A. QUARRY	10.67	85.4	9.39
B. AGGREGATE PRODUCT	1.99	15.3	0.78
C. RAW MATERIALS	0.37	1.5	0.14
D. ASPHALT PRODUCT	0.64	3.9	0.39
E. CONCRETE PRODUCT	0.61	4.9	0.41
TOTAL HAUL ROAD EMISSIONS	14.28	111.0	11.11

SECTION 4: COMPLIANCE WITH SDAPCD RULES

Before any construction or operation at the proposed quarry can begin, compliance with the following APCD standards must be established.

1) **Prohibitive Standards,** which limit the amount of process emissions from each plant.

2) **New Source Performance Standards,** requiring stricter controls, when compared to existing facilities, for the proposed aggregate and hot-mix asphalt plants.

3) **New Source Review Standards,** which require that Best Available Control Technology (BACT) be applied to all portions of the proposed facility, and that potential Air Quality Impacts of all proposed quarry operations be fully evaluated.

4) **Title V Federal Permit Standards,** which require that the facility remain below certain emission levels, or obtain a Federal Permit to Operate.

1. Compliance with Prohibitive Standards

SDAPCD Prohibitive Rules 50, 51, 54 and 68 will all apply to the proposed facility. The plant is expected to comply with these Prohibitive Standards, based on the following analysis:

- Rule 50 limits the amount of visible emissions (opacity) arising from all sources within the plant. All existing rock, asphalt and concrete batch plants throughout San Diego County routinely comply with Rule 50, therefore the new facility is also expected to comply.

- Rule 51 prohibits the discharge of any air contaminant which causes injury, nuisance or annoyance to the public. Currently all existing plants throughout the County comply with Rule 51, therefore, the new facility is also expected to comply.

- Rule 54 limits the discharge of process emissions from the proposed rock, asphalt and concrete plants to 40 POUNDS/HOUR for each plant. The process emissions from each plant were calculated in Section 3-1 of this report as:

AGGREGATE PLANT	:	8.2	POUNDS/HOUR
ASPHALT BATCH PLANT	:	9.6	POUNDS/HOUR
CONCRETE BATCH PLANT	:	0.8	POUNDS/HOUR

  Therefore, all three plants comply with District Rule 54.

- Rule 68 limits the concentration of oxides of nitrogen in the exhaust stack of the asphalt plant baghouse. All existing asphalt plants in the County comply with Rule 68, therefore the new asphalt plant is also expected to comply.

006801

2. Compliance with New Source Performance Standards

To meet the NSPS requirements, the new aggregate and hot-mix asphalt plants has been designed with pollution controls which are significantly better than at existing plants.

- SDAPCD Rule 260.670 requires that new non-metallic mineral processing plants, such as the proposed aggregate plant, meet stricter standards than existing rock plants for visible emissions from crushing stations, screening operations, transfer points and stockpiling.

  Therefore, the rock crushing plant will be designed with a dust control system allowing the capture of airborne particulate matter with a fabric filter (baghouse) system.

- SDAPCD Rule 260.90 requires that new asphalt concrete plants, such as the proposed hot-mix asphalt batch plant, meet stricter standards than existing plants for both visible emissions and particulate emissions from the stack.

  Therefore, the asphalt plant has a fabric filter (baghouse) system for pollution control which will provide 60% cleaner exhaust than at existing plants not subject to the NSPS.

3. Compliance with New Source Review Rules

PM_{10} emissions from the entire facility, as summarized in Section 3-4 of this report, are compared to the threshold levels of the District's New Source Review Rules in the following Table:

RULE NUMBER	THRESHOLD LEVEL	SITE EMISSIONS	RULE APPLIES?
20.2 (d)(1) BACT	10 POUNDS/DAY	65.8 POUNDS/DAY	YES
20.2 (d)(2) AQIA	100 POUNDS/DAY[1]	95 POUNDS/DAY[1]	NO
20.2 (d)(5) OFFSETS	15 TONS/YEAR[1]	10.1 TONS/YEAR[1]	NO

[1] Process Emissions only

PM_{10} emissions exceed only the 10 POUNDS/DAY threshold of APCD Rule 20.2. Therefore, BEST AVAILABLE CONTROL TECHNOLOGY (BACT) will be required for the entire facility (i.e. all three plants); however an Air Quality Impact Analysis or Emission Offsets evaluation will not be required by the San Diego APCD.

Best Available Control Technology Criteria

BACT is determined on a case-by-case basis by the local Air Pollution Control District. Based on similar plants built in previous years in San Diego County, BACT conditions for the proposed plants, along with the justification for each condition, are presented below:

Aggregate Plant

- **Dust emissions from all crushing operations shall be controlled by venting to a fabric filter system.**

  This condition assures additional reductions in process emissions when compared to plants utilizing only water sprays.

- **Stockpiles of crushed rock shall be kept moist or shall be watered before being loaded into haul trucks.**

  This condition is designed to minimize dust emissions when stockpiled material is being transferred.

- **Visible emissions from transfer points shall not exceed 20% opacity at any time.**

  Rather than allowing the 3 minutes of excess emissions which District Prohibitive Rule 50 provides for, this condition curtails all excessive (i.e. greater than 20% opacity) visible emissions.

- **Unpaved haul roads will be chemically stabilized to minimize dust emissions, or watered as necessary to minimize dust.**

  Chemical stabilization of haul roads reduces emissions by 90%, as compared to only 50% with typical watering.

- **Maximum speed of all vehicles on unpaved roads is limited to 10 miles/hour.**

  When compared to emissions at 30 MPH, speed control of 10 MPH reduces emissions 67%.

006803

Hot-Mix Asphalt Plant

- **Temperature of batched hot-mix asphaltic concrete shall not exceed 330°F, unless a blue-smoke control system approved by the APCD is installed at the batch plant.**

  Reducing the temperature of the mixed asphalt significantly curtails visible emissions of "blue-smoke" during loading of haul trucks.

- **Covers for hot-oil storage tanks shall be kept in place unless the tanks are being filled. The condenser system for fugitive blue-smoke emissions shall be fully operational.**

  This condition regulates the release of visible emissions and hydrocarbon laden vapors from the asphaltic cement storage tanks.

Concrete Batch Plant

- **Transfer of cement shall only be pneumatic conveying. There shall be no leaks of cement dust to the atmosphere anywhere within the transfer system.**

  Pneumatic conveying is a better proven and cleaner transfer technology than relying on mechanical conveying systems.

- **The weigh hopper, concrete batcher and truck discharge shall be vented to a fabric filter (baghouse) system.**

  Requiring a fabric filter system for concrete batching reduces emissions by 90%.

4. Compliance with Federal Title V Permit Standards

The proposed facility would only be required to obtain a Federal Title V Operating Permit if process particulate emissions exceed 100 TONS/YEAR. As noted in Section 3-4, the total process emissions from the facility are only 12.98 TON/YEAR; therefore, the facility does not need a Title V Operating Permit.

SECTION 5: CONCLUSIONS

The San Diego Air Pollution Control District will evaluate the proposed facility before any construction is allowed. The evaluation will not just deal with the District's prohibitive Rules, but will also include the requirement to meet the more stringent New Source Performance Standards (NSPS) for both the aggregate and asphaltic concrete processing plants.

In addition, the SDAPCD will require that additional controls, in the form of BEST AVAILABLE CONTROL TECHNOLOGY (BACT), be placed on all three of the plants.

The proposed rock plant, as currently designed, complies with the Prohibitive and New Source Performance Standards of the District, when producing up to 1,100,000 TONS/YEAR of aggregate and while providing rock for the proposed hot-mix asphalt and concrete batch plants. Both the hot-mix asphalt and concrete batch plants also meet all of the APCD's standards.

The District's requirements to place BACT on all three proposed plants will reduce emissions to the maximum extent technically feasible. With BACT installed on the plant, total emissions remain below the threshold levels for Air Quality Analysis or Emission Offsets evaluations.

Emissions from the facility also remain below the threshold for requiring a Federal (Title V) Operating Permit.

L

APPENDIX L

HYDROLOGY ADDENDUM

Simons, Li & Associates, Inc.
Water Resources & Civil Engineering Consultants MAR 3 1995

March 1, 1995

Roma Jones
BRIAN F. MOONEY ASSOCIATES
9902 E. Businesspark Avenue
San Diego, California 92131-1120

SUBJECT: PALOMAR AGGREGATE QUARRY EIR. REVISIONS TO PROPOSED SR-76 REALIGNMENT.

Dear Ms. Jones,

At your request we have reviewed the proposed revisions to the SR-76 realignment by the Palomar Aggregate Quarry. This realignment was previously studied by Simons, Li & Associates, Inc, and the results of our study are described in a report entitled "Proposed Realignment of State Highway 76 for Pankey Ranch Project" dated December 1988. According to our 1988 report, two sections of SR-76 would be realigned by the proposed project. Segment 1 of the realignment, as described in our report, will cut through the concave side of the river bank, which will affect the flow conditions near the river bend. The maximum rise in water surface elevation would be 1.1 feet. The velocity would increase by a maximum of approximately 2.7 feet per second. Impacts would not extend upstream or downstream of the project area. Segment 2 of the realignment would have no impact on the river hydraulics.

The following assumptions regarding the proposed revisions to the realignment are based on your January 20, 1995 memo to us, and on our March 1, 1995 telephone conversation:

1. The centerline of the revised roadway realignment is the same as the centerline of the roadway alignment studied by Simons, Li & Associates, Inc., and presented in our December 1988 report.

2. The revised realignment consists of the reduction in roadway width of one lane in Segment 1.

3. The reduction in roadway width results in a corresponding reduction in the proposed encroachment into the floodplain of the San Luis Rey River.

Based upon our previous analysis, and the above assumptions, we conclude that the proposed revised realignment of SR-76 will have less impact on the floodplain of the San Luis Rey River than was anticipated in our December 1988 report. The reduction in impact will be approximately 10% to 20%. Since the original impact was not expected to extend upstream or downstream of the property line, is relatively minor, and has been reduced, no additional or detailed analysis is recommended at this time.

Please call me if you have any questions regarding this matter.

Sincerely,

Philip Lowe

Philip Lowe
Project Manager

006808

3636 Birch Street • Suite 290 • Newport Beach, CA 92660-2619 • Tel. (714)476-2150 • Fax. (714)476-2064
Offices in Arizona • California • Colorado • Taiwan

MITIGATION MONITORING PROGRAM

006809

MITIGATION MONITORING PROGRAM
FOR PALOMAR AGGREGATES QUARRY
P87-021, RP87-001, Log #87-2-13

Prepared for:

Palomar Aggregates, Inc.
2150 North Centre City Parkway
Escondido, California 92026

Prepared by:

Brian F. Mooney Associates
9903-B Businesspark Avenue
San Diego, California 92131
(619) 578-8964

February 11, 1997

MITIGATION MONITORING PROGRAM

Mitigation measures which would reduce or eliminate potential environmental impacts of the proposed project have been identified throughout this report. The project proponent is required to implement adopted mitigation measures. In order to ensure compliance, the following mitigation monitoring program has been formulated. This program consists of a checklist followed by a detailed description of the mitigation measures.

The Mitigation Monitoring program is intended to be administered by the Department of Planning and Land Use (DPLU). The County has final responsibility for signing off all satisfied Major Use Permit (MUP) conditions. It is further intended that funds for administering the mitigation monitoring program be provided on a full-cost recovery basis by the permittee or successor in interest to the Major Use Permit. Certifications of Compliance by other agencies, such as Caltrans, County Department of Public Works, or County APCD, shall be secured by the permittee and presented to DPLU. No authorization to commence any activity on-site shall be granted except with the concurrence of DPLU.

The following checklist is intended to be used by DPLU as the appointed monitoring entity. Information contained within the checklist clearly identifies the mitigation measure, delineates the monitoring schedule and defines the conditions required to verify compliance. Following is an explanation of the six columns which constitute the checklist.

Column 1 — Mitigation Measure: An inventory of each mitigation measure is provided with a brief description. The monitor should refer to the corresponding number within the mitigation text for a more detailed description of requirements.

Column 2 — Type: Each mitigation measure is classified as either Project Design Mitigation (PD), Ongoing Mitigation (OM), or Cumulative Mitigation (CM) based upon the following definitions:

- Project Design Mitigation - mitigation which has been incorporated into the project design (e.g., acoustical barriers, road improvements);
- Ongoing Mitigation - mitigation associated with a project over a period of time (e.g., dust control, landscape maintenance);
- Cumulative Mitigation - mitigation which requires monitoring over a greater period of time (e.g., progressive reclamation of mining site).

Column 3 — Monitor: Identifies the agency or department which is responsible to determine compliance with the mitigation measure and to inform DPLU regarding compliance.

Column 4 — Schedule: As scheduling is dependent upon the progression of the overall project, specific dates are not used within the "Schedule" column. Instead, scheduling describes a logical succession of events (e.g., prior to occupancy, annual) and if necessary, delineates a follow-up program.

Column 5 — Compliance Criteria: The monitor can easily determine a mitigation measure's completion by referring to "Compliance Criteria". Upon satisfaction of the requirement listed in this column, the mitigation measure is considered complete.

Column 6 — Verification of Compliance: The monitor verifies completion of the particular mitigation measure by initialing and dating in this column. Where the "Schedule" column indicates annual or other ongoing mitigation measures, verification of compliance may not occur until completion of the project. Provision of all required signatures within the Verification of Compliance column signifies conclusion of the monitoring program.

Column 7 — Remarks: The status of ongoing and cumulative mitigation measures is to be documented during each visit. If the space provided is inadequate, the monitoring date and reference to a progress report would be provided in this column. Information provided within progress reports will be helpful in the development of future mitigation programs.

This program is to be adopted by the lead and responsible agencies upon formulation of findings in order to comply with the requirements set forth by Assembly Bill 3180 (Public Resources Code Section 21081.6).

006812

Mitigation Monitoring Checklist

Mitigation Measure	Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance: Initials	Date	Remarks
A-1. Realignment and widening of SR-76	PD	DPLU	During the initial stage of project and prior to material export	Final approval of Caltrans			
A-2. Sight distance	PD	DPLU	Prior to processing facility operations	Final approval of Caltrans			
A-3. Improvements to Highway 76	PD	DPLU	During the initial stage of project and prior to material export	Final approval of Caltrans			
A-4. Encroachment Permit	PD	DPLU	Prior to commencement of work in State right-of-way	Final approval of Caltrans			
A-5. Vacation of existing right-of-way	PD	DPLU	Prior to realignment of SR-76	Final approval of Caltrans			
A-6. Improvement design and permits	PD	DPLU	Prior to the realignment of SR-76	Acquisition of permits			
A-7. Erect and maintain warning signs	OM	DPLU	Prior to processing facility operations	Signs erected and maintained to County standards			
A-8. Pay for necessary improvements to SR-76 and I-15 ramps	OM	DPLU	Prior to construction of the processing facilities	Funds received or payment schedule arranged by County			
A-9. Secured Agreement for Project Study Report	OM	DPLU	As a condition of the MUP and prior to construction of processing facilities	Agreement secured with County			
A-10. Pave all parking areas and driveways	PD	DPLU	Prior to processing facility operations	Approval of DPLU			
A-11. Maximum monthly average of 514 ADT's, not to reach 1,028 for five consecutive days, and a daily log	OM	DPLU	For the duration of quarry operations	Daily logs to be made available for DPLU approval			
B-1. Re-evaluation of existing vegetative conditions including aerial	PD	DPLU	Prior to preparation of final mitigation plans				
B-2. Preservation of 6.7 acres of willow scrub in open space	PD	DPLU	Prior to any grading or use of the site	Approval by DPLU			

006814

Mitigation Monitoring Checklist

Mitigation Measure		Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance: Initials	Date	Remarks
B-3.	Revegetation of willow scrub in accordance with revegetation plan	PD	DPLU	Prior to processing facility operations	Approval by DPLU			
B-4.	Secured Agreement with County to ensure success of revegetation plan.	OM	DPLU	Prior to any use or reliance on the MUP	Agreement secured with County			
B-5.	Preservation of 7.4 acres of off-site oak woodland for preservation	PD	DPLU	Prior to any use or reliance on the MUP	Approval by qualified biologist or horticulturist			
B-6.	Preservation of 5.1 acres of on-site chaparral for preservation	PD	DPLU	Prior to any use or reliance on the MUP	Approval by qualified biologist or horticulturist			
B-7.	SR-76 slope bank and streambed plantings	PD	DPLU	Prior to processing facility operations	Approval by qualified biologist or horticulturist			
B-8.	Preservation 54.6 acres of a combination of on and off-site sage scrub, including 24.8 acres of toad accessible sage scrub.	PD	DPLU	Prior to any use or reliance on the MUP	Approval by qualified biologist or horticulturist			
B-9.	Erect and maintain fence	PD/OM	DPLU	Prior to any grading	Fence erected and maintained to County standards			
B-10.	Conduct annual vireo and flycatcher surveys	OM	DPLU	Annual	Approval of DPLU			
B-11.	Prohibit truck trips to east between March 15 and September 30, with annual verification letter	OM	DPLU	Condition of MUP and annual	Annual letter report from qualified biologist verifying signage			
C-1.	Paint plant equipment	PD	DPLU	Prior to processing facility operations	Equipment painted and maintained in earthtone colors			
C-2.	Construct 30 foot high berm adjacent to SR-76	PD	DPLU	Prior to processing facility operations	Physical inspection			
C-3.	Landscape berm according to final landscape plan	PD	DPLU	Prior to operation of concrete and asphalt plants	Physical inspection			
C-4.	Sculpting and revegetation	PD	DPLU	Constant reclamation to be completed as part of the mining process	Physical inspection			
C-5.	Permeon staining of final face	PD	DPLU	Constant reclamation to be completed as part of the mining process	Physical inspection			

Mitigation Monitoring Checklist

Mitigation Measure		Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance		
						Initials	Date	Remarks
C-6.	Inspection of sculpted face by a design professional (ie. landscape architect)	OM	DPLU	After sculpting and prior to reclamation	A design professional shall verify that the final sculpted face meets with the intent of this document and submit a letter with photographs to DPLU.			
C-7.	Inspection of sculpted face by engineering geologist	PD	DPLU	Constant reclamation to be completed as part of the mining process	An engineering geologist shall verify that the final sculpted face meets with safety standards outlined in this document and submit a letter with photographs to DPLU.			
C-8.	Annual aerial photograph	OM	DPLU	Annual	Approval of DPLU			
C-9.	Temporary irrigation system (if necessary)	OM	DPLU	As needed	Approval of DPLU			
C-10.	Hydroseed eastern cut slope with native vegetation	PD	DPLU	Constant reclamation to be completed as part of the mining process	Approval of DPLU			
C-11.	Submit final landscape plan	PD	DPLU	Prior to obtaining building permits	Approval of DPLU			
C-12.	Remove all plant equipment and facilities at completion of mining	OM	DPLU	At completion of mining	Physical inspection			
C-13	Permanent fund for wire mesh	OM	DPLU	Prior to use or reliance on the MUP	Physical inspection			
D-1.	Enclose secondary crushers and screens	PD	DPLU	Prior to processing facility operations	Physical inspection			
D-2.	Use resilient materials on screens and crushers	PD	DPLU	Prior to processing facility operations and for the duration of the project	Physical inspection			
D-3.	Enclosure material shall have minimum surface density of 2.0 lb/ft^2	PD	DPLU	Prior to processing facility operations	Noise levels not to exceed 75 dB(A) at the property line			
D-4.	Demonstrate that power shovel/excavator does not exceed 75 dB at 50 feet	PD	DPLU	Prior to processing facility operations	Physical inspection			
D-5.	Construction of 30 foot berm	PD	DPLU	Prior to processing facility operations	Approval of noise mitigation buffers			

006816

Mitigation Monitoring Checklist

Mitigation Measure		Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance: Initials	Date	Remarks
D-6.	Demonstrate all moving parts on batch plant are enclosed in baghouses	PD	County Noise officer or Planning Director	Prior to processing facility operations	Physical inspection			
D-7.	Screens, cone crushers and support structures shall not contact enclosures; all wall to wall, wall to floor, wall to roof joints and any holes cut for powerlines shall be sealed	PD/OM	DPLU	Prior to processing facility operations	Physical inspection			
D-8.	Doors shall be insulated and have gaskets	PD/OM	DPLU	Prior to processing facility operations	Physical inspection			
D-9.	Noise testing of equipment	OM	DPLU	Prior to processing facility operations	Noise measurements			
D-10.	Additional noise measurements along permit boundary	OM	DPLU	Every 3 months for first year and every 6 months thereafter	Noise measurements			
E-1.	No blasting in 15+ mph wind	OM	APCD	During operation	Annual statement from blasting contractor			
E-2.	Fabric filter system for dust control	OM	APCD	During operation	Physical inspection			
E-3.	Water sand stockpiles	OM	APCD	During operation	Physical inspection			
E-4.	Control visible emissions	OM	APCD	During operation	Physical inspection			
E-5.	Dust control on roads	OM	APCD	During operation	Physical inspection			
E-6.	Water during initial grading	PD	APCD	During initial clearing of areas to be mined	Physical inspection			
E-7.	Water quarry working area	OM	APCD	During operation	Physical inspection			
E-8.	Enclose of secondary crushers and screens	PD	APCD	Prior to construction and during operations	Physical inspection			
E-9.	Other dust control as needed	OM	APCD	During operation	Physical inspection			
E-10.	Pneumatic cement transfer	OM	APCD	During operation	Physical inspection			
E-11.	Baghouse for asphalt plant	OM	APCD	During operation	Physical inspection			
E-12.	Cover hot oil storage	OM	APCD	During operation	Physical inspection			
E-13.	Temperature of hot oil	OM	APCD	During operation	Physical inspection			
E-14.	Enclose loading bins	OM	APCD	During operation	Physical inspection			

Mitigation Monitoring Checklist

Mitigation Measure		Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance: Initials	Date	Remarks
E-15.	Water sprays shall be used during loading and unloading	OM	APCD	During operation	Physical inspection			
E-16.	Operations shall be shut down when wind speed exceeds 20 mph	OM	APCD	During operation	Physical inspection			
E-17.	Only unleaded gasoline and diesel fuel with less than 0.05% sulfur content shall be used on-site	OM	APCD	During operation	Physical inspection			
E-18.	Compliance with APCD Rules and Regulations	OM	APCD	During operation	Physical inspection			
F-1.	Riprap SR-76 slope	PD	DPW	Upon relocation of SR-76	Bank protection installed			
F-2.	HEC-2 Analysis / Update of FEMA and County Maps	PD	DPW	Prior to construction of SR-76	Approval by County DPW			
F-3.	Install sediment basin	PD	DPW	Prior to construction of processing facilities	Physical inspection			
F-4.	Runoff directed to basin	PD	DPW	Prior to plant operation	Physical inspection			
F-5.	Maintain sediment basin	OM	DPW	Annually	Physical inspection installed			
F-6.	Standard grease trap to be installed and maintained	PD/OM	DPW	Prior to plant operation	Physical inspection installed			
F-7.	Remove silt material after each storm event	OM	DPW	During operation	Physical inspection			
F-8.	Culverts under access road	PD	DPW	Prior to plant operation	Physical inspection			
F-9.	RWQCB permits	PD	DPW	Prior to construction of processing facilities	Letter from SDCWA			
I-1.	Concrete pond Monitoring	CM	DPLU	For life of project	Letter from blasting engineer			
I-2.	Slope stability analysis	CM	DPLU	For life of project	Letter from Geotechnical Engineer			
I-3.	Drape wire mesh over rockface	CM	DPLU	As needed	Letter from Geotechnical Engineer			
I-4.	Clear employees from blasting area	OM	DPLU	Prior to blasting of mining face	Copy of Mining and Blasting Plan with this condition specified			
I-5.	Remove floaters	PD	DPLU	Prior to processing facility operations	Letter from Geotechnical Engineer			

006817

Mitigation Monitoring Checklist

Mitigation Measure		Type	Monitor	Schedule	Compliance Criteria	Verification of Compliance		
						Initials	Date	Remarks
I-6.	Erect and maintain rockfall signs	OM	Caltrans	Prior to plant operation and annual	Signs erected and maintained to County standards			
I-7.	Determine seepage effect and dam stability	CM	DPLU	Prior to implementation of water reservoir reclamation plan	Report submitted to County DPLU from qualified geotechnical engineer			
I-8.	Determine need for setbacks, berms/barriers	CM	DPLU	Prior to reclamation of site for agricultural use	Physical inspection and approval of Geotechnical Engineer			
I-9.	Erect and maintain fence	PD/OM	DPLU	Prior to operation	Fence erected and maintained to County standards			
I-10.	Blasting permit	PD	DPLU	During operation	Approval of DPW			
J-1.	LPS lamps	PD	DPLU	During operation	Physical inspection			
J-2.	Minimum intensity	PD	DPLU	Prior to plant operation	Physical inspection			
J-3.	Outdoor lighting off at 10 p.m.	OM	DPLU	During operation	Physical inspection			

A. List of Mitigation Measures

The following provides a more detailed description of the mitigation measures presented in the checklist.

Traffic

A-1. During the initial stage of the project and prior to export of material from the site, State Route 76 shall be realigned and widened from two lanes to four lanes between I-15 and the western boundary of the project. The highway would transition to three lanes at the western boundary and then back to two lanes just east of the project. This widening shall be constructed by the applicant and available for use prior to any export of material from the site.

A-2. Prior to project operation, five-hundred and fifty (550) feet of intersectional sight distance shall be provided along SR-76 from the proposed driveway entrance to the satisfaction of Caltrans.

A-3. During the initial stage of the project and prior to export of material from the site, State Highway 76 will be improved from I-15 to the project entrance to a four-lane road with bike lanes, asphaltic concrete pavement over approved base, asphaltic concrete dikes, asphaltic concrete acceleration/deceleration lanes, asphaltic concrete widening to accommodate a left turn lane at the project entrance, and asphaltic concrete taper to existing pavement at the eastern boundary of the project, to the satisfaction of the Director of Public Works and Caltrans.

A-4. Prior to commencement of work in the State right-of-way, an encroachment permit shall be obtained from Caltrans.

A-5. Prior to the realignment of SR-76, the right-of-way for the existing on-site alignment of SR-76 shall be vacated to the satisfaction of the Director of Public Works and Caltrans.

A-6. Prior to construction, all proposed improvements shall be coordinated with both Caltrans and the County Traffic Engineer and all necessary permits shall be secured.

A-7. Prior to the commencement of quarry operations, appropriate warning signs shall be installed east and west of the project's access onto SR-76 to warn motorists of slow moving vehicles.

A-8. Prior to commencement of construction, in accordance with County policy, the project proponent will pay for all improvements deemed necessary by Caltrans in their Project Study Report, including: ~~the project shall contribute its fair share towards future~~ improvement of and signalization to the I-15 northbound and southbound SR-76 on and off-ramps, realignment and widening of SR-76 from I-15 to the project site, and for maintenance and repair of SR-76 due to damage from project-related heavy truck traffic. The Client may request a reimbursement agreement with the County of San Diego for improvements deemed necessary by Caltrans except for improvements necessary for project access from SR-76.

Caltrans shall determine, during its feasibility analysis for the road widening, the appropriate amount of money or other assurance to be provided for maintenance of SR-76 and other Caltrans requirements.

A-9. As a condition of the Major Use Permit and prior to construction, the applicant shall enter into a Secured Agreement with the County of San Diego for funding a Project Study Report (PSR) with Caltrans for the construction of SR-76 relocation environmental approval and the design of the relocated segment.

A-10. Prior to quarry operations, all parking areas and driveways shown on the plot plan shall be improved with a minimum of one and one-half inches of road oil mix, asphaltic concrete or PCC concrete, and parking spaces shall be delineated.

A-11. During quarry operations, average daily trips generated by the Proposed Project shall not exceed a monthly average of 514 ADTs or reach 1,028 ADTs for more than five consecutive days. The project proponent (Palomar Aggregates Inc.) shall keep a daily log of truck and automobile trips and make it available to the Department of Planning and Land Use on an on-call basis.

Biological Resources

B-1. Prior to the preparation of final mitigation plans, the area will be revisited and conditions mapped with the use of an up-to-date aerial to reflect any fluctuations in the vegetative conditions. The numbers provided below describe current conditions at the Shearer Crossing mitigation site for both the existing vegetation and the area to be restored. However, riverine systems are dynamic in nature, often scouring vegetated areas during flooding, while other areas undergo vegetative development where historically vegetation was absent. It is likely that conditions within and adjacent to the San Luis Rey River may change in the future. Although the total mitigation parcel size of 18.4 acres will not change, there may be differences between the future acreages of both the existing vegetation and the area to be restored, and the numbers provided below.

B-2. Prior to any grading, an approximately 6.7 acre area of southern willow scrub shall be preserved in open space at the mitigation site west of Shearer Crossing. Although a portion of the mitigation area west of Shearer Crossing may not be suitable for vireo breeding because it is within the I-15 60 dB(A) noise contour, it has been approved as a mitigation area based on its local and regional importance for vireo migration and dispersal.

B-3. Prior to operation of the processing facilities, revegetation for southern willow scrub shall be completed in accordance with the Palomar Aggregates Revegetation Plan. Revegetation shall take place at two sites: in the river west of Shearer Crossing, and north of the river along side the future realignment of SR-76, on the fill slope facing the river. Cuttings from the willows in the drainage north of SR-76 shall be used as part of the revegetation plan. The recommended restoration at the site west of Shearer Crossing shall include the revegetation of approximately 9.8 acres. This amount is derived from a 3:1 replacement (6.6 acres) for the 0.3 acre impact to riparian vegetation at the quarry site and 1.9 acres of noise impacted area along Horse Ranch Creek plus a 1:1 replacement (3.2 acres) for the loss of vireo critical habitat and proposed willow flycatcher critical habitat south of the road. Approximately 11.7 acres of potential southern willow scrub restoration area will be available west of Shearer Crossing.

If the road realignment impacts any of the J.W. Sand revegetation area, then the amount of this revegetation would be increased. The area of increase would range from a 1:1 to a 3:1 ratio based on the quality of the revegetated habitat at the time of the impact. Impacts to extant southern willow scrub is typically replaced at a 3:1 ratio, therefore the revegetation will lower the significant cumulative impact to southern willow scrub and the cumulative noise impact below a level of significance.

B-4. Prior to any use or reliance on the MUP, the applicant shall enter into a Secured Agreement with the County of San Diego to ensure success of the revegetation plan.

B-5. Prior to any use or reliance on the MUP, the loss of 1.3 acres of oak woodland shall be mitigated with off-site mitigation at a ratio of 5.7:1 by dedicating a hillside south of the San Luis Rey River that supports oak woodland to open space (7.4 acres). The woodland outside the mining area (1.7 acres) but within the MUP shall also be placed in open space.

B-6. Prior to any use or reliance on the MUP, most of the chaparral at the quarry site (5.1 acres) not impacted by the mining shall be dedicated as open space.

B-7. Prior to operation of the processing facilities, riparian plantings shall be completed along the SR-76 slope bank and adjacent streambed. Revegetation shall include twelve tree and shrub species and a hydroseed mix of five species that would be planted at various elevations within the channel. The riparian planting along SR-76 will mitigate for impacts from the realignment of SR-76 to the individual riparian trees. The terms of the replacement measures shall be negotiated through consultation with CDFG and Army Corps of Engineers, and subject to a Federal 404 Permit of the Clean Water Act and, possibly, State "1601" or "1603" Streambed Alteration Agreements.

B-8. Prior to any use or reliance on the MUP, 54.6 acres of sage scrub shall be preserved both on- and off-site providing approximately a 2:1 mitigation ratio for this habitat. Approximately 29.8 acres have been identified on the project site, adjacent to the site and south of the San Luis Rey River. The yet to be identified 24.8 acres required to mitigate impacts to the California Gnatcatcher also shall mitigate potential impacts to the arroyo southwestern toad. That is, the property shall be contiguous to potential river habitat of the arroyo southwestern toad, accessible to the arroyo toad and acceptable to the United States Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). Two methods suggested by CDFG staff that may enhance connectivity between the river habitat to the yet to be identified 24.8 acre sage scrub mitigation parcel, include minor grading of riverbanks and conversion of adjacent existing agricultural land to native habitat. The property should be located in the project vicinity and shall be maintained in perpetuity as open space through a transfer fee title or conservation easement to an organization acceptable to the USFWS and CDFG.

B-9. Prior to any grading, as shown on the plot plan, a ten foot high fence topped with one foot of barbed wire shall be constructed at a 50-foot set back from the mining face. This fence is intended to serve as both a safety feature to restrict access and as a protective barrier to prevent mining activities from impacting the adjacent on-site biological and archaeological open space. The perimeter fencing shall be maintained in good repair throughout the period of operation. Final approval of the location of the mitigation area will be by the Department of Planning and Land Use, the United States Fish and Wildlife Service and California Department of Fish and Game.

B-10. As an ongoing condition of the MUP, surveys of the vegetation east of the site where vireos were sighted in 1986 (RECON 1989) shall be conducted in early March during every year of the project to determine if the vegetation could support vireos and/or flycatchers. If the vegetation is found to be of inadequate quality for the species, then truck traffic associated with the proposed project will be allowed to proceed during the spring and summer months. If survey results reveal that there is a potential for vireos and/or flycatchers to be using the site, then the following mitigation measure will apply to mitigate potential noise impacts to vireos in the area:

B-11. As an ongoing condition of the MUP, no sand or other raw materials may be trucked to the Palomar Aggregates site from the east between March 15 and September 30, inclusive. To notify project employees of the restricted truck traffic distribution, a sign shall be prepared which states that no truck trips, either importing or exporting material, shall be allowed east of the project site during the vireo and flycatcher nesting season (March 15 - September 30). This sign shall be posted annually on March 15 and shall remain posted through September 30. Verification of posting shall be provided to the County Department of Planning and Land Use (DPLU) in the form of an annual letter report to be prepared by a qualified biologist. This mitigation measure may be eliminated if the vireo and flycatcher is no longer considered an endangered species by the Federal government or annual surveys indicate no vireos or flycatchers are present.

Visual

C-1. Prior to operation, processing equipment shall be painted in earth tone colors, excluding white and orange, to further minimize the visual impact.

C-2. Prior to operation, a 30 foot high earthen berm shall be constructed and landscaped upon the relocation of SR-76, to screen views of the processing plant in accordance with the Conceptual Landscape Plan.

C-3. Prior to operation of the concrete and asphalt plants, the berm and its landscaping shall be installed. This landscape screen along SR-76 shall be in place six months before operation of the batch plants. At a minimum, the final landscape plan shall provide for the following tree container size by percentage: 24-inch box (25%), 15-gallon (25%), 5-gallon (50%). Shrub container sizes shall be according to the following proportions: 5-gallon (20%) and 1-gallon (80%). The final landscape plan shall also provide for specific performance standards to be assessed by a 5-year monitoring and maintenance program to assure that the

006822

goals of the landscape plan are met. A survival rate of 80% shall be maintained for all container stock during the life of the 5-year monitoring period. Combined vegetative cover milestones of 40% (after year one), 60% (after year three), and 100% (after year five) shall be met. Remedial measures such as replanting or modifying irrigation shall be conducted annually as necessary to meet performance standards. Monitoring and maintenance shall continue until the conditions specified at the end of year five are met.

C-4. As part of the ongoing reclamation plan, the following mitigation shall be implemented:

As the mining reaches the surface area which is to be the final reclaimed surface, the method of blasting hole placement and gradient will change. The final blasting pattern of this 33-foot high mining face shall consist of a random pattern of drill holes at variable depths and angles which would result in sculpting of irregular sloped surfaces with ledges of 2 to 12-foot wide, no greater than 66 feet long with no greater than 120 feet of vertical separation. This, in effect, will be a "sculpted' rock surface with ledges nooks and crannies designed to trap and hold soil. The ledges shall also be angled towards the rock face so that 6-12 inches of soil can be installed. The resulting mining face shall have irregularly shaped ledges at varying height locations. Soil shall be placed in the nooks and crannies and on the ledges, and hydroseeded. Wire mesh shall then be placed over the rock face and bolted down with rock bolts.

C-5. After the completion of rock sculpting and the hanging of mesh on each 240 foot horizontal section of the final face, and after a sufficient distance of 240 feet is obtained from the adjacent working area, Permeon, a non-toxic rock stain consisting of iron salts, magnesium salts and other trace elements shall be applied by a manufacturer trained professional. As well as staining without any environmental damage, the Permeon would release small amounts of nitrogen which has a fertilization effect that would enhance the growth of vegetation. The application, which is colorless when first applied, is formulated to match the variation of colors of the adjoining rock surfaces. Full colors would develop in one to two weeks, depending on the temperature and exposure to sunlight. Additional staining may be required to be modified on completed sections of the final face in both vertical and horizontal directions to assure a natural looking face. This method allows for the mining face to be in constant reclamation.

C-6. After the sculpting blast but prior to the beginning of the reclamation process, the resulting mining face shall be inspected by a design professional (i.e. landscape architect) to determine that the resulting mining face meets with the intent of this document. The design professional shall then submit a letter to DPLU, with photographs, that the mining face does meet the intent of this document. DPLU shall have final approval of the design of the resultant rock face.

C-7. As part of the ongoing reclamation, an engineering geologist and a landscape architect shall determine the project's conformance with rock sculpting and determine the project's conformance with structural safety mitigation measures as identified in the EIR after the completion of the first section of final face consisting of 240 horizontal feet by 33 vertical feet. This inspection of the final face will continue every 240 feet along the first two working benches, and after it is determined the rock sculpting program is in conformance with the EIR mitigation measures, additional inspections will occur on a random basis as determined by DPLU. If it is determined that sculpting is not in conformance with the EIR, changes will be required in the blasting and excavation design to achieve mitigation.

C-8. As part of the ongoing reclamation, an oblique aerial photograph shall be taken on an annual basis and submitted to DPLU to determine conformance with visual mitigation measures.

C-9. If after the first rainy season the hydroseeding has not germinated, a temporary irrigation system shall be installed to assist the vegetative growth on the reclaimed face. The system shall be an overhead spray and shall be attached to the wire mesh that will be draped over the rock face.

C-10. As part of the ongoing reclamation, the cut slope along the eastern project boundary shall be planted with native vegetation, including a hydroseed mixture of native plants as the mining proceeds.

C-11. Prior to obtaining any building or other permits, a final landscaping plan shall be submitted and approved and a review fee shall be submitted to the DPLU. The Landscape plan shall apply to the earthen berm and shall include the types and locations of all landscaping features, including planting and irrigation. Landscaping will include native vegetation.

C-12. At the completion of mining activities, the final reclamation shall include removal of all plant equipment and facilities, and regrading of the processing area. Then it is expected to either be filled with water at this point or a dam constructed to elevation 500 feet AMSL and then filled with water. Reclamation to reuse the site as a reservoir would further reduce the visual impacts resulting from the visibility of mined slopes from the Couser Canyon viewshed.

C-13 Prior to use or reliance of the MUP, the project proponent shall establish a permanent fund for wire mesh maintenance.

Noise

D-1. Prior to operation, screens and secondary crushers shall be fully enclosed except for the openings necessary to accommodate the conveyor belts. Also, the screens and crushing units shall have resilient materials, most likely rubber pads, installed and maintained on the impact surface areas.

D-2. Prior to operation, sound absorbing materials on the inside surfaces of the enclosures shall be installed and maintained throughout the life of the permit.

D-3. Prior to operation, the material used for enclosing the secondary crushers and screens shall have a minimum surface density of approximately 2.0 lb/ft^2.

D-4. Prior to operation, the applicant shall demonstrate that the power shovel/excavator does not exceed a maximum noise level of 75 dB at 50 feet. The applicant shall also demonstrate that the drill does not exceed 79 dB at 100 feet. Or, the cumulative noise level associated with the excavation equipment including the portable primary crusher shall not exceed a one-hour average noise level of 81 dB at 100 feet.

D-5. Prior to operation a minimum 30-foot high berm as measured from pad elevations of the asphalt and concrete batch plant shall be constructed adjacent to SR-76.

D-6. Prior to operation the permittee shall demonstrate that all moving parts on batch plant facilitates are enclosed in baghouses.

D-7. Prior to operation, the enclosures shall be designed so that the screens and cone crushers, as well as their support structures shall not contact the enclosure walls or ceilings. All wall to wall, wall to roof, wall to floor joints, and holes cut for control and power lines shall be sealed.

D-8. Prior to operation, enclosure doors shall be metal with an insulating foam core. Door frames shall have gaskets and seals to provide a tight seal.

D-9. Prior to the project being placed in operation, noise testing shall be conducted for the proposed equipment. The design noise levels shall be attained for the individual pieces of equipment as shown in Table 9 in the EIR. For excavation/drilling equipment, the individual design noise levels shall be met; or the cumulative noise level associated with the excavation equipment including the portable primary crusher shall not exceed a one-hour noise level of 81 dB L_{eq} at 100 feet.

Alternatively, it may be possible that even though an individual piece of equipment may exceed the noise design criteria, that with all of the equipment operating the cumulative on-site operation noise level would still meet the County's noise ordinance limits at the permit boundary. This would result if greater than anticipated noise attenuation is achieved due to intervening topography and structures, or other individual pieces of equipment are quieter than the design criteria. Therefore, if all the equipment is operating, and the cumulative noise level with equipment that does not meet the individual design criteria would still not exceed the County's noise standard at the permit boundary, then the nonconforming individual piece(s) of equipment would not be required to meet the specific design noise levels in Table 9 in the EIR. This must be shown to the satisfaction of the Department of Planning and Land Use.

D-10. Every three months for the first year of operation and every six-months thereafter, noise testing shall be conducted along the permit boundary to ensure design noise levels are maintained during ongoing operations. The noise testing protocol shall be conducted in accordance with the County's noise ordinance and performed by a County certified acoustical consultant. Also, this condition specifies that the 60 CNEL exterior noise level shall not be exceeded by the project as measured at any residential building site or other noise sensitive location which may be developed in the future. The results of the noise tests shall be submitted in a written report to the County Department of Planning and Land Use within one week after conducting the noise tests. If the design noise levels are not met, the quarry operator will have 60 days to correct the problem. If after 60 days, the problem has not been corrected, the quarry operator will only be allowed to operate the remaining equipment which will meet the design noise levels. The quarry operator shall fund the noise testing and County's staff time to review the results of the noise tests.

Air Quality

E-1. As a condition of operation, no blasting shall take place when wind velocity equals or exceeds 15 miles per hour. A licensed blasting contractor shall determine wind speed through the use of an anometer located a minimum of 10 feet above ground level near the on-site project office.

E-2. As a condition of operation, dust emissions from all crushing operations shall be controlled by venting to a fabric filter system.

E-3. As a condition of operation, stockpiles of sand shall be kept moist or shall be watered before reaching transfer points.

E-4. As a condition of operation, visible emissions from transfer points shall not exceed 20 percent opacity at any time. This is a statewide regulation enforced and monitored by SDAPCD.

E-5. As a condition of operation, unpaved haul roads will be chemically stabilized to minimize dust emissions to below the requirements of APCD Rule 50 (20 percent opacity). In lieu of chemical stabilization, watering of haul roads at least every two hours will be required.

E-6. Initial clearing of areas to be mined, including removal and stockpiling of topsoil, shall be accompanied by surface watering to control dust generation.

E-7. As a condition of operation, the quarry area traversed by quarry equipment shall be watered two times a day (once prior to commencing work in the morning and once at mid-day).

E-8. As a condition of operation, screens and secondary crushers would be fully enclosed except for the openings necessary to accommodate the conveyor belts.

E-9. As a condition of operation, other dust control methods, as necessary, must be applied to any dust-producing condition which may develop at the borrow pit, which would result in a nuisance from this operation (APCD Rule 51).

E-10. As a condition of operation, the transfer of cement shall be only by pneumatic conveying. There shall be no leaks of cement dust to the atmosphere anywhere within the transfer system.

E-11. As a condition of operation, the hot-mix asphalt plant shall have a fabric filter (baghouse) system.

E-12. As a condition of operation, covers for hot-oil storage tanks must be kept in place unless the tanks are being filled. The condenser system for fugitive blue-smoke emissions shall be fully operational.

E-13. As a condition of operation, the temperature of batched hot-mix asphalt shall not exceed 330° F.

E-14. As a condition of operation, loading bins shall be enclosed.

E-15. As a condition of operation, water sprays shall be used during the loading/unloading operations for aggregate and stockpile materials, if visible emissions are present.

E-16. As a condition of operation, quarry operations shall shut down when wind speed exceeds 20 miles per hour as determined by an on-site anemometer.

E-17. As a condition of operation, only unleaded gasoline and diesel fuel containing less than 0.05% sulfur shall be used in the on-site equipment.

E-18. As a condition of operation, the project shall comply with all APCD rules and regulations applicable to new quarry operations, including APCD Rule 20.2.

Hydrology/Erosion Control

F-1. Upon relocation of SR-76, riprap bank protection shall be constructed along the south side of SR-76 to the satisfaction of the Department of Public Works and Caltrans consisting of a 30 inch blanket of rip-rap with a median size of 18 inches and a 12 inch layer of gravel filter along the alignment of SR-76.

F-2. Prior to relocation of SR-76, a HEC-2 computer analysis shall be prepared for review by the County Department of Public Works. Provide the basis for appropriate flood control measures regarding flood hydraulics, erosion and sedimentation (as related to the site and adjacent properties); fill bank stabilization and installation of new riparian vegetation on the fill bank for the road. If warranted by HEC-2 analysis, an 18-inch blanket layer of riprap and a 6-inch layer of gravel filter extending from the toe of the bank about 100 feet to the river shall be constructed. If the Hec-2 study shows that the floodplain and/or floodway is located differently than as shown on the County floodplain map (Figure 77), the County and FEMA floodplain maps will be revised.

F-3. Prior to construction, a sedimentation basin capable of handling a minimum of 6.3 cfs shall be designed and constructed to the satisfaction of the San Diego County Water Authority (SDCWA), the Department of Public Works and the Regional Water Quality Control Board (RWQCB) prior to commencement of quarry operations. It shall be at least two feet in depth with an overall depth of four feet, and be lined with vinyl. Design of the sedimentation pond shall include an emergency spillway to divert drainage during heavy rainfall beneath SR 76 to the San Luis Rey River.

F-4. As a condition of operation, all runoff from the mined area shall pass through the sedimentation basin.

006827

F-5. As a condition of operation, the sediment basin shall be maintained. Once a year it shall be cleaned out and the resulting sediment recycled into the concrete and asphalt production process.

F-6. Prior to operation, a standard grease trap shall be installed at the sedimentation basin to the satisfaction of the Department of Health Services for contaminant removal.

F-7. As a condition of operation, silt material shall be cleared from the project site following each storm event.

F-8. Prior to operation, culvert pipes shall be designed and constructed underneath the access road to prevent gullies from forming.

F-9. Prior to construction, all required RWQCB permits to operate and construct shall be obtained.

Groundwater

G-1. Mitigation Measure F-3 will also mitigate any potential impacts to groundwater.

Land Use

H-1 The mitigation measures proposed for Visual/Aesthetics, Traffic/Circulation, Noise, and Air Quality impacts would provide adequate mitigation for potential land use and community character impacts.

Public Safety

I-1. As a condition of operation, the concrete-lined pond located near the northern portion of the project site shall be monitored after blasting each week for potential leakage and drained as the mining operation is advanced to within 400 feet of the pond, unless advised otherwise by the inspecting blasting engineer. Records and recommendations of such inspections shall be maintained at the mining site and a copy provided to County DPLU.

I-2. As a condition of operation, mining shall be conducted from the top down and from south to north along the face being worked. The working face shall be a maximum of approximately 33 feet in height with a minimum 66-foot-wide flat bench above it. This will result in an interim benched slope configuration as mining proceeds downward at 33-foot intervals. A Registered Engineering Geologist (REG) or Geotechnical Engineer (GE) shall map the exposed rock surface on a weekly basis. Inspection and mapping of the mining face may be more frequent as needed, depending on the field conditions. Each 33-foot vertical by 66-foot horizontal bench may only be removed following on-site inspection and in accordance with written recommendations of the REG or GE. No finished slope greater than 2:1 (horizontal to vertical) shall be established except in compliance with the recommendation of the REG or GE. The engineer or geologist shall record all inspections on a form satisfactory to DPLU and send a copy to the Codes Enforcement Division within one week of any inspection. The review of the reports associated with this condition will be considered a cost chargeable to the annual inspection deposit.

I-3. Prior to blasting of the next working bench and hanging of the wire mesh, the geotechnical engineer or engineering geologist shall decide if the final rock face is safe. If it is determined to be safe, the 33-foot freshly exposed face will be draped with anchored wire mesh prior to blasting of the next level as recommended by Cal/OSHA and Mining Safety and Health Administration. This method of preventing rockfalls has been a general practice for many years. Benching and/or rock anchors will be required where unfavorable stability conditions are encountered. The engineer or geologist shall record all inspections on a form satisfactory to DPLU and send a copy to the Code Enforcement Division within one week of any inspection. The wire mesh will be used and maintained as long as any mining activity is conducted at the base of the cut face. The applicant will be responsible for maintenance during the time the mining project is in existence. Any required subsequent maintenance would be the responsibility of the then current land user using a perpetual fund established by the applicant. If the area is used for a reservoir, as proposed, the mesh would no longer be required and could be removed as part of reclamation.

I-4. Prior to blasting, the area to be blasted shall be cleared of all personnel at a distance to be determined by the on-site licensed blasting contractor. This requirement shall be included on the mining and blasting plan. A copy of the plan shall be kept at the mining site and a copy shall be provided to County DPLU.

I-5. Prior to operation, all the loose rock ("floaters") facing the realigned portion of SR-76 shall be removed or tied down. Although the potential for blasting to induce rockfall along the highway is not anticipated provided blasting is properly executed, removal or tie-down of the floaters above SR-76 prior to blasting within 200 feet would further reduce the risk of rockfall from blasting.

I-6. Prior to operation, standard roadside warning signs indicating potential rockfall area to the approaching motorist shall be installed. The project civil engineer for the Highway 76 realignment shall incorporate these public safety measures on a plan to be submitted for review and recommendation by the County Department of Public Works; and for approval by Caltrans.

I-7. Prior to implementation of the water reservoir reclamation plan, a qualified geotechnical engineer shall determine the seepage effect and the stability of the earthen dam which may be required to retain the ponding in the south-eastern part of the mined area. Conclusions and recommendations shall be provided in a report to be submitted to the County of San Diego Department of Planning and Land Use

I-8. Prior to implementation of the alternative reclamation plan (i.e. agricultural use) the site shall be inspected by a qualified geologist/geotechnical engineer who shall determine the need for setbacks from the exposed mining face, the need for a soil berm or precast concrete barriers, and for permanent maintenance of the installed wire mesh to ensure the safety of structures and employees from seismically induced rockfall. Setbacks and berms/barriers shall be erected as per the geologist's or geotechnical engineer's recommendations prior to use of the agricultural facilities.

I-9. Construction of a ten foot high fence with one foot of barbed wire around the MUP site as described in the mitigation section of Biological Resources will also serve as a Public Safety mitigation measure by restricting access into the mining area.

I-10. Prior to operation, the applicant shall obtain a blasting permit and comply with all conditions contained within San Diego County Ordinance No.7821 relating to blasting operations as well as those of the California Uniform Fire Code.

Dark Skies

J-1. For the life of the project, all outdoor lighting will consist of LPS lamps and will be fully shielded (as defined by the County Light Pollution Code) to prevent any direct upward illumination.

J-2. Prior to operation the applicant shall demonstrate that the intensity of the lights, as well as the number necessary for safety purposes, shall be kept to a minimum.

J-3. As a condition of operation, outdoor lights other than those necessary for security will be turned off by 10:00 p.m.

COMMENTS AND RESPONSES

006831